

# Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents—Payment Reform

Fourth Annual Report, Appendices  
March 2021



## Prepared for

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RTI Project No. 0214448.001.005.000.005  
CMS Contract No. 500-2014-000371

# EVALUATION OF THE INITIATIVE TO REDUCE AVOIDABLE HOSPITALIZATIONS AMONG NURSING FACILITY RESIDENTS—PAYMENT REFORM

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March 2021

This project was funded by the Centers for Medicare & Medicaid Services under contract no. 500-2014-000371. The statements contained in this report are solely those of the authors and do not necessarily reflect the views or policies of the Centers for Medicare & Medicaid Services. RTI assumes responsibility for the accuracy and completeness of the information contained in this report.

## **ACKNOWLEDGMENTS**

The authors gratefully acknowledge the support and contributions of the following individuals. David Grabowski, from Harvard Medical School, contributed to the quantitative evaluation design. Mary D. Naylor, from the University of Pennsylvania, and Debra Saliba from the RAND Corporation, provided expert inputs into the practitioner survey design, protocols for primary data collection activities, and feedback on the 2019 NFI 2 revisions to the criteria for the six qualifying conditions. Susan R. Mitchell and Roberta Constantine assisted in updating the ICD-9 and ICD-10 codes for potentially avoidable hospitalization conditions, with clinical input and decisional support from Christopher Beadles. John Robst assisted in providing a high-level review of content and report structure. Michelle Back and Nathan Yates helped with editing, Debbie Bond, Roxanne Snaauw, Sarah Barringer and Michelle Bogus with document preparation, and Vivien Arnold and Shari Lambert with graphic design.

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## APPENDIX A

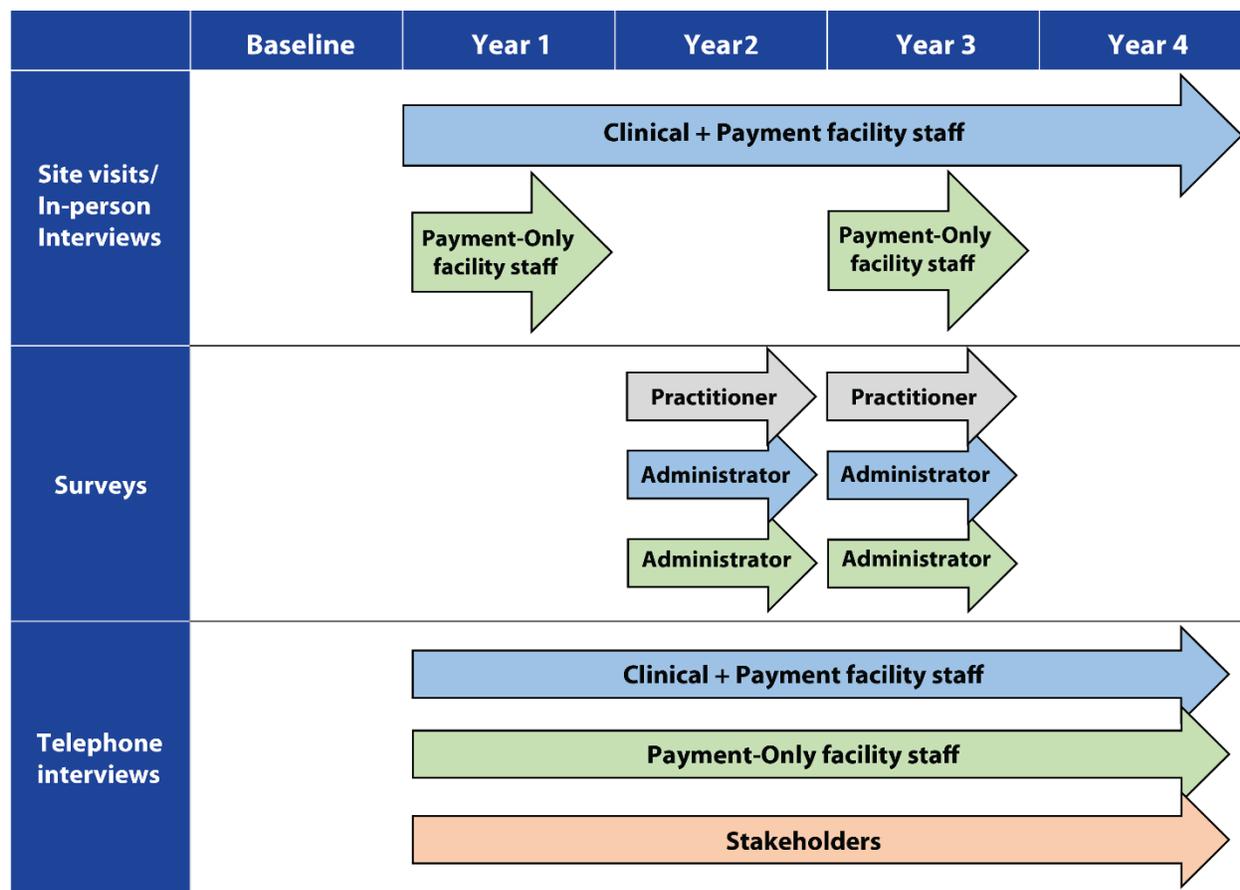
### PRIMARY DATA COLLECTION METHODS AND ANALYSES

#### A.1 Overview

*Appendix A* describes primary data collection methods and activities undertaken by RTI during NFI 2. RTI conducted a series of site visits to each Enhanced Care and Coordination Provider (ECCP) and a selection of their partnering facilities, both those facilities in the Clinical + Payment group and facilities in the Payment-Only group. When appropriate, findings from NFI 1 informed aspects of NFI 2 primary data collection, particularly related to Clinical + Payment facilities. We also conducted annual telephone interviews with participating facilities; a biennial survey of nursing facility administrators in all participating facilities; a biennial survey of all participating practitioners (physicians, advanced practice registered nurses [APRNs], and physician assistants [PAs]); and a series of telephone interviews with key stakeholders from each of the participating ECCP states.

All primary data collection efforts—site visits, telephone interviews, and surveys—complemented each other. Analyses of the data collected during ECCP and participating facility site visits and telephone interviews provided a better understanding of how the NFI 2 payment model was implemented, how it worked in practice, and how NFI 1 clinical and educational interventions in participating facilities were evolving when combined with the NFI 2 payment model. Survey data provided standardized information about participating practitioners' buy-in and operational issues related to the payment model implementation—neither of which could be gleaned from the quantitative data analyses. The survey also provided quantifiable information on the payment model implementation in participating nursing facilities. Further supplementing other qualitative and quantitative data analysis findings, we conducted key stakeholder interviews to understand recent NFI 2-related activities underway in the states involved in NFI 2. Stakeholder and state policymaker interviews provided a greater understanding of the effect on potentially avoidable hospitalizations resulting from other state activities, state and federal reforms, and changes to usual care practices. These interviews also served to expand our understanding of the context within which NFI 2 is taking place, providing guidance toward mitigating potential problems when considering scaling up the model in the real-world context. Together, these critical analyses describe the environment in which this new payment model is being implemented and help explain how and why it may be implemented differently across ECCPs and between Clinical + Payment and Payment-Only facilities. *Figure A-1* is a flowchart of our NFI 2 primary data collection activities.

**Figure A-1. Primary data collection flowchart**



NOTES: Clinical + Payment = clinical and educational intervention and payment model facilities; Payment-Only = payment model facilities only; Practitioners = physicians, advanced practice registered nurses (e.g., nurse practitioners), and physician assistants participating in both Clinical + Payment and Payment-Only facilities. Stakeholders = state administrators and policymakers interviewed about state policy and environmental changes. RTI conducted interviews with Clinical +Payment facilities as part of the NFI 1 evaluation. Some of these interviews occurred during the baseline period.

## **A.2 Facility Site Visit and Telephone Interview Task Overview**

Site visits and telephone interviews served as a means of collecting qualitative data to monitor and evaluate NFI 2 implementation and outcomes for Clinical + Payment and Payment-Only facilities. RTI sought to understand the context in which each ECCP delivers NFI 2 efforts toward improving resident health outcomes and reducing overall health care spending. In addition, NFI 2 site visits and telephone interviews explored the billing processes and financial components for the NFI 2 payment model for facilities and practitioners, while also exploring how the financial components affect care practices. We also focused on learning how the specific six qualifying conditions may affect care management and related practices in the participating facilities.

To understand the variation in NFI 2 implementation experiences across facilities, RTI conducted a series of staggered site visits to a selection of both Clinical + Payment and Payment-Only facilities, supplemented by telephone interviews to the facilities that were not visited in person. Because implementation of the NFI 2 payment model alone does not involve all staff levels and is not as all-

encompassing as the clinical/educational interventions in NFI 1, we conducted only two rounds of site visits to Payment-Only facilities. This reduced burden on both ECCPs and facilities by limiting the number of in-person visits RTI conducts.

For NFI 2, RTI tried to visit some Clinical + Payment facilities that exhibited best practices or experienced particular challenges in NFI 1, as well as facilities that may not have been visited during NFI 1, were not interviewed by phone, or that have particular features of interest (e.g., ownership type, location, bed size, or five-star rating). We provided Centers for Medicare & Medicaid Services (CMS) with a list of facilities selected for site visits, and we also tried to align our site visit timing and facility selection with the implementation contractor's efforts to minimize burden on ECCPs and participating facilities.

As shown in **Figure A-1**, in Initiative Years 1 and 3 of implementation, RTI conducted site visits to the Payment-Only facilities. The first set of Payment-Only site visits focused on implementation, and the second set of site visits concentrated on financial outcomes, operational issues, leadership buy-in, successes, and challenges of the payment model. For each ECCP, we visited three to five Payment-Only facilities each in Initiative Years 1 and 3; we conducted additional telephone interviews with Payment-Only facilities in all four data collection years. During Initiative Year 2 we did not visit Payment-Only facilities in person. Instead, we aimed to complete telephone interviews with key staff in at least half of the Payment-Only facilities. For Initiative Year 4, we planned to visit mostly Clinical + Payment and a few Payment-Only facilities.

A team of three RTI staff conducted each site visit, consisting of a senior state evaluation team lead with NFI 1 site visit leadership experience and two supporting staff members. This team structure allowed RTI to capture detailed notes to inform later analyses, while generating assessments of engagement and other key domains. Site visits typically lasted between 4 and 5 days and included two separate data collection activities: (1) *ECCP component*—a visit to the ECCP headquarters and interviews with key ECCP leadership and other staff, and (2) *facility component*—a visit to participating facilities to interview facility staff and, in Clinical + Payment facilities, the ECCP nurse.

### **A.2.1 ECCP Component**

RTI conducted interviews with most key staff in each ECCP, including facility-based ECCP staff in each facility we visited. The interview length depended on the type of staff and the availability of the interviewees; some interviews took 1 hour, while others only required 5 or 10 minutes. Data collection included information on model design changes related to payment-component introduction; implementation timetable and experience; provider training and support; ECCP staffing changes; data collection; and detailed descriptions of the clinical interventions and how they were adapted for NFI 2. We interviewed ECCP leadership regarding any new supports or barriers that have emerged; changes in leadership structure or program model; communication pathways that have developed between ECCP staff and/or facility staff; internal and external data exchanges; and infrastructure modifications for data collection and project implementation. We

were also interested in learning about efforts to improve communication with providers through NFI 2, particularly in the context of the NFI 2 six qualifying conditions.

During the ECCP interviews we also gathered information regarding perceived barriers to implementation arising from state, local, commercial, or corporate policies or regulations; changes to other entities such as Medicare managed care plan penetration or local hospital changes; and any new challenges to accepting new practices (e.g., liability or family concerns). Other topics included data collection processes, billing- and claims-related concerns, unintended consequences of the project and related spillover effects (positive and negative), lessons learned, sustainability efforts, and, if applicable, reasons for facilities withdrawing from the Initiative. When possible, we also interviewed ECCP partners, subcontractors, or on-site stakeholders.

### **A.2.2 Nursing Facility Clinical + Payment and Payment-Only Components**

As described, for each ECCP, RTI visited three to five Clinical + Payment facilities annually and three to five Payment-Only facilities in each ECCP biennially. Across all years, RTI completed telephone interviews with Clinical + Payment and Payment-Only facilities not visited in person until saturation was reached (i.e., approximately 50 percent of participating facilities). Selecting facilities depended on several factors, including successes or challenges during NFI 1 (Clinical + Payment only), facility size, profit status, rural or urban location, five-star ratings, location, NFI 2 claims submission volume, resident demographics, and other factors that may arise through data collection (e.g., stakeholder interviews or survey results).

At each Clinical + Payment facility, the site visit team conducted multiple interviews, ranging in length from 5 to 60 minutes by facility role, depending on interviewee type. The types of data collected included information on identification and treatment of the six qualifying conditions; billing process and related documentation; adjustments to model design; any changes to the clinical interventions that may have taken place; data on care transition activities; changes in policies/procedures required at the facility level; training; relationship with ECCP staff, as well as overall project successes, challenges, sustainability efforts, and lessons learned.

For Payment-Only facilities, the team conducted multiple interviews of similar length, but the focus was more on identification and treatment of the six qualifying conditions and the new billing processes in NFI 2. We were also interested in learning what kinds of processes and capabilities Payment-Only facilities had implemented to prepare for and maintain NFI 2.

Interviewees from both Clinical + Payment and Payment-Only facilities included nursing facility administrators (NFAs), directors of nursing (DONs), medical directors, primary care providers (PCPs) of record, APRNs, as well as business office staff, MDS (Minimum Data Set) coordinators, and other relevant staff members involved with billing processes. RTI teams also talked to residents and families when appropriate. Special care was given to reaching practitioners, because they provide integral feedback regarding the payment processes and treatment of residents who have the six qualifying conditions. **Table A-1** presents types of staff interviewed by RTI in Initiative Year 3.

**Table A-1. Types of staff interviewed across all facilities for Initiative Year 3 site visits**

Facilities and staff	Clinical + Payment	Payment-Only
Number of facilities participating	138	105
Number of site visit facilities	24	24
Total staff interviewed	152	113
NFAs	21	22
DONs	22	19
ADONs	6	7
Medical directors	6	8
ECCP APRNs/RNs/QISs	23	0
Non-ECCP APRNs	5	9
Facility nurses	13	14
MDS nurses/RNACs	14	6
Billing/finance coordinators	20	16
Staff educators	4	4
Other	18	8

ADON = assistant director of nursing; APRN = advanced practice registered nurse; DON = director of nursing; MDS = Minimum Data Set; NFA = nursing facility administrator; RN = registered nurse; RNAC = registered nurse assessment coordinator.

NOTES: Telephone interviews were conducted between March and June 2019, and site visits were conducted between June and November 2019. “Other” staff included individuals said by the facility lead to be integral to the success of NFI 2; examples include building social workers, practitioners who are not medical directors, or representatives from corporate offices.

RTI worked with ECCPs and facilities to determine the best time to reach practitioners, as we know from experience that medical directors, attending physicians, and other practitioners have varied schedules. We coordinated timing that works best for these interviewees to minimize burden for facilities. This meant that we might conduct interviews at unusual times of day (e.g., early morning), whenever the timing worked best for facilities and practitioners. These interviews were important to understand practitioners’ perspectives, and likewise, it was important for RTI to be flexible in obtaining the interviews to achieve high response rates.

For facilities not visited in person, we conducted interviews by telephone with several Clinical + Payment and Payment-Only facilities across ECCPs until we reached saturation. For each facility telephone interview, we spoke with one or more staff members concurrently who were the most knowledgeable about the Initiative, such as a DON, NFA, or business office manager. At their discretion, ECCP evaluation leads may have decided to conduct a second interview with additional staff, such as ECCP facility-based staff in Clinical + Payment facilities.

Through NFI 1, facility attrition was minimal. However, for facilities that left the Initiative, understanding the reasons for withdrawal remains very important for our evaluation. For NFI 1, we developed a protocol for open-ended telephone interviews with facilities that withdrew from

the initiative. This protocol was modified for facilities that have left the Initiative during NFI 2. All exit interviews were limited to 15 minutes in length and were conducted as close to the time of facility withdrawal as possible. As of this report, fewer than 10 exit interviews have been conducted since the start of NFI 2.

All interviews conducted for NFI 2 were tracked in our existing Access database, which already contained contact information for all ECCPs and facilities that participated in NFI 1. This database also documented the response status on all NFI 1 and NFI 2 primary data collection activities for all participating facilities (Clinical + Payment); we implemented a similar system to track NFI 2 survey and interview response status throughout all years of the NFI 2 primary data collection.

### **A.2.3 Sharing Collaborative**

CMS and its implementation contractor, SSS-T, led activities in the Sharing Collaborative with all the ECCPs to share progress toward the Initiative's goals. During the Sharing Collaborative telephone meetings, ECCP staff discussed issues of common concern, including their successes, lessons learned, barriers encountered, and other findings that may be of interest to other ECCPs. RTI participated in these calls as a component of our evaluation.

RTI observed and monitored Sharing Collaborative activities, in addition to analyzing the results of data collected during site visits and telephone interviews, which included questions about the Sharing Collaborative's impact and value. Specifically, our interview protocols included a series of questions to assess the impact of the Sharing Collaborative activities on ECCP's NFI 2 implementation efforts. For example, we aimed to learn whether ECCPs reported a change in practice, based on information obtained via Sharing Collaborative activities and the level of support the ECCPs receive in participating in these activities. Through 2019 these Sharing Collaborative activities largely were not happening.

### **A.2.4 Protocol Development**

RTI built on our existing NFI 1 interview protocol to develop three separate protocols (ECCP leadership, Payment-Only, and Clinical + Payment) for the NFI 2 activities, developing new process- and payment-related questions. We worked closely with CMS to finalize protocols and related materials annually, prior to conducting site visits and telephone interviews (e.g., recruitment materials or consent letters), as protocols are reviewed and tweaked slightly for each new Initiative year to reflect new developments or changes. Per CMS guidance to pilot-test our interview protocols, we conducted nursing facility telephone interviews in every ECCP prior to conducting site visits.

Our interview protocols in NFI 2 explored the role of the new payment component. Previous questions were concerned with implementation of the Initiative, relationship with the ECCP, processes for reducing avoidable hospitalizations, staff response to the Initiative, successes and challenges faced, and sustainability. Many of these issues were still present and tracked. New questions for NFI 2 focused on the following:

- Payment-Only facility screening and recruitment
- Readiness assessments for NFI 2
- Types of support provided by ECCPs to assist in implementation
- Establishment of new participation agreements between Payment-Only facilities and ECCPs
- Prior efforts to reduce avoidable hospitalizations
- Variation in work plans
- Screening and selection of practitioners
- Training of facility staff and practitioners
- Changes in facility practices related to the six qualifying conditions
- Billing and documentation processes
- Technical assistance on payment processes throughout the project
- Sustainability of Initiative goals and plans for the future.

Other questions covered ongoing participation in Learning Community events and processes for reporting key data to CMS and its contractors. Per CMS request, RTI also asked about any resident disenrollment from Medicare Advantage plans to participate in NFI 2 and any shifting of fee-for-service (FFS) residents to institutional special needs plans (I-SNPs) or other managed care. We asked about managed care attrition rates and for interviewees' opinions as to the motives toward switching between NFI 2 and managed care.

RTI submitted protocol drafts to CMS 2 months prior to the first telephone interview. We revised the protocols and interview guides according to the feedback we received and submitted the final version to CMS 2 weeks prior to the telephone interviews. We anticipated minor revisions to the protocols over time, based on any changes observed in the field; any revisions were discussed with CMS prior to conducting further interviews or site visits.

#### **A.2.5 Analyzing Site Visit and Telephone Interview Data**

RTI used several strategies to organize and synthesize the large volume of qualitative data that were generated by this effort. RTI implemented rigorous procedures for standardized note-taking and analyses during NFI 1, and we revised our current NFI 1 high-level codebook to capture key study domains in NFI 2. RTI used NVivo software to analyze primary data in NFI 1, and the coding process has remained the same across years to facilitate longitudinal comparisons. For NFI 2, we built upon this existing codebook so that we can look back at how the Initiative has developed across years and across ECCPs. RTI also added new codes to target billing and documentation, implementation costs, effects of the six qualifying conditions on facility practice, and practitioner participation. It is important to note that we used only high-level NVivo codes to maximize efficiency. A modified content analysis approach was used to analyze the interview data, with codes or labels attached to portions of the interview notes. Although some labels emerged directly from the content of the interviews, others represent a priori categories reflecting the project aims.

In this way, both unanticipated findings and anticipated areas of interest were captured during the coding process. For detailed reports by ECCP, please see **Appendices B–G**.

### **A.3 Key Stakeholder Telephone Interviews**

Another component of NFI 2 primary data collection was a series of interviews with key state administrators and other stakeholders to examine overlaps in potentially competing or complementary initiatives in the NFI 2 ECCP states (i.e., in addition to information from the CMS Master Data Management system [MDM]), as well as policy environment context for NFI 2. Multiple federal and state initiatives for reforming health care delivery and financing included the Partnership for Patients, Accountable Care Organizations (ACOs), State Innovation Models (SIM), the Financial Alignment Initiative, and Round Two of Health Care Innovation Awards. For example, our NFI 1 site visit findings from New York indicated that several competing initiatives, such as the Delivery System Reform Incentive Payment program and the state’s demonstration under the Financial Alignment Initiative, focused on reducing hospitalizations.

RTI relied on existing ECCP contacts and stakeholder networks for preliminary recruitment, and we used a snowball approach to recruit additional responses (i.e., asking interviewees to recommend other potential interviewees). We developed one general interview guide in conjunction with our consultants, which was adapted to the needs of each state. We worked closely with CMS to finalize protocols and any related materials prior to conducting the stakeholder interviews. For a summary of stakeholder interviews, please see **Appendix J**.

### **A.4 Survey Task Overview**

RTI conducted two web-based surveys as part of NFI 2 primary data collection activities: the NFA Survey and the Practitioner Survey. RTI administered both surveys in Initiative Years 2 and 3. Surveys provided standardized information from respondents in both Clinical + Payment and Payment-Only facilities. The core items in both surveys focused on the financial aspect of NFI 2, including how facilities and practitioners are paid, challenges related to billing, as well as attitudes toward the billing codes. The NFA Survey included more specific items on facility-related barriers to implementation and facility policies/procedures. The Practitioner Survey also included items on practitioner-specific barriers to billing as well as more clinically focused items, such as confidence in clinical staff.

Overall, the goal of these web-based surveys was to obtain consistent information from participating facilities’ administrators and practitioners about the impact of the Initiative. The survey instrument was carefully designed to complement information captured from other primary data collection activities, all of which informed the quantitative data analysis. Based on the successes of the NFI 1 survey, RTI continued web-based data collection to ensure easy access of the survey by respondents and a high response rate. RTI worked closely with CMS to finalize the survey instrument and was responsible for all data collection and analysis. RTI also identified and communicated any issues affecting sample frame design or data collection with the CMS, or through meetings as needed.

#### **A.4.1 Instrument Development**

RTI designed all survey instruments for the specific needs of this evaluation. Instrument development primarily focused on evaluating engagement with the NFI 2 billing process and factors that could affect this engagement from the perspective of NFAs and practitioners. Although the instrument development process was similar for both surveys, we solicited additional feedback from clinical experts when designing the Practitioner Survey, given the general challenges of obtaining responses from practitioners. For both surveys, we also prioritized designing a concise instrument as possible to minimize respondent burden. We purposefully limited the overall length of the instrument and the number of questions, incorporating gate questions in the survey design to allow respondents to skip over inapplicable follow-up questions

Survey instrument design began with a review of relevant surveys, including prior NFI 1 NFA Surveys, and existing surveys of providers for the Practitioner Survey. We then narrowed the focus to domains most relevant for NFI 2, in consultation with input from the primary data collection teams who had gone on site visits and conducted phone interviews. We obtained substantial internal review of the survey instruments among our team members and RTI researchers with expertise in long-term care settings, health policy, and survey methods.

For the Practitioner Survey, RTI solicited additional feedback from consultants who had a similar background to potential respondents (i.e., a physician and APRN). RTI also consulted with CMS to obtain feedback on the survey domains. Furthermore, we conducted cognitive testing of the Practitioner Survey by interviewing medical directors and participating practitioners from the majority of ECCPs. These practitioners provided information on the survey design, user testing, as well as guidance regarding item content and framing. This feedback helped reduce measurement error by ensuring the specific wording used in survey items matched the question intent. Testing also ensured that the format of the web survey was familiar and easy to use for practitioners, helping to improve response rate.

A major priority in developing the survey instruments was to minimize respondent burden. For instance, both surveys consisted primarily of close-ended questions with a very limited number of open-ended responses. The minimal use of open-ended items reduced response time and facilitated analysis across practitioners and facilities. Based on feedback from cognitive testing, we also emphasized having extremely concise surveys. Both surveys had an estimated completion time of less than 10 minutes. Furthermore, we tested the surveys on both mobile devices and tablets to ensure they were accessible and well-designed, an especially important consideration for practitioners. Finally, to facilitate the recall of respondents who were initially invited to complete the survey in March and April of 2019, the time frame used for the survey referred to the prior calendar year, 2018. Since there are two waves of this survey, the survey instruments were slightly revised to address issues and newly relevant domains between waves. For example, the second wave included items about recommended changes to the Initiative if it were implemented nationally. The majority of items and domains remained constant between the two waves to track changes over time.

In addition to the survey content and domain, draft versions of both survey instruments were submitted to CMS 2 months prior to the deployment of the survey. Final materials were submitted to the COR 2 weeks prior to data collection and incorporate any feedback received. Web versions of the survey were also shared with the COR prior to deployment.

#### **A.4.2 Survey Frame Development**

As in NFI 1, RTI received a complete sampling frame of NFAs from the ECCPs for the Clinical + Payment and Payment-Only facilities, consisting of, at a minimum, the names, e-mail addresses, and facility affiliations of potential respondents.

The sampling frame development process for the Practitioner Survey was more complex and included several steps outlined below. Because participating practitioners could be affiliated with multiple facilities, RTI's sample design for Initiative Year 2 allowed practitioners to complete separate surveys related to different facilities. RTI used two main files from CMS to design the initial practitioner sample frame: (1) list of participating practitioners from a monthly roster file from CMS, and (2) file of approved practitioners, including their contact information at the time of initial approval, which also had facility affiliation information. We were then able to link contact e-mails/phone numbers with the current list of practitioners at the practitioner-facility level.

We then excluded practitioners whose approval period did not overlap with the period of the survey for Initiative Year 2, 2017, as well as those affiliated with facilities that were not participating in NFI 2. We followed up with CMS to obtain further clarification as needed regarding the file contents and accurate linking information for practitioners. Although most reminder e-mails were able to be automated, reaching out to practitioners affiliated with three or more facilities necessitated a more manual follow-up. To minimize the number of affiliated facilities for a given practitioner, we reviewed the case loads of practitioners affiliated with at least three facilities and removed the affiliations that represented less than 10 percent of a practitioner's total case load. Finally, we obtained contact information for practitioners directly from the ECCPs as a final update to our data files.

During data collection, RTI followed up by phone and e-mail to obtain updated contact information for any NFA and practitioner e-mail address that bounced back. This information was used to correct the sampling frame. In addition, RTI received communication via phone and e-mail during survey follow-up from practitioners and their affiliated facilities and medical groups regarding updates to the practitioners' participation status or current affiliation. Thus, aside from removing e-mail addresses that were designated as noncontact (e.g., bouncing back or other server errors), our sample frame also decreased after removing ineligible practitioners who were no longer participating or affiliated with a specific facility.

For Initiative Year 3, we decided to build on the sampling frame created in the prior year. For both NFAs and practitioners, we used information shared by the ECCPs to update contact information. We excluded practitioners who were no longer approved or affiliated with participating facilities in 2018 and added those who had newly joined in 2018. To simplify the sampling frame and response

rate determination, we also limited practitioners to one affiliated facility. We continued to update contact information and eligibility based on communications received during data collection and follow-up.

### **A.4.3 Survey Administration**

RTI was responsible for the full survey life cycle, including working with CMS to develop the instruments, programming the instruments into web applications, running the data collection effort, and performing all data processing and editing of survey data.

Prior to the start of data collection, to increase awareness among potential respondents, RTI communicated with ECCPs regarding the timing of the NFA and Practitioner Surveys. For Initiative Year 2, data collection largely occurred from January–February of 2018 for both surveys, continuing into early March. Potential respondents received hyperlinked e-mail invitations to complete the web-based surveys, removing the need for them to log in and use passwords. For Initiative Year 3, RTI collected data from the NFA Survey in January–February of 2019, and from the Practitioner Survey in March–April of 2019.

Surveys were administered in conjunction with RTI partners in the Survey Research Division and the Research Computing Division using a web-based application called Voxco, which provided the necessary flexibility for data collection but also offers data encryption to ensure data security. Respondents were also provided with a toll-free telephone number and e-mail contact information for any technical or content-related questions. For our case management, we used RTI’s Nirvana/Symphony system to keep track of the response status of NFAs and practitioners, and to send initial and follow-up e-mail reminders. Reminder e-mails were initially sent on a biweekly basis, increasing the frequency closer to survey due dates.

For Initiative Year 3, we used a combination of reminder e-mails and telephone calls to follow up with NFAs and practitioners. For NFAs, project staff conducted all follow-up communication. For practitioners, we partnered with RTI’s Research Operations Center, who have call center employees with experience contacting physicians and medical staff, for all follow-up telephone communication. We utilized a computer-assisted telephone interviewing protocol that simulated the data collection process from prior years, with an added design complexity that automated scenarios where potential respondents had identical phone numbers (e.g., practitioners from the same medical practice). This approach allowed us to improve our determination of participant eligibility, increase our level of communication with nonrespondent practitioners, and employ a more efficient calling methodology.

**Table A-2** presents the overall response rates for the NFA and Practitioner Surveys, using American Association for Public Opinion Research (AAPOR) response rate definition #6, which includes

partial responses in the numerator and excludes undelivered e-mails from the denominator.<sup>1</sup> We counted a survey as a partial response if the first substantive question about billing status was answered.

**Table A-2. Survey response rates for Initiative Year 3**

Respondent group	NFA		Practitioner	
	N	Response rate (%)	N	Response rate (%)
All ECCPs combined	246	88.6	547	44.2
By ECCP				
AQAF	40	97.5	83	51.8
ATOP2	34	76.5	58	29.3
MOQI	40	90.0	71	39.4
NY-RAH	57	94.7	178	44.4
OPTIMISTIC	40	85.0	76	50.0
RAVEN	35	82.9	81	45.7
By intervention group				
Clinical + Payment	108	86.0	276	42.4
Payment-Only	141	90.6	271	46.1

SOURCE: RTI analysis of Nursing Facility Administrator and Practitioner Surveys (RTI program JW04).

Given the complex design of the sample frame for the Practitioner Survey, we also used another metric to evaluate the representativeness of the practitioner responses, beyond the practitioner-level response rate. The 547 unique practitioners were affiliated with a total of 214 unique facilities. The percentage of facilities with at least one eligible practitioner, where at least one practitioner responded, was 70.6 percent. This means that while over 40 percent of contacted practitioners responded to the survey, these surveys represent the practitioners’ experiences for over two-thirds of participating facilities.

#### **A.4.4 Analysis of Survey Data**

RTI presents the analysis of survey responses in **Appendix K** and has incorporated the survey findings into **Section 2** of this year’s annual report. We will continue to analyze the survey data and incorporate findings into the project’s mid-year and annual reports for Initiative Year 4, along with the Final Report.

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<sup>1</sup> American Association for Public Opinion Research. Standard Definitions, various dates. Available at [https://www.aapor.org/Standards-Ethics/Standard-Definitions-\(1\).aspx](https://www.aapor.org/Standards-Ethics/Standard-Definitions-(1).aspx)

This year’s report includes full survey responses in aggregate for the NFA and Practitioner Surveys, as well as stratified responses by Clinical + Payment and Payment-Only intervention groups. **Section 2** reports the aggregated findings, highlighting notable differences where a particular respondent group’s findings may depart from the overall results. In the future, RTI plans to analyze results longitudinally to examine changes over time and to evaluate the progress and impact of the Initiative. RTI may be able to further investigate whether different facility-level factors are related to engagement and billing.

### A.5 Primary Data Collection Schedule in Initiative Year 3

Site visits to all six ECCPs were completed in the summer and early fall of Initiative Year 3.

**Table A-3** provides the data collection timeline of site visits in Initiative Year 3.

**Table A-3. RTI site visit schedule for Initiative Year 3**

ECCP	State	Facility	Site visit dates
AQAF	Alabama	Clinical + Payment and Payment-Only	July 8–17, 2019
ATOP2	Nevada/Colorado	Clinical + Payment and Payment-Only	June 17–26, 2019
MOQI	Missouri	Clinical + Payment and Payment-Only	September 23–October 3, 2019
NY-RAH	New York	Clinical + Payment and Payment-Only	September 16–19, 2019 October 21–24, 2019
OPTIMISTIC	Indiana	Clinical + Payment and Payment-Only	August 5–9, 2019 September 16–20, 2019
RAVEN	Pennsylvania	Clinical + Payment and Payment-Only	October 21–24, 2019 November 4–6, 2019

In addition, we administered the web-based NFA Survey to all facilities and the web-based Practitioner Survey to all participating practitioners. Both surveys were deployed on January 25, 2018, and data collection ended on March 2, 2018. RTI also conducted a series of interviews with key state administrators and other stakeholders between August 1, 2017, and March 1, 2018.

## APPENDIX B

### ALABAMA QUALITY ASSURANCE FOUNDATION (AQAF)

#### B.1 Overview

##### *2019 AQAF Site Visit and Telephone Interview Findings*

- The 2018 AQAF model change from education-only to adding a clinical assessment component continued to be challenging Clinical + Payment facilities; facility interviewees provided mixed feedback on the new role of the embedded AQAF nurses and uncertainty about their ability to deliver clinical care onsite.
- Because of the model change, reported fatigue with the Initiative, and perceived insufficient incentives, staff engagement seemed lower than in prior years for Clinical + Payment and Payment-Only facilities, as well as for practitioners.
- Although nearly all Clinical + Payment and Payment-Only facility interviewees described reductions in avoidable hospitalizations among residents, they were unsure whether the reductions were attributable solely to NFI 2, particularly given that several facilities reported limited or no billing for NFI 2. Many practitioners also reported billing infrequently.
- Medicare managed care continued expanding statewide, reducing the population of eligible NFI 2 residents and creating confusion for facility staff in determining care for residents with various insurance coverage or NFI 2 eligibility.
- Interviewees anticipated that continued use of INTERACT tools, improved facility staff communication practices, and increased attention to the six qualifying conditions likely would be sustained beyond NFI 2.

In Initiative Year 3 (2019), AQAF continued implementing the revised version of their model that was introduced in 2018. This new model included a hands-on resident assessment component and was introduced in response to AQAF's receipt of a Centers for Medicare & Medicaid Services (CMS) Programmatic Assistance Letter (PAL) in early 2018. Given that AQAF could not require facilities to implement the Initiative in a consistent manner, the actual revised model implementation differed substantially across participating facilities. Our findings indicated that facility NFI 2 engagement depends on whether facility leadership and practitioners find sufficient value in the incentive payments, and as of Initiative Year 3, only some facilities reported widespread engagement and resultant billing. Interviewees in Clinical + Payment facilities described variation in the hands-on resident care component provided by AQAF embedded nurses, referred to as Delta Nurses. For example, not all facilities allowed the AQAF Delta Nurses to provide hands-on care or resident assessment, mostly because of liability concerns. Although Payment-Only facilities were not directly affected by the model changes, many interviewees reported varied support from AQAF amid the model transition. In addition to model changes, facility and ECCP interviewees also attributed the diversity of NFI 2 engagement across facilities to differences in facility, physician, administration, and staff engagement, as well as corporate

support. Variability in clinical staff turnover, education, and training also contributed to the range of NFI 2 engagement. **Table B-1** shows the number of facilities participating as of July 2019, the number of facility ownership changes since the 2018 site visit, and the number of facilities withdrawn or removed from the Initiative since the 2018 site visit.

**Table B-1. 2019 data collection summary**

Number of facilities participating as of site visit date (July 9, 2019)	40
Number of facility ownership changes since 2018 site visit	0
Number of facilities withdrawn or removed from Initiative since 2018 site visit	1

All data described in this report were collected in calendar year 2019. The RTI team completed in-person interviews with AQAF leadership on July 9, 2019. RTI also interviewed nursing facility administrators (NFAs), directors of nursing (DONs), assistant directors of nursing (ADONs), charge nurses, medical directors, facility advanced practice registered nurses (APRNs), AQAF nurses, billing coordinators, and other key staff in four Clinical + Payment facilities and four Payment-Only facilities in person between July 9, 2019, and July 17, 2019. These visits followed April through May 2019 telephone interviews with NFAs, DONs, and other key staff in 14 Clinical + Payment facilities and 15 Payment-Only facilities. **Table B-2** shows the site visit and telephone interview summary findings for facility staff buy-in and implementation.

**Table B-2. Site visit and phone interview summary findings: 2019 facility staff buy-in and implementation**

Facility staff buy-in and implementation	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone or in person)	37	18	19
Interviewer perception of buy-in to NFI 2			
High	13	6	7
Medium	12	8	4
Low	12	4	8
Number of facilities that hired new staff in 2019 because of NFI 2	1	0	1
Number of facilities with resident opt-outs in 2019	1	1	0
Number of facilities reporting that NFI 2 has been effective in reducing potentially avoidable hospitalizations	31	15	16

NOTES: RTI interviewed 37 of the 40 participating facilities. Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing and/or have not trained staff on the six qualifying conditions; generally limited engagement and limited participation in NFI 2.

Based on interviews with ECCP leadership and facility staff, RTI identified the following key findings:

- Across Clinical + Payment and Payment-Only facilities, engagement and NFI 2 billing varied tremendously. AQAF leadership described the need for facility staff, leadership, practitioner, and corporate buy-in to bill for NFI2 and reduce avoidable hospitalizations among residents. Buy-in from all these key stakeholders was not present in a number of facilities, resulting in fewer claims than anticipated and limited achievement of Initiative goals.
- In response to the 2018 PAL, AQAF changed their model from education-only to include clinical care. As a result, AQAF nurses are now supposed to assess and provide direct clinical care to Clinical + Payment facility residents. However, the role of the AQAF nurse varied greatly by facility, largely because of facility leadership preferences. Leadership staff in some facilities were supportive of AQAF nurses providing clinical care and allowed the AQAF nurse to assess residents, while other facility leaders did not allow such care and preferred that their AQAF nurses provide only Initiative support and education for the facility's clinical staff. Thus, the new clinical care component of the AQAF model was implemented inconsistently across Clinical + Payment facilities.
- According to interviewees, lower engagement in both Clinical + Payment and Payment-Only facilities stemmed from confusion about the 2018 model change, fear of recoupment, declining populations of eligible residents, and a general perception that the efforts required for documentation are not commensurate with the generated revenue. Additionally, Clinical + Payment facility interviewees expressed fatigue with the Initiative after 7 years of participation in both NFI 1 and NFI 2, thus resulting in somewhat lower engagement as NFI 2 has progressed.
- Billing frequency was highly variable among Clinical + Payment and Payment-Only facilities, as well as among practitioners. Documentation requirements, the 48-hour certification window, practitioner employment status (e.g., rural health clinic [RHC] designation), and fear of recoupment posed challenges to both facility and practitioner billing. Facilities with minimal billing indicated that the NFI 2 billing requirements were not worth the time or effort to try to change their practices to increase billing at this late stage of the Initiative.
- In part because of the varied billing frequency, many Clinical + Payment and Payment-Only facility interviewees were unsure whether any perceived reductions in avoidable hospitalizations were attributable to the payment component of NFI 2. Perceived reductions in hospitalization rates among residents were often associated with changes in facility culture and staff mindsets about sending residents to the hospital, which may be associated with NFI efforts or may be the result of similar corporate encouragement to reduce hospitalizations.
- As described in 2018, Medicare managed care continued expanding statewide, particularly because of growth by the locally owned Simpra Advantage managed care plan. The effect of more managed care was twofold: (1) fewer NFI 2 eligible residents, and (2) staff

frustration in determining the correct processes to apply to residents, based on participation in NFI 2 versus managed care.

- Interviewees anticipated that many components of NFI 2 would stay in place without AQAF and/or CMS support of the Initiative. Specifically, facility staff shared that use of INTERACT tools, improved facility staff communication practices, attention to the six qualifying conditions, and focus on reducing avoidable hospitalizations likely would be sustained beyond NFI 2. Interviewees reported that some of the existing documentation requirements and required data collection would not be maintained post-NFI 2.
- Many facility interviewees stated that the well-being of residents is their utmost priority, and although this Initiative supports that priority by keeping residents in-house, they believed the required Initiative documentation and related efforts sometimes distract from resident care.
- Interviewees at many facilities reported that staff turnover was higher this year, and they perceived that this instability could diminish potential benefits of NFI 2. Some interviewees also noted concerns about the quality of nursing care, explaining that recent nursing graduates lack the same knowledge and skill set as experienced nursing staff; some indicated the knowledge gap was great enough to make the Initiative training challenging.

## **B.2 Changes to Model and Implementation in 2019**

AQAF has fully implemented the changes required by the 2018 PAL, including expanding the role of their AQAF nurses and adding part-time AQAF APRNs.

### **B.2.1 Changes to Structure and Model**

To meet CMS PAL requirements issued in 2018, AQAF changed their nurses' role from full-time Coaches, who provided facility staff education, to part-time Delta Nurses, who are expected to provide some facility education and some hands-on resident assessments. These changes were fully implemented at the time of RTI 2019 site visit. All Clinical + Payment facilities had part-time Delta Nurses in place, although these nurses' activities varied greatly (see **Section B.2.4**, for more information). AQAF also contracted with non-ECCP APRNs already working in Clinical + Payment facilities to provide after-hours care to eligible residents. Some of these APRNs also work for Simpra, the Alabama-specific Medicare managed care plan. The APRNs are paid by the facility for care during regular business hours and paid by AQAF for after-hours care. Most staff interviewed at Clinical + Payment facilities were largely unaware whether their facility had after-hours, AQAF-contracted APRNs.

AQAF also hired a new Medical Director this year, as their previous Medical Director left to join Simpra Advantage (for more information about Simpra, see **Section B.10.3, State Policy Environment**). The new Medical Director is working to establish relationships with participating practitioners and increase practitioner engagement.

### **B.2.2 Learning Community Activities**

AQAF reinstated monthly Learning Communities, after a short break, while AQAF was revising their model. However, both AQAF leadership and facility interviewees reported generally low facility engagement in the Learning Community activities. For example, interviewees said that the conference calls and webinars are generally not well-attended, and those facilities that have staff attend tend to be high-performing facilities.

### **B.2.3 New Developments with INTERACT Tools and Other Components**

Similar to findings from the previous Initiative Year, all Clinical + Payment and Payment-Only facilities reported consistent use of the INTERACT tool suite, including SBAR and Stop and Watch. To encourage facilities' continued use of INTERACT tools, AQAF leadership instituted an INTERACT Report Card that shows facilities how many resident changes in condition were documented using INTERACT tools. This report card is provided to facility leadership monthly.

### **B.2.4 Changes in Role of ECCP Nurses**

Beginning in 2018, AQAF's Coaches, now called Delta Nurses, were expected to transition from an education-only role to a clinical care role. In their new role, Delta Nurses are expected to assess and treat residents, including but not limited to, measuring vital signs, weighing residents, and completing wound care. Although AQAF leadership reported that all of their Delta Nurses now provide this direct care to residents, facility interviewees stated this was not always the case. The activities of the Delta Nurse varied significantly by facility because the nurses' scope of practice has been limited based on facility leadership preferences. In facilities where leadership team members were supportive of AQAF nurses providing direct care, nurses are assessing and caring for residents regularly (e.g., rounding weekly, helping identify changes in condition). In facilities where members of leadership were less supportive, Delta Nurses' interactions with residents range from talking with residents about health concerns to reviewing resident charts. Facility leaders who allowed Delta Nurses to provide clinical care reported that they appreciated the additional clinical assistance, especially because facilities are generally short-staffed. Those who limited direct care reiterated concerns about liability associated with allowing non-facility-employed staff to care for residents.

### **B.3 Sharing Collaborative Activities in 2019**

AQAF leadership continued to participate in CMS Sharing Collaborative activities and expressed appreciation for the opportunity for cross-ECCP collaboration. AQAF leaders also connected with individual ECCPs on an as-needed basis to learn about their activities. For example, AQAF reached out to MOQI to learn more about MOQI's facility audit tool for billing. AQAF subsequently provided a version of this tool to their participating facilities.

## **B.4 Changes to Facility Staff and Practitioner Engagement in 2019**

As in prior Initiative years, facility staff and practitioner engagement were widely variable across both Clinical + Payment and Payment-Only facilities, although engagement generally seemed somewhat lower this year compared to prior years across many facilities.

### **B.4.1 Facility Staff**

Clinical + Payment facility interviewees reported ongoing support for both NFI's goal of reducing avoidable hospitalizations by addressing resident care needs in-house and for the components introduced in NFI 1 (e.g., INTERACT tools). However, facility interviewees noted that the model changes (i.e., NFI 1 to NFI 2 and then original AQAF NFI 2 education-only to their new post-PAL clinical care version) have resulted in diminished overall engagement. Notably, facility interviewees said the shift from NFI 1 to NFI 2 resulted in facility leadership taking more ownership of the Initiative, compared to heavy involvement from facility staff in NFI 1. Most facility direct care workers reported feeling far removed from NFI 2, since they are not involved directly with billing. Interviewees also noted that the potential for increased revenue that could be re-invested to improve resident care was appealing, but, in practice, facility staff saw minimal direct benefits of that additional revenue, thus further diminishing overall facility staff engagement. Many interviewees also said the Initiative requirements, specifically nursing notes for NFI 2 documentation, sometimes get in the way or distract them from direct resident care. Several facilities commented on the amount of paperwork and documentation required for the Initiative; one staff interviewee indicated facility nurses mostly perceived the Initiative as *"just more paperwork to fill out."* Some Clinical + Payment facility interviewees also described overall fatigue with the Initiative, after their 7 years of participation (i.e., NFI 1 and NFI 2).

Payment-Only facility staff also reported a perception of distance from NFI 2. Interviewees at most facilities noted that whoever was the driving force or Initiative champion, typically an NFA, DON, or ADON, tried to be encouraging, but there was a substantial knowledge gap between the one or two team members responsible for Initiative documentation/billing and all other facility staff, whose main NFI 2 expectation was maintaining thorough nursing notes. With the increasing role of managed care and other competing priorities, interviewees described NFI 2 as an additional burden and a distraction from direct patient care. Multiple facility staff interviewees said NFI 2 notes were just one more item on their ever-growing lists of required tasks, serving as a source of either frustration or creating feelings of indifference.

### **B.4.2 Practitioners**

As in prior years, practitioner engagement varied significantly across facilities. Most physicians or APRNs were available to certify conditions for billing, but interviewees said that many refrain from submitting their own Initiative claims. No physicians have withdrawn formally, although a few still expressed dislike for NFI 2, describing it as insufficient incentive to effect behavioral changes. One physician labeled the Initiative as *"misplaced money,"* stating that *"the money the government is*

*spending on AQAF and this Initiative would be better spent trying to encourage people to go into [studying or working in] nursing and long-term care.”*

APRN prevalence statewide continued to grow, with nearly all facilities reporting some APRN presence, either provided by a corporate office, affiliated with attending physicians, or available through resident managed care plans. Most interviewees reported that APRNs were more engaged with NFI 2 compared to physicians and were more likely to certify changes of resident condition for facility billing. Although most practitioners supported the overall goal of keeping residents in-house for care when appropriate, submitting their own bills was described as burdensome, particularly given interviewee-stated “fear” of NFI 2 practitioner claims recoupment. Many interviewees reported that the majority of physicians submitted few claims and expressed little interest in billing NFI 2 in the future.

### **B.5 Updates for Documenting and Certifying Six Qualifying Conditions**

Documentation of changes in resident condition remain challenging for most facilities. Interviewees reported difficulties getting nurses to document changes consistently in their nurses’ notes and identified challenges with the components required for facility billing. Multiple facility leaders shared that they had created checklists and guides to make documentation easier for nurses. These additional tools facilitated documentation in some facilities. However, in other facilities, interviewees said these additional tools were just one more task for nurses to do, and therefore, were met with resistance.

Interviewees had little-to-no feedback about the six qualifying conditions and their associated clinical criteria. Some staff shared that they would like to see more conditions added (e.g., falls), but most staff believed the six qualifying conditions were adequate for their resident populations. Staff also had limited feedback on the clinical criteria, including the recent changes to the criteria. The few facilities that shared feedback on these changes said that the changes in criteria had caused a decrease in their ability to bill under the Initiative because the revised criteria are stricter.

### **B.6 Updates to Existing Billing Practices**

Facility and practitioner billing remained highly variable across facilities in 2019, with recoupment potentially reducing billing, especially among practitioners. Facilities with lower billing levels recognized the potential financial benefit associated with the Initiative, but these interviewees shared that documentation requirements and practitioner engagement limited the facility’s ability to submit claims.

#### **B.6.1 ECCP Tools and Support**

This Initiative Year, AQAF distributed a modified version of the Missouri Quality Initiative (MOQI)-developed self-audit tool to participating Clinical + Payment and Payment-Only facilities. This tool was intended to assist facility staff as they reviewed claims documentation to ensure that all required components were present for facility billing, thereby reducing errors and potential

recoupment. At the time of the RTI site visit, it was unclear if or how facilities were using this tool or how successful it had been in reducing billing errors.

AQAF also redesigned their monthly scorecards for facilities. Previously, these scorecards included information such as facility hospitalization rates and number of eligible residents. The scorecards still include this information, but AQAF also added data about missed billing opportunities and resultant lost revenue. AQAF leadership reported that these enhanced scorecards were well-received by facilities and encouraged them to evaluate missed billing opportunities. AQAF also shared these scorecards with facilities' corporate offices with the goal of increasing corporate support for the Initiative. Some facility interviewees noted that the scorecards increased corporate focus on the Initiative, with more corporate encouragement to identify facility opportunities for NFI 2 billing.

### **B.6.2 Facility Billing and Recoupment**

NFI 2 facility billing varied across facilities this Initiative Year. Some facilities submitted several claims, while others did not submit any claims. Facility leadership interviewees who were not submitting claims said they did not have the appropriate documentation, or they said their practitioners did not certify the conditions within the required time window that would allow them to submit claims. Members of the leadership team in these facilities were trying to improve documentation and practitioner engagement but with limited success.

Recoupment, which began in late spring 2019, also appeared to be disincentivizing some facility billing and practitioner engagement. In many cases, facility staff reported questions or concerns about NFI 2 billing based on claims being kicked back. For example, some interviewees suggested they were being penalized for claims submitted prior to the change in clinical criteria (i.e., old claims are being held to new standards and, therefore, being recouped). When discussing recoupment, one interviewee mentioned, *"It seems to us that they are trying to recoup money based on a different set of rules. Some of the clinical information changed over the years, and I'm not sure that the audit reflects that."* AQAF leadership provided guidance to facilities; however, they believed that at this stage in the Initiative, understanding the six qualifying conditions and associated clinical criteria and catching potential omissions or errors in NFI 2 claims were the responsibility of the facilities. Consequently, some facilities expressed frustration both with AQAF's guidance and with the billing process overall, thus further eroding engagement and overall facility billing frequency.

Although most facilities expressed concerns about recoupment, a small number of facilities were unconcerned. These facilities generally billed a high volume of claims, believing that a few claims with recoupment would not affect them overall. The ethos of these facilities was to bill everything possible, and that some resultant recoupment would be expected and acceptable.

### **B.6.3 Practitioner Billing and Recoupment**

Consistent with the first 2 years of NFI 2, many participating practitioners billed infrequently, with a number of practitioners indicating that the effort required to submit claims was not worth the payment. In addition, practitioner recoupment appears to be decreasing practitioner incentives to bill. Some physician interviewees shared that recoupment seemed to be disproportionately affecting practitioners (i.e., practitioner claims were being recouped at a higher rate than facility claims, and recoupment reduced practitioner engagement more than it affected facility engagement).

Many practitioners, especially those serving Payment-Only facilities (which were more likely to be rural), work in rural health clinics (RHCs). Because RHCs must bill for service delivery using only designated rural health Medicare institutional claims, Part A billing codes, they cannot use other billing codes, including NFI 2 codes, while serving in that rural health care capacity. In order for RHC practitioners to bill for NFI 2, they have to visit the nursing facility and certify conditions when they are not “on the clock” as RHC providers. This timing issue introduced complexity to practitioner billing (i.e., keeping track of the hours they were serving as an RHC and hours they were serving as a non-RHC provider). One interviewee noted, *“the compensation does not make up for the hassle.”* Practitioner interviewees reported that the NFI 2 incentives were not large enough to encourage RHC practitioners to introduce this complexity into their billing structures.

### **B.7 Updates to Data Collection**

Data collection, which slowed somewhat in 2018 during the model change, was steady in 2019. A majority of both Clinical + Payment and Payment-Only facilities were submitting completed workbooks to AQAF on a weekly basis. AQAF revised the workbook format to make data entry easier (e.g., adding drop-down menus for fields instead of requiring manual entry), and AQAF leadership started reporting summary data back to the facilities in their monthly scorecards. AQAF leadership attributed the increase from 2018 to 2019 in facilities completing workbooks to these data entry and reporting changes. Of note, there was no consistency in who in the facility was completing the workbooks. Staff completing the workbooks included NFAs, DONs, medical records staff, billers, Delta Nurses, and admissions staff.

### **B.8 Update on the Perceived Effectiveness of the Initiative in 2019**

Both Clinical + Payment and Payment-Only facility interviewees provided mixed feedback about whether NFI 2 had an effect in reducing potentially avoidable hospitalization rates.

#### **B.8.1 Facility Staff Perceptions of Potentially Avoidable Hospitalizations**

Among the Clinical + Payment and Payment-Only facility interviewees who believed the Initiative was effective in reducing avoidable hospitalization rates, most attributed these decreases to the following: (1) increased staff awareness of the benefits of treating residents in-house, and/or (2) improved communication about changes in resident condition. Most interviewees did not

associate reduced hospitalization rates with the Delta Nurses or NFI 2 billing components. Those facility staff who reported that the Initiative had little-to-no impact on hospitalization rates shared that increasing resident medical acuity and low practitioner engagement made it difficult to keep residents in-house. Staff interviewees across facilities shared that hospitals were sending their facilities sicker and sicker residents, making it difficult for their often-short-staffed facilities to cope. One facility leader explained, *“Having a higher acuity among residents has put a challenge on our nursing staff.”* Practitioners’, and occasionally facility leadership’s, concern about the nursing staff’s abilities to adequately address residents’ needs in-house also reportedly led to hospitalizations.

There was some feedback that the Initiative may have had more positive effects early on (i.e., NFI 1), but at this point in time, interviewees said that any reduction in hospitalization rates may be unrelated to the Initiative.

### **B.8.2 Residents’ and Families’ Perceptions of NFI 2**

The majority of facilities in both the Clinical + Payment and Payment-Only groups reported that no residents had opted out of the Initiative. Only one facility reported an opt-out in the first year of NFI 2 because of resident resistance to participating in any type of program. Most facility staff interviewees said residents and families were aware that the facility attempts to treat residents in-house whenever possible, although they may not know the name or specifics of the Initiative.

### **B.9 New Reports of Spillover and Contamination Effects**

There were no reported changes related to spillover within the facilities this Initiative year. Across both groups, facility staff are treating all residents as if they are eligible for the Initiative, but only billing NFI 2 for those residents who meet the criteria. Many facilities used the same documentation requirements and tools (i.e., INTERACT) on all residents, regardless of NFI 2 eligibility, so the majority of charge nurses and direct care workers had very little awareness of who was actually part of the Initiative. Some facilities also used the INTERACT tools for residents in managed care to fulfill the managed care billing and documentation requirements.

As described in last year’s report, spillover with contamination effects are increasing because of Simpra. AQAF leadership estimated that Simpra is operational in about 80 to 90 facilities statewide and is aiming to expand to 10 to 20 more facilities (nearly half of all facilities in the state) through 2020. Simpra’s structure is very similar to the AQAF NFI 2 model, and Simpra now provides payment at the same payment rate as NFI 2.

AQAF is also planning to increase their reach in the coming years. AQAF leadership shared that they would like the key components of the Initiative to be in all facilities in the state, and they are thinking of ways to achieve this goal. See **Section B.11** for more information.

## **B.10 Updates to Policies and External Stakeholders**

As was true in prior years, hospital engagement varies, with some facility staff reporting recent participation in health community partnerships with local hospitals. Most notably, ongoing and widespread growth in managed care enrollment continues reducing the population of eligible NFI 2 residents across the state.

### **B.10.1 Hospital Engagement**

Because AQAF is Alabama’s Quality Improvement Organization (QIO), the organization is involved in hospital and nursing facility quality efforts beyond NFI 2. One of these efforts is the development of “health care communities,” establishing informal meetings that occur between health leaders who bill Medicare within a given geographic area (e.g., NFAs and members of hospital administration within a given county). Some Clinical + Payment and Payment-Only facilities reported that they participated in these local health communities, which meet a few times per year. Meeting topics include health concerns specific to their communities, as well as broader topics such as reducing hospital readmissions or antibiotic stewardship. For facilities participating in these health care communities, interviewees noted that NFI 2 has become a primary topic of discussion, as local hospital leaders perceived the Initiative as being potentially beneficial to reducing hospital readmissions.

For Clinical + Payment and Payment-Only facilities that do not participate regularly in the health communities, hospital awareness of NFI 2 varied. Most facility leadership interviewees said that their local hospitals have heard of NFI 2 or know the general goals, but their interactions with the hospitals have not changed as a result of their participation in NFI 2. A few facility administrators described more communication with local hospitals since the start of NFI 2, although these interviewees were unsure whether the increased communication actually could be attributed to NFI 2 or to the recent hospital penalties for readmissions.

### **B.10.2 Competing or Similar Initiatives**

Some facilities are participating in a separate AQAF Initiative in partnership with the CDC: the National Healthcare Safety Network (NHSN). Hospital NHSN data collection has existed for decades to identify infection prevention concerns and reduce the incidence of health care-associated infections (HAIs). Nursing facilities have been added more recently, and although NHSN is separate from NFI 2, there is some overlap across the initiatives. For example, a key component of nursing facility NHSN efforts is antibiotic stewardship, specifically limiting the use of antibiotics in facilities whenever possible. NFI 2 encourages facilities to treat conditions in-house, often through use of treatments such as antibiotics, when appropriate. Interviewees from facilities that have both NHSN and NFI 2 in place make extra effort to determine what is best for residents, while following guidance provided by both programs.

### **B.10.3 State Policy Environment**

Historically, Alabama has been a Medicare fee-for-service state, with very low prevalence of Medicare managed care. Across the years of NFI 1 and NFI 2, the environment has changed substantially with significant expansion of managed care plans. The Alabama-specific Medicare managed care plan, Simpra Advantage, which was created by a consortium of various owners and managers of Alabama nursing facilities, launched in January 2018 and has grown tremendously in the months that followed. Although Simpra self-identified as being modeled after NFI 2, facilities were reporting initially that the reimbursement rates for Simpra were lower than those for the Initiative, and payments were disbursed more slowly for Simpra compared to NFI 2. As of our site visit this year, Simpra increased their reimbursement rates to match NFI 2.

Other Medicare managed care plans, such as Optum, also exist, although most facility staff indicated a preference for Simpra over Optum. Several interviewees described Optum more negatively, partly because of slow payments and partly because of being a large, national corporation. Simpra, in contrast, seemed to be viewed more favorably because it is locally owned and specific to Alabama. For facilities with a high managed care presence, staff noted that not only have managed care plans reduced the population of NFI 2 eligible residents, but also having to implement both NFI 2 and managed care initiative requirements creates a lot of confusion among staff for which steps to follow for which residents.

### **B.11 Initiative Sustainability and Plans for the Future**

Interviewees from both groups indicated that, when NFI 2 ends, their use of INTERACT tools and their focus on reducing avoidable hospitalizations will remain. Facility staff shared that NFI 2 had changed staff mindsets so that staff focus on treating residents in-house when possible and value using structured tools (e.g., INTERACT) to identify and communicate changes in condition. When asked what aspects of the Initiative would stay in place, one interviewed stated, *“This is just the way of life now. This is what we are forever going to be measured by, and the day and time of just sending patients to the hospital is over with.”*

The AQAF leadership team has been discussing future plans internally. Although they do not have definitive plans, AQAF leadership shared that they would like to expand the Initiative to all 227 nursing facilities in the state. They believe they may be able to do this under their authority as the Alabama QIO. They are also considering partnering with Simpra Advantage, as the two models are similar. AQAF leadership has reached out to Simpra to begin discussions, but it is unclear what such a partnership would look like or how it could benefit both parties.

After statewide expansion, whether through their regular QIO activities or partnerships with other entities, AQAF leadership shared they also would like to expand NFI 2 components to neighboring states.

## **B.12 Next Steps**

For the coming year of data collection, RTI will continue the following:

- Document how the clinical components are being operationalized by both Delta Nurses and partner APRNs.
- Observe billing frequency among Clinical + Payment and Payment-Only facilities and examine the impact of recoupment on billing and engagement.
- Note practitioner engagement and billing frequency.
- Document managed care penetration, particularly the growing presence of Simpra.
- Evaluate the sustainability of NFI 2 model components, including AQAF's plans for expansion and potential partnership with Simpra.

## APPENDIX C

### ADMISSIONS AND TRANSITIONS OPTIMIZATION PROGRAM (ATOP2)

#### C.1 Overview

##### *2019 ATOP2 Site Visit and Telephone Interview Findings*

###### **Key Findings:**

- Staff in the Clinical + Payment facilities were more engaged with the Initiative than the Payment-Only facilities.
- Clinical + Payment staff noted that their regular practitioners routinely and promptly certified the conditions to facilitate facility billing. However, Payment-Only facilities were often unable to bill because of delays in practitioner certification.
- Centers for Medicare & Medicaid (CMS), the ECCP, and corporate leadership convened a meeting in May 2019 designed to re-engage about half of the facilities in the Payment-Only group that had suspended ATOP2 activities since fall 2018.
- Clinical + Payment staff were minimally concerned about the recoupments that had taken place shortly before the site visit. However, Payment-Only staff were very concerned that large amounts of payments could be recouped so long after an audit and expressed a lack of confidence in future billing.
- CMS’s revised clinical guidelines released in January 2019 generated questions and concerns from both the ECCP and facility staff during the first half of 2019. Questions were related to the practitioner certification timeframe and stricter requirements that effectively reduced the number of billable urinary tract infections (UTIs).
- In spring 2019, the ECCP instituted a process to assess the sustainability of ATOP2 in each Clinical + Payment facility whereby a champion and a team in each facility would take complete responsibility for all Initiative activities. The ECCP planned to introduce this in the Payment-Only facilities in fall 2019.

During the 2019 interviews, the Clinical + Payment facility staff expressed increased confidence in managing the six qualifying conditions on site and taking responsibility for ATOP2 activities, rather than depending entirely on the ATOP2 nurses. The Payment-Only facility staff continued to vary greatly, depending primarily on corporate affiliation, in their engagement and knowledge of the Initiative.

**Table C-1. 2019 data collection summary**

Number of facilities participating as of site visit date (June 16–26, 2019)	34
Number of facility ownership changes since 2018 site visit	0
Number of facilities withdrawn or removed from Initiative since 2018 site visit	0

This report summarizes the phone and site visit interviews conducted in 12 of the 13 Clinical + Payment facilities in Nevada, 17 of the 21 Payment-Only facilities in Colorado, and the ECCP interviews we conducted during the site visit. We conducted telephone interviews during April and May 2019; four of the facility interviews in each group were conducted on the site visit that occurred from June 16, 2019 to June 26, 2019. We selected three of the four Payment-Only facilities for a site visit because we had difficulty scheduling telephone interviews with them from the beginning of the Initiative. These three facilities had submitted one claim each since ATOP2 began in December 2017. In addition to leadership and staff at the ECCP and nursing facilities, we interviewed practitioners at nursing facilities and the ECCP’s contractor, Intermountain Quality Innovations (ImQI), that administers ATOP2 in the Payment-Only facilities in Colorado.

**Table C-2. Site visit and phone interview summary findings: 2019 facility staff buy-in and implementation**

Facility staff buy-in and implementation	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone or in person)	29	12	17
Interviewer Perception of buy-in to NFI 2			
High	13	10	3
Medium	11	2	9
Low	5	0	5
Number of facilities that hired new staff in 2019 because of NFI 2	2	1	1
Number of facilities with resident opt-outs in 2019	1	1	0
Number of facilities reporting that NFI 2 has been effective in reducing potentially avoidable hospitalizations	14	9	5

NOTES: RTI interviewed 29 of the 34 participating facilities. Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing and/or have not trained staff on the six qualifying conditions; generally limited engagement and limited participation in NFI 2.

Based on interviews with ECCP leadership and facility staff, RTI identified the following key findings:

- Staff in the Clinical + Payment facilities were more engaged with the Initiative than the Payment-Only facilities.
- Clinical + Payment staff noted that their regular practitioners routinely and promptly certified the conditions to facilitate facility billing. However, Payment-Only facilities were often unable to bill because of delays in practitioner certification; several rural facilities reported difficulty obtaining practitioners’ notes and certifications within the 3-day required time frame. Overall, for the two groups, approximately 50 percent of practitioners were timely in certifying conditions for facility billing. According to the ECCP, about 8

percent of all practitioners were billing for their own time on the Initiative. The ECCP tried multiple approaches to improve practitioner engagement, including contacting group practices and billing coordinators, attending their medical meetings and conferences, conducting surveys to ascertain challenges to billing, and developing easy access to billing information. None had increased billing rates as of our June 2019 site visit.

- CMS, the ECCP, and corporate leadership convened a meeting in May 2019 designed to re-engage 12 Life Care Center Payment-Only facilities after that corporation directed their facilities to suspend ATOP2 activities while they were implementing a new corporate-wide software system. Facility staff interviewed after this meeting reported a positive, renewed interest in ATOP2, although some had submitted only one claim since the beginning of ATOP2.
- Clinical + Payment staff were minimally concerned about the recoupments that had taken place shortly before the site visit. However, Payment-Only staff were very concerned that large amounts could be recouped so long after an audit and expressed a lack of confidence in future billing for fear those payments might be recouped. Some Payment-Only staff were unaware of the ECCP's NFI 2 audit tool that is designed to guide facility staff in timing and billing to ensure proper billing of allowable charges.
- CMS's revised clinical guidelines released in January 2019 generated questions and concerns from both the ECCP and facility staff during the first half of 2019. The questions were related to the practitioner certification timeframe and stricter requirements that effectively reduced the number of billable UTI events. The draft clinical guidelines included a redesign of several clinical requirements and a secondary practitioner certification window of 5 days (previously 3 days). The ECCP believed that the best practice for practitioner certification was 3 days, which they intended to maintain regardless of the guideline change. In addition, the January draft guidelines were not finalized until late June 2019, reportedly causing some uncertainty among facility staff and leadership during the first 6 months of 2019.
- In spring 2019, the ECCP instituted a process to assess the sustainability of ATOP2 in each Clinical + Payment facility whereby a champion and a team in each facility would take complete responsibility for all Initiative activities. The ECCP planned to introduce this in the Payment-Only facilities in fall 2019. The ECCP required a team approach, rather than just one a single champion, because of the high turnover rate of facility staff, and to ensure the sustainability of ATOP2. ECCP nurses trained the team, and the champion provided back up support, as needed. Staff reported this was a successful model in all four facilities visited.
- Staff in most of the Clinical + Payment facilities reported that they believed ATOP2 was responsible for reducing avoidable hospitalizations for the six qualifying conditions. In contrast, less than one-third of the Payment-Only facilities believed that ATOP2 was effective in reducing avoidable hospitalizations. Facility staff in both groups reported a general increase in avoidable hospitalizations because of behavioral and mental health concerns and substance use issues that sometimes included resident noncompliance.

## **C.2 Changes to Model and Implementation in 2019**

In 2018, the ECCP entity, HealthInsight, merged with Qualis Health to become Comagine. This merger reportedly did not have any major effects on ATOP2 implementation, although it did result in increased learning community activities becoming available to Nevada Clinical + Payment facilities in 2019. The ECCP also focused on Initiative sustainability in 2019, including refocusing support on facility ATOP champions and reducing the role of ECCP nurses as the drivers of the Initiative.

### **C.2.1 Changes to Structure and Model**

ECCP staff reported that the HealthInsight–Qualis Health merger had little impact on the Initiative: there was no staff turnover through 2019 and there was no change in the ECCP headquarter location. The ECCP did gain access to additional resources for participating nursing facilities, including several webinars per month on topics such as quality sleep culture in long-term care facilities created by a regional collaboration of QIOs known as the Great 8+. All facilities served by Comagine Health, including ATOP2 Clinical+ Payment facilities, received access to these education sessions as a result of the merger. The ECCP coordinated with the Great 8+ network to provide additional access to Payment-Only facilities located in Colorado, which is not part of the Comagine Health network.

### **C.2.2 Learning Community Activities**

In 2019, ATOP leadership continued to refine learning community activities. Specifically, the ECCP sought to coordinate within their organization, eliminate some meetings, institute others, and encourage greater investment in ATOP2-specific meetings through quarterly “champion meetings.” In the process, they revised their approach to webinars and in-person collaboratives.

In 2018, ATOP2 staff hosted monthly webinars for both Nevada Clinical + Payment and Colorado Payment-Only facilities. These webinars were often attended only by facility leadership, who reported the webinars conflicted with other educational opportunities making it challenging for staff to attend. To address this issue, in 2019, ATOP2 leadership coordinated with other teams within HealthInsight and identified existing webinar series. In lieu of monthly ATOP2-related webinars, the Initiative facilities were invited to two 30-minute webinars each month focused specifically on infection control and behavioral health topics. The larger QIO team managed content for these sessions and also invited non-Initiative facilities. ECCP staff reported that a roughly equal proportion of ATOP2 facilities attended these sessions as the previous ATOP2 specific monthly webinars. In addition, facilities were invited to webinars hosted by the Great 8+ network featuring a wider range of topics.

In addition to these webinars, ATOP2 created two sets of quarterly “champion calls” in 2019, one for Clinical + Payment facilities and another for Payment-Only facilities, to address issues specific to the Initiative. During these calls, facility staff identified as Initiative champions discussed questions related to billing or clinical criteria and shared lessons learned during the previous quarter. ECCP leadership reported that engagement by both groups was good, but that

attendance from Clinical + Payment facilities was generally higher compared to Payment-Only attendance. Facility interviewees in both groups indicated that when staff were able to attend, the learning community activities were valuable, but one-on-one conversations and trainings were more effective than these group sessions.

Finally, the number of in-person collaboratives was reduced during 2019. ATOP2 leadership discovered that in-person collaboratives compete with Nevada Health Care Association (NVHCA) events for Clinical + Payment facility attendance. To reduce this conflict, ATOP2 staff attended the NVHCA convention and met with facility staff at the convention, rather than hosting a separate in-person collaborative. At the time of the site visit, the ECCP planned to host an in-person meeting for Colorado Payment-Only facilities in fall 2019.

### **C.2.3 New Developments with INTERACT Tools and Other Components**

Facilities in both the Clinical + Payment groups and Payment-Only continued to use INTERACT tools regularly in ATOP2 to document resident condition changes. Of all INTERACT tools, the ECCP has prioritized SBAR use across participating facilities. In 2019, the ECCP required SBAR use in the Clinical + Payment facilities, with ECCP leadership conducting quarterly SBAR audits to ensure that SBARs were accurately completed for billing. ATOP leadership noted that the audits were implemented based on a lesson learned and a process they wished they had implemented from the beginning of the Initiative. Although SBAR use had been standardized across most participating Payment-Only facilities prior to NFI 2, SBAR reporting to ATOP2 has been inconsistent and, therefore, difficult to track over time. To address these challenges, the ECCP developed a new ATOP2 web portal requirement that all participating facilities document SBAR use for every resident qualifying condition. The ECCP was hopeful that this new requirement would result in more accurately tracking SBAR use across facilities.

### **C.2.4 Changes in Role of ECCP Nurses**

With the ECCP's focus in 2019 on Initiative sustainability (described further in **Section C.11**), ECCP nurses were no longer the main drivers of the Initiative's day-to-day activities. ECCP nurses were still integrated into the Clinical + Payment facilities' day-to-day activities, such as participating in morning stand-up, care planning, and other routine nursing facility meetings, but were acting more as NFI 2 coaches than leaders. As one ECCP nurse expressed, *"we're focused on having a team from each facility responsible for the project. That seems to have really stirred up some enthusiasm among facilities for the biller to see their role and the clinicians to see their clear role and know that they are expected to communicate with providers. We're really trying to get [facility staff] into position to just take over."* In 2019, ECCP nurses were also responsible for guiding Clinical + Payment facilities through their readiness assessments, supporting ATOP2 champions, facility leadership, and other key Initiative staff within the facilities to identify when internal processes should be strengthened to sustain the Initiative after ATOP2 ends.

Consistent with reports from 2018, ECCP nurses reported that they were certifying very few, if any, qualifying conditions. Even in facilities with moderate engagement, facility staff were instead communicating with practitioners to request visits and documentation of a resident's change in

condition. According to ECCP nurses, documentation from facility staff had improved since 2018 as a result of ECCP nurses' continued efforts and education in this area. Getting practitioners to document differently for ATOP2 in their progress notes, however, remained a challenge. As one administrator expressed, *"Some [practitioners] just don't understand. They always take care of the patient and feel they always would've done that. They're going to confirm the diagnosis in that they are ordering labs, but they may not document the full note on it."* ECCP nurses reported similar experiences with practitioners.

### **C.3 Sharing Collaborative Activities in 2019**

There were no major developments in sharing collaborative activities reported by the ECCP. As in previous years, ATOP2 staff valued opportunities to discuss issues directly and meet with other ECCPs and Medicare-Medicaid Coordination Office (MMCO) in person.

### **C.4 Changes to Facility Staff and Practitioner Engagement in 2019**

As in prior Initiative years, facility staff and practitioner engagement varied widely across both Clinical + Payment and Payment-Only facilities. With the ECCP's new focus on Initiative sustainability in Clinical + Payment facilities, Nevada facilities seemed more eager to engage in Initiative activities. This new focus included readiness assessments with Clinical + Payment facilities beginning in Spring 2019. These readiness assessments allowed facilities to set individual goals that would make the ATOP2 program sustainable beyond the ECCP's involvement. At the time of telephone and site visit interviews with Payment-Only facilities, however, engagement varied widely. Although ATOP2 champions were identified for both Clinical + Payment and Payment-Only facilities, the ECCP decided to wait until fall 2019 to begin readiness assessments with Payment-Only facilities. The ECCP anticipated, however, that when they unveiled readiness assessments in fall 2019 for Payment-Only facilities, engagement would improve as it did with the Clinical + Payment facilities.

#### **C.4.1 Facility Staff**

With the ECCP's new focus on sustainability (described further in **Section C.11**), facility staff in both Nevada and Colorado were expected to take greater ownership of the Initiative in their facilities. When we spoke with Clinical + Payment facilities in 2018, ECCP nurses were the driving forces of the Initiative. In comparison, facility staff at the four Clinical + Payment facilities visited in 2019 described this transition in roles. Both clinical and administrative staff shared success stories of staff communicating with each other to proactively capture and begin documenting changes in a resident's condition, without the prodding of ECCP nurses. As one Clinical + Payment champion described, *"I work with nurses and resident care managers to get the doctor in and make sure we're documenting every day, doing Stop and Watch, and making sure someone is charting and I'll get in contact with the doctor or [APRN] to come in and document."* Interviewees across both the Clinical + Payment and Payment-Only facilities generally agreed that the presence of an ATOP2 champion in the facility helped them follow the entire Initiative process—from the moment a resident's change in condition was identified up until the claim was submitted for payment and

reimbursements were received. With a team approach in mind, ATOP2 champion efforts involved not just the individual champion, but also involved facility staff across a variety of roles, including administrators, directors of nursing, and billing office coordinators. Because staff turnover continued to be a concern across facilities in both groups, having teams in place was a way to support the Initiative's implementation, even as individuals left.

In Colorado, Life Care Centers of America suspended ATOP2 activities in their Payment-Only facilities from fall 2018 to spring 2019 because of the rollout of their new electronic records software. Although the corporate office did not withdraw from ATOP2, corporate leadership informed its 12 NFI 2 facilities that ATOP2 was not a priority activity during the period of their software implementation. Some participating facilities reported that they had received mixed messages about their status in the Initiative, while others reported that they believed the corporate office had withdrawn all facilities from ATOP2. As a result, the ECCP and its subcontractor ImQI began working with these 12 facilities and corporate representatives to "relaunch" ATOP2 in spring 2019. This relaunch culminated in a meeting with MMCO, corporate and ECCP leadership, and all 12 participating facilities on May 23, 2019. At the time of our June 2019 visit, all 12 facilities had resumed NFI 2 activities and were submitting their NFI 2 data and billing. However, although facilities reported that NFI 2 activities and billing had resumed, even prior to suspension of NFI 2 activities, these facilities had low to no engagement with the Initiative and were not billing regularly. These facilities pointed to low hospitalizations or high staff turnover as reasons for not participating. Nevertheless, all four Life Care facilities that RTI visited described the May meeting as helpful and a way to re-engage with ATOP2. The ECCP was also hopeful that the renewed engagement of these Payment-Only facilities would continue.

#### **C.4.2 Practitioners**

Consistent with last year, there were no reports of practitioners withdrawing from the Initiative. However, engaging and educating practitioners on the Initiative remained a challenge, specifically around ATOP2 billing. In response, ECCP leadership piloted several initiatives to promote practitioner engagement and billing. For example, they developed a short survey for practitioners to complete by text, email, or phone asking: (1) if they were billing, (2) if they know they can bill, (3) why they were not billing, and (4) how ATOP2 staff could facilitate. At the time of the visit, this survey was still being developed and the ECCP had no results to share. However, RTI interview feedback from practitioners was consistent with the theme that practitioners are generally on board with the Initiative's mission and focus, but they cannot be bothered with billing because they do not have time or they do not want to change their practice patterns. The ECCP had also developed a mobile-friendly version of the pocket guide for practitioners so that billing codes and other billing information could be easy to reference. This tool was to be released in early July 2019. In Colorado, ImQI staff continued to attend statewide association meetings that attract practitioners to increase NFI 2 awareness. Most recently, ImQI staff met with Colorado's AMDA chapter also to encourage NFI 2 participation.

## **C.5 Updates for Documenting and Certifying Six Qualifying Conditions**

Changes to the official clinical guidelines for the Initiative went into effect in January 2019. ATOP2 staff issued updated facility staff pocket guides outlining the revised clinical criteria and educating facilities via webinars and one-on-one trainings. In general, facility staff reported that the updates did not substantially impact implementation of the Initiative, and some believed the criteria were “*better defined and easier to understand.*” Others, however, thought that the new guidelines were too stringent and made it more challenging to qualify changes in condition for billing. These interviewees noted that even when changes in a resident’s condition required a similar level of care to treat in house, the new criteria effectively reduce the number of claims the facility staff could submit. Staff noted that the new requirements for UTI were restrictive and reduced their ability to submit claims for residents with dementia because of new UTI restrictions on changes in behavior.

ATOP2 staff described confusion around billing issues, particularly related to the new timing of practitioner certification that was discussed during the SSS-T audit in October 2018. Although CMS had issued the clinical criteria draft, there were fundamental differences in the ECCP’s understanding of billing components and the verbal explanations of updates given by the implementation contractor and CMS. In particular, the ECCP believed that expanding the window for practitioner certification from 3 to 5 days would both weaken the impact of the Initiative and potentially confuse facilities. At the time of the site visit, ATOP2 staff were awaiting confirmation from CMS before revising the tools provided to facilities. CMS issued written clarification for the Initiative billing criteria in July 2019.

## **C.6 Updates to Existing Billing Practices**

In 2019, ECCP staff created digital tools to assist with identifying eligible residents and determining billing eligibility as part of the ATOP2 web portal registry. As in 2018, there was little practitioner billing and no reported practitioner recoupment. Clinical + Payment and Payment-Only facilities received recoupment notices in June 2019 following an audit by the implementation contractor in October 2018.

### **C.6.1 ECCP Tools and Support**

Utilization of the paper self-audit tools introduced by ATOP2 in 2018 continued to grow. These checklists assist facility staff to track documentation, ensure changes in condition meet criteria for the Initiative, and review documentation for completion and accuracy. Although Payment-Only facilities drove usage of this tool during 2018, Clinical + Payment facilities increasingly utilized it during 2019. This may be, in part, because of the ECCP’s efforts to give ownership of the Initiative to Clinical + Payment facility staff, as described in **Section C.11**.

Several updated tools were made available to facilities through the ATOP2 web portal registry. A digitized version of the audit checklist was available to assist facilities with documenting changes in condition and billing processes. Staff were able to use a responsive calculator to determine eligibility based on practitioner confirmations and billing dates. Facility staff were also able to run

reports on the number of residents with a change in condition, missed opportunities, and eligible populations from the portal. Although facility staff reported increased use of the audit checklist, few described using the portal to access reports.

### **C.6.2 Facility Billing and Recoupment**

ATOP2 facilities audited by the implementation contractor in October 2018 received recoupment notices in the spring of 2019. Although most facilities did not receive recoupment notices, there were two distinct reactions from those that did. First, some facilities believed they had learned from their past billing errors and were not overly concerned about future billing. In contrast, other facilities reported that concerns about recoupment dissuaded them from billing or they implemented additional quality checks before submitting claims. Colorado Payment-Only facilities were cautious about billing after learning of large recoupment notices sent to other Payment-Only facilities. The ECCP responded to facilities' concerns by empathizing, comparing the amount recouped to the total earned under the Initiative, and reviewing errors identified during the audit to prevent further issues.

### **C.6.3 Practitioner Billing and Recoupment**

As in previous years, facility staff reported limited practitioner billing and no instances of recoupment from practitioners. The ECCP's records indicated approximately 8 percent of certified NFI 2 practitioners had billed. In a number of facilities, staff were unaware of practitioner billing habits. Others reported that practitioners did not have sufficient time or were uninterested in implementing the Initiative billing codes. As one administrator described, *"We couldn't find anything to motivate them [to bill]."*

However, lack of practitioner billing under the Initiative did not necessarily result in the inability of NFs to bill. All visited Clinical + Payment facilities reported that although their practitioners did not bill, they understood the Initiative's requirements and promptly met the facility's needs. Three of the four Payment-Only facilities visited had not been submitting claims and the fourth indicated that obtaining practitioner certification for facility claims was a challenge. This was also a theme among the Payment-Only telephone interviewees. As described in **Section C.4**, the ECCP launched a survey of practitioners associated with Clinical + Payment facilities in the summer of 2019 to better understand their billing practices and reticence.

### **C.7 Updates to Data Collection**

In 2018, the ECCP launched the web portal registry, which allows facility staff to directly enter resident rosters, changes in condition, and hospitalization data. ECCP nurses enter changes in condition and hospitalization data for Clinical + Payment facilities; Payment-Only facility staff are responsible for entering their own data. Payment-Only facilities reported that the portal was an improvement that, *"...makes entering data, tracking residents in [ATOP2] or who may soon be eligible for [ATOP2] a lot easier."* Fewer Clinical + Payment facilities commented on the usefulness of the web portal registry, perhaps due to their already reduced data burden. Previously, Nevada and Colorado facility staff had been asked to enter all resident information, not just NFI 2-eligible

residents, into Excel spreadsheets that they submitted to the ECCP. Beginning in spring 2019, facilities were only required to enter data into the portal for NFI 2 eligible residents. Facilities, particularly those with large short-stay populations, were pleased with this reduction in burden, which was widely noted in previous years' interviews.

## **C.8 Update on the Perceived Effectiveness of the Initiative in 2019**

As in previous years, facility staff generally reported that the Initiative enhanced clinical capabilities and, in turn, contributed to reduced avoidable rehospitalizations. Compared to 2018, in 2019, facility staff in both Nevada and Colorado more frequently cited pressure from families to hospitalize and residents' behavioral health status as challenges to the Initiative's overall effect.

### **C.8.1 Facility Staff Perceptions of Potentially Avoidable Hospitalizations**

Facility interviewees generally thought that the Initiative was reducing avoidable hospitalizations, either (1) directly through early detection and treatment of the six qualifying conditions; (2) indirectly through enhanced clinical capabilities of front-line staff; or (3) in some cases, through the use of Initiative reimbursement funds to hire an in-house nurse practitioner. ECCP leadership shared an example: In an effort to convince corporate leadership of their need for an in-house nurse practitioner, a facility provided their corporate office with a breakdown of missed opportunities and the total dollar amount of lost NFI 2 reimbursements.

Nine facilities in the Clinical + Payment group believed that the Initiative was effective in reducing avoidable hospitalizations; four said it was not effective. Staff in Payment-Only facilities either thought that the Initiative was effective (N=5), or that it was too early to tell; none said that it was not effective.

Particularly noteworthy was that staff interviewed in both Nevada and Colorado frequently attributed potentially avoidable hospitalizations to behavioral and mental health issues, substance use disorders, or often a combination of both. When probed, facility staff indicated that behaviors of these challenging residents were a contributing factor in hospital admissions. In one facility, for example, a resident with kidney disease, as a result of opioid use, refused dialysis. As the director of nursing explained, *"we have a resident here with renal failure, and they did not get the appropriate mental health interventions early on. They do not want to go to their regularly scheduled dialysis appointment . . . noncompliant around everything. They had to go back to acute."* Facility staff in both groups cited similar examples of situations with residents with mental and behavioral health challenges or substance use that they believed were contributing to avoidable hospitalizations.

### **C.8.2 Residents' and Families' Perceptions of NFI 2**

Compared to 2018, when several Colorado facilities expressed confusion about the number of resident opt-outs, in 2019, staff in Colorado seemed more aware that it was their responsibility to provide residents with the option of opting out of ATOP2 enrollment. The implementation of ATOP2 champions across both groups seemed to have contributed to staff awareness of Initiative

requirements. All nursing facility staff in Nevada and the majority of staff in Colorado were familiar with the resident opt-out protocol and reported that very few new residents had declined to participate.

Interviewed staff across telephone interviews and on-site visits reported that family engagement was crucial to reducing avoidable hospitalizations. As ECCP leadership noted, *“I think it seems arbitrary that those six [qualifying] conditions are focused on so heavily when really things that lead to transfers have more to do with family desires and things that aren’t really cellulitis.”* These sentiments further emphasize the finding that families may have an effect on hospitalization rates.

### **C.9 New Reports of Spillover and Contamination Effects**

There were no reported changes to within-facility spillover this Initiative year. Across both groups, facility staff stated that they treat all residents similarly. Interviewees did not report any contamination of facilities outside of the Initiative.

### **C.10 Updates to Policies and External Stakeholders**

Similar to 2018, there was minimal engagement with hospitals with regard to ATOP2. Medicare managed care presence continued to grow in the nursing facility sector in both Nevada and Colorado.

#### **C.10.1 Hospital Engagement**

There were no reported changes to the existing, minimal hospital engagement in either group.

#### **C.10.2 Competing or Similar Initiatives**

According to nursing facility staff and the ECCP, Medicare managed care penetration was reportedly increasing in both northern and southern Nevada. Colorado already had a significant managed care presence, prior to NFI 2, and it continues to grow. Interviewees noted that the short-stay residents in Payment- Only facilities, who often transition to become long-stay residents, had increasing managed care participation.

#### **C.10.3 State Policy Environment**

Unlike the previous year, in 2019, nursing facility administrators did not report an increase in small, newly built, hospital-owned, short-stay Medicare-only facilities (i.e., “pop-up” facilities) that had interfered with established facilities’ census. Interviewees reported no other state policy environment changes in 2019.

### **C.11 Initiative Sustainability and Plans for the Future**

The ECCP’s focus during 2019 was on increasing the capacity for facilities across both groups to sustain Initiative activities beyond the end of ATOP2. Accordingly, the ECCP instituted readiness assessments across each Nevada nursing facility. Readiness assessments involved a process of (1) identifying a facility champion and team, (2) training and support provided by the ECCP nurse

(Nevada Clinical + Payment facilities only), and (3) eventually measuring facility progress through an ECCP-developed tool. The RTI team first learned of these readiness assessments through telephone interviews with Clinical + Payment facilities, and they appeared to be successful in all four Clinical + Payment facilities visited. According to ECCP leadership, *“some facilities have even begun to use ATOP2 tools, such as the data reporting system, as their own internal data tracker.”* As previously shared in **Section C.4.1**, the ECCP implemented a team approach for sustainability efforts, meaning that multiple people, including facility leadership, needed to be part of the team for ATOP2. The team approach not only promoted continuous ATOP2 learning to keep facility staff up to date in the Initiative, but it also helped address high staff turnover rates; if one person left, other team members would already be trained in ATOP2. For the Payment-Only facilities, the ECCP was allowing time for the 12 Life Care facilities to re-engage with the Initiative before introducing the readiness assessment and sustainability training in all 21 facilities. This process was expected to be introduced in fall 2019 at the in-person meeting of all the Payment-Only facilities. It was also expected to be more challenging without the presence of ECCP nurses in the Colorado facilities.

Similar to 2018, nursing facilities in both groups indicated that Medicare managed care was growing, and they expected it to have an impact on their long-stay populations. One Clinical + Payment facility administrator shared that while *“there’s no increase in managed care on the long-term care side, new admissions in short-stay seem to have more managed care, so when they transition to long-term, that will increase our managed care on the long-term care side.”*

## **C.12 Next Steps**

In 2019, ATOP2 activities focused on building processes for sustaining Initiative activities after ATOP2 ends, increasing practitioner buy-in and billing, and re-engaging the 12 Life Care Center facilities that had suspended ATOP2 activities in late 2018.

In the upcoming year of data collection, RTI will focus on the following:

- Engagement and billing frequency among both Payment-Only and Clinical + Payment facilities.
- Practitioner engagement in both groups.
- Managed care growth in both states and its effect on eligibility.
- Sustainability of ATOP2 with or without an ECCP nurse to carry out the majority of ATOP2 components.

## APPENDIX D MISSOURI QUALITY INITIATIVE (MOQI)

### D.1 Overview

#### *2019 MOQI Site Visit and Telephone Interview Findings*

##### **Key Takeaways:**

- Facility leadership and staff turnover remained the largest determinants of Initiative buy-in and engagement. There was consistent submission of claims in facilities where the leadership team had longevity (Clinical + Payment and Payment-Only).
- Practitioner billing continued to vary and has not appreciably increased in 2019 in both Clinical + Payment and Payment-Only facilities. Some facility staff reported instances of over and underbilling.
- Full-time presence of APRNs in Clinical + Payment facilities increased the likelihood for appropriate and accurate billing for residents who met the six qualifying conditions' billing criteria.
- Early recognition of resident change in condition and prompt treatment decreased the number of opportunities to bill and submit claims for the six qualifying conditions.

The MOQI model remained well established in 2019 with no changes. Most staff in Clinical + Payment and Payment-Only facilities were engaged to “finish [The Initiative] strong.” ECCP leaders continued to express frustration with inconsistent billing and submission of claims across Clinical + Payment and Payment-Only facilities. The issue was serious in Payment-Only facilities where claims, in a few facilities, had not been submitted because of a complete turnover of the facility leadership and billing staff. The ECCP billing team intensified its efforts in those facilities through monthly on-site education, additional training, and in one instance, completed the backlogged billing for the facility. **Table D-1** presents an overview of facility participation data from 2019. This appendix includes site visit and telephone interview data collected during calendar year 2019.

**Table D-1. 2019 data collection summary**

Number of facilities participating as of site visit date (September 23–October 3, 2019)	40
Number of facility ownership changes since 2018 site visit	0
Number of facilities withdrawn or removed from Initiative since 2018 site visit	0

The RTI team completed in-person interviews with MOQI leadership on September 23, 2019. RTI interviewed medical directors, directors of nursing (DONs), associate directors of nursing (ADONs), advance practice registered nurses (APRNs), nursing facility administrators (NFAs), facility nurses, billing coordinators, minimum data set (MDS) nurses, and other key staff in four Clinical + Payment facilities from September 24 to September 27, 2019. The RTI team completed in-person interviews with similar staff in Payment-Only facilities from September 30–October 3, 2019. These visits

followed the March to May 2019 telephone interviews with DONs, NFAs, and other key staff in 11 Clinical + Payment facilities and 16 Payment-Only facilities. **Table D-2** summarizes the site visit and telephone interview findings for facility staff buy-in and implementation.

**Table D-2. Site visit and phone interview summary findings: 2019 facility staff buy-in and implementation**

Facility staff buy-in and implementation	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone or in person)	35	15	20
Interviewer perception of buy-in to NFI 2			
High	26	13	13
Medium	8	2	6
Low	1	0	1
Number of facilities that hired new staff in 2019 because of NFI2	0	0	0
Number of facilities with resident opt-outs in 2019	5	2	3
Number of facilities reporting that NFI 2 has been effective in reducing potentially avoidably hospitalizations	29	15	14

NOTES: RTI interviewed 35 of the 40 participating facilities. Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff that are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing and/or have not trained staff on the six qualifying conditions; generally limited engagement and limited participation in NFI 2.

Based on interviews with ECCP leadership and facility staff, RTI identified the following key findings:

- Facility interviewees reported two key factors that positively impacted Initiative buy-in and engagement: facility leadership stability and longevity for the NFA and DON in Clinical + Payment and Payment-Only facilities and the MOQI APRN in Clinical + Payment facilities. Clinical + Payment facility leaders who described a longstanding collaborative relationship with the MOQI APRN reported high staff buy-in and engagement and an associated reduction in hospitalizations compared to facilities with weaker facility–MOQI APRN relationships.
- Across both Clinical + Payment and Payment-Only facilities, interviewees noted that turnover of facility clinical staff continued to be a major barrier to consistent implementation of Initiative components. Some facility leadership described staff turnover as a crisis and have resorted to hiring agency nurses to fulfill their staffing needs, although facility leaders noted these agency nurses have limited engagement with the Initiative. Consistent with 2018 interviews, facility leaders in 2019 reported the excessive amount of time, effort, and cost to educate, reeducate, and train new staff.

- As in 2018, ECCP leaders in 2019 reported variable facility billing by Clinical + Payment and Payment-Only facilities, as they observed instances of overbilling and underbilling. An ECCP interviewee described underbilling as *“some doctors just aren’t billing for [six qualifying conditions].”* Payment-Only facilities continued to receive frequent support from the ECCP staff, through on-site training, education, and hands-on billing assistance. ECCP leadership interviewees said that consistent billing and claims submission were highest in those facilities with stable leadership.
- Some Clinical + Payment and Payment-Only facility interviewees reported submitting fewer claims because of early recognition of changes in condition, treatment, and resolution prior to the resident meeting the qualifying criteria.
- As of 2019 data collection, NFI 2 practitioner billing had not changed appreciably since 2018, despite the one-on-one efforts of the ECCP medical director in Clinical + Payment facilities and the facility-based physician education and encouragement from the ECCP leadership team at Payment-Only facilities. Practitioner billing continued to be contingent upon the practitioner buy-in and engagement in the Initiative. Practitioners who were averse to billing indicated that their resistance stemmed from concerns about documentation requirements or reluctance to receive additional reimbursement for care they are already reimbursed for providing.
- Medicare Managed care penetration continued to expand in Missouri, and both Clinical + Payment and Payment-Only facility interviewees reported this growth had limited the number of eligible residents for the Initiative. Facility leaders described a few instances in which residents transferred back from managed care insurance to traditional fee-for-service Medicare, after learning that some therapies were not covered under their managed care plans.
- The majority of Clinical+ Payment facilities implemented an electronic medical record (EMR), and most have integrated the six qualifying condition criteria and SBAR into their systems. Facility staff reported this intervention has contributed to improving required NFI 2 documentation for the six qualifying conditions.
- Clinical + Payment facility staff reported that most components of the Initiative would be sustainable, with the exception of the ability to hire a facility-based APRN because of resource constraints. A physician who cares for residents in a Clinical + Payment facility suggested that an APRN could be hired in place of a facility-based educator.

## **D.2 Changes to Model and Implementation in 2019**

The MOQI model is well-established across the participating facilities with no changes in 2019.

### **D.2.1 Changes to Structure and Model**

Phone interviews and site visit findings indicated that there were no formal changes to the MOQI model in Clinical + Payment and Payment-Only facilities in 2019. The Initiative ran in a similar manner as the previous Initiative year.

## **D.2.2 Learning Community Activities**

No changes were made to Learning Community activities for 2019. A few Clinical + Payment facilities reported participating in Learning Communities. Findings suggested that they continued to focus on integrating Crucial Conversations into resident care and INTERACT tool usage. The Crucial Conversations Learning Community activities educate staff on how to facilitate end-of-life (EOL) conversations with residents and their families. Staff who attended the Learning Community activities viewed them favorably and found them to be helpful.

## **D.2.3 New Developments with INTERACT Tools and Other Components**

Both Clinical + Payment and Payment-Only facilities continued to use INTERACT tools. The majority of facility interviewees reported regular use of SBAR and Stop and Watch in their daily care, with a few interviewees reporting inconsistent use of SBAR. An interviewee shared, *“We have SBAR, some use it, some do it in their head, we do it in our nursing notes anyway.”* A Payment-Only facility interviewee described a “Neighborhood Watch” program, which encourages residents to complete Stop and Watches for each other if they notice a change in condition in a fellow resident.

Discussions surrounding EOL care remained variable across all facilities. The MOQI APRN from a Clinical + Payment facility noted that she does not *“see nurses participating [in EOL conversations] as much...I don’t think the nurses are as comfortable here.”* Conversely, an administrator from another Clinical + Payment facility reported that *“one of the things [MOQI] has helped with is the advance directives...keeping folks here, not going to the hospital.”* However, most Clinical + Payment and Payment-Only facilities reported increased use of the Transportable Physician Orders for Patient Preferences (TPOPP) form to document residents’ EOL wishes.

## **D.2.4 Changes in Role of MOQI APRNs**

Some Clinical + Payment facilities experienced turnover of MOQI APRNs, which interviewees noted had somewhat negative effects on facility staff buy-in. A Clinical + Payment facility interviewee reported that their current MOQI APRN was their third since the start of NFI 2, and that the prior two either retired or left the program. Leadership staff from a facility affected by this turnover shared that they had to retrain staff on how to connect with the new MOQI APRN. In lieu of full-time MOQI APRNs in some facilities, MOQI provided part-time staff. It was unanimous among Clinical + Payment facilities that having a stable MOQI APRN in the facility was crucial to Initiative success.

## **D.3 Sharing Collaborative Activities in 2019**

The ECCP reported low engagement with Sharing Collaborative activities.

## **D.4 Changes to Facility Staff and Practitioner Engagement in 2019**

For this Initiative year, interviewees reported similar facility and staff engagement in both Clinical + Payment and Payment-Only facilities as in the second year of NFI 2. Barriers to engagement included staff turnover for several facilities and low practitioner buy-in for some facilities.

#### **D.4.1 Facility Staff**

Across facilities, staff interviewees continued to view the Initiative favorably. Facility leadership noted that staff “love” the Initiative *“especially because they get to be involved.”* The self-confidence of staff has grown as a result of the Initiative, with one interviewee stating, *“nurses [have] become a lot more comfortable with SBAR, Stop and Watch.”* Likewise, all facilities continued to feel supported by MOQI leadership. As one interviewee shared, *“when I have questions, they are good at helping me. I think the tools they put out for us to use are helpful.”*

Although facility interviewees generally shared favorable opinions of the Initiative, facilities with substantial staff turnover faced challenges maintaining NFI 2 activities. In Payment-Only facilities, staff reported experiencing a *“staffing crisis”* with increasing rates of turnover that necessitated frequent onboarding of new staff to the Initiative. Some Payment-Only facilities recently experienced a complete turnover of key leadership staff, including the NFA, DON, ADON, and dietary management. As a result, staff in this facility were unaware that the work they were doing was a part of MOQI. When asked about reasons for high turnover, facility leadership provided various theories, including low wage rates. One Payment-Only interviewee noted that the current minimum wage in Missouri is \$7.25, which is the rate at which most facility certified nursing assistants are compensated. Consequently, some staff have moved to other nursing facilities that can pay more.

#### **D.4.2 Practitioners**

Similar to previous Initiative years, practitioner engagement varied in both facility groups, with some facilities having practitioners with high buy-in and others having limited interaction with the Initiative. Overall, the payment component of the Initiative was viewed as a motivating factor for some practitioners. One interviewee from a Payment-Only facility shared that their team believes the toughest aspect to sustain after the Initiative would be having *“the physicians coming on site as quick... We’re not doing it for the monetary value, but the physicians are. Especially the ones who can bill for it.”*

Practitioners with low engagement cited four barriers: billing process, time constraints, new health technology (i.e., telehealth), and facility staff turnover. Regarding the billing process, some practitioners reported having difficulty determining whether a resident was MOQI-eligible, creating challenges for practitioners to submit their own NFI 2 claims. Additionally, practitioners in some facilities were not confirming conditions in time, as a Payment-Only facility interviewee noted, *“getting the practitioner in within that [NFI 2] timeframe is becoming a challenge again.”* In some rural Payment-Only facilities that had telehealth, practitioners did not use the technology because of technical difficulties and preferred to travel to the facility to confirm diagnoses in person. In facilities with high staff turnover, practitioners were also impacted, as a newly hired practitioner from a Payment-Only facility said that she did not *“really know what MOQI is in the first place.”*

## D.5 Updates for Documenting and Certifying Six Qualifying Conditions

Most interviewees in Clinical + Payment and Payment-Only facilities were aware of the June 2019 memo from CMS revising the clinical criteria. Most of the staff in Clinical + Payment and Payment-Only facilities reported no concerns about the changes, although ECCP leaders expressed concern about CMS changing the six qualifying conditions criteria in the middle of NFI 2 from a research methodology perspective. This Initiative year, some interviewees reported fewer opportunities for billing as they had been successful in identifying changes in condition early and being able to treat residents' early signs and symptoms before they met the clinical criteria for facility billing. Some interviewees in Payment-Only facilities questioned the removal of "change in mental status" from the criteria for qualifying a resident with a urinary tract infection (UTI). They reported that a change in mental status was often the first symptom, and this was particularly important for residents who are not able to verbally express their symptoms. As one facility interviewee expressed, *"The only thing I don't like about the new criteria is...increased confusion and behaviors, I don't agree with them taking that off. That's the first sign of an elderly person with a UTI. They don't complain or have a fever."* In one Clinical + Payment facility the standard SBAR was customized to create a "mini SBAR," which facilitated the required documentation to meet the revised UTI criteria. A facility staff interviewee explained, *"Mini is more of a, 'hey, right now,' alert. The Mini one just gets it going. We see it more with the UTIs. It's focused on that disease process. We have the mini SBAR in the EMR. It spells it out what you should look for."*

Most Clinical + Payment facility interviewees continued to report the presence of a full-time facility-based MOQI APRN as one of the most significant contributing factors for identifying residents who meet the criteria for the six qualifying conditions, ensuring the required clinical documentation is sufficient to bill for the condition, and reducing avoidable hospitalizations. Some facility staff reported issues with their staff nurses' self-confidence in their resident assessment and clinical intervention skills when a MOQI APRN is not consistently present in the facility. As mentioned previously, inconsistent MOQI APRN presence in a facility reduces Initiative impact. As one MOQI APRN noted, *"We've seen several [residents] go to the hospital that if the [facility] nurses contacted us, they wouldn't have to go out. That's the one thing we continue to work on is some of my nurses'[self-] confidence."*

Most Payment-Only facility staff reported having devoted practitioners who visited residents within the 24- to 48-hour time frame of a change in condition. One medical director reported facility coverage by either a physician or an advanced practice registered nurse (APRN) 24 hours/day, 7 days/week.

In this Initiative year, interviewees explained that the greatest impact on reducing hospitalizations was for residents with pneumonia and UTIs (Clinical + Payment) and cellulitis, UTIs, and pneumonia (Payment-Only). As one facility nurse noted, *"We're catching pneumonia – big impact with pneumonia. We know what we're looking for... Being proactive instead of reactive. Pneumonia has been addressed quicker. UTIs are also addressed quicker."*

## **D.6 Updates to Existing Billing Practices**

The volume of billing continued to vary across facilities. Facilities that were significantly affected by excessive staff turnover reported more challenges with NFI 2 billing, while facilities that had minimal staff turnover reported greater successes with billing.

### **D.6.1 ECCP Tools and Support**

This year, the ECCP billing team reported having a much more active role in helping facilities with their NFI 2 billing. For some facilities, the ECCP billing team visited monthly to train new staff and ensure that the facility was engaged in the billing processes. One member of the team mentioned that they found the constant retraining to be frustrating, adding that they feel as though they have been *“knocked back to square one with some homes.”* In terms of the criteria for billing, the ECCP billing team cited confusion about billing dates and insufficient documentation as the main barriers to Clinical + Payment and Payment-Only facility billing. To clarify the confusion around billing dates that many facilities cited, the ECCP developed the *“Five Fingers”* guide, where each finger represents a step in the billing process. For example, the thumb represents the day a change in condition is identified, so then the physician has two days, represented by the pointer and middle finger, to confirm the condition. Many facilities recalled this guide as being helpful to keep track of the billing process.

### **D.6.2 Facility Billing and Recoupment**

All facilities were aware of the billing requirements for the Initiative, and most were submitting claims regularly. In the Clinical + Payment facilities, the APRNs were cited as important resources for maintaining the NFI 2 billing processes. Many APRNs mentioned that one of their responsibilities was demonstrating proper documentation. For example, one MOQI APRN said *“I look back at the documentation and make sure we have everything that qualifies them for the diagnosis. If I find some that don’t qualify because it wasn’t documented well, we don’t bill for that, but we do use it as a teachable moment.”* Generally, Clinical + Payment facility interviewees said that their facilities were billing and receiving reimbursement.

Many Payment-Only facility interviewees said that they were not billing because they could identify and address changes in condition so early that the resident did not meet all of the qualifying condition criteria to be able to bill through the Initiative. The Payment-Only facilities also tended to be a little less knowledgeable about the billing process, because in many cases, billing was done at the corporate level to maintain consistency. This remote billing process improved billing practices, but it also meant that facilities were not actually aware of whether they were receiving reimbursement. This same sentiment was also reported in the Clinical + Payment facilities where billing occurred at the corporate level.

Both groups of facilities reported having experience with recoupment. The most common reason that facilities were asked to return money was because dates submitted on the claim did not match the dates required by the qualifying criteria. However, a few facilities referenced the *“Five Fingers”* guide as a helpful resource to remember the dates correctly.

### **D.6.3 Practitioner Billing and Recoupment**

In this Initiative year, there were no major changes to practitioner billing. Practitioners were supportive of identifying conditions early and would often agree to see patients in a timely manner when possible so that the resident's health status was addressed, and the facility would be able to bill for the episode. However, practitioners themselves did not always take advantage of the NFI 2 billing codes. In one anecdote recounted by the ECCP, a facility staff member mentioned that their physician was not billing on his own through the Initiative, as he thought it was "outright fraud and refused to participate." However, his documentation was so clear that the facility used it for their own facility billing purposes. The practitioners in Payment-Only facilities that were billing, mentioned that billing was done through their billing offices, and they were not aware of how many claims were submitted or if they had received any reimbursement or recoupment notices.

### **D.7 Updates to Data Collection**

The ECCP leadership reported that they were not collecting as much data as they had in previous years. A new method of data collection that they were using was a survey designed for the MOQI APRNs to measure indicators like physician engagement, and the impact of APRNs on preventing hospitalizations. There were no major updates to facility data collection, although facilities with high staff turnover (e.g., Medical Records staff) reported greater struggles maintaining MOQI data requirements.

### **D.8 Update on the Perceived Effectiveness of the Initiative in 2019**

There were no changes from prior years on perceived Initiative effectiveness. All facilities reported a decrease in potentially avoidable hospitalizations, although some facilities credit this decrease to protocols in place prior to MOQI involvement.

#### **D.8.1 Facility Staff Perceptions of Potentially Avoidable Hospitalizations**

All facilities reported seeing a decrease in potentially avoidable hospitalizations. However, a few Payment-Only facilities were hesitant to attribute this trend entirely to MOQI. As a Payment-Only facility interviewee shared, *"My perception of the program is that it's things that we're already doing and have in place already. I don't know that we've had more or less [hospitalizations] due to the program."* Additionally, in facilities with frequent staff transitions, leadership staff reported that momentum was lost in catching changes in condition. These interviewees were also unaware of exact numbers of avoidable hospitalizations prevented because of the pressures and priority of hiring new staff. In Clinical + Payment facilities, leadership indicated that the decline of potentially avoidable hospitalizations was most consistent when there was also a consistent presence of the MOQI APRN.

#### **D.8.2 Residents' and Families' Perceptions of NFI 2**

Interview findings indicate that residents and families in Clinical + Payment and Payment-Only facilities were supportive of MOQI. However, staff cited the following examples as barriers to family and resident buy-in. As a few Clinical + Payment facility interviewees noted, strong cultural

and religious beliefs often were a barrier to keeping residents in the facility for treatment. These barriers were seen in facilities with a high African American or Jewish population. Leadership staff from a Clinical + Payment facility shared that they *“have a higher population of Jewish residents, and the Jewish faith, they sustain life at all costs. Especially if you are Orthodox...Those folks are...our frequent fliers.”* Moreover, education on MOQI for families was lacking in some facilities. One Clinical + Payment facility’s leader admitted that they do not *“know that families are well versed in what we’re doing with the program. We don’t have a program to let all the families know...We can definitely do a better job and have a more robust communication with families.”*

A few facility interviewees from both Clinical + Payment and Payment-Only facilities reported that residents had opted out of MOQI, either for personal reasons or to enroll in a Medicare managed care plan, namely United Healthcare’s Optum.

## **D.9 New Reports of Spillover and Contamination Effects**

Although there were no major changes, spillover continued in both Clinical + Payment and Payment-Only facilities. Leadership staff from several Clinical + Payment facilities shared that the MOQI APRN will see residents who are not MOQI-eligible, and that the facility APRNs, if present, will see residents who are MOQI-eligible. A Clinical + Payment facility interviewee shared that often the MOQI APRN will collaborate with the facility APRN when helping a resident. Leadership staff shared that they continued treating all residents as if everyone were eligible for the Initiative.

## **D.10 Updates to Policies and External Stakeholders**

In 2019, The Missouri policy environment continued to include high Medicare managed care penetration in urban and rural areas, which has reduced the number of residents eligible for the Initiative. As in 2018, the St. Louis area accountable care organizations (ACOs), acute care hospital, and nursing facility care consortium, continued to meet to disseminate acute care best practices to nursing facility residents with the long-term goal of standardizing care across all nursing facilities in the state. Legislation to enable APRNs to practice as independent practitioners had progressed with new legislation that will address current restrictions for APRNs working in long-term care.

### **D.10.1 Hospital Engagement**

A majority of interviewed facility staff reported that their local hospitals were aware of their facility’s participation in MOQI. Many Clinical + Payment interviewees and one Payment-Only facility interviewee reported that hospitals had begun to view them as part of the continuum of care, meeting with facilities intermittently to discuss hospitalizations. An ECCP interviewee described leading a coalition with an ACO that includes three major hospitals and some nursing facilities for the purpose of sharing hospital and facility best practices, with an emphasis on treatment for UTIs and pressure ulcers, as well as advance directives, across hospital groups and nursing facilities located in suburban St. Louis.

### **D.10.2 Competing or Similar Initiatives**

No new competing or similar initiatives with the goal of reducing avoidable hospitalizations were reported during the 2019 interviews. As reported in 2018, the Missouri policy environment continues to include high Medicare managed care penetration, in metropolitan areas (i.e., St. Louis, Columbia, Springfield) and surrounding rural areas. Interviewees in all Clinical + Payment facilities reported some resident participation in Medicare managed care. A facility interviewee reported some residents transfer from Optum back to traditional Medicare to receive therapies not covered by the managed care plan. A few Payment-Only facilities reported varying degrees of influence from the Optum program. One interviewee noted that MOQI opt-outs are on the rise because of the presence of an Optum APRN who visits all residents in the facility, which affects the resident's eligibility for the Initiative. Staff in both Clinical + Payment and Payment-Only facilities reported an increase in the number of residents admitted to their facility that are insured by a Medicare managed care plan.

### **D.10.3 State Policy Environment**

The ECCP continued its longstanding efforts to influence state and federal legislation to expand the scope of practice and reimbursement for APRNs in Missouri. Legislation was scheduled to move forward in 2019 to advocate for full independent practice authority, meaning APRNs would be able to practice collaboratively and as independent practitioners. The federal legislation proposes to modify the Social Security Act (SSA) that currently restricts APRNs from working as employees of long-term care facilities. If passed, APRNs would be able to work as employees and still bill Medicare. The ECCP leadership interviewee believes this would level the playing field with positions in long-term care and *"of itself have the major impact needed nationally if we can get this to happen."* The legislation has gained momentum at the state and national level with strong support from state legislators, a major academic St. Louis-area health care system, national nursing associations, and long-term care medical associations. Plans include a request to meet with Missouri Senator Roy Blunt (R) to solicit support needed for changes to the SSA and garner CMS support.

### **D.11 Initiative Sustainability and Plans for the Future**

An ECCP leadership interviewee reported that the MOQI team has developed their own limited liability company (LLC) and are hoping to start a new business with the goal of disseminating the best practices that they have developed through the MOQI Initiative throughout the state. They were optimistic about the response to the business model and were looking forward to launching a pilot program. In their opinion, the success of MOQI has been the improvement of Clinical + Payment facility's Health IT systems, as most facilities were able to transition into fully electronic medical record systems and incorporated applications such as CareMail, CareView, and Mediprocity to facilitate communication among providers. Additional successes included consistent use of INTERACT tools and the increase in EOL conversations.

All Clinical + Payment facilities indicated they could sustain the use of INTERACT tools, particularly the Stop and Watch forms, as well as the SBAR. Many of the nursing staff like using the SBAR

because it allows them to communicate clearly with the practitioners and helps to increase their own credibility when reporting changes in condition. They also valued the education that the MOQI APRNs provided to staff in those facilities and hoped to continue providing educational materials and in-service trainings even after the end of the Initiative. The Payment-Only facilities all expressed that they wanted to continue identifying changes in condition early and treating residents in the facility whenever possible. However, they did not see the payment portion of NFI 2 as an essential component for sustaining Initiative goals. Overall, all facilities agreed that they wanted to decrease their hospitalization rates and keep residents in the facility whenever possible.

## **D.12 Next Steps**

In this Initiative year, as in previous years, the ECCP interviewees reported progress in moving the goals of the Initiative forward. ECCP and facility staff continued to express that the Initiative was effective in reducing hospitalizations, despite the challenges of high staff turnover, decreased opportunities for billing, and fewer eligible residents due to increasing Medicare managed care penetration. Consistent presence of the MOQI embedded APRN continued to be viewed as the most critical element and most valued NFI 2 component for Clinical + Payment facilities. Clinical + Payment and Payment-Only interviewees attributed their perceived Initiative successes of reducing hospitalizations to improvement in the nurses' clinical judgement and self-confidence because of education on the six qualifying conditions and one-to-one coaching at the point of care. The ECCP leadership described the most notable successes of MOQI as the development of Health IT systems, along with the use of INTERACT tools, and the increase in EOL conversations. Facility and ECCP staff were optimistic they will be able to sustain all Initiative strategies to reduce hospitalizations, except funding for an APRN position.

For the coming year of data collection, RTI will continue the following:

- Observe the billing frequency among Clinical + Payment and Payment-Only facilities, with emphasis on Payment-Only facilities who are not billing and assess the impact of recoupment on billing and engagement.
- Evaluate the sustainability of NFI 2 model components, further exploring MOQI's business plans to disseminate nursing facility best practices at a national level.
- Assess progress with the Missouri and federal legislation to expand the scope of APRN practice in Missouri that address work and billing restrictions for APRNs working in long-term care.
- Assess the progress and effectiveness of the ACO nursing facility consortium in disseminating best care practices across the participating nursing facilities and across nursing facilities in other state regions.
- Assess the impact of Medicare managed care penetration and resident care by APRNs working for a Medicare managed care organization or hired by a physician practice.
- Explore plans for Initiative sustainability by both MOQI leadership and facility leadership and staff.

## APPENDIX E

### NEW YORK REDUCING AVOIDABLE HOSPITALIZATIONS (NY-RAH)

#### E.1 Overview

##### *2019 NY-RAH Site Visit and Telephone Interview Findings*

##### **Key Findings:**

- At the start of Initiative Year 3, the NY-RAH ECCP shifted their Clinical + Payment model by eliminating the Registered Nurse Care Coordinator (RNCC) position and created new Quality Improvement Specialist (QIS) and Clinical Project Specialist (CPS) positions; the model remains education-only. The transition from RNCCs to QISs resulted in gaps in embedded ECCP staff support for many Clinical + Payment facilities, which negatively affected their ability to sustain the payment initiative.
- Payment-Only facilities, not directly affected by the model change, continued to engage and submit claims regularly; however, the updated clinical criteria for the six qualifying conditions greatly affected some facilities' abilities to meet the new criteria, and caused a reduction in claims submission.
- Practitioner engagement and increased use of the G9685 practitioner billing code continued to be a major priority with the introduction of CPS role for Clinical + Payment facilities at the beginning of Initiative Year 3, which saw limited success. In Payment-Only facilities, not supported by CPSs, some practitioners continue to submit claims.
- The ECCP introduced a new Tableau report to help all facilities identify missed billing opportunities. Facilities reported challenges accessing the reports and provided feedback that the year data lag prevented the reports from providing any actionable insight.
- In the last quarter of Initiative Year 3, the ECCP started a new pilot project, guided by both QISs and CPSs, called rapid cycle performance improvement projects (PIPs). The intent of these projects was to reduce avoidable hospitalizations at the four largest Clinical + Payment facilities with the highest number of hospitalizations.

Though the model remained education-only, the ECCP made a major shift in their staffing model for the Clinical + Payment facilities at the start of Initiative Year 3. The ECCP RNCCs, registered nurses working in the Clinical + Payment facilities since the start of NFI 1, were eliminated, and new QIS positions were introduced. This new staffing model shifted the support in facilities from ECCP clinical consultants (i.e., the RNCCs) to having consultants focused on quality improvement (QI). The ECCP initially intended to have many of their existing RNCCs transition to the new QIS role, but many RNCCs did not have the required quality improvement and data interpretation skillsets. This resulted in long hiring delays for the QIS positions. The Centers for Medicare & Medicaid Services (CMS), concerned with the potential impacts on implementation, issued a Programmatic Assistance Letter (PAL) to the ECCP in mid-January 2019 after the delay in hiring QISs persisted. Although the ECCP had hired 9 of 11 QISs by December, facility leadership indicated

most QISs were not in place and assigned to facilities until March 2019. Also, because of the quick turnover among some of the newly hired QISs, a few facilities experienced delays with QIS assignment until summer 2019. These delays resulted in multiple Clinical + Payment facilities not submitting claims during this staffing gap.

**Table E-1. 2019 data collection summary**

Number of facilities participating as of site visit date (September 16–20, 2019 [Payment-Only] and October 21-25, 2019 [ECCP and Clinical + Payment])	55
Number of facility ownership changes since 2018 site visit	0
Number of facilities withdrawn or removed from Initiative since 2018 site visit	4

All data described in this report were collected in calendar year 2019. The RTI team completed in-person interviews with four Payment-Only facilities from September 17 to 19, 2019. The RTI team completed in-person interviews with ECCP leadership and staff from four Clinical + Payment facilities from October 21 to 25, 2019. We interviewed a variety of staff at these facilities including nursing facility administrators (NFAs), directors of nursing (DONs), assistant directors of nursing (ADONs), practitioners, billing/finance coordinators, and other nursing staff. These site visits followed 41 telephone interviews conducted April to July 2019 with ECCP QISs and CPSs; facility NFAs, DONs, ADONs, medical directors; and other facility staff. **Table E-2** summarizes the site visit and telephone interview findings for facility staff buy-in and implementation.

**Table E-2. Site visit and phone interview summary findings: 2019 facility staff buy-in and implementation**

Facility staff buy-in and implementation	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone or in-person)	37*	19*	18
Interviewer perceptions of buy-in to NFI 2			
High	20	8	12
Medium	12	6	6
Low	5	5	0
Number of facilities that hired new staff in 2019 because of NFI2	6	3	3
Number of facilities with resident opt-outs in 2019	1	0	1
Number of facilities reporting that NFI 2 has been effective in reducing potentially avoidable hospitalizations	24	10	14

\*At one Clinical + Payment facility, we completed both a telephone interview and site visit because another nursing facility previously selected for a site visit was removed from NFI 2 by the ECCP. This facility has been counted once in the totals.

NOTES: RTI interviewed 37 of the 55 participating facilities. Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing and/or have not trained staff on the six qualifying conditions; generally limited engagement and limited participation in NFI 2.

Based on interviews with ECCP leadership and facility staff, RTI identified the following key findings:

- Clinical + Payment facilities underwent a major staffing model change when the ECCP replaced the RNCCs with QISs. Although the staffing model shifted it did not affect the original intention of model's design, remaining education-only with the new QIS and CPS not providing any direct, clinical services to eligible residents. The ECCP leadership's intent was to improve QI processes and to make the Initiative more sustainable. ECCP leadership indicated the new QIS positions were difficult to fill, resulting in many facilities having a gap in ECCP staffing for 5 or more months. Consequently, multiple facilities reported a significant gap in claims submission, as the RNCCs had been responsible for the claims submission, which was not the intent of the ECCP model.
- The ECCPs' newly introduced CPSs (n=2) initially focused on increasing Clinical + Payment practitioner use of the NFI 2 G9685 code for practitioner billing. CPSs reached out to all facility medical directors and eligible practitioners and were able to contact all but two. However, the ECCP identified very little return on this investment, and near the end of the Initiative year, the ECCP decided CPSs would focus on practitioner engagement to aid nursing facility claims submission including assisting with the rapid PIPs.
- Payment-Only facilities not directly affected by the staffing model change continued to engage and submit claims regularly, although more Payment-Only facility staff commented the number of claims they had submitted reduced because of the changes to the clinical criteria, specifically the UTI criteria. Some Payment-Only practitioners continued to submit claims.
- The ECCP rolled out new Tableau reports to assist all facilities with QI, to identify missed billing opportunities, and to increase the timeliness of claims submission. A Tableau report, named The Potential Missed Opportunities Dashboard, was introduced to all facilities in the summer of 2019. The success of these reports is still in question as facility NFAs, most commonly assigned access to the Tableau reports, infrequently described using these although QIS frequently cited accessing and reviewing the reports with their facility contacts. Some facility leaders also cited the timeliness of the data as an issue and in some cases said the data were not applicable because staff and leadership has since turned over.
- The ECCP started a new rapid cycle PIP project in the last quarter of Initiative Year 3. This pilot focused on four Clinical + Payment facilities. Facilities chosen for the pilot had the highest number of eligible residents and the highest number of hospitalization rates. The goal of this targeted effort was to reduce hospitalizations in these outlier facilities with the overall goal of reducing hospitalizations and influencing the NY-RAH Clinical + Payment evaluation results.

## **E.2 Changes to Model and Implementation in 2019**

The ECCP made changes to their staffing model at the start of Initiative Year 3, directly impacting Clinical + Payment facility engagement and stalling claims submission.

### **E.2.1 Changes to Structure and Model**

At the start of Initiative Year 3, the ECCP eliminated the RNCC positions and introduced half as many QIS positions to assist facilities with implementing a more sustainable billing workflow and to provide consultation on PIPs to reduce avoidable hospitalization rates. We describe the impact of this change on facility engagement in more detail in **Section E.2.4**.

### **E.2.2 Learning Community Activities**

Most of the Clinical + Payment facility interviewees reported participating in Learning Community activities. About half of Payment-Only facilities reported not participating in Learning Community activities. Of those who did participate, about half reported these were very valuable, and half reported that they were somewhat valuable.

The ECCP's webinars (i.e., their Learning Community activities) in the past year focused on a variety of topics for all facilities, including education related to the new Tableau reporting, implementation contractor's onsite audit findings and new reporting requirements, the revisions to the clinical criteria for the six qualifying conditions, and nursing documentation. In Clinical + Payment facilities, additional trainings emphasized nursing documentation and advance directives. Most [NY-RAH webinars](#) are publicly available, as they have been in the past.

### **E.2.3 New Developments with INTERACT Tools and Other Components**

The NY-RAH model continued to focus on elements and tools that may facilitate reductions in avoidable hospitalizations and introduced new methods and tools to align with the new QIS role. Along with these changes, the ECCP decided to reduce focus and assistance for Clinical + Payment facilities' use of the SBAR and Stop and Watch. Multiple members of ECCP leadership stated this change was because their dedicated focus and resources had been ongoing since NFI 1, but with little improvement among many Clinical + Payment facilities. In addition to this change, the ECCP incorporated new methods or tools to assist facilities with reducing avoidable hospitalizations, including Tableau reports and the rapid cycle PIPs. PIPs, part of the QIS and CPS roles, are described in **Section E.2.4**.

Tableau reports, available to both facility groups, were implemented in late summer 2019 (therefore, only Clinical + Payment facility staff visited in-person could comment). QISs help Clinical + Payment leadership staff use the Tableau reports by providing login information and providing interpretation of their facility's data; Payment-Only facilities receive no support. The Potential Missed Opportunities Dashboard, the first Tableau report, was introduced by QISs to Clinical + Payment facility leadership from late summer to early fall. The QISs goal was to train each facility's Payment Liaison<sup>2</sup> to access the report independently at least one time. However, by late October, ECCP leadership reported that few NFAs (only 7 of 25 Clinical + Payment facilities and 10 of 30

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<sup>2</sup> Payment Liaisons are facility-based staff, selected by facilities at the end of 2018, ahead of the elimination of the RNCCs and introduction of the QISs. Payment Liaisons are the NY-RAH coordinator in each Clinical + Payment facility and monitor documentation, changes in condition, and may enter NY-RAH required portal data.

Payment-Only facilities) had accessed the dashboard. ECCP leadership planned to expand access to the dashboard beyond just NFAs in an attempt to get more facility staff to log-in. A second claims-based report, The Hospital Transfers Dashboard had also been developed but was not implemented until after our site visit.

In addition to the challenge of engaging leadership to access a new software program, the MDS and claims data used to construct the Tableau reports, are currently on a 1-year lag. A few Clinical + Payment facility staff commented on the data lag stating that the Tableau data are too old to be useful; this sentiment was also echoed by a few QISs. In addition, one ECCP staff member commented that Clinical + Payment facilities were “*experiencing an overload*” in the amount of data provided by the ECCP. Although a few QISs commented that the facilities found the Tableau reports helpful, at least two QISs commented that their facility contacts disregard these reports because of the data lag, which undermines the ECCP’s goal to provide actionable data to facilities. Perhaps disappointingly, the excitement around the new Tableau reports failed to materialize as most facility interviewees failed to mention them during their interviews.

Toward the end of Initiative Year 3, the ECCP started a rapid cycle PIP with four Clinical + Payment facilities. Facilities selected to participate had the highest hospitalization rates. QIS and CPS staff work together with these four facilities to identify areas for reducing avoidable hospitalization rates. ECCP leadership commented that their rationale for implementing this project was to reduce avoidable hospitalizations among their largest facilities with the highest hospitalization rates, with the hopes of positively affecting their NFI 2 evaluation results. This intervention, if successful, will be disseminated to other Clinical + Payment facilities in Initiative Year 4. RTI will continue to inquire about outcomes associated with these projects in Year 4.

Finally, reducing or eliminating ECCP-guided support for INTERACT tools (e.g., SBAR and Stop and Watch) did not prevent facility interviewees from highlighting their use as a strength of their facility’s NFI 2 process. Examples of their continued importance include two facilities who said that the SBAR had recently been integrated with their electronic medical record (EMR), and one facility re-educated all facility staff (e.g., all clinical staff and nonclinical staff) on using this tool. Likewise, most Payment-Only facilities we spoke to reported using the INTERACT Tools. Most reported using both the SBAR and Stop and Watch, but the SBAR continues to be the most prevalent.

#### **E.2.4 Changes in Role of ECCP Staff**

The biggest change in the third year of NFI 2 was the ECCP’s decision to shift the Clinical + Payment model away from RNCCs to QISs, resulting in an implementation delay for multiple Clinical + Payment facilities. The next sections describe the primary roles of the QISs and the delay and perceptions of the QISs by leadership at Clinical + Payment facilities. A final section also describes the roles and functions of the newly added two CPSs.

##### ***Background and Role of the QIS***

QISs have a variety of backgrounds, but a majority have no clinical training or long-term care experience. A key requirement for the QIS position was experience working with data and the

ability to use data to inform QI. QISs have two primary functions in their assigned facilities. Their first role is to promote a sustainable billing workflow, and their second is to facilitate PIPs to reduce avoidable hospitalizations. The description for the role of the QISs is derived from our interviews with ECCP staff and the QISs since many facility staff could not describe their roles in detail. QISs began by working with facilities, primarily the facility's designated Payment Liaison, to identify how facilities approach the Initiative, including who in the facility is responsible for reviewing eligible conditions, who completes all required data entry, and who is responsible for review and submission of claims (i.e., the billing workflow). Previously, the ECCP RNCCs were often the Initiative point person in each facility, effectively acting as their Payment Liaison, in addition to training staff on the clinical criteria. QISs new roles were to help facilities identify and support the best in-house facility staff to sustain all billing workflow processes, including a Payment Liaison.

The other primary role of the QISs is to assist facilities with identifying PIPs to reduce avoidable hospitalizations in each of their assigned facilities. The PIPs started in late summer, with the release of The Potential Missed Opportunities Dashboard (i.e., a report showing potential missed billing opportunities), and will have four Plan-Do-Study-Act (PDSA)<sup>3</sup> cycles over the last Initiative year. The intent was for the QISs to review potential missed billing opportunities with their facility contacts to help facilities inform selection of their PIPs.

During our site visits, Clinical + Payment facility leadership reported little to no PIP progress, likely because most efforts were just starting. Some QISs reported starting PIPs with their assigned facilities as of late summer, while others were still considering their PIP focus in late October, and a few others had yet to start the PIP process. Of those QISs who had an early start on determining PIP projects, the following breaks down the focus of these efforts: establishing/optimizing facility billing and workflow (n=3 nursing facilities), increasing advance directives (n=3 nursing facilities), reducing transfers from ventilator units (n=2 nursing facilities), increasing documentation via INTERACT tools (n=3 nursing facilities), and reducing hospital transfers related to UTIs and CHF (n=2 nursing facilities). The ECCP commented that they tried to sway facilities from selecting INTERACT focused PIPs but that a few facilities still chose it.

### ***Facility Challenges with Quality Improvement Specialist***

One of the biggest challenges during the staffing transition was the delayed hiring. Most QISs were not hired by the end of October 2018, following the elimination of the RNCCs. Speaking to many of the Clinical + Payment facilities, we identified a gap of 4 or more months in ECCP staffing in eight facilities. Three of these facilities had gaps for over 6 months and one had a gap of 8 months. In addition, two QISs were hired in June for facilities that had early QIS turnover.

Several NFAs lamented the loss of the RNCC role and/or a lack of any ECCP staff in their facility for several months as a challenge. QISs also commented that multiple facilities had stopped billing during this staffing gap. Some facilities caught up on their billing lag, while others were still

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<sup>3</sup> Plan-Do-Study-Act is an iterative, four-stage problem-solving model used for improving a process or carrying out change (source: <http://www.ihl.org/resources/Pages/Tools/PlanDoStudyActWorksheet.aspx> .

catching up as of late summer. This comment from one NFA captures the frustration facilities experienced after the RNCCs were eliminated, *“I find the new initiative with switching from the clinical person to the QI person [QIS] not really fruitful. We’re in the billing phases, and the old clinical person [RNCC] used to be very helpful at helping us with the billing process. Until recently, the QIS wasn’t helpful, but I think that’s by design. I’m very disappointed in the QIS, and with the whole concept and individual as well.”*

This quote from another NFA reveals that some facilities never really recovered after the loss of the RNCC *“There has been a change in the structure of the program. They changed the program from having nurse liaisons. There has been a gap in having the QI specialist. They recruited someone, and she started and left after a day. Been another month to get someone else on board, and that person has been here twice since they introduced us 2 weeks ago. Not a lot of traction with the program since the past year. No billing since June 2018 [10 months].”* Staff from many Clinical + Payment facilities shared this sentiment, even though a few facilities expressed satisfaction with their QIS. One NFA described their QIS as equally competent to the previous RNCC.

A misalignment with the QISs role and the project goals was also described by a few NFAs; for example, one NFA questioned their QIS’s background, indicating a discrepancy with the project’s clinical goals, *“We found that when they eliminated the RNCC, even I noticed a difference. It’s not against the data person; it’s the role. Doesn’t seem to make sense, since we are dealing with clinical protocols and clinical data where NY-RAH was already doing data and giving it to us.”* Similarly, another NFA stated, *“[It] wasn’t clear to us what the role of the QI specialist [QIS] was going to be. When I said something about the QI specialist [QIS] about being a nurse, she said she’s not a nurse.”* A few other facilities also described their QISs as inactive in their facilities because they only work with one contact (e.g., the NFA, DON or quality assurance staff) to develop the NY-RAH PIP projects and rarely visit the facility in person.

QISs were better able to articulate their roles than facility leadership. As one QIS described, *“I go to morning report. After morning report, I meet with leadership if any updates such as billing or [advance directive] reports from NY-RAH. I can go straight to work with the liaison who is responsible for NY-RAH work. I work with the same person the RNCC worked with. Our goal—she does everything on her own, she likes to have second set of eyes. We review, we move onto anything I need from her as far as reporting.”* Another described the role by saying, *“I have positioned myself as a consultant.”* These quotes are especially important in highlighting the varied levels of QIS engagement within the Clinical + Payment facilities.

### ***Clinical Project Specialist Challenges***

As previously mentioned, the ECCP also created two new CPS staff positions, to increase buy-in and use of the G6985 billing code among certified practitioners. The CPSs split the Clinical + Payment facilities and contacted all certified practitioners (approximately 160 practitioners), mostly by phone. They also attempted contact with all facility Medical Directors. The ECCP facilitated these contacts by providing the CPS with lists of practitioners who had or had not billed. The purpose of the call was to assess barriers and challenges with using the billing code. CPS found

the biggest barrier cited by practitioners was not knowing the NFI 2 eligibility status of a resident. In addition, practitioners also cited the “onerous” documentation requirements as a barrier to using the practitioner billing code. ECCP leaders commented that although the CPS contacted almost all practitioners through this effort, there was still little engagement with the billing code. At the end of Initiative Year 3, the ECCP pivoted the role of the two CPSs to focus on practitioner challenges that may impede nursing facility claims submission in addition to supporting the four facility rapid-cycle PIPs.

### **E.3 Sharing Collaborative Activities in 2019**

For Initiative Year 3, ECCP staff reported little to no participation in sharing collaborative activities, stating their perceived lack of utility and also noting that overall interaction with CMS has decreased. ECCP staff reported attending monthly conference calls to present data and day-to-day issues but commented that these calls are often cancelled, and written materials are provided to CMS instead. Similar to previous Initiative years, ECCP staff reported that leadership from ECCPs are more comfortable contacting each other directly to ask questions and collaborate with one another.

### **E.4 Changes to Facility Staff and Practitioner Engagement in 2019**

There were few changes to staff or practitioner engagement in Year 3. A few Clinical + Payment facilities hired previous ECCP facility-based staff back (e.g., RNCCs) to assist with NFI 2 activities. As described previously CPSs focused on practitioner engagement throughout most of the Initiative year but saw almost no increased use of the practitioner billing code (G6985) (see **Section E.2.4**).

#### **E.4.1 Facility Staff**

Of all staff types interviewed, across both facility types, facility leaders continued to be the most engaged in NFI 2. This core group includes NFAs, DONs, MDS nurse coordinators, staff educators, business office managers, and other administrative staff. As in previous years, facility leaders frequently cited that protocols for identifying and documenting changes of a resident’s condition to reduce avoidable hospitalizations were a priority for all residents, regardless of payor or resident eligibility. These leaders said they often did not inform clinical staff, other than nursing supervisors about payment incentives or distinguish NFI 2-eligible residents.

To build capacity in nursing facilities to support the goals of the Initiative, three Clinical + Payment facilities and three Payment-Only facilities reported hiring new staff to support the Initiative. ECCP leadership reported a total of four Clinical + Payment facilities hired their former NY-RAH RNCCs to assist with the Initiative and act as their official NY-RAH Payment Liaison. Their responsibilities, very similar to their previous RNCC roles, include identifying acute changes of condition, auditing NFI 2 claims submissions to ensure the facility bills correctly, and entering all data into the NY-RAH data portal. One facility commented that the cost to hire their RNCC was budget neutral considering the reimbursement income they expect to receive as a result of participating in the Initiative. In both Clinical + Payment and Payment-Only facilities, interviewees said that identifying

a payment liaison that champions facility billing is key to successful implementation of the payment incentive.

#### **E.4.2 Practitioners**

As reported in previous years, practitioners across both facility groups are primarily engaged with certifying conditions and providing documentation for the facility to submit claims. Several Payment-Only facilities stated that support and buy-in from their medical director and other practitioners was a key to facility success with NFI 2. However, we found variability with practitioner billing through use of the G9685 code across Clinical + Payment and Payment-Only facilities. Less than half of the interviewed Clinical + Payment NFAs reported that practitioners were billing under the Initiative. In addition, no Clinical + Payment practitioner interviewees (n=12) were using the code. Two Clinical + Payment practitioners commented that the reimbursement amount was not enough to incentivize practitioners. The few Payment-Only practitioners we spoke to in person stated they were submitting claims.

As mentioned in **Section E.2.4**, CPSs were hired in Initiative Year 3 to facilitate Clinical + Payment practitioner's use of the G9685 code for NFI 2 billing. Notably, the ECCP again pivoted toward the end of Initiative Year 3 and made the decision to no longer focus on trying to increase practitioners' use of this code.

#### **E.5 Updates for Documenting and Certifying Six Qualifying Conditions**

Most participating facilities did not report changes to their documentation and certification processes for the six qualifying conditions. Consistently, they emphasized the use of morning report or 24-hour report and SBARs as the standard protocol for identifying residents with a change of condition. Continuous education on the six qualifying conditions and their clinical criteria kept nurses engaged and improve their clinical capabilities to identify and treat the conditions. Similar to last year, Clinical + Payment and Payment-Only facilities also reported that they were able to identify changes in a resident's condition before any of the clinical criteria requirements were met, meaning that those residents did not meet the qualifications to bill under NFI 2.

Several Payment-Only facilities expressed frustration with the changes CMS made to the clinical criteria in 2019 and reported that the changes greatly affected facility participation in the Initiative because fewer resident met the new criteria. Multiple facility staff described the updated clinical criteria definitions for UTI as a challenge. Specifically, the removal of the altered mental status criteria greatly reduced facilities' ability to bill for residents with dementia, for whom the altered mental status could be the first indication of a UTI diagnosis. A few facilities also described the criteria changes reducing billing, although less frequently, for cellulitis and pneumonia. Although facilities said the criteria restricted their identification of qualifying conditions, they maintained that they were still able to catch changes in conditions early and treat in place.

SSS-T's annual audits identified nursing documentation as another area of improvement for Clinical + Payment facilities. These findings led to the ECCP conducting a training session on the

importance of documentation and their decision to offer and pay for a customized documentation assessment and training for 12 Clinical + Payment facilities. ECCP leadership stated that training was limited to 12 facilities because of funding constraints. An outside consultant, the CMS Compliance Group, provided the assessment and training; this independent organization, based in Long Island, assists nursing facilities to prepare for state surveys. Their services include an in-depth review of a nursing facility's documentation practices followed-up by a report that provides recommendations for areas for improvement. They then create training sessions to improve facility nurse's documentation. The assessments were ongoing during the time of our site visit, and a few facilities reported mixed reviews of the findings. All four facilities participating in the rapid cycle PIPs were strongly encouraged to participate in the training.

## **E.6 Updates to Existing Billing Practices**

There were some changes to facility billing practices in Initiative Year 3 because of new tools the ECCP introduced, including the previously described Tableau reports provided to all facilities and a Monthly Billed Facility Episodes Report. CMS also identified conditions that Clinical + Payment and Payment-Only facilities recertified and billed beyond the 14-day benefit period. CMS asked the ECCP to review documentation for the conditions and determine if the episodes were billed appropriately (with proper recertification criteria) or inappropriately (for which they would receive recoupment notices). Results of this review are described in Section E.6.2.

### **E.6.1 ECCP Tools and Support**

In June 2019, the ECCP implemented new Tableau reports, to all facilities, previously described in **Section E.2.4** with little success. The ECCP also added the new Monthly Billed Facility Episodes Report to address gaps in billing for all facilities. The ECCP designed this report to help facilities that are infrequently billing to identify gaps in time between payment and when a qualifying episode was documented. No facilities provided feedback on this report but a few Clinical + Payment facility staff commented they had increased their billing frequency.

### **E.6.2 Facility Billing and Recoupment**

In Initiative Year 3, the ECCP staffing model change impacted billing in several Clinical + Payment facilities, as described in **Section E.2.4**. Payment-Only facilities reported no such interruptions in billing, although billing frequency varied widely. Reported billing ranged from one claim to upwards of 10 claims submitted per month. Most facilities continued to use spreadsheets to track documentation and clinical criteria requirements to ensure they were meeting the requirements for NFI 2 billing.

During the recoupment process, the ECCP leadership noted that their case load for the extended benefit period recoupment (i.e., cases billed more than 14 days) reached up to 39 cases, the most of any of the ECCPs. In total, 15 facilities across Clinical + Payment and Payment-Only facilities had claims recouped during this process. ECCP leadership stated that the facilities encountered multiple challenges reconciling these cases because many had been submitting since the start of NFI 2 and the cases had already been closed by their Medicare Administrative Contractor (MAC).

Other than the extended benefit period recoupment, the ECCP said they did not experience much pushback from facility leadership during recoupment. Instead, many facilities were relieved that SSS-T audits were not meant to be punitive and that wrongly filed claims were not used to estimate recoupment payments beyond those sampled during the SSS-T audit. A few facilities shared they had received recoupment notices and had resolved the cases.

### **E.6.3 Practitioner Billing and Recoupment**

There were no changes to the processes for practitioners to bill, and we did not learn of any recoupment with practitioners.

## **E.7 Updates to Data Collection**

New challenges with the ECCP's data collection and facility reports occurred during Initiative Year 3, driven by replacement of the RNCCs with QISs. RNCCs had previously helped all Clinical + Payment facilities enter ECCP required data into the NY-RAH portal. The portal collects information on resident census and eligibility data, resident hospitalization data, and Medical Orders for Life-Sustaining Treatment (MOLST) forms status and additional resident end-of-life (EOL) preferences. At the time of our site visit, ECCP leadership reported that many facilities were no longer entering hospitalization and EOL data into the portal. Because of this, the Hospital Transfer Report and the Palliative Care Report, which use this data, were invalid for most facilities. The ECCP also stated it had deprioritized the data entry required for the Palliative Care Report, as they thought the Hospital Transfer Report was a higher priority to help facilities improve. As previously noted, we learned that four facilities had rehired previous RNCCs to complete all NY-RAH required data entry.

## **E.8 Update on the Perceived Effectiveness of the Initiative in 2019**

Similar to previous years, most participating facilities believed that the Initiative was having the desired effect on reducing hospitalizations, but some reported that it was hard to determine whether reduced hospitalizations were the result of the Initiative or the result of other efforts to reduce hospitalizations and rehospitalizations. Residents and families have no direct interaction with the goals and operations of the Initiative, except for its impact on their experience of care and clinical outcomes.

### **E.8.1 Facility Staff Perceptions of Potentially Avoidable Hospitalizations**

Most Clinical + Payment and Payment-Only facilities believed that the Initiative was having the desired effect of reducing potentially avoidable hospitalizations. One facility leader who thought the Initiative was helping to reduce hospitalizations said, *“Overall there has been a positive effect in reducing hospitalizations on all the units including the rehab unit. Once we started with NY-RAH, we focused on the six [qualifying] conditions. From the rehab to CNAs to LPNs, everyone has become involved. We have really streamlined with implementing SBAR and Stop and Watch policies. It has been an overall positive effect.”* However, not all facilities agreed, indicating that the Initiative was not solely responsible for their transfer reductions. For example, leadership at one Payment-Only facility said, *“This facility had a strong practice and history in treating people onsite*

*before the NY-RAH Initiative. It didn't really impact because we were already doing that which NY-RAH was trying to encourage." Similarly, a leader at another facility said, "Our numbers prior to that were pretty low. We were already doing INTERACT before the Initiative. We didn't measure as closely as we should for our long-stay population. Our numbers for CMS have been quite low. The long-term population is less than half the national average. I don't know if NY-RAH has impacted that. It has helped us benefit from what we were already doing."*

## **E.8.2 Residents' and Families' Perceptions of NFI 2**

There were no changes with how facilities engaged residents and families in Initiative Year 3. No Clinical + Payment facilities reported any residents opting out, while only one Payment-Only facility had an opt-out. Interviewees reported that this resident was fearful of sharing data.

## **E.9 New Reports of Spillover and Contamination Effects**

Similar to previous years, the majority of Clinical + Payment and Payment-Only facilities reported treating all residents in their facilities the same, regardless of NFI 2 eligibility. For example, leadership at one Payment-Only facility said, *"We make it our standard of care for all residents whether rehab, long term, or eligible or not—any resident with a change in condition. All staff participated in INTERACT training they know to report anything they see differently."* Similarly, leadership at a Clinical + Payment facility said, *"We use the same standard whether they are NY-RAH eligible or not."*

## **E.10 Updates to Policies and External Stakeholders**

Facility staff continued to describe little involvement or engagement by hospitals for NFI 2, as reported in previous years. In terms of the larger policy environment, facilities we met with during site visits reported being somewhat distracted by the changes to Medicare SNF payment policies under the Patient Driven Payment Model (PDPM) that went into effect on October 1, 2019, as well as changes to Medicaid case-mix methodology that have been proposed for New York.

### **E.10.1 Hospital Engagement**

Fewer than half of interviewees at Payment-Only facilities reported that local hospitals were aware of the Initiative, while just over half of the Clinical + Payment facilities reported that local hospitals were aware of the Initiative.

### **E.10.2 Competing or Similar Initiatives**

Just over half of Payment-Only facilities stated that they were aware of, or participating in, other initiatives or programs with goals similar to the Initiative. Some Clinical + Payment and Payment-

Only facilities participate in the New York’s Medicaid Delivery System Reform Incentive Payment (DSRIP)<sup>4</sup> program, as described in previous years.

### **E.10.3 Policy Environment**

Some facilities we visited in-person reported being distracted by changes in Medicare and Medicaid payment policies likely because the timing of our site visits which coincided with roll out date of the Medicare SNF PDPM on October 1, 2019. Announcement of proposed changes to New York’s Medicaid case-mix index payment methodology happened during the summer.

### **E.11 Initiative Sustainability and Plans for the Future**

Only a few Clinical + Payment facilities commented that they would continue their NFI 2 processes if the Initiative ended. A few Payment-Only facilities said they would continue the protocols for the six qualifying conditions, while another facility interviewee stated they would continue using the SBAR and Stop and Watch, commenting, *“We have become so used to it.”* One Payment-Only NFA commented that their staff had gained new clinical skills which would remain but that *“the documentation pieces would probably fall.”* Likewise, a Clinical + Payment facility stated that the clinical interventions would remain in place, but that documentation would not. This same facility commented on the usefulness of the new processes beyond NFI 2, stating, *“We found this to help improve our care, and I believe we would still continue to review hospital transfers.”*

### **E.12 Next Steps**

For the coming year of data collection, RTI will continue the following:

- Monitor the new QIS staffing model and its potential continued effect on Clinical + Payment facility engagement.
- Follow the progress of the QIS-guided PIPs and the four rapid cycle PIPs, implemented in Clinical + Payment facilities.
- Observe facility billing frequency among all facilities and recoupment effects.
- Determine if the CPS role facilitates practitioner engagement with nursing facility billing workflow (not practitioner billing engagement).
- Describe practitioner engagement and billing frequency.
- Evaluate the sustainability of NFI 2 model components, including whether the ECCP enacts specific sustainability goals for Clinical + Payment facilities to meet by the end of the Initiative.

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<sup>4</sup>The DSRIP program, which has been ongoing since 2015, is New York’s Medicaid redesign program and has a similar NFI 2 goal to reduce avoidable hospitalizations among various community health care settings, including nursing facilities and skilled nursing facilities.

**APPENDIX F**  
**OPTIMIZING PATIENT TRANSFERS, IMPACTING MEDICAL QUALITY, AND**  
**IMPROVING SYMPTOMS: TRANSFORMING INSTITUTIONAL CARE (OPTIMISTIC)**

**F.1 Overview**

***2019 OPTIMISTIC Site Visit and Telephone Interview Findings***

***Key Findings:***

- Several interviewees from both Clinical + Payment and Payment-Only facilities reported that the number of episodes billed decreased compared to last year because of improved clinical ability of staff to recognize changes in condition early, staff and physician turnover, and the change in criteria for UTIs and skin infections.
- OPTIMISTIC leadership reported that they expended more resources this year to meet with practitioners to encourage greater utilization of the billing codes. They added that that 75 percent of episodes billed by facilities have a corresponding practitioner bill.
- Payment-Only facilities expressed a desire for more education and resources. The Clinical + Payment facilities expressed satisfaction with the amount of education received, which is provided largely by the OPTIMISTIC RN.
- OPTIMISTIC reported that, currently, the rates of episodes billed for Clinical + Payment and Payment-Only facilities are trending to the same rate.
- Regarding sustainability, the responses from facilities were mixed, with most stating that they plan to continue using the materials provided by OPTIMISTIC.

The OPTIMISTIC model itself was unchanged in 2019. However, the ECCP enhanced implementation of the model for the purpose of increasing practitioner engagement in Clinical + Payment and Payment-Only facilities.

**Table F-1. 2019 data collection summary**

Number of facilities participating as of site visit date (August 20, 2019)	40
Number of facility ownership changes since 2018 site visit	0
Number of facilities withdrawn or removed from Initiative since 2018 site visit	0

This report highlights telephone interviews and site visit findings collected in 2019. The RTI team completed two on-site visits from August 5, 2019 to August 9, 2019 (Clinical + Payment facilities and ECCP headquarters) and from September 16, 2019 to September 20, 2019 (Payment-Only facilities). The team interviewed 9 members of the OPTIMISTIC leadership team, 7 OPTIMISTIC nurses (RNs and advanced practice registered nurses [APRNs]), and 35 facility staff members, including nursing facility administrators (NFAs), directors of nursing (DONs) and assistant directors of nursing (ADONs), charge nurses/unit managers, minimum data set (MDS) nurses, billing

coordinators, certified nursing assistants (CNAs), an Activities Director and non-OPTIMISTIC APRNs. In addition, the team conducted a telephone interview with a representative from one facility's corporate billing office.

Additionally, from March to April 2019, the evaluation team completed a total of 23 telephone interviews with participating Clinical + Payment and Payment-Only facilities. Facility interviews were conducted with NFAs, DONs, ADONs, MDS nurses, billing coordinators, care transition nurses, a facility VP of Finance, a facility CEO, a Social Behavioral Wellness Coach, and an INTERACT Nurse. **Table F-2** shows the site visit and telephone interview summary findings for facility staff buy-in and implementation.

**Table F-2. Site visit and phone interview summary findings: 2019 facility staff buy-in and implementation**

Facility staff buy-in and implementation	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone or in person)	29	13	16
Interviewer perceptions of buy-in to NFI 2			
High	13	7	6
Medium	9	5	4
Low	7	1	6
Number of facilities that hired new staff in 2019 because of NFI 2	0	0	0
Number of facilities with resident opt-outs in 2019	5	3	2
Number of facilities reporting that NFI 2 has been effective in reducing potentially avoidable hospitalizations	18	8	10

NOTES: RTI interviewed 29 of the 40 participating facilities. Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing and/or have not trained staff on the six qualifying conditions; generally limited engagement and limited participation in NFI 2.

Based on interviews with ECCP leadership and facility staff, RTI identified the following key findings:

- Both Clinical + Payment and Payment-Only facilities reported that the number of episodes billed decreased compared to last year because of improved clinical ability of staff to recognize early identification of changes in condition, staff and physician turnover, and the change in criteria for urinary tract infections (UTIs) and skin infections. It was noted that OPTIMISTIC has worked to increase practitioner engagement and reported 75 percent of episodes billed by a facility have a matching bill submitted by the practitioner.

- The OPTIMISTIC RN role continues to be an essential component of the model and is highly regarded by the Clinical + Payment facilities. The role of the OPTIMISTIC RN in these facilities included assisting with NFI 2 documentation, educating, having end-of-life (EOL) conversations, coordinating between practitioners, clinical and billing staff, and in a few facilities, performing day-to-day facility duties (such as transportation arrangements) because of lack of facility staff. In both Clinical + Payment and Payment-Only facilities, most interviewees thought resources and assistance provided by OPTIMISTIC were sufficient; however, some Payment-Only facilities had expressed they would have appreciated more OPTIMISTIC education.
- Clinical + Payment facilities were generally more satisfied with the education and resources they received, which were primarily provided by the OPTIMISTIC RN. Facility leaders in Payment-Only facilities noted that they would benefit from more education and resources from the ECCP. Even though the Payment-Only facilities wanted more education and resources, OPTIMISTIC leadership stated that rates of billing were trending the same between the two groups.
- OPTIMISTIC leadership and certifying practitioners did not express concerns about the changes to the criteria for the six qualifying conditions; however, the facilities did express concern. Specifically, interviewees from both facility groups stated it became more difficult for them to certify UTIs and skin infections using the revised clinical criteria since fewer residents met the criteria.
- Both Clinical + Payment and Payment-Only facility interviewee responses were mixed regarding the ability to sustain interventions that were implemented during the Initiative. Some facilities thought that the components of the model were “built” into their facility culture and would be sustained after the end of the Initiative. Clinical + Payment facilities noted that more involved interventions, such as EOL discussions, would be more difficult to maintain. Most of the facilities, both Clinical + Payment and Payment-Only facilities stated that they believed they would be able to sustain the model after the end of the Initiative. Most of the facilities believed they will continue to use the materials and tools provided by OPTIMISTIC. OPTIMISTIC is planning to focus on specific methods to achieve model sustainability during the final year.
- OPTIMISTIC has a licensed agreement with Indiana University to develop and market their product Probari, which is based on their experiences with the Initiative. According to leadership, “[We] want to keep the momentum of OPTIMISTIC while being mindful of contamination effects.” OPTIMISTIC has a contract with three facilities in Michigan and is marketing to other facility chains who are not engaged in the Initiative.

## **F.2 Changes to Model and Implementation in 2019**

The OPTIMISTIC model and its implementation were largely unchanged. Minor implementation changes were made to enhance physician participation and to address polypharmacy.

### **F.2.1 Changes to Structure and Model**

OPTIMISTIC made no changes to its structure or model.

### **F.2.2 Learning Community Activities**

Learning Community activities continue to be offered via webinars, quarterly meetings, e-mail blasts, and monthly calls. During this Initiative year, OPTIMISTIC increased its efforts to educate practitioners, encouraging them to use the billing codes to increase revenue and to certify residents to decrease their own hospitalization rates. OPTIMISTIC also had sessions with some corporate offices to enhance understanding of the certification and billing processes. Most facility interviewees rated these Learning Community activities as somewhat to very valuable. Staff at some facilities reported implementing a new tool or process (e.g., the billing audit tool) after attending a Learning Community activity. Others stated the sessions were valuable in that they reaffirmed facilities were implementing the payment model correctly.

### **F.2.3 New Developments with INTERACT Tools and Other Components**

#### ***Interact Tools***

As in previous years, OPTIMISTIC nurses in the Clinical + Payment facilities continue to work with facilities in using the SBAR tool correctly and with consistency. Many of the Payment-Only facilities also used INTERACT or similar tools to assist nursing staff in documenting changes in condition. To encourage more consistent tool use, OPTIMISTIC leadership shared data with all participating facilities that demonstrated a correlation between decreased hospitalizations and tool use.

#### ***Polypharmacy/Medication Reduction***

OPTIMISTIC developed several algorithms (e.g., congestive heart failure [CHF] medications, proton-pump inhibitors, and statins) to facilitate appropriate medication reduction. During this year, one of the OPTIMISTIC APRNs was designated to assist with medication reduction for residents who are receiving palliative care across Clinical + Payment facilities. This APRN stated that medication reduction can result in “stepping on toes [of residents’ primary care physicians],” but that issue was lessened when the resident elected to receive palliative care measures only.

#### ***Symptom Assessment***

A pilot project started last Initiative year using the SATISFIE (Symptom Assessment to Improve Symptom Control for Institutionalized Elderly) tool was discontinued because of reported implementation complexities.

#### ***Advance Care Planning***

In July 2018, Indiana passed legislation allowing APRNs to sign POST (Physician Orders for Scope of Treatment) forms. OPTIMISTIC monitors the percentage of residents in both Clinical + Payment and Payment-Only facilities who have had an EOL discussion and/or a POST form in place. The OPTIMISTIC RN leads this activity in the Clinical + Payment facilities. Payment-Only facilities are reliant on their own staff for this activity.

#### **F.2.4 Changes in Role of ECCP Nurses**

During this Initiative year, the role of OPTIMISTIC RNs and APRNs did not change materially.

#### **F.3 Sharing Collaborative Activities in 2019**

OPTIMISTIC continues to value the annual meeting, but interviewees stated they have not participated in other sharing collaborative activities.

#### **F.4 Changes to Facility Staff and Practitioner Engagement in 2019**

##### **F.4.1 Facility Staff**

For both Clinical + Payment and Payment-Only facilities, interviewees said that no new Initiative-specific staff members have been hired. Additionally, interviewees from both groups identified high staff turnover and shortages, at all levels in the facilities, as a major challenge.

Although leadership at some Clinical + Payment facilities indicated the presence of their OPTIMISTIC staff and related training help improve staff knowledge and Initiative engagement, other facilities reported that the Initiative is a challenge to maintain. One OPTIMISTIC APRN noted that facility clinical staff documentation of resident care was a big issue since it is low on the list of priorities, and staff are too busy to perform NFI 2 assessments; consequently, the OPTIMISTIC RN helps the facilities to complete NFI 2 documentation. Another facility noted that their OPTIMISTIC staff were also performing day-to-day facility duties (e.g., making transportation arrangements) because of facility staff shortages, including mid- and upper-level management positions.

Payment-Only facilities were found to have few systems in place to make OPTIMISTIC operational. Additionally, one facility was on the Centers for Medicare & Medicaid Services (CMS) special focus facility list and had limited resources to devote to implementation of NFI 2. Payment-Only facilities also noted that they would like more education from OPTIMISTIC because of high staff turnover, which interviewees said has led to significant gaps of knowledge about the Initiative. Some facility interviewees reported initial training at the time of hire, but they would like more follow-up training regarding the Initiative.

##### **F.4.2 Practitioners**

OPTIMISTIC is continuing to educate practitioners in both groups on billing codes. There have been no practitioner withdrawals; however, the level of practitioner buy-in varies among facilities in both groups.

#### **F.5 Updates for Documenting and Certifying Six Qualifying Conditions**

Overall, there was no change in documentation practices. In some facilities, the OPTIMISTIC nurses completed the necessary documentation in the resident's record. Regarding the six qualifying conditions for certification, the ECCP leadership and APRNs generally agreed with the CMS's recent revisions to the clinical criteria. However, some facility interviewees noted that the changes made

it difficult for facilities to certify, especially for skin conditions and UTIs. It was also noted that sometimes trying to treat a UTI early can seem at odds with the CDC guidance regarding antibiotic stewardship: *“Just noting a change in condition [indicating the resident had a UTI] would be kind of jumping the gun.”*

One ECCP leader stated that they were still unclear why these six qualifying conditions were selected, adding that they seemed too reliant on “hospital diagnoses.” They stated that, *“facilities don’t have the resources for diagnostic evaluations like a hospital. Some of the conditions are not triggered as often because it is often not clear what is happening, for example, mental status changes for UTIs.”*

According to DONs, practitioners did not provide any negative feedback about the changes in certifying the six qualifying conditions, although some stated that UTIs have become more challenging to certify under the revised criteria. Interviewees in both Clinical + Payment and Payment-Only facilities stated that they find it difficult to encourage participation in the Initiative by practitioners and medical groups who do not have buy-in.

## **F.6 Updates to Existing Billing Practices**

Many interviewees in both Clinical + Payment and Payment-Only facilities spoke highly of the support provided by OPTIMISTIC. This support includes e-mails and monthly phone calls to review data such as episodes billed.

### **F.6.1 ECCP Tools and Support**

In addition to quarterly meetings, OPTIMISTIC provides tools (e.g., diagnostic cards) and numerous webinars available to access anytime on its website ([optimistic-care.org](https://optimistic-care.org)) that are available to both Clinical + Payment and Payment-Only facilities, as well as to the public. Interviewees reported varied use of these tools, although most facilities reported using at least some of the materials available. This Initiative year OPTIMISTIC introduced a billing audit tool that most facilities, Clinical + Payment and Payment-Only, use to make sure requirements are met to bill an episode of care for NFI 2.

### **F.6.2 Facility Billing and Recoupment**

OPTIMISTIC leadership reported that at the beginning of NFI 2, the Payment-Only facilities were more enthusiastic about the Initiative and outpaced the Clinical + Payment facilities in number of NFI 2 episodes billed. Clinical + Payment facilities relied on the OPTIMISTIC nurses to perform Initiative tasks as they had during NFI 1; however, OPTIMISTIC placed the responsibility for billing processes on facility staff. In Clinical + Payment facilities, OPTIMISTIC nurses identify residents potentially eligible for a billable episode and coordinate the certification process, but they are not involved in the actual documentation or facility billing processes.

In Payment-Only facilities, the duties of the OPTIMISTIC nurse are absorbed by another position, such as the DON, the MDS nurse, the infection preventionist, and/or the facility’s own APRN. In

previous years, some facilities had identified plans to hire an individual who would champion the OPTIMISTIC program; however, this year no interviewees reported having hired or assigned an OPTIMISTIC-specific position. One non-ECCP APRN reported that she “thought about care and not certification [...] having someone to coordinate [certification/billing] was key to the success of the Initiative.” Numerous facilities in both groups have a “transitions” nurse (a.k.a. INTERACT nurse) whose role is to coordinate resident care to prevent hospitalizations. These nurses typically work with managed care programs, but many have included OPTIMISTIC residents to their caseloads.

OPTIMISTIC leadership reported that Clinical + Payment and Payment-Only facilities tend to bill a similar volume of NFI 2 claims. Several interviewees from both Clinical + Payment and Payment-Only facilities reported that the number of episodes billed decreased compared to last year because of improved clinical ability of staff to recognize early identification of changes in condition, staff and physician turnover, and the change in criteria for UTIs and skin infections. A Payment-Only facility interviewee noted that the percentage of time devoted to OPTIMISTIC by their facility APRN used to be greater, but this focus decreased because of a reduction in the number of OPTIMISTIC-eligible residents resulting from increased managed care and hospice participation. Additionally, both groups reported that absence of a coordinating person on at least a temporary basis, usually resulted in a drop in number of certifications. This included a few Clinical + Payment facilities that did not have an OPTIMISTIC RN for a limited period of time as a result of turnover or a shift in assignment to a different facility.

OPTIMISTIC has identified a method used for both groups that compares episodes the facilities billed with what OPTIMISTIC believed could have been billed. This information is provided to facilities during the monthly calls. Facility interviewees explained that missed opportunities were attributed to staff turnover (lack of knowledge about the Initiative), family preference for hospitalization, lack of facility nursing skills, inability of staff to critically evaluate residents’ conditions, missing laboratory results, and inability to get a practitioner to certify within the NFI 2 billing window. A few facilities reported minimal billing because residents were medically stable or because the six qualifying conditions were not commonly experienced by the resident population (e.g., younger residents with mental health concerns).

Some facilities in both groups had centralized corporate billing, meaning the facility staff were not aware whether episodes had been billed and/or reimbursed. Some facilities reported they have received requests for additional documentation related to billable episodes, but no facilities reported that money had been recouped. The most common issues identified when a billing episode was questioned were having a wrong start date for an episode and not having adequate supporting documentation.

A few Payment-Only facilities reported that the reimbursement realized from the Initiative was not worth the resources the facility expended in meeting the requirements. One administrator expressed frustration that the Initiative system for gathering data did not interface with the facility’s electronic medical record (EMR); therefore, data entry was duplicative.

### **F.6.3 Practitioner Billing and Recoupment**

OPTIMISTIC leadership reported that they expended more resources this year to meet with practitioners to encourage greater utilization of the billing codes. They added that 75 percent of episodes billed by facilities have a corresponding practitioner bill. Some episodes would not have a corresponding bill because practitioners work in Rural Health Clinics (RHCs) and are unable to bill. Some practitioners were not interested in billing because their payment structures provide no incentive for them to use the NFI 2 billing codes. Additional reasons for not billing included practitioner concern of an audit, time involved in the process, and previous failed attempts at billing.

### **F.7 Updates to Data Collection**

The OPTIMISTIC data analytics team continues to provide numerous reports to meet the needs of the OPTIMISTIC leadership team and participating facilities.

### **F.8 Update on the Perceived Effectiveness of the Initiative in 2019**

Many facility leaders reported that the increased revenue generated by the Initiative was helpful, but as one administrator reported, a decrease in PAH did not correlate with increased payment. Most often, in both Clinical + Payment and Payment-Only facilities, interviewees stated that the focus on the six qualifying conditions, including more education through webinars and diagnostic tools, and the increased presence of APRNs and RNs in both groups of facilities, were more instrumental. One Payment-Only facility leader reported that clinical staff were more focused on the six qualifying conditions and decreasing potentially avoidable hospitalizations and did not know about the increase in payment.

#### **F.8.1 Facility Staff Perceptions of Potentially Avoidable Hospitalizations**

Most facilities in both groups reported that the Initiative was successful in preventing avoidable hospitalizations. Many facilities in both groups reported other benefits gained by participating, such as increased responsiveness of practitioners to changes in resident condition, improved shift-to-shift and departmental/corporate communication, recognition of the importance of keeping residents in house, and increase in nursing skills. One Payment-Only facility stated, *“One thing we really like is that our nurses...are trained to be RNs and this program allows them to operate as an RN...it is a little more self-gratifying.”* A Clinical + Payment facility also reported improved job satisfaction of their nurses.

A few facilities in both groups reported the Initiative did not seem to be effective. Several Clinical + Payment facilities claimed it was the interventions that were initially implemented in NFI 1 that resulted in a decrease in potentially avoidable hospitalizations, not the financial incentives provided in NFI 2.

## **F.8.2 Residents' and Families' Perceptions of NFI 2**

Most facilities reported residents and families did not fully understand the program and its impact on their care.

## **F.9 New Reports of Spillover and Contamination Effects**

Most spillover is related to the increased skills learned by facility clinical staff. This improvement in skill set impacts both Initiative eligible and noneligible residents. In addition, facility interviewees noted that staff and leadership take the Initiative knowledge with them when they move to different facilities. OPTIMISTIC developed Initiative related webinars and tools that are available to anyone visiting their website. It is unknown how use of the information might be impacting the resident care in facilities not engaged in the Initiative. Lastly, although OPTIMISTIC is exercising care to not contaminate the effects of the Initiative by the launch of Probari, the potential exists that there could be an inadvertent impact.

## **F.10 Updates to Policies and External Stakeholders**

### **F.10.1 Hospital Engagement**

Hospital engagement varies by facility, but overall, it continues to be low through this Initiative year.

### **F.10.2 Competing or Similar Initiatives**

In 2019, RTI was made aware by an ECCP leader that one corporation, which includes several OPTIMISTIC facilities, recently added hospice services. Consequently, one ECCP leader noted increased referrals to hospice and a more “pro-hospice” corporate attitude. Several facilities in both groups also noted having a nurse on staff whose role was to coordinate care and services in order to prevent hospitalization of residents, particularly those in managed care payment groups. One Clinical + Payment facility also related that one corporation, which includes some nursing facilities participating in the Initiative, is leading its own medication reduction and rehospitalization prevention programs.

Implementation of Phase III of the CMS 2016 Nursing Home regulations may be competing for facility resources as facility leadership complies with new requirements such as having an Infection Preventionist, Compliance, and Ethics programs, trauma-informed care, and competency testing. Additionally, OPTIMISTIC leadership and one Clinical + Payment facility reported that administrative staff are focusing attention on the SNF PDP, which may lead to less time available for implementation of OPTIMISTIC.

### **F.10.3 State Policy Environment**

Medicare managed care remains a concern in Indiana, although penetration varied substantially by facility. One Payment-Only facility noted facility staff and residents are more aware of Medicare managed care than OPTIMISTIC because of the consistent presence of a managed care nurse in the building. Another administrator in a Payment-Only facility noted increased marketing on

behalf of Medicare managed care that led several residents to select a managed care plan and therefore be ineligible for OPTIMISTIC.

### **F.11 Initiative Sustainability and Plans for the Future**

OPTIMISTIC is planning to use the final year of the Initiative to focus on helping facilities sustain model interventions, including an eight-module training program for OPTIMISTIC nurses to become clinical educators. In addition, OPTIMISTIC will provide training for any corporation or facility that would like one of its staff members to take on the role of the OPTIMISTIC nurse.

OPTIMISTIC reported they are developing an algorithm for facilities to use to systematically look at hospital transfers and find areas of improvement in care to prevent those hospitalizations. Along with its own efforts to develop a tool to forecast resident risk of hospitalization, OPTIMISTIC is also working with a software program (RTMS) that is an MDS scrubber that also draws information from the resident's medical record and stratifies residents according to hospitalization risk.

Clinical + Payment facilities had mixed thoughts regarding their abilities to maintain NFI 2. Some facilities indicated the components of the model were built into their facility culture and processes and would be sustained. One Clinical + Payment facility reported that during a 5- to 6-month period, they were without an OPTIMISTIC RN and were "relieved" that the number of billed episodes was not impacted during that time. Other Clinical + Payment facility interviewees indicated that interventions, such as the in-depth approach to EOL discussions, would be difficult to sustain because of the amount of time OPTIMISTIC nurses devoted to the task. Many facilities stated that staff turnover would have a negative impact on Initiative sustainability. Both Clinical + Payment and Payment-Only facilities reported they would continue to use materials such as the diagnostic cards provided by OPTIMISTIC.

### **F.12 Next Steps**

OPTIMISTIC leadership made no material changes to its model or its implementation in the past several years. Both leadership and many Clinical + Payment facilities expressed that they believed the Initiative is successful because of the interventions initially implemented in NFI 1 and not because of NFI 2 payment. Clinical + Payment facilities most often cited the OPTIMISTIC RN as the critical element to the model and referenced that the education and coordination provided by the RN was crucial to success. Most Payment-Only facilities often reported struggling to provide the resources and systems necessary to implement the Initiative.

OPTIMISTIC leadership reported that the billing rates of the Clinical + Payment and the Payment-Only facilities were trending to the same volume. Several Payment-Only facilities reported they would have liked having an OPTIMISTIC nurse and more education but reported making use of tools and information that were available to them on the OPTIMISTIC website.

Some Clinical + Payment facilities were hopeful that they could maintain the elements of the Initiative after it ended; however, only one facility reported the possibility of hiring a person to

replace the OPTIMISTIC RN when the Initiative ends. OPTIMISTIC will be focusing on ways to assist facilities with sustainability in the coming year.

OPTIMISTIC is also in the process of marketing Probari, a product based on lessons learned during the Initiative. Leadership reported limiting discussions with facilities/corporations so as not to contaminate results of the study.

For the next Initiative year of data collection, RTI will continue to monitor:

- Facility and practitioner engagement and the interventions that impact the number of certifications and bills that are submitted.
- The impact of model interventions on the skills of facility clinical staff.
- Use of reimbursement realized from the Initiative incentives.
- Successes, challenges, and lessons learned by the ECCP and participating facilities.
- Differences in practices and outcomes between Clinical + Payment and Payment Only facilities.
- Methods employed to sustain the model post Initiative among the Clinical + Payment and Payment-Only facilities.

## APPENDIX G

### UNIVERSITY OF PITTSBURGH MEDICAL CENTER COMMUNITY PROVIDER SERVICES PROGRAM TO REDUCE AVOIDABLE HOSPITALIZATIONS (RAVEN)

#### G.1 Overview

##### *2019 RAVEN Site Visit and Telephone Interview Findings*

##### **Key Takeaways:**

- Facility staff and leadership turnover remained the biggest challenge to NFI 2 engagement and implementation.
- Facility billing in Payment-Only facilities often relied on a medical director or other practitioner champion, while in Clinical + Payment facilities, billing was driven almost entirely by ECCP APRNs; APRNs were also highly valued for end-of-life (EOL) counseling and support to residents and their families.
- Practitioner billing was reported to be low in most facilities, particularly in Clinical + Payment facilities, although practitioners were supportive of the Initiative’s goals.
- In comparison to 2018, facility billing rates were reported to be lower in 2019, particularly in Payment-Only facilities. Interviewees cited several reasons for this decrease, including changes in NFI 2 clinical guidelines and efforts to identify signs and symptoms early for the six qualifying conditions, as well as a more selective approach to claims submission related to being aware of the potential recoupment.
- In terms of sustainability, Clinical + Payment facilities reported efforts to fund facility-based APRNs positions akin to the NFI 2 ECCP nurse roles; Payment-Only facility interviewees suggested that their clinical practices will not change when the Initiative ends.

The University of Pittsburgh Medical Center (UPMC) Community Provider Services Program to Reduce Avoidable Hospitalizations (RAVEN) model remained stable in 2019, with no major changes to the model or to facility engagement. Facility leadership and practitioners whom we interviewed continued to support the Initiative’s goals, as do most facility staff. Practitioner engagement seemed to have increased somewhat in the Payment-Only facilities. Several practitioners who had not wanted to participate in the Initiative left and were succeeded by medical directors and independent practitioners who were more eager to work with RAVEN. **Table G-1** presents an overview of facility participation data from 2019.

**Table G-1. 2019 data collection summary**

Number of facilities participating as of site visit date (November 7, 2019)	35
Ownership changes since 2018 site visit	none
Facilities withdrawn or removed from Initiative since 2018 site visit	none

This appendix is based on data collected during calendar year 2019. First, from April to May 2019, the RTI team conducted telephone interviews with nursing facility administrators (NFAs), directors of nursing (DONs), and other key staff in seven Clinical + Payment facilities and eight Payment-Only facilities. Next, RTI completed in-person interviews with RAVEN leadership on October 22, 2019. RTI also interviewed NFAs, DONs, assistant directors of nursing (ADONs), charge nurses, medical directors, facility advanced practice registered nurses (APRNs), RAVEN nurses, billing coordinators, and other key staff in four Clinical + Payment facilities from October 23, 2019 to October 25, 2019 and in four Payment-Only facilities from November 5, 2019 to November 7, 2019. **Table G-2** summarizes the site visit and telephone interview findings for facility staff buy-in and implementation.

**Table G-2. Site visit and phone interview summary findings: 2019 facility staff buy-in and implementation**

Facility staff buy-in and implementation	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone or in person)	23	11	12
Interviewer perception of buy-in to NFI 2			
High	12	7	5
Medium	9	2	7
Low	2	2	0
Number of facilities that hired new staff in 2019 because of NFI 2	0	0	0
Number of facilities with resident opt-outs in 2019	6	1	5
Number of facilities reporting that NFI 2 has been effective in reducing potentially avoidable hospitalization	19	10	9

NOTES: RTI interviewed 23 of the 35 participating facilities. Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing and/or have not trained staff on the six qualifying conditions; generally limited engagement and limited participation in NFI 2.

Based on interviews with ECCP leadership and facility staff, RTI identified the following key findings:

- In general, staff turnover, especially among leadership, was the biggest factor affecting Initiative buy-in. Nursing facilities with continuity of leadership (NFA/DON) tended to implement the Initiative more comprehensively, and facilities heavily reliant on agency staff had difficulty obtaining buy-in from the nurses and had to continually re-educate staff about the Initiative.
- Clinical + Payment facilities continued to be highly reliant on the ECCP nurses. The ECCP nurses generally oversaw all documentation and billing for RAVEN in each facility. These

nurses, especially when they were APRNs, had a notable positive effect on nursing staff clinical performance, often including spillover to advising on non-RAVEN residents.

- For Clinical + Payment facilities, the model did not seem to work well when the ECCP nurse was an RN who could not write orders or certify the six qualifying conditions for the facility billing.
- Apart from one high-billing nursing facility, Payment-Only facilities reported low facility billing rates; of the four facilities visited, three submitted fewer than 10 claims for the entire calendar year, although one reported ~70 claims for the year. Some Payment-Only facilities attributed low billing to their efforts to treat residents before they could qualify for one of the six qualifying conditions.
- Several Payment-Only facilities reported that the Initiative was reimbursing them for work that was already being done prior to the Initiative. Additionally, non-NFI 2 corporate initiatives and local hospital programs had been incentivizing some facilities to reduce unnecessary hospitalizations.
- Practitioners reported support for the goal of reducing hospitalizations, but some thought there were too few eligible residents in their facilities for practitioner billing to make financial sense.
- The prevalence of residents enrolled in Medicare Advantage (MA) plans increased in 2019, especially in the Philadelphia area; however, few facilities reported eligible residents leaving the Initiative once in the facility for managed care plans.
- Several Clinical + Payment facilities mentioned that they hoped they would be able to retain their RAVEN APRNs after the end of the program, although many were not sure this would be financially viable.

## **G.2 Changes to Model and Implementation in 2019**

The RAVEN model is well-established across the participating facilities. There were no changes from the ECCP side; most facilities were focused on maintaining, rather than expanding, the Initiative.

### **G.2.1 Changes to Structure and Model**

Phone interview and site visit findings indicated there were no change to the RAVEN model in Clinical + Payment and Payment-Only facilities in 2019. The Initiative operates in a manner similar to the previous Initiative year.

### **G.2.2 Learning Community Activities**

Across both groups, majority of staff members reported participating in Learning Community activities. DONs and NFAs, in particular, almost always participated, especially among the Payment-Only facilities. Clinical + Payment facilities found the Learning Communities valuable, especially the opportunity to share best practices across facilities. All Payment-Only facilities

reported monthly visits from RAVEN's Payment-Only nurse liaison who provides valuable in-person support, training, and documentation reviews. As one Payment-Only NFA shared, "As far as RAVEN support, [nursing facility liaison] has been our rock."

Multiple NFAs and DONs in Payment-Only facilities referenced traveling to the ECCP-led Leadership Day, which is an annual event in Harrisburg, PA. One Payment-Only DON reported that she wished the Initiative had begun with more trainings like what was being offered at the latest Leadership Day meeting, and that "[the training] really brought everything together" as the first time the Initiative was presented holistically to that DON. Although attendance was high for Learning Community activities overall, not all staff thought that the activities taken altogether were of high value.

### **G.2.3 New Developments with INTERACT Tools and Other Components**

INTERACT tools continue to be used widely in the facilities. Uptake was often bolstered in Payment-Only facilities by outside corporate directives. In Clinical + Payment facilities, RAVEN nurses continue to discuss EOL and advanced care planning routinely and with each significant change in resident condition, including discussing and updating Physician's Orders for Life-Sustaining Treatment (POLST) forms with families. Multiple facilities reported increased in-facility deaths (as opposed to residents dying in a hospital) because of these activities. Some interviewees also reported reduced family pressure to hospitalize because of the education and trust provided by RAVEN nurses. Rx Partners continues to provide resident medication review services to Clinical + Payment facilities. Interviewed Rx Partners staff reported that they have helped to establish regular monthly Interdisciplinary Team Meetings in about half of the Clinical + Payment facilities.

#### ***Telemedicine***

Use of the new Curavi telemedicine carts is gradually increasing in the Clinical + Payment facilities. As one DON shared, "*...the new Curavi cart is amazing. The accessibility of it and the ease of use is just amazing. The staff are less reluctant to use it knowing that it connects very easily.*"

Despite some positive feedback, utilization of telemedicine remained low. The time required for a telemedicine consult compared to simply calling a physician for a consult was still cited as a barrier to telemedicine use in Clinical + Payment facilities. Clinical + Payment facilities with good practitioner coverage reported using the Curavi cart less frequently than those with less practitioner coverage. In an interview with members of the Curavi team, we learned that in 2019 there was an expansion of overnight and weekend hours to include 6:00 pm to 6:00 am Monday through Friday, and then all hours during the weekend. Furthermore, Curavi has added a telepresenter at several facilities near Pittsburgh who travels to facilities and operates the telemedicine cart during the encounter. The telepresenter position was created to increase facility willingness to use telemedicine by reducing time and training commitments for facility nurses. The creation of this position reflects the challenges of implementing this telemedicine element in the RAVEN model in nursing facility environments, despite multiple improvements made to the equipment through the NFI 1/NFI 2 implementation.

One Payment-Only facility had used Curavi independently of RAVEN in the prior Initiative year, but subsequently they switched to a different telemedicine provider, citing dissatisfaction with the complexity and significant time investment for the nurse operating the Curavi cart.

#### **G.2.4 Changes in Role of ECCP Nurses**

ECCP nurse roles have not changed substantially in 2019. In facilities with a consistent presence of the same RAVEN nurses, facility staff reported that these nurses are generally trusted and well-respected. ECCP nurses at two Clinical + Payment facilities left their positions and finding a replacement has been difficult. One facility with an RN rather than an APRN had a harder time implementing the program and thought less highly of it. The DON at that facility felt that without the ability to independently prescribe and write orders, the RAVEN nurses disrupted the facilities' clinical chain of command. Other facilities that reported high ECCP APRN turnover also noted having a harder time implementing the program.

#### **G.3 Sharing Collaborative Activities in 2019**

We did not receive any substantial feedback about the Sharing Collaborative activities in 2019. It did not appear that the RAVEN leadership team was using the NFI 2 web portal. However, they stated that they are active participants and attendees in the Medicare-Medicaid Coordination Office (MMCO) workgroup calls.

#### **G.4 Changes to Facility Staff and Practitioner Engagement in 2019**

Interviewees reported similar facility staff engagement and slightly increased practitioner engagement in 2019 compared to the prior year of NFI 2.

##### **G.4.1 Facility Staff**

According to interviews, there has been little change in facility staff engagement with the Initiative since the previous Initiative year. In general, facility leadership and staff have grown accustomed to NFI 2 and its requirements. However, the Initiative has been implemented differently depending on the facility type. As in previous years, payment-related Initiative activities were almost entirely championed by the RAVEN APRN in Clinical + Payment facilities. They complete most of the documentation and certification for the six qualifying conditions

In Payment-Only facilities, Initiative activities are still driven by facility leadership, largely because of concerns about staff turnover and use of agency staff. As one Payment-Only facility's NFA shared, *"That's a challenge too [staff turnover]. We've had such big turnover with staff. When we had the interim DON, we in-serviced a bunch of folks, but we've had such turnover. So, we just put it on the 24-hour report for nurses to document. But I don't think they're [the nurses] that aware of RAVEN."*

Engagement of staff in Payment-Only facilities is supported by the RAVEN liaison nurse, who visits each facility monthly and is available for questions daily.

RAVEN APRNs also take the lead on facilitating EOL conversations with residents and their families. Facility staff highly praised their RAVEN APRNs' abilities to speak with families, explaining the importance of treating residents in house whenever possible and the need for appropriate EOL care.

Facilities in both groups continue to value ongoing support by RAVEN leadership and noted that RAVEN leadership was always available and willing to help. Facility direct care staff in Clinical + Payment facilities spoke positively about the education and training provided by RAVEN leadership and the Jewish Healthcare Foundation (JHC). Facility leadership in most Clinical + Payment facilities welcomed this outside education because they thought their staff were more engaged when education was given by outside experts. Payment-Only staff continue to appreciate the support provided by the RAVEN nursing facility liaison, especially the mock audits she conducts and her suggestions to improve billing processes.

#### **G.4.2 Practitioners**

Generally, practitioner engagement in the Payment-Only group facilities remains higher than in the Clinical + Payment group facilities, especially in those Payment-Only facilities that had their own non-RAVEN APRNs. In multiple instances, practitioners who had previously been suspicious of or indifferent to RAVEN left their position or retired, and the new practitioners were more eager to work with the program. Facilities from both groups reported that many of their practitioners were very supportive of the goals of the Initiative, but these practitioners said it was just not worth the time and effort needed to bill for themselves. However, practitioners and facility staff in Payment-Only facilities reported practitioners frequently certifying diagnoses for facility billing.

#### **G.5 Updates for Documenting and Certifying Six Qualifying Conditions**

In this Initiative year, some interviewees reported that opportunities for billing were decreasing because staff were identifying and treating residents for signs and symptoms before they met the clinical criteria for NFI 2 six qualifying conditions required for facility billing, particularly in the Payment-Only facilities. As one staff member shared, *"We're identifying the symptoms of many of these conditions so quickly now. I think we're getting them started and treated before they get enough symptoms to qualify. We're not going to stop treatment so they can get another symptom to be eligible for billing, but there are some that I see where it's like if we hadn't caught it so quickly, we could have maybe captured them for RAVEN. That's not a bad thing."*

Multiple facilities reported including stickers (i.e., physical stickers for paper charts or icons for electronic health records [EHRs]) on the charts of Initiative-enrolled residents for easy identification. Facility staff reported that these stickers were often a useful reminder to complete documentation.

Most interviewees reported that implementing the recent Centers for Medicare & Medicaid Services (CMS) changes to the clinical criteria has gone smoothly. Although a majority of interviewees stated that the changes had limited-to-no impact on facility billing, a few reported that they found it easier for resident changes in condition to meet the revised clinical criteria (i.e.,

found it easier to bill under the new criteria that allowed billing for partial episodes of care). Some reported that the new criteria, particularly for skin infection and urinary tract infection (UTI), decreased their opportunities to bill because of more stringent criteria to qualify for billing. RAVEN clinical staff noted that UTIs were particularly difficult, as tests required time to process and UTIs were often associated with other, more serious conditions, such as sepsis.

## **G.6 Updates to Existing Billing Practices**

According to ECCP and facility interviewees, facilities billed less than they have in previous Initiative years, and practitioner billing rates remain low. Practitioners expressed more interest in the Initiative, particularly on the Payment-Only side, but this has not translated to higher rates of facility billing.

### **G.6.1 ECCP Tools and Support**

Some facilities reported specific efforts to identify and avoid missed billing opportunities, using tools provided by the ECCP. For example, one Payment-Only Registered Nurse Assessment Coordinator (RNAC) reported that the RAVEN liaison had identified specific residents to watch closely for a change in condition. One Payment-Only billing manager also reported that the corporate ownership conducted its own audits of the facility to identify and correct documentation errors.

### **G.6.2 Facility Billing and Recoupment**

Interviews indicated that both Clinical + Payment and Payment-Only facilities are billing for NFI 2; however, the volume of claims appears to have decreased since the previous Initiative year. Some staff attributed this reduction to fewer eligible residents, and fewer residents who meet the clinical criteria for billing, especially under the revised clinical criteria.

Centralized or corporate billing structures remain a challenge to NFI 2 billing. As described in last year's report, facilities had limited contact with corporate billing offices; these facilities had no indication whether the corporate offices were actually submitting their NFI 2 claims. Likewise, corporate offices did not share whether there had been any issues with any claims the facilities had submitted.

Of those facilities that had successfully billed, most were not using resultant reimbursements for specific activities or equipment. For most facilities, reimbursements were added to a general fund to use for resident care. One Clinical + Payment facility reported that the additional reimbursement was used to purchase vital sign carts. Some facilities stated that the funds allowed for additional clinical staff.

### **G.6.3 Practitioner Billing and Recoupment**

Billing among practitioners remains low. Although practitioners expressed positive thoughts about the Initiative, and some practitioners are actively certifying patients to enable facility billing, utilization of the practitioner billing codes remains low. An issue raised by the RAVEN clinical

leadership was the lack of eligible residents in several facilities. They reported that RAVEN residents represented only 25 percent of residents in a given facility, resulting in an insufficient resident volume to incentivize practitioners to submit claims.

## **G.7 Updates to Data Collection**

Interviews indicated no change in data collection activities in Clinical + Payment facilities, while some Payment-Only facilities reported being engaged in additional data collection and analysis compared to the prior Initiative year. For example, one Payment-Only Facility reported accessing data from the Keystone Health Information Exchange (KeyHIE<sup>5</sup>). Leadership believed that utilization trends generated from EHRs by the KeyHIE reports offered useful information regarding the root causes of hospital admissions.

ECCP leadership shared examples of data reports they provide to both facility groups: these reports contain a wealth of data in an easily digestible format. The Payment-Only reports included change-in-condition rates with comparisons to the RAVEN Payment-Only mean, transfer rates over time, and a breakdown of projected facility reimbursements from each G-code, compared to reimbursements for all other RAVEN facilities. The Clinical + Payment report includes these data, as well as telemedicine usage, transfer locations and outcomes, INTERACT and other tools use prior to transfer, EOL planning status prior to transfer, potentially avoidable transfers, number of transfers by practitioners (including the names of practitioners alongside their totals), and main conditions and reasons of transfers.

## **G.8 Update on the Perceived Effectiveness of the Initiative in 2019**

When asked about the effectiveness of the Initiative, the Clinical + Payment facilities with RAVEN APRNs reported that they viewed these embedded APRNs as the central most important and most valued NFI 2 component of the Initiative. Many Payment-Only facilities also described independent programs (i.e., not NFI 2) and motivations for reducing hospitalizations, noting that Initiative reimbursements were not a major incentive to reduce hospitalizations.

### **G.8.1 Facility Staff Perceptions of Potentially Avoidable Hospitalizations**

Most interviewed Clinical + Payment and Payment-Only staff believed the Initiative was effective in reducing hospitalization rates for their long-stay residents. Most facility interviewees across both groups agreed that the Initiative had sharpened clinical skills and improved communication among facility staff. As one DON stated, *“I think it’s made all of us, from physicians to PAs down to the nurses, more aware of residents’ symptoms and how to identify something from the first symptom.”*

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<sup>5</sup> KeyHIE is a health information company that analyses EHR data obtained from providers to generate reports. On their website, they offer the following reports to long-term care providers: (1) hospital discharge summaries, (2) medication lists and allergies, (3) imaging and lab test results, and (4) physician recommendations.

Interviewees from both groups explained that the idea of treating residents in house is now a widely accepted part of facility culture and care patterns in most of the participating facilities.

### **G.8.2 Residents' and Families' Perceptions of NFI 2**

Interviewees indicated that residents and families in Clinical + Payment facilities were generally supportive of the Initiative, as it gave residents access to additional clinical care. Only one of the interviewed Clinical + Payment facilities reported resident opt-out. Most Payment-Only facility families and residents were unaware of the Initiative, although a few Payment-Only facilities indicated that some residents had opted out of NFI 2. Some reasons for opting out included misunderstanding the Initiative and concern it would prevent them from getting necessary treatment in the hospital. Without a RAVEN nurse to consult with families, these attitudes among Payment-Only facility residents remain difficult to address.

### **G.9 New Reports of Spillover and Contamination Effects**

Similar to prior Initiative years, facility staff believed that NFI 2 had caused a cultural change in their facilities, wherein the Initiative was improving standards for care throughout the facility, not just for eligible long-stay residents.

### **G.10 Updates to Policies and External Stakeholders**

Multiple facilities reported that their relationships with hospitals and other providers had been enhanced by their involvement in RAVEN. Additionally, many Payment-Only facilities reported policies independent of the Initiative as motivations to reduce potentially avoidable hospitalizations.

#### **G.10.1 Hospital Engagement**

A majority of interviewed facility staff reported that their local hospitals are aware of the facility's participation in RAVEN. Multiple facilities reported that hospitals had begun to view them as part of the continuum of care in a systematic way, and sometimes this was formal in the case of a facility belonging to a hospital's accountable care organization (ACO) or preferred provider network. One Payment-Only facility stated that RAVEN was a selling point to become a preferred provider for the local hospital. In all of these cases, RAVEN and hospital initiatives to reduce readmissions were seen as complementary.

#### **G.10.2 Competing or Similar Initiatives**

About half of facilities interviewed by phone had other programs or policies in place related to reducing hospitalization rates for long-stay residents. These other programs included corporate hospitalization tracking initiatives and CMS-run quality improvement programs.

#### **G.10.3 State Policy Environment**

In 2019, Medicare managed care continued to grow across Pennsylvania. A majority of facility staff indicated that they anticipated continued growth in the number of residents on managed care

because of the increase in number of managed care offerings for long-stay residents. Rural western Pennsylvania, where some of the Clinical+ Payment facilities are located, is less affected by this trend compared to other parts of the state. At least two Clinical + Payment facilities reported discouraging RAVEN-eligible residents from joining managed care plans or discouraging managed care plans from marketing in their facilities because of RAVEN's presence.

Pennsylvania's Medicaid managed long-term services and supports program, Community Health Choices (CHC), launched its Phase II around the Philadelphia area in January 2019. The statewide launch would occur in January 2020. CHC had previously been operating in Western Pennsylvania only, so many Clinical + Payment facilities already had residents who were enrolled in this program.

### **G.11 Initiative Sustainability and Plans for the Future**

When asked about Initiative components that would remain in place beyond NFI 2, a majority of interviewees across facilities shared they would continue to prioritize the six qualifying conditions, the use of INTERACT tools, the improved within-facility communication about resident changes in condition, and most importantly, the focus on treating residents in house. As one NFA stated, *"I think we would still be diligent about symptoms for those things [six qualifying conditions]. It's kind of put a light bulb off in what we need to look for... I think the staff would still remember. Like, 'If this happened, I would do this' kind of thing."*

Interviewees shared concerns about maintaining practitioner engagement, with one interviewee sharing that practitioner billing is *"part of what drives the program. So, without that, some of that interaction with physicians could fall away."*

Among the Payment-Only facilities, clinical practices to reduce potentially avoidable hospitalizations were seen as fully integrated protocols at the facility and were generally described as standard practices, not specifically associated with RAVEN. These facilities all said that these practices would be sustained even without the NFI 2 billing.

Notably, most Clinical + Payment facilities expressed concerns about the Initiative ending. In particular, facilities worried about not having access to their RAVEN APRNs, who have become vital resources. Some Clinical + Payment facilities reported efforts to retain their RAVEN APRNs or hire an APRN post-NFI 2. In addition, some Clinical + Payment facilities shared that ECCP nurses and RAVEN leadership are making efforts to prepare facilities for the end of NFI 2. For example, in at least two cases, RAVEN staff are making a more concerted effort to teach facility staff about the NFI 2 data collection, documentation, and billing processes, so facility staff can take over these responsibilities when the RAVEN nurse is no longer in the facility. However, RAVEN leadership expressed their need for timely CMS guidance on how to wrap up the Initiative in facilities.

As far as sustainability within the ECCP itself, RAVEN leadership plans to sustain the RAVEN model in UPMC skilled facilities, which were not part of the Initiative, once the Initiative ends. They will

keep an APRN in UPMC facilities, continue medication review by Rx Partners, and continue to provide regular clinical education.

## **G.12 Next Steps**

For the coming year of data collection, RTI will continue the following:

- Document how the RAVEN model clinical and educational components are being implemented in the Clinical +Payment facilities, especially the telemedicine activities.
- Observe billing frequency among Clinical + Payment and Payment-Only facilities and examine the impact of recoupment on billing and engagement.
- Note practitioner engagement and billing frequency and whether it differs between Clinical + Payment and Payment-Only facilities.
- Document managed care penetration, particularly the growing presence of plans that include APRNs.
- Evaluate the sustainability of NFI 2 model components, including RAVEN plans for continuing the model in the UPMC facilities.

## APPENDIX H

### REVISIONS TO THE SIX QUALIFYING CONDITIONS CLINICAL CRITERIA, IMPLEMENTED JANUARY 1, 2019

On January 1, 2019 (Initiative Year 3), Centers for Medicare & Medicaid Services (CMS) instituted changes to the NFI 2 six clinical criteria conditions. CMS based these changes on feedback solicited from a few members of ECCP leadership, including some participating ECCP Medical Directors. Prior to the official changes taking effect, CMS led learning calls (late September–October 2018) for all ECCP staff and their partnering nursing facilities and practitioners. These efforts were followed by ECCP-led education efforts beginning in September 2019.

As summarized in **Table H-1**, changes to the criteria for each condition ranged from being more strict (i.e., the criteria revisions were more stringent than what had been in place prior to 2019) to those that may be perceived as less strict (i.e., the criteria revisions were relaxed). Two RTI evaluation consultants, Debra Saliba, MD, MPH, AGSF, and Mary Naylor, PhD, RN, FAAN, assessed whether these changes would result in more or fewer NFI 2-eligible cases and subsequently more or less billing. The changes are summarized as follows:

- Acute care pneumonia changed with the addition of “new” pulmonary infiltrate chest X-ray confirmation and a minor change in a sub-criteria definition for oxygen saturation level. The addition of “new,” without worsening, under the qualifying diagnosis outweighs the elimination of “blood” oxygen in the sub-criteria, with the overall effect of these changes potentially meaning fewer residents meeting the new criteria.
- The chest X-ray criteria for congestive heart failure (CHF) were broadened to include edema and bilateral pleural effusion. Changes to sub-criteria for CHF included modifications to brain natriuretic peptide (BNP) and the addition of weight gain. The lower acceptable BNP and addition of weight gain might lead to more eligible residents qualifying with this condition.
- Acute care chronic obstructive pulmonary disease (COPD)/asthma had minor changes to sub-criteria, with the most notable addition of cough and removing “increased” sputum production. These changes may support more billing, as few providers have used this code previously for someone at a baseline level of wheezing.
- Skin infection had the largest number of changes, most notably that the infection site can be either new or a worsened existing site. Sub-criteria for fever and white blood cell count also were added. The exception to increased stringency is the removal of the word “painful,” but the other added criteria arguably make these criteria stricter.
- Fluid or electrolyte disorder previously included “or dehydration” in the criteria name. Facilities reported low likelihood of using this billing code, as dehydration triggers a negative F-tag during state facility surveys. Removal of dehydration from the condition name may reduce this facility hesitancy to submit claims for this condition.

- Altered mental status (AMS) was previously a sub-criterion symptom to qualify a diagnosis for urinary tract infection. Many nursing facilities treat Alzheimer’s and other dementia patients, wherein removing AMS as a qualifying symptom may lead to a decrease in eligible UTI cases. Although AMS was removed from the criteria, it is still included in symptomatic guidance. Removal of AMS requires education to providers, as this is a commonly used criterion. Furthermore, removal of AMS and addition of the prostate exam is likely to decrease the number of qualifying residents for this condition.

**Table H-1. CMS Changes to Clinical Criteria, 2019**

Condition	Change in condition criteria	2019 updated criteria are MORE or LESS STRICT than original NFI 2?	Expect to see MORE or LESS BILLING as a result of 2019 changes?
Acute care pneumonia—G9679	<ul style="list-style-type: none"> <li>In sub-criteria, blood oxygen saturation level was revised to oxygen saturation level</li> </ul>	<p>More strict: addition of “new” chest x-ray might lead to confusion</p> <p>Less strict: deletion of “blood”</p>	Might lead to less billing
Congestive heart failure (CHF)—G9680	<ul style="list-style-type: none"> <li>Chest X-ray criteria broadened to include edema and bilateral pleural effusions</li> <li>BNP criteria adjusted</li> <li>Weight gain added as a sub-criterion</li> </ul>	Less strict: expanded eligibility	Might lead to more billing
Acute care chronic obstructive pulmonary disease (COPD)/asthma—G9681	<ul style="list-style-type: none"> <li>Cough added as sub-criterion, symptoms updated to new or worsening</li> <li>In sub-criteria, blood oxygen saturation level was revised to oxygen saturation level</li> </ul>	<p>More strict: “new or worsening” wheezing</p> <p>Less strict: expanded eligibility by adding “cough” and removing “increased” sputum production</p>	Might lead to more billing
Skin infection—G9682	<ul style="list-style-type: none"> <li>Infection site can be either new or worsening of an existing site</li> <li>Fever and elevated white blood cell count added as sub-criteria</li> </ul>	<p>More strict: addition of fever and white blood cell count</p> <p>Less strict: includes both new and worsening infection sites</p>	Might lead to less billing
Fluid or electrolyte disorder—G9683	<ul style="list-style-type: none"> <li>Condition name was adjusted from dehydration to fluid/electrolyte disorder</li> </ul>	No change in qualifications	No effect
Urinary tract infection (UTI)—G9684	<ul style="list-style-type: none"> <li>AMS was removed from sub-criteria</li> <li>Catheter-associated symptoms were added under sub-criteria</li> <li>Addition of prostate exam in males</li> <li>Decreased WBC level</li> </ul>	<p>More strict: removal of AMS, require prostate exam</p> <p>Less strict: catheter-associated symptoms added, decreased WBC to a more reasonable level.</p>	Might lead to less billing

AMS = altered mental status; BNP = brain natriuretic peptide; WBC = white blood cell count

\* CMS made one global change for each of the six conditions criteria, not captured in the table above.

\*\*Additional review and feedback provided by outside consultants, Deb Saliba, MD, and Mary Naylor, RN.

# APPENDIX I

## DISPARITIES IN NURSING FACILITY NFI 2 IMPLEMENTATION BY FACILITIES OF DIFFERING RACIAL COMPOSITIONS

### I.1 Overview

**Appendix I** presents a summary of findings related to participating facility resident racial minority population.

NFI 2 provided new billing opportunities to incentivize participating nursing facilities to achieve desirable resident health outcomes. However, participating facilities were not identical in the types of residents for whom they provided care and potentially did not bill to the same extent. Building on a large body of nursing facility research noting resident population differences by race,<sup>6,7</sup> variations in care quality<sup>8</sup> and financial stability by racial makeup of resident population,<sup>9</sup> as well as differences in preventive care<sup>10</sup> and hospitalizations<sup>11</sup> among racial minority residents, we explored how NFI 2 implementation across participating facilities differed depending on the racial minority status of participating residents. We conducted descriptive and multivariate analyses to examine this relationship. We stratified participating facilities into two groups: predominantly racial minority and non-minority facilities, using a cut-off point of 30 percent nonwhite.

### I.2 Methods and Results

**Tables I-1** and **I-2** display means, standard deviations, and medians for selected facility characteristics by resident racial minority status. Facilities with 30 percent or more residents identifying as racial minorities differed from predominantly white resident facilities in several ways. Notably, Clinical + Payment and Payment-Only facilities with larger populations of racial minorities submitted fewer NFI 2 claims compared to predominantly white facilities. The billing gap between facilities widened over time, with facilities that had more racial minority residents submitting even fewer claims in 2018 compared to 2017. In addition, minority facilities had higher

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<sup>6</sup> Mack, D., & Lapane, K. (2018). Inequality across nursing homes: Measurement of racial segregation among nursing homes in the United States. *Innovation in Aging*, 2(Suppl 1), 981.

<sup>7</sup> Feng, Z., et al. (2011). The Care Span: Growth of racial and ethnic minorities in U.S. nursing homes driven by demographics and possible disparities in options. *Health Aff (Millwood)*, 30(7), 1358-1365.

<sup>8</sup> Kang, Y. (2011). Racial disparities in nursing home quality of care: A multilevel analysis using 2004 national nursing home survey data, ProQuest Information & Learning. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 71(7-B), 4209-4209.

<sup>9</sup> Chisholm, L., et al. (2013). Nursing home quality and financial performance: does the racial composition of residents matter? *Health Serv Res*, 48(6 Pt 1), 2060-2080.

<sup>10</sup> Luo, H., et al. (2014). Racial/ethnic disparities in preventive care practice among U.S. nursing home residents. *J Aging Health*, 26(4), 519-539.

<sup>11</sup> Ghosh, A. K., et al. (2019). National trends in 30-day re-hospitalization rates of skilled nursing facilities with disproportionate shares of racial minorities and dual eligibles. *J Gen Intern Med* 2019 Nov 21. doi: 10.1007/s11606-019-05521-6. Online ahead of print.

acuity residents, based on case mix index, and lower Nursing Home Compare star ratings, as well as fewer residents with advance directives and slightly fewer nursing hours per resident days.

Predominantly white resident populations (i.e., 70 percent or more of the residents are white, and 30 percent or fewer are racial minorities) are shown along with facilities in which 30 percent or more of residents are racial minorities. **Table I-3** shows the percentage of facilities with fewer than 30 percent of their residents being racial minorities by ECCP. **Tables I-4, I-5, and I-6** each display results from two linear regression models predicting facility-level rates of billing NFI 2 (i.e., number of NFI 2 claims per 1,000 Initiative-eligible resident-days) which were both run for three different study populations: for both facility groups combined, and for the Clinical + Payment group and the Payment-Only group, respectively. Both regression models control for a variety of facility-level factors, including staffing levels, and overall Nursing Home Compare star ratings (not presented in tables). The first regression (models 1, 3, and 5) includes a binary variable that indicates whether 30 percent of a facility's residents are racial minorities. The second regression (models 2, 4, and 6) includes a continuous variable of the percentage of residents that are black/African American. Facilities with greater than or equal to 30 percent of their residents being racial minorities and facilities with higher percentages of black/African American residents tended to have lower NFI 2 billing rates. We created two separate race variables so that we could analyze both facilities with higher percentages of nonwhite residents overall, as well as facilities specifically with large Black or African American resident populations. This minority group was the largest across ECCPs and, according to numerous prior studies, has a high likelihood of experiencing health disparities. These two regression models are similar to a regression presented in **Appendix M**, which also predicts the facility-level NFI 2 billing rate, and controls for the same facility-level characteristics. However, instead of the race variables described above, that model includes a variable that divides facilities into four different categories based on their percentages of racial minority residents.

**Table I-1. Selected facility characteristics by racial makeup of resident population, FY 2017**

Characteristic	Racial Makeup	Clinical + Payment				Payment-Only			
		N	Mean	SD	Median	N	Mean	SD	Median
NFI 2 acute care episodes per 1,000 resident-days	Facilities with <30% racial minority residents	69	1.53	0.95	1.45	121	1.11	1.15	0.89
	Facilities with ≥ 30% racial minority residents	41	1.36	1.15	1.05	24	0.68	0.71	0.63
Case-mix index†	Facilities with <30% racial minority residents`	69	11.89	0.88	12.04	121	11.45	1.05	11.50
	Facilities with ≥ 30% racial minority residents	41	12.58	1.24	12.45	24	12.24	1.03	12.37
Overall star rating	Facilities with <30% racial minority residents	69	3.70	1.33	4.00	121	3.94	1.21	4.00
	Facilities with ≥ 30% racial minority residents	41	3.29	1.21	3.00	24	3.46	1.22	3.50
Percentage of residents with advance directives	Facilities with <30% racial minority residents	69	50.63	32.95	52.58	121	58.43	35.39	62.07
	Facilities with ≥ 30% racial minority residents	41	45.74	34.47	42.43	24	33.47	31.25	24.86
RN staffing HPRD	Facilities with <30% racial minority residents	69	0.57	0.26	0.51	121	0.63	0.24	0.58
	Facilities with ≥ 30% racial minority residents	41	0.54	0.23	0.53	24	0.60	0.21	0.53
Licensed (LPN+RN) staffing HPRD	Facilities with <30% racial minority residents	69	1.39	0.33	1.37	121	1.49	0.31	1.46
	Facilities with ≥ 30% racial minority residents	41	1.37	0.32	1.37	24	1.44	0.23	1.47

HPRD= hours per resident-day; LPN = Licensed practical nurse; RN = Registered nurse; SD = standard deviation.

SOURCE: RTI analysis of Medicare claims data (RTI program AF770; RTI folder: sarnold\output\pah2\_af770\_ss - 2.17.2020).

NOTES: † Case-mix index is a weighted sum of the variables for the proportion of residents in a facility with specific characteristics. This case-mix variable is based on Feng et al. (2006). The effect of state Medicaid case-mix payment on nursing home resident acuity. *Health Services Research*, 41(4 Pt 1), 1317–1336. Results based on N = 255 facilities that have non-missing values for all variables included in table.

**Table I-2. Selected facility characteristics by racial makeup of resident population, FY 2018**

Characteristic	Racial Makeup	Clinical + Payment				Payment-Only			
		N	Mean	SD	Median	N	Mean	SD	Median
NFI 2 acute care episodes per 1,000 resident-days	Facilities with <30% racial minority residents	69	1.63	1.20	1.52	120	1.29	1.19	1.06
	Facilities with ≥ 30% racial minority residents	42	1.04	1.11	0.64	26	0.61	0.57	0.60
Case-mix index†	Facilities with <30% racial minority residents	69	11.87	0.89	11.96	120	11.37	1.02	11.42
	Facilities with ≥ 30% racial minority residents	42	12.48	1.21	12.52	26	12.18	1.00	12.46
Overall star rating	Facilities with <30% racial minority residents	69	3.59	1.24	4.00	120	3.83	1.20	4.00
	Facilities with ≥ 30% racial minority residents	42	3.33	1.32	3.00	26	3.50	1.36	3.50
Percentage of residents with advance directives	Facilities with <30% racial minority residents	69	52.62	34.18	54.44	120	62.19	35.76	72.37
	Facilities with ≥30% racial minority residents	42	39.20	31.66	35.40	26	34.48	29.91	28.10
RN staffing HPRD	Facilities with <30% racial minority residents	69	0.58	0.25	0.57	120	0.64	0.25	0.61
	Facilities with ≥ 30% racial minority residents	42	0.56	0.22	0.53	26	0.59	0.21	0.57
Licensed (LPN+RN) staffing HPRD	Facilities with <30% racial minority residents	69	1.41	0.34	1.39	120	1.50	0.31	1.51
	Facilities with ≥ 30% racial minority residents	42	1.44	0.31	1.40	26	1.40	0.23	1.42

HPRD= hours per resident-day; LPN = Licensed practical nurse; RN = Registered nurse; SD = standard deviation.

SOURCE: RTI analysis of Medicare claims data (RTI program AF770; RTI folder: sarnold\output\pah2\_af770\_ss - 2.17.2020).

NOTES: † Case-mix index is a weighted sum of the variables for the proportion of residents in a facility with specific characteristics. This case-mix variable is based on Feng et al. (2006). The effect of state Medicaid case-mix payment on nursing home resident acuity. *Health Services Research*, 41(4 Pt 1), 1317–1336. Results based on N = 257 facilities that have non-missing values for all variables included in table.

**Table I-3. Percentage of facilities with less than 30% racial minority residents by ECCP, FY 2017 and FY 2018**

ECCP	2017		2018	
	Clinical + Payment	Payment-Only	Clinical + Payment	Payment-Only
AQAF (Alabama)	65.22	63.64	65.22	68.18
ATOP2 (Nevada/Colorado)	57.14	87.50	50.00	79.17
MOQI (Missouri)	80.00	100.00	81.25	95.45
NY-RAH (New York)	45.83	75.00	50.00	75.76
OPTIMISTIC (Indiana)	52.63	92.00	47.37	92.00
RAVEN (Pennsylvania)	86.67	85.00	86.67	85.00
All ECCPs combined	62.72	83.45	62.16	82.19

SOURCE: RTI analysis of Medicare claims data (RTI program AF770; RTI folder: sarnold\output\pah2\_af770\_ss - 2.17.2020).

NOTE: Results based on N = 255 facilities in FY 2017 and N = 257 facilities in FY 2018.

**Table I-4. All ECCPs, Clinical + Payment and Payment-Only: Association between facility racial minority population and NFI 2 billing, FY 2017 and FY 2018**

Characteristic	Linear regression with adjustment for clustering		
	$\beta$	SE	p
Model 1: Facilities with $\geq$ 30% racial minority residents	<b>-0.324</b>	<b>0.157</b>	<b>0.041</b>
Model 2: % of residents that identify as black	<b>-0.013</b>	<b>0.003</b>	<b>&lt;0.001</b>

SOURCE: RTI analysis of Medicare claims data (RTI program MS 03; RTI folder: sarnold\output\pah2\_ms03\_ss - 3.4.2020).

NOTES: Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1. Results based on N = 255 facilities in FY 2017 and N = 257 facilities in FY 2018; facilities that have non-missing covariates.

**Table I-5. All ECCPs, Clinical + Payment: Association between facility racial minority population and NFI 2 billing, FY 2017 and FY 2018**

Characteristic	Linear regression with adjustment for clustering		
	$\beta$	SE	p
Model 3: Facilities with $\geq$ 30% racial minority residents	-0.273	0.232	0.241
Model 4: % of residents that identify as black	<b>-0.012</b>	<b>0.006</b>	<b>0.029</b>

SOURCE: RTI analysis of Medicare claims data (RTI program MS 03; RTI folder: sarnold\output\pah2\_ms03\_ss - 3.4.2020).

NOTES: Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1. Results based on N = 110 Clinical + Payment facilities in FY 2017 and N = 111 Clinical + Payment facilities in FY 2018; facilities that have non-missing covariates.

**Table I-6. All ECCPs, Payment-Only: Association between facility racial minority population and NFI 2 billing, FY 2017 and FY 2018**

Characteristic	Linear regression with adjustment for clustering		
	$\beta$	SE	p
Model 5: Facilities with $\geq$ 30% racial minority residents	<b>-0.554</b>	<b>0.195</b>	<b>0.005</b>
Model 6: % of residents that identify as black	<b>-0.014</b>	<b>0.005</b>	<b>0.006</b>

SOURCE: RTI analysis of Medicare claims data (RTI program MS 03; RTI folder: sarnold\output\pah2\_ms03\_ss - 3.4.2020).

NOTES: Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1. Results based on N = 145 Payment-Only facilities in FY 2017 and N = 146 Payment-Only facilities in FY 2018; facilities that have non-missing covariates.

## **APPENDIX J**

### **STAKEHOLDER INTERVIEW FINDINGS SUMMARY**

Between September 2017 and April 2019, RTI conducted 47 stakeholder interviews. Stakeholders included representatives from nursing facility trade associations, state departments of health, state Medicaid offices, state Ombudsman offices, state chapters of the American Medical Directors Association, nursing associations, and hospital associations, among others. The purpose of these interviews was to examine the market and policy contexts in each state where NFI 2 was implemented. We sought to determine what factors may have affected the Initiative by hindering nursing facilities' ability to reduce hospitalizations or improve quality more generally and what state-level efforts exist to reduce hospitalizations among nursing facility residents. Stakeholders reported that a series of federal and state policies and the growing presence of Medicare managed care are contributing to higher acuity in nursing facilities among both short- and long-stay residents. Some also stated that reimbursement rates and staffing have not kept up with acuity. Staff are difficult to find, as there is competition for staff from the growing number of assisted living facilities, as well as other industries. Most states are also experiencing decreased occupancy in nursing facilities.

Of the participating states, only New York was found to have policies or initiatives specifically aimed at reducing hospitalizations with their Delivery System Reform Incentive Payment (DSRIP) and Nursing Home Quality Pool (NHQP) programs. However, interviewees said the DSRIP program had less focus on nursing facility residents. Colorado is reportedly planning for a Medicaid value-based purchasing program, and although Indiana has a value-based purchasing program already, it does not include a measure of hospitalizations. All states, except New York, were found to have regional coalitions of health care related organizations, including hospitals, hospices, home health agencies, and nursing facilities with aims focused on improving some aspect(s) of care. Several of these groups were focused on reducing hospital readmissions.

When asked what else could be done to reduce hospitalizations among nursing facility residents, stakeholders suggested a greater presence of medical directors and nurse practitioners in nursing facilities, better training around behavioral health issues for frontline staff, and more advance care planning and education of families about end of life care.

**APPENDIX K**  
**FACTORS ASSOCIATED WITH PRACTITIONER ENGAGEMENT**  
**AND ADOPTION OF NFI 2**

This study analyzed practitioner adoption of the billing component of NFI 2, with the goal of understanding factors that promote or discourage billing. The Practitioner Survey was designed to provide a standardized set of responses on attitudes about the Initiative from all practitioners who were able to use practitioner billing codes. We present descriptive statistics on key survey responses, then results from a multivariate model testing whether these survey responses were associated with billing. We combined data from both waves of the Practitioner Survey. Practitioner billing status was assessed via a question about whether a practitioner had used any of the billing codes related to the Initiative, which we dichotomized into Yes (used any billing codes) and No (did not use billing codes or unsure of usage). **Table K-1** presents practitioners’ key survey responses, stratified by billing status.

**Table K-1. Practitioner survey responses by billing status**

Item and responses	Practitioner Initiative billing status		
	Response N	Billing (%)	Not billing (%)
Number of respondents	N=444	N = 305	N = 139
Frequency at the facility delivering direct patient care			
Fewer than three times per week	216	61.1	38.9
Three or more times per week	228	75.9	24.1
Confirming diagnosis in required time window			
Yes, major or somewhat of a challenge	235	63.4	36.6
Not a challenge	209	74.6	25.4
Completing amount of documentation in time			
Yes, major or somewhat of a challenge	228	66.2	33.8
Not a challenge	216	71.3	28.7
Travel time to facility			
Yes, major or somewhat of a challenge	103	55.3	44.7
Not a challenge	341	72.7	27.3
Practitioner is a physician			
Yes	284	64.8	35.2
No (NP, PA)	160	75.6	24.4

(continued)

**Table K-1. Practitioner survey responses by billing status (continued)**

Item and responses	Practitioner Initiative billing status		
	Response N	Billing (%)	Not billing (%)
Practitioner employment arrangement			
Salaried employee	76	72.4	27.6
Part of a large medical group	122	62.3	37.7
Independent physician	244	70.9	29.1
Type of Initiative group			
Clinical + Payment	223	64.1	35.9
Payment-Only	221	73.3	26.7
Having enough eligible long-stay residents at facility to make billing worthwhile			
Yes, a challenge	138	63.0	37.0
Not a challenge	306	71.2	28.8
Makes financial sense to bill for qualifying conditions			
Strongly agree/agree	376	73.1	26.9
Disagree/strongly disagree	68	44.1	55.9
Inadequacy of payments			
Yes, a challenge	156	63.5	36.5
Not a challenge	288	71.5	28.5
Belief that Initiative reduced potentially avoidable hospitalizations			
Strongly agree/agree	377	72.4	27.6
Disagree/strongly disagree	67	47.8	52.2
Belief that Initiative improved quality/outcomes of resident care			
Strongly agree/agree	390	71.3	28.7
Disagree/strongly disagree	54	50.0	50.0
Received education and training to confirm diagnosis for qualifying conditions			
Yes, and this training was sufficient	299	83.6	16.4
Insufficient training or no training	145	37.9	62.1
Confidence in clinical staff to assess and treat residents for qualifying conditions			
Strongly agree/agree	360	70.8	29.2
Disagree/strongly disagree	84	59.5	40.5

(continued)

**Table K-1. Practitioner survey responses by billing status (continued)**

Item and responses	Practitioner Initiative billing status		
	Response N	Billing (%)	Not billing (%)
Clinical staff communicated clearly			
Strongly agree/agree	407	68.6	31.5
Disagree/strongly disagree	37	70.3	29.7
Clinical staff communicated in a timely manner			
Strongly agree/agree	388	70.9	29.1
Disagree/strongly disagree	56	53.6	46.4

SOURCE: RTI analysis of survey data (RTI program: \\RTPNHIP02\0214448.001.005\_PAH2\_Project-HIPAA\006 Task 4.3 Survey\Manuscript work\Multivariate model\manuscript\_descriptive\_freqcheck.do)

We used a logistic regression to predict practitioner billing, adjusting for facility-level clustering. **Table K-2** shows the results of the logistic regression, including the odds ratios (ORs) and 95 percent confidence intervals (CIs).

The analysis found that practitioners who were present in the facility less frequently had a lower likelihood of billing (OR = 0.50, 95% CI = 0.29, 0.88). Practitioners who felt like it did not make financial sense for them to bill were also less likely to bill (OR = 0.36, 95% CI = 0.18, 0.71).

Practitioners who were part of the Clinical + Payment group had just over half the odds of billing compared to practitioners who were part of the Payment-Only group (OR = 0.54, 95% CI = 0.30, 0.96). This finding is consistent with reports from site visits and telephone interviews suggesting that practitioners in Payment-Only facilities may have been more incentivized to bill. Because many Clinical + Payment facilities included embedded ECCP advanced practice registered nurses (APRNs) who continued from NFI 1, these APRNs often confirmed Initiative diagnoses for facilities to support facility billing without being able to bill for the work themselves.

Finally, the factor most strongly associated with practitioner billing in our multivariate model was a lack of training and educational support. Practitioners who did not receive any training or felt this training was insufficient, approximately a third of respondents, had a much lower likelihood of billing compared to practitioners who found training sufficient (OR = 0.12, 95% CI = 0.05, 0.22).

**Table K-2. Practitioner survey responses associated with practitioner billing: odds ratios**

Practitioner survey response	Association with billing		
	OR	95% CI	
<b>Lower on-site frequency</b>	<b>0.50</b>	<b>0.29</b>	<b>0.88</b>
Inadequate time window for diagnoses	0.81	0.44	1.49
Time to complete documentation	1.42	0.77	2.60
Long travel time to facility	0.63	0.33	1.17
NP/PA role (not MD)	1.70	0.92	3.12
Salaried practice (not independent)	0.53	0.22	1.28
Large medical group practice (not independent)	0.60	0.30	1.22
<b>Part of Clinical + Payment group</b>	<b>0.54</b>	<b>0.30</b>	<b>0.96</b>
Low number of eligible residents	0.68	0.35	1.33
<b>Does not make financial sense to bill</b>	<b>0.36</b>	<b>0.18</b>	<b>0.72</b>
Inadequate billing amount	1.38	0.74	2.56
Initiative does not reduce avoidable hospitalizations	0.58	0.27	1.25
Initiative does not improve quality/outcomes	0.99	0.38	2.57
<b>Inadequate or lack of training/education</b>	<b>0.12</b>	<b>0.06</b>	<b>0.22</b>
Lack of confidence in clinical staff	1.17	0.55	2.47
Lack of clear clinical communication	1.68	0.56	5.01
Lack of timely clinical communication	0.93	0.37	2.31

OR = odds ratios.

SOURCE: RTI analysis of survey data (RTI program: SS\_030\_svy; RTI folder: sarnold/output/pah2\_ss020\_svy-04.03.2020).

NOTE: Bold text indicates that the estimate is statistically significant at the 95% confidence interval level.

## APPENDIX L

### DATA AND METHODS USED TO EVALUATE THE IMPACT OF THE INITIATIVE ON UTILIZATION, EXPENDITURE, AND QUALITY OUTCOME MEASURES

#### L.1 Overview

In this fourth annual report we present results from multivariate regression models that enable us to estimate the Initiative's effects on key outcomes. Specifically, we use difference-in-differences (DD) models, risk-adjusted for resident- and facility-level characteristics, to calculate the effect of the payment component in the Clinical + Payment and Payment-Only interventions on participating nursing facility residents, relative to comparison group residents. The key resident-level outcomes evaluated are utilization of hospital-related Medicare-covered services and associated expenditures. This report covers a 6-year period from 2014 to 2019 (all years are Medicare fiscal years [FYs], from October 1 of the prior calendar year through September 30 of the named calendar year). We use FY 2014 to FY 2016 as baseline years.

In this appendix, we first provide an overview of our quantitative approach to annual evaluation analyses (**Section L.2**) and a description of secondary data sources (**Section L.3**), which are necessary for defining both the Initiative-eligible population and the outcome measures. We then document our approach to identifying the population of Initiative-eligible nursing facility residents in each year who are included in the evaluation analyses (**Section L.4**), and we detail our approach to selecting a comparison group (**Section L.5**) and creating our analytic file (**Section L.6**). In subsequent sections we describe how the outcome measures are operationalized annually (**Sections L.7 and L.8**), how we select covariates (i.e., independent or control variables) associated with the outcome measures (**Section L.9**), and how we specify the DD models used to perform multivariate regression analyses and calculate marginal effects (**Section L.10**). In **Section L.11** we discuss the interpretation of the Initiative effects.

Descriptive statistics on the final set of model covariates, including percentages for categorical variables and means and standard deviations for continuous variables, are presented in **Appendix N**. Descriptive results on the outcome measures are presented in **Appendix O** (utilization, measured as percentage of individuals using a given type of service), **Appendix P** (utilization, measured as utilization rate per 1,000 Initiative-eligible resident-days), **Appendix Q** (expenditures, by type of service, measured in dollars per Initiative-eligible resident-year), **Appendix R** (Minimum Data Set [MDS]-based quality measures, measured as percent of observed quarters with each event), and **Appendix S** (resident mortality). The key multivariate results are presented in **Section 3** of the main report, and sensitivity analyses are presented in **Appendix W**. Complete multivariate regression results for an example model are presented in **Appendix X**.

#### L.2 Analytic Approach to Annual Evaluation: Overview

Regression-based models were used to estimate the effects of the ECCP interventions (see **Section L.10** for specifications). We used one general model form to provide the framework for the evaluation of all outcomes defined at the resident level. The model follows a DD design with

multiple annual observation periods before the intervention (FY 2014–FY 2016) and three post-intervention observation periods (FY 2017, FY 2018, and FY 2019). The model includes indicator variables for a facility being in the intervention (either Clinical + Payment or Payment-Only) or comparison group for periods during the intervention and marks those same facilities during the pre-intervention years.

Several caveats should be noted on the quantitative analyses presented in the current report:

1. Only fee-for-service (FFS) Medicare enrollees who meet eligibility criteria for participation in the Initiative or those in the comparison group who would be eligible for the Initiative are included in the multivariate analyses (see **Section L.4** for detailed criteria and procedures used to identify Initiative-eligible residents). The majority are dually eligible for Medicare and Medicaid.
2. Relatedly, only Medicare expenditures are analyzed and reported. Because the measures of interest are mainly reflected in Medicare claims, the limitation is not substantive. We conducted simulation analyses to provide an estimate of the impact of NFI 2 on FY 2019 Medicaid expenditures. We also analyzed the FY 2016 Transformed Medicaid Statistical Information System (T-MSIS) Analytic Files (TAF), which are the mostly recently available data. We will include analyses of more recent Medicaid expenditures once the T-MSIS TAF data are available for any of the Initiative years.

### **L.3 Secondary Data Used in Quantitative Analyses**

Secondary data are data used to administer CMS programs; these data play a central role in this analysis. They are used for identifying Initiative-eligible residents, selecting the comparison group, measuring the outcomes, and defining covariates for inclusion in multivariate analysis as risk-adjusters.

RTI obtained Medicare data (eligibility, enrollment, claims, and assessments) from the CMS Integrated Data Repository (IDR). We expect to obtain additional Medicaid data in the TAF form in late 2020. Resident assessment data come from the MDS 3.0. The following sections briefly describe these files and additional data sources used in our analyses.

#### **L.3.1 Resident Assessment Data—Minimum Data Set 3.0**

RTI uses MDS 3.0 as the main data source for identifying Initiative-eligible residents and Initiative-related exposure periods; defining the resident-level and MDS-based quality outcomes; and identifying some of the resident-level characteristics (used in comparison group selection and multivariate modeling) associated with these outcomes. We use a 6-week runout time for MDS data; that is, we request MDS data through about 6 weeks after the end of each observation period (fiscal year) so that almost all data for the observation period have been submitted.

Examining the MDS data stream for each resident allows the identification of the resident's time residing in or out of the facility. All Medicare- and Medicaid-certified nursing facilities are required

to collect and submit MDS data to CMS for every resident in a certified bed (regardless of payment sources) on admission, quarterly, annually, and upon a significant change in resident status, and to submit any significant corrections to prior comprehensive or quarterly assessments. In addition, facilities are required to submit assessments when residents are discharged from the facility, regardless of plan for returning. The data collection and submission requirements are intended to encourage facilities to base a given resident's care planning on a comprehensive set of health and functional information. In addition, providers must complete and submit assessments for Medicare FFS beneficiaries who receive Medicare Part A–covered post-acute care. As of the study period, these assessments were completed at 5, 14, 30, 60, and 90 days of the Medicare Part A stay and upon readmission or return to the facility. Effective October 1, 2016, CMS also requires Medicare Part A PPS Discharge Assessment when a resident's Medicare Part A stay ends, and the resident remains in the facility.

MDS items evaluate each resident's demographic characteristics, physical health (e.g., chronic diseases, infections, and skin conditions), mental health (e.g., mood and psychological status), and functional and cognitive status (e.g., activities of daily living [ADL] and cognitive performance) and give a multidimensional view of their health and functional status. MDS 3.0 has excellent to very good reliability, or reproducibility of measurement, when assessments by research nurses are compared to assessments by facility nurses.<sup>12</sup>

### **L.3.2 Medicare Claims and Eligibility Data**

RTI uses Medicare claims, through the CMS IDR system, as the data source for tracking outcomes on service utilization (e.g., hospitalizations, emergency department [ED] visits) and expenditures. With data updated on a weekly (or at least monthly) basis, the IDR provides timely and complete data that meet CMS's timeline for our reports. The IDR also provides up-to-date indicators for dual-eligible status, which we use to identify dual-eligible residents in our analyses, and for FFS status, which we use to exclude those who were enrolled in Medicare Advantage.

RTI creates Medicare utilization and expenditure measures per beneficiary in each observation period (fiscal year). We allow 3 months for claims runout from the end of the observation period. A longer runout period would allow more time for late submissions or adjustments; however, it would leave inadequate time for processing and analyzing those claims for our reports.

In addition to using Medicare data to track outcomes (utilization events and expenditures), we use Medicare data to capture resident-level health characteristics for use in multivariate modeling. For this purpose, we use Medicare Hierarchical Condition Categories (HCCs), which are updated by CMS annually and are derived from ICD-9-CM and ICD-10-CM codes on principal hospital inpatient, secondary hospital inpatient, hospital outpatient, physician, and clinically trained nonphysician claims. HCCs are clinically meaningful groupings of ICD-9 or ICD-10 diagnosis codes maintained by

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<sup>12</sup> Saliba, D., & Buchanan, J. (2012). Making the investment count: Revision of the Minimum Data Set for Nursing Homes, MDS 3.0. *J Am Med Dir Assoc.*, 13(7), 602–610. doi: 10.1016/j.jamda.2012.06.002

CMS to risk adjust capitation payments to Medicare Advantage insurance plans. HCCs are binary variables: a given Medicare beneficiary is designated as having or not having a condition or diagnosis contained in a given HCC cluster. HCCs have been used to predict readmissions and mortality in the Medicare hospital quality models used for Hospital Compare. They are also used in the CMS readmissions models for skilled nursing facilities, inpatient rehabilitation facilities, and long-term care hospitals. CMS first implemented the RTI-designed HCC model for capitation in 2004.

### **L.3.3 Nursing Facility Data**

We use data from the CMS CASPER (Certification and Survey Provider Enhanced Reports) system, and Nursing Home Compare (NHC), to identify facility characteristics. These characteristics, including inspection survey-based measures of quality and staffing levels, are then used for selecting comparison groups. Selected characteristics are also included in multivariate analyses of individual-level outcomes.

CASPER (formerly known as OSCAR, or Online Survey Certification and Reporting) is a data system maintained by CMS in cooperation with the state long-term care survey agencies. CASPER includes a compilation of data collected by surveyors during the on-site inspection surveys conducted at nursing facilities for certification and continued participation in the Medicare and Medicaid programs. CASPER is the most comprehensive source of facility-level information on the operations, patient census, and regulatory compliance of nursing facilities.

Staffing data from CASPER are considered to be less than accurate, with the potential for gaming staffing schedules by facilities. There is an alternative source, the new Payroll-Based Journal (PBJ) system, which is designed to be more precise and to feed from facility payroll systems. PBJ staffing data were not used in the comparison group selection analysis because these data were unavailable or incomplete for the baseline years and for the first Initiative year.

NHC, which is part of public reporting, provides quality of resident care and staffing information for more than 15,000 Medicare- and Medicaid-certified nursing facilities across the country. It includes a compilation of nursing facility inspection results, staffing levels, federal penalties, and quality ratings in specific areas of care. The star rating feature gives each facility a rating between one and five stars, from poor to excellent, based on health inspection, staffing, and quality of resident care measures. Each facility receives a star rating for each of the three domains along with an overall star rating. Data about staffing, penalties, nursing facility characteristics, and health deficiencies are reported from CMS's health inspection database. Some of these variables were used in the propensity score models for comparison group selection as described in **Section L.5**.

### **L.3.4 MDM Data**

Of interest to CMS is the potential for unrelated initiatives and interventions to mask or otherwise distort the estimated effects of this Initiative. RTI's survey of comparison facilities in NFI 1 indicated that a majority of responding facilities had introduced Initiative-analogous practices to reduce potentially avoidable hospitalizations among their long-stay residents. Another potential

source of confounding is participation in other CMS initiatives and demonstration projects. To control for overlapping enrollment, RTI uses the MDM (Master Data Management) system to identify enrollment in selected CMS initiatives in each year. The MDM, however, does not provide information on enrollment in all CMS initiatives that can alter utilization of health services. MDM enrollment information often lags because during the designated periods of the year demonstration programs and initiatives may not be able to enter beneficiary and provider information in a timely manner.

#### **L.4 Identification of Initiative-Eligible Residents and Initiative-Eligible Exposure Periods**

Here we describe how we identified Initiative-eligible residents using both facility- and resident-level characteristics. At the individual level, the same eligibility criteria were applied to residents in Clinical + Payment facilities, Payment-Only facilities, and comparison facilities in each year. We selected the Initiative-eligible residents, and defined their Initiative-eligible exposure period, for each year (including the baseline years FY 2014–FY 2016).

Please note that throughout this report, we use the terms “Initiative-eligible exposure period,” and “exposure period” interchangeably. These terms, along with “Initiative-eligible days” and “Initiative-eligible resident-days,” all refer to the period of time during which the resident has satisfied the eligibility criteria. In some cases, it includes short periods of time when the individual is not in the nursing facility as described below.

Initially, there were 263 facilities in the Initiative—115 facilities in the Clinical + Payment model and 148 in the Payment-Only model. There were CMS-imposed requirements for the facilities to be able to participate in the Initiative, including that facilities could not be on the list of Special Focus Facilities (SFFs) and must be Medicare and Medicaid certified. For the newly recruited facilities that form the Payment-Only group, there were additional requirements including that facilities must have an average daily census of at least 80 residents with greater than 40 percent of the facility residents defined as long-stay and enrolled in traditional FFS Medicare, have no survey deficiencies for immediate jeopardy to resident health or safety within the last 12 months, and have at least a three-star overall rating on NHC.

In general, based on an intent-to-treat approach, residents in all facilities that participated in the Initiative were included in our quantitative evaluation even if they dropped out of the Initiative.<sup>13</sup> However, certain categories of facilities (and all their residents) were excluded.<sup>14</sup> These included veterans homes, because we do not have the ability to track utilization in the Veterans Health Administration system, and facilities that focus on HIV/AIDS patients, because the population is so

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<sup>13</sup> Facilities that withdrew prior to September 30, 2017, were excluded from primary data collection activities even though they were included in the DD analyses. Note also that there were some facilities that were in the Initiative in NFI 1 but did not continue in NFI 2, and these were excluded from all analyses. Finally, one of the facilities withdrew before the Initiative even began and was excluded from all analyses.

<sup>14</sup> These facility-level exclusions were made for quantitative data analysis. These facilities were still included for primary data collection activities.

different from the population in other facilities. For the DD analyses presented in this report, 259 intervention facilities, including 148 facilities in the Payment-Only group, and 111 facilities in the Clinical + Payment group, were included.

We identified residents in these Initiative facilities by identifying the CMS Certification Number (CCN) for all Initiative facilities and then selecting MDS records for residents in these facilities. For one facility in Indiana (Swiss Village), we had to use two CCNs to match and derive the MDS data. Swiss Village historically has had the CCN 155707, but for pulling in MDS data we had to use CCN 15E002 with this facility.

Next, in **Table L-1**, we present the individual-level eligibility criteria for NFI 2 that were prescribed by CMS and then describe how we implemented these criteria in our secondary data analysis. **Table L-1** also compares these criteria with those applied to NFI 1: whether they were the same, different, or new to NFI 2.

**Table L-1. Comparison of NFI 2 and NFI 1 resident eligibility criteria**

NFI 2 criteria	Comparison to NFI 1 criteria
<ul style="list-style-type: none"> <li>■ Not enrolled in a Medicare managed care (Medicare Advantage) plan</li> </ul>	<ul style="list-style-type: none"> <li>■ Same criteria</li> </ul>
<ul style="list-style-type: none"> <li>■ Have resided in the long-term care facility for 101 cumulative days or more starting from the resident's date of admission to the long-term care facility</li> </ul>	<ul style="list-style-type: none"> <li>■ Different—in NFI 1 only, could also be eligible by not having an active discharge plan</li> </ul>
<ul style="list-style-type: none"> <li>■ Enrolled in Medicare (Part A and Part B FFS) and Medicaid, or Medicare (Part A and Part B FFS) only</li> </ul>	<ul style="list-style-type: none"> <li>■ Different—in NFI 1 only, also included Medicaid only and Medicare (Part A or Part B FFS)</li> </ul>
<ul style="list-style-type: none"> <li>■ Not receiving Medicare through Railroad Retirement Board</li> </ul>	<ul style="list-style-type: none"> <li>■ New—NFI 2 criterion only</li> </ul>
<ul style="list-style-type: none"> <li>■ Have not elected Medicare Hospice</li> <li>■ Days spent in hospice are not counted toward 101 cumulative days or more for eligibility (exception if patient discontinues hospice, can reaccumulate 101 days for eligibility)</li> </ul>	<ul style="list-style-type: none"> <li>■ New—NFI 2 criteria only</li> </ul>

FFS = fee-for-service.

To be eligible, residents must have Medicare Part A and Part B FFS status throughout their Initiative-eligible exposure periods during a reporting period (fiscal year, from October to September, for annual evaluation). We identified Initiative-eligible residents in Medicare enrollment data to determine their Medicare Advantage and FFS status. Residents in Medicaid managed care were included if they are also enrolled in FFS Medicare (Part A and Part B) and meet all other Initiative eligibility criteria during each reporting period.

Residents were eligible for the Initiative only if they have resided in the nursing facility for 101 cumulative days or more starting from their date of admission to the facility. We used MDS assessments and Medicare enrollment and claims data to identify Initiative-eligible residents and

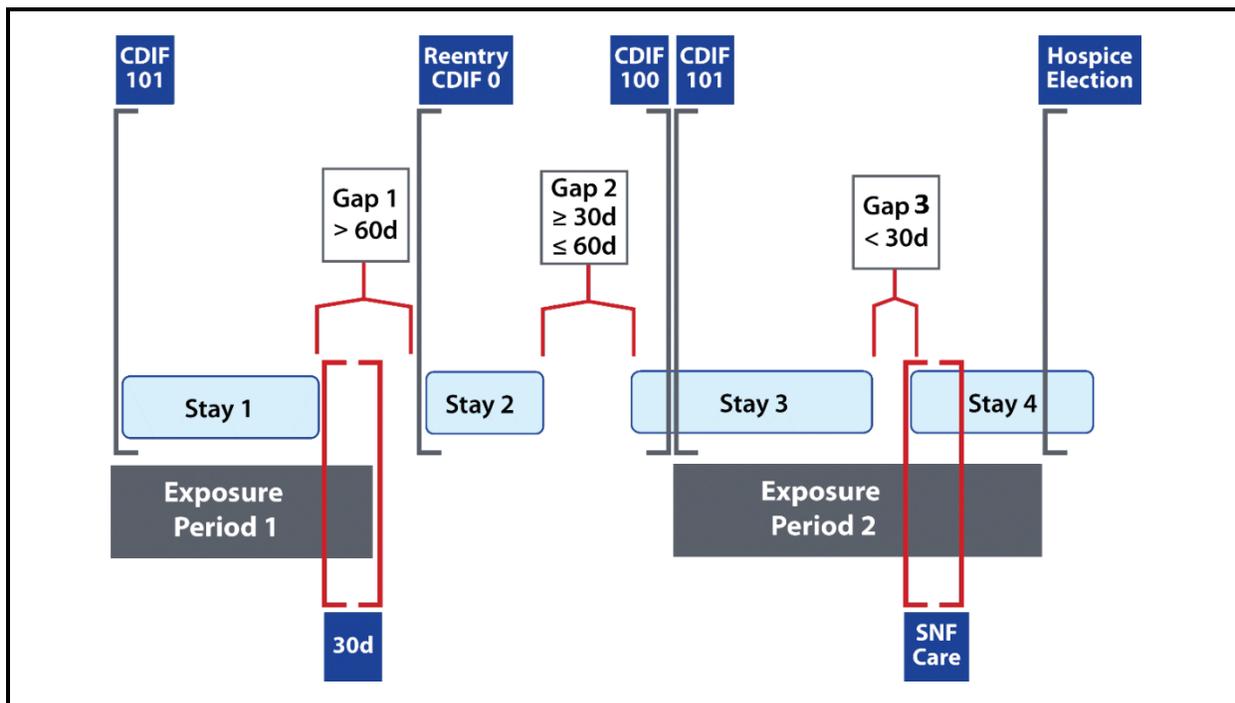
Initiative-eligible exposure periods. This allows a uniform approach to determine the periods during which a resident would be eligible for the clinical or payment interventions, whether in a participating facility or in a comparison facility. The diagram in **Figure L-1** shows a hypothetical resident's nursing facility use that can be depicted using the resident's MDS data stream. We use this hypothetical resident to illustrate the 101 days Initiative eligibility criteria. Elements of the diagram are defined below:

- A stay is a period between a resident's entry (either admission or reentry) into a nursing facility and either a discharge (with or without anticipation of return) or death. During a stay, a resident is physically in the nursing facility.
- A gap is a period between two stays. During a gap, a resident is temporarily out of the nursing facility.

The exposure period starts on the 101st day and may span across stays and brief gaps (30 days or fewer) between them. The resident's health care utilization, events, spending, and quality outcomes are measured for the evaluation only if they occur during the exposure periods. For a gap that is longer than 30 days and adjacent to a stay in the exposure period, the exposure period also contains the first 30 days in the gap (illustrated by Exposure Period 1 in **Figure L-1**). Thus, the inclusion of brief gaps and the first 30 days in longer gaps ensures that the hospitalizations or ED visits that trigger these gaps are captured in the evaluation analysis. A resident may have multiple Initiative-related nursing facility exposure periods if they have one or more gaps longer than 30 days.

Note that a gap longer than 60 days breaks the continuity of the exposure period. If a former resident is readmitted more than 60 days after discharge from a previous stay, the resident will not be eligible until an additional 101 days of residence are reached (i.e., the resident would become eligible again on the 101st cumulative day, as illustrated by Exposure Period 2 in **Figure L-1**).

**Figure L-1. A hypothetical resident’s nursing facility use and Initiative-eligible exposure periods**



CDIF = cumulative day in facility; SNF = skilled nursing facility.

NOTES: A stay is a period between a resident’s entry (either admission or reentry) into a facility and either a discharge (with or without anticipation of return) or death. During a stay, a resident is physically in the nursing facility. A gap is a period between two stays. During a gap, a resident is temporarily out of the nursing facility.

Finally, an eligible resident who elects the Medicare hospice benefit is no longer eligible for NFI 2. Thus, the Initiative-eligible exposure period ends with hospice enrollment (illustrated by Exposure Period 2 in **Figure L-1**). If the resident opts out of hospice status or is discharged alive from hospice, the hospice enrollment period is treated as a gap. In that case, the number of days spent under hospice care plays a key role in determining the re-eligibility of the resident for NFI 2.

- If the resident opts out of hospice in 59 or fewer days from enrollment, the resident will be eligible for NFI 2 from the day after the discharge from hospice.<sup>15</sup>
- If the resident opts out after spending longer than 59 days under hospice care, the resident has to reaccumulate 101 days in the nursing facility to be eligible again for NFI 2.

A narrative of the hypothetical resident’s nursing facility use and Initiative-eligible exposure periods illustrated in **Figure L-1** further clarifies our approach. It shows how exposure periods are defined for a resident with different types of gaps in residency. The hypothetical resident started a new stay—Stay 1—after already accumulating the required 101 days previously. Because the

<sup>15</sup> While all other reasons for a gap allow for a 60-day interruption, a gap due to hospice only allows for a 59-day interruption.

resident met the number of days previously, Exposure Period 1 and Stay 1 start on the same day. Although Stay 1 ends when the resident leaves the facility, Exposure Period 1 continues for 30 days. The resident stays out of the facility for at least 60 days, resetting the count of cumulative days back to 0.

Upon return to the facility, the cumulative day counter starts anew with Stay 2. The resident has not been in the facility for 101 cumulative days when there is another gap, of 60 days or less, which ends Stay 2. The day counter is frozen while the resident is absent during this gap and resumes when the resident returns for Stay 3. During Stay 3 the counter reaches 101 cumulative days and the second exposure period begins. Stay 3 ends when the resident again leaves the facility, for fewer than 30 days this time. The 30-day gap is included in Exposure Period 2, so we can capture hospitalizations or other utilization that may occur during this short gap. The resident returns for Stay 4, still in Exposure Period 2. Exposure Period 2 ends when the resident elects hospice care. The stay technically continues because the resident did not leave the facility for this care.

Two additional considerations are worth noting:

1. A resident may have Initiative-eligible exposure periods in more than one nursing facility; the Initiative-eligible exposure period in each nursing facility was determined as previously mentioned. When a resident transfers from one nursing facility directly to another (i.e., both the end of the Initiative-eligible exposure period in the first facility and the start of the Initiative-eligible exposure period in the second facility fall on the day of transfer), we count utilization, events, and spending starting on the day of transfer against the first facility, because it is more likely to be responsible for these occurrences. This would include the entire cost of a hospital stay with an admission on that day.
2. By including stays and brief gaps, the exposure periods may contain skilled nursing facility (SNF) care episodes following hospitalizations that are covered under Medicare Part A (illustrated by the SNF care period in Exposure Period 2 in **Figure L-1**). Although nursing facilities are not eligible for the Initiative-related payment during these SNF episodes because they are already paid at the higher SNF rate (compared to the Medicaid or private pay nursing facility rate), practitioners participating in the Initiative are eligible for the higher Initiative-related payment and in some Clinical + Payment facilities, the resident would continue to receive any clinical interventions. Thus, there are Initiative-related incentives, albeit smaller than the rest of the exposure period, to reduce hospitalizations during these SNF episodes.

Identifying Initiative-eligible residents and their Initiative-eligible exposure periods was the first step to forming the analytic sample and preparing analytic files to support both comparison group selection and data analyses. We then extracted key covariates capturing demographics, functional status, diagnosis, and enrollment in other federal initiatives or demonstrations from the data sources described in **Section L.3**. The final analytic files included Initiative-eligible residents who

were successfully linked with Medicare enrollment and claims data, MDM, and who had non-missing values for all the covariates.

## L.5 National Comparison Group Selection

We originally planned to create comparison groups from within the same state as the ECCP to account for state-level variations such as state policy changes or changes in local market conditions. However, our NFI 1 findings discovered some spillover effect, which indicated that other within-state facilities also picked up some components of NFI 1.<sup>16</sup> In fact, some ECCPs deliberately encouraged the spread of good practices beyond the Initiative participants. This spillover effect created the potential to underestimate the Initiative effects because the results for the within-state comparison facilities may look so similar to the Initiative facilities that it would seem the Initiative had minimal impact.

Therefore, we concluded that despite the advantages of using a within-state comparison group, this structure might not give full credit to the intervention for reducing hospitalizations if the within-state comparison facilities were implementing similar interventions. To address this limitation, we determined that it would be better to use a national comparison group selected from outside the Initiative-participating states and adjust for differences in trends. This group is larger and less subject to random fluctuation than the within-state comparison group of matched facilities used in the evaluation of NFI 1.<sup>16</sup> Using a national comparison group, because of its large size, has the important advantage of producing stable estimates for regression model parameters.

We created a uniform national comparison group for all ECCPs. The national comparison group was selected from the national sample of residents in non-ECCP states. In this section, we describe how the comparison group was constructed.

We first defined a baseline period for the evaluation. To identify the appropriate baseline years to include in the analysis, we examined trends over time for utilization and Medicare expenditures. Based on these trends, and in consultation with CMS, it was determined that FY 2014–FY 2016 would be used as the baseline years. These 3 years immediately preceded NFI 2 and were the years, for the Clinical + Payment group, where NFI 1 had been fully implemented.

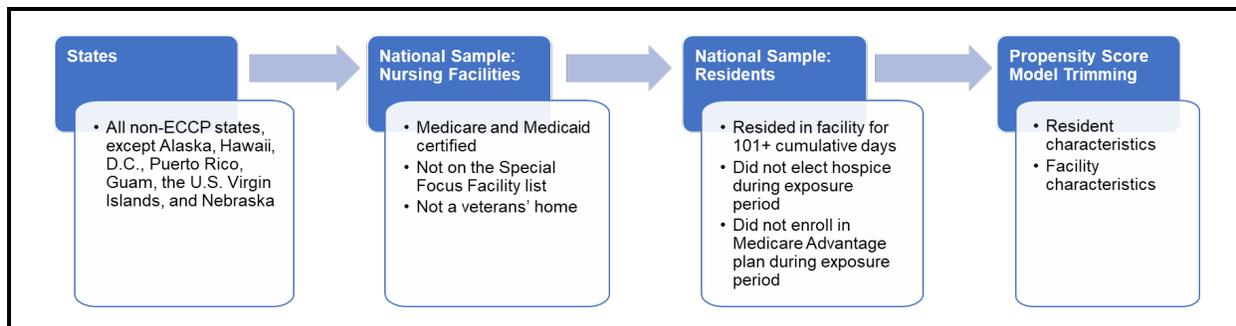
**Figure L-2** depicts our analytic approach to selecting comparison group residents, nationally. To construct a national comparison group, we first selected states from which the national sample frame was drawn. The national sample was selected from all non-ECCP states, with a few exceptions. Facilities and residents in Alaska; Hawaii; Washington, DC; Puerto Rico; Guam; and the U.S. Virgin Islands were excluded from the national sample because of differences in their nursing facility resident populations compared to those in the 48 contiguous states. We also excluded

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<sup>16</sup> Ingber, M., Feng, Z., Khatutsky, G., et al. (2017, September). Evaluation of the initiative to reduce avoidable hospitalizations among nursing facility residents. Final report. Report for Centers for Medicare & Medicaid Services. Waltham, MA: RTI International. <https://downloads.cms.gov/files/cmmti/irahnr-finalevalrpt.pdf>

Nebraska from the national sample because Nebraska had participated in NFI 1 and did not continue into NFI 2.

**Figure L-2. Analytic approach to selecting national comparison group residents**



The national sample was drawn in each year for FY 2014–FY 2016 (3 baseline years) and for FY 2017 (Initiative Year 1), FY 2018 (Initiative Year 2), and FY 2019 (Initiative Year 3) for evaluation analyses in the current report. From all the states included in the national sample in each year, we then selected facilities using the following criteria:

- Medicare and Medicaid certified,
- not an SFF, and
- not a veterans' home.

After identifying all facilities meeting the inclusion criteria above, we next selected residents in those facilities who would meet the following criteria for inclusion in the national sample frame, consistent with the NFI 2 eligibility criteria for residents in participating facilities:

- resided in the nursing facility for 101 cumulative days or longer starting from the resident's date of admission to the nursing facility,
- did not receive benefits through Railway Retirement Board,
- enrolled in Medicare (Part A and Part B) FFS and Medicaid or Medicare (Part A and Part B) FFS only,
- did not elect the Medicare hospice benefit, and
- did not enroll in a Medicare Advantage plan.

Residents meeting these criteria during each year comprise the national sample frame from which the final national comparison group of residents was selected using propensity score models.

**National Comparison Group Construction—Propensity Score Models to Exclude Outliers.** In each year, we combined all eligible residents of the intervention group facilities (both Clinical + Payment and Payment-Only) into one single intervention group. For each of the baseline years (FY 2014–FY 2016), we selected residents of the intervention group based on the intervention eligibility

requirements (even though obviously the intervention had not begun at that time). Then, using a combined file that included all residents from the single intervention group and all residents from the national sample frame, separately for each year, we ran a propensity score model to predict the probability of a resident being in the intervention group as opposed to being in the national sample frame. From this model, propensity scores were computed for all intervention group residents and for all residents in the national sample frame. The propensity scores were not used to match individuals, but to exclude individuals very different from the study population.

Our use of propensity scores to trim outliers from a national comparison group of would-be eligible nursing facility residents, rather than to match specific individuals (or facilities), is different from the typical comparison group selection methods used in some other CMS evaluations. The principal approach used here to control for differences in residents in the intervention and comparison groups is the use of extensive risk adjustment in the modeling. We included an extensive list of resident characteristics (demographics and health characteristics measured by HCCs) as risk adjusters in all regression models of outcomes. We believe this approach is appropriate and serves our analytic purposes well. The “light-touch” approach to trimming cases with out-of-range propensity scores helped to identify and retain a large-sized national comparison group that ensures stable and robust parameter estimates from DD regression models for impact analysis.

Both resident- and facility-level characteristics were included in a logistic regression model to calculate the propensity score, which is the predicted probability of being in the intervention group. For the most part, the variables included in the propensity score models were the same as those included in the DD analytical models. The main differences were that the analytical models included a few additional health conditions, and the propensity score model included additional facility-level variables, such as several of the facility’s rating variables from NHC.<sup>17</sup>

***Within-State Reference Groups.*** A disadvantage of using the national comparison group is that we would not be able to account for possible state-specific factors that may impact our outcomes of interest—such as concurrent within-state efforts (which are unrelated to NFI) to reduce hospitalizations. This concern can be addressed with the use of a within-state reference group (WSRG) to capture possible changes in state policies and local market conditions. For each year, the WSRG includes all would-be eligible residents from all nonparticipating facilities within current ECCP states meeting the facility inclusion criteria (e.g., never an SFF, always Medicare and Medicaid certified). Facilities that were active participants at any point in NFI 1 but are no longer participating in NFI 2 were excluded from the WSRG. We performed the analysis using a WSRG as a sensitivity analysis, as we describe further in **Section L.10** below.

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<sup>17</sup> The complete list of variables included in the DD models, along with descriptive statistics, is in **Appendix N**. Propensity models did not include neurogenic bladder, obstructive uropathy, or ESRD post-transplant status. DD models did not include staffing rating, star rating, survey rating (all from NHC), or presence of an on-site clinical lab or x-ray. There were slight differences between the two models in how profit status and rurality were measured.

## L.6 Final Counts of Eligible Residents After Exclusions: FY 2019 Analytical File

We applied the NFI 2 eligibility criteria to create our sample of Initiative-eligible residents for the two intervention groups, and the national comparison group (and the WSRG), and then applied a final set of exclusion criteria specific to various outcomes of interest. **Table L-2** displays the counts before and after exclusions for the two intervention groups and for the national comparison group, for each year separately. We initially began with the sample of nursing facility residents who had resided in a facility for 101 cumulative days or more starting from their date of admission to the facility. The table describes some of the specific exclusions we applied and provides the total number of beneficiaries remaining in the sample after all exclusions had been applied. Although the specific exclusions listed in the table were at the resident level, there were both resident- and facility-level exclusions applied to the initial sample as described above.

**Table L-3** explains additional exclusions we applied to derive the final analytic samples for each of the analyses we performed, including the exclusions based on propensity scores. The largest number of beneficiaries were included in the utilization analyses, with slightly smaller numbers in the expenditure and quality measure analyses. A small number of observations with negative expenditures were deleted. Beneficiaries were deleted from quality measure samples if they were missing quality measure data or met measure exclusion criteria. Furthermore, we deleted observations where we considered the expenditures to be an outlier, using a cutoff of \$500,000 in 2014 for total Medicare expenditures which was subsequently adjusted for yearly inflation.

**Table L-2. Counts of eligible residents in the analytical file**

Sample overview	2014			2015			2016			2017			2018			2019		
	C + P	PO	NCG															
Initial sample	24,074	24,429	1,396,872	24,035	24,401	1,390,608	24,257	23,905	1,358,649	24,158	23,994	1,346,724	24,158	23,880	1,344,218	23,982	23,462	1,322,076
Selected exclusion criteria (exclusions are not mutually exclusive)																		
Not enrolled in FFS Medicare	4,663	3,758	189,128	5,020	4,143	232,485	5,687	4,390	236,027	5,870	5,028	248,307	6,398	5,886	263,678	6,757	6,508	276,654
Not enrolled in Medicare A and B	2,699	2,047	137,339	2,811	2,008	140,087	2,999	2,077	146,198	3,056	1,930	141,671	3,120	1,894	143,632	3,155	1,961	146,759
No overlapping exposure period	2,186	1,981	113,954	1,913	1,853	108,017	1,750	1,681	102,070	1,766	1,718	103,639	1,860	1,838	105,710	1,805	1,809	102,459
No matching Medicare data	1,701	1,236	90,776	1,813	1,231	95,014	2,113	1,330	105,365	2,212	1,321	106,781	2,265	1,335	108,773	2,306	1,329	110,397
Total number of excluded beneficiaries	10,845	9,296	623,441	11,042	9,507	655,693	11,752	9,590	654,090	12,070	10,200	661,589	12,874	11,174	680,366	13,215	11,793	694,208
Total number of eligible beneficiaries	13,229	15,133	773,531	12,993	14,894	734,915	12,505	14,315	704,559	12,088	13,794	685,135	11,284	12,706	663,852	10,767	11,669	627,868

C + P = Clinical + Payment; FFS = fee-for-service; NCG = national comparison group; PO = Payment-Only.

SOURCE: RTI analysis of Medicare claims data (RTI program AF600; RTI folder: sarnold\output\pah2\_af600\_ar4 - 5.07.2020\06112020).

NOTES: This table shows only selected exclusions. Exclusions are not mutually exclusive.

**Table L-3. Counts of residents used for specific analyses**

Sample overview	2014			2015			2016			2017			2018			2019		
	C + P	PO	NCG															
Total number of eligible beneficiaries	13,229	15,133	773,531	12,993	14,894	734,915	12,505	14,315	704,559	12,088	13,794	685,135	11,284	12,706	663,852	10,767	11,669	627,868
Overall exclusions applied for analytic sample																		
Excluded due to out-of-range propensity scores	—	—	4,111	—	—	11,539	—	—	979	—	—	2,679	—	—	288	—	—	1,241
Excluded due to missing covariate	648	629	40,704	647	707	40,256	718	620	37,426	594	694	35,531	662	720	38,371	616	591	33,690
<b>Total number used for utilization analyses</b>	12,581	14,504	728,716	12,346	14,187	683,120	11,787	13,695	666,154	11,494	13,100	646,925	10,622	11,986	625,193	10,151	11,078	592,937
Exclusions applied for expenditure analyses																		
Excluded due to outlier expenditures	56	34	1,917	48	36	1,612	53	33	1,645	44	35	1,461	34	26	1,290	41	23	1,231
Excluded due to negative expenditures	—	—	10	—	—	7	—	—	10	—	—	12	1	1	6	—	—	7
<b>Total number used for expenditure analyses</b>	12,525	14,470	726,789	12,298	14,151	681,501	11,734	13,662	664,499	11,450	13,065	645,452	10,587	11,959	623,897	10,110	11,055	591,699
Exclusions applied for quality measure analyses																		
Excluded due to missing QM outcome data	226	262	13,272	227	239	12,951	207	232	12,249	213	250	11,893	134	100	8,160	143	106	6,945
<b>Total number used for quality measures</b>	12,355	14,242	715,444	12,119	13,948	670,169	11,580	13,463	653,905	11,281	12,850	635,032	10,488	11,886	617,033	10,008	10,972	585,992

C + P = Clinical + Payment; NCG = national comparison group; PO = Payment-Only; QM = quality measures.

— = data not available.

SOURCE: RTI analysis of Medicare claims data (RTI program AF600; RTI folder: sarnold\output\pah2\_af600\_ar4 - 5.07.2020\05132020).

NOTES: The total number of beneficiaries used for quality measures is based on having complete quality measure outcome variables for the quality measures. Several measures have additional exclusion criteria applied. The total number of beneficiaries excluded due to negative expenditures includes only those beneficiaries that had negative total Medicare expenditures. Additional beneficiaries were excluded from some of the specific category expenditure models due to having negative expenditures in that category.

## L.7 Defining Outcome Measures

The outcome measures we consider in this report fall into the following four broad categories: service utilization,<sup>18</sup> Medicare expenditures, MDS-based quality outcomes, and resident mortality. These include both resident-level outcome variables that are used in multivariate regression analyses and aggregated outcome variables used for descriptive analyses. Below are a few general notes on these measures, followed by a more detailed description of them.

- Unless otherwise specified, measures are calculated per fiscal year.
- All measures are based on the portion of the reporting period during which the individual is Initiative eligible (Initiative-eligible exposure period<sup>19</sup>) so that events that occurred (or dollars that were spent) are only counted if they occurred during this period, unless otherwise specified. This is determined based on whether the admission date on the claim fall within a resident’s Initiative-eligible exposure period. The exception is that for the mortality outcome we count resident deaths occurring within the fiscal year, even if the death occurs after the Initiative-eligible exposure period.
- We account for the length of the individual’s Initiative-eligible exposure period in several ways, with differences between the measures, as detailed below. Techniques (used for at least one measure) include annualizing the outcome variable, incorporating exposure as a covariate in the regression model, and using weights in the regression model, as explained in **Section L.9**.
- Descriptive results, calculated at the aggregate level, are presented for the following groups of nursing facility residents (see **Appendices O–Q**) (WSRG tables are available upon request):
  - National comparison group residents
  - Clinical + Payment group residents, all ECCPs combined
  - Clinical + Payment group residents, each ECCP separately
  - Payment-Only group residents, all ECCPs combined
  - Payment-Only group residents, each ECCP separately

### L.7.1 Medicare Utilization

As described in **Table L-4**, we track the utilization of Medicare-covered services and report the following descriptive measures in each year:

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<sup>18</sup> This includes hospitalizations, ED visits, and acute care transitions (which includes hospitalizations, ED visits, and observation stays).

<sup>19</sup> The Initiative-eligible exposure period could be the entire reporting period or some portion thereof.

- the percentage of residents who experienced an event during their Initiative-eligible exposure period, and
- the rate of events (e.g., hospitalizations) per 1,000 Initiative-eligible resident-days.

These measures are calculated at the aggregate level for each of the groups of residents defined above. They are reported in tables of descriptive statistics (in **Appendices O** and **P**) that are not adjusted for resident characteristics.

For multivariate regression analyses, we define a series of individual resident-level utilization measures two ways, as either a probability or a count, as described in **Table L-4**.

- For the probability model, a dichotomous (1/0) variable indicates whether a resident experienced an event over her or his Initiative-eligible exposure period in each year.
- For the count model, we use the count of events during the resident’s Initiative-eligible exposure period in each year.

**Table L-4. Utilization measures used for descriptive and multivariate analyses**

Outcome measure	Specifications	Descriptive/ multivariate
Aggregate level: percentage of residents who experienced an event <sup>1</sup>	Sum (residents who experienced the event) / Sum (all residents), per reporting period. Only events that occur during the Initiative-eligible exposure period are counted. This measure does not account for length of exposure period.	Descriptive
Aggregate level: rate of events <sup>1</sup> per 1,000 resident-days	Sum (events)*1,000 / Sum (Initiative-eligible resident-days), per reporting period. Only events that occur during the Initiative-eligible exposure period are counted. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.	Descriptive
Individual level: whether an event <sup>1</sup> occurred	Dichotomous (1/0) variable indicating whether a resident experienced an event during their Initiative-eligible exposure period.	Multivariate <sup>2</sup>
Individual level: count of events <sup>1</sup>	Number of events experienced by the individual during reporting period. Only events that occur during the Initiative-eligible exposure period are counted.	Multivariate <sup>2</sup>

<sup>1</sup> Includes each of the types of hospital-related events (hospitalizations, emergency department visits, observation stays, and any of these acute care transitions), whether all-cause, potentially avoidable, potentially avoidable because of any of the six qualifying conditions, or potentially avoidable because of one of the six qualifying conditions.

<sup>2</sup> Potentially avoidable utilization because of each of the six qualifying conditions separately are not included in multivariate analyses because of the relatively low frequency of events related to each individual condition.

The utilization measures of Medicare-covered services referred to above include hospitalizations, ED visits, observation stays, and any of these acute care transitions, all defined using Medicare claims. These hospital-related events are described further in **Table L-5**.

**Table L-5. Identifying types of hospital-related utilization events in claims**

Outcome	Specifications	Data source
Hospitalizations	Hospitalizations are identified based on FFS inpatient bills.	Medicare inpatient claims
ED visits	Includes ED visits that did not result in inpatient admission identified from institutional outpatient claims, as Revenue Center Code (RCC) = 045X or 0981 or HCPCS (CPT) code = 99281–99285.	Medicare hospital outpatient (institutional) claims
Acute care transitions	Includes hospitalizations, ED visits, or observation stays. Hospitalizations and ED visits identified as above. Observation stays are identified in the outpatient claims as RCC = 0760 or 0762 and HCPCS = G0378 or G0379. In general, outpatient visits that result in inpatient admissions are billed only as inpatient claims so there will be no double counting. We count just once those claims that would be considered both ED visits and observation stays. Note that because of the unique billing practices of critical access hospitals (CAH), there could be some double counting of events in CAH. This occurrence is rare.	Medicare inpatient claims; Medicare hospital outpatient (institutional) claims

ED = emergency department; FFS = fee-for-service.

For the hospital-related utilization events just described, we examine all-cause events, potentially avoidable events, potentially avoidable events because of any of the six qualifying conditions, and potentially avoidable events because of each of the six qualifying conditions separately, described in further detail in **Table L-6**. The classification of events as all-cause, potentially avoidable, etc., is determined by the diagnoses on the hospital claim. In most cases this is based on the principal diagnosis and sometimes it is based on a combination of principal and secondary diagnoses. The potentially avoidable category is a broader group that includes diagnoses like falls and trauma, and poor glycemic control, among others, whereas the six qualifying conditions are a narrower group with principal diagnosis specific to pneumonia, congestive heart failure, chronic obstructive pulmonary disease/asthma, skin infection, dehydration and urinary tract infection. Note that events related to each of the six qualifying conditions separately are not included in multivariate analysis—we only present descriptive results. We provide additional details on identifying potentially avoidable events and potentially avoidable events because of the six qualifying conditions in **Section L.8** of this appendix.

**Table L-6. Types of hospital-related utilization events**

Outcome	Specifications
All-cause event <sup>1</sup>	Event is counted regardless of primary discharge diagnosis.
Potentially avoidable event <sup>1</sup>	We started from the definition of potentially avoidable hospitalization diagnoses as developed by Walsh et al. (2010, 2012) in their study of high-cost dually eligible populations. <sup>2</sup> The list was converted from ICD-9 to ICD-10 for use with data beginning October 1, 2015, and refinements were made because of the increased specificity of ICD-10. Events were considered as potentially avoidable if the primary discharge diagnosis had any of the ICD-9/ICD-10 codes considered potentially avoidable or if the event had one of a group of specified combinations of primary and secondary ICD-10 diagnoses (the list of primary diagnoses and combinations is lengthy and is available upon request).
Potentially avoidable event <sup>1</sup> because of any of the six qualifying conditions as a group	An event is considered attributable to any of the six qualifying conditions if its primary discharge diagnosis had any of the ICD-9/ICD-10 codes deemed to be associated with these conditions, or if the event had one of a group of specified ICD-10 combinations of primary and secondary diagnoses, which indicate these six qualifying conditions (list available upon request).
Potentially avoidable event <sup>1</sup> because of each of the six qualifying conditions <sup>3</sup>	Same as above except that this measure is calculated separately for each condition.

<sup>1</sup> Applies to hospitalizations, emergency department visits, observation stays, or any of these acute care transitions.

<sup>2</sup> Walsh, E.G., Freiman, M.P., Haber, S., et al. (2010). Cost drivers for dually eligible beneficiaries: Potentially avoidable hospitalizations from long-term and post-acute care settings. Report for the Centers for Medicare & Medicaid Services. Waltham, MA: RTI International.

Walsh, E.G., Wiener, J.M., Haber, S., et al. (2012). Potentially avoidable hospitalizations of dually eligible Medicare and Medicaid beneficiaries from nursing facility and home- and community-based services waiver programs. *J Amer Geriatrics Soc.*, 60(5), 821–829.

<sup>3</sup> Events because of each of the six qualifying conditions separately are not included in multivariate analyses.

## L.7.2 Medicare Expenditures

Expenditures are reported both as a total and for select service categories. Total expenditure is the sum of Medicare paid amounts, including the following types of Medicare claims: inpatient, outpatient (institutional), SNF, hospice, home health, durable medical equipment, carrier file services (e.g., professional, lab), and total payments for Part D drugs. For reporting expenditures for specific categories, we closely mirrored the categories we used for utilization measures, described above. Expenditures for inpatient hospital are based on the inpatient file only and do not include professional claims from the carrier file. Similarly, ED and observation stay expenditures are based on the outpatient claims only.

For the multivariate models, we annualized the measures used for multivariate analyses based on the length of each resident’s Initiative-eligible exposure period, as described further in **Section L.10**. Measures are calculated per beneficiary per year. We calculated measures at the aggregate level to display descriptive results, and at the individual level for use in multivariate models, as we describe in **Table L-7**.

**Table L-7. Expenditure measures used for descriptive and multivariate analyses**

Outcome measure	Specifications	Descriptive/ multivariate
Aggregate level: Total Medicare expenditures per resident-year	Sum (Medicare-paid dollar amount for all covered services) * 365 / Sum (Initiative-eligible days), per reporting period. The numerator counts Medicare payments for all services included in the following types of Medicare claims: inpatient, outpatient (institutional), SNF, hospice, home health, DME, Carrier file, and Part D drugs. Only payments that are incurred during the Initiative-eligible exposure period are counted. Each individual resident contributes their count of dollars to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.	Descriptive
Aggregate level: Medicare expenditures per resident-year for a specific expenditure category <sup>1</sup>	Sum (Medicare-paid dollar amount for a specific category of service) * 365 / Sum (Initiative-eligible days), per reporting period. Only payments that are incurred during the Initiative-eligible exposure period are counted. Each individual resident contributes their count of dollars to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.	Descriptive
Individual level: Total Medicare expenditures per resident-year	(Medicare-paid dollar amount for all covered services * 365) / Count (Initiative-eligible days <sup>2</sup> ), per reporting period. Medicare payments for all services included in the following types of Medicare claims: inpatient, outpatient (institutional), SNF, hospice, home health, DME, Carrier file, and Part D drugs. Only payments that are incurred during the Initiative-eligible exposure period are counted.	Multivariate <sup>3</sup>
Individual level: Medicare expenditures per resident-year for a specific expenditure category <sup>1</sup>	(Medicare-paid dollar amount for a specific category of service) * 365 / Count (Initiative-eligible days <sup>2</sup> ), per reporting period. Only payments that are incurred during the Initiative-eligible exposure period are counted.	Multivariate <sup>3</sup>

DME = durable medical equipment; SNF = skilled nursing facility.

<sup>1</sup> Includes each of the types of hospital-related events (hospitalizations, emergency department visits, observation stays, and any of these acute care transitions), whether all-cause, potentially avoidable, potentially avoidable because of any of the six qualifying conditions, or potentially avoidable because of each of the six qualifying conditions separately.

<sup>2</sup> If the count of Initiative-eligible days was < 30, the denominator was equal to 30.

<sup>3</sup> Multivariate analyses for each of the six qualifying conditions separately are not performed because of their relatively low frequency.

### L.7.3 MDS-Based Quality Measures

Resident-level quality measures are defined using the nursing home resident assessment MDS, Version 3.0 (hereinafter referred to as MDS-based quality measures). MDS-based measures assess quality of care, health, and functional outcomes, which we refer to broadly as MDS-based quality measures. We selected quality measures based on two major criteria: (1) clinical relevance to potentially avoidable hospitalizations and the six qualifying conditions, and (2) alignment with other CMS initiatives (e.g., NHC, the Nursing Home Value-Based Purchasing Program, and the Five-Star Quality Rating system) or partnering initiatives (e.g., Advancing Excellence in America’s Nursing Homes). These measures are presented in **Table L-8**. All selected measures are analyzed

descriptively, and a subset of measures is also included in multivariate analyses. Measures not included in the multivariate analyses have statistical characteristics (e.g., extremely low prevalence, potential measurement issues) that do not allow for stable or meaningful results with this methodology.

**Table L-8. MDS-based quality measures used for descriptive and multivariate analyses**

Measure	Definition	Variable type	Descriptive/ Multivariate
Catheter inserted and left in bladder	The proportion of observed quarters with data on the presence of indwelling catheters.	Proportion	Descriptive and multivariate
One or more falls with injury	The proportion of observed quarters with data on the presence of one or more look-back scan assessments that indicate one or more falls that resulted in injury.	Proportion	Descriptive and multivariate
Self-report moderate to severe pain	The proportion of observed quarters with data on the presence of either (1) almost constant or frequent moderate to severe pain in the last 5 days or (2) any very severe/horrible pain in the last 5 days.	Proportion	Descriptive and multivariate
Pressure ulcers stage II or higher	The proportion of observed quarters with data on the presence of Stage II–IV pressure ulcers.	Proportion	Descriptive and multivariate
Decline in ADLs	The proportion of observed quarters with data indicating that a resident’s need for help with late-loss ADLs has increased. An increase is defined as an increase in two or more coding points in one late-loss ADL item or one-point increase in coding points in two or more late-loss ADL items.	Proportion	Descriptive and multivariate
Urinary tract infection	The proportion of observed quarters with data on the presence of urinary tract infection within the last 30 days.	Proportion	Descriptive and multivariate
Antipsychotic medication use	The proportion of observed quarters with data indicating that a resident received an antipsychotic medication.	Proportion	Descriptive and multivariate
Antianxiety or hypnotic medication use	The proportion of observed quarters with data indicating that a resident received antianxiety or hypnotic medications.	Proportion	Descriptive
Weight loss	The proportion of observed quarters with data indicating that a resident has a weight loss of 5 percent or more in the last month or 10 percent or more in the last 6 months and was not on a physician prescribed weight-loss regimen.	Proportion	Descriptive
Physically restrained	The proportion of observed quarters with data on the presence of daily physical restraints (trunk restraint used in bed, limb restraint used in bed, trunk restraint used in chair or out of bed, limb restraint used in chair or out of bed, or chair prevents rising used in chair or out of bed).	Proportion	Descriptive

ADL = activity of daily living; MDS = Minimum Data Set.

We defined each MDS-based quality measure as the proportion of observed quarters with the presence of each adverse event for each resident, producing an annual score for each resident ranging from 0 to 1. We present these proportions as percentages in descriptive tables (**Tables R-1 to R-8**) in **Appendix R**. Because Initiative-eligible residents can be observed for different lengths of time depending on their residence and eligibility in the nursing facilities, the measures were weighted by their exposure as a proportion of a year. The weighted values were reported in our descriptive analysis and included in the multivariate analyses.

#### L.7.4 End-of-Life Outcomes

Our main end-of-life outcome was mortality within the fiscal year. We examined deaths occurring within the fiscal year to capture deaths occurring after a resident’s exposure period ended. For example, a resident’s Initiative-eligible period ends if the resident elects hospice, and the outcome of mortality within the fiscal year includes deaths following the start of a hospice stay. Hospice use varied greatly across the sample states and other palliative care could not be measured, so these factors were not used to adjust death rates. In Section 3.3.1 of the main report, we explain why we include deaths following the start of a hospice stay. We conducted descriptive and multivariate analyses to evaluate and understand resident mortality. The measure is described in **Table L-9**.

**Table L-9. End-of-life measures used for descriptive and multivariate analyses**

Outcome measure	Specifications	Descriptive/multivariate
Mortality within fiscal year	Dichotomous (1/0) variable indicating whether a resident has date of death in the fiscal year. The date of death was derived from Medicare enrollment data.	Descriptive and Multivariate

#### L.8 Definition of Potentially Avoidable Hospitalizations and Identification of Six Qualifying Conditions

Our starting point for defining potentially avoidable hospitalizations (and potentially avoidable ED visits and potentially avoidable acute care transitions) was the list of potentially avoidable hospitalization conditions and corresponding ICD-9-CM diagnosis codes developed by Walsh et al.<sup>20,21</sup> in their study of high-cost Medicare-Medicaid dually eligible populations. We have updated this initial list to reflect subsequent updates to the coding system and ongoing evaluation of codes

<sup>20</sup> Walsh, E.G., Freiman, M.P., Haber, S., et al. Cost drivers for dually eligible beneficiaries: Potentially avoidable hospitalizations from long-term and post-acute care settings. Report for the Centers for Medicare & Medicaid Services. Waltham, MA: RTI International, 2010.

<sup>21</sup> Walsh, E.G., Wiener, J.M., Haber, S., et al. Potentially avoidable hospitalizations of dually eligible Medicare and Medicaid beneficiaries from nursing facility and home- and community-based services waiver programs. *J Amer Geriatrics Soc.* 60(5): 821–829, 2012.

clinically appropriate for inclusion in the list. Also, as previously explained, under NFI 2, the payment incentives are specifically targeted for the in-house treatment of acute changes in six qualifying conditions that are a subset of conditions deemed potentially avoidable for hospital admissions. We thus developed a shorter list of ICD-CM codes, a subset of the original list for all potentially avoidable conditions, to capture hospitalizations for the six qualifying conditions.

### **L.8.1 Sets of Potentially Avoidable Hospitalizations (ICD-9-CM and ICD-10-CM)**

Initial lists of potentially avoidable hospitalization conditions have undergone a series of revisions since the start of the base period used in the evaluation. The transition to ICD-10-CM diagnosis codes effective October 1, 2015, necessitated mapping previously identified ICD-9-CM codes for potentially avoidable hospitalization conditions to the new code system. One-to-many relationships were identified by mapping ICD-9-CM codes to ICD-10-CM codes and by mapping ICD-10-CM codes to ICD-9-CM codes.

An updated list of ICD-9-CM codes, created in spring 2018 and validated in fall 2019, reflects potentially avoidable hospitalizations and captures additional ICD-9-CM codes identified in

- ICD-9-CM code files, updated for FY 2014, available on the CMS website;
- one-to-many relationships of ICD-10-CM codes to ICD-9-CM (e.g., the ICD-10 code for Essential [primary] hypertension [I10] maps to ICD-9 codes for Malignant essential hypertension [401.0] and Benign essential hypertension [401.1]); and
- ongoing evaluation for codes clinically appropriate for inclusion in the potentially avoidable hospitalization list (e.g., addition to the list of ICD-9-CM code for Methicillin-susceptible *Staphylococcus aureus* in conditions classified elsewhere and of unspecified site [041.11]). RTI clinicians, including physician Dr. Christopher Beadles, provided clinical input and decisional support on appropriateness of codes.

Listings of ICD-10-CM codes for potentially avoidable hospitalizations were created/updated in spring 2018, and updated again in fall 2019, to reflect the following:

- Mapping of ICD-9-CM potentially avoidable hospitalization codes to ICD-10-CM code files for FY 2019.
- Mapping of ICD-9-CM potentially avoidable hospitalization codes to ICD-10-CM annual update code files for FY 2019. The mapping captures codes added, deleted, and modified in FY 2019 ICD-10-CM code files, and the clinical appropriateness of including such changes in the list of potentially avoidable hospitalization conditions.
- One-to-many relationships of ICD-9-CM codes to ICD-10-CM (e.g., the ICD-9-CM code for Closed fracture of acetabulum [808.0] maps to 54 unique ICD-10-CM codes that describe closed fractures of the acetabulum in terms such as anatomy of the acetabulum, displaced/nondisplaced, and laterality).
- Ongoing evaluation for codes clinically appropriate for inclusion in the potentially avoidable hospitalization conditions list (e.g., addition to the list of ICD-10-CM code for

Periorbital cellulitis [L03.213]). RTI clinicians, including physician Dr. Beadles, provided clinical input and decisional support on appropriateness of codes. All clinical concepts identified as additional potentially avoidable hospitalization conditions were incorporated into both ICD-10-CM lists for FY 2019 and the ICD-9-CM lists.

Several overarching considerations have been applied across the ICD-9-CM and ICD-10-CM lists of potentially avoidable hospitalization conditions, including the following:

- Only valid ICD-9-CM and ICD-10-CM code numbers are included on the lists. Header codes are not included.
- ICD-10-CM “subsequent encounter” and “sequela” codes have been determined to be inappropriate for the lists. ICD-9-CM “late effect” codes were in the original list of potentially avoidable hospitalization conditions developed by Walsh et al.<sup>22,23</sup> Because there is no specified look-back period for late effect (sequela) codes, these are not good indicators of the recency of the incident conditions and they do not specify the nature of the sequela. Based on clinical review and consultant recommendations, we did not include ICD-10-CM “subsequent encounter” or “sequela” codes for any conditions (including those that are mapped to ICD-9-CM “late effect” codes). We did include any ICD-10-CM “initial encounter” codes related to conditions for which an ICD-9-CM “late effect” was originally listed.
- Certain conditions requiring more than one ICD-9 or ICD-10 code have special treatment. Coding manuals provide instructions such as “code first” and “code also.” In addition, RTI clinical experts have advised that certain combinations of codes are indicative of potentially avoidable hospitalization conditions (e.g., nonchronic pressure ulcer code in combination with cellulitis code). Examples include the following:
  - For certain codes related to fractures that are identified as the principal diagnosis in the ICD-9-CM list of potentially avoidable conditions, the ICD-10-CM instructions for the parallel codes are to *code first* any spinal cord injury—including injury of nerves and spinal cord at neck level or at thorax level and injury of lumbar and sacral spinal cord and nerves at abdomen, lower back, or pelvis level—if it occurred. To properly identify these codes, it is necessary to detect the spinal cord lesion in the principal diagnosis (e.g., S14.XXXX, S24.XXXX, S34.XXXX) *and* detect one of the fracture codes in the secondary diagnosis (e.g., S12.XXXX, S22.XXXX, S32.XXXX). We added such combinations of codes to our updated ICD-10-CM list of potentially avoidable

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<sup>22</sup> Walsh, E.G., Freiman, M.P., Haber, S., et al. (2010). Cost drivers for dually eligible beneficiaries: Potentially avoidable hospitalizations from long-term and post-acute care settings. Report for the Centers for Medicare & Medicaid Services. Waltham, MA: RTI International.

<sup>23</sup> Walsh, E.G., Wiener, J.M., Haber, S., et al. (2012). Potentially avoidable hospitalizations of dually eligible Medicare and Medicaid beneficiaries from nursing facility and home- and community-based services waiver programs. *J Amer Geriatrics Soc.*, 60(5), 821–829.

hospitalization conditions. The fractures may also occur as a principal diagnosis if there is no spinal cord lesion.

- Certain electrolyte disorder codes reflect dehydration if they appear in combination with codes indicating volume depletion. To identify these codes, it is necessary to detect the electrolyte disorder in the principal diagnosis (e.g., E87.X) *and* detect one of the codes for volume depletion in secondary diagnosis (e.g., E86.X). We added such combinations of codes to our updated ICD-10-CM list of potentially avoidable hospitalization conditions. The volume depletion may also occur as a principal diagnosis.

The finalized set of **ICD-9-CM** codes for potentially avoidable hospitalization conditions, applicable for claims services during FY 2014 and FY 2015, contains a total of 1,930 standalone principal diagnosis codes. An additional 29 principal diagnosis codes, each to be identified in conjunction with one appropriate secondary diagnosis code, are also included in the set. The full list of these ICD-9-CM codes can be provided upon request (not included in this report for reasons of space).

The finalized set of **FY 2016 ICD-10-CM** codes for potentially avoidable hospitalization conditions—with codes updated through September 2016—contains a total of 11,408 standalone principal diagnosis codes and 104 additional principal diagnosis codes each to be identified in conjunction with one appropriate secondary diagnosis code. The full list of these FY 2016 ICD-10-CM codes can be provided upon request (not included in this report for reasons of space).

The finalized set of **FY 2017 ICD-10-CM** codes for potentially avoidable hospitalization conditions—with codes updated through September 2017—contains a total of 11,584 standalone principal diagnosis codes and 104 additional principal diagnosis codes each to be identified in conjunction with one appropriate secondary diagnosis code. The full list of these FY 2017 ICD-10-CM codes can be provided upon request (not included in this report for reasons of space).

The finalized set of **FY 2018 ICD-10-CM** codes for potentially avoidable hospitalization conditions—with codes updated through September 2018—contains a total of 11,655 standalone principal diagnosis codes and 104 additional principal diagnosis codes each to be identified in conjunction with one appropriate secondary diagnosis code. The full list of these FY 2018 ICD-10-CM codes can be provided upon request (not included in this report for reasons of space).

The finalized set of **FY 2019 ICD-10-CM** codes for potentially avoidable hospitalization conditions—with codes updated through September 2019—contains a total of 11,660 standalone principal diagnosis codes and 104 additional principal diagnosis codes each to be identified in conjunction with one appropriate secondary diagnosis code. The full list of these FY 2019 ICD-10-CM codes can be provided upon request (not included in this report for reasons of space).

Because of the transition from ICD-9-CM to ICD-10-CM, there could be a potential issue with comparability of the codes for potentially avoidable conditions between the two coding systems. We exercised diligence in the mapping process, including clinician advisement, to ensure both completeness and accuracy in the code sets across all years. This was for the transition to ICD-10

and the updates that followed. All longitudinal studies must accommodate coding system revisions. We did not observe any unusual fluctuations or irregularities in the rates of potentially avoidable hospitalizations before and after the transition to ICD-10-CM.

### **L.8.2 Identifying Subsets of ICD-10-CM Codes Specific to the Six Qualifying Conditions**

Each of the six qualifying conditions has qualifying criteria defining the clinical or diagnostic conditions of a beneficiary that could trigger the benefit. Although CMS specified the clinical criteria for each of the six qualifying conditions, as described in **Section 1** of the main report, it has provided no guidance on which specific ICD-10-CM codes should be used to identify those conditions. Although the final list of potentially avoidable hospitalization conditions identified by the RTI team contains subsets of ICD-10-CM codes that generally match each of the six broadly categorized qualifying conditions—pneumonia, CHF, COPD/Asthma, skin infection, dehydration, and UTI—there is not always exact correspondence between those codes, the categorization of each condition, and the clinical criteria for each condition as specified by CMS. The symptoms of acute change in each condition, as described in the clinical criteria, are observable to the clinicians who treat a resident in the facility and may be in the medical record; they are not available in the claims. With clinical guidance from our consultant, Dr. Beadles, the RTI team has identified, reviewed, and finalized a subset of ICD-10-CM codes for potentially avoidable hospitalization conditions that for practical purposes matches the CMS-specified clinical criteria for each qualifying condition, briefly summarized below. Details are available upon request.

- *Pneumonia*: The symptomatic and treatment guidance specified by CMS suggests that bacterial pneumonia is the focus here, not viral pneumonia. Thus, we removed any ICD-10-CM codes for viral pneumonia.
- *CHF*: The qualifying diagnosis, symptoms, and treatment guidance, as specified by CMS, are not limiting to a type of CHF.
- *COPD/Asthma*: The qualifying diagnosis, symptoms, and treatment guidance, as specified by CMS, are not limiting in the type of asthma.
- *Skin Infection*: The qualifying diagnosis, as specified by CMS, focuses on “new onset of painful, warm and/or swollen/indurated skin infection requiring oral or parenteral antibiotic or antiviral therapy.” It further clarifies that “if associated with a skin ulcer or wound there is an acute change in condition with signs of infection such as purulence, exudate, fever, new onset of pain, and/or induration.” Therefore, the presence of skin ulcers alone but without infection does not meet the clinical criteria for the qualifying condition. We identified cellulitis, acute lymphadenitis, and other specified local infections of the skin that meet the qualifying criteria. However, certain skin ulcer codes reflect infection if they appear in combination with codes indicating cellulitis, acute lymphadenitis, and other specified local infections of the skin. These codes are identified by the presence of skin ulcers in the principal diagnosis in conjunction with a secondary diagnosis code for cellulitis, acute lymphadenitis, or other specified skin infections.
- *Dehydration*: The qualifying diagnosis and treatment guidance, as specified by CMS, pertain to fluid or electrolyte disorder or dehydration, and the focus is on dehydration or

volume depletion. As noted earlier, certain electrolyte disorder codes reflect dehydration if they appear in combination with codes indicating volume depletion. These codes are identified by the presence of electrolyte disorder in the principal diagnosis *and* presence of volume depletion in the secondary diagnosis.

- *UTI*: The symptomatic and treatment guidance provided by CMS focuses on dysuria, frequency, new incontinence, altered mental status, hematuria, and costovertebral angle tenderness. As with the other conditions, all the possible signs and symptoms related to the diagnosis of the condition are not observed in the codes.

## **L.9 Independent Variables**

The selection of covariates (i.e., independent or control variables) as risk adjusters in our final regression models is guided by literature review and is also shaped by limitations of the administrative data used in our analyses. Descriptive statistics on the final set of model covariates, including percentages for categorical variables and means and standard deviations for continuous variables, are summarized in **Appendix N**.

**Resident-Level Characteristics.** Selected covariates at the individual level include residents' demographic characteristics, and health and functional status derived from the MDS and Medicare claims. Age and sex are combined to create groupings by 5-year age brackets (except for the under-65 group and 95-or-older group) for both sexes. Resident race/ethnicity is coded in five categories, including non-Hispanic White (reference category), non-Hispanic Black, non-Hispanic Asian, Hispanic, and all other racial/ethnic groups. In all models, we included an indicator for Medicare-Medicaid dual-eligible status (any episode-month) and whether their original Medicare eligibility was because of a disability. Residents are categorized as rural, urban non-metropolitan, and metropolitan based on their county of residence.

Comorbidities are included as clustered by the CMS HCCs as described in **Section L.3**. In a few cases, we aggregated HCC groups that were clinically related because one of the groups has a very small number of residents with that characteristic. Combining clinically related HCC groups when some groups have very few residents makes these groups more stable. We also excluded a few HCC categories from the model where the prediction was counterintuitive, and we believed the relationship may be spurious. We excluded variables in a model if the number of residents with the characteristic is zero or very small and aggregation with another variable was not appropriate. Finally starting in our AR4 models, we included the HCC count per resident as a covariate. This is the total number of HCCs for which a beneficiary has diagnoses. A higher number of HCCs indicates a higher comorbidity burden, reflecting a higher level of medical complexity beyond the individual conditions. We included four categories (i.e., HCC count 0–2, 3–4, 5–7, and 8 or more) to allow for a nonlinear effect and ensure comparable sample size across category.

We included several additional diagnoses documented in the MDS: anemia (which is one of the potentially avoidable conditions for hospitalization), dementia (Alzheimer's or other types), neurogenic bladder, and obstructive neuropathy. There are a few additional MDS-based

covariates, including a 4-level categorical variable for degree of ADL dependence; a 4-level categorical variable for body mass index (BMI); a 4-level Cognitive Function Scale<sup>24</sup> capturing cognitive function; and depression status measured by Patient Health Questionnaire (PHQ)-9 (either self-report or staff assessment scores), which are included as risk adjusters. We included flags for patients with end-stage renal disease (ESRD) with dialysis and ESRD after receiving a transplant, both derived from the IDR.

It is important to note that all resident-level covariates from the MDS are based on the first MDS assessment (limiting to certain types such as admission, quarterly, annual, discharge, and PPS) starting from middle of the year *prior* to the one containing a resident's Initiative-eligible episode. This way, we use lagged individual-level risk factors to predict current outcome variables in each year, thereby mitigating potential endogeneity in the relationship between them. In a similar way, we use HCCs that are defined using diagnoses documented in Medicare claims from the *previous* year.

In our analysis, we also control for enrollment in the following CMS demonstrations from information obtained from the MDM:

- Community-Based Care Transition Program (CCTP)
- Comprehensive ESRD Care (CEC)
- Comprehensive Primary Care Initiative (CPCI)
- Comprehensive Primary Care Plus (CPC+), non-Shared Saving Program (SSP) participants
- Comprehensive Primary Care Plus (CPC+), SSP participants
- Financial Alignment Initiative
- Maryland Total Cost of Care, Primary Care Program
- Medicare Shared Savings Program
- Next Generation Accountable Care Organization (NGACO)
- Pioneer Accountable Care Organization
- Vermont All-Payer ACO Model.

Because information is lacking on other CMS demonstrations in the MDM, including Bundled Payment Care Initiatives and State Innovation Models, we are unable to control for the potential impacts of these programs on NFI 2 in our models. We did not control for participation in the Multi-Payer Advanced Primary Care Practice demonstration, which ended in 2016. Although we account for enrollment in the above national demonstrations systematically through the MDM, we

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<sup>24</sup> Thomas, K., Dosa, D., Wysocki, A., et al. (2017). The Minimum Data Set 3.0 Cognitive Function Scale. *Medical Care*, 55(9), e68-e72. doi: 10.1097/MLR.0000000000000334

are unable to account for impacts of other changes to usual care that may take place at the state or facility level.

**Facility-Level Characteristics.** In addition to resident-level risk factors specified above, we further control for facility-level variables that may have an impact on hospital use and the quality of care provided nursing facility residents: the profit status of the facility, whether the facility was hospital based, and whether the facility was in a rural, urban or metropolitan location. Additionally, starting in our AR4 models, we included a facility-level Medicare Advantage (MA) penetration covariate. This is a variable indicating the proportion of long-stay residents enrolled in an MA plan in each facility. We included MA penetration in the model as a set of categorical variables to allow for a nonlinear effect. For the propensity score analysis described in **Section L.5** that we performed to aid the selection of national comparison group residents, we included additional facility-level variables. For risk adjustment purposes in our regression models of resident outcomes, facility-level factors are less important than individual-level characteristics specified above.

**State-Level Characteristics.** In addition to the resident- and facility-level covariates, we further control for the yearly state-level percentage of deaths related to influenza or pneumonia, FY 2014–FY 2019. Influenza and pneumonia deaths can vary significantly by year and location, and affect hospitalization rates of nursing facilities; therefore, we include this variable as a potential confounder. This covariate was new to our FY 2019 models.

## **L.10 Statistical Methods for Multivariate Analyses**

A regression-based model was used to assess the effects of the payment incentive within the Clinical + Payment and the Payment-Only interventions separately. Similar models were run when measuring the combined impact of all of the ECCPs for a given intervention or for each ECCP separately. The difference was whether we included residents from all ECCP states in the model or only the residents from a particular ECCP state. The study population included in these regression models, including both the Initiative-eligible residents and the comparison group residents, are described in **Sections L.4–L.6**. The main outcome variables of interest, including hospital-related utilization and Medicare expenditures, have been described in **Sections L.7–L.8**. The covariates included in the models have been described in **Section L.9**.

### **L.10.1 Accounting for Differences in Exposure Time**

We used several methods to address differences between residents in their exposure times within the reporting period. First, we modified the outcome variable where appropriate. For expenditure outcomes, as indicated in **Section L.7**, measures were annualized. This assumes the expenditure patterns would be the same for the full 365-day period as they were for the shorter period during which residents were observed. Second, in the probability and count models, and quality measure models, exposure time was used as a control variable. Because nonlinearity was observed in the

relationship between exposure and hospitalization,<sup>25</sup> we used categories of exposure time. Third, we used weights in the regression models, weighting observations based on exposure time (with a floor of 30 days so even individuals with fewer than 30 days of exposure time were considered to have 30 days), so that residents with longer exposure times exerted greater impact on the coefficient estimates. In the mortality models, exposure time was not used as a control variable or for weighting, because it is endogenous with the outcome.

### **L.10.2 Accounting for Clustering**

Note that in the models we describe, adjustments to standard errors are made to account for correlations among observations from each facility. As we explain in each of the sections below dedicated to each of the specific outcomes, we account for the “clustering” effect by using robust standard errors which account for nursing facility clustering. When discussing the utilization probability models below, we also explain other approaches that we tested.

### **L.10.3 State Fixed Effects**

We included indicator variables for each of the states in the national comparison group (California was left as the reference group). In contrast to previous years, in the models that combined all the intervention states, we included indicator variables for the individual intervention states in the model. Collinearity is avoided because there are seven states and we include only six indicators (omitting Colorado and Nevada for the Clinical + Payment and Payment-Only models, respectively). We did not include any interactions with these state dummies. Thus, the changes we are capturing over time, that we use to estimate the effect of the Initiative, is based on an average of all the residents in the national comparison group regardless of state.

### **L.10.4 Multivariate Regression Model: General Specification**

We first present a general form of the model, followed by specifications suitable for each of the types of outcome variables. It is a DD design with multiple observation periods before the NFI 2 Initiative began (FY 2014–FY 2016) and multiple observations after. In this report, we present FY 2019 results.

We begin with a simplified model and then explain how we adapted the simplified model to specific analytic considerations. The simplest DD model we could use for each payment model would be the following<sup>26</sup>:

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<sup>25</sup> Increasing exposure time was associated with increased hospitalizations (both proportion of residents with a hospitalization and number of hospitalizations per resident) for those with less than a full year of exposure time. However, those with a full year of exposure time had reduced hospitalizations compared to those in several of the categories with less than a year of exposure time.

<sup>26</sup> For simplicity, we are ignoring the state fixed effects and the yearly state-level percentage of deaths related to influenza or pneumonia.

$$\text{Model 1: } Y_{ijt} = \beta_0 + \beta_x * X_{ijt} + \beta_z * Z_{jt} + \beta_{IG} * IG + \beta_p * Post + \beta_{IG,p} * (IG * Post) + \varepsilon_{ijt}$$

In this model,  $Y_{ijt}$  represents an outcome variable measured for individual  $i$  in facility  $j$  for year  $t$ . The  $X_{ijt}$  are resident characteristics, such as age, sex, clinical characteristics, and participation in other initiatives that may impact the outcome.  $Z_{jt}$  are selected facility characteristics (e.g., for-profit status). The term  $\beta_{IG} * IG$  accounts for baseline differences between the intervention group (IG) and the national comparison group that are based on the average differences during the entire base period, consisting of multiple years (FY 2014– FY 2016). The term  $\beta_p * Post$  is used to account for changes over time common to all groups and not because of the intervention. In the above model, we include a single “Post” term to account for the post-intervention period, which could be a single year or could be all the years combined. We can also include multiple terms to account for separate post-intervention years.

Using this statistical model requires us to make a key assumption. We assume that in the absence of the intervention, the difference between the respective means of the outcome variable in the intervention and comparison groups, controlling for the differences in the covariates, remains the same over time (the “parallel trends” assumption). In other words, the effect on the outcome variable of being in the intervention group as opposed to the comparison group, absent the intervention itself, would not change over time. Given this assumption, the effect of the intervention itself is captured by  $\beta_{IG,p} * (IG * Post)$ , which is the difference between the change in the intervention group relative to its baseline and the change in the national comparison group relative to its baseline. The last term  $\varepsilon_{ijt}$  in the equation is a resident-level residual term that represents error in the prediction.

### L.10.5 Adjusting for Baseline Trends

The assumption we have described may be questionable under some circumstances. In fact, in our situation, the Clinical + Payment group, which participated in NFI 1, could be expected to have trends related to the specifics of each ECCP intervention.

An alternative approach is to explicitly allow for the possibility that there could be different linear trends in the intervention group and in the comparison group. Based on our use of multiple years in the baseline period, we can employ the following model:

$$\text{Model 2: } Y_{ijt} = \beta_0 + \beta_x * X_{ijt} + \beta_z * Z_{jt} + \beta_{IG} * IG + \beta_t * YC_t + \beta_{t,IG} * YC_t * IG + \beta_p * Post + \beta_{IG,p} * (IG * Post) + \varepsilon_{ijt}$$

The variable  $YC$  is a count of the years since the first baseline year, FY 2014 (thus,  $YC = 0$  for 2014,  $YC = 1$  for 2015, and so on). The term  $\beta_t * YC_t$  represents the linear trend in the comparison group and the term  $\beta_{t,IG} * YC_t * IG$  allows for a different baseline trend in the intervention group. The term  $\beta_{IG,p} * (IG * Post)$  estimates the difference in the outcome in the intervention group in the post-intervention period from its expected value. Note that the expected value incorporates the different baseline trends in the intervention group and in the comparison group.

In Appendix K of Annual Report 2<sup>27</sup> for 2017, we argued based on empirical evidence that it was appropriate to use a model that allows for different linear trends. We estimated the coefficient for the term  $\beta_{t\_IG} * YC_t * IG$  in the model above, respectively for each intervention group. This term represents the difference in linear trends over the baseline years FY 2014–FY 2016 between the national comparison group and the intervention group. These coefficients were mostly negative in the Clinical + Payment group and often statistically significant, indicating a decline in the intervention groups relative to the national comparison group. This was particularly apparent in three ECCPs: MOQI, RAVEN, and NY-RAH. (We also reexamined these coefficients based on the FY 2018 models and found a similar pattern.) These findings led us to adopt the structure of the model above for our primary analysis, with 3 years (FY 2014–FY 2016) of baseline data and different linear trends in the intervention and comparison groups.

However, as we noted in Annual Report 2, this model also requires an assumption that the intervention and comparison groups would continue to change by the amount indicated by their own baseline trends. One reason to challenge this assumption is that the impact of the NFI 1 interventions could have plateaued in 2015 or 2016, in which case the trends from the baseline period would differ going forward. Another related reason is that rates had declined to a point where further reductions would be difficult. We argue that although still plausible for 2017, it is not plausible to assume that the relatively high rate of reductions in the Clinical + Payment group would continue indefinitely.

For our analysis of 2018 data in Annual Report 3,<sup>28</sup> we applied an approach that incorporates our assumption that the past trends would continue—but only up until a point in time. Specifically, we used the trend in projecting the expected outcome value in 2017 and then no further influence from the prior trend for 2018. Thus, the projected trendline for 2018 became horizontal. In terms of the model equation above, we assigned  $YC$  for 2014 = 0;  $YC$  for 2015 = 1;  $YC$  for 2016 = 2;  $YC$  for 2017 = 3; and  $YC$  for 2018 = 3 instead of 4. For our present evaluation of 2019 data in the present report, we adopt the same method and set  $YC$  for 2019 = 3.

**Figure L-3** illustrates the evaluation concept underlying our analyses. Solid red diamonds represent hypothetical outcome values for both comparison and intervention groups for the pre-intervention period (FY 2014–FY 2016). We use these data points to create trendlines: the solid line depicts the trendline for the pre-intervention period and the dashed line depicts the projected trendline for the post-intervention period (FY 2017–FY 2019).

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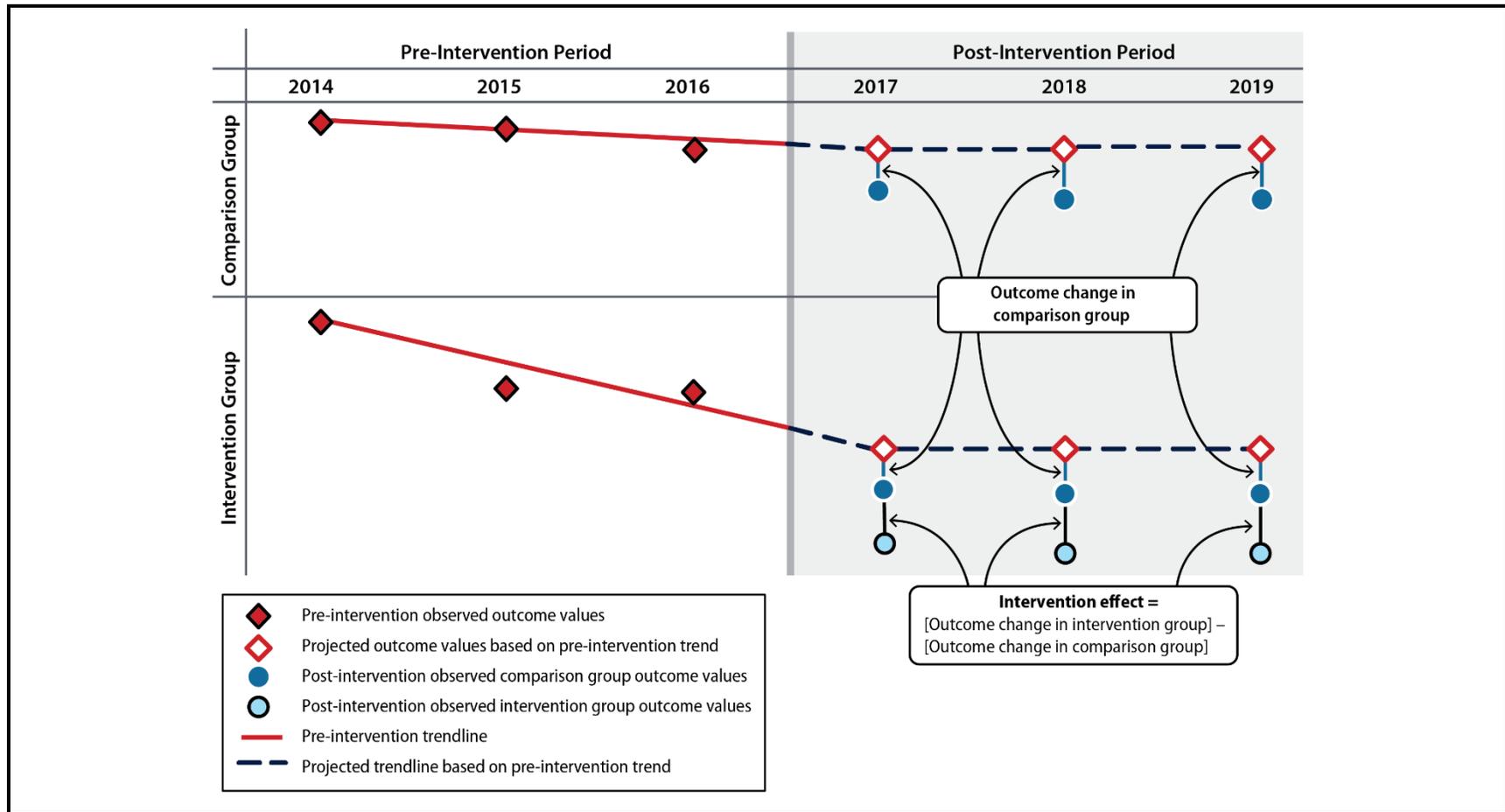
<sup>27</sup> Ingber, M., Feng, Z., Khatutsky, G., et al. (2019, March). Evaluation of the initiative to reduce avoidable hospitalizations among nursing facility residents. Second Annual Report. Report for Centers for Medicare & Medicaid Services. Waltham, MA: RTI International. <https://downloads.cms.gov/files/cmimi/rahnfr-phasetwo-secondannrpt.pdf>

<sup>28</sup> Ingber, M., Feng, Z., Khatutsky, G., et al. (2019, December). Evaluation of the initiative to reduce avoidable hospitalizations among nursing facility residents. Third Annual Report. Report for Centers for Medicare & Medicaid Services. Waltham, MA: RTI International. <https://downloads.cms.gov/files/rahnfr-phasetwo-thirdannrpt.pdf>

Open red diamonds denote predicted values for both comparison and intervention groups for the post-intervention period. These values were derived using the trends established in the pre-intervention period. The solid blue circles for the comparison group represent the observed values for the post-intervention period. We are specifically interested in the difference between predicted and observed values.

The vertical solid blue lines, or the difference between predicted and observed values in the comparison group, signifies the change that occurred, which is not because of the Initiative. The light blue circles represent the observed values for the post-intervention period in the intervention group. The vertical solid black lines depict the difference in the intervention group between predicted and observed values for the post-intervention period minus the non-intervention change in outcome (the solid blue line). In other words, the vertical solid black line shows the intervention effect: the change in outcome because of the Initiative.

Figure L-3. Depiction of use of baseline trend in calculating difference-in-differences estimates



In addition to the main analysis just described, we conducted a sensitivity analysis, shown in **Appendix W**, with 2016 alone used as the baseline period (this is essentially Model 1 above with 2016 as the baseline) and parallel trends assumed. We consider the analysis with 3 baseline years and a linear trend to be primary because this approach is realistic and more conservative.

### L.10.6 Incorporating a Within-State Reference Group

When conducting the sensitivity analysis based on using would-be eligible residents in non-intervention group facilities in the seven states (the WSRG) as our comparison group as described in **Section L.5** above, we include both the national comparison group residents and the WSRG residents in the analytical file. We then employ this model:

$$\text{Model 3: } Y_{ijt} = \beta_0 + \beta_x * X_{ijt} + \beta_z * Z_{jt} + \beta_{state} * state + \beta_{IG} * IG + \beta_t * YC_t + \beta_{t\_state} * YC_t * state + \beta_{t\_IG} * YC_t * IG + \beta_p * Post + \beta_{state,p} * (state * Post) + \beta_{IG,p} * (IG * Post) + \varepsilon_{ijt}$$

The indicator variable, *state*, equals 1 for all eligible and would-be eligible residents in the given Initiative-participating state, whether they reside in an intervention facility or in a WSRG facility. In the case where all ECCPs are combined in the same model, this indicator variable is assigned the value of 1 for all eligible and would-be eligible residents in any of the ECCP states and 0 otherwise. The term  $\beta_t * YC_t$  represents the linear trend in the national comparison group and the terms  $\beta_{t\_state} * YC_t * state$  and  $\beta_{t\_IG} * YC_t * IG$  allow for different baseline trends in the state and in the intervention group, respectively. The term  $\beta_{state,p} * (state * Post)$  would indicate if following the intervention there was a change in the state relative to the national comparison group, because of state-specific factors, including possible concurrent within-state efforts, unrelated to NFI, to reduce hospitalizations. The term  $\beta_{IG,p} * (IG * Post)$  captures the effect of the NFI intervention above and beyond the effect of other state-specific factors. It is the Initiative effect relative to the WSRG.

Note that we view the Initiative effect relative to the WSRG as a sensitivity analysis. Our primary analysis is calculated with respect to the national comparison group and is based on this model<sup>29</sup>:

$$\text{Model 4: } Y_{ijt} = \beta_0 + \beta_x * X_{ijt} + \beta_z * Z_{jt} + \beta_{WSRG} * WSRG + \beta_{IG} * IG + \beta_t * YC_t + \beta_{t\_WSRG} * YC_t * WSRG + \beta_{t\_IG} * YC_t * IG + \beta_p * Post + \beta_{WSRG,p} * (WSRG * Post) + \beta_{IG,p} * (IG * Post) + \varepsilon_{ijt}$$

This model is analogous to the prior model except that an indicator for WSRG instead of an indicator for the whole state is used. The indicator variable, *WSRG*, equals 1 for would-be eligible residents in non-intervention group facilities in an Initiative-participating state and *WSRG* = 0 both for residents in intervention group facilities and residents in other states (from the national comparison group). Here,  $\beta_{IG,p} * (IG * Post)$  functions like a standard DD coefficient, identifying the effect of the intervention as the difference between change in the intervention group relative to

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<sup>29</sup> In theory, we could use Model 3 and simply sum the terms  $\beta_{IG,p} + \beta_{state,p}$ . Note also that Model 4 and Model 2 both obtain the effect of the Initiative relative to the national sample. The only difference is whether nursing facility residents in the WSRG are included in the analysis (Model 4) or altogether omitted (Model 2).

its baseline and the change in the national comparison group relative to its baseline, and not accounting for the effect of being in the specific state. It is the effect relative to the national comparison group. Note that Model 4 estimates the same effect as Model 2, but Model 4 assumes the inclusion of the WSRG in the analysis and thus distinguishes this group from the national comparison group. In **Appendix W**, we present the effect relative to the WSRG. In the main report, we present only the effect relative to the national comparison group.

Thus, to summarize, we present four regression analyses, considering the first one primary and the others to be sensitivity analyses:

1. Adjusting for baseline trends and using a national comparison group (Model 4)
2. Adjusting for baseline trends and using a WSRG (Model 3)
3. Using 2016 as the baseline year and using a national comparison group (Model 1 except that the members of the WSRG are included in the analytical sample as they are in Model 4)
4. Using the average of 2014–2016 as the baseline period and using a national comparison group (Model 1 except that the members of the WSRG are included in the analytical sample as they are in Model 4)

#### **L.10.7 Utilization Probability Models**

For the probability of discrete events, such as the probability of a hospitalization, we used the general equation above to fit a logistic regression model that predicts the probability of the event. We estimated robust standard errors that accounted for clustering at the nursing facility level.

As a sensitivity analysis based on data from 2017, we ran two other models that addressed the clustering issue differently:

- We employed a Generalized Estimating Equation model approach, with the binomial distribution and the logit link function specified. An exchangeable working correlation structure was further specified, which allowed us to obtain parameter estimates and standard errors that account for within-facility correlation of observations. Robust standard errors were estimated, which are valid even if the correlation structure is not exactly as specified. This approach corrects the standard errors of the coefficients in the models and impacts the parameter estimates themselves.
- A model with nursing facility-level random effects.

With these models, weighting the observations based on exposure time was not possible. Because results were similar in these sensitivity analyses to the original logistic regression model, we used the original model in the final analysis.

### **L.10.8 Utilization Count Models**

To account for the fact that some residents used a given type of service more than once during their Initiative-eligible exposure period in a year, we also estimated a parallel set of models whereby the dependent variable was defined as the count of utilization events. We considered both a Poisson model and a negative binomial model. Because preliminary analysis suggested that the simple Poisson models were inadequate, given the overdispersion of the data—that is, greater variability in the data set than would be expected from a Poisson model—we ultimately used negative binomial models. We estimated robust standard errors that accounted for clustering at the nursing facility level.

### **L.10.9 Medicare Expenditure Models**

For total Medicare expenditures, the values exceed zero in virtually all cases. To predict total Medicare spending, we employed a Generalized Linear Model (GLM) with the log link function and Gamma distribution specified, which is a widely used approach to modeling expenditure data that tend to be highly skewed. We estimated robust standard errors that accounted for clustering at the nursing facility level.

For specific subcategories of service utilization such as all-cause hospitalizations, many residents have zero utilization and expenditure for these services. To overcome this issue, we employed a two-part model rather than a simple GLM model. The first part predicted the probability of service utilization, whereby the outcome equals 1 if a resident had any positive expenditure and zero otherwise. The second part was conditional on having any positive expenditure and incorporates a GLM model (log link function and Gamma distribution) for service users only that predicts their expected spending. For both parts of the model, we adjusted the standard errors to account for facility-level clustering. Then, using predicted values obtained from these two models, the predicted expenditure per resident was calculated by multiplying the probability of having any positive expenditure (from the part-one model) by the expected amount of expenditure (from the part-two model). At the end of this process, the two-part model yielded a predicted amount of spending for all residents included in the first part of the model, including both actual users and nonusers.

### **L.10.10 MDS-based Quality Measure Models**

The MDS-based quality outcomes are specified as the proportion of observed quarters with the presence of each adverse event or outcome for each resident, producing an annual score for each resident ranging from 0 to 1. These proportion variables can be conceptualized as a sequence of Bernoulli trials (a resident can have up to four target assessments, each of which indicates presence [1] or absence [0] of an event). We use a GLM model with a logit link function and the binomial distribution for these outcomes. Furthermore, we accounted for facility clustering to allow for intra-facility correlation among residents within the same facilities.

### L.10.11 Mortality Models

For the probability of mortality within fiscal year, a discrete event, we used the general equation above. We estimated robust standard errors that accounted for clustering at the nursing facility level.

### L.10.12 Estimation of Initiative Effects

For presentation of multivariate regression model results, we calculated and reported the Initiative effect, or the marginal effect of the intervention, on each outcome in meaningful units, such as dollars or percentage points. (The estimated values of coefficients in the models were often not in easily interpretable units.) Conceptually, the marginal effect is the effect of a change in a given predictor variable on the conditional mean of the dependent variable. In a linear regression model, the marginal effect for a given covariate equals the slope coefficient for that covariate (or an incremental change if a binary 1/0 variable is used). In the DD context with a linear model, the intervention effect is equal to the slope of the IG\*Post term. However, for nonlinear models, such as those in our analyses, it is not as straightforward to obtain the marginal effects in useful units; this form of an effect can be different for each observed case.<sup>30</sup>

Various methods exist to calculate the average marginal effects; we followed a widely adopted method. We compute the predicted outcome and the marginal effect for each observation in the treatment group in the post period with respect to a predictor variable of primary interest (which in our case is IG\*Post). More specifically, we follow these steps, using Medicare expenditure as an example outcome:

1. For each observation with IG = 1 and Post = 1, we forced the term IG\*Post to equal zero, leaving the values for all other independent variables as is, and we used the inverse link function to compute the predicted expenditure. This is the expected expenditure in the absence of the intervention.
2. For the same observation, we repeated everything in the first step, except resetting IG\*Post to 1, to compute the predicted amount of expenditure after accounting for the intervention.
3. We took the difference between the two predicted expenditure amounts obtained in steps 1 and 2. This is the marginal effect for that observation.
4. We repeated the two steps above for all observations with IG = 1 and Post = 1.
5. We computed the average of all the marginal effects, which was the average marginal effect related to IG\*Post. We are comparing two populations that have the same values on all the independent variables in the model except IG\*Post. Because the only difference between them was whether the intervention effect was included in the prediction, the

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<sup>30</sup> Karaca-Mandic, P., Norton, E., & Dowd, B.(2012). Interaction Terms in Nonlinear Models. *HSR*, 47(1), 255-274.

difference in their expected expenditure amounts can be attributed to the effect of the intervention.

6. Going back to step 1, we computed the average of all the predicted values for all observations with  $IG = 1$  and  $Post = 1$  to obtain the group-level average predicted expenditure.
7. We divide the marginal effect by the predicted mean to obtain the relative effect. This helps to facilitate comparison of effect sizes across outcomes and states. Thus, if the predicted mean expenditure in the absence of the intervention was \$10,000 and the marginal effect was a reduction in expenditure of \$1,000, the relative effect would be a 10 percent reduction in expenditure.

### **L.11 Interpreting the Initiative Effects**

The marginal effect for the interaction term  $IG*Post$  indicates the average effect of the intervention on the outcome. For a dichotomous utilization outcome, the marginal effect is the difference in the predicted probabilities of the outcome event with and without the intervention. It represents the average effect of the Initiative on the probability of the event occurring during the resident's Initiative-eligible exposure period, which on average is less than 365 days (about 250 days).

For count outcomes, the Intervention effect represents the average effect of the Initiative on the count of events per resident during their Initiative-eligible exposure period.

For expenditure outcomes, the Intervention effect represents the average effect of the Initiative on expenditures per resident-year. This is the anticipated effect of the Initiative if all residents were eligible for all 365 days in an intervention year (and assuming their expenditure patterns would be the same for the 365 days as they were for the shorter period during which we observed them).

For the presentation of multivariate regression results in **Appendix X**, we reported the average marginal effect of the ECCP intervention on each outcome and its 90 percent confidence interval and the p-value (obtained using the delta method).

## APPENDIX M

### IN-DEPTH ANALYSES OF NFI 2 BILLING CODE USE

In this appendix, we present a more detailed examination of the use of new Initiative billing codes by facilities and practitioners, beyond those that appear in **Section 2** of the main report. This appendix is organized as follows:

- **Section M.1** presents technical details of the selection of Initiative-related claims and creation of episodes of care for facility- and resident-level analyses.
- **Section M.2** relates to **Section 2.4** of the main report and presents facility and practitioner use of new billing codes across Clinical + Payment and Payment-Only groups, and across ECCPs for fiscal year (FY) 2019.
- **Section M.3** offers multivariate analysis to study the effect of nursing facility characteristics on on-site treatment as reported in **Section 2.4**.
- **Section M.4** presents additional details relating to the analysis of resident characteristics and their treatment status for the six conditions as reported in **Section 2.5**.
- **Section M.5** provides the results of correlation analysis to study the relationship between facility-level billing for on-site treatment and facility-level rates of acute care transitions (ACTs), as reported in **Section 2.5**.
- Lastly, **Section M.6** describes Medicare payments to facilities and practitioners for FY 2019.

#### **M.1 Sample Selection and Creation of Episodes**

The Healthcare Common Procedure Coding System (HCPCS) codes corresponding to the six qualifying conditions that we analyzed are listed in **Table M-1**.

We identified practitioner visits for the confirmation and treatment of conditions and for care coordination conferences from claims in the carrier file (claim type code 71) with HCPCS codes G9685 and G9686, respectively. Each claim line with one of these codes corresponds to a single visit with a practitioner.

We identified nursing facility payments for providing acute care from claims in the outpatient file (claim type code 40, facility type code 2, service classification type code 2 or 3, i.e., Type of Bill 22x or 23x) with HCPCS codes G9679–G9684. Claims consist of claim lines which typically each represent an acute care day—a day that acute care was provided in the nursing facility. Using these claim lines, we created episodes that consist of consecutive days with the same HCPCS code billed. Episodes can span multiple claims.

**Table M-1. NFI 2 billing codes**

HCPCS code	Service
G9679	On-site acute care treatment of a nursing facility resident with pneumonia
G9680	On-site acute care treatment of a nursing facility resident with congestive heart failure
G9681	On-site acute care treatment of a nursing facility resident with chronic obstructive pulmonary disease/asthma
G9682	On-site acute care treatment of a nursing facility resident with a skin infection
G9683	On-site acute care treatment of a nursing facility resident with fluid/electrolyte disorder or dehydration
G9684	On-site acute care treatment of a nursing facility resident with a urinary tract infection
G9685	Practitioner payment for the confirmation and treatment of conditions on site at nursing facility
G9686	Practitioner payment for care coordination conference

NFI = Nursing Facility Initiative; HCPCS = Healthcare Common Procedure Coding System.

NOTE: The first six codes are for facility use; the last two are for practitioners.

In our analyses, we considered counts of both acute care days and episodes, and practitioner visits. We focused on acute care days, episodes, and visits that we were able to attribute to individuals who met our study inclusion criteria,<sup>31</sup> which took place fully within the individual’s Initiative-eligible period (see **Appendix L** for descriptions of the inclusion criteria and the Initiative-eligible period). Over 90 percent of episodes met these criteria.

For nursing facility payments for providing acute care in 2019, we began with 34,922 claim lines. This includes a relatively small number of duplicates where the same person met the 101-day requirement for two facilities. After eliminating claim lines for residents in nonparticipating facilities (these are typically but not always the duplicates referenced above) and for those who did not match to the file of Initiative-eligible residents that we created from the Minimum Data Set (MDS), we used 33,647 claim lines to create 5,572 episodes. After eliminating episodes that were not fully within the resident’s Initiative-eligible exposure period, or where the resident did not meet the eligibility criteria (such as the fee-for-service [FFS] requirement), we were left with 5,225 episodes that were used in the analysis.<sup>32</sup> For analysis of practitioner use, we began with 3,325 claim lines associated with the HCPCS code G9685, and after applying similar exclusions as with nursing facility payments, we had a total of 2,966 visits in the analysis.

<sup>31</sup> Examples of where the criteria were not met include instances where the resident could not be matched to the file of Initiative-eligible residents that we created from the MDS because the resident did not meet the FFS requirement, had not yet met the 101-day requirement before the first day that acute nursing facility treatment was billed (although they may have met it for a subsequent day), or was associated with a facility that was not included in the RTI quantitative evaluation as an intervention facility.

<sup>32</sup> Claims for ineligible residents are subject to recoupment by CMS. Thus, some of these claims may be recouped.

For some of the 2019 analyses we present, such as those at the resident level, we applied an additional exclusion where we excluded episodes for residents in facilities for which analysis variables were missing. In these analyses, 5,096 episodes and 2,890 visits were used.

For FY 2018, nursing facility payments began with 52,460 claim lines and we reduced these to 50,670 after we applied exclusions. These were used to create 8,100 episodes of which 7,528 were used in the analysis. For practitioner visits in FY 2018, we began with 4,523 claim lines and ended up with 4,048 visits after applying exclusions.

For FY 2017, the respective numbers were 58,010 claim lines and 55,600 after we applied exclusions. These were used to create 8,443 episodes, and after exclusions, we were left with 7,883 episodes. For practitioner visits, we began with 4,883 claim lines and used 4,298 visits in the analysis.

## **M.2 Facility and Practitioner Use of NFI 2 Billing Codes**

*(Key results presented in Section 2.4 of the main report)*

Complete results for use of nursing facility new billing codes for the Clinical + Payment facilities and Payment-Only facilities are presented in **Tables M-2** and **M-3**, respectively, for FY 2019. Complete results for use of practitioner new billing codes for FY 2019 are presented in **Table M-4**. For related graphical representations, see **Figures 2-3** and **2-4**. Results for earlier years are presented in our third annual report.<sup>33</sup> We calculated the rates of episodes, days, and visits, per 1,000 Initiative-eligible resident-days.<sup>34</sup> We calculated rates separately for the Clinical + Payment group and Payment-Only group, for each ECCP and for all ECCPs combined. For nursing facility payments, we calculated these rates for codes G9679–G9684 separately and for all of them combined. The major takeaways from these results are presented in **Section 2.4** of the main report.

Facility billing among the top 10 percent of billing facilities along with percentage of non-billing facilities by ECCP in the Clinical + Payment and Payment-Only groups are presented in **Tables M-5**, **M-6**, and **M-7** for FY 2017, FY 2018, and FY 2019, respectively.

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<sup>33</sup> Ingber, M., Feng, Z., Khatutsky, G., et al. (2019, December). Evaluation of the initiative to reduce avoidable hospitalizations among nursing facility residents. Third Annual Report. Report for Centers for Medicare & Medicaid Services. Waltham, MA: RTI International. <https://downloads.cms.gov/files/rahnfr-phasetwo-thirdannrpt.pdf>

<sup>34</sup> For each group, the numerator is the number of episodes (or days or visits) among all residents in the group. The denominator is the number of Initiative-eligible days among all eligible residents in the group divided by 1,000.

**Table M-2. Clinical + Payment: Use of nursing facility billing codes, FY 2019**

(number of events reported per 1,000 Initiative-eligible resident-days; selected numbers depicted in **Figure 2-3** in the main report)

Nursing facility billing codes (G9679–G9684)	All ECCPs (all states)	AQAF (AL)	ATOP2 (NV)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Number of residents meeting eligibility criteria	10,767	1,405	1,118	1,357	3,828	1,607	1,452
Mean exposure period (days)	236.12	234.73	246.46	250.92	217.01	231.14	271.53
<b>On-site acute treatment for any of the six qualifying conditions, combined (days)</b>	6.65	6.53	7.73	8.10	5.91	5.75	7.16
<b><i>On-site acute treatment for each of the six qualifying conditions, separately</i></b>							
Pneumonia (G9679)	2.39	2.76	2.03	2.92	2.14	2.21	2.59
CHF (G9680)	0.33	0.30	0.13	0.69	0.28	0.34	0.28
COPD/asthma (G9681)	0.36	0.69	0.59	0.14	0.25	0.24	0.44
Skin infection (G9682)	0.96	0.64	1.04	0.73	1.02	0.85	1.34
Dehydration (G9683)	0.25	0.07	0.23	0.26	0.27	0.26	0.33
UTI (G9684)	2.36	2.08	3.72	3.36	1.95	1.83	2.17
<b>On-site acute treatment for any of the six qualifying conditions, combined (episodes)</b>	1.12	1.08	1.26	1.43	0.98	0.97	1.22
<b><i>On-site acute treatment for each of the six qualifying conditions, separately</i></b>							
Pneumonia (G9679)	0.38	0.42	0.32	0.46	0.33	0.37	0.42
CHF (G9680)	0.06	0.05	0.02	0.12	0.05	0.05	0.06
COPD/asthma (G9681)	0.06	0.10	0.09	0.02	0.05	0.04	0.08
Skin infection (G9682)	0.15	0.09	0.16	0.12	0.16	0.13	0.22
Dehydration (G9683)	0.06	0.02	0.06	0.06	0.07	0.05	0.08
UTI (G9684)	0.41	0.39	0.60	0.65	0.32	0.32	0.36

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 08; RTI folder: csaur\output\pah2\_ar4\_nbc\_1).

NOTES: ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

**Table M-3. Payment-Only: Use of nursing facility billing codes, FY 2019**

(number of events reported per 1,000 Initiative-eligible resident-days; selected numbers depicted in **Figure 2-3** in the main report)

Nursing facility billing codes (G9679–G9684)	All ECCPs (all states)	AQAF (AL)	ATOP2 (CO)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Number of residents meeting eligibility criteria	11,669	1,106	1,447	1,693	3,914	1,869	1,640
Mean exposure period (days)	242.21	241.34	244.21	246.72	237.66	237.55	252.54
<b>On-site acute treatment for any of the six qualifying conditions, combined (days)</b>	5.15	3.55	5.39	1.61	6.78	6.13	4.81
<b><i>On-site acute treatment for each of the six qualifying conditions, separately</i></b>							
Pneumonia (G9679)	1.63	0.88	1.48	0.46	2.35	1.55	1.87
CHF (G9680)	0.32	0.16	1.02	0.07	0.25	0.30	0.27
COPD/asthma (G9681)	0.31	0.16	0.52	0.04	0.34	0.37	0.41
Skin infection (G9682)	0.71	0.48	0.46	0.36	0.92	0.89	0.75
Dehydration (G9683)	0.15	0.07	0.07	0.00	0.18	0.43	0.05
UTI (G9684)	2.02	1.80	1.84	0.68	2.74	2.59	1.46
<b>On-site acute treatment for any of the six qualifying conditions, combined (episodes)</b>	0.84	0.55	0.85	0.28	1.12	0.98	0.81
<b><i>On-site acute treatment for each of the six qualifying conditions, separately</i></b>							
Pneumonia (G9679)	0.26	0.14	0.23	0.08	0.38	0.24	0.31
CHF (G9680)	0.05	0.03	0.15	0.01	0.04	0.06	0.06
COPD/asthma (G9681)	0.05	0.03	0.08	0.01	0.06	0.06	0.07
Skin infection (G9682)	0.11	0.07	0.07	0.05	0.14	0.14	0.13
Dehydration (G9683)	0.03	0.02	0.03	0.00	0.04	0.09	0.01
UTI (G9684)	0.34	0.27	0.30	0.13	0.46	0.40	0.25

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 08; RTI folder: csaur\output\pah2\_ar4\_nbc\_1).

NOTES: ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

**Table M-4. Use of practitioner billing codes, FY 2019**

(number of events reported per 1,000 Initiative-eligible resident-days; numbers depicted in **Figures 2-3 and 2-4** in the main report)

Practitioner billing codes (G9685–G9686)	Practitioner services: confirmation and treatment of conditions (G9685)	Practitioner services: care coordination conference (G9686)
All ECCPs (6 states) – Clinical + Payment	0.36	0.00
All ECCPs (6 states) – Payment-Only	0.73	0.01
AQAF (Alabama) – Clinical + Payment	0.85	0.00
AQAF (Alabama) – Payment-Only	0.30	0.00
ATOP2 (Nevada) – Clinical + Payment	0.44	0.00
ATOP2 (Colorado) – Payment-Only	0.77	0.00
MOQI (Missouri) – Clinical + Payment	0.01	0.00
MOQI (Missouri) – Payment-Only	0.21	0.00
NY-RAH (New York) – Clinical + Payment	0.27	0.00
NY-RAH (New York) – Payment-Only	0.92	0.03
OPTIMISTIC (Indiana) – Clinical + Payment	0.67	0.00
OPTIMISTIC (Indiana) – Payment-Only	1.00	0.00
RAVEN (Pennsylvania) – Clinical + Payment	0.09	0.00
RAVEN (Pennsylvania) – Payment-Only	0.78	0.00

SOURCE: RTI analysis of Medicare claims data (RTI program MS 08; RTI folder: csaur\output\pah2\_ar4\_nbc\_1).

NOTES: ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

**Table M-5. Non-billing facilities and episodes billed by the top 10% of facilities, by ECCP, FY 2017**

State	Clinical + Payment					Payment-Only				
	# of facilities	# of non-billing facilities	% of non-billing facilities	# of facilities in top 10%	% of billing due to top 10%	# of facilities	# of non-billing facilities	% of non-billing facilities	# of facilities in top 10%	% of billing due to top 10%
All ECCPS	112	9	8.0	12	24.0	148	23	15.5	15	31.0
AL	23	6	26.1	3	40.4	22	3	13.6	3	50.6
CO	NA	NA	NA	NA	NA	24	10	41.7	3	47.3
IN	19	2	10.5	2	28.0	25	6	24.0	3	48.5
MO	16	0	0.0	2	22.2	24	0	0.0	3	24.0
NV	14	0	0.0	2	30.5	NA	NA	NA	NA	NA
NY	25	1	4.0	3	27.3	33	3	9.1	4	23.1
PA	15	0	0.0	2	20.8	20	1	5.0	2	24.0

SOURCE: RTI analysis of Medicare claims data (RTI program MS NBC 08; RTI folder: csaur\output\pah2\_ar2\_nbc\_1)

NOTE: Billing was measured based on the rate per 1,000 Initiative-eligible resident-days for all six qualifying conditions combined. The top 10% of facilities across all ECCPs were identified for each of the Clinical + Payment and Payment-Only groups, within each state and across all state. For example, for the Clinical + Payment group, we selected the 12 facilities with the highest billing based on the rate of per 1,000 Initiative-eligible resident-days.

**Table M-6. Non-billing facilities and episodes billed by the top 10% of facilities, by ECCP, FY 2018**

State	Clinical + Payment					Payment-Only				
	# of facilities	# of non-billing facilities	% of non-billing facilities	# of facilities in top 10%	% of billing due to top 10%	# of facilities	# of non-billing facilities	% of non-billing facilities	# of facilities in top 10%	% of billing due to top 10%
All ECCPS	111	12	10.8	12	26.7	148	22	14.9	15	29.9
AL	23	8	34.8	3	49.0	22	10	45.5	3	57.2
CO	NA	NA	NA	NA	NA	24	5	20.8	3	54.4
IN	19	2	10.5	2	28.3	25	3	12.0	3	38.6
MO	16	0	0.0	2	18.5	24	2	8.3	3	29.2
NV	14	2	14.3	2	42.1	NA	NA	NA	NA	NA

(continued)

**Table M-6. Non-billing facilities and episodes billed by the top 10% of facilities, by ECCP, FY 2018 (continued)**

State	Clinical + Payment					Payment-Only				
	# of facilities	# of non-billing facilities	% of non-billing facilities	# of facilities in top 10%	% of billing due to top 10%	# of facilities	# of non-billing facilities	% of non-billing facilities	# of facilities in top 10%	% of billing due to top 10%
NY	24	0	0.0	3	29.5	33	2	6.1	4	24.0
PA	15	0	0.0	2	29.4	20	0	0.0	2	19.7

SOURCE: RTI analysis of Medicare claims data (RTI program MS NBC 08; RTI folders: csaur\output\pah2\_ar3\_nbc\_2)

NOTE: Billing was measured based on the rate per 1,000 Initiative-eligible resident-days for all six qualifying conditions combined. The top 10% of facilities across all ECCPs were identified for each of the Clinical + Payment and Payment-Only groups, within each state and across all state. For example, for the Clinical + Payment group, we selected the 12 facilities with the highest billing based on the rate of per 1,000 Initiative-eligible resident-days.

**Table M-7. Non-billing facilities and episodes billed by the top 10% of facilities, by ECCP, FY 2019**

State	Clinical + Payment					Payment-Only				
	# of facilities	# of non-billing facilities	% of non-billing facilities	# of facilities in top 10%	% of billing due to top 10%	# of facilities	# of non-billing facilities	% of non-billing facilities	# of facilities in top 10%	% of billing due to top 10%
All ECCPs	111	17	15.3	12	29.5	148	49	33.1	15	39.1
AL	23	7	30.4	3	47.3	22	8	36.4	3	68.2
CO	NA	NA	NA	NA	NA	24	15	62.5	3	86.8
IN	19	4	21.1	2	27.8	25	9	36.0	3	33.9
MO	16	0	0.0	2	25.5	24	8	33.3	3	63.6
NV	14	3	21.4	2	39.9	NA	NA	NA	NA	NA
NY	24	2	8.3	3	34.6	33	5	15.2	4	25.4
PA	15	1	6.7	2	28.8	20	4	20.0	2	30.0

SOURCE: RTI analysis of Medicare claims data (RTI program MS NBC 08; RTI folders: csaur\output\pah2\_ar4\_nbc\_1)

NOTE: Billing was measured based on the rate per 1,000 Initiative-eligible resident-days for all six qualifying conditions combined. The top 10% of facilities across all ECCPs were identified for each of the Clinical + Payment and Payment-Only groups, within each state and across all state. For example, for the Clinical + Payment group, we selected the 12 facilities with the highest billing based on the rate of per 1,000 Initiative-eligible resident-days.

In **Tables M-8** (Clinical + Payment) and **M-9** (Payment-Only), we present results of a facility-level analysis for codes G9679–G9684 combined, for FY 2019. Instead of calculating rates at the

aggregate group level as we reported above, for the current tables we calculate rates at the facility level and present the distribution of these rates across facilities. This allows us to see to what extent the use of the new billing codes varies across facilities within the same states. With all states combined, the facility-level rate of billing, for providing acute care on-site for any of the qualifying conditions, is over seven times greater at the 75th percentile than at the 25th percentile in the Clinical + Payment facilities (1.66 episodes per 1,000 Initiative-eligible resident-days vs. 0.23 episodes per 1,000 Initiative-eligible resident-days). In the Payment-Only facilities, the 75th and 25th percentiles are 1.13 episodes and 0.00 episodes per 1,000 Initiative-eligible resident-days, respectively.<sup>35</sup>

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<sup>35</sup> Due to the intention-to-treat evaluation design, this analysis includes 16 facilities that withdrew from the program in prior years. These facilities were prohibited from billing.

**Table M-8. Clinical + Payment: Facility-level distribution of total nursing facility acute care events, FY 2019**

(all six qualifying conditions combined per 1,000 Initiative-eligible resident-days; selected numbers depicted in **Table 2-1** in the main report)

Nursing facility billing codes (G9679-G9684 combined)	# of facilities	Mean	SD	Min	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Max
All ECCPs (6 states), <i>days</i>	111	6.04	5.54	0.00	0.00	0.00	1.25	5.06	9.78	13.94	17.00	22.60
AQAF (Alabama)	23	5.44	6.34	0.00	0.00	0.00	0.00	4.07	9.32	15.75	16.02	22.60
ATOP2 (Nevada)	14	6.68	4.98	0.00	0.00	0.00	2.68	8.24	10.79	12.66	14.70	14.70
MOQI (Missouri)	16	7.45	5.68	0.10	0.10	1.25	1.83	7.57	11.50	16.68	17.00	17.00
NY-RAH (New York)	24	5.66	6.02	0.00	0.00	0.17	0.96	3.38	9.46	14.99	17.88	18.30
OPTIMISTIC (Indiana)	19	5.28	4.40	0.00	0.00	0.00	0.85	5.22	7.86	9.78	17.62	17.62
RAVEN (Pennsylvania)	15	6.45	5.64	0.00	0.00	0.75	1.94	5.57	9.95	12.10	21.87	21.87
All ECCPs (6 states), <i>episodes</i>	111	1.02	0.93	0.00	0.00	0.00	0.23	0.79	1.66	2.55	2.92	3.58
AQAF (Alabama)	23	0.92	1.06	0.00	0.00	0.00	0.00	0.65	1.52	2.83	2.92	3.58
ATOP2 (Nevada)	14	1.09	0.81	0.00	0.00	0.00	0.44	1.08	1.71	2.14	2.31	2.31
MOQI (Missouri)	16	1.31	0.98	0.10	0.10	0.23	0.31	1.31	2.02	2.68	2.93	2.93
NY-RAH (New York)	24	0.95	1.02	0.00	0.00	0.04	0.18	0.50	1.53	2.77	2.97	3.02
OPTIMISTIC (Indiana)	19	0.89	0.72	0.00	0.00	0.00	0.21	0.87	1.32	1.70	2.82	2.82
RAVEN (Pennsylvania)	15	1.09	0.93	0.00	0.00	0.11	0.35	0.96	1.74	2.12	3.58	3.58

SOURCE: RTI analysis of Medicare claims data (RTI program MS 08; RTI folder: csaur\output\pah2\_ar4\_nbc\_1).

NOTES: ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

**Table M-9. Payment-Only: Facility-level distribution of total nursing facility acute care events, FY 2019**

(all six qualifying conditions combined per 1,000 Initiative-eligible resident-days; selected numbers depicted in **Table 2-1** in the main report)

Nursing facility billing codes (G9679-G9684 combined)	# of facilities	Mean	SD	Min	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Max
All ECCPs (6 states), <i>days</i>	148	4.54	6.40	0.00	0.00	0.00	0.00	1.79	7.08	12.34	19.13	29.76
AQAF (Alabama)	22	3.43	5.01	0.00	0.00	0.00	0.00	1.11	6.95	8.42	11.97	19.13
ATOP2 (Colorado)	24	3.80	8.62	0.00	0.00	0.00	0.00	0.00	2.03	23.21	26.30	28.13
MOQI (Missouri)	24	1.78	2.92	0.00	0.00	0.00	0.00	0.41	1.81	6.06	8.53	10.55
NY-RAH (New York)	33	6.38	4.97	0.00	0.00	0.00	2.02	6.20	9.29	12.18	15.13	21.83
OPTIMISTIC (Indiana)	25	6.28	8.58	0.00	0.00	0.00	0.00	3.14	8.77	18.71	27.78	29.76
RAVEN (Pennsylvania)	20	4.77	5.68	0.00	0.00	0.00	0.49	2.46	7.36	13.25	18.79	19.69
All ECCPs (6 states), <i>episodes</i>	148	0.74	1.01	0.00	0.00	0.00	0.00	0.31	1.13	2.02	3.05	4.33
AQAF (Alabama)	22	0.55	0.76	0.00	0.00	0.00	0.00	0.22	0.99	1.65	1.80	2.79
ATOP2 (Colorado)	24	0.60	1.37	0.00	0.00	0.00	0.00	0.00	0.33	3.86	4.16	4.33
MOQI (Missouri)	24	0.31	0.51	0.00	0.00	0.00	0.00	0.06	0.35	1.02	1.48	1.92
NY-RAH (New York)	33	1.06	0.84	0.00	0.00	0.00	0.31	1.05	1.48	2.02	2.35	3.89
OPTIMISTIC (Indiana)	25	0.99	1.28	0.00	0.00	0.00	0.00	0.45	1.58	2.68	4.13	4.31
RAVEN (Pennsylvania)	20	0.80	0.95	0.00	0.00	0.00	0.08	0.44	1.17	2.31	3.17	3.28

M-11

SOURCE: RTI analysis of Medicare claims data (RTI program MS 08; RTI folder: csaur\output\pah2\_ar4\_nbc\_1).

NOTES: ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

### **M.3 Relationship Between Nursing Facility Characteristics and On-Site Treatment**

*(Key results presented in Section 2.5 of the main report)*

In this section, we present the results of the analysis conducted to identify facility-level factors that were associated with facility-level billing for the Initiative codes and that potentially reflect the facility's capability to provide acute care on-site. For this analysis, we ran a facility-level linear regression predicting billing rates using data from FY 2017–FY 2018. We included several factors, including nursing facility staffing, quality ratings, and the demographic makeup of facilities' resident populations. Facility-level variables were derived from the Payroll-Based Journal (PBJ), Certification and Survey Provider Enhanced Reports (CASPER), and Nursing Home Compare (NHC). There were 260 active facilities in FY 2017 and 259 in 2018. Because some facilities were missing values for some variables, we included 255 facilities in FY 2017 and 257 facilities in FY 2018.

We present descriptive statistics of the variables we included in the analysis, with their means, standard deviations and percentiles for continuous variables, and percentages for categorical variables in **Tables M-10** and **M-11**, respectively. The estimated coefficients, robust standard errors to account for multiple observations of the same facilities (almost all facilities contributed two observations to this analysis, one for each year), and p-values for the linear regression predicting facility-level billing rates are presented in **Table M-12**. Note that we present results from a very similar model (the only difference being how we measured the racial compositions of facilities) in **Appendix I** where we focus in more depth on the relationship between the racial compositions of facilities and Initiative billing. In the multivariate analysis, we found that a higher rate of CNA staffing was associated with higher NFI 2 billing. We found that having a resident population where 10 to 30 percent of residents were racial minorities and having a resident population where 30 percent or more of residents were racial minorities were associated with lower NFI 2 billing. ACT per 1,000 resident days in 2016 had an inverse relationship to on-site treatment but this relationship was not statistically significant.

**Table M-10. Nursing facility characteristics (continuous variables), FY 2017–FY 2018**

(Means, standard deviations, and percentiles)

Characteristic	Mean	SD	Min	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	Max
NFI 2 acute care episodes per 1,000 resident-days (outcome)	1.25	1.13	0.00	0.00	0.38	1.02	1.83	2.67	7.69
Count of eligible residents	91.02	51.70	15.00	44.00	61.00	82.00	108.50	137.00	446.00
Licensed (LPN+RN) staffing HPRD	1.45	0.32	0.42	1.06	1.26	1.44	1.64	1.84	2.47
CNA staffing HPRD	2.27	0.41	1.48	1.83	1.97	2.18	2.48	2.81	4.49
Physician (medical director + other physicians) HPRD	0.02	0.02	0.00	0.00	0.00	0.01	0.02	0.04	0.18
Case-mix index†	11.80	1.10	7.41	10.34	11.13	11.84	12.53	13.03	16.49
Proportion of residents with advance directives	52.50	35.15	0.00	1.25	20.58	53.00	85.41	100.00	100.00
Proportion of male residents	32.40	10.95	9.76	20.25	24.18	30.74	38.36	48.91	68.75
Proportion of residents under 65	12.65	10.94	0.00	2.04	5.03	10.12	17.84	26.09	90.91
Average age of residents 65+	82.16	3.13	71.17	78.04	79.99	82.30	84.35	86.13	90.54
Proportion of residents with CHF	32.91	9.15	9.46	21.98	26.95	32.40	38.47	44.83	69.81
Proportion of residents with COPD	26.58	9.26	4.92	15.79	20.00	25.86	31.82	38.03	68.52
Proportion of residents with skin ulcer	13.59	7.65	0.00	5.08	8.28	12.29	17.29	23.81	46.36
Proportion of MA Residents	21.14	14.30	0.00	4.82	9.68	17.33	32.13	42.81	63.27
NFI 2 acute care transitions per 1,000 resident-days for 2016	0.44	0.29	0.00	0.14	0.25	0.39	0.57	0.80	1.58

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; LPN = licensed practical nurse; RN = registered nurse; HPRD = hours per resident-day.

† Case-mix index is a weighted sum of the variables for the proportion of residents in a facility with specific characteristics. This case-mix variable is based on Feng et al. (2006). The effect of state Medicaid case-mix payment on nursing home resident acuity. *Health Services Research*, 41(4 Pt 1), 1317-1336.

SOURCE: RTI analysis based on Medicare claims data, MDS, PBJ, CASPER, and NHC data (RTI program AF 770; RTI folder: sarnold\output\pah2\_af770\_ss - 2.17.2020).

NOTE: Results based on N = 255 facilities in FY 2017 and N = 257 facilities in FY 2018.

**Table M-11. Nursing facility characteristics (categorical variables), FY 2017–FY 2018**  
(Percent of nursing facilities with each attribute)

Characteristic	Percentage
Metropolitan location	78.52
Chain affiliation	59.77
For-profit	68.16
Clinical lab on site	66.41
X-ray on site	69.73
Presence of physician extenders (physician assistants or nurse practitioners)	56.25
Overall star rating	
1	5.47
2	16.02
3	18.36
4	24.61
5	35.55
Proportion of minority residents	
<5%	31.25
5%-10%	15.63
10%-30%	27.15
>= 30%	25.98
AQAF Clinical + Payment	8.98
AQAF Payment-Only	8.59
ATOP2 Clinical + Payment	5.47
ATOP2 Payment-Only	9.38
MOQI Clinical + Payment	6.05
MOQI Payment-Only	8.59
NY-RAH Clinical + Payment	9.38
NY-RAH Payment-Only	12.70
OPTIMISTIC Clinical + Payment	7.42
OPTIMISTIC Payment-Only	9.77
RAVEN Clinical + Payment	5.86
RAVEN Payment-Only	7.81
Fiscal year 2017	49.80
Fiscal year 2018	50.20

SOURCE: RTI analysis based on Medicare claims data, MDS, PBJ, CASPER, and NHC (RTI program MS 03 & AF 770; RTI folder: sarnold\output\pah2\_af770\_ss - 2.17.2020).

NOTE: Results based on N = 255 facilities in FY 2017 and N = 257 facilities in FY 2018. Metropolitan location is based on Rural/Urban Continuum code 1-3.

**Table M-12. Nursing facility characteristics associated with billing for providing on-site acute care, FY 2017–FY 2018: Multivariate regression results**

(number of episodes per 1,000 Initiative-eligible resident-days)

Characteristic	$\beta$	SE	p
Intercept	-3.17	3.13	0.31
Count of eligible residents	0.00	0.00	0.39
Licensed (LPN+RN) staffing HPRD	-0.25	0.30	0.40
CNA staffing HPRD	<b>0.70</b>	<b>0.20</b>	<b>0.00</b>
Physician (medical director + other physicians) HPRD	-0.72	1.98	0.71
Case-mix index	0.09	0.07	0.20
Proportion of residents with advance directives	0.00	0.00	0.42
Proportion of male residents	0.00	0.01	0.73
Proportion of residents under 65	0.00	0.01	0.78
Average age of residents 65+	0.02	0.04	0.51
Proportion of residents with CHF	<b>0.02</b>	<b>0.01</b>	<b>0.01</b>
Proportion of residents with COPD	0.01	0.01	0.29
Proportion of residents with skin ulcer	0.00	0.01	0.70
Proportion of MA residents	-0.01	0.00	0.13
Acute care transitions per 1,000 resident-days for 2016	-0.19	0.20	0.35
Metropolitan location	-0.18	0.22	0.42
Chain affiliation	-0.06	0.20	0.77
For-profit	0.07	0.25	0.77
Clinical lab on site	<b>0.30</b>	<b>0.17</b>	<b>0.08</b>
X-ray on site	-0.21	0.19	0.27
Presence of physician extenders (physician assistants or nurse practitioners)	-0.04	0.14	0.81
Overall star rating = 1	-0.10	0.25	0.68
Overall star rating = 2	-0.07	0.17	0.67
Overall star rating = 4	0.16	0.14	0.27
Overall star rating = 5	0.17	0.15	0.26
Overall star rating = 3 ‡	—	—	—
Proportion of minority residents between 5%–10%	-0.10	0.17	0.54
Proportion of minority residents between 10%–30%	<b>-0.31</b>	<b>0.16</b>	<b>0.05</b>

(continued)

**Table M-12. Nursing facility characteristics associated with billing for providing on-site acute care, FY 2017–FY 2018: Multivariate regression results (continued)**

(number of episodes per 1,000 Initiative-eligible resident-days)

Characteristic	$\beta$	SE	p
Proportion of minority residents $\geq$ 30%	<b>-0.55</b>	<b>0.20</b>	<b>0.01</b>
Proportion of minority residents < 5% †	—	—	—
AQAF Clinical + Payment	<b>-0.51</b>	<b>0.30</b>	<b>0.09</b>
AQAF Payment-Only	<b>-0.70</b>	<b>0.34</b>	<b>0.04</b>
ATOP2 Clinical + Payment	0.11	0.35	0.75
ATOP2 Payment-Only	-0.46	0.30	0.12
MOQI Clinical + Payment	0.27	0.35	0.44
MOQI Payment-Only	<b>-0.64</b>	<b>0.31</b>	<b>0.04</b>
NY-RAH Payment-Only	-0.15	0.23	0.52
OPTIMISTIC Clinical + Payment	0.09	0.33	0.79
OPTIMISTIC Payment-Only	-0.17	0.40	0.68
RAVEN Clinical + Payment	0.49	0.38	0.19
RAVEN Payment-Only	0.19	0.30	0.53
NY-RAH Clinical + Payment †	—	—	—
Fiscal year 2018	0.05	0.07	0.49

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; HPRD = hours per resident day; LPN = licensed practical nurse; RN = registered nurse.

— = data not applicable; † = reference category.

† Case-mix index is a weighted sum of the variables for the proportion of residents in a facility with specific characteristics. This case-mix variable is based on Feng et al. (2006). The effect of state Medicaid case-mix payment on nursing home resident acuity. *Health Services Research*, 41(4 Pt 1), 1317-1336.

SOURCE: RTI analysis based on Medicare claims data, MDS, PBJ, CASPER, and NHC (RTI program MS 03; RTI folder: sarnold\output\pah2\_ms03\_ss - 3.4.2020).

NOTES: Results based on N = 255 facilities in FY 2017 and N = 257 facilities in FY 2018. Metropolitan location is based on Rural/Urban Continuum code 1-3. Findings that are statistically significant at the level of  $p < 0.1$  are bolded.

#### **M.4 Characteristics of Residents Treated On-Site and Those Treated in the Hospital**

*(Key results presented in Section 2.5 of the main report)*

**Table M-16** displays the percentage of residents in each of four categories that we defined in **Section 2**: those who were not treated for the six qualifying conditions either on site or in the hospital, who received on-site treatment, experienced an ACT for the six qualifying conditions, or had both. The study population included 68,431 Initiative-eligible residents from FY 2017 through FY 2019 (as per **Tables L-2** and **L-3** in **Appendix L**). In **Table M-16** we present results from FY 2017 through FY 2019 combined and in **Tables M-13–M-15**, we present them for each year separately.

As noted in **Section 2**, residents were more likely to be treated on-site for all conditions except CHF. **Table M-16** is graphically represented in **Figure 2-13**.

**Table M-13. Acute care received for the six qualifying conditions, FY 2017**

(all conditions combined, and each condition separately)

Subset	Value type	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
<b>Clinical + Payment Total N=11,494)</b>					
All conditions	N	8,308	2,281	591	314
	%	72.3	19.9	5.1	2.7
Pneumonia	N	10,396	823	210	65
	%	90.5	7.2	1.8	0.6
CHF	N	11,142	167	171	14
	%	96.9	1.5	1.5	0.1
COPD/asthma	N	11,244	140	101	9
	%	97.8	1.2	0.9	0.1
Skin infection	N	10,708	728	31	27
	%	93.2	6.3	0.3	0.2
Dehydration	N	11,194	240	56	4
	%	97.4	2.1	0.5	0.0
UTI	N	10,181	1,014	241	58
	%	88.6	8.8	2.1	0.5
<b>Payment-Only (Total N=13,100)</b>					
All conditions	N	10,026	1,914	880	280
	%	76.5	14.6	6.7	2.1
Pneumonia	N	12,068	717	268	47
	%	92.1	5.5	2.1	0.4
CHF	N	12,683	166	239	12
	%	96.8	1.3	1.8	0.1
COPD/asthma	N	12,783	158	147	12
	%	97.6	1.2	1.1	0.1

(continued)

**Table M-13. Acute care received for the six qualifying conditions, FY 2017 (continued)**

(all conditions combined, and each condition separately)

Subset	Value type	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
<b>Payment-Only (continued) (Total N=13,100)</b>					
Skin infection	N	12,479	559	51	11
	%	95.3	4.3	0.4	0.1
Dehydration	N	12,894	128	76	2
	%	98.4	1.0	0.6	0.0
UTI	N	11,936	787	322	55
	%	91.1	6.0	2.5	0.4

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCES: RTI analysis of Medicare claims data (RTI program AF 800 & HV 03; RTI folder: mkluckman\output\pah2\_ss\_nbc\_hv03\_tables\_111419).

**Table M-14. Acute care received for the six qualifying conditions, FY 2018**

(all conditions combined, and each condition separately)

Subset	Value type	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
<b>Clinical + Payment (Total N=10,622)</b>					
All conditions	N	7,723	2,078	574	247
	%	72.7	19.6	5.4	2.3
Pneumonia	N	9,547	801	226	48
	%	89.9	7.5	2.1	0.5
CHF	N	10,319	136	159	8
	%	97.2	1.3	1.5	0.1
COPD/asthma	N	10,454	96	63	9
	%	98.4	0.9	0.6	0.1
Skin infection	N	9,860	712	36	14
	%	92.8	6.7	0.3	0.1

(continued)

**Table M-14 Acute care received for the six qualifying conditions, FY 2018 (continued)**

(all conditions combined, and each condition separately)

Subset	Value type	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
<b>Clinical + Payment (continued) (Total N=10,622)</b>					
Dehydration	N	10,409	163	48	2
	%	98.0	1.5	0.5	0.0
UTI	N	9,449	900	223	50
	%	89.0	8.5	2.1	0.5
<b>Payment-Only (Total N=11,986)</b>					
All conditions	N	8,887	1,990	838	271
	%	74.1	16.6	7.0	2.3
Pneumonia	N	10,877	740	316	53
	%	90.8	6.2	2.6	0.4
CHF	N	11,564	171	238	13
	%	96.5	1.4	2.0	0.1
COPD/asthma	N	11,724	163	87	12
	%	97.8	1.4	0.7	0.1
Skin infection	N	11,333	578	54	21
	%	94.6	4.8	0.5	0.2
Dehydration	N	11,750	158	74	4
	%	98.0	1.3	0.6	0.0
UTI	N	10,765	857	305	59
	%	89.8	7.2	2.5	0.5

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCES: RTI analysis of Medicare claims data (RTI program AF 800 &amp; HV 03; RTI folder: mkluckman\output\pah2\_ss\_nbc\_hv03\_tables\_111419).

**Table M-15. Acute care received for the six qualifying conditions, FY 2019**

(all conditions combined, and each condition separately)

Subset	Value type	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
<b>Clinical + Payment (Total N=10,151)</b>					
All conditions	N	7,751	1,578	578	244
	%	76.4	15.6	5.7	2.4
Pneumonia	N	9,169	713	217	52
	%	90.3	7.0	2.1	0.5
CHF	N	9,846	110	176	19
	%	97.0	1.1	1.7	0.2
COPD/asthma	N	9,969	113	60	9
	%	98.2	1.1	0.6	0.1
Skin infection	N	9,802	302	44	3
	%	96.6	3.0	0.4	0.0
Dehydration	N	9,976	133	42	0
	%	98.3	1.3	0.4	0.0
UTI	N	9,137	741	227	46
	%	90.0	7.3	2.2	0.5
<b>Payment-Only (Total N=11,078)</b>					
All conditions	N	8,690	1,344	863	181
	%	78.4	12.1	7.8	1.6
Pneumonia	N	10,196	551	296	35
	%	92.0	5.0	2.7	0.3
CHF	N	10,748	109	213	8
	%	97.0	1.0	1.9	0.1
COPD/asthma	N	10,871	103	98	6
	%	98.1	0.9	0.9	0.1
Skin infection	N	10,746	246	80	6
	%	97.0	2.2	0.7	0.1

(continued)

**Table M-15. Acute care received for the six qualifying conditions, FY 2019 (continued)**

(all conditions combined, and each condition separately)

Subset	Value type	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
<b>Payment-Only (continued) (Total N=11,078)</b>					
Dehydration	N	10,948	69	59	2
	%	98.8	0.6	0.5	0.0
UTI	N	10,069	646	322	41
	%	90.9	5.8	2.9	0.4

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCES: RTI analysis of Medicare claims data (RTI program AF 800 &amp; HV 03; RTI folder: mkluckman\output\ar4\HV03\pah2\_ss\_nbc\_hv03\_tables\_061020).

**Table M-16. Acute care received for the six qualifying conditions, FY 2017–FY 2019**(all conditions combined, and each condition separately; numbers correspond to *Figure 2-13* in the main report)

Subset	Value type	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
<b>Clinical + Payment (Total N=32,267)</b>					
All conditions	N	23,782	5,937	1,743	805
	%	73.7	18.4	5.4	2.5
Pneumonia	N	29,112	2,337	653	165
	%	90.2	7.2	2.0	0.5
CHF	N	31,307	413	506	41
	%	97.0	1.3	1.6	0.1
COPD/asthma	N	31,667	349	224	27
	%	98.1	1.1	0.7	0.1
Skin infection	N	30,370	1,742	111	44
	%	94.1	5.4	0.3	0.1
Dehydration	N	31,579	536	146	6
	%	97.9	1.7	0.5	0.0
UTI	N	28,767	2,655	691	154
	%	89.2	8.2	2.1	0.5

(continued)

**Table M-16. Acute care received for the six qualifying conditions, FY 2017–FY 2019  
(continued)**

(all conditions combined, and each condition separately; numbers correspond to **Figure 2-13** in the main report)

Subset	Value type	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
<b>Payment-Only (Total N=36,164)</b>					
All conditions	N	27,603	5,248	2,581	732
	%	76.3	14.5	7.1	2.0
Pneumonia	N	33,141	2,008	880	135
	%	91.6	5.6	2.4	0.4
CHF	N	34,995	446	690	33
	%	96.8	1.2	1.9	0.1
COPD/asthma	N	35,378	424	332	30
	%	97.8	1.2	0.9	0.1
Skin infection	N	34,558	1,383	185	38
	%	95.6	3.8	0.5	0.1
Dehydration	N	35,592	355	209	8
	%	98.4	1.0	0.6	0.0
UTI	N	32,770	2,290	949	155
	%	90.6	6.3	2.6	0.4

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCES: RTI analysis of Medicare claims data (RTI program AF 800 & HV 03; RTI folder: mkluckman\output\ar4\HV03\pah2\_ss\_nbc\_hv03\_tables\_061020).

In **Table M-17**, we present descriptive statistics, including means of continuous variables and percentages of categorical variables, for residents in the Clinical + Payment and Payment-Only facilities, grouped by status of treatment for the six qualifying conditions and broken down for each condition considered separately. **Table 2-3** in **Section 2.5** of the main report presents similar demographic characteristics and patient comorbidities for all conditions combined. Residents are categorized as follows: residents who (1) did not receive on-site acute care and were not transferred to the hospital for the specific condition, (2) received care on site only for the specific condition, and (3) were treated in the hospital (any ACT) for the specific condition. The measures we used, derived from Medicare data and Nursing Home MDS assessments, included age, sex, percentage of residents who died, percentage of residents with dementia, average count of hierarchical condition categories (HCC), dialysis status, average body mass index, average cognitive function scale (CFS) score to measure cognitive impairment, average activities of daily living (ADL) score to measure functional impairment, percentage of residents who experienced an acute care transition, and average total Medicare expenditures per resident-year.

To further compare those treated on-site to those treated in the hospital, **Table M-18** shows selected odds ratio point estimates, lower, and upper limits of 95 percent Wald's confidence interval and associated p-values based on a logistic regression modeling the likelihood of hospital treatment (any ACT) as opposed to only on-site treatment for those treated for the six qualifying conditions during FY 2017 through FY 2018 (N = 12,258). Additional variables including 77 HCC categories were included as control variables but are not reflected in the table below.

**Table M-17. Characteristics of residents by status of acute care received for six qualifying conditions, FY 2017–FY 2019**  
(all conditions combined and each condition separately)

Subset	Characteristic	Total N	Average age (years)	Percentage			Average HCC count	Percentage with ESRD dialysis status	Average			Percentage with any acute care transition	Average total Medicare expenditures per resident-year (\$)
				Male	Died	Dementia			BMI	CFS	ADL score (0–28)		
All conditions	No acute care	51,385	79.8	33.8	21.7	54.3	4.4	3.4	26.9	1.2	17.0	30.5	16,803.0
	On-site treatment only	11,185	81.6	28.2	23.6	55.4	4.7	1.9	27.8	1.2	17.5	35.8	24,284.2
	Hospital treatment only	5,861	78.8	35.4	34.8	43.6	6.5	6.8	28.9	1.0	16.9	100.0	47,981.3
Pneumonia	No acute care	62,253	79.9	32.9	22.2	53.8	4.5	3.5	27.2	1.2	17.0	35.3	19,329.9
	On-site treatment only	4,345	82.5	30.8	27.9	54.0	5.0	2.4	27.4	1.2	17.9	40.3	26,591.3
	Hospital treatment only	1,833	78.7	42.4	42.3	45.4	6.7	5.6	27.8	1.1	17.6	100.0	53,123.0
CHF	No acute care	66,302	80.0	33.2	22.6	54.1	4.6	3.3	27.1	1.2	17.1	36.1	19,891.2
	On-site treatment only	859	84.9	25.5	32.3	46.5	5.4	0.9	29.8	1.0	17.0	40.5	27,234.2
	Hospital treatment only	1,270	79.4	32.4	43.5	32.3	7.7	15.4	31.2	0.7	16.0	100.0	58,299.1
COPD/asthma	No acute care	67,045	80.0	33.0	23.1	53.9	4.6	3.5	27.1	1.2	17.1	36.7	20,280.7
	On-site treatment only	773	81.4	30.4	21.7	47.7	5.6	1.6	28.6	0.9	16.0	44.6	31,883.2
	Hospital treatment only	613	77.1	37.5	27.2	31.5	7.1	4.9	29.9	0.6	14.9	100.0	52,022.2

(continued)

**Table M-17. Characteristics of residents by status of acute care received for six qualifying conditions, all conditions combined and each condition separately, FY 2017–FY 2019 (continued)**

Subset	Characteristic	Total N	Average age (years)	Percentage			Average HCC count	Percentage with ESRD dialysis status	Average			Percentage with any acute care transition	Average total Medicare expenditures per resident-year (\$)
				Male	Died	Dementia			BMI level	CFS	ADL score (score range of 0–28)		
Skin infection	No acute care	64,928	80.1	33.0	23.3	53.9	4.6	3.4	27.1	1.2	17.1	36.6	19,990.6
	On-site treatment only	3,125	79.1	33.6	19.9	50.9	5.2	3.3	29.2	1.2	17.3	44.2	31,427.0
	Hospital treatment only	378	74.1	37.8	22.5	29.6	7.0	9.0	33.3	0.7	16.3	100.0	53,162.5
Dehydration	No acute care	67,171	80.0	33.1	22.7	53.4	4.6	3.5	27.2	1.2	17.1	36.9	20,516.3
	On-site treatment only	891	83.4	29.7	44.4	64.9	4.8	0.8	26.2	1.5	19.0	42.3	27,465.9
	Hospital treatment only	369	81.5	35.2	39.8	64.8	5.0	2.7	25.8	1.5	17.9	100.0	37,080.4
UTI	No acute care	61,537	79.9	34.1	23.3	53.6	4.6	3.7	27.1	1.2	17.1	35.0	19,533.5
	On-site treatment only	4,945	81.4	22.1	20.2	55.3	4.8	1.0	27.9	1.2	17.5	40.7	26,543.8
	Hospital treatment only	1,949	79.1	28.5	26.3	48.8	5.9	3.9	28.6	1.1	17.3	100.0	42,567.1

HCC= hierarchical condition categories; ADL = activities of daily living; BMI = body mass index; CFS = cognitive function scale; ESRD = end-stage renal disease; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCES: RTI analysis of Medicare claims data (RTI program AR4 AF800 & HV 01; RTI folder: \mkluckman\output\ar4\HV01).

NOTE: For ADL, CFS and BMI, higher score means more impairment/obesity. Unlike Medicare expenditures reported elsewhere in this report, the total Medicare expenditures in this table are not annualized.

**Table M-18. Hospital treatment as opposed to on-site only treatment for the six qualifying conditions: Selected odds ratios**

Characteristic	On-site vs. hospital treatment for the six qualifying conditions			
	OR	90% CI		p
HCC count	<b>1.27</b>	<b>1.13</b>	<b>1.43</b>	<b>&lt;.0001</b>
Male, <65	1.09	0.84	1.41	0.521
Female, 65–69	<b>0.79</b>	<b>0.60</b>	<b>1.04</b>	<b>0.097</b>
Male, 65–69	1.11	0.83	1.49	0.476
Female, 70–74	1.06	0.82	1.37	0.650
Male, 70–74	1.15	0.87	1.52	0.329
Female, 75–79	1.08	0.85	1.38	0.540
Male, 75–79	1.00	0.76	1.31	0.993
Female, 80–84	0.90	0.71	1.14	0.388
Male, 80–84	0.88	0.67	1.16	0.370
Female, 85–89	0.86	0.68	1.09	0.208
Male, 85–89	0.87	0.66	1.15	0.323
Female, 90–94	<b>0.78</b>	<b>0.62</b>	<b>1.00</b>	<b>0.046</b>
Male, 90–94	0.93	0.68	1.26	0.618
Female, 95+	<b>0.75</b>	<b>0.57</b>	<b>0.98</b>	<b>0.034</b>
Male, 95+	0.99	0.62	1.57	0.957
Black, non-Hispanic	<b>1.96</b>	<b>1.72</b>	<b>2.23</b>	<b>&lt;.0001</b>
Asian	1.11	0.80	1.53	0.530
Hispanic	<b>1.38</b>	<b>1.09</b>	<b>1.74</b>	<b>0.008</b>
Other race/ethnicity	0.96	0.70	1.32	0.788
Dementia	<b>0.89</b>	<b>0.81</b>	<b>0.98</b>	<b>0.017</b>
Anemia	0.98	0.90	1.07	0.645
BMI	0.97	0.92	1.02	0.191
ADL score	<b>0.90</b>	<b>0.85</b>	<b>0.95</b>	<b>&lt;.0001</b>
CFS	<b>0.93</b>	<b>0.89</b>	<b>0.98</b>	<b>0.007</b>
Urban non-metropolitan	<b>1.29</b>	<b>1.16</b>	<b>1.43</b>	<b>&lt;.0001</b>
Rural	1.22	0.91	1.64	0.186
Resident’s mood assessment (PHQ)	0.99	0.98	1.01	0.291
Full-dual eligibility	<b>0.74</b>	<b>0.65</b>	<b>0.84</b>	<b>&lt;.0001</b>

(continued)

**Table M-18. Hospital treatment as opposed to on-site only treatment for the six qualifying conditions: Selected odds ratios (continued)**

Characteristic	On-site vs. hospital treatment for the six qualifying conditions			
	OR	90% CI		p
Original eligibility due to disability	<b>1.11</b>	<b>0.99</b>	<b>1.24</b>	<b>0.082</b>
For-profit nursing facility	1.06	0.97	1.16	0.181

OR = odds ratios; HCC= hierarchical condition categories; ADL = activities of daily living; BMI = body mass index; CFS = cognitive function scale; ESRD = end-stage renal disease; PHQ = patient health questionnaire.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 04; RTI folder: \mkluckman\output\pah2\_ss\_nbc\_ms04\_logistic\_reg\_7.20.2020)

NOTES: Reference categories are Female <65, Non-Hispanic White, and Urban Metropolitan. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

## M.5 Relationship Between Facility-Level Billing for On-Site Treatment and Facility-Level Rates of ACTs

*(Key results presented in Section 2.5 of the main report)*

We studied the correlation between facility-level rates of providing acute care on-site for the six qualifying conditions on-site and the ACT rate caused by the six conditions. These rates are influenced by case-mix, facility-level likelihood of treating patients in the facility versus transferring them to the hospital, and availability of practitioners to certify the conditions, among other factors.

Our motivation was to identify whether the opportunity for facilities to be reimbursed for providing acute care on-site helps reduce transfers to the hospital for the six qualifying conditions. If there was a substantial amount of on-site treatment for the six qualifying conditions in place of transfers to the hospital, one would expect to see an inverse correlation between the two, with facilities providing more within-facility acute care for the six qualifying conditions having lower rates of transferring residents to the hospital for the six qualifying conditions.

**Table M-19** displays the distribution of rates of ACTs in the Initiative facilities from FY 2016 through FY 2018 and the rate of on-site treatment for FY 2017 through FY 2018.<sup>36</sup> All rates were calculated as events per 1,000 Initiative-eligible resident-days. The Initiative covered 260 facilities in FY 2016, 260 facilities in FY 2017, and 259 in FY 2018. Although the mean rate of ACT for the six qualifying conditions remained fairly consistent across all three years (0.44 in FY 2016, 0.42 in FY 2017 and 0.46 in FY 2018), the mean rate of on-site treatment was higher than the mean ACT rate for the six qualifying conditions in FY 2017 (1.24 vs 0.42) and FY 2018 (1.26 vs 0.46).

<sup>36</sup> In this analysis, on-site treatment rates were calculated with a sample that included all residents eligible for NFI 2, while ACT rates were calculated with the final analytic sample, a slightly reduced sample that excluded residents with missing covariate values

**Table M-19. All ECCPs: Facility-level acute care transition rates, FY 2016–FY 2018**

(episodes per 1,000 Initiative-eligible patient days)

Type of inpatient use	Cause of inpatient use	N	Mean	SD	Min	Percentile							Max
						5th	10th	25th	50th	75th	90th	95th	
<b>2016</b>													
Hospitalizations	All-cause	260	1.56	0.68	0	0.6	0.72	1.04	1.45	1.96	2.52	2.81	3.57
	Potentially avoidable	260	0.55	0.28	0	0.17	0.23	0.34	0.53	0.7	0.93	1.08	1.65
	Six qualifying conditions	260	0.3	0.2	0	0.01	0.07	0.16	0.27	0.41	0.53	0.65	1.25
Emergency department	All-cause	260	1.18	0.69	0	0.32	0.49	0.71	1.04	1.49	2	2.36	4.74
	Potentially avoidable	260	0.54	0.37	0	0.12	0.2	0.31	0.47	0.65	0.95	1.2	2.47
	Six qualifying conditions	260	0.14	0.16	0	0	0	0.04	0.1	0.18	0.31	0.44	1.06
Acute care transitions	All-cause	260	2.75	1.16	0	1.1	1.34	1.91	2.58	3.43	4.25	4.69	7.39
	Potentially avoidable	260	1.1	0.53	0	0.45	0.53	0.75	1.01	1.35	1.77	2.1	3.37
	Six qualifying conditions	260	0.44	0.29	0	0.09	0.14	0.25	0.39	0.57	0.78	1.02	1.58
<b>2017</b>													
Hospitalizations	All-cause	260	1.59	0.74	0.25	0.6	0.7	1.05	1.49	2.08	2.51	3.05	4.55
	Potentially avoidable	260	0.56	0.28	0	0.2	0.25	0.37	0.52	0.71	0.92	1.1	1.6
	Six qualifying conditions	260	0.3	0.19	0	0.05	0.09	0.17	0.27	0.4	0.52	0.63	1.07

(continued)

**Table M-19. Facility-level acute care transition rates: Episodes per 1,000 initiative-eligible patient days, all ECCPs, FY 2016–FY 2018 (continued)**

Type of inpatient use	Cause of inpatient use	N	Mean	SD	Min	Percentile						Max	
						5th	10th	25th	50th	75th	90th		95th
<b>2017 (continued)</b>													
Emergency department	All-cause	260	1.19	0.68	0	0.4	0.51	0.71	1.07	1.47	1.98	2.6	4.67
	Potentially avoidable	260	0.51	0.33	0	0.15	0.19	0.3	0.46	0.65	0.9	1.11	2.59
	Six qualifying conditions	260	0.13	0.14	0	0	0	0.04	0.09	0.16	0.24	0.39	0.92
Acute care transitions	All-cause	260	2.8	1.23	0.66	1.15	1.43	1.87	2.6	3.49	4.28	4.76	7.47
	Potentially avoidable	260	1.07	0.49	0.1	0.43	0.53	0.73	1.01	1.32	1.78	1.89	3.5
	Six qualifying conditions	260	0.42	0.26	0	0.09	0.14	0.23	0.38	0.55	0.74	0.9	1.58
On-site acute treatment for the six qualifying conditions		260	1.24	1.11	0	0	0	0.41	0.99	1.83	2.7	3.41	7.69
<b>2018</b>													
Hospitalizations	All-cause	259	1.7	0.79	0.16	0.68	0.76	1.12	1.63	2.22	2.69	3.08	5.78
	Potentially avoidable	259	0.6	0.34	0	0.12	0.24	0.36	0.56	0.75	1.06	1.24	1.96
	Six qualifying conditions	259	0.32	0.22	0	0	0.08	0.17	0.28	0.43	0.63	0.81	1.18
Emergency department	All-cause	259	1.28	0.94	0.11	0.37	0.49	0.76	1.11	1.62	2.15	2.46	11.27
	Potentially avoidable	259	0.57	0.36	0	0.13	0.21	0.32	0.5	0.74	1.01	1.13	2.52
	Six qualifying conditions	259	0.14	0.15	0	0	0	0.04	0.1	0.19	0.3	0.4	1.18

(continued)

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**Table M-19. Facility-level acute care transition rates: Episodes per 1,000 initiative-eligible patient days, all ECCPs, FY 2016–FY 2018 (continued)**

Type of inpatient use	Cause of inpatient use	N	Mean	SD	Min	Percentile							Max
						5th	10th	25th	50th	75th	90th	95th	
<b>2018 (continued)</b>													
Acute care transitions	All-cause	259	2.99	1.53	0.53	1.17	1.47	2.01	2.84	3.66	4.64	5.17	17.05
	Potentially avoidable	259	1.18	0.6	0	0.38	0.52	0.77	1.1	1.5	1.84	2.05	4.33
	Six qualifying conditions	259	0.46	0.32	0	0.07	0.12	0.24	0.39	0.59	0.88	1.06	2.01
On-site acute treatment for the six qualifying conditions		259	1.26	1.16	0	0	0	0.35	1.02	1.85	2.78	3.66	6.88

SOURCES: RTI analysis of claims data (RTI programs MS 08, MS NBC 08, SS NBC MS 02 and AF710; RTI folder: mkluckman\output\pah2\_ss\_nbc\_ms02\_correlation\_091919).

Correlations of ACTs and on-site treatments are reported in **Table M-20**. We examined the relationship between the facility-level rates of on-site treatment and ACTs to observe any potential substitution that would be consistent with the Initiative goal of reducing hospitalizations in favor of on-site treatment. Additionally, correlations between FY 2017 and FY 2018 on-site rates are reported, to see whether patterns hold across years. Finally, correlations between on-site treatment rates in FY 2017 through FY 2018 and ACTs for FY 2016 are included. By comparing the relationship between ACTs in the base period (FY 2016) and subsequent years of on-site treatment, we examined the relationship between facilities' tendency to transfer residents to the hospital prior to the Initiative and to treat on-site during the Initiative.

All estimated correlations between on-site treatment and the various hospital ACT events were negative, although most were small in magnitude and not statistically significant. All-cause ACT, the broadest group, had a significant and negative correlation with on-site billing for both FY 2017 and FY 2018, as did the narrower groups of all-cause emergency department visits, potentially avoidable ACTs, and potentially avoidable hospitalizations in 2018. Correlations for on-site treatment between FY 2017 and FY 2018 were unsurprisingly positive, large, and significant. Interestingly, ACTs for patients with the six qualifying conditions in FY 2016 were significantly and negatively correlated with on-site treatment in FY 2017.

The universally inverse correlations between on-site treatment and ACTs could be consistent with some substitution of on-site treatment for hospitalization, although these relationships are weak in magnitude and, in many cases, not statistically significant. Moreover, rates of on-site treatment in FY 2017 were inversely correlated with ACT rates for the six qualifying conditions in FY 2016, prior to the introduction of payments, indicating that facilities that provided on-site treatment at a high rate in FY 2017 may have already been offering on-site treatment at a higher rate for the six qualifying conditions prior to the introduction of the new facility billing codes in NFI 2 (hence the lower ACT rates in FY 2016). This indicates that at least some of the fairly weak inverse correlations between on-site treatment and ACTs are not due to the Initiative.

**Table M-20. Correlations between rates of facility-level on-site treatment and acute care transitions for the six qualifying conditions, FY 2017–FY 2018**

Year	Type of inpatient use	Cause of inpatient use	On-site treatment of six qualifying conditions				
			2017		2018		
			Pearson coefficient	P-value	Pearson coefficient	P-value	
2016	Acute care transitions	All-cause	-0.073	0.239	-0.076	0.221	
		Potentially avoidable	-0.079	0.206	-0.059	0.341	
		Six qualifying conditions	<b>-0.130</b>	<b>0.037</b>	-0.035	0.572	
2017	Hospitalizations	All-cause	-0.090	0.147	—	—	
		Potentially avoidable	-0.053	0.399	—	—	
		Six qualifying conditions	-0.026	0.671	—	—	
	Emergency department	All-cause	-0.094	0.131	—	—	
		Potentially avoidable	-0.053	0.396	—	—	
		Six qualifying conditions	-0.063	0.312	—	—	
	Acute care transitions	All-cause	<b>-0.106</b>	<b>0.088</b>	—	—	
		Potentially avoidable	-0.063	0.308	—	—	
		Six qualifying conditions	-0.053	0.393	—	—	
		<b>On-site treatment of six qualifying conditions</b>	1	—	<b>0.736</b>	<b>&lt;.0001</b>	
	2018	Hospitalizations	All-cause	—	—	-0.100	0.109
			Potentially avoidable	—	—	<b>-0.116</b>	<b>0.063</b>
Six qualifying conditions			—	—	-0.091	0.146	
Emergency department		All-cause	—	—	<b>-0.111</b>	<b>0.074</b>	
		Potentially avoidable	—	—	-0.099	0.111	
		Six qualifying conditions	—	—	-0.028	0.657	
Acute care transitions		All-cause	—	—	<b>-0.122</b>	<b>0.051</b>	
		Potentially avoidable	—	—	<b>-0.130</b>	<b>0.037</b>	
		Six qualifying conditions	—	—	-0.077	0.217	
		<b>On-site treatment of six qualifying conditions</b>	<b>0.736</b>	<b>&lt;.0001</b>	1	—	

SOURCE: RTI analysis of Medicare claims data (RTI program SS NBC MS 02; RTI folder: mkluckman\output\pah2\_ss\_nbc\_ms02\_correlation\_091919).

NOTE: Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

## M.6 Medicare Payments to Facilities and Practitioners, FY 2019

In **Tables M-21** and **M-22** we present total Medicare payments for the new billing codes for FY 2019. Unlike the prior analysis where we applied exclusion criteria as explained above, here we include all claim lines in the Medicare data with no exclusions applied. In 2019, Medicare paid over \$7 million to facilities and about \$0.6 million to practitioners for Initiative episodes.

**Table M-21 Medicare payments specific to NFI 2 six qualifying conditions to facilities, FY 2019**

Facility payments	HCPCS code	Number of claim lines	Total Medicare payment (\$)
Acute care pneumonia	G9679	11,842	2,509,339
Acute care CHF	G9680	2,020	429,233
Acute care COPD/asthma	G9681	1,956	413,438
Acute care skin infection	G9682	4,983	1,061,080
Acute care dehydration	G9683	1,125	239,666
Acute care UTI	G9684	12,996	2,768,736
<b>Total for facilities</b>		<b>34,922</b>	<b>7,421,492</b>

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; HCPCS = Healthcare Common Procedure Coding System; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 08 Part 2; RTI folder: csaur\output\pah2\_ar4\_nbc\_3).

NOTE: Unlike Medicare expenditures reported elsewhere in this report, the total Medicare expenditures in this table are not annualized

**Table M-22. Medicare payments specific to NFI 2 six qualifying conditions to practitioners, FY 2019**

Practitioner payments	HCPCS code	Number of claim lines	Total Medicare payment (\$)
Confirmation and treatment of conditions	G9685	3,325	600,287
Care coordination conference	G9686	36	2,794
<b>Total for practitioners</b>		<b>3,361</b>	<b>603,081</b>

HCPCS = Healthcare Common Procedure Coding System.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 08 Part 2; RTI folder: csaur\output\pah2\_ar4\_nbc\_3).

NOTE: Unlike Medicare expenditures reported elsewhere in this report, the total Medicare expenditures in this table are not annualized.

## APPENDIX N

### DESCRIPTIVE STATISTICS OF VARIABLES USED AS REGRESSION COVARIATES

**Appendix N** presents descriptive statistics on the final set of resident-, facility- and state-level model covariates, including annual percentages for categorical variables and means and standard deviations for continuous variables, from FY 2014–FY 2019. These descriptive statistics are summarized separately for each of the following groups:

- **Table N-1:** The national comparison group
- **Table N-2:** The Clinical + Payment group, combining all ECCPs
- **Table N-3:** The Payment-Only group, combining all ECCPs

**Table N-1. National comparison group: Resident-, facility-, and state-level characteristics, FY 2014–FY 2019**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
<b>Resident-level characteristics:</b>						
Basic information						
Residents meeting eligibility criteria	728,716	683,120	666,154	646,925	625,193	592,937
Mean exposure, in days	246.89 (132.62)	241.76 (133.47)	245.62 (133.21)	242.92 (133.08)	242.48 (133.16)	244.19 (132.82)
Exposure days 1–89	20.33	21.16	20.51	20.81	20.87	20.76
Exposure days 90–179	14.17	15.25	14.55	15.15	15.31	14.61
Exposure days 180–269	10.59	10.58	10.67	10.67	10.57	10.84
Exposure days 270–364	9.35	9.11	9.40	9.30	9.18	9.29
Exposure days 365/366	45.56	43.91	44.87	44.07	44.07	44.51
Male, < 65	5.81	5.75	5.99	6.11	6.25	6.30
Male, 65–69	3.43	3.56	3.85	4.16	4.38	4.70
Male, 70–74	4.06	4.16	4.28	4.48	4.72	4.97
Male, 75–79	4.60	4.66	4.73	4.80	4.95	5.18
Male, 80–84	5.07	5.05	5.04	5.07	5.10	5.18
Male, 85–89	4.89	4.95	4.83	4.76	4.64	4.48
Male, 90–94	2.90	2.96	2.96	2.92	2.89	2.84
Male, 95+	0.88	0.92	0.96	0.97	0.97	0.98
Female, < 65	4.84	4.83	4.97	5.04	5.13	5.21
Female, 65–69	3.79	3.91	4.18	4.37	4.43	4.51
Female, 70–74	5.33	5.51	5.69	5.84	6.14	6.31
Female, 75–79	7.90	7.86	7.80	7.87	8.00	8.25
Female, 80–84	12.00	11.63	11.34	11.12	10.93	10.76
Female, 85–89	15.65	15.25	14.68	14.09	13.49	12.98
Female, 90–94	12.67	12.74	12.43	12.09	11.66	11.22

(continued)

**Table N-1. National comparison group: Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Female, 95+	6.19	6.27	6.27	6.32	6.30	6.13
White, non-Hispanic	77.60	77.71	77.46	76.94	76.26	75.47
Black, non-Hispanic	12.95	12.80	12.96	13.17	13.46	13.76
Asian	1.64	1.59	1.75	1.87	1.98	2.14
Hispanic	5.16	5.01	5.03	5.20	5.42	5.57
Other race/ethnicity	2.64	2.89	2.80	2.82	2.87	3.06
Full dual eligibility	80.61	79.98	80.71	80.97	81.73	82.46
Original eligibility because of disability	16.13	16.49	17.24	18.04	18.96	19.79
<b>Health status</b>						
Dementia	53.81	53.37	52.82	52.90	52.24	51.54
Anemia	30.31	30.26	29.81	29.65	29.85	30.26
BMI <18.5	6.99	7.05	7.01	6.93	6.86	6.65
BMI = 18.5–24.9	37.91	37.71	37.51	36.99	36.63	36.21
BMI = 25–29.9	28.51	28.28	28.11	28.09	27.90	27.89
BMI ≥ 30	26.59	26.96	27.37	27.99	28.62	29.25
ADL score= 0–7	12.39	11.82	11.62	11.63	11.89	11.95
ADL score= 8–14	17.15	16.82	16.86	17.03	17.34	17.74
ADL score= 15–21	50.45	52.37	53.47	54.31	54.50	54.59
ADL score= 22–28	20.02	18.98	18.04	17.03	16.28	15.72
Resident's mood assessment using PHQ	2.57 (3.64)	2.44 (3.55)	2.29 (3.42)	2.15 (3.32)	2.03 (3.24)	1.93 (3.18)
CFS= 3 (Severely impaired)	11.12	10.68	10.29	9.90	9.61	9.08
CFS= 2 (Moderately impaired)	34.82	34.36	33.62	33.21	32.71	32.66
CFS= 1 (Mildly impaired)	22.79	22.94	23.24	23.13	23.65	23.97
CFS= 0 (Cognitively intact)	31.27	32.02	32.85	33.76	34.03	34.29
Neurogenic bladder	2.40	2.47	2.69	3.07	3.29	3.48
Obstructive uropathy	0.78	0.85	1.00	1.29	1.59	1.80
ESRD patient with dialysis status	2.53	2.61	2.70	2.76	2.85	3.00
ESRD patients after transplant who are not on dialysis after transplant	0.09	0.09	0.10	0.10	0.10	0.11
<b>Hierarchical Condition Categories</b>						
HIV/AIDS (HCC 1)	0.27	0.29	0.31	0.35	0.35	0.37
Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock (HCC 2)	12.20	12.95	14.15	14.49	15.33	15.90
Opportunistic Infections (HCC 6)	0.56	0.53	0.59	0.65	0.64	0.61
Metastatic Cancer and Acute Leukemia (HCC 8)	0.98	0.98	1.01	1.02	1.08	1.14
Lung and Other Severe Cancers (HCC 9)	1.14	1.14	1.20	1.13	1.16	1.17
Lymphoma and Other Cancers (HCC 10)	1.22	1.23	1.26	1.16	1.17	1.21
Colorectal, Bladder, and Other Cancers (HCC 11)	1.75	1.75	1.78	1.69	1.67	1.72

(continued)

**Table N-1. National comparison group: Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Breast, Prostate, and Other Cancers and Tumors (HCC 12)	3.80	3.78	3.85	3.73	3.74	3.81
Diabetes with Acute Complications (HCC 17)	1.10	1.09	1.28	1.26	1.42	1.52
Diabetes with Chronic Complications (HCC 18)	21.22	21.77	25.29	28.72	30.49	31.99
Diabetes without Complication (HCC 19)	17.86	17.57	14.51	11.41	10.09	9.31
Protein-Calorie Malnutrition (HCC 21)	10.55	10.52	10.88	11.10	11.90	12.26
Other Significant Endocrine and Metabolic Disorders (HCC 23)	4.54	4.63	5.10	5.35	5.79	6.34
End-Stage Liver Disease (HCC 27)	0.79	0.82	0.88	0.87	0.92	0.99
Cirrhosis of Liver (HCC 28)	0.73	0.77	0.80	0.82	0.92	0.99
Chronic Hepatitis (HCC 29)	0.42	0.45	0.51	0.58	0.66	0.74
Intestinal Obstruction/Perforation (HCC 33)	4.24	4.22	4.22	4.19	4.26	4.39
Chronic Pancreatitis (HCC 34)	0.31	0.32	0.33	0.33	0.35	0.37
Inflammatory Bowel Disease (HCC 35)	0.85	0.85	0.91	0.92	0.91	0.93
Bone/Joint/Muscle Infections/Necrosis (HCC 39)	3.11	3.22	3.36	3.31	3.45	3.69
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 40)	4.89	5.07	5.29	5.52	5.56	5.70
Severe Hematological Disorders (HCC 46)	0.89	0.79	0.84	0.86	0.80	0.80
Disorders of Immunity (HCC 47)	1.63	1.64	1.81	1.79	1.87	2.00
Coagulation Defects and Other Specified Hematological Disorders (HCC 48)	8.56	8.40	8.71	8.81	9.28	9.36
Drug/Alcohol Psychosis (HCC 54)	1.64	1.66	1.52	0.84	0.86	0.88
Drug/Alcohol Dependence (HCC 55)	1.75	1.94	2.51	3.42	3.63	3.98
Schizophrenia (HCC 57)	7.21	7.14	7.96	8.64	9.22	9.88
Major Depressive, Bipolar, and Paranoid Disorders (HCC 58)	17.90	18.32	21.80	26.93	29.99	32.45
Quadriplegia (HCC 70)	1.37	1.58	1.86	2.08	2.32	2.45
Paraplegia (HCC 71)	1.07	1.12	1.18	1.22	1.26	1.31
Spinal Cord Disorders/Injuries (HCC 72)	1.29	1.29	1.30	1.10	1.06	1.13
Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease (HCC 73)	0.18	0.18	0.18	0.17	0.17	0.19
Cerebral Palsy (HCC 74)	0.88	0.91	1.00	1.09	1.10	1.17
Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy (HCC 75)	1.25	1.27	1.38	1.35	1.53	1.53
Muscular Dystrophy (HCC 76)	0.15	0.14	0.17	0.16	0.16	0.16
Multiple Sclerosis (HCC 77)	1.60	1.61	1.66	1.68	1.70	1.71
Parkinson's and Huntington's Diseases (HCC 78)	7.50	7.47	7.60	7.80	7.83	7.94
Seizure Disorders and Convulsions (HCC 79)	11.99	12.15	12.43	12.54	12.90	13.44
Coma, Brain Compression/Anoxic Damage (HCC 80)	1.30	1.33	1.47	1.67	2.08	2.37
Respiratory Arrest (HCC 83)	0.18	0.17	0.16	0.15	0.13	0.12
Cardio-Respiratory Failure and Shock (HCC 84)	9.92	10.45	11.32	11.91	12.84	13.54

(continued)

**Table N-1. National comparison group: Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Congestive Heart Failure (HCC 85)	31.86	31.78	32.15	31.96	32.62	33.24
Acute Myocardial Infarction (HCC 86)	3.04	3.01	3.43	4.32	4.69	5.07
Unstable Angina and Other Acute Ischemic Heart Disease (HCC 87)	2.65	2.63	2.55	1.87	2.05	2.14
Angina Pectoris (HCC 88)	1.91	1.85	2.22	2.84	2.97	3.06
Specified Heart Arrhythmias (HCC 96)	26.54	26.93	27.51	27.49	27.95	28.48
Cerebral Hemorrhage (HCC 99)	2.32	2.39	2.56	2.52	2.62	2.65
Ischemic or Unspecified Stroke (HCC 100)	14.72	14.53	14.44	12.27	12.98	13.50
Hemiplegia/Hemiparesis (HCC 103)	8.42	8.50	9.31	10.45	10.87	11.36
Monoplegia, Other Paralytic Syndromes (HCC 104)	0.48	0.45	0.47	0.41	0.48	0.49
Atherosclerosis of the Extremities with Ulceration or Gangrene (HCC 106)	2.79	2.80	2.99	3.17	3.28	3.48
Vascular Disease with Complications (HCC 107)	3.98	4.01	4.16	4.21	4.38	4.49
Vascular Disease (HCC 108)	44.39	44.68	45.96	44.35	44.94	44.97
Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 110 or HCC 111)	25.83	25.68	26.09	26.26	26.64	26.98
Fibrosis of Lung and Other Chronic Lung Disorders (HCC 112)	0.83	0.79	0.81	0.72	0.75	0.82
Aspiration and Specified Bacterial Pneumonias (HCC 114)	6.95	6.77	7.15	7.14	7.40	7.37
Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 115)	0.72	0.63	0.78	1.21	2.51	3.25
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 122)	1.21	1.22	1.27	1.27	1.37	1.45
Exudative Macular Degeneration (HCC 124)	2.01	2.09	2.19	2.27	2.27	2.30
Acute Renal Failure (HCC 135)	15.28	15.99	16.84	17.39	18.25	18.91
Chronic Kidney Disease, Stage 5 (HCC 136)	0.88	0.84	0.75	0.67	0.62	0.58
Chronic Kidney Disease, Severe (Stage 4) (HCC 137)	1.07	1.09	1.21	1.35	1.41	1.46
Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone (HCC 157)	1.75	1.82	2.12	2.48	2.54	2.72
Pressure Ulcer of Skin with Full Thickness Skin Loss (HCC 158)	3.37	3.52	4.16	4.81	5.16	5.55
Chronic Ulcer of Skin, Except Pressure (HCC 161)	6.71	6.65	6.56	6.06	6.65	6.97
Severe Head Injury or Major Head Injury (HCC 166 or HCC 167)	2.46	2.52	2.59	2.44	2.52	2.59
Vertebral Fractures without Spinal Cord Injury (HCC 169)	2.98	3.08	3.08	2.82	2.93	3.02
Hip Fracture/Dislocation (HCC 170)	6.75	6.83	6.76	5.78	5.73	5.72
Complications of Specified Implanted Device or Graft (HCC 176)	4.68	4.85	5.53	5.91	6.06	6.35

(continued)

**Table N-1. National comparison group: Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Artificial Openings for Feeding or Elimination (HCC 188)	5.79	5.76	5.98	6.13	6.27	6.50
Amputation Status, Lower Limb/Amputation Complications (HCC 189)	1.45	1.49	1.64	1.76	1.88	2.06
HCC count = 0-2	36.60	36.03	33.42	32.71	30.48	28.73
HCC count = 3-4	27.25	27.25	27.32	27.13	27.04	26.77
HCC count = 5-7	21.68	21.83	22.91	23.04	23.87	24.47
HCC count >= 8	14.46	14.89	16.35	17.13	18.61	20.02
<b>Participation in other initiatives</b>						
Community-based Care Transition Program (CCTP)	0.69	0.89	0.70	0.24	—	—
Comprehensive ESRD Care (CEC)	—	—	0.09	0.23	0.39	0.46
Comprehensive Primary Care Initiative (CPCI)	0.32	0.29	0.22	0.10	—	—
Comprehensive Primary Care Plus (CPC+), non-SSP Participants	—	—	—	0.58	0.85	0.79
Comprehensive Primary Care Plus (CPC+), SSP Participants	—	—	—	0.66	0.79	0.86
MMCO Financial Alignment Demonstration (Duals) (DEMME)	0.26	0.36	0.39	0.57	0.65	0.64
Next Generation Accountable Care Organization (NGACO)	—	—	1.42	3.34	4.18	3.97
Pioneer Accountable Care Organization Model	3.03	2.49	1.98	0.55	—	—
Medicare Shared Savings Program	16.01	20.27	23.35	23.16	21.63	27.28
Vermont All-Payer ACO Model	—	—	—	—	—	0.14
Maryland Total Cost of Care, Primary Care Program	—	—	—	—	—	0.08
<b>Facility-level characteristics</b>						
Hospital based	2.05	1.38	2.47	2.10	2.30	2.06
For profit	76.49	75.84	75.36	75.77	75.89	75.51
% MA residents < 10	65.34	58.94	55.28	50.01	45.29	39.75
% MA residents = 10-19.9	22.05	24.10	25.01	27.76	30.30	31.65
% MA residents = 20-29.9	7.16	9.23	10.82	12.18	12.95	14.94
% MA residents >= 30	5.46	7.74	8.89	10.05	11.46	13.65
Metropolitan	73.69	73.11	72.34	72.45	72.38	72.60
Urban nonmetropolitan	23.18	23.68	24.38	24.25	24.34	24.14
Rural	3.13	3.20	3.27	3.30	3.28	3.25
<b>State-level characteristics</b>						
Percentage of deaths due to influenza or pneumonia	7.28	7.35	6.75	6.71	6.90	6.19
<b>N (Facilities)</b>	10,917	10,917	11,004	11,038	11,196	11,031

ADL = activities of daily living; BMI = body mass index; CFS = cognitive function scale; ESRD = end-stage renal disease; MA = Medicare Advantage; PHQ = Patient Health Questionnaire; — = not measured in specific year.

SOURCES: RTI analysis of MDS 3.0, Medicare claims data, and CASPER data (RTI program: MS125; RTI folder: sarnold\output\pah2\_ms125\_ar4 - 5.13.2020).

NOTE: Number in parentheses are standard deviations for continuous variables.

**Table N-2. Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
<b>Resident-level characteristics:</b>						
<b>Basic information</b>						
Residents meeting eligibility criteria	12,581	12,346	11,787	11,494	10,622	10,151
Mean exposure, in days	248.95 (132.84)	245.56 (133.58)	247.99 (133.41)	244.06 (133.24)	238.31 (134.48)	240.05 (135.01)
Exposure days 1–89	20.38	20.65	20.11	20.93	21.86	22.62
Exposure days 90–179	13.35	14.91	14.50	14.73	16.02	13.81
Exposure days 180–269	10.33	10.02	10.07	10.65	10.25	10.96
Exposure days 270–364	9.14	8.25	8.78	8.60	8.47	8.83
Exposure days 365/366	46.81	46.18	46.54	45.08	43.39	43.78
Male, < 65	5.98	6.50	6.54	6.80	6.78	6.76
Male, 65–69	3.39	3.56	4.16	4.68	4.86	5.47
Male, 70–74	4.31	4.43	4.48	4.44	4.83	5.28
Male, 75–79	4.68	4.80	4.47	5.11	5.30	5.20
Male, 80–84	4.77	5.11	4.83	4.80	5.27	5.26
Male, 85–89	4.59	4.79	4.43	4.45	4.45	4.37
Male, 90–94	2.34	2.34	2.33	2.26	2.48	2.58
Male, 95+	0.72	0.75	0.71	0.79	0.85	0.95
Female, < 65	4.98	5.14	5.58	5.32	5.33	5.58
Female, 65–69	3.86	4.12	4.15	4.38	4.55	4.85
Female, 70–74	5.72	6.09	5.98	5.97	6.38	6.54
Female, 75–79	8.53	8.27	8.20	7.93	7.96	7.76
Female, 80–84	12.17	11.63	11.80	11.02	10.43	10.33
Female, 85–89	15.60	14.88	14.50	13.83	12.89	12.64
Female, 90–94	12.51	11.96	11.98	12.06	11.51	10.09
Female, 95+	5.84	5.63	5.86	6.15	6.14	6.34
White, non-Hispanic	74.04	73.28	73.71	72.71	71.68	70.69
Black, non-Hispanic	18.45	18.57	18.21	18.73	19.10	19.01
Asian	1.23	1.44	1.72	1.94	2.43	2.63
Hispanic	4.46	4.14	4.03	4.22	4.60	5.22
Other race/ethnicity	1.82	2.57	2.33	2.40	2.18	2.44
Full dual eligibility	85.06	85.29	85.38	85.85	85.80	86.20
Original eligibility because of disability	16.79	17.31	17.44	18.88	19.04	19.85
<b>Health status</b>						
Dementia	55.50	54.89	54.18	53.35	52.39	51.47
Anemia	30.95	32.97	31.93	31.36	31.67	31.91
BMI <18.5	7.14	6.76	7.63	8.01	8.03	7.26
BMI = 18.5–24.9	39.20	38.38	37.41	37.45	37.95	37.97

(continued)

**Table N-2. Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
BMI = 25–29.9	28.22	28.37	28.12	27.15	26.54	26.86
BMI >= 30	25.44	26.50	26.84	27.38	27.48	27.91
ADL score= 0–7	9.43	9.88	10.30	9.83	8.83	9.10
ADL score= 8–14	15.03	14.73	14.30	14.90	14.98	15.21
ADL score= 15–21	51.56	53.02	54.05	54.81	56.17	54.77
ADL score= 22–28	23.98	22.36	21.35	20.45	20.02	20.91
Resident's mood assessment using PHQ	2.31 (3.41)	2.43 (3.49)	2.58 (3.65)	2.59 (3.64)	2.26 (3.34)	2.17 (3.29)
CFS= 3 (Severely impaired)	12.42	11.64	10.93	10.46	10.60	9.72
CFS= 2 (Moderately impaired)	32.42	32.12	33.32	32.21	31.60	32.21
CFS= 1 (Mildly impaired)	22.14	22.40	22.20	22.56	22.96	22.91
CFS= 0 (Cognitively intact)	33.03	33.84	33.55	34.77	34.83	35.15
Neurogenic bladder	2.49	2.75	2.83	2.92	3.07	3.29
Obstructive uropathy	0.74	0.94	1.09	1.55	1.81	1.98
ESRD patient with dialysis status	3.36	3.43	3.66	3.61	4.10	4.45
ESRD patients after transplant who are not on dialysis after transplant	0.12	0.12	0.16	0.17	0.17	0.15
Hierarchical Condition Categories						
HIV/AIDS (HCC 1)	0.67	0.69	0.77	0.76	0.95	0.91
Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock (HCC 2)	13.65	13.73	14.38	15.11	16.07	16.53
Opportunistic Infections (HCC 6)	0.59	0.53	0.60	0.59	0.58	0.57
Metastatic Cancer and Acute Leukemia (HCC 8)	1.07	1.09	1.20	1.19	1.31	1.32
Lung and Other Severe Cancers (HCC 9)	1.31	1.37	1.19	1.29	1.21	1.42
Lymphoma and Other Cancers (HCC 10)	1.36	1.43	1.32	1.17	1.34	1.37
Colorectal, Bladder, and Other Cancers (HCC 11)	1.66	1.80	1.91	1.72	1.98	1.83
Breast, Prostate, and Other Cancers and Tumors (HCC 12)	3.99	4.13	4.13	3.80	3.91	3.80
Diabetes with Acute Complications (HCC 17)	1.20	1.04	1.50	1.47	1.72	1.86
Diabetes with Chronic Complications (HCC 18)	19.37	20.57	23.48	27.68	29.34	30.92
Diabetes without Complication (HCC 19)	20.02	19.30	17.42	13.02	11.89	10.67
Protein-Calorie Malnutrition (HCC 21)	11.37	11.46	11.18	10.84	12.65	13.44
Other Significant Endocrine and Metabolic Disorders (HCC 23)	4.86	4.48	5.00	5.66	6.25	6.66
End-Stage Liver Disease (HCC 27)	0.86	0.62	0.70	0.77	0.77	0.89

(continued)

**Table N-2. Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Cirrhosis of Liver (HCC 28)	0.69	0.66	0.76	0.73	0.86	1.10
Chronic Hepatitis (HCC 29)	0.51	0.58	0.65	0.71	0.86	1.05
Intestinal Obstruction/Perforation (HCC 33)	4.80	4.53	4.49	4.60	4.86	4.71
Chronic Pancreatitis (HCC 34)	0.29	0.33	0.37	0.39	0.39	0.32
Inflammatory Bowel Disease (HCC 35)	1.21	0.79	0.98	1.06	1.12	1.19
Bone/Joint/Muscle Infections/Necrosis (HCC 39)	3.75	3.73	3.93	3.73	4.10	4.31
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 40)	4.49	4.67	5.19	4.76	5.15	5.44
Severe Hematological Disorders (HCC 46)	1.02	0.88	0.76	0.89	0.90	0.92
Disorders of Immunity (HCC 47)	1.72	1.53	1.80	1.69	1.91	2.30
Coagulation Defects and Other Specified Hematological Disorders (HCC 48)	10.19	9.59	9.76	9.75	10.12	10.36
Drug/Alcohol Psychosis (HCC 54)	1.61	1.81	1.65	1.11	0.75	0.99
Drug/Alcohol Dependence (HCC 55)	1.75	1.89	2.21	2.98	3.74	3.96
Schizophrenia (HCC 57)	6.10	6.63	6.91	8.18	9.25	9.89
Major Depressive, Bipolar, and Paranoid Disorders (HCC 58)	17.34	19.42	23.33	26.84	31.13	33.63
Quadriplegia (HCC 70)	1.80	2.18	2.08	2.33	2.61	2.66
Paraplegia (HCC 71)	1.03	1.17	1.02	1.38	1.41	1.47
Spinal Cord Disorders/Injuries (HCC 72)	1.54	1.64	1.22	1.03	0.99	1.31
Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease (HCC 73)	0.17	0.23	0.26	0.19	0.26	0.20
Cerebral Palsy (HCC 74)	1.20	1.20	1.23	1.33	1.20	1.41
Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy (HCC 75)	1.47	1.51	1.59	1.54	1.58	1.66
Muscular Dystrophy (HCC 76)	0.21	0.15	0.17	0.19	0.20	0.23
Multiple Sclerosis (HCC 77)	1.95	2.11	2.42	2.36	2.43	2.39
Parkinson's and Huntington's Diseases (HCC 78)	7.31	7.76	7.53	7.83	8.17	8.00
Seizure Disorders and Convulsions (HCC 79)	14.17	14.56	14.80	14.33	14.61	15.03
Coma, Brain Compression/Anoxic Damage (HCC 80)	1.44	1.66	1.55	1.77	2.57	2.66
Respiratory Arrest (HCC 83)	0.22	0.22	0.18	0.12	0.12	0.18

(continued)

**Table N-2. Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Cardio-Respiratory Failure and Shock (HCC 84)	9.93	10.88	11.08	12.01	13.22	13.44
Congestive Heart Failure (HCC 85)	33.63	33.61	34.13	34.74	34.30	35.21
Acute Myocardial Infarction (HCC 86)	3.46	2.96	3.63	4.61	4.83	5.36
Unstable Angina and Other Acute Ischemic Heart Disease (HCC 87)	3.13	3.28	3.11	2.22	2.94	3.27
Angina Pectoris (HCC 88)	1.49	1.49	2.10	2.92	3.15	2.78
Specified Heart Arrhythmias (HCC 96)	26.32	26.74	27.24	26.74	26.93	27.97
Cerebral Hemorrhage (HCC 99)	2.48	2.75	2.87	2.86	3.10	3.04
Ischemic or Unspecified Stroke (HCC 100)	16.06	15.27	15.34	12.84	13.70	14.45
Hemiplegia/Hemiparesis (HCC 103)	9.39	9.82	10.08	10.39	11.18	11.24
Monoplegia, Other Paralytic Syndromes (HCC 104)	0.61	0.43	0.36	0.40	0.38	0.48
Atherosclerosis of the Extremities with Ulceration or Gangrene (HCC 106)	2.91	3.12	3.64	3.76	3.99	3.98
Vascular Disease with Complications (HCC 107)	4.55	4.02	4.07	4.21	4.59	5.23
Vascular Disease (HCC 108)	45.82	44.34	44.35	46.35	44.49	45.36
Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 110 or HCC 111)	25.86	25.92	26.71	26.81	26.79	28.33
Fibrosis of Lung and Other Chronic Lung Disorders (HCC 112)	0.79	0.80	0.75	0.75	0.67	0.75
Aspiration and Specified Bacterial Pneumonias (HCC 114)	6.99	7.10	6.98	6.95	8.19	7.89
Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 115)	0.82	0.69	0.80	1.00	2.22	2.98
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 122)	1.14	1.27	1.26	1.19	0.95	1.14
Exudative Macular Degeneration (HCC 124)	1.63	1.77	1.70	1.83	1.94	1.71
Acute Renal Failure (HCC 135)	15.70	16.65	16.61	17.39	18.44	20.06
Chronic Kidney Disease, Stage 5 (HCC 136)	1.18	1.13	0.82	0.95	0.73	1.06
Chronic Kidney Disease, Severe (Stage 4) (HCC 137)	0.90	1.01	1.04	1.35	1.39	1.34
Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone (HCC 157)	2.43	2.29	2.60	3.26	3.25	3.39

(continued)

**Table N-2. Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Pressure Ulcer of Skin with Full Thickness Skin Loss (HCC 158)	4.00	4.54	5.37	6.75	7.07	7.54
Chronic Ulcer of Skin, Except Pressure (HCC 161)	8.04	7.92	7.54	5.72	6.45	7.03
Severe Head Injury or Major Head Injury (HCC 166 or HCC 167)	2.36	2.35	2.32	2.49	2.25	2.61
Vertebral Fractures without Spinal Cord Injury (HCC 169)	2.37	2.49	2.71	2.31	2.65	2.79
Hip Fracture/Dislocation (HCC 170)	6.33	6.36	6.07	5.54	5.23	5.13
Complications of Specified Implanted Device or Graft (HCC 176)	4.80	5.22	5.94	6.13	6.90	6.94
Artificial Openings for Feeding or Elimination (HCC 188)	6.98	7.16	6.66	6.66	7.04	7.29
Amputation Status, Lower Limb/Amputation Complications (HCC 189)	1.39	1.63	1.45	1.71	1.83	1.93
HCC count = 0-2	34.50	33.41	31.68	31.02	28.64	26.85
HCC count = 3-4	26.64	27.70	27.15	26.95	26.92	26.42
HCC count = 5-7	22.52	22.17	23.42	23.76	23.83	24.58
HCC count >= 8	16.35	16.72	17.76	18.27	20.62	22.15
Participation in other initiatives						
Community-based Care Transition Program (CCTP)	0.25	0.47	0.62	0.30	—	—
Comprehensive ESRD Care (CEC)	—	—	0.03	0.44	1.06	1.20
Comprehensive Primary Care Initiative (CPCI)	0.02	0.02	—	—	—	—
Comprehensive Primary Care Plus (CPC+), non-SSP Participants	—	—	—	0.03	0.05	0.06
Comprehensive Primary Care Plus (CPC+), SSP Participants	—	—	—	0.03	0.02	0.04
MMCO Financial Alignment Demonstration (Duals) (DEMME)	0.06	0.00	0.00	0.00	0.00	0.00
Next Generation Accountable Care Organization (NGACO)	—	—	0.02	1.83	4.20	4.25
Pioneer Accountable Care Organization Model	5.17	1.61	1.36	0.77	—	—
Medicare Shared Savings Program	9.07	14.57	18.99	18.74	19.82	27.06
Vermont All-Payer ACO Model	—	—	—	—	—	0.01
Maryland Total Cost of Care, Primary Care Program	—	—	—	—	—	—

(continued)

**Table N-2. Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
<b>Facility-level characteristics</b>						
Hospital based	0.95	0.90	0.92	0.84	1.10	0.88
For profit	67.67	63.36	62.38	63.65	64.65	63.38
% MA residents < 10	45.31	39.05	39.15	29.65	24.92	17.88
% MA residents = 10-19.9	25.18	34.42	26.97	35.58	25.76	25.91
% MA residents = 20-29.9	16.64	13.28	14.88	17.12	23.01	22.90
% MA residents >= 30	12.86	13.25	19.00	17.64	26.31	33.31
Metropolitan	89.08	89.04	88.63	88.94	91.20	90.98
Urban nonmetropolitan	10.17	10.15	10.55	10.22	7.96	8.21
Rural	0.76	0.81	0.82	0.84	0.85	0.82
<b>State-level characteristics</b>						
Percentage of deaths due to influenza or pneumonia	7.15	7.40	6.61	6.70	7.34	6.60
N (Facilities)	112	112	112	112	111	111

ADL = activities of daily living; BMI = body mass index; CFS = cognitive function scale; ESRD = end-stage renal disease; MA = Medicare Advantage; PHQ = Patient Health Questionnaire; — = not measured in specific year.

SOURCES: RTI analysis of MDS 3.0, Medicare claims data, and CASPER data (RTI program: MS125; RTI folder: sarnold\output\pah2\_ms125\_ar4 - 5.13.2020).

NOTE: Number in parentheses are standard deviations for continuous variables.

**Table N-3. Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
<b>Resident-level characteristics:</b>						
Basic information						
Residents meeting eligibility criteria	14,504	14,187	13,695	13,100	11,986	11,078
Mean exposure, in days	247.99 (132.42)	245.71 (132.21)	251.39 (131.60)	247.25 (132.65)	244.86 (132.17)	246.81 (131.56)
Exposure days 1–89	20.02	19.72	19.27	20.11	19.96	19.90
Exposure days 90–179	14.27	15.73	13.87	14.69	15.58	14.72
Exposure days 180–269	10.67	10.19	10.69	10.27	10.66	10.83
Exposure days 270–364	8.55	9.15	9.51	8.85	9.13	9.51
Exposure days 365/366	46.48	45.21	46.67	46.08	44.68	45.04
Male, < 65	4.74	4.76	5.02	5.04	4.99	5.00
Male, 65–69	3.13	3.26	3.49	3.42	3.45	3.60
Male, 70–74	3.59	3.54	3.61	4.02	4.33	4.58
Male, 75–79	4.54	4.63	4.35	4.34	4.53	4.73
Male, 80–84	5.10	5.04	5.08	5.05	4.86	5.01
Male, 85–89	5.04	5.06	5.07	5.02	5.07	4.94
Male, 90–94	3.03	3.12	3.14	3.39	3.30	3.11
Male, 95+	0.97	1.02	0.96	1.06	0.98	1.10
Female, < 65	3.85	3.90	3.92	4.31	4.41	4.75
Female, 65–69	2.92	3.29	3.53	3.53	3.57	3.74
Female, 70–74	5.14	5.04	5.21	5.33	4.96	5.00
Female, 75–79	7.77	7.83	7.86	7.78	7.96	8.25
Female, 80–84	12.35	12.24	11.78	11.16	11.17	10.84
Female, 85–89	16.45	15.93	15.42	15.07	14.65	13.91
Female, 90–94	14.37	14.10	14.37	14.03	14.05	13.87
Female, 95+	7.01	7.24	7.18	7.45	7.72	7.57
White, non-Hispanic	81.82	81.96	82.12	81.65	82.30	81.38
Black, non-Hispanic	11.67	11.78	12.06	12.12	11.61	11.73
Asian	0.71	0.84	1.00	1.20	1.18	1.26
Hispanic	3.53	3.40	3.11	3.31	3.35	3.70
Other race/ethnicity	2.27	2.02	1.70	1.72	1.56	1.92
Full dual eligibility	81.31	82.00	82.80	82.74	82.65	82.85
Original eligibility because of disability	15.86	16.04	16.17	16.66	17.49	17.73
Health status						
Dementia	56.16	56.31	56.33	55.31	54.91	53.47
Anemia	28.25	28.88	29.19	28.18	27.60	27.24
BMI <18.5	6.87	7.05	6.66	6.22	6.57	6.07

(continued)

**Table N-3. Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
BMI = 18.5–24.9	38.04	38.13	37.78	37.24	36.03	35.99
BMI = 25–29.9	29.34	28.46	28.67	28.13	28.16	28.53
BMI ≥ 30	25.75	26.37	26.89	28.40	29.23	29.41
ADL score= 0–7	10.09	10.34	10.68	11.05	11.51	11.52
ADL score= 8–14	14.71	15.15	14.98	15.31	15.76	15.88
ADL score= 15–21	56.49	58.05	58.99	58.53	57.84	58.78
ADL score= 22–28	18.70	16.46	15.35	15.12	14.88	13.82
Resident's mood assessment using PHQ	2.82 (3.90)	2.79 (3.96)	2.71 (3.94)	2.42 (3.62)	2.23 (3.37)	2.27 (3.40)
CFS= 3 (Severely impaired)	11.29	11.11	10.87	10.50	9.69	9.22
CFS= 2 (Moderately impaired)	34.71	34.05	34.02	34.01	33.61	33.46
CFS= 1 (Mildly impaired)	23.04	22.52	22.62	22.79	24.40	24.14
CFS= 0 (Cognitively intact)	30.96	32.32	32.49	32.71	32.29	33.18
Neurogenic bladder	2.05	2.19	2.45	2.55	2.94	3.07
Obstructive uropathy	1.12	1.25	1.20	1.46	1.80	2.01
ESRD patient with dialysis status	2.23	2.37	2.55	2.75	2.83	3.34
ESRD patients after transplant who are not on dialysis after transplant	0.06	0.10	0.15	0.13	0.10	0.11
Hierarchical Condition Categories						
HIV/AIDS (HCC 1)	0.23	0.22	0.29	0.27	0.36	0.33
Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock (HCC 2)	11.58	11.42	13.52	12.94	14.50	15.25
Opportunistic Infections (HCC 6)	0.43	0.37	0.47	0.59	0.53	0.60
Metastatic Cancer and Acute Leukemia (HCC 8)	0.91	1.04	1.10	1.06	1.13	0.95
Lung and Other Severe Cancers (HCC 9)	1.49	1.33	1.12	1.13	1.24	1.25
Lymphoma and Other Cancers (HCC 10)	1.32	1.24	1.37	1.42	1.29	1.35
Colorectal, Bladder, and Other Cancers (HCC 11)	1.64	1.50	1.68	1.65	1.74	1.99
Breast, Prostate, and Other Cancers and Tumors (HCC 12)	3.92	3.82	4.05	3.73	3.80	3.83
Diabetes with Acute Complications (HCC 17)	1.11	0.94	1.18	1.15	1.36	1.42
Diabetes with Chronic Complications (HCC 18)	18.90	18.71	21.77	25.70	27.47	29.55
Diabetes without Complication (HCC 19)	18.48	19.28	15.60	12.58	11.55	11.10
Protein-Calorie Malnutrition (HCC 21)	8.00	8.61	9.16	8.76	8.75	9.26

(continued)

**Table N-3. Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Other Significant Endocrine and Metabolic Disorders (HCC 23)	4.05	4.21	4.86	4.85	5.04	5.65
End-Stage Liver Disease (HCC 27)	0.65	0.73	0.69	0.67	0.77	0.82
Cirrhosis of Liver (HCC 28)	0.57	0.49	0.56	0.69	0.71	0.85
Chronic Hepatitis (HCC 29)	0.33	0.40	0.53	0.53	0.52	0.56
Intestinal Obstruction/Perforation (HCC 33)	3.91	3.95	4.14	3.66	3.98	3.92
Chronic Pancreatitis (HCC 34)	0.30	0.27	0.22	0.29	0.27	0.33
Inflammatory Bowel Disease (HCC 35)	1.15	0.94	1.01	0.98	0.93	1.18
Bone/Joint/Muscle Infections/Necrosis (HCC 39)	3.07	3.15	3.34	3.11	3.14	3.86
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 40)	4.84	4.97	5.25	5.57	5.71	5.90
Severe Hematological Disorders (HCC 46)	0.73	0.79	0.71	0.90	0.80	0.76
Disorders of Immunity (HCC 47)	1.39	1.48	1.62	1.43	1.74	1.81
Coagulation Defects and Other Specified Hematological Disorders (HCC 48)	8.90	7.93	8.76	8.24	8.59	8.41
Drug/Alcohol Psychosis (HCC 54)	1.52	1.64	1.45	0.57	0.63	0.66
Drug/Alcohol Dependence (HCC 55)	1.09	1.42	1.79	2.31	2.45	2.65
Schizophrenia (HCC 57)	6.51	6.53	7.00	7.49	7.43	7.75
Major Depressive, Bipolar, and Paranoid Disorders (HCC 58)	14.46	14.66	19.16	23.80	25.71	28.40
Quadriplegia (HCC 70)	0.99	1.17	1.47	1.73	1.90	1.97
Paraplegia (HCC 71)	0.74	0.94	0.96	0.81	0.93	0.97
Spinal Cord Disorders/Injuries (HCC 72)	1.45	1.30	1.28	0.99	0.78	1.08
Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease (HCC 73)	0.19	0.16	0.19	0.15	0.09	0.15
Cerebral Palsy (HCC 74)	1.07	1.11	1.15	1.31	1.23	1.08
Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy (HCC 75)	1.12	1.39	1.53	0.98	1.12	1.20
Muscular Dystrophy (HCC 76)	0.14	0.11	0.17	0.11	0.14	0.20
Multiple Sclerosis (HCC 77)	1.55	1.59	1.53	1.59	1.54	1.76
Parkinson's and Huntington's Diseases (HCC 78)	7.99	7.81	8.51	8.41	8.31	7.93

(continued)

**Table N-3. Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Seizure Disorders and Convulsions (HCC 79)	11.33	11.91	11.92	11.91	12.29	12.49
Coma, Brain Compression/Anoxic Damage (HCC 80)	1.03	1.17	1.20	1.47	1.84	1.82
Respiratory Arrest (HCC 83)	0.23	0.20	0.16	0.21	0.17	0.05
Cardio-Respiratory Failure and Shock (HCC 84)	9.98	10.21	11.30	11.67	12.62	13.08
Congestive Heart Failure (HCC 85)	32.18	32.25	32.95	31.69	32.96	34.50
Acute Myocardial Infarction (HCC 86)	2.87	2.64	3.39	4.44	4.90	4.93
Unstable Angina and Other Acute Ischemic Heart Disease (HCC 87)	2.71	2.78	2.71	2.28	2.34	2.35
Angina Pectoris (HCC 88)	1.43	1.49	1.85	2.32	2.63	2.78
Specified Heart Arrhythmias (HCC 96)	26.83	26.93	27.93	27.56	28.37	29.19
Cerebral Hemorrhage (HCC 99)	2.20	2.09	2.27	2.30	2.70	2.66
Ischemic or Unspecified Stroke (HCC 100)	14.11	14.21	13.37	11.44	12.06	12.96
Hemiplegia/Hemiparesis (HCC 103)	7.72	7.87	8.68	9.03	9.76	9.90
Monoplegia, Other Paralytic Syndromes (HCC 104)	0.45	0.41	0.37	0.30	0.30	0.42
Atherosclerosis of the Extremities with Ulceration or Gangrene (HCC 106)	2.83	2.55	2.71	2.94	3.07	3.17
Vascular Disease with Complications (HCC 107)	4.34	3.95	4.26	4.15	4.62	5.07
Vascular Disease (HCC 108)	48.60	49.21	47.30	45.51	45.69	48.02
Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 110 or HCC 111)	26.11	25.80	25.83	25.78	26.76	26.55
Fibrosis of Lung and Other Chronic Lung Disorders (HCC 112)	0.72	0.62	0.66	0.72	0.83	0.97
Aspiration and Specified Bacterial Pneumonias (HCC 114)	6.18	5.80	6.05	6.03	6.38	5.88
Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 115)	0.77	0.60	0.84	0.99	3.01	3.50
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 122)	1.03	1.12	1.27	1.13	1.00	1.32
Exudative Macular Degeneration (HCC 124)	2.20	2.17	2.41	2.52	2.65	2.69
Acute Renal Failure (HCC 135)	14.02	14.08	15.55	15.69	16.27	16.96
Chronic Kidney Disease, Stage 5 (HCC 136)	0.65	0.63	0.75	0.82	0.64	0.66

(continued)

**Table N-3. Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Chronic Kidney Disease, Severe (Stage 4) (HCC 137)	1.11	1.23	1.21	1.37	1.56	1.47
Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone (HCC 157)	1.57	1.46	1.77	1.95	1.99	2.26
Pressure Ulcer of Skin with Full Thickness Skin Loss (HCC 158)	3.44	3.01	3.66	4.80	4.98	5.77
Chronic Ulcer of Skin, Except Pressure (HCC 161)	7.07	6.60	6.43	5.82	6.13	6.37
Severe Head Injury or Major Head Injury (HCC 166 or HCC 167)	2.42	2.69	2.63	2.26	2.36	2.87
Vertebral Fractures without Spinal Cord Injury (HCC 169)	2.83	3.09	3.46	2.76	2.89	3.05
Hip Fracture/Dislocation (HCC 170)	6.41	6.14	6.38	5.83	5.58	5.96
Complications of Specified Implanted Device or Graft (HCC 176)	4.31	4.14	5.25	5.73	6.06	6.32
Artificial Openings for Feeding or Elimination (HCC 188)	4.94	4.65	5.05	5.13	5.23	5.51
Amputation Status, Lower Limb/Amputation Complications (HCC 189)	1.25	1.18	1.40	1.60	1.56	1.81
HCC count = 0-2	37.24	36.91	35.29	35.02	33.76	31.18
HCC count = 3-4	28.59	28.32	27.19	27.79	27.01	26.34
HCC count = 5-7	21.13	21.79	22.73	22.08	22.03	24.17
HCC count >= 8	13.03	12.98	14.79	15.11	17.20	18.31
Participation in other initiatives						
Community-based Care Transition Program (CCTP)	0.16	0.35	0.53	0.31	—	—
Comprehensive ESRD Care (CEC)	—	—	0.08	0.37	0.58	0.66
Comprehensive Primary Care Initiative (CPCI)	1.37	1.40	0.91	0.31	—	—
Comprehensive Primary Care Plus (CPC+), non-SSP Participants	—	—	—	1.43	2.84	2.86
Comprehensive Primary Care Plus (CPC+), SSP Participants	—	—	—	0.93	0.44	0.71
MMCO Financial Alignment Demonstration (Duals) (DEMME)	0.07	3.06	4.64	5.33	4.40	0.00
Next Generation Accountable Care Organization (NGACO)	—	—	0.04	1.67	3.42	3.55
Pioneer Accountable Care Organization Model	1.03	0.51	1.06	0.57	—	—
Medicare Shared Savings Program	11.25	15.94	18.66	19.25	20.15	25.02

(continued)

**Table N-3. Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2014–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2014	2015	2016	2017	2018	2019
Vermont All-Payer ACO Model	—	—	—	—	—	0.02
Maryland Total Cost of Care, Primary Care Program	—	—	—	—	—	—
Facility-level characteristics						
Hospital based	0.00	0.00	0.00	0.67	0.79	0.55
For profit	64.66	64.85	64.41	66.72	67.26	67.19
% MA residents < 10	56.83	50.37	49.69	37.07	28.00	23.68
% MA residents = 10-19.9	23.09	28.24	23.69	32.89	31.84	29.81
% MA residents = 20-29.9	15.15	11.63	14.15	16.21	22.49	20.27
% MA residents >= 30	4.93	9.76	12.46	13.83	17.67	26.24
Metropolitan	73.30	72.53	72.49	72.11	71.59	73.28
Urban nonmetropolitan	24.37	24.99	25.02	25.31	26.11	24.73
Rural	2.33	2.48	2.49	2.57	2.29	1.99
State-level characteristics						
Percentage of deaths due to influenza or pneumonia	7.12	7.38	6.52	6.60	7.17	6.55
<b>N (Facilities)</b>	148	148	148	148	148	148

ADL = activities of daily living; BMI = body mass index; CFS = cognitive function scale; ESRD = end-stage renal disease; MA = Medicare Advantage; PHQ = Patient Health Questionnaire; — = not measured in specific year.

SOURCES: RTI analysis of MDS 3.0, Medicare claims data, and CASPER data (RTI program: MS125; RTI folder: sarnold\output\pah2\_ms125\_ar4 - 5.13.2020).

NOTE: Number in parentheses are standard deviations for continuous variables.

## APPENDIX O

### DESCRIPTIVE ANALYSIS OF UTILIZATION (PERCENTAGE)

In this appendix, we present summary results from a descriptive analysis of utilization measures, reporting the annual percentage of residents who were hospitalized, visited the emergency department, or experienced any of these acute care transitions, for all-cause, potentially avoidable, and the six qualifying conditions aggregated and separately. **Table O-1** presents the results from the national comparison group. **Tables O-2** through **O-8** present the results by intervention group (Clinical + Payment and Payment-Only), combined across all ECCPs, and then separately for each ECCP.

**Table O-1. National comparison group: Utilization by service type, FY 2014–FY 2019**

(percentage of residents per year)

Event	National comparison group					
	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	728,716	683,120	666,154	646,925	625,193	592,937
Mean exposure (days)	246.89	241.76	245.62	242.92	242.48	244.19
<b>Any hospitalization (all-cause)</b>	29.36	30.20	29.38	30.03	30.39	30.15
Any potentially avoidable hospitalization	15.00	14.96	14.31	14.41	14.38	14.09
Any potentially avoidable hospitalization (all six qualifying conditions)	9.64	9.51	8.98	8.98	8.90	8.56
Any hospitalization (pneumonia)	4.37	4.32	3.80	3.24	3.63	3.37
Any hospitalization (CHF)	1.77	1.80	1.74	1.94	1.96	1.99
Any hospitalization (COPD/asthma)	0.94	0.93	0.82	1.30	0.86	0.76
Any hospitalization (skin infection)	0.72	0.69	0.60	0.59	0.57	0.54
Any hospitalization (dehydration)	0.30	0.25	0.45	0.45	0.45	0.43
Any hospitalization (UTI)	2.43	2.38	2.34	2.25	2.18	2.17
Any hospitalization (sepsis)	—	—	—	—	—	9.10
<b>Any ED visit (all-cause)</b>	25.44	26.26	26.53	26.71	27.38	27.48
Any potentially avoidable ED visit	14.40	15.06	15.13	15.15	15.44	15.49
Any potentially avoidable ED visit (all six qualifying conditions)	4.91	5.34	5.24	5.39	5.51	5.45
Any ED visit (pneumonia)	1.00	1.13	1.02	1.02	1.06	1.00
Any ED visit (CHF)	0.48	0.52	0.51	0.56	0.58	0.58
Any ED visit (COPD/asthma)	0.55	0.60	0.59	0.60	0.63	0.62
Any ED visit (skin infection)	0.47	0.47	0.38	0.39	0.41	0.42
Any ED visit (dehydration)	0.49	0.51	0.54	0.55	0.54	0.50
Any ED visit (UTI)	2.24	2.46	2.55	2.64	2.67	2.72
<b>Any acute care transition (all-cause)</b>	42.83	43.85	43.36	43.91	44.46	44.36
Any potentially avoidable acute care transition	25.20	25.62	25.15	25.22	25.40	25.26
Any potentially avoidable acute care transition (all six qualifying conditions)	12.99	13.17	12.62	12.75	12.77	12.49
Any acute care transition (pneumonia)	4.94	4.96	4.41	3.87	4.28	4.00
Any acute care transition (CHF)	2.10	2.14	2.08	2.31	2.35	2.39
Any acute care transition (COPD/asthma)	1.38	1.40	1.29	1.76	1.36	1.26
Any acute care transition (skin infection)	1.13	1.10	0.93	0.92	0.91	0.92
Any acute care transition (dehydration)	0.77	0.74	0.95	0.97	0.96	0.90
Any acute care transition (UTI)	4.38	4.53	4.57	4.57	4.54	4.59

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table O-2. All ECCPs (all states): Utilization by service type, FY 2014–FY 2019**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	12,581	12,346	11,787	11,494	10,622	10,151	14,504	14,187	13,695	13,100	11,986	11,078
Mean exposure (days)	248.95	245.56	247.99	244.06	238.31	240.05	247.99	245.71	251.39	247.25	244.86	246.81
<b>Any hospitalization (all-cause)</b>	27.88	27.78	26.67	26.70	26.96	26.09	26.43	27.45	26.05	24.66	26.24	26.09
Any potentially avoidable hospitalization	12.57	12.08	11.11	11.35	11.12	11.71	13.04	12.98	11.83	10.95	11.99	11.65
Any potentially avoidable hospitalization (all six qualifying conditions)	7.19	6.67	6.06	6.15	6.07	6.17	7.90	8.06	7.04	6.31	6.67	6.60
Any hospitalization (pneumonia)	3.24	2.96	2.28	2.11	2.31	2.42	3.53	3.86	2.91	2.06	2.70	2.56
Any hospitalization (CHF)	1.35	1.31	1.17	1.45	1.41	1.76	1.80	1.68	1.61	1.63	1.80	1.81
Any hospitalization (COPD/asthma)	0.58	0.53	0.44	0.80	0.52	0.46	0.75	0.64	0.64	0.91	0.57	0.51
Any hospitalization (skin infection)	0.52	0.49	0.42	0.33	0.35	0.29	0.47	0.59	0.41	0.31	0.42	0.44
Any hospitalization (dehydration)	0.16	0.19	0.38	0.35	0.34	0.30	0.25	0.22	0.39	0.28	0.27	0.29
Any hospitalization (UTI)	1.84	1.70	1.62	1.53	1.53	1.37	1.70	1.66	1.53	1.41	1.37	1.46
Any hospitalization (sepsis)	—	—	—	—	—	8.01	—	—	—	—	—	7.82
<b>Any ED visit (all-cause)</b>	18.62	18.57	17.81	18.24	18.40	18.96	21.48	22.41	21.47	20.86	21.75	21.98
Any potentially avoidable ED visit	9.42	9.61	9.45	9.48	9.47	9.88	11.53	12.61	12.12	11.16	12.00	11.84
Any potentially avoidable ED visit (all six qualifying conditions)	2.31	2.32	2.39	2.24	2.09	2.42	3.50	3.77	3.57	3.18	3.55	3.75
Any ED visit (pneumonia)	0.37	0.34	0.30	0.38	0.38	0.31	0.55	0.73	0.57	0.54	0.53	0.54
Any ED visit (CHF)	0.18	0.26	0.18	0.20	0.22	0.21	0.33	0.30	0.39	0.34	0.39	0.32
Any ED visit (COPD/asthma)	0.22	0.21	0.25	0.20	0.18	0.25	0.48	0.41	0.42	0.34	0.36	0.52

(continued)

**Table O-2. All ECCPs (all states): Utilization by service type, FY 2014–FY 2019 (continued)**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Any ED visit (skin infection)	0.26	0.21	0.18	0.17	0.13	0.19	0.37	0.33	0.31	0.19	0.23	0.37
Any ED visit (dehydration)	0.16	0.16	0.28	0.17	0.13	0.12	0.34	0.41	0.31	0.32	0.38	0.27
Any ED visit (UTI)	1.16	1.18	1.28	1.17	1.10	1.41	1.61	1.74	1.80	1.55	1.80	1.95
<b>Any acute care transition (all-cause)</b>	<b>37.85</b>	<b>38.01</b>	<b>36.51</b>	<b>36.92</b>	<b>36.88</b>	<b>36.55</b>	<b>38.15</b>	<b>39.92</b>	<b>38.17</b>	<b>36.89</b>	<b>38.31</b>	<b>38.20</b>
Any potentially avoidable acute care transition	19.72	19.53	18.59	18.70	18.51	18.85	21.57	22.42	21.03	19.59	20.97	20.52
Any potentially avoidable acute care transition (all six qualifying conditions)	8.89	8.48	8.03	7.87	7.73	8.10	10.58	10.85	9.75	8.85	9.25	9.42
Any acute care transition (pneumonia)	3.50	3.22	2.49	2.39	2.58	2.65	3.90	4.34	3.36	2.40	3.08	2.99
Any acute care transition (CHF)	1.45	1.54	1.32	1.61	1.57	1.92	2.03	1.84	1.86	1.92	2.09	1.99
Any acute care transition (COPD/asthma)	0.75	0.72	0.67	0.96	0.68	0.68	1.18	0.97	0.96	1.21	0.83	0.94
Any acute care transition (skin infection)	0.76	0.67	0.59	0.50	0.47	0.46	0.81	0.87	0.67	0.47	0.63	0.78
Any acute care transition (dehydration)	0.31	0.36	0.64	0.52	0.47	0.41	0.57	0.62	0.69	0.60	0.65	0.55
Any acute care transition (UTI)	2.85	2.75	2.83	2.60	2.57	2.69	3.19	3.27	3.22	2.88	3.04	3.28

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table O-3. AQAF (Alabama): Utilization by service type, FY 2014–FY 2019**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	2,391	2,425	2,411	2,218	1,532	1,355	2,072	2,001	1,950	1,814	1,403	1,070
Mean exposure (days)	265.39	259.09	261.71	253.28	225.54	237.38	252.88	258.71	259.13	257.49	251.15	245.50
<b>Any hospitalization (all-cause)</b>	28.11	30.35	30.24	29.44	29.50	31.29	33.25	32.53	29.38	28.39	28.72	28.97
Any potentially avoidable hospitalization	14.26	15.26	13.52	13.57	13.45	15.20	18.39	16.59	13.64	13.34	14.61	15.23
Any potentially avoidable hospitalization (all six qualifying conditions)	8.70	8.82	7.30	7.12	7.31	8.27	12.11	10.89	8.56	7.72	8.34	9.44
Any hospitalization (pneumonia)	4.06	4.12	2.61	2.43	2.94	3.47	5.79	5.45	3.13	2.81	3.06	3.93
Any hospitalization (CHF)	1.71	2.02	1.29	1.76	1.63	1.99	2.56	1.80	1.79	1.38	2.00	2.71
Any hospitalization (COPD/asthma)	0.84	0.91	0.75	1.04	0.46	0.89	1.21	0.90	0.87	1.43	1.00	0.93
Any hospitalization (skin infection)	0.50	0.33	0.29	0.27	0.20	0.22	0.77	0.65	0.41	0.44	0.43	0.37
Any hospitalization (dehydration)	0.21	0.41	0.46	0.45	0.52	0.30	0.58	0.30	0.41	0.17	0.43	0.37
Any hospitalization (UTI)	2.09	1.69	2.28	1.89	2.02	1.85	2.56	2.65	2.26	2.04	2.07	1.96
Any hospitalization (sepsis)	—	—	—	—	—	8.86	—	—	—	—	—	7.48
<b>Any ED visit (all-cause)</b>	23.09	23.34	22.40	21.64	22.00	22.80	25.48	26.14	24.72	23.48	24.73	27.20
Any potentially avoidable ED visit	11.84	13.40	12.77	11.77	13.19	13.28	13.71	13.94	14.00	12.24	13.26	15.89
Any potentially avoidable ED visit (all six qualifying conditions)	3.22	3.92	4.02	2.80	3.52	3.25	3.86	3.95	4.31	3.14	4.28	4.86
Any ED visit (pneumonia)	0.42	0.37	0.50	0.41	0.72	0.15	0.19	0.50	0.46	0.44	0.43	0.56
Any ED visit (CHF)	0.42	0.70	0.41	0.32	0.39	0.22	0.53	0.40	0.56	0.39	0.78	0.47
Any ED visit (COPD/asthma)	0.21	0.37	0.41	0.45	0.20	0.66	0.77	0.35	0.67	0.50	0.57	0.47
Any ED visit (skin infection)	0.21	0.45	0.17	0.14	0.13	0.15	0.43	0.30	0.36	0.11	0.14	0.28
Any ED visit (dehydration)	0.13	0.37	0.54	0.32	0.33	0.44	0.48	0.35	0.21	0.17	0.57	0.37
Any ED visit (UTI)	1.88	1.77	2.12	1.35	1.89	1.70	1.54	2.10	2.26	1.54	2.07	3.08

(continued)

**Table O-3. AQAF (Alabama): Utilization by service type, FY 2014–FY 2019 (continued)**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Any acute care transition (all-cause)</b>	40.90	42.35	41.56	40.26	40.86	42.66	45.95	46.98	42.97	41.57	40.70	43.55
Any potentially avoidable acute care transition	23.21	24.91	23.19	22.00	23.24	24.28	27.85	26.49	24.36	22.38	23.52	26.92
Any potentially avoidable acute care transition (all six qualifying conditions)	11.13	11.79	10.66	9.38	10.05	11.00	14.96	14.04	11.74	10.36	11.12	13.27
Any acute care transition (pneumonia)	4.35	4.37	2.99	2.84	3.46	3.62	5.94	5.75	3.54	3.09	3.42	4.49
Any acute care transition (CHF)	1.92	2.68	1.62	1.98	1.96	2.14	2.90	2.00	2.26	1.71	2.57	2.99
Any acute care transition (COPD/asthma)	0.96	1.20	1.12	1.44	0.59	1.55	1.93	1.20	1.38	1.87	1.43	1.31
Any acute care transition (skin infection)	0.71	0.78	0.46	0.41	0.33	0.37	1.21	0.90	0.72	0.50	0.57	0.65
Any acute care transition (dehydration)	0.33	0.78	1.00	0.77	0.85	0.74	1.06	0.65	0.62	0.33	1.00	0.75
Any acute care transition (UTI)	3.76	3.26	4.15	3.11	3.85	3.47	4.01	4.65	4.41	3.53	4.06	4.86

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table O-4. ATOP2 (Nevada/Colorado): Utilization by service type, FY 2014–FY 2019**

(percentage of residents per year)

Event	Clinical + Payment (Nevada)						Payment-Only (Colorado)					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,142	1,118	1,058	1,082	1,093	1,049	1,786	1,722	1,645	1,601	1,506	1,379
Mean exposure (days)	228.23	238.47	248.09	243.49	246.92	250.82	244.97	230.81	240.81	235.47	237.86	246.78
<b>Any hospitalization (all-cause)</b>	28.02	29.70	29.77	26.80	29.37	27.55	17.81	18.35	18.42	18.36	18.99	20.38
Any potentially avoidable hospitalization	12.78	12.08	10.49	10.35	11.62	11.63	8.12	7.78	7.72	7.81	7.50	7.76
Any potentially avoidable hospitalization (all six qualifying conditions)	6.83	5.90	4.91	5.36	5.95	6.10	4.93	4.47	4.56	4.25	3.39	4.42
Any hospitalization (pneumonia)	3.42	3.22	1.89	2.13	2.84	2.67	2.18	2.21	2.25	1.81	1.26	1.67
Any hospitalization (CHF)	0.44	0.27	0.57	1.02	1.19	1.43	1.12	0.75	0.73	1.19	0.93	1.45
Any hospitalization (COPD/asthma)	0.44	0.18	0.38	0.55	0.55	0.67	0.62	0.52	0.12	0.62	0.33	0.07
Any hospitalization (skin infection)	0.61	0.27	0.66	0.28	0.46	0.29	0.39	0.41	0.30	0.06	0.33	0.29
Any hospitalization (dehydration)	0.00	0.18	0.09	0.28	0.27	0.48	0.06	0.12	0.61	0.19	0.13	0.15
Any hospitalization (UTI)	2.01	2.15	1.42	1.66	1.10	0.95	0.73	0.81	0.73	0.56	0.73	1.23
Any hospitalization (sepsis)	—	—	—	—	—	9.34	—	—	—	—	—	5.95
<b>Any ED visit (all-cause)</b>	17.08	20.48	16.92	20.89	19.85	20.88	19.93	20.67	21.52	20.49	21.25	22.12
Any potentially avoidable ED visit	9.46	10.82	8.70	10.91	9.79	10.30	10.92	12.14	12.04	10.62	11.49	12.33
Any potentially avoidable ED visit (all six qualifying conditions)	2.01	2.33	2.27	2.87	2.29	2.38	4.03	4.24	5.11	3.81	3.52	5.00
Any ED visit (pneumonia)	0.70	0.18	0.19	0.37	0.27	0.19	1.01	1.10	0.85	1.19	1.00	1.23
Any ED visit (CHF)	0.09	0.27	0.00	0.28	0.55	0.29	0.39	0.29	0.36	0.62	0.20	0.29
Any ED visit (COPD/asthma)	0.09	0.45	0.19	0.00	0.27	0.38	0.39	0.46	0.55	0.31	0.53	0.51
Any ED visit (skin infection)	0.18	0.18	0.28	0.28	0.27	0.10	0.67	0.70	0.55	0.31	0.27	0.87
Any ED visit (dehydration)	0.09	0.18	0.19	0.18	0.00	0.00	0.11	0.23	0.73	0.25	0.13	0.22
Any ED visit (UTI)	0.88	1.16	1.42	1.76	1.01	1.62	1.57	1.68	2.49	1.44	1.53	2.18

(continued)

**Table O-4. ATOP2 (Nevada/Colorado): Utilization by service type, FY 2014–FY 2019 (continued)**

(percentage of residents per year)

Event	Clinical + Payment (Nevada)						Payment-Only (Colorado)					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Any acute care transition (all-cause)</b>	37.74	41.50	39.60	39.56	39.07	39.37	30.85	32.52	32.52	31.86	32.20	34.45
Any potentially avoidable acute care transition	19.53	21.11	17.67	19.04	19.30	18.78	16.97	17.89	17.69	16.30	17.00	17.62
Any potentially avoidable acute care transition (all six qualifying conditions)	8.41	7.69	6.90	7.49	7.69	8.10	8.17	7.90	8.81	7.31	6.44	8.19
Any acute care transition (pneumonia)	3.94	3.40	1.98	2.31	2.93	2.86	2.91	2.90	2.86	2.56	2.12	2.47
Any acute care transition (CHF)	0.53	0.54	0.57	1.29	1.65	1.72	1.46	0.93	0.97	1.75	1.06	1.52
Any acute care transition (COPD/asthma)	0.53	0.63	0.57	0.55	0.82	0.95	0.90	0.87	0.67	0.87	0.80	0.58
Any acute care transition (skin infection)	0.79	0.36	0.95	0.55	0.73	0.38	1.06	1.05	0.85	0.31	0.60	1.02
Any acute care transition (dehydration)	0.09	0.36	0.28	0.46	0.27	0.48	0.17	0.35	1.22	0.44	0.27	0.36
Any acute care transition (UTI)	2.80	3.22	2.84	3.23	2.10	2.57	2.24	2.56	3.16	2.00	2.19	3.19

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado.

**Table O-5. MOQI (Missouri): Utilization by service type, FY 2014–FY 2019**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,548	1,604	1,513	1,442	1,357	1,308	2,187	2,179	2,056	1,928	1,790	1,628
Mean exposure (days)	260.29	248.00	257.78	254.62	249.34	253.67	252.51	247.97	261.81	259.21	250.32	250.27
<b>Any hospitalization (all-cause)</b>	29.20	27.93	24.19	25.87	27.19	24.31	29.04	31.21	28.89	29.20	30.06	30.84
Any potentially avoidable hospitalization	13.24	13.59	10.77	11.51	10.61	10.70	15.09	16.20	14.59	14.83	14.86	14.74
Any potentially avoidable hospitalization (all six qualifying conditions)	7.36	7.67	6.61	6.73	5.90	6.73	8.96	10.19	9.05	9.23	9.33	7.92
Any hospitalization (pneumonia)	2.91	3.55	2.78	2.08	1.92	2.29	4.53	5.69	4.09	2.96	3.97	2.46
Any hospitalization (CHF)	1.74	2.12	1.92	2.01	1.62	2.22	1.83	1.88	1.99	2.59	2.46	2.15
Any hospitalization (COPD/asthma)	0.52	0.31	0.40	0.49	0.66	0.31	0.55	0.69	0.92	1.04	0.61	1.04
Any hospitalization (skin infection)	0.65	0.81	0.59	0.55	0.29	0.61	0.27	0.92	0.63	0.47	0.67	0.49
Any hospitalization (dehydration)	0.26	0.12	0.13	0.35	0.44	0.15	0.27	0.28	0.39	0.31	0.34	0.43
Any hospitalization (UTI)	1.68	1.31	1.32	1.53	1.55	1.83	2.06	1.51	1.99	2.28	2.18	2.03
Any hospitalization (sepsis)	—	—	—	—	—	7.87	—	—	—	—	—	7.74
<b>Any ED visit (all-cause)</b>	20.87	16.27	16.85	17.41	17.69	17.43	27.62	26.62	26.51	27.28	28.21	27.40
Any potentially avoidable ED visit	10.66	7.67	8.92	9.02	8.47	9.48	16.42	16.48	16.05	17.01	16.42	15.23
Any potentially avoidable ED visit (all six qualifying conditions)	2.00	1.68	1.92	1.87	1.92	3.13	5.53	5.28	4.72	6.33	6.09	5.34
Any ED visit (pneumonia)	0.26	0.37	0.26	0.42	0.37	0.54	1.10	1.06	0.97	1.35	1.17	1.04
Any ED visit (CHF)	0.13	0.00	0.00	0.07	0.22	0.23	0.50	0.46	0.63	0.57	0.73	0.61
Any ED visit (COPD/asthma)	0.26	0.25	0.20	0.07	0.15	0.23	1.01	0.78	0.49	0.83	0.61	0.98
Any ED visit (skin infection)	0.26	0.19	0.26	0.21	0.15	0.23	0.32	0.32	0.58	0.21	0.45	0.37
Any ED visit (dehydration)	0.06	0.19	0.26	0.21	0.15	0.08	0.46	0.64	0.39	0.93	0.61	0.68
Any ED visit (UTI)	1.16	0.81	0.93	0.97	0.88	1.83	2.61	2.39	2.14	2.80	2.91	2.33

(continued)

**Table O-5. MOQI (Missouri): Utilization by service type, FY 2014–FY 2019 (continued)**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Any acute care transition (all-cause)</b>	40.57	36.85	33.97	36.06	36.85	34.94	44.12	45.30	42.85	44.61	45.25	45.09
Any potentially avoidable acute care transition	21.32	19.70	17.78	18.31	17.46	17.81	27.07	28.13	25.78	27.59	26.59	25.61
Any potentially avoidable acute care transition (all six qualifying conditions)	8.79	9.04	7.93	8.04	7.44	9.40	13.21	14.00	12.31	14.06	13.02	11.61
Any acute care transition (pneumonia)	3.10	3.80	2.97	2.43	2.28	2.75	5.17	6.52	4.86	3.73	4.64	3.38
Any acute care transition (CHF)	1.81	2.12	1.92	2.08	1.69	2.45	2.15	2.11	2.43	3.11	2.96	2.64
Any acute care transition (COPD/asthma)	0.78	0.56	0.59	0.55	0.74	0.54	1.42	1.33	1.22	1.76	0.95	1.72
Any acute care transition (skin infection)	0.90	1.00	0.79	0.76	0.44	0.84	0.59	1.19	1.02	0.67	1.06	0.80
Any acute care transition (dehydration)	0.26	0.31	0.40	0.55	0.59	0.23	0.69	0.92	0.78	1.19	0.95	1.04
Any acute care transition (UTI)	2.71	2.06	2.25	2.43	2.36	3.67	4.44	3.67	3.79	4.72	4.64	4.05

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table O-6. NY-RAH (New York): Utilization by service type, FY 2014–FY 2019**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	3,906	3,598	3,328	3,403	3,499	3,510	4,424	4,284	4,101	3,912	3,696	3,640
Mean exposure (days)	243.42	239.56	231.71	226.70	227.54	221.91	248.09	246.79	251.03	246.76	242.31	243.72
<b>Any hospitalization (all-cause)</b>	30.65	29.54	28.22	27.80	28.24	26.55	26.18	27.57	26.04	23.77	26.30	25.11
Any potentially avoidable hospitalization	12.93	11.12	10.88	10.67	10.86	10.43	11.57	11.76	10.10	9.20	10.96	10.00
Any potentially avoidable hospitalization (all six qualifying conditions)	7.37	6.31	6.46	6.05	5.89	5.36	7.14	7.21	6.14	5.09	5.60	5.80
Any hospitalization (pneumonia)	2.79	2.53	2.37	1.91	2.09	1.88	2.71	2.96	2.41	1.51	2.27	2.25
Any hospitalization (CHF)	1.61	1.00	1.32	1.38	1.40	1.42	1.88	1.56	1.51	1.46	1.54	1.37
Any hospitalization (COPD/asthma)	0.64	0.69	0.36	0.82	0.46	0.37	0.68	0.58	0.41	0.61	0.30	0.44
Any hospitalization (skin infection)	0.74	0.69	0.45	0.26	0.40	0.26	0.47	0.56	0.44	0.33	0.43	0.47
Any hospitalization (dehydration)	0.23	0.11	0.51	0.50	0.20	0.26	0.25	0.26	0.41	0.31	0.27	0.25
Any hospitalization (UTI)	1.95	1.67	1.71	1.50	1.63	1.48	1.54	1.68	1.27	1.12	1.06	1.37
Any hospitalization (sepsis)	—	—	—	—	—	9.12	—	—	—	—	—	8.79
<b>Any ED visit (all-cause)</b>	15.59	16.65	14.78	16.16	16.78	17.01	18.20	20.49	17.82	17.08	17.94	18.65
Any potentially avoidable ED visit	7.12	7.84	7.06	7.96	7.95	8.23	8.93	11.25	9.75	8.79	9.66	9.23
Any potentially avoidable ED visit (all six qualifying conditions)	1.51	1.22	1.44	1.41	1.00	1.65	2.06	2.57	2.12	1.87	2.27	2.25
Any ED visit (pneumonia)	0.13	0.17	0.09	0.24	0.20	0.17	0.25	0.54	0.22	0.13	0.24	0.22
Any ED visit (CHF)	0.03	0.11	0.03	0.00	0.09	0.11	0.20	0.12	0.12	0.13	0.22	0.11
Any ED visit (COPD/asthma)	0.18	0.06	0.12	0.12	0.06	0.09	0.20	0.21	0.22	0.13	0.14	0.36
Any ED visit (skin infection)	0.28	0.08	0.12	0.12	0.03	0.11	0.20	0.23	0.10	0.20	0.16	0.22
Any ED visit (dehydration)	0.20	0.11	0.21	0.09	0.11	0.09	0.20	0.37	0.24	0.15	0.41	0.11
Any ED visit (UTI)	0.69	0.69	0.90	0.85	0.51	1.08	1.08	1.14	1.22	1.12	1.14	1.24

(continued)

**Table O-6. NY-RAH (New York): Utilization by service type, FY 2014–FY 2019 (continued)**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Any acute care transition (all-cause)</b>	38.43	38.77	35.97	37.14	37.15	35.73	36.28	38.98	36.19	34.10	36.58	35.38
Any potentially avoidable acute care transition	18.46	17.57	16.68	17.19	17.06	16.55	18.58	20.52	17.92	16.72	18.80	17.01
Any potentially avoidable acute care transition (all six qualifying conditions)	8.47	7.34	7.57	7.23	6.66	6.61	8.79	9.20	7.83	6.75	7.49	7.55
Any acute care transition (pneumonia)	2.92	2.70	2.43	2.09	2.26	2.05	2.92	3.38	2.63	1.61	2.49	2.42
Any acute care transition (CHF)	1.64	1.08	1.32	1.38	1.49	1.54	2.06	1.63	1.61	1.58	1.70	1.46
Any acute care transition (COPD/asthma)	0.79	0.75	0.45	0.91	0.51	0.43	0.88	0.75	0.56	0.74	0.41	0.71
Any acute care transition (skin infection)	0.97	0.78	0.57	0.38	0.43	0.37	0.63	0.75	0.51	0.51	0.57	0.69
Any acute care transition (dehydration)	0.44	0.22	0.72	0.59	0.31	0.34	0.43	0.63	0.66	0.46	0.68	0.36
Any acute care transition (UTI)	2.53	2.25	2.58	2.32	2.09	2.34	2.55	2.64	2.44	2.20	2.16	2.53

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table O-7. OPTIMISTIC (Indiana): Utilization by service type, FY 2014–FY 2019**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,987	1,979	1,877	1,813	1,656	1,527	2,264	2,242	2,154	2,149	1,966	1,800
Mean exposure (days)	233.64	225.47	229.34	234.00	230.77	235.13	239.03	236.37	244.13	236.37	237.81	242.91
<b>Any hospitalization (all-cause)</b>	24.26	23.85	23.02	25.10	25.48	25.34	24.47	26.09	25.02	23.22	26.25	25.89
Any potentially avoidable hospitalization	10.17	10.36	10.55	11.75	10.99	13.03	12.59	13.20	12.40	10.84	12.46	13.06
Any potentially avoidable hospitalization (all six qualifying conditions)	5.03	5.05	5.11	6.07	5.80	6.35	6.67	7.54	7.01	6.00	6.97	6.89
Any hospitalization (pneumonia)	2.47	2.02	1.92	2.10	1.93	2.49	3.14	3.75	2.79	1.77	2.80	2.89
Any hospitalization (CHF)	0.81	1.01	1.07	1.32	1.33	2.62	1.50	1.74	1.72	1.68	1.98	1.78
Any hospitalization (COPD/asthma)	0.40	0.25	0.21	0.99	0.54	0.33	0.57	0.58	1.07	1.02	0.92	0.44
Any hospitalization (skin infection)	0.25	0.35	0.32	0.39	0.30	0.20	0.31	0.49	0.23	0.28	0.25	0.56
Any hospitalization (dehydration)	0.05	0.25	0.32	0.17	0.60	0.39	0.09	0.13	0.09	0.28	0.20	0.33
Any hospitalization (UTI)	1.31	1.67	1.33	1.43	1.33	0.98	1.41	1.52	1.53	1.30	1.32	1.28
Any hospitalization (sepsis)	—	—	—	—	—	5.57	—	—	—	—	—	6.72
<b>Any ED visit (all-cause)</b>	18.52	17.79	19.50	16.16	18.78	20.83	22.79	21.90	23.03	21.96	24.26	24.11
Any potentially avoidable ED visit	10.47	9.85	10.44	8.55	10.08	11.46	12.54	12.53	13.74	11.73	14.24	14.06
Any potentially avoidable ED visit (all six qualifying conditions)	2.87	2.43	2.34	2.15	2.42	2.75	4.55	4.28	4.13	2.84	3.56	4.50
Any ED visit (pneumonia)	0.40	0.35	0.32	0.39	0.24	0.20	0.93	0.94	0.84	0.33	0.41	0.33
Any ED visit (CHF)	0.10	0.20	0.27	0.11	0.06	0.26	0.35	0.58	0.70	0.33	0.41	0.56
Any ED visit (COPD/asthma)	0.35	0.10	0.27	0.33	0.30	0.33	0.53	0.58	0.60	0.14	0.41	0.83
Any ED visit (skin infection)	0.35	0.15	0.11	0.11	0.24	0.26	0.53	0.36	0.37	0.23	0.25	0.28
Any ED visit (dehydration)	0.10	0.05	0.16	0.22	0.18	0.07	0.53	0.36	0.28	0.33	0.41	0.39
Any ED visit (UTI)	1.61	1.57	1.28	1.10	1.39	1.70	1.90	1.65	1.67	1.49	1.83	2.33

(continued)

**Table O-7. OPTIMISTIC (Indiana): Utilization by service type, FY 2014–FY 2019 (continued)**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Any acute care transition (all-cause)</b>	34.78	34.26	35.54	34.47	36.65	37.13	36.57	37.51	37.74	35.78	39.88	38.39
Any potentially avoidable acute care transition	18.52	17.99	19.13	18.75	19.08	21.81	21.64	21.86	22.38	19.31	23.14	23.11
Any potentially avoidable acute care transition (all six qualifying conditions)	7.25	6.97	7.30	7.83	7.91	8.64	10.03	10.12	9.89	8.19	9.61	9.94
Any acute care transition (pneumonia)	2.72	2.32	2.24	2.43	2.17	2.62	3.71	4.15	3.30	1.95	3.00	3.11
Any acute care transition (CHF)	0.86	1.21	1.33	1.43	1.39	2.75	1.68	2.05	2.09	1.86	2.29	2.00
Any acute care transition (COPD/asthma)	0.55	0.30	0.48	1.16	0.85	0.65	1.10	1.03	1.53	1.12	1.22	1.17
Any acute care transition (skin infection)	0.55	0.51	0.43	0.50	0.48	0.46	0.80	0.76	0.60	0.47	0.51	0.78
Any acute care transition (dehydration)	0.15	0.30	0.48	0.39	0.79	0.46	0.62	0.49	0.37	0.60	0.61	0.72
Any acute care transition (UTI)	2.72	3.03	2.56	2.43	2.66	2.62	3.22	3.08	3.11	2.79	3.05	3.50

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table O-8. RAVEN (Pennsylvania): Utilization by service type, FY 2014–FY 2019**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,607	1,622	1,600	1,536	1,485	1,402	1,771	1,759	1,789	1,696	1,625	1,561
Mean exposure (days)	260.66	265.60	273.72	271.54	268.82	272.62	250.92	252.01	250.24	248.76	254.21	255.83
<b>Any hospitalization (all-cause)</b>	23.96	23.37	22.69	22.92	21.01	21.26	27.10	27.40	27.39	25.35	26.46	26.71
Any potentially avoidable hospitalization	11.33	10.11	9.31	9.77	9.56	11.13	13.50	12.62	13.75	11.08	12.49	11.66
Any potentially avoidable hospitalization (all six qualifying conditions)	7.28	5.80	4.69	5.08	5.79	5.49	8.13	8.41	7.43	6.60	7.45	6.73
Any hospitalization (pneumonia)	4.23	2.59	1.81	2.15	2.56	2.64	3.56	3.75	3.24	2.12	3.20	2.88
Any hospitalization (CHF)	1.12	1.23	0.50	1.11	1.28	1.28	1.75	2.44	1.84	1.59	2.09	2.18
Any hospitalization (COPD/asthma)	0.44	0.43	0.50	0.65	0.54	0.43	1.02	0.63	0.50	1.00	0.55	0.32
Any hospitalization (skin infection)	0.12	0.25	0.38	0.33	0.40	0.21	0.62	0.51	0.39	0.24	0.37	0.38
Any hospitalization (dehydration)	0.06	0.06	0.50	0.13	0.13	0.29	0.23	0.17	0.50	0.41	0.25	0.26
Any hospitalization (UTI)	1.93	1.91	1.19	1.11	1.28	0.93	1.98	1.65	1.57	1.36	1.23	1.15
Any hospitalization (sepsis)	—	—	—	—	—	6.21	—	—	—	—	—	8.78
<b>Any ED visit (all-cause)</b>	18.42	17.63	16.69	19.27	17.64	18.12	17.28	19.95	18.61	18.46	18.15	17.94
Any potentially avoidable ED visit	8.90	8.69	9.25	10.09	9.23	9.06	8.81	10.18	9.11	8.61	9.11	8.65
Any potentially avoidable ED visit (all six qualifying conditions)	2.74	2.84	2.50	3.26	2.83	2.57	2.26	3.52	2.68	2.48	3.02	2.82
Any ED visit (pneumonia)	0.75	0.74	0.50	0.65	0.67	0.78	0.11	0.40	0.45	0.35	0.31	0.38
Any ED visit (CHF)	0.44	0.25	0.31	0.65	0.27	0.29	0.11	0.11	0.17	0.29	0.25	0.13
Any ED visit (COPD/asthma)	0.25	0.25	0.31	0.13	0.27	0.07	0.17	0.23	0.17	0.41	0.18	0.13
Any ED visit (skin infection)	0.25	0.25	0.25	0.33	0.13	0.36	0.23	0.23	0.11	0.06	0.12	0.45
Any ED visit (dehydration)	0.31	0.06	0.25	0.07	0.00	0.07	0.34	0.51	0.11	0.24	0.12	0.06
Any ED visit (UTI)	0.87	1.29	1.06	1.50	1.62	1.07	1.41	2.16	1.73	1.30	2.09	1.79

(continued)

**Table O-8. RAVEN (Pennsylvania): Utilization by service type, FY 2014–FY 2019 (continued)**

(percentage of residents per year)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Any acute care transition (all-cause)</b>	33.17	33.17	31.56	33.46	30.77	31.46	35.69	37.81	37.79	35.67	36.31	37.03
Any potentially avoidable acute care transition	17.67	16.46	16.38	17.32	16.77	17.12	19.48	20.52	20.51	17.57	18.58	18.58
Any potentially avoidable acute care transition (all six qualifying conditions)	9.09	7.89	6.69	7.29	7.95	7.20	9.77	11.14	9.73	8.49	9.66	9.35
Any acute care transition (pneumonia)	4.67	3.08	2.06	2.41	2.90	3.00	3.61	4.04	3.63	2.42	3.38	3.20
Any acute care transition (CHF)	1.37	1.36	0.81	1.56	1.41	1.43	1.86	2.44	1.90	1.77	2.34	2.31
Any acute care transition (COPD/asthma)	0.68	0.68	0.81	0.78	0.81	0.43	1.13	0.85	0.67	1.42	0.68	0.45
Any acute care transition (skin infection)	0.37	0.37	0.63	0.65	0.54	0.50	0.79	0.74	0.50	0.29	0.49	0.83
Any acute care transition (dehydration)	0.37	0.12	0.63	0.20	0.13	0.36	0.56	0.63	0.61	0.65	0.37	0.32
Any acute care transition (UTI)	2.61	3.14	2.25	2.41	2.83	2.07	3.16	3.70	3.24	2.59	3.14	2.95

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays.

## **APPENDIX P**

### **DESCRIPTIVE ANALYSIS OF UTILIZATION (RATE)**

In this appendix, we present summary results from a descriptive analysis of utilization rates, reporting the number of events per 1,000 Initiative-eligible resident-days, including hospitalizations, emergency department visits, and acute care transitions, for all-cause, potentially avoidable, and the six qualifying conditions aggregated and separately. **Table P-1** presents the results from the national comparison group. **Tables P-2** through **P-8** present the results by intervention group (Clinical + Payment and Payment-Only), combined across all ECCPs, and then separately for each ECCP. **Figures P-1** through **P-7** are descriptive trend graphs for the all-cause acute care transitions measure. Each graph shows the Clinical + Payment and Payment-Only for each ECCP, along with the national comparison group.

**Table P-1. National comparison group: Utilization by service type, FY 2014–FY 2019**  
(rate per 1,000 Initiative-eligible resident-days)

Event	National comparison group					
	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	728,716	683,120	666,154	646,925	625,193	592,937
Mean exposure (days)	246.892	241.756	245.624	242.917	242.483	244.191
<b>Hospitalizations (all-cause)</b>	1.878	1.971	1.890	1.957	1.987	1.965
Potentially avoidable hospitalizations	0.777	0.786	0.734	0.745	0.746	0.723
Potentially avoidable hospitalizations (all six qualifying conditions)	0.479	0.481	0.443	0.447	0.442	0.423
Hospitalizations (pneumonia)	0.201	0.202	0.173	0.147	0.166	0.153
Hospitalizations (CHF)	0.084	0.087	0.083	0.094	0.095	0.097
Hospitalizations (COPD/asthma)	0.044	0.044	0.038	0.061	0.040	0.035
Hospitalizations (skin infection)	0.032	0.031	0.027	0.026	0.025	0.024
Hospitalizations (dehydration)	0.012	0.011	0.019	0.019	0.019	0.018
Hospitalizations (UTI)	0.107	0.107	0.103	0.100	0.097	0.095
Hospitalizations (sepsis)	—	—	—	—	—	0.449
<b>ED visits (all-cause)</b>	1.600	1.719	1.722	1.762	1.826	1.831
Potentially avoidable ED visits	0.753	0.812	0.805	0.815	0.837	0.834
Potentially avoidable ED visits (all six qualifying conditions)	0.232	0.256	0.249	0.258	0.266	0.261
ED visits (pneumonia)	0.044	0.051	0.045	0.045	0.047	0.044
ED visits (CHF)	0.021	0.023	0.023	0.025	0.027	0.026
ED visits (COPD/asthma)	0.025	0.028	0.028	0.028	0.030	0.029
ED visits (skin infection)	0.020	0.021	0.016	0.017	0.018	0.018
ED visits (dehydration)	0.020	0.022	0.023	0.023	0.023	0.021
ED visits (UTI)	0.101	0.111	0.114	0.119	0.121	0.122
<b>Acute care transitions (all-cause)</b>	3.502	3.711	3.634	3.742	3.836	3.817
Potentially avoidable acute care transitions	1.538	1.605	1.545	1.566	1.590	1.563
Potentially avoidable acute care transitions (all six qualifying conditions)	0.713	0.739	0.694	0.707	0.711	0.686
Acute care transitions (pneumonia)	0.246	0.253	0.219	0.192	0.214	0.197
Acute care transitions (CHF)	0.105	0.111	0.107	0.120	0.123	0.123
Acute care transitions (COPD/asthma)	0.069	0.072	0.066	0.090	0.070	0.064
Acute care transitions (skin infection)	0.052	0.052	0.043	0.043	0.043	0.043
Acute care transitions (dehydration)	0.033	0.033	0.042	0.043	0.042	0.040
Acute care transitions (UTI)	0.208	0.219	0.218	0.219	0.219	0.218

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table P-2. All ECCPs (all states): Utilization by service type, FY 2014–FY 2019**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	12,581	12,346	11,787	11,494	10,622	10,151	14,504	14,187	13,695	13,100	11,986	11,078
Mean exposure (days)	248.949	245.556	247.988	244.058	238.306	240.049	247.989	245.714	251.385	247.254	244.856	246.811
<b>Hospitalizations (all-cause)</b>	1.744	1.707	1.623	1.658	1.765	1.707	1.621	1.688	1.528	1.488	1.599	1.584
Potentially avoidable hospitalizations	0.629	0.593	0.539	0.547	0.570	0.590	0.648	0.651	0.565	0.538	0.584	0.572
Potentially avoidable hospitalizations (all six qualifying conditions)	0.338	0.318	0.279	0.285	0.296	0.303	0.377	0.390	0.320	0.291	0.318	0.313
Hospitalizations (pneumonia)	0.144	0.135	0.103	0.091	0.107	0.110	0.158	0.175	0.125	0.090	0.118	0.114
Hospitalizations (CHF)	0.062	0.060	0.055	0.065	0.068	0.085	0.083	0.080	0.070	0.074	0.086	0.084
Hospitalizations (COPD/asthma)	0.026	0.024	0.020	0.036	0.026	0.021	0.033	0.030	0.027	0.042	0.026	0.023
Hospitalizations (skin infection)	0.022	0.020	0.018	0.015	0.015	0.013	0.021	0.025	0.017	0.014	0.017	0.018
Hospitalizations (dehydration)	0.006	0.008	0.016	0.014	0.014	0.012	0.010	0.009	0.016	0.012	0.011	0.012
Hospitalizations (UTI)	0.079	0.072	0.068	0.065	0.065	0.061	0.072	0.071	0.064	0.060	0.060	0.062
Hospitalizations (sepsis)	—	—	—	—	—	0.398	—	—	—	—	—	0.365
<b>ED visits (all-cause)</b>	1.039	1.039	1.026	1.056	1.105	1.146	1.256	1.349	1.246	1.236	1.314	1.341
Potentially avoidable ED visits	0.457	0.468	0.449	0.461	0.482	0.495	0.573	0.635	0.594	0.553	0.604	0.600
Potentially avoidable ED visits (all six qualifying conditions)	0.101	0.100	0.103	0.101	0.094	0.105	0.157	0.171	0.160	0.140	0.159	0.172
ED visits (pneumonia)	0.015	0.014	0.012	0.016	0.016	0.013	0.024	0.032	0.024	0.023	0.023	0.025
ED visits (CHF)	0.008	0.011	0.008	0.009	0.010	0.009	0.014	0.012	0.017	0.015	0.016	0.013
ED visits (COPD/asthma)	0.010	0.009	0.011	0.009	0.008	0.011	0.021	0.021	0.018	0.015	0.015	0.023
ED visits (skin infection)	0.011	0.009	0.007	0.007	0.007	0.008	0.016	0.014	0.013	0.008	0.010	0.015
ED visits (dehydration)	0.007	0.007	0.012	0.007	0.006	0.005	0.014	0.017	0.012	0.013	0.016	0.011
ED visits (UTI)	0.050	0.051	0.054	0.052	0.048	0.060	0.069	0.075	0.076	0.067	0.078	0.084

(continued)

**Table P-2. All ECCPs (all states): Utilization by service type, FY 2014–FY 2019 (continued)**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Acute care transitions (all-cause)</b>	2.799	2.764	2.667	2.724	2.878	2.862	2.891	3.050	2.787	2.736	2.925	2.941
Potentially avoidable acute care transitions	1.090	1.070	0.996	1.009	1.053	1.087	1.225	1.290	1.160	1.094	1.191	1.174
Potentially avoidable acute care transitions (all six qualifying conditions)	0.439	0.419	0.382	0.385	0.390	0.409	0.534	0.562	0.480	0.432	0.477	0.485
Acute care transitions (pneumonia)	0.160	0.148	0.115	0.107	0.123	0.124	0.182	0.207	0.149	0.113	0.141	0.139
Acute care transitions (CHF)	0.069	0.071	0.062	0.073	0.078	0.094	0.097	0.092	0.088	0.089	0.102	0.097
Acute care transitions (COPD/asthma)	0.035	0.033	0.030	0.045	0.033	0.032	0.054	0.051	0.045	0.056	0.041	0.047
Acute care transitions (skin infection)	0.033	0.029	0.025	0.022	0.022	0.021	0.037	0.040	0.030	0.022	0.028	0.034
Acute care transitions (dehydration)	0.013	0.015	0.027	0.022	0.020	0.017	0.024	0.026	0.028	0.025	0.027	0.023
Acute care transitions (UTI)	0.129	0.122	0.122	0.117	0.113	0.121	0.141	0.147	0.141	0.128	0.138	0.146

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table P-3. AQAF (Alabama): Utilization by service type, FY 2014–FY 2019**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	2,391	2,425	2,411	2,218	1,532	1,355	2,072	2,001	1,950	1,814	1,403	1,070
Mean exposure (days)	265.386	259.086	261.713	253.282	225.539	237.379	252.883	258.712	259.134	257.493	251.148	245.502
<b>Hospitalizations (all-cause)</b>	1.625	1.709	1.712	1.809	2.046	1.971	2.038	1.864	1.666	1.666	1.711	1.938
Potentially avoidable hospitalizations	0.689	0.723	0.648	0.650	0.758	0.765	0.928	0.807	0.613	0.638	0.701	0.777
Potentially avoidable hospitalizations (all six qualifying conditions)	0.386	0.401	0.314	0.333	0.394	0.395	0.588	0.510	0.366	0.343	0.400	0.457
Hospitalizations (pneumonia)	0.164	0.180	0.111	0.098	0.148	0.165	0.263	0.238	0.139	0.116	0.125	0.175
Hospitalizations (CHF)	0.080	0.083	0.054	0.077	0.101	0.090	0.113	0.083	0.069	0.058	0.094	0.122
Hospitalizations (COPD/asthma)	0.035	0.038	0.029	0.050	0.023	0.037	0.048	0.042	0.038	0.062	0.051	0.046
Hospitalizations (skin infection)	0.019	0.013	0.011	0.011	0.009	0.009	0.036	0.025	0.016	0.017	0.017	0.019
Hospitalizations (dehydration)	0.008	0.018	0.019	0.018	0.023	0.012	0.023	0.012	0.016	0.006	0.017	0.015
Hospitalizations (UTI)	0.080	0.070	0.090	0.080	0.090	0.081	0.105	0.110	0.089	0.083	0.096	0.080
Hospitalizations (sepsis)	—	—	—	—	—	0.420	—	—	—	—	—	0.358
<b>ED visits (all-cause)</b>	1.201	1.240	1.233	1.175	1.464	1.458	1.498	1.518	1.334	1.295	1.388	1.633
Potentially avoidable ED visits	0.548	0.614	0.588	0.536	0.773	0.703	0.670	0.664	0.645	0.576	0.650	0.807
Potentially avoidable ED visits (all six qualifying conditions)	0.132	0.159	0.162	0.126	0.168	0.143	0.166	0.166	0.182	0.126	0.187	0.225
ED visits (pneumonia)	0.016	0.014	0.019	0.016	0.035	0.006	0.008	0.021	0.018	0.017	0.017	0.023
ED visits (CHF)	0.016	0.029	0.017	0.014	0.017	0.009	0.021	0.015	0.022	0.017	0.031	0.019
ED visits (COPD/asthma)	0.011	0.014	0.016	0.020	0.009	0.028	0.032	0.017	0.028	0.019	0.023	0.019
ED visits (skin infection)	0.008	0.018	0.006	0.005	0.009	0.006	0.017	0.012	0.016	0.004	0.006	0.011
ED visits (dehydration)	0.005	0.014	0.021	0.014	0.014	0.019	0.019	0.014	0.008	0.006	0.023	0.015
ED visits (UTI)	0.077	0.070	0.082	0.057	0.084	0.075	0.069	0.087	0.091	0.062	0.088	0.137

(continued)

**Table P-3. AQAF (Alabama): Utilization by service type, FY 2014–FY 2019 (continued)**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Acute care transitions (all-cause)</b>	2.871	2.997	2.994	2.992	3.528	3.445	3.563	3.400	3.018	2.974	3.119	3.586
Potentially avoidable acute care transitions	1.258	1.367	1.263	1.186	1.537	1.467	1.605	1.476	1.261	1.218	1.359	1.584
Potentially avoidable acute care transitions (all six qualifying conditions)	0.520	0.563	0.475	0.459	0.561	0.538	0.756	0.678	0.550	0.471	0.587	0.681
Acute care transitions (pneumonia)	0.181	0.194	0.130	0.114	0.182	0.171	0.271	0.259	0.156	0.133	0.142	0.198
Acute care transitions (CHF)	0.096	0.113	0.071	0.091	0.119	0.099	0.136	0.099	0.093	0.075	0.125	0.141
Acute care transitions (COPD/asthma)	0.046	0.054	0.044	0.069	0.032	0.065	0.080	0.060	0.065	0.081	0.074	0.065
Acute care transitions (skin infection)	0.027	0.030	0.017	0.016	0.017	0.016	0.053	0.037	0.032	0.021	0.023	0.030
Acute care transitions (dehydration)	0.013	0.032	0.040	0.032	0.038	0.031	0.042	0.027	0.024	0.013	0.040	0.030
Acute care transitions (UTI)	0.158	0.140	0.173	0.137	0.174	0.155	0.174	0.197	0.180	0.148	0.184	0.217

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table P-4. ATOP2 (Nevada/Colorado): Utilization by service type, FY 2014–FY 2019**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment (Nevada)						Payment-Only (Colorado)					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,142	1,118	1,058	1,082	1,093	1,049	1,786	1,722	1,645	1,601	1,506	1,379
Mean exposure (days)	228.233	238.470	248.086	243.494	246.919	250.825	244.968	230.811	240.812	235.470	237.856	246.782
<b>Hospitalizations (all-cause)</b>	1.888	1.984	1.852	1.780	1.964	1.878	1.019	1.069	1.030	1.157	1.061	1.161
Potentially avoidable hospitalizations	0.633	0.604	0.488	0.501	0.593	0.566	0.384	0.395	0.374	0.393	0.371	0.373
Potentially avoidable hospitalizations (all six qualifying conditions)	0.315	0.281	0.210	0.243	0.267	0.285	0.224	0.229	0.204	0.210	0.173	0.206
Hospitalizations (pneumonia)	0.153	0.150	0.080	0.087	0.119	0.110	0.096	0.106	0.098	0.085	0.056	0.076
Hospitalizations (CHF)	0.019	0.011	0.023	0.042	0.052	0.076	0.050	0.038	0.030	0.061	0.053	0.059
Hospitalizations (COPD/asthma)	0.023	0.008	0.015	0.023	0.022	0.027	0.025	0.025	0.005	0.029	0.014	0.003
Hospitalizations (skin infection)	0.031	0.011	0.030	0.011	0.019	0.011	0.021	0.018	0.015	0.003	0.014	0.012
Hospitalizations (dehydration)	0.000	0.008	0.004	0.011	0.011	0.019	0.002	0.005	0.025	0.008	0.006	0.006
Hospitalizations (UTI)	0.088	0.094	0.057	0.068	0.044	0.042	0.030	0.038	0.030	0.024	0.031	0.050
Hospitalizations (sepsis)	—	—	—	—	—	0.475	—	—	—	—	—	0.264
<b>ED visits (all-cause)</b>	1.078	1.328	1.059	1.207	1.223	1.190	1.150	1.223	1.328	1.321	1.270	1.372
Potentially avoidable ED visits	0.541	0.589	0.450	0.528	0.500	0.502	0.530	0.609	0.654	0.552	0.595	0.644
Potentially avoidable ED visits (all six qualifying conditions)	0.096	0.109	0.099	0.129	0.096	0.110	0.185	0.199	0.245	0.180	0.162	0.232
ED visits (pneumonia)	0.031	0.008	0.008	0.019	0.011	0.008	0.050	0.048	0.038	0.050	0.042	0.062
ED visits (CHF)	0.004	0.011	0.000	0.011	0.022	0.011	0.016	0.013	0.023	0.027	0.008	0.012
ED visits (COPD/asthma)	0.008	0.019	0.011	0.000	0.011	0.019	0.016	0.020	0.025	0.013	0.022	0.024
ED visits (skin infection)	0.012	0.008	0.011	0.011	0.011	0.004	0.032	0.033	0.023	0.013	0.020	0.038
ED visits (dehydration)	0.004	0.008	0.011	0.008	0.000	0.000	0.005	0.010	0.030	0.011	0.006	0.009
ED visits (UTI)	0.038	0.056	0.057	0.080	0.041	0.068	0.066	0.075	0.106	0.066	0.064	0.088

(continued)

**Table P-4. ATOP2 (Nevada/Colorado): Utilization by service type, FY 2014–FY 2019 (continued)**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment (Nevada)						Payment-Only (Colorado)					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Acute care transitions (all-cause)</b>	2.981	3.334	2.937	2.999	3.198	3.071	2.192	2.310	2.380	2.504	2.353	2.545
Potentially avoidable acute care transitions	1.174	1.197	0.949	1.029	1.093	1.068	0.917	1.014	1.027	0.950	0.971	1.023
Potentially avoidable acute care transitions (all six qualifying conditions)	0.411	0.390	0.309	0.372	0.363	0.395	0.409	0.430	0.449	0.390	0.335	0.441
Acute care transitions (pneumonia)	0.184	0.158	0.088	0.106	0.130	0.118	0.146	0.153	0.136	0.135	0.098	0.138
Acute care transitions (CHF)	0.023	0.023	0.023	0.053	0.074	0.087	0.066	0.050	0.053	0.088	0.061	0.071
Acute care transitions (COPD/asthma)	0.031	0.026	0.027	0.023	0.033	0.046	0.041	0.045	0.030	0.042	0.036	0.029
Acute care transitions (skin infection)	0.042	0.019	0.042	0.023	0.030	0.015	0.053	0.050	0.038	0.016	0.033	0.050
Acute care transitions (dehydration)	0.004	0.015	0.015	0.019	0.011	0.019	0.007	0.015	0.056	0.019	0.011	0.015
Acute care transitions (UTI)	0.127	0.150	0.114	0.148	0.085	0.110	0.096	0.116	0.136	0.090	0.095	0.138

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado.

**Table P-5. MOQI (Missouri): Utilization by service type, FY 2014–FY 2019**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,548	1,604	1,513	1,442	1,357	1,308	2,187	2,179	2,056	1,928	1,790	1,628
Mean exposure (days)	260.287	248.001	257.777	254.617	249.341	253.667	252.511	247.970	261.814	259.213	250.317	250.273
<b>Hospitalizations (all-cause)</b>	1.737	1.677	1.438	1.465	1.637	1.462	1.722	1.899	1.622	1.713	1.752	1.885
Potentially avoidable hospitalizations	0.658	0.661	0.533	0.517	0.505	0.524	0.750	0.787	0.676	0.714	0.714	0.753
Potentially avoidable hospitalizations (all six qualifying conditions)	0.333	0.370	0.310	0.283	0.281	0.326	0.416	0.481	0.414	0.408	0.437	0.388
Hospitalizations (pneumonia)	0.132	0.156	0.121	0.084	0.077	0.096	0.206	0.252	0.169	0.128	0.163	0.118
Hospitalizations (CHF)	0.074	0.106	0.092	0.084	0.074	0.099	0.081	0.089	0.084	0.112	0.116	0.096
Hospitalizations (COPD/asthma)	0.025	0.015	0.015	0.019	0.038	0.015	0.024	0.028	0.039	0.042	0.025	0.047
Hospitalizations (skin infection)	0.025	0.035	0.023	0.022	0.012	0.027	0.011	0.039	0.024	0.022	0.029	0.020
Hospitalizations (dehydration)	0.010	0.005	0.005	0.014	0.018	0.006	0.011	0.011	0.015	0.012	0.016	0.017
Hospitalizations (UTI)	0.067	0.053	0.054	0.060	0.062	0.081	0.083	0.063	0.084	0.092	0.089	0.091
Hospitalizations (sepsis)	—	—	—	—	—	0.353	—	—	—	—	—	0.346
<b>ED visits (all-cause)</b>	1.072	0.825	0.936	0.921	0.966	0.934	1.709	1.675	1.577	1.751	1.743	1.794
Potentially avoidable ED visits	0.474	0.357	0.385	0.400	0.366	0.422	0.875	0.872	0.825	0.878	0.839	0.815
Potentially avoidable ED visits (all six qualifying conditions)	0.087	0.075	0.074	0.079	0.080	0.124	0.254	0.255	0.217	0.282	0.283	0.258
ED visits (pneumonia)	0.012	0.015	0.010	0.016	0.015	0.021	0.047	0.046	0.041	0.058	0.056	0.044
ED visits (CHF)	0.005	0.000	0.000	0.003	0.012	0.009	0.022	0.019	0.024	0.024	0.029	0.025
ED visits (COPD/asthma)	0.010	0.010	0.008	0.003	0.006	0.009	0.043	0.046	0.019	0.036	0.027	0.047
ED visits (skin infection)	0.010	0.008	0.010	0.008	0.006	0.009	0.013	0.013	0.024	0.008	0.018	0.015
ED visits (dehydration)	0.002	0.008	0.010	0.008	0.006	0.003	0.018	0.028	0.015	0.036	0.025	0.027
ED visits (UTI)	0.047	0.035	0.036	0.041	0.035	0.072	0.110	0.104	0.095	0.120	0.129	0.101

(continued)

**Table P-5. MOQI (Missouri): Utilization by service type, FY 2014–FY 2019 (continued)**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Acute care transitions (all-cause)</b>	2.829	2.511	2.387	2.421	2.619	2.426	3.451	3.583	3.218	3.490	3.513	3.723
Potentially avoidable acute care transitions	1.134	1.021	0.920	0.923	0.875	0.952	1.633	1.660	1.503	1.601	1.560	1.576
Potentially avoidable acute care transitions (all six qualifying conditions)	0.419	0.447	0.385	0.362	0.361	0.449	0.670	0.738	0.632	0.694	0.721	0.648
Acute care transitions (pneumonia)	0.144	0.171	0.131	0.101	0.092	0.118	0.254	0.298	0.210	0.186	0.219	0.162
Acute care transitions (CHF)	0.079	0.106	0.092	0.087	0.086	0.109	0.103	0.107	0.108	0.138	0.145	0.123
Acute care transitions (COPD/asthma)	0.035	0.028	0.023	0.022	0.044	0.024	0.067	0.074	0.058	0.078	0.051	0.093
Acute care transitions (skin infection)	0.035	0.043	0.033	0.030	0.018	0.036	0.024	0.054	0.048	0.030	0.047	0.034
Acute care transitions (dehydration)	0.012	0.013	0.015	0.022	0.024	0.009	0.029	0.039	0.030	0.048	0.040	0.044
Acute care transitions (UTI)	0.114	0.088	0.090	0.101	0.098	0.154	0.194	0.167	0.178	0.214	0.219	0.191

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table P-6. NY-RAH (New York): Utilization by service type, FY 2014–FY 2019**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	3,906	3,598	3,328	3,403	3,499	3,510	4,424	4,284	4,101	3,912	3,696	3,640
Mean exposure (days)	243.418	239.558	231.711	226.703	227.544	221.910	248.091	246.792	251.027	246.760	242.311	243.724
<b>Hospitalizations (all-cause)</b>	2.040	1.915	1.914	1.880	1.953	1.873	1.675	1.736	1.544	1.448	1.697	1.528
Potentially avoidable hospitalizations	0.661	0.559	0.564	0.552	0.575	0.544	0.574	0.584	0.488	0.444	0.535	0.479
Potentially avoidable hospitalizations (all six qualifying conditions)	0.361	0.305	0.329	0.297	0.296	0.272	0.337	0.341	0.272	0.233	0.262	0.272
Hospitalizations (pneumonia)	0.128	0.116	0.117	0.091	0.103	0.087	0.119	0.132	0.103	0.063	0.105	0.098
Hospitalizations (CHF)	0.075	0.050	0.069	0.066	0.068	0.074	0.091	0.076	0.066	0.066	0.068	0.065
Hospitalizations (COPD/asthma)	0.026	0.032	0.022	0.039	0.024	0.017	0.030	0.027	0.017	0.029	0.012	0.019
Hospitalizations (skin infection)	0.033	0.030	0.021	0.012	0.019	0.012	0.021	0.024	0.017	0.015	0.018	0.019
Hospitalizations (dehydration)	0.009	0.005	0.022	0.022	0.009	0.012	0.011	0.010	0.017	0.012	0.011	0.011
Hospitalizations (UTI)	0.089	0.072	0.079	0.067	0.074	0.071	0.065	0.072	0.051	0.048	0.048	0.059
Hospitalizations (sepsis)	—	—	—	—	—	0.507	—	—	—	—	—	0.429
<b>ED visits (all-cause)</b>	0.878	0.934	0.901	1.038	1.089	1.123	1.019	1.207	1.034	0.956	1.163	1.100
Potentially avoidable ED visits	0.342	0.384	0.354	0.438	0.435	0.463	0.424	0.566	0.458	0.421	0.488	0.442
Potentially avoidable ED visits (all six qualifying conditions)	0.062	0.051	0.066	0.069	0.044	0.077	0.091	0.109	0.088	0.078	0.096	0.098
ED visits (pneumonia)	0.005	0.007	0.004	0.010	0.009	0.009	0.010	0.022	0.009	0.005	0.010	0.010
ED visits (CHF)	0.001	0.005	0.001	0.000	0.004	0.005	0.008	0.005	0.006	0.005	0.009	0.005
ED visits (COPD/asthma)	0.007	0.002	0.006	0.005	0.003	0.004	0.009	0.009	0.009	0.005	0.006	0.016
ED visits (skin infection)	0.012	0.003	0.005	0.005	0.001	0.005	0.009	0.009	0.004	0.008	0.007	0.009
ED visits (dehydration)	0.008	0.005	0.009	0.004	0.005	0.004	0.008	0.015	0.010	0.006	0.018	0.005
ED visits (UTI)	0.028	0.029	0.040	0.044	0.023	0.050	0.046	0.048	0.051	0.048	0.047	0.054

(continued)

**Table P-6. NY-RAH (New York): Utilization by service type, FY 2014–FY 2019 (continued)**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Acute care transitions (all-cause)</b>	2.919	2.849	2.818	2.919	3.042	2.997	2.697	2.944	2.579	2.406	2.862	2.633
Potentially avoidable acute care transitions	1.002	0.943	0.918	0.990	1.010	1.008	1.000	1.151	0.946	0.866	1.023	0.921
Potentially avoidable acute care transitions (all six qualifying conditions)	0.423	0.356	0.396	0.366	0.340	0.349	0.428	0.450	0.360	0.311	0.358	0.370
Acute care transitions (pneumonia)	0.134	0.123	0.121	0.101	0.112	0.096	0.129	0.154	0.112	0.068	0.115	0.108
Acute care transitions (CHF)	0.076	0.055	0.070	0.066	0.072	0.080	0.099	0.080	0.072	0.071	0.077	0.070
Acute care transitions (COPD/asthma)	0.034	0.035	0.029	0.044	0.026	0.021	0.039	0.037	0.026	0.034	0.018	0.035
Acute care transitions (skin infection)	0.044	0.034	0.026	0.017	0.020	0.017	0.030	0.033	0.021	0.023	0.025	0.028
Acute care transitions (dehydration)	0.018	0.009	0.031	0.026	0.014	0.015	0.019	0.026	0.026	0.019	0.029	0.016
Acute care transitions (UTI)	0.118	0.101	0.119	0.111	0.097	0.121	0.111	0.120	0.103	0.095	0.095	0.113

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table P-7. OPTIMISTIC (Indiana): Utilization by service type, FY 2014–FY 2019**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,987	1,979	1,877	1,813	1,656	1,527	2,264	2,242	2,154	2,149	1,966	1,800
Mean exposure (days)	233.643	225.474	229.336	234.001	230.766	235.135	239.027	236.370	244.128	236.368	237.810	242.908
<b>Hospitalizations (all-cause)</b>	1.465	1.477	1.364	1.501	1.599	1.601	1.500	1.668	1.485	1.410	1.651	1.523
Potentially avoidable hospitalizations	0.534	0.536	0.511	0.573	0.573	0.668	0.626	0.696	0.609	0.567	0.650	0.636
Potentially avoidable hospitalizations (all six qualifying conditions)	0.252	0.262	0.246	0.292	0.288	0.329	0.325	0.392	0.333	0.297	0.357	0.327
Hospitalizations (pneumonia)	0.123	0.103	0.095	0.092	0.097	0.120	0.142	0.185	0.120	0.085	0.133	0.130
Hospitalizations (CHF)	0.037	0.045	0.051	0.061	0.065	0.125	0.068	0.083	0.086	0.077	0.103	0.085
Hospitalizations (COPD/asthma)	0.022	0.011	0.012	0.047	0.026	0.014	0.030	0.032	0.046	0.053	0.043	0.021
Hospitalizations (skin infection)	0.013	0.016	0.014	0.021	0.013	0.008	0.013	0.021	0.010	0.012	0.011	0.023
Hospitalizations (dehydration)	0.002	0.011	0.014	0.007	0.026	0.017	0.004	0.006	0.004	0.012	0.009	0.014
Hospitalizations (UTI)	0.056	0.076	0.060	0.064	0.060	0.045	0.068	0.066	0.068	0.059	0.060	0.055
Hospitalizations (sepsis)	—	—	—	—	—	0.276	—	—	—	—	—	0.320
<b>ED visits (all-cause)</b>	1.167	1.100	1.185	1.006	1.065	1.278	1.356	1.396	1.335	1.305	1.491	1.569
Potentially avoidable ED visits	0.549	0.527	0.530	0.453	0.510	0.557	0.626	0.657	0.685	0.587	0.764	0.762
Potentially avoidable ED visits (all six qualifying conditions)	0.136	0.114	0.107	0.104	0.118	0.120	0.209	0.206	0.196	0.124	0.165	0.210
ED visits (pneumonia)	0.017	0.016	0.014	0.016	0.010	0.008	0.041	0.045	0.036	0.014	0.017	0.018
ED visits (CHF)	0.004	0.011	0.012	0.005	0.005	0.011	0.017	0.025	0.032	0.014	0.017	0.023
ED visits (COPD/asthma)	0.015	0.004	0.012	0.016	0.013	0.014	0.024	0.028	0.029	0.006	0.017	0.037
ED visits (skin infection)	0.015	0.007	0.005	0.005	0.016	0.011	0.022	0.017	0.015	0.012	0.011	0.011
ED visits (dehydration)	0.004	0.002	0.007	0.009	0.008	0.003	0.022	0.015	0.011	0.014	0.017	0.016
ED visits (UTI)	0.080	0.074	0.058	0.052	0.065	0.072	0.083	0.075	0.072	0.065	0.086	0.105

(continued)

**Table P-7. OPTIMISTIC (Indiana): Utilization by service type, FY 2014–FY 2019 (continued)**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Acute care transitions (all-cause)</b>	2.639	2.600	2.562	2.520	2.677	2.894	2.873	3.098	2.841	2.725	3.161	3.120
Potentially avoidable acute care transitions	1.083	1.069	1.041	1.030	1.083	1.225	1.257	1.361	1.293	1.154	1.416	1.402
Potentially avoidable acute care transitions (all six qualifying conditions)	0.388	0.377	0.353	0.396	0.406	0.448	0.534	0.600	0.529	0.421	0.522	0.537
Acute care transitions (pneumonia)	0.140	0.119	0.109	0.108	0.107	0.128	0.183	0.230	0.156	0.098	0.150	0.149
Acute care transitions (CHF)	0.041	0.056	0.063	0.066	0.071	0.136	0.085	0.108	0.118	0.091	0.120	0.107
Acute care transitions (COPD/asthma)	0.037	0.016	0.023	0.064	0.039	0.028	0.054	0.060	0.074	0.059	0.060	0.057
Acute care transitions (skin infection)	0.028	0.022	0.019	0.026	0.029	0.019	0.035	0.040	0.025	0.024	0.021	0.034
Acute care transitions (dehydration)	0.006	0.013	0.021	0.016	0.034	0.019	0.026	0.021	0.015	0.026	0.026	0.030
Acute care transitions (UTI)	0.136	0.150	0.118	0.115	0.126	0.117	0.152	0.142	0.141	0.124	0.145	0.160

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table P-8. RAVEN (Pennsylvania): Utilization by service type, FY 2014–FY 2019**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,607	1,622	1,600	1,536	1,485	1,402	1,771	1,759	1,789	1,696	1,625	1,561
Mean exposure (days)	260.659	265.601	273.723	271.544	268.822	272.625	250.924	252.012	250.235	248.762	254.209	255.825
<b>Hospitalizations (all-cause)</b>	1.480	1.381	1.265	1.297	1.280	1.342	1.607	1.692	1.716	1.510	1.530	1.595
Potentially avoidable hospitalizations	0.540	0.462	0.402	0.429	0.431	0.536	0.659	0.638	0.670	0.529	0.557	0.556
Potentially avoidable hospitalizations (all six qualifying conditions)	0.332	0.258	0.187	0.218	0.251	0.256	0.389	0.395	0.351	0.292	0.320	0.311
Hospitalizations (pneumonia)	0.181	0.109	0.073	0.089	0.108	0.115	0.146	0.160	0.141	0.088	0.128	0.120
Hospitalizations (CHF)	0.045	0.049	0.021	0.046	0.050	0.060	0.079	0.111	0.083	0.071	0.092	0.108
Hospitalizations (COPD/asthma)	0.017	0.016	0.018	0.024	0.023	0.026	0.047	0.025	0.020	0.047	0.027	0.013
Hospitalizations (skin infection)	0.005	0.009	0.014	0.014	0.018	0.010	0.025	0.023	0.018	0.009	0.015	0.015
Hospitalizations (dehydration)	0.002	0.002	0.018	0.005	0.005	0.010	0.009	0.009	0.022	0.019	0.010	0.010
Hospitalizations (UTI)	0.081	0.072	0.043	0.041	0.048	0.034	0.083	0.068	0.067	0.057	0.048	0.045
Hospitalizations (sepsis)	—	—	—	—	—	0.262	—	—	—	—	—	0.378
<b>ED visits (all-cause)</b>	0.957	0.910	0.849	1.000	0.904	0.958	0.979	1.148	1.061	1.043	0.949	0.947
Potentially avoidable ED visits	0.406	0.392	0.395	0.420	0.383	0.385	0.428	0.474	0.411	0.405	0.392	0.381
Potentially avoidable ED visits (all six qualifying conditions)	0.117	0.111	0.105	0.122	0.115	0.099	0.097	0.158	0.114	0.111	0.126	0.118
ED visits (pneumonia)	0.029	0.028	0.018	0.024	0.025	0.029	0.005	0.018	0.018	0.014	0.012	0.015
ED visits (CHF)	0.019	0.009	0.011	0.024	0.010	0.010	0.005	0.005	0.007	0.012	0.010	0.005
ED visits (COPD/asthma)	0.010	0.009	0.011	0.005	0.010	0.003	0.007	0.014	0.007	0.017	0.010	0.005
ED visits (skin infection)	0.010	0.009	0.009	0.012	0.005	0.013	0.011	0.009	0.004	0.002	0.005	0.018
ED visits (dehydration)	0.014	0.002	0.009	0.002	0.000	0.003	0.014	0.020	0.004	0.009	0.005	0.003
ED visits (UTI)	0.036	0.053	0.046	0.055	0.065	0.042	0.056	0.092	0.074	0.057	0.085	0.073

(continued)

**Table P-8. RAVEN (Pennsylvania): Utilization by service type, FY 2014–FY 2019 (continued)**

(rate per 1,000 Initiative-eligible resident-days)

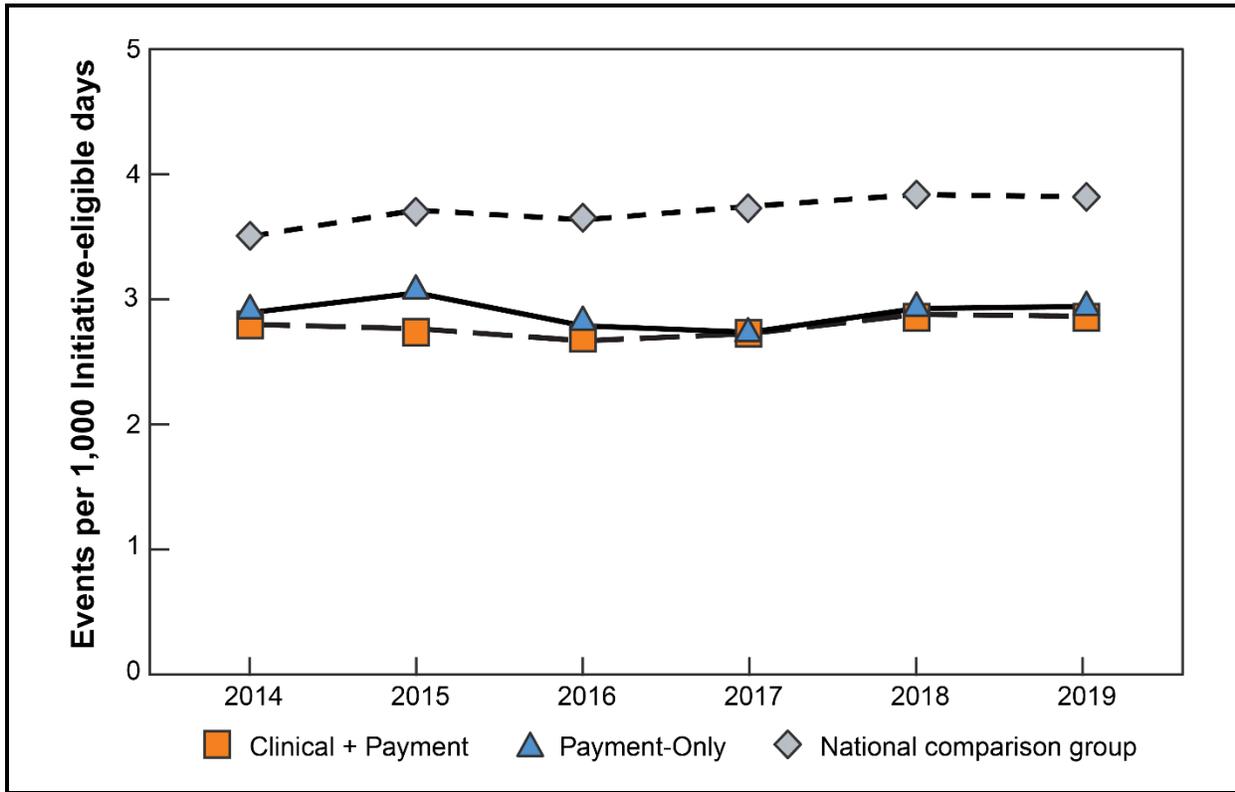
Event	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Acute care transitions (all-cause)</b>	2.449	2.300	2.121	2.302	2.187	2.305	2.595	2.847	2.781	2.553	2.489	2.544
Potentially avoidable acute care transitions	0.945	0.857	0.799	0.849	0.814	0.926	1.089	1.114	1.083	0.934	0.949	0.937
Potentially avoidable acute care transitions (all six qualifying conditions)	0.449	0.369	0.292	0.340	0.366	0.358	0.486	0.553	0.467	0.403	0.445	0.428
Acute care transitions (pneumonia)	0.210	0.137	0.091	0.113	0.133	0.144	0.151	0.178	0.159	0.102	0.140	0.135
Acute care transitions (CHF)	0.064	0.058	0.032	0.070	0.060	0.071	0.083	0.115	0.089	0.083	0.102	0.113
Acute care transitions (COPD/asthma)	0.026	0.026	0.030	0.029	0.033	0.029	0.054	0.038	0.027	0.064	0.036	0.018
Acute care transitions (skin infection)	0.014	0.019	0.023	0.026	0.023	0.024	0.036	0.032	0.022	0.012	0.019	0.033
Acute care transitions (dehydration)	0.017	0.005	0.027	0.007	0.005	0.013	0.023	0.029	0.027	0.028	0.015	0.013
Acute care transitions (UTI)	0.117	0.125	0.089	0.096	0.113	0.078	0.140	0.160	0.143	0.114	0.133	0.118

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

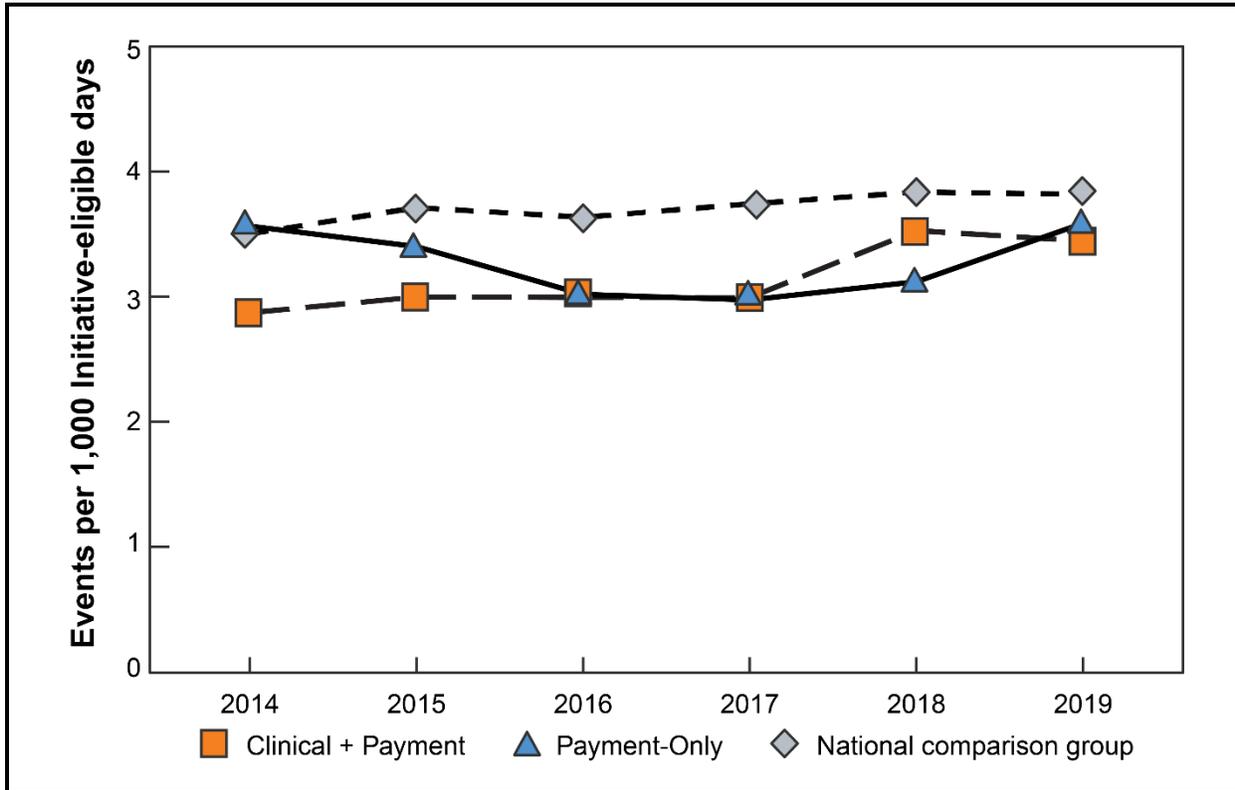
NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

Figure P-1. All ECCPs (all states): All-cause acute care transitions, FY 2014–FY 2019



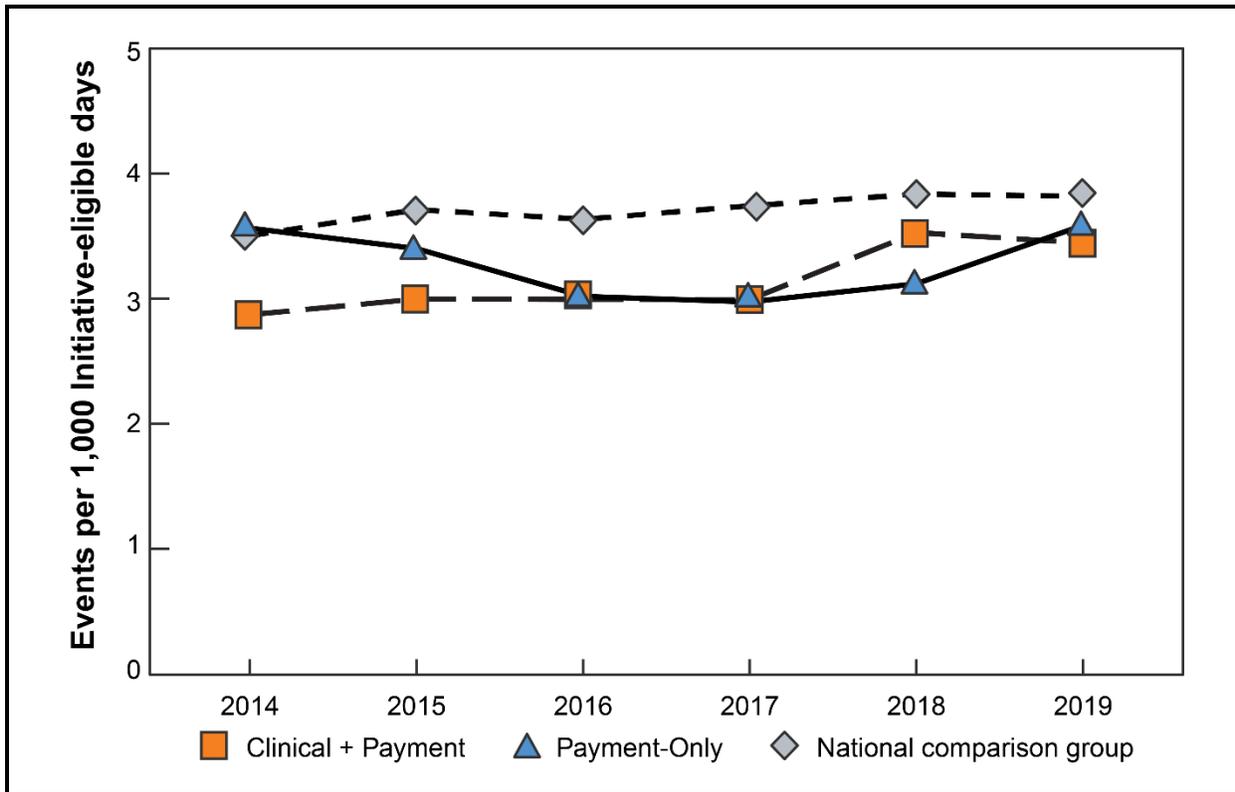
SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

Figure P-2. AQAF (Alabama): All-cause acute care transitions, FY 2014–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

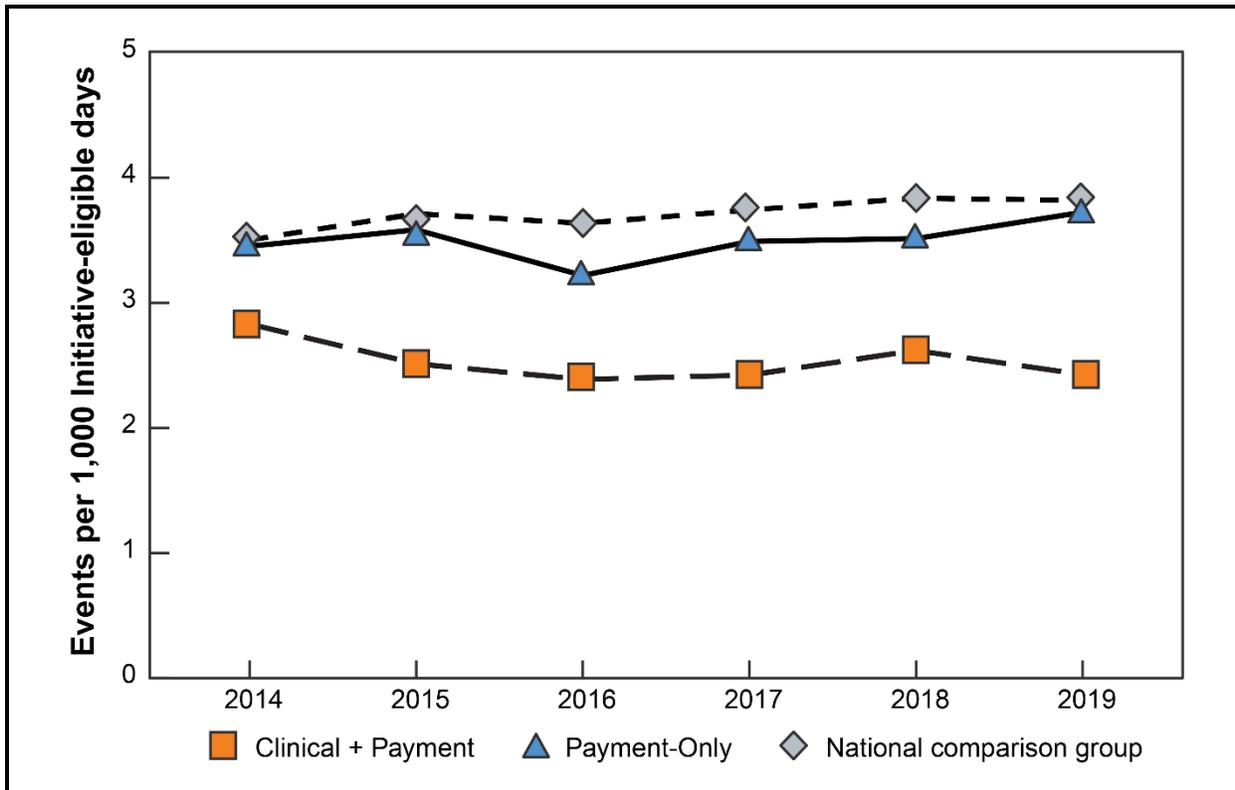
Figure P-3. ATOP2 (Nevada/Colorado): All-cause acute care transitions, FY 2014–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

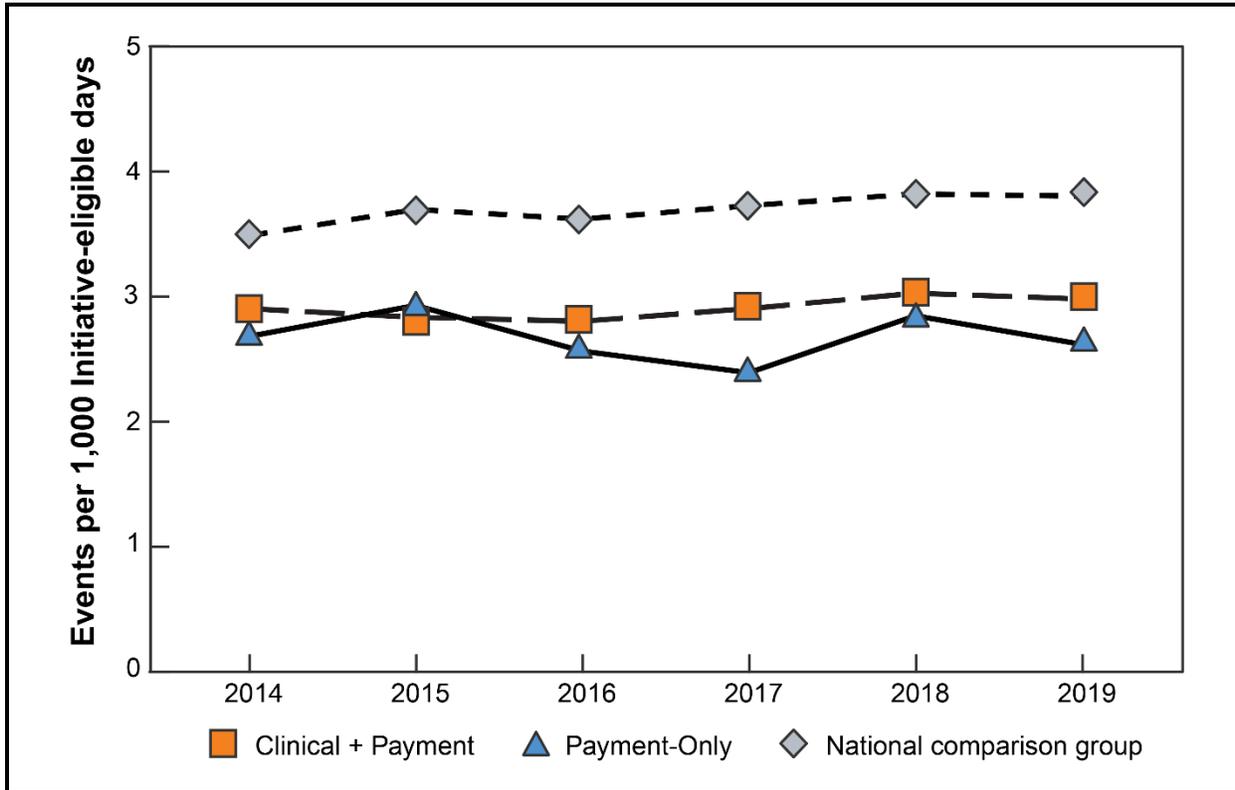
NOTE: ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado.

Figure P-4. MOQI (Missouri): All-cause acute care transitions, FY 2014–FY 2019



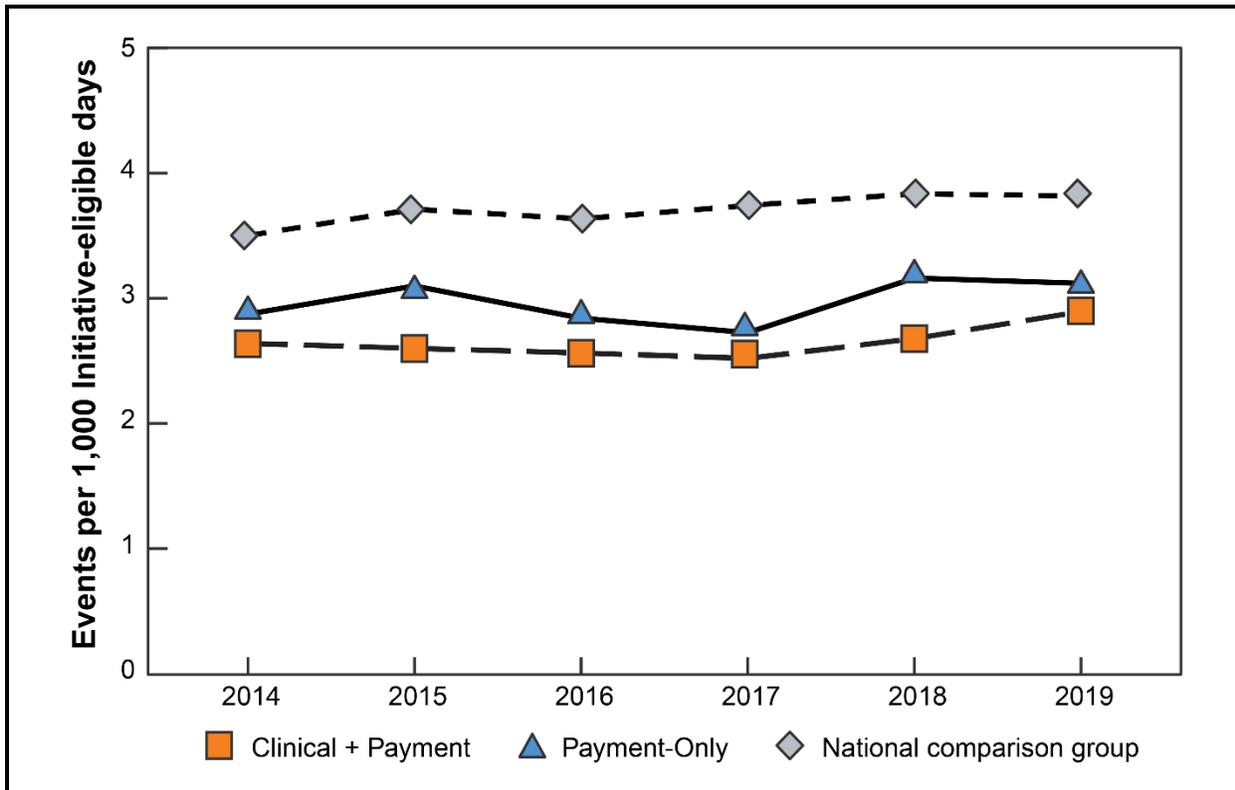
SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

Figure P-5. NY-RAH (New York): All-cause acute care transitions, FY 2014–FY 2019



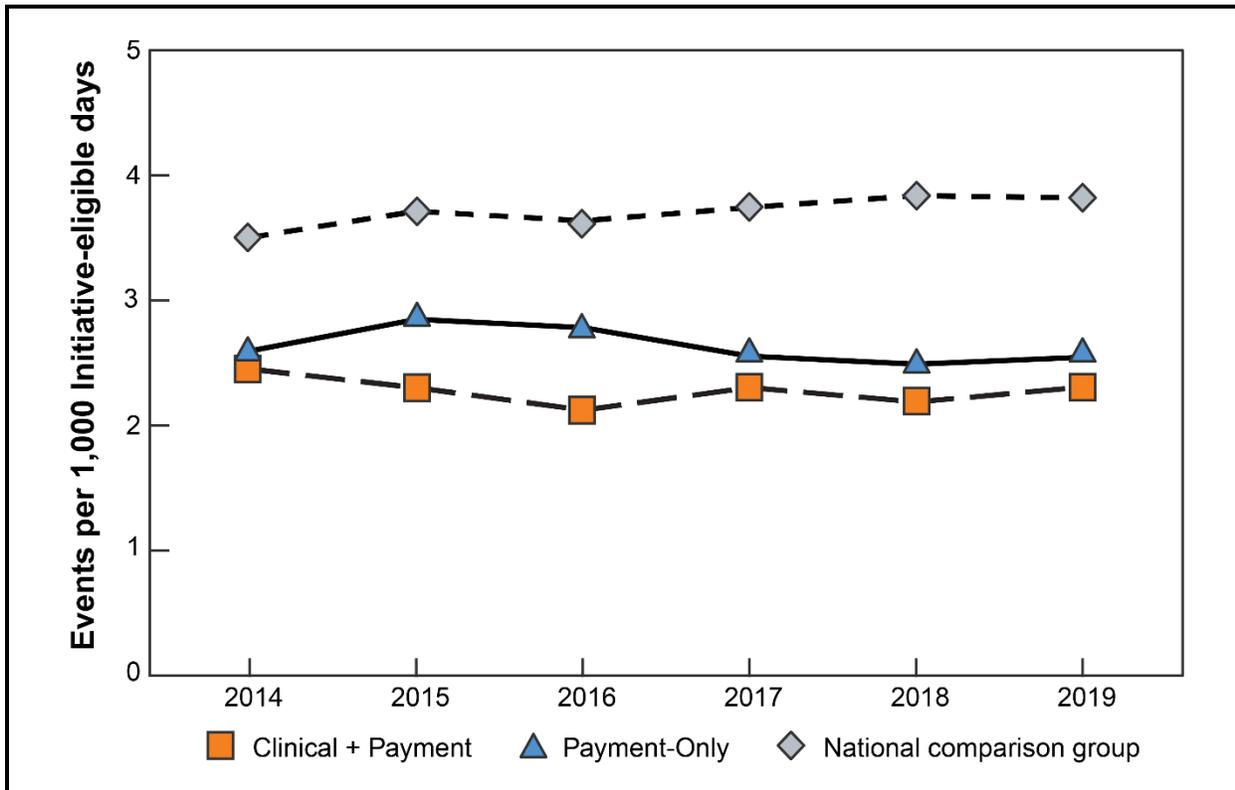
SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

Figure P-6. OPTIMISTIC (Indiana): All-cause acute care transitions, FY 2014–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

Figure P-7. RAVEN (Pennsylvania): All-cause acute care transitions, FY 2014–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

## APPENDIX Q DESCRIPTIVE ANALYSIS OF EXPENDITURES

In this appendix, we present summary results from a descriptive analysis of Medicare expenditures per resident-year (see **Appendix L**), reporting on total Medicare expenditures and expenditures associated with hospitalizations, emergency department visits, and any of these acute care transitions, for all-cause, potentially avoidable, and the six qualifying conditions aggregated and separately. Total expenditures cover all categories of Medicare spending: hospital, physician, skilled nursing facility (SNF), home health, durable medical equipment (DME), lab and other providers and suppliers, hospice, and Part D drugs. **Table Q-1** presents the results from the national comparison group. **Tables Q-2** through **Q-8** present the results by intervention group (Clinical + Payment and Payment-Only), combined across all ECCPs, and then separately for each ECCP.

**Table Q-1. National comparison group: Medicare expenditures, FY 2014–FY 2019**

(dollars, per resident-year)

Measure	National comparison group					
	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	726,789	681,501	664,499	645,452	623,897	591,699
Mean exposure (days)	247.40	242.20	246.10	243.34	242.87	244.58
<b>Total Medicare expenditures</b>	26,560.88	28,144.85	28,247.48	29,596.91	31,161.17	32,571.59
<b>Hospitalizations (all-cause)</b>	7,484.60	7,873.46	7,808.44	8,082.90	8,529.88	8,805.98
Potentially avoidable hospitalizations	2,523.08	2,544.40	2,427.31	2,463.07	2,561.51	2,577.70
Potentially avoidable hospitalizations (all six qualifying conditions)	1,471.31	1,469.40	1,370.12	1,374.59	1,422.12	1,400.50
Hospitalizations (pneumonia)	722.35	705.58	627.36	529.34	615.07	587.31
Hospitalizations (CHF)	258.12	272.41	267.21	318.71	334.42	337.67
Hospitalizations (COPD/asthma)	116.83	118.24	106.01	175.29	114.96	106.22
Hospitalizations (skin infection)	102.86	106.92	88.65	81.54	78.72	77.98
Hospitalizations (dehydration)	26.27	22.42	44.18	44.97	48.69	48.86
Hospitalizations (UTI)	244.88	243.83	236.71	224.75	230.26	242.47
Hospitalizations (sepsis)	—	—	—	—	—	2,525.53
<b>ED visits (all-cause)</b>	341.48	374.46	387.46	415.51	456.77	481.35
Potentially avoidable ED visits	153.74	168.20	171.44	181.17	198.60	207.61
Potentially avoidable ED visits (all six qualifying conditions)	54.86	61.46	63.20	67.60	75.13	77.31
ED visits (pneumonia)	12.47	14.70	13.46	13.85	15.69	15.24
ED visits (CHF)	6.28	6.85	7.09	7.87	9.09	9.35
ED visits (COPD/asthma)	6.31	6.70	6.85	7.38	8.49	8.47
ED visits (skin infection)	3.04	3.43	3.11	3.39	3.83	4.14
ED visits (dehydration)	5.16	5.51	6.12	6.58	6.88	6.45
ED visits (UTI)	21.59	24.27	26.57	28.53	31.16	33.66
<b>Acute care transitions (all-cause)</b>	7,847.46	8,267.13	8,215.54	8,519.91	9,009.50	9,310.55
Potentially avoidable acute care transitions	2,681.88	2,717.34	2,602.50	2,648.48	2,764.69	2,789.30
Potentially avoidable acute care transitions (all six qualifying conditions)	1,527.58	1,532.14	1,434.61	1,443.80	1,499.02	1,479.41
Acute care transitions (pneumonia)	735.00	720.45	640.95	543.39	630.98	602.74
Acute care transitions (CHF)	264.99	279.77	274.73	327.37	344.30	347.72
Acute care transitions (COPD/asthma)	123.22	125.04	112.99	182.79	123.57	114.80
Acute care transitions (skin infection)	106.09	110.45	91.91	84.99	82.64	82.24
Acute care transitions (dehydration)	31.61	28.07	50.47	51.72	55.77	55.44
Acute care transitions (UTI)	266.68	268.36	263.55	253.54	261.75	276.46

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their expenditure to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table Q-2. All ECCPs (all states): Medicare expenditures, FY 2014–FY 2019**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	12,525	12,298	11,734	11,450	10,587	10,110	14,470	14,151	13,662	13,065	11,959	11,055
Mean exposure (days)	249.80	246.29	248.84	244.77	238.89	240.78	248.45	246.16	251.84	247.76	245.23	247.18
<b>Total Medicare expenditures</b>	27,678.67	28,885.45	28,883.06	30,742.65	33,647.65	34,265.16	24,376.11	26,248.84	25,480.21	26,632.61	28,614.36	29,966.40
<b>Hospitalizations (all-cause)</b>	8,663.61	8,380.45	8,199.46	8,465.17	9,564.00	9,680.43	6,819.23	7,120.45	6,575.80	6,365.02	7,178.86	7,550.75
Potentially avoidable hospitalizations	2,392.87	2,206.63	2,060.81	2,108.79	2,375.12	2,542.26	2,093.90	2,152.84	1,895.19	1,833.87	2,009.53	2,110.55
Potentially avoidable hospitalizations (all six qualifying conditions)	1,233.94	1,110.96	999.02	1,056.95	1,182.43	1,220.13	1,132.73	1,217.23	976.68	924.50	996.33	1,056.73
Hospitalizations (pneumonia)	583.00	549.99	451.95	445.85	543.74	540.09	522.82	643.90	441.58	312.23	422.66	431.55
Hospitalizations (CHF)	222.65	207.57	193.17	232.65	285.67	350.62	272.17	249.22	235.38	297.63	296.63	323.53
Hospitalizations (COPD/asthma)	88.73	81.58	58.99	123.06	87.20	77.73	83.74	79.87	73.16	117.59	60.34	60.86
Hospitalizations (skin infection)	95.89	71.99	68.23	50.34	51.35	44.51	60.59	69.05	50.06	37.37	55.58	51.85
Hospitalizations (dehydration)	24.22	18.70	47.20	39.96	39.01	37.44	24.22	16.96	38.64	31.68	31.79	33.84
Hospitalizations (UTI)	219.45	181.14	179.50	165.09	175.47	169.74	169.20	158.23	137.87	127.99	129.33	155.10
Hospitalizations (sepsis)	0.00	0.00	0.00	0.00	0.00	3,110.37	0.00	0.00	0.00	0.00	0.00	2,282.88
<b>ED visits (all-cause)</b>	210.17	224.37	218.09	234.00	256.79	272.10	250.39	266.13	265.29	273.00	313.65	335.23
Potentially avoidable ED visits	90.02	91.89	90.86	91.98	105.34	115.58	111.83	119.54	117.81	114.73	139.20	141.45
Potentially avoidable ED visits (all six qualifying conditions)	22.25	21.12	22.19	22.04	22.70	28.96	33.35	34.63	37.60	33.42	43.89	46.67
ED visits (pneumonia)	4.13	3.25	3.04	3.88	3.97	4.47	5.78	7.69	6.07	6.10	7.20	7.47
ED visits (CHF)	2.43	3.15	1.68	2.30	2.46	2.97	3.54	2.73	5.43	3.70	4.54	4.14
ED visits (COPD/asthma)	2.76	1.75	2.40	2.01	2.38	2.74	5.06	4.11	4.18	3.63	4.22	6.20
ED visits (skin infection)	1.81	1.60	1.12	1.29	1.70	1.33	2.23	2.21	2.81	1.40	2.08	3.70
ED visits (dehydration)	1.28	1.13	2.85	1.52	1.34	1.30	2.94	3.72	3.17	3.55	4.52	3.42
ED visits (UTI)	9.84	10.22	11.10	11.05	10.84	16.15	13.80	14.18	15.94	15.05	21.33	21.74

(continued)

**Table Q-2. All ECCPs (all states): Medicare expenditures, FY 2014–FY 2019 (continued)**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Acute care transitions (all-cause)</b>	8,885.65	8,621.47	8,435.53	8,706.86	9,829.99	9,971.51	7,090.75	7,403.92	6,854.15	6,649.38	7,508.54	7,908.38
Potentially avoidable acute care transitions	2,484.29	2,302.54	2,154.30	2,201.23	2,481.15	2,661.37	2,214.33	2,277.16	2,013.29	1,949.61	2,151.44	2,255.80
Potentially avoidable acute care transitions (all six qualifying conditions)	1,256.23	1,132.35	1,021.22	1,078.99	1,205.13	1,249.25	1,168.85	1,252.35	1,014.47	958.11	1,040.22	1,104.45
Acute care transitions (pneumonia)	587.17	553.24	454.98	449.73	547.71	544.56	528.60	651.58	447.65	318.33	429.85	439.02
Acute care transitions (CHF)	225.08	210.81	194.86	234.95	288.13	353.60	278.47	251.95	240.95	301.39	301.17	328.64
Acute care transitions (COPD/asthma)	91.49	83.52	61.39	125.07	89.58	80.47	88.80	83.98	77.34	121.22	64.56	67.13
Acute care transitions (skin infection)	97.70	73.59	69.35	51.63	53.05	45.83	62.82	71.52	52.87	38.77	57.66	55.55
Acute care transitions (dehydration)	25.49	19.83	50.05	41.48	40.35	38.74	27.16	20.85	41.81	35.23	36.31	37.26
Acute care transitions (UTI)	229.29	191.36	190.59	176.14	186.31	186.05	183.00	172.47	153.85	143.17	150.65	176.84

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table Q-3. AQAF (Alabama): Medicare expenditures, FY 2014–FY 2019**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	2,387	2,423	2,408	2,216	1,531	1,353	2,069	1,999	1,948	1,811	1,403	1,070
Mean exposure (days)	265.78	259.28	261.98	253.48	225.66	237.65	253.19	258.93	259.36	257.82	251.15	245.50
<b>Total Medicare expenditures</b>	21,483.07	23,597.42	24,405.93	25,715.68	29,161.49	28,929.88	23,672.23	24,225.20	23,540.60	25,182.73	25,206.78	27,843.40
<b>Hospitalizations (all-cause)</b>	5,150.01	5,676.80	5,777.62	6,106.51	7,595.87	7,258.64	6,386.22	6,057.46	5,559.36	5,261.03	5,657.36	7,400.08
Potentially avoidable hospitalizations	1,768.76	1,869.20	1,767.50	1,702.05	2,296.29	2,398.06	2,379.26	2,089.89	1,553.00	1,548.64	1,747.68	2,381.36
Potentially avoidable hospitalizations (all six qualifying conditions)	833.98	932.22	714.08	766.18	1,018.03	998.28	1,402.97	1,172.69	806.74	756.39	911.47	1,398.12
Hospitalizations (pneumonia)	389.12	469.24	289.29	270.85	427.99	465.89	701.27	598.27	355.51	312.12	324.06	573.94
Hospitalizations (CHF)	194.04	211.72	135.46	205.07	299.96	255.36	299.48	237.27	186.80	132.86	237.82	447.28
Hospitalizations (COPD/asthma)	63.40	86.86	56.40	96.95	46.70	72.63	97.81	83.04	73.57	122.38	95.41	120.70
Hospitalizations (skin infection)	38.67	21.27	21.95	15.43	15.01	19.28	92.23	51.48	29.14	51.86	48.56	30.06
Hospitalizations (dehydration)	11.93	37.88	58.02	46.64	42.46	30.58	35.59	16.21	23.73	9.87	26.11	55.72
Hospitalizations (UTI)	136.82	105.24	152.96	131.23	185.92	154.53	176.58	186.41	137.98	127.32	179.51	170.43
Hospitalizations (sepsis)	—	—	—	—	—	1,992.88	—	—	—	—	—	1,653.56
<b>ED visits (all-cause)</b>	210.01	213.92	217.18	220.74	256.04	280.27	231.92	248.98	223.21	201.74	249.34	286.91
Potentially avoidable ED visits	93.71	97.80	92.96	80.37	124.45	126.68	98.31	98.14	95.80	94.33	109.93	135.71
Potentially avoidable ED visits (all six qualifying conditions)	23.56	28.05	25.17	20.76	30.74	32.56	27.86	25.78	34.14	24.78	35.91	43.58
ED visits (pneumonia)	2.44	2.27	3.09	2.41	7.29	2.04	1.33	4.30	2.05	2.82	3.68	4.29
ED visits (CHF)	5.57	8.61	3.74	2.93	4.24	5.15	4.12	2.40	7.32	4.14	6.31	6.91
ED visits (COPD/asthma)	2.30	2.37	2.29	3.79	1.04	4.77	6.16	2.93	4.80	2.75	4.00	4.29

(continued)

**Table Q-3. AQAF (Alabama): Medicare expenditures, FY 2014–FY 2019 (continued)**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
ED visits (skin infection)	0.97	2.09	0.72	1.24	0.95	0.33	1.55	1.53	3.39	0.61	0.58	2.20
ED visits (dehydration)	0.59	2.06	3.36	1.99	2.25	5.86	3.38	1.89	1.68	1.81	4.82	1.84
ED visits (UTI)	11.69	10.66	11.97	8.39	14.97	14.40	11.32	12.74	14.91	12.67	16.52	24.05
<b>Acute care transitions (all-cause)</b>	5,391.10	5,913.90	6,019.08	6,332.91	7,856.60	7,557.75	6,646.04	6,312.83	5,787.32	5,473.03	5,910.85	7,697.24
Potentially avoidable acute care transitions	1,869.21	1,978.08	1,867.32	1,782.42	2,423.92	2,524.73	2,498.79	2,189.27	1,649.81	1,645.17	1,859.29	2,517.06
Potentially avoidable acute care transitions (all six qualifying conditions)	857.71	961.13	739.25	786.94	1,048.77	1,030.85	1,449.79	1,199.63	841.89	782.04	947.38	1,441.70
Acute care transitions (pneumonia)	391.73	471.51	292.37	273.26	435.29	467.94	702.61	602.57	357.56	314.94	327.74	578.23
Acute care transitions (CHF)	199.61	220.74	139.21	208.01	304.20	260.51	322.56	239.67	195.13	136.99	244.13	454.19
Acute care transitions (COPD/asthma)	65.70	89.67	58.69	100.74	47.73	77.40	103.97	85.97	78.37	125.13	99.41	124.99
Acute care transitions (skin infection)	39.64	23.36	22.67	16.67	15.96	19.62	93.78	53.01	32.53	52.46	49.14	32.25
Acute care transitions (dehydration)	12.52	39.94	61.38	48.63	44.71	36.44	38.97	19.27	25.41	11.67	30.93	57.56
Acute care transitions (UTI)	148.51	115.91	164.93	139.62	200.89	168.93	187.90	199.15	152.89	140.85	196.03	194.48

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table Q-4. ATOP2 (Nevada/Colorado): Medicare expenditures, FY 2014–FY 2019**

(dollars, per resident-year)

Measure	Clinical + Payment (Nevada)						Payment-Only (Colorado)					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,129	1,108	1,048	1,075	1,085	1,046	1,784	1,719	1,643	1,601	1,505	1,377
Mean exposure (days)	230.25	240.14	249.83	244.61	248.19	251.35	245.17	231.03	241.07	235.47	238.00	247.09
<b>Total Medicare expenditures</b>	28,362.32	30,263.75	31,268.01	32,482.52	32,942.30	35,306.78	18,019.62	18,549.54	19,726.24	21,537.90	22,975.85	24,608.81
<b>Hospitalizations (all-cause)</b>	9,863.88	9,747.97	11,378.23	10,145.37	10,891.06	11,697.97	4,287.95	4,002.88	4,641.07	4,846.56	4,405.78	5,159.16
Potentially avoidable hospitalizations	2,393.65	2,174.50	1,910.68	1,884.47	2,427.76	2,568.59	1,282.09	1,315.59	1,400.06	1,451.45	1,263.87	1,340.00
Potentially avoidable hospitalizations (all six qualifying conditions)	1,168.73	1,000.93	814.33	802.59	1,117.84	1,430.22	673.96	713.63	722.21	659.25	553.23	656.04
Hospitalizations (pneumonia)	633.39	669.69	319.32	340.90	600.53	657.69	302.28	391.68	396.97	276.07	202.22	261.53
Hospitalizations (CHF)	48.68	40.23	59.50	133.39	245.88	431.21	134.91	129.94	84.64	209.65	206.83	216.96
Hospitalizations (COPD/asthma)	75.44	23.58	34.34	87.20	54.22	91.51	85.57	66.75	24.55	91.60	29.48	8.49
Hospitalizations (skin infection)	203.23	38.49	199.43	62.56	88.87	34.75	65.15	41.79	63.04	12.85	39.10	50.82
Hospitalizations (dehydration)	0.00	10.98	10.57	18.86	33.15	75.45	2.84	9.47	71.00	27.93	12.58	12.51
Hospitalizations (UTI)	207.99	217.96	191.17	159.68	95.19	139.61	83.23	74.00	82.01	41.15	63.02	105.74
Hospitalizations (sepsis)	—	—	—	—	—	3,933.71	—	—	—	—	—	1,465.05
<b>ED visits (all-cause)</b>	321.20	418.78	274.96	370.93	340.33	293.68	263.80	268.82	361.79	363.48	344.25	401.69
Potentially avoidable ED visits	140.82	146.04	104.28	128.70	121.47	107.26	113.41	131.58	182.31	153.22	146.94	181.06
Potentially avoidable ED visits (all six qualifying conditions)	33.62	24.59	21.24	36.07	23.65	25.91	44.06	43.19	75.24	58.09	50.12	74.74
ED visits (pneumonia)	13.99	1.17	3.11	4.25	1.49	1.27	16.28	14.68	11.89	17.36	13.90	25.14
ED visits (CHF)	2.49	4.17	0.00	3.12	2.58	1.89	3.24	2.96	8.02	8.08	1.66	4.64
ED visits (COPD/asthma)	2.61	3.78	2.35	0.00	5.68	8.34	4.81	3.23	6.23	4.47	7.61	9.03
ED visits (skin infection)	2.23	1.08	1.77	3.51	4.07	0.25	5.16	5.80	8.12	2.52	5.54	9.86
ED visits (dehydration)	2.46	1.64	2.37	3.67	0.00	0.00	1.08	1.86	8.72	3.54	0.78	2.04
ED visits (UTI)	9.84	12.75	11.64	21.53	9.84	14.17	13.49	14.66	32.25	22.11	20.63	24.02

(continued)

**Table Q-4. ATOP2 (Nevada/Colorado): Medicare expenditures, FY 2014–FY 2019 (continued)**

(dollars, per resident-year)

Measure	Clinical + Payment (Nevada)						Payment-Only (Colorado)					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Acute care transitions (all-cause)</b>	10,196.09	10,239.00	11,673.10	10,529.06	11,271.12	11,993.73	4,587.86	4,314.55	5,044.50	5,226.07	4,777.90	5,577.67
Potentially avoidable acute care transitions	2,534.48	2,320.87	2,020.25	2,013.16	2,549.23	2,675.85	1,401.63	1,473.64	1,582.37	1,606.75	1,424.13	1,531.48
Potentially avoidable acute care transitions (all six qualifying conditions)	1,202.34	1,025.51	835.57	838.66	1,141.49	1,456.13	718.02	757.30	797.45	717.35	603.35	731.33
Acute care transitions (pneumonia)	647.38	670.86	322.43	345.15	602.02	658.95	318.55	406.36	408.86	293.43	216.12	286.67
Acute care transitions (CHF)	51.17	44.40	59.50	136.50	248.46	433.09	138.15	132.90	92.66	217.73	208.49	221.60
Acute care transitions (COPD/asthma)	78.05	27.36	36.69	87.20	59.89	99.85	90.38	69.99	30.78	96.07	37.08	18.07
Acute care transitions (skin infection)	205.46	39.57	201.20	66.07	92.94	34.99	70.31	47.59	71.16	15.38	44.64	60.68
Acute care transitions (dehydration)	2.46	12.62	12.94	22.53	33.15	75.45	3.92	11.33	79.72	31.47	13.37	14.55
Acute care transitions (UTI)	217.83	230.71	202.81	181.21	105.03	153.78	96.72	89.14	114.27	63.26	83.65	129.76

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI older: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado.

**Table Q-5. MOQI (Missouri): Medicare expenditures, FY 2014–FY 2019**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,547	1,603	1,511	1,441	1,355	1,307	2,185	2,178	2,052	1,927	1,788	1,628
Mean exposure (days)	260.42	248.14	258.09	254.77	249.60	253.74	252.69	248.05	262.26	259.33	250.38	250.27
<b>Total Medicare expenditures</b>	23,617.44	25,517.79	24,095.83	26,119.85	27,548.81	26,963.53	22,080.88	24,485.79	22,213.30	23,919.78	25,610.63	28,213.23
<b>Hospitalizations (all-cause)</b>	5,990.54	6,307.65	5,401.73	5,753.56	6,332.52	5,611.19	5,691.70	6,757.21	5,333.25	5,714.81	6,177.96	6,773.95
Potentially avoidable hospitalizations	1,999.87	2,105.13	1,760.74	1,610.81	1,514.10	1,638.80	2,139.88	2,327.63	1,917.90	2,060.50	2,197.12	2,232.06
Potentially avoidable hospitalizations (all six qualifying conditions)	881.46	1,188.74	980.62	749.71	765.15	905.69	1,101.85	1,398.06	1,070.70	1,064.09	1,185.58	1,006.06
Hospitalizations (pneumonia)	470.17	601.76	387.67	275.62	278.12	304.98	600.92	872.79	525.32	375.17	491.85	387.92
Hospitalizations (CHF)	174.72	312.76	263.48	260.61	247.84	314.10	243.66	223.43	213.43	321.59	370.54	252.75
Hospitalizations (COPD/asthma)	56.44	30.86	75.97	44.91	76.66	37.72	48.30	71.50	88.10	98.00	50.25	80.61
Hospitalizations (skin infection)	48.22	122.91	76.86	36.73	20.62	70.52	18.74	93.43	45.87	54.63	70.98	46.15
Hospitalizations (dehydration)	16.55	8.93	15.20	20.37	32.62	13.61	26.51	17.26	28.49	22.02	28.63	33.69
Hospitalizations (UTI)	115.36	111.52	161.45	111.47	109.28	164.76	163.71	119.66	169.48	192.68	173.34	204.94
Hospitalizations (sepsis)	—	—	—	—	—	1,711.95	—	—	—	—	—	1,655.33
<b>ED visits (all-cause)</b>	215.52	168.10	220.41	209.24	253.72	247.65	346.87	352.65	333.20	355.50	414.75	430.88
Potentially avoidable ED visits	84.09	67.64	77.73	82.35	85.05	100.05	171.62	169.74	153.07	158.66	184.09	196.19
Potentially avoidable ED visits (all six qualifying conditions)	17.87	15.77	18.46	12.50	24.73	32.49	53.98	51.70	49.01	59.53	72.76	69.94
ED visits (pneumonia)	3.26	5.61	1.65	3.46	5.00	7.34	8.30	11.22	13.07	13.59	16.45	12.41
ED visits (CHF)	0.87	0.00	0.00	0.36	2.79	4.40	4.85	4.73	7.43	5.37	8.47	6.07
ED visits (COPD/asthma)	2.07	1.75	0.75	0.67	3.66	1.56	13.83	10.47	3.41	8.59	6.30	14.50
ED visits (skin infection)	1.23	0.75	2.21	0.63	2.38	1.11	2.49	2.04	3.18	1.48	2.55	4.73
ED visits (dehydration)	0.28	1.19	5.41	1.32	2.35	0.48	3.07	6.86	3.40	9.76	7.55	9.91
ED visits (UTI)	10.15	6.48	8.43	6.07	8.55	17.61	21.45	16.38	18.51	20.74	31.44	22.31

(continued)

**Table Q-5. MOQI (Missouri): Medicare expenditures, FY 2014–FY 2019 (continued)**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
<b>Acute care transitions (all-cause)</b>	6,228.71	6,490.51	5,643.26	5,980.70	6,595.18	5,956.12	6,081.94	7,115.14	5,688.40	6,098.38	6,611.91	7,292.01
Potentially avoidable acute care transitions	2,084.20	2,173.44	1,841.91	1,695.24	1,601.01	1,762.07	2,331.20	2,498.85	2,071.57	2,220.89	2,385.65	2,442.61
Potentially avoidable acute care transitions (all six qualifying conditions)	899.33	1,205.18	999.08	762.22	789.87	938.19	1,155.83	1,451.25	1,119.71	1,124.05	1,258.33	1,082.57
Acute care transitions (pneumonia)	473.43	607.37	389.32	279.08	283.12	312.32	609.23	884.01	538.39	388.76	508.30	400.33
Acute care transitions (CHF)	175.59	312.76	263.48	260.97	250.64	318.50	248.51	228.16	220.87	327.31	379.00	265.39
Acute care transitions (COPD/asthma)	58.51	33.28	76.72	45.58	80.32	39.28	62.13	81.97	91.51	106.59	56.55	95.11
Acute care transitions (skin infection)	49.46	123.66	79.07	37.36	22.99	71.63	21.23	96.95	49.05	56.11	73.53	50.89
Acute care transitions (dehydration)	16.83	10.12	20.61	21.68	34.97	14.09	29.58	24.12	31.90	31.78	36.17	43.61
Acute care transitions (UTI)	125.51	117.99	169.88	117.54	117.83	182.37	185.16	136.04	187.99	213.49	204.78	227.25

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table Q-6. NY-RAH (New York): Medicare expenditures, FY 2014–FY 2019**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	3,880	3,573	3,297	3,372	3,479	3,482	4,401	4,258	4,078	3,886	3,674	3,623
Mean exposure (days)	244.64	240.78	233.29	228.26	228.51	223.18	249.11	247.85	252.01	247.99	243.31	244.50
<b>Total Medicare expenditures</b>	34,490.72	35,459.94	37,028.17	38,695.10	42,229.93	42,557.84	28,046.65	30,646.55	29,614.55	30,792.57	34,259.31	35,174.03
<b>Hospitalizations (all-cause)</b>	13,909.87	13,067.65	13,350.70	13,507.61	14,199.53	14,256.41	9,539.15	9,850.44	8,859.82	8,614.38	10,132.87	9,926.62
Potentially avoidable hospitalizations	3,507.82	2,972.22	2,996.24	3,106.22	3,290.28	3,132.58	2,384.57	2,443.96	2,102.90	2,057.09	2,392.09	2,298.27
Potentially avoidable hospitalizations (all six qualifying conditions)	1,940.60	1,570.27	1,699.80	1,766.78	1,715.50	1,541.85	1,349.15	1,357.01	1,087.10	1,092.37	1,135.34	1,196.12
Hospitalizations (pneumonia)	768.70	712.87	802.84	797.75	821.04	679.10	545.88	663.85	462.06	323.95	521.71	474.84
Hospitalizations (CHF)	415.04	273.63	353.17	334.90	373.71	402.13	394.06	268.12	314.62	409.80	310.91	377.86
Hospitalizations (COPD/asthma)	150.13	164.70	86.86	213.61	131.10	91.11	91.71	103.64	55.17	131.44	42.85	68.90
Hospitalizations (skin infection)	194.73	126.29	99.34	64.64	70.58	61.15	62.39	77.83	66.89	40.98	77.91	61.37
Hospitalizations (dehydration)	56.34	16.19	82.24	84.53	36.97	38.03	38.55	26.50	45.91	38.17	53.17	30.53
Hospitalizations (UTI)	355.67	276.61	275.35	271.34	282.11	270.33	216.56	217.08	142.45	148.01	128.80	182.61
Hospitalizations (sepsis)	—	—	—	—	—	5,326.82	—	—	—	—	—	3,587.39
<b>ED visits (all-cause)</b>	176.09	215.17	211.01	228.83	249.52	288.62	201.03	240.60	215.20	219.56	279.31	294.06
Potentially avoidable ED visits	72.36	90.86	86.15	98.97	109.53	124.38	83.41	112.86	93.38	90.40	120.68	113.83
Potentially avoidable ED visits (all six qualifying conditions)	14.01	13.63	17.30	17.78	12.15	20.58	18.84	24.46	21.46	19.40	30.99	30.31
ED visits (pneumonia)	0.94	1.93	1.06	3.51	2.00	2.48	2.97	5.12	2.14	1.97	3.67	2.60
ED visits (CHF)	0.30	1.46	0.19	0.00	1.71	1.63	2.06	1.07	2.30	1.26	3.04	1.65
ED visits (COPD/asthma)	3.09	0.64	1.23	1.21	0.69	0.75	1.46	1.95	3.31	1.12	1.16	3.11
ED visits (skin infection)	2.38	1.70	0.87	0.88	0.32	1.71	1.17	1.44	1.27	1.49	1.65	2.07

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**Table Q-6. NY-RAH (New York): Medicare expenditures, FY 2014–FY 2019 (continued)**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
ED visits (dehydration)	1.32	0.90	2.49	0.61	1.37	0.87	1.79	4.37	2.67	1.84	5.44	1.72
ED visits (UTI)	5.98	7.01	11.45	11.57	6.06	13.14	9.39	10.50	9.78	11.72	16.03	19.17
<b>Acute care transitions (all-cause)</b>	14,085.96	13,282.81	13,562.89	13,737.77	14,449.06	14,545.02	9,745.20	10,091.72	9,076.25	8,834.66	10,413.41	10,222.36
Potentially avoidable acute care transitions	3,580.18	3,063.07	3,082.39	3,205.19	3,399.81	3,256.96	2,471.83	2,557.50	2,196.28	2,148.10	2,512.77	2,412.09
Potentially avoidable acute care transitions (all six qualifying conditions)	1,954.62	1,583.90	1,717.10	1,784.56	1,727.66	1,562.43	1,367.99	1,381.47	1,108.56	1,111.77	1,166.33	1,226.43
Acute care transitions (pneumonia)	769.64	714.79	803.90	801.26	823.04	681.58	548.85	668.96	464.20	325.92	525.38	477.44
Acute care transitions (CHF)	415.34	275.08	353.36	334.90	375.42	403.76	396.12	269.19	316.92	411.06	313.95	379.51
Acute care transitions (COPD/asthma)	153.22	165.33	88.10	214.82	131.79	91.86	93.16	105.59	58.47	132.57	44.01	72.01
Acute care transitions (skin infection)	197.11	127.99	100.21	65.53	70.91	62.87	63.56	79.27	68.16	42.47	79.55	63.45
Acute care transitions (dehydration)	57.66	17.09	84.73	85.15	38.34	38.90	40.34	30.87	48.58	40.02	58.61	32.25
Acute care transitions (UTI)	361.65	283.61	286.80	282.91	288.17	283.47	225.95	227.58	152.23	159.73	144.82	201.78

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table Q-7. OPTIMISTIC (Indiana): Medicare expenditures, FY 2014–FY 2019**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,982	1,975	1,873	1,810	1,653	1,523	2,261	2,240	2,153	2,147	1,966	1,798
Mean exposure (days)	234.09	225.85	229.76	234.28	231.11	235.67	239.29	236.53	244.23	236.55	237.81	243.13
<b>Total Medicare expenditures</b>	28,448.99	29,479.04	28,499.31	30,089.15	32,506.74	34,769.98	24,221.57	26,756.85	25,617.60	26,513.54	28,164.65	27,604.89
<b>Hospitalizations (all-cause)</b>	6,821.41	6,542.21	6,285.07	6,666.74	7,240.52	8,156.20	5,477.18	6,158.48	5,623.11	5,328.60	6,458.24	6,299.86
Potentially avoidable hospitalizations	1,926.49	2,025.64	2,015.16	2,031.23	2,149.69	2,909.78	1,806.04	2,206.83	1,942.67	1,819.33	2,140.65	2,288.07
Potentially avoidable hospitalizations (all six qualifying conditions)	849.01	768.12	804.35	920.07	1,075.27	1,297.73	875.84	1,236.83	966.18	829.79	1,018.99	1,008.17
Hospitalizations (pneumonia)	487.45	340.55	412.82	341.59	412.67	569.77	437.17	706.71	430.23	260.23	421.32	435.91
Hospitalizations (CHF)	106.02	155.57	154.78	227.25	294.74	476.78	182.70	248.14	253.79	276.24	320.87	271.00
Hospitalizations (COPD/asthma)	62.57	23.51	34.71	150.51	106.99	69.82	67.82	74.02	113.37	143.16	106.37	56.78
Hospitalizations (skin infection)	33.86	52.04	39.13	44.37	61.08	30.76	43.68	67.26	21.12	24.26	25.91	60.47
Hospitalizations (dehydration)	6.35	22.12	37.06	11.78	57.26	48.40	6.39	7.06	17.27	21.25	17.46	54.22
Hospitalizations (UTI)	152.76	174.33	125.84	144.57	142.54	102.20	138.08	133.63	130.39	104.64	127.06	129.80
Hospitalizations (sepsis)	—	—	—	—	—	1,769.48	—	—	—	—	—	1,464.45
<b>ED visits (all-cause)</b>	231.97	226.21	246.12	212.21	256.77	291.82	292.89	271.98	281.87	289.29	369.74	418.43
Potentially avoidable ED visits	102.92	89.53	112.08	84.23	115.05	132.64	136.31	119.56	133.04	128.75	187.00	172.94
Potentially avoidable ED visits (all six qualifying conditions)	29.05	22.74	25.22	24.12	29.44	41.52	46.02	41.91	44.89	29.39	52.35	56.27
ED visits (pneumonia)	5.28	2.56	4.85	3.87	3.36	5.95	8.81	10.06	8.59	4.09	6.64	4.96
ED visits (CHF)	0.95	1.85	1.90	2.08	0.52	2.48	5.12	5.65	8.91	2.86	5.39	8.24
ED visits (COPD/asthma)	3.30	0.96	4.73	3.66	4.12	4.27	5.73	5.35	6.30	1.88	5.78	8.67
ED visits (skin infection)	2.13	1.04	0.64	0.75	4.19	1.62	3.47	2.83	2.71	1.95	1.79	1.90

(continued)

**Table Q-7. OPTIMISTIC (Indiana): Medicare expenditures, FY 2014–FY 2019 (continued)**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
ED visits (dehydration)	1.11	0.28	1.00	2.29	1.91	0.55	5.09	2.16	3.19	3.90	5.46	5.69
ED visits (UTI)	16.28	16.06	12.10	11.47	15.34	26.65	17.80	15.85	15.19	14.71	27.29	26.81
<b>Acute care transitions (all-cause)</b>	7,058.33	6,786.36	6,577.65	6,893.55	7,517.01	8,465.95	5,784.85	6,492.52	5,929.03	5,640.01	6,859.64	6,747.90
Potentially avoidable acute care transitions	2,029.41	2,123.94	2,127.24	2,116.69	2,264.75	3,042.42	1,943.33	2,330.48	2,075.71	1,948.08	2,328.96	2,463.28
Potentially avoidable acute care transitions (all six qualifying conditions)	878.06	790.86	829.58	944.18	1,104.71	1,339.25	921.85	1,278.96	1,011.06	859.17	1,071.34	1,064.45
Acute care transitions (pneumonia)	492.73	343.11	417.68	345.46	416.03	575.72	445.98	716.77	438.82	264.33	427.96	440.87
Acute care transitions (CHF)	106.98	157.42	156.68	229.33	295.25	479.26	187.82	253.79	262.70	279.10	326.26	279.23
Acute care transitions (COPD/asthma)	65.86	24.47	39.44	154.17	111.11	74.09	73.55	79.37	119.68	145.04	112.15	65.45
Acute care transitions (skin infection)	35.99	53.08	39.77	45.12	65.27	32.38	47.15	70.32	23.83	26.22	27.69	62.38
Acute care transitions (dehydration)	7.46	22.40	38.07	14.08	59.17	48.94	11.48	9.22	20.45	25.15	22.92	59.91
Acute care transitions (UTI)	169.04	190.39	137.94	156.03	157.88	128.85	155.88	149.48	145.58	119.34	154.35	156.61

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

**Table Q-8. RAVEN (Pennsylvania): Medicare expenditures, FY 2014–FY 2019**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,600	1,616	1,597	1,536	1,484	1,399	1,770	1,757	1,788	1,693	1,623	1,559
Mean exposure (days)	261.48	266.36	274.11	271.54	268.98	273.13	251.02	252.25	250.33	249.13	254.47	256.10
<b>Total Medicare expenditures</b>	24,250.39	25,107.80	24,239.21	26,473.42	27,173.10	27,035.54	25,446.85	26,581.22	27,035.06	26,643.94	27,958.83	28,749.65
<b>Hospitalizations (all-cause)</b>	5,960.31	5,933.14	5,111.66	5,492.11	6,101.72	5,987.18	6,145.58	6,247.58	6,804.03	5,823.25	6,388.99	6,579.03
Potentially avoidable hospitalizations	1,704.90	1,470.13	1,241.91	1,474.47	1,530.49	1,883.82	2,132.78	2,005.81	2,159.59	1,730.39	1,699.82	1,854.16
Potentially avoidable hospitalizations (all six qualifying conditions)	1,044.04	805.24	496.59	708.53	762.71	807.95	1,082.92	1,143.82	1,039.43	912.78	921.36	969.18
Hospitalizations (pneumonia)	639.03	437.51	244.86	354.14	403.82	415.06	479.83	521.58	443.78	305.93	410.09	426.46
Hospitalizations (CHF)	113.15	129.62	50.29	124.54	148.15	183.77	218.70	357.80	246.41	299.77	286.23	342.13
Hospitalizations (COPD/asthma)	56.22	50.67	37.22	54.60	47.06	87.50	109.11	48.55	91.82	96.29	53.90	32.60
Hospitalizations (skin infection)	6.37	31.79	22.68	81.32	35.92	28.94	86.93	65.52	62.59	30.36	44.45	42.30
Hospitalizations (dehydration)	12.23	5.94	30.38	7.88	31.99	26.23	15.39	13.29	47.41	68.36	26.66	22.79
Hospitalizations (UTI)	217.04	149.71	111.16	86.05	95.77	66.46	172.97	137.08	147.42	112.08	100.03	102.90
Hospitalizations (sepsis)	—	—	—	—	—	1,449.72	—	—	—	—	—	2,036.16
<b>ED visits (all-cause)</b>	189.43	187.92	168.18	219.03	218.19	219.48	209.13	232.09	241.28	275.73	243.21	213.02
Potentially avoidable ED visits	84.32	76.73	78.92	87.91	77.46	91.55	92.27	88.44	81.41	89.57	94.76	82.42
Potentially avoidable ED visits (all six qualifying conditions)	28.59	27.06	27.41	29.09	27.93	30.21	24.04	32.01	22.96	26.86	32.36	26.84
ED visits (pneumonia)	7.38	7.17	5.83	6.66	6.40	8.90	0.79	4.35	3.11	2.62	2.60	3.05
ED visits (CHF)	5.59	2.20	3.63	7.09	3.94	3.85	3.24	0.91	1.69	3.91	3.58	0.94
ED visits (COPD/asthma)	2.88	2.65	3.83	1.86	1.96	0.82	1.23	2.17	2.10	5.81	4.07	0.72
ED visits (skin infection)	1.77	2.41	1.24	1.83	0.51	2.03	0.93	1.04	0.65	0.28	1.12	3.94

(continued)

**Table Q-8. RAVEN (Pennsylvania): Medicare expenditures, FY 2014–FY 2019 (continued)**

(dollars, per resident-year)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
ED visits (dehydration)	2.61	0.76	2.58	0.59	0.00	0.66	4.30	4.00	0.83	1.61	1.20	0.33
ED visits (UTI)	8.35	11.87	10.29	11.06	15.12	13.96	13.56	19.54	14.57	12.62	19.78	17.85
<b>Acute care transitions (all-cause)</b>	6,157.24	6,127.54	5,286.41	5,714.03	6,320.82	6,208.97	6,372.93	6,487.86	7,046.05	6,098.98	6,659.03	6,799.23
Potentially avoidable acute care transitions	1,789.21	1,549.06	1,322.22	1,562.38	1,607.96	1,977.69	2,228.34	2,098.34	2,241.38	1,819.96	1,794.57	1,936.57
Potentially avoidable acute care transitions (all six qualifying conditions)	1,072.63	832.30	524.00	737.62	790.65	839.21	1,106.96	1,175.84	1,062.77	939.64	953.72	996.01
Acute care transitions (pneumonia)	646.41	444.68	250.69	360.80	410.22	423.96	480.62	525.93	446.90	308.56	412.70	429.51
Acute care transitions (CHF)	118.74	131.82	53.92	131.63	152.10	187.62	221.94	358.71	248.10	303.67	289.81	343.07
Acute care transitions (COPD/asthma)	59.11	53.33	41.06	56.46	49.02	88.31	110.33	50.72	93.92	102.10	57.97	33.32
Acute care transitions (skin infection)	8.14	34.19	23.92	83.16	36.43	30.96	87.86	66.56	63.24	30.64	45.58	46.24
Acute care transitions (dehydration)	14.84	6.70	32.96	8.47	31.99	26.89	19.68	17.29	48.25	69.97	27.86	23.12
Acute care transitions (UTI)	225.39	161.58	121.45	97.11	110.89	81.47	186.52	156.62	162.37	124.70	119.81	120.76

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

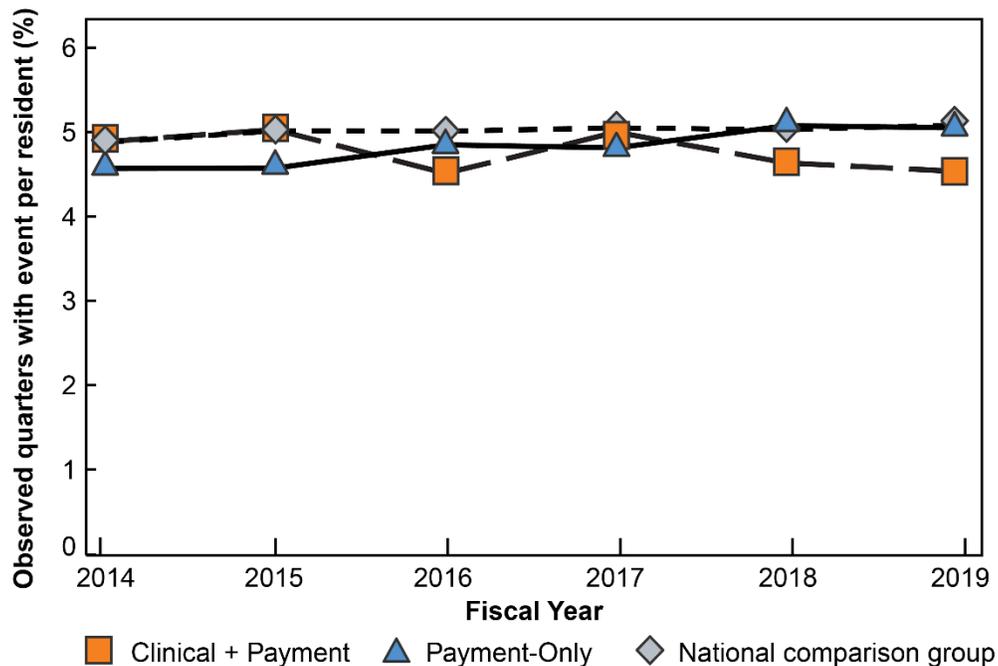
SOURCE: RTI analysis of Medicare claims data (RTI program MS 109; RTI folder: sarnold\output\pah2\_ms109\_ar4 - 5.13.2020).

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays.

## APPENDIX R MDS-BASED QUALITY MEASURES

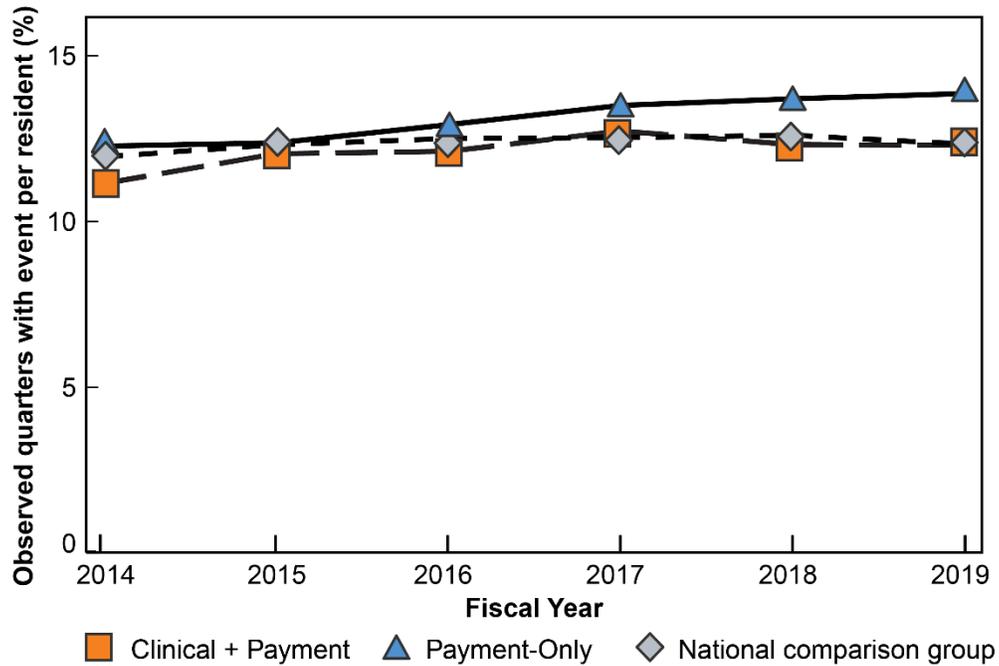
In **Section 3.2** of the main report, we describe results from our multivariate regression analysis. In this appendix, we present summary results from a descriptive analysis of Minimum Data Set (MDS)-based quality measures, reporting the percentage of observed quarters with each event per resident, on average. We first present the results in **Figures R-1** through **R-10**, showing the trends over time and allowing for comparison between the Clinical + Payment, Payment-Only, and national comparison group for each of the quality measures. Then, **Table R-1** presents the summary results for the national comparison group. **Tables R-2** through **R-8** present the results by intervention group (Clinical + Payment and Payment-Only), combined across all ECCPs, and then separately for each ECCP.

**Figure R-1. All ECCPs: Percentage of observed quarters average resident had a catheter inserted and left in bladder, FY 2014–FY 2019**



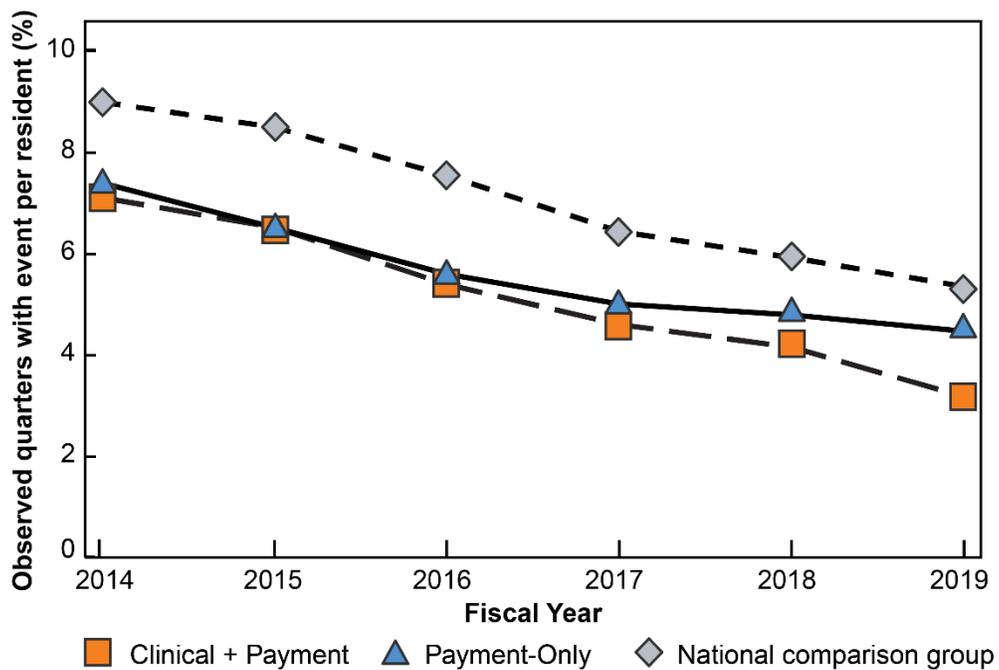
SOURCE: RTI analysis of MDS data. (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Figure R-2. All ECCPs: Percentage of observed quarters average resident experienced one or more falls with injuries, FY 2014–FY 2019**



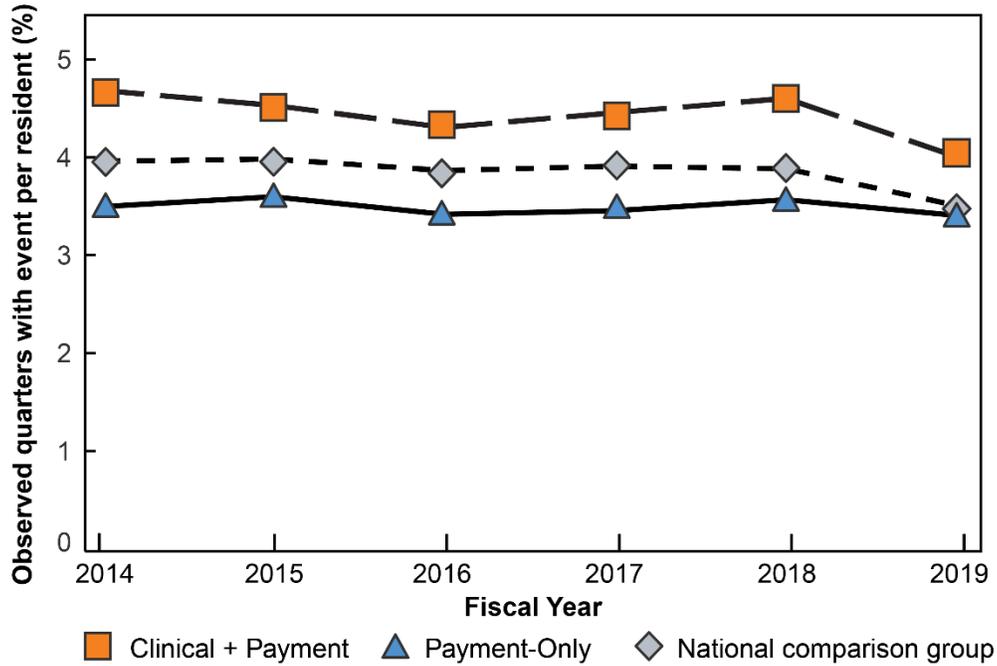
SOURCE: RTI analysis of MDS data. (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Figure R-3. All ECCPs: Percentage of observed quarters average resident self-reported moderate to severe pain, FY 2014–FY 2019**



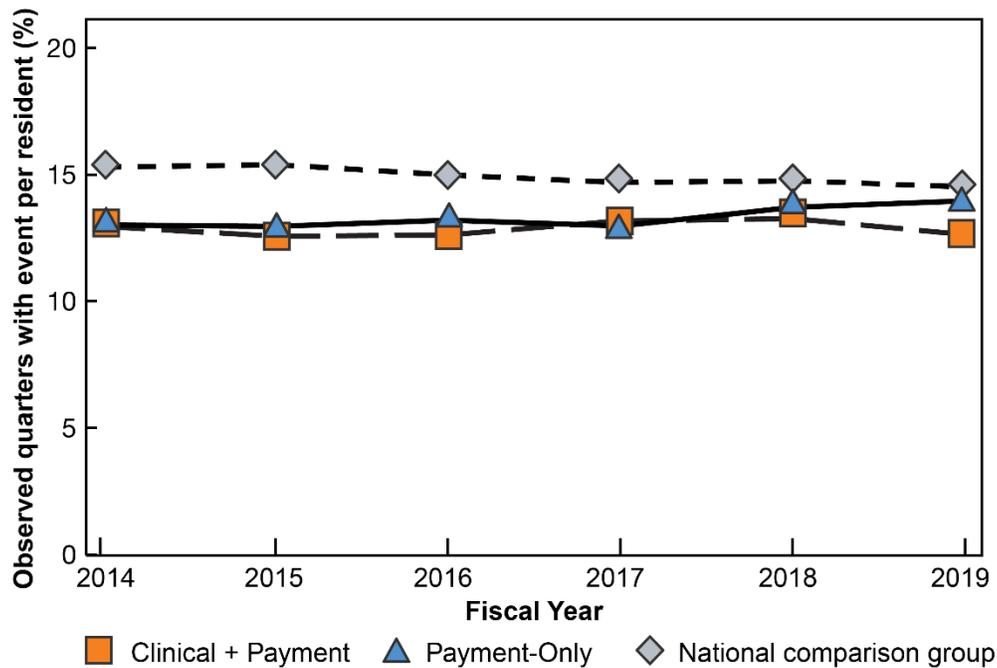
SOURCE: RTI analysis of MDS data. (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Figure R-4. All ECCPs: Percentage of observed quarters average resident was diagnosed with a pressure ulcer of Stage II or higher, FY 2014–FY 2019**



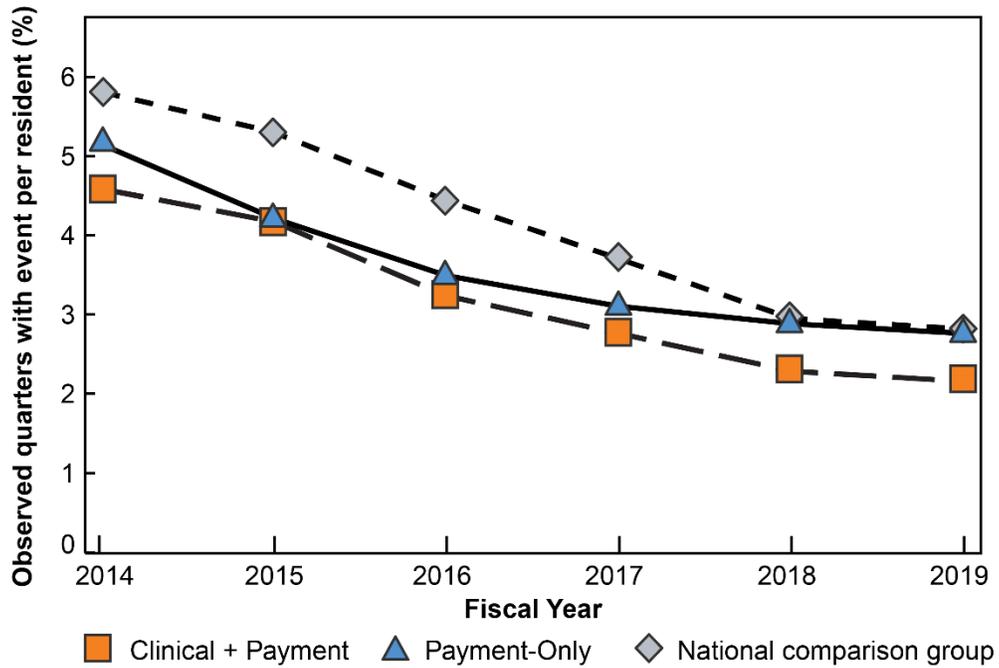
SOURCE: RTI analysis of MDS data. (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Figure R-5. All ECCPs: Percentage of observed quarters average resident experienced a decline in ADLs, FY 2014–FY 2019**



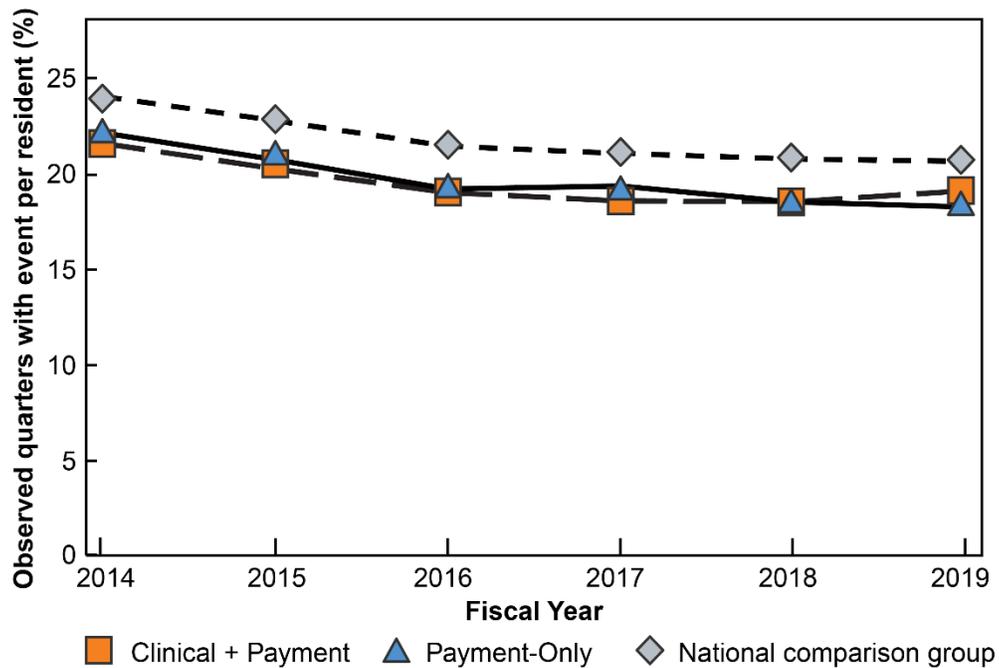
SOURCE: RTI analysis of MDS data. (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Figure R-6. All ECCPs: Percentage of observed quarters average resident was diagnosed with a urinary tract infection, FY 2014–FY 2019**



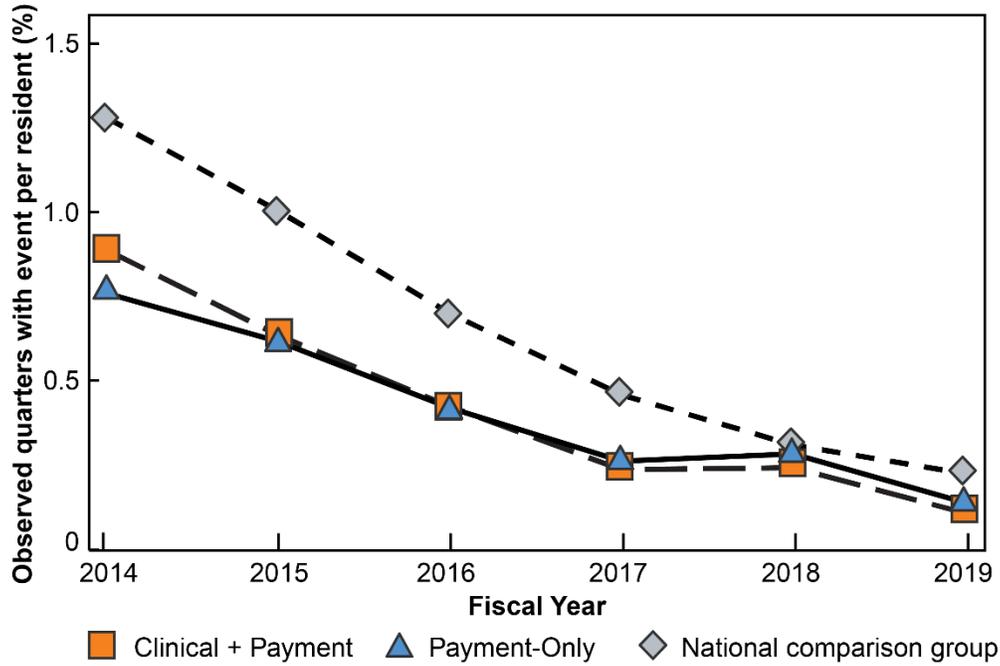
SOURCE: RTI analysis of MDS data. (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Figure R-7. All ECCPs: Percentage of observed quarters average resident received antipsychotic medication, FY 2014–FY 2019**



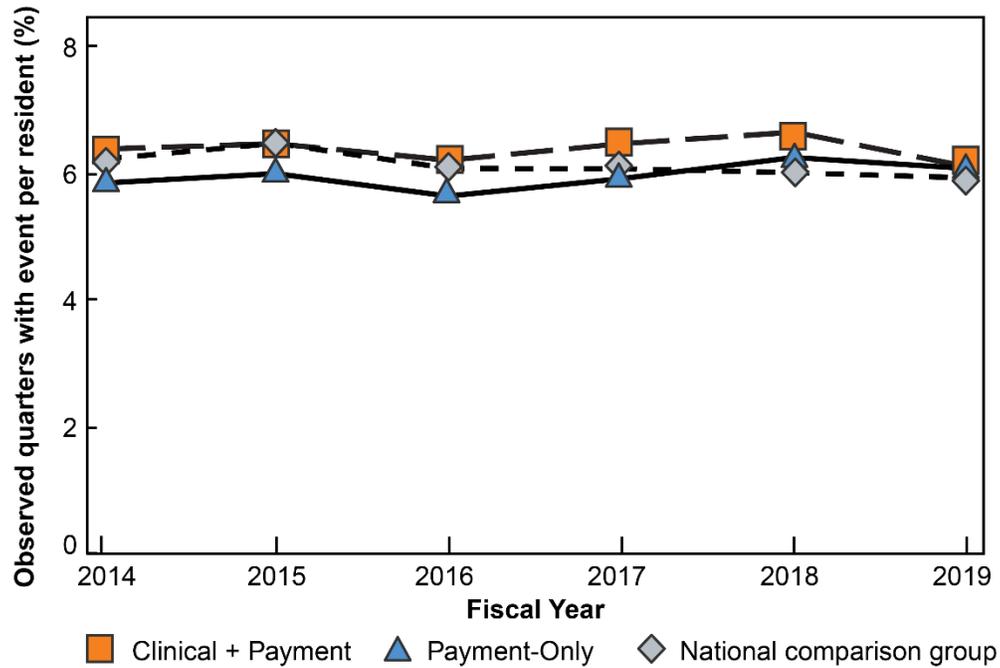
SOURCE: RTI analysis of MDS data. (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Figure R-8. All ECCPs: Percentage of observed quarters average resident was physically restrained, FY 2014–FY 2019**



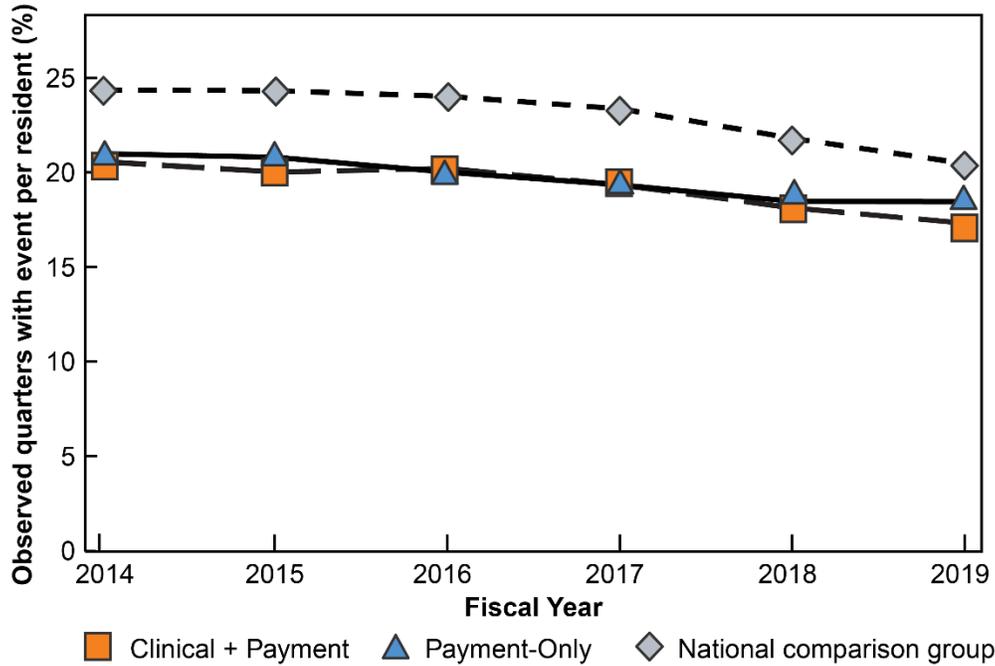
SOURCE: RTI analysis of MDS data. (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Figure R-9. All ECCPs: Percentage of observed quarters average resident experienced weight loss, FY 2014–FY 2019**



SOURCE: RTI analysis of MDS data. (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Figure R-10. All ECCPs: Percentage of observed quarters average resident received antianxiety or hypnotic medication, FY 2014–FY 2019**



SOURCE: RTI analysis of MDS data. (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Table R-1. National comparison group: MDS-based quality measures, FY 2014–FY 2019**

(percent of observed quarters with event per resident; numbers correspond to **Figure 3-2** in the main report)

Measure	National comparison group					
	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	728,716	683,120	666,154	646,925	625,193	592,937
Mean exposure (Initiative-eligible days)	247	242	246	243	242	244
Catheter inserted and left in bladder	4.9	5.0	5.0	5.0	5.0	5.1
One or more fall with injury	12.0	12.3	12.5	12.5	12.6	12.3
Self-reported moderate to severe pain	9.0	8.5	7.6	6.4	5.9	5.4
Pressure ulcer Stage II or higher	4.0	4.0	3.9	3.9	3.9	3.5
Decline in ADLs	15.3	15.4	15.0	14.7	14.8	14.5
Urinary tract infection	5.8	5.3	4.4	3.7	2.9	2.8
Antipsychotic medication use	24.0	22.8	21.4	21.1	20.8	20.6
Physically restrained	1.3	1.0	0.7	0.5	0.3	0.2
Weight loss	6.2	6.5	6.1	6.1	6.0	5.9
Antianxiety or hypnotic medication use	24.4	24.3	24.0	23.4	21.8	20.5

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Table R-2. All ECCPs: MDS-based quality measures, FY 2014—FY 2019**

(percent of observed quarters with event per resident; numbers correspond to **Figure 3-2** in the main report)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	12,581	12,346	11,787	11,494	10,622	10,151	14,504	14,187	13,695	13,100	11,986	11,078
Mean exposure (Initiative-eligible days)	249	246	248	244	238	240	248	246	251	247	245	247
Catheter inserted and left in bladder	4.9	5.0	4.5	5.0	4.6	4.5	4.6	4.6	4.8	4.8	5.1	5.0
One or more fall with injury	11.1	12.0	12.1	12.7	12.3	12.3	12.3	12.4	12.9	13.5	13.7	13.9
Self-reported moderate to severe pain	7.1	6.5	5.4	4.6	4.2	3.2	7.4	6.5	5.6	5.0	4.8	4.5
Pressure ulcer Stage II or higher	4.7	4.5	4.3	4.5	4.6	4.0	3.5	3.6	3.4	3.5	3.6	3.4
Decline in ADLs	13.0	12.6	12.6	13.2	13.3	12.6	13.0	13.0	13.2	13.0	13.7	14.0
Urinary tract infection	4.6	4.2	3.2	2.8	2.3	2.2	5.1	4.2	3.5	3.1	2.9	2.8
Antipsychotic medication use	21.6	20.3	19.0	18.6	18.5	19.1	22.1	20.7	19.2	19.4	18.5	18.3
Physically restrained	0.9	0.6	0.4	0.2	0.2	0.1	0.8	0.6	0.4	0.3	0.3	0.1
Weight loss	6.4	6.5	6.2	6.5	6.7	6.1	5.9	6.0	5.7	5.9	6.3	6.1
Antianxiety or hypnotic medication use	20.6	20.0	20.2	19.3	18.1	17.3	21.0	20.8	20.0	19.3	18.5	18.5

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Table R-3. AQAF (Alabama): MDS-based quality measures, FY 2014—FY 2019**

(percent of observed quarters with event per resident)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	2,391	2,425	2,411	2,218	1,532	1,355	2,072	2,001	1,950	1,814	1,403	1,070
Mean exposure (Initiative-eligible days)	265	259	262	253	226	237	253	259	259	257	251	246
Catheter inserted and left in bladder	4.0	3.7	3.3	3.8	2.8	3.4	4.4	4.1	4.1	3.9	4.0	3.4
One or more fall with injury	11.2	12.2	13.9	14.3	14.3	15.8	11.5	11.2	10.7	11.5	11.2	13.5
Self-reported moderate to severe pain	8.2	6.8	6.0	3.9	3.4	4.4	7.3	6.6	5.8	4.7	5.1	6.2
Pressure ulcer Stage II or higher	2.4	2.7	2.6	2.7	2.9	2.8	3.1	3.3	3.3	3.6	3.3	2.8
Decline in ADLs	12.5	12.4	12.9	14.3	13.4	11.8	11.0	12.5	11.3	12.5	13.5	13.9
Urinary tract infection	3.9	4.0	4.0	3.6	3.6	3.7	4.3	3.5	3.1	2.0	2.4	2.4
Antipsychotic medication use	24.1	23.7	20.8	21.1	22.1	23.9	24.3	23.7	22.5	24.4	23.6	22.2
Physically restrained	0.5	0.4	0.3	0.2	0.1	0.1	0.8	0.5	0.3	0.1	0.0	0.0
Weight loss	6.1	7.1	7.1	7.4	8.1	7.6	7.1	5.6	5.4	6.6	7.0	8.3
Antianxiety or hypnotic medication use	29.1	29.4	29.2	28.8	27.5	27.2	32.6	33.9	31.8	29.4	26.5	25.2

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Table R-4. ATOP2 (Nevada/Colorado): MDS-based quality measures, FY 2014—FY 2019**

(percent of observed quarters with event per resident)

Measure	Clinical + Payment (Nevada)						Payment-Only (Colorado)					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,142	1,118	1,058	1,082	1,093	1,049	1,786	1,722	1,645	1,601	1,506	1,379
Mean exposure (Initiative-eligible days)	228	238	248	243	247	251	245	231	241	235	238	247
Catheter inserted and left in bladder	8.1	8.9	8.3	8.7	7.2	7.9	5.7	6.0	6.2	6.1	7.1	7.2
One or more fall with injury	11.0	12.6	12.0	12.9	12.7	12.6	14.8	14.6	14.9	16.1	17.6	16.7
Self-reported moderate to severe pain	13.0	16.9	14.1	13.4	8.3	6.9	8.7	7.9	7.3	6.3	6.6	6.0
Pressure ulcer Stage II or higher	6.2	5.4	4.4	5.2	5.4	4.3	2.6	2.6	2.9	2.6	2.5	3.2
Decline in ADLs	15.8	14.4	14.8	14.4	14.3	11.7	13.2	13.8	14.5	13.1	12.3	12.9
Urinary tract infection	4.5	5.0	2.2	2.3	2.1	1.8	5.3	3.8	3.9	3.1	2.6	2.9
Antipsychotic medication use	20.8	18.7	18.5	18.7	22.1	22.6	16.9	17.1	16.4	16.6	15.9	16.0
Physically restrained	0.2	0.1	0.3	0.0	0.1	0.1	0.3	0.4	0.7	0.3	0.2	0.1
Weight loss	6.9	7.4	4.5	5.3	5.9	4.4	5.2	5.7	4.8	5.2	5.5	4.7
Antianxiety or hypnotic medication use	27.0	24.4	23.9	22.4	20.5	17.1	15.2	14.6	14.3	14.7	13.5	13.4

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Table R-5. MOQI (Missouri): MDS-based quality measures, FY 2014—FY 2019**

(percent of observed quarters with event per resident)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,548	1,604	1,513	1,442	1,357	1,308	2,187	2,179	2,056	1,928	1,790	1,628
Mean exposure (Initiative-eligible days)	260	248	258	255	249	254	253	248	262	259	250	250
Catheter inserted and left in bladder	4.6	5.7	5.1	5.2	5.4	5.8	3.7	3.3	3.6	3.7	3.6	3.6
One or more fall with injury	16.1	17.3	16.6	17.0	14.9	12.6	17.2	16.3	17.4	16.3	18.2	19.3
Self-reported moderate to severe pain	8.5	7.4	4.4	4.2	5.5	3.7	9.9	8.9	7.3	6.9	6.8	6.9
Pressure ulcer Stage II or higher	3.2	3.1	3.4	3.5	3.6	3.7	2.7	2.7	2.0	2.9	3.3	2.8
Decline in ADLs	11.7	12.8	10.1	11.0	13.9	13.8	12.6	14.0	13.0	12.2	13.3	14.3
Urinary tract infection	6.9	5.5	3.7	3.2	2.7	3.1	6.2	5.3	3.7	4.7	4.3	4.1
Antipsychotic medication use	19.7	18.6	17.1	18.1	17.9	19.0	23.2	21.7	20.3	20.5	20.7	21.2
Physically restrained	0.8	0.5	0.2	0.1	0.3	0.2	0.6	0.4	0.4	0.2	0.0	0.0
Weight loss	5.0	5.6	5.9	6.1	5.2	5.5	6.3	7.4	6.2	6.6	5.5	4.8
Antianxiety or hypnotic medication use	24.1	22.8	22.4	22.6	22.7	22.2	25.0	25.1	23.3	24.0	23.0	24.6

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Table R-6. NY-RAH (New York): MDS-based quality measures, FY 2014—FY 2019**

(percent of observed quarters with event per resident)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	3,906	3,598	3,328	3,403	3,499	3,510	4,424	4,284	4,101	3,912	3,696	3,640
Mean exposure (Initiative-eligible days)	243	240	232	227	228	222	248	247	251	247	242	244
Catheter inserted and left in bladder	4.4	4.2	4.0	4.8	4.3	3.7	4.7	4.6	5.3	5.4	5.7	5.3
One or more fall with injury	7.9	8.3	7.9	8.8	10.0	9.4	8.7	9.5	10.3	10.3	11.3	10.4
Self-reported moderate to severe pain	3.0	2.0	2.1	2.1	2.4	1.2	5.4	5.1	3.7	2.7	2.3	2.1
Pressure ulcer Stage II or higher	6.6	6.5	6.4	6.5	6.6	5.4	5.1	5.1	4.7	4.7	4.9	4.6
Decline in ADLs	11.0	9.8	9.5	10.1	9.8	9.4	12.4	11.2	11.3	11.2	11.9	12.4
Urinary tract infection	4.3	3.9	2.8	2.6	2.1	1.7	5.1	4.4	3.2	2.9	2.7	2.8
Antipsychotic medication use	18.4	16.7	15.2	13.1	12.4	11.1	24.3	23.0	21.4	20.9	19.5	18.7
Physically restrained	1.3	1.0	0.7	0.4	0.3	0.1	1.4	1.1	0.6	0.5	0.7	0.3
Weight loss	6.3	5.4	5.6	5.6	6.8	6.3	4.8	5.8	5.3	5.4	6.5	6.5
Antianxiety or hypnotic medication use	13.6	13.1	12.9	12.3	11.3	11.5	16.8	16.4	16.0	15.4	15.9	15.8

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Table R-7. OPTIMISTIC (Indiana): MDS-based quality measures, FY 2014—FY 2019**

(percent of observed quarters with event per resident)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,987	1,979	1,877	1,813	1,656	1,527	2,264	2,242	2,154	2,149	1,966	1,800
Mean exposure (Initiative-eligible days)	234	225	229	234	231	235	239	236	244	236	238	243
Catheter inserted and left in bladder	4.4	4.5	4.0	4.7	4.7	4.7	4.4	4.6	4.7	4.9	4.7	4.5
One or more fall with injury	12.9	15.8	14.9	14.9	13.2	14.3	14.0	14.8	15.3	17.5	16.7	17.2
Self-reported moderate to severe pain	6.3	3.7	3.9	3.0	2.7	2.4	8.6	5.8	5.4	5.2	4.4	4.0
Pressure ulcer Stage II or higher	4.1	4.4	3.9	4.2	3.9	4.0	2.9	3.0	3.2	2.9	3.3	2.7
Decline in ADLs	13.1	12.4	12.8	13.4	14.1	15.1	15.8	14.6	15.1	16.3	16.9	15.5
Urinary tract infection	3.8	3.2	2.7	1.8	1.2	1.1	5.2	4.2	3.9	3.3	3.1	2.4
Antipsychotic medication use	19.9	17.7	18.7	18.1	16.9	18.3	22.3	20.3	16.9	16.2	16.8	16.8
Physically restrained	0.5	0.4	0.4	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.0
Weight loss	7.6	7.8	6.9	8.7	8.1	6.7	6.4	5.9	6.4	5.9	6.7	6.5
Antianxiety or hypnotic medication use	14.4	13.6	15.3	15.0	14.4	14.0	19.2	18.2	18.4	16.9	17.3	16.7

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID117; RTI folder: ykaganova\ar4\id117).

**Table R-8. RAVEN (Pennsylvania): MDS-based quality measures, FY 2014—FY 2019**

(percent of observed quarters with event per resident)

Measure	Clinical + Payment						Payment-Only					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Number of residents meeting eligibility criteria	1,607	1,622	1,600	1,536	1,485	1,402	1,771	1,759	1,789	1,696	1,625	1,561
Mean exposure (Initiative-eligible days)	261	266	274	272	269	273	251	252	250	249	254	256
Catheter inserted and left in bladder	6.2	6.2	4.9	4.6	4.3	3.8	4.6	5.3	5.0	4.6	4.8	5.7
One or more fall with injury	11.8	10.2	10.4	11.8	11.9	12.8	11.4	10.8	11.7	12.4	9.2	10.2
Self-reported moderate to severe pain	10.9	10.6	7.2	6.5	5.5	3.9	6.5	6.5	6.5	7.0	6.7	5.5
Pressure ulcer Stage II or higher	5.1	4.3	4.4	3.8	3.1	2.3	2.7	3.3	3.3	2.8	2.6	2.9
Decline in ADLs	16.9	16.7	18.1	17.7	17.3	16.4	13.3	13.2	15.9	13.7	15.6	16.1
Urinary tract infection	5.1	4.4	3.7	3.0	2.3	2.2	4.9	3.7	3.6	2.7	2.2	2.0
Antipsychotic medication use	29.0	27.5	25.5	26.1	27.4	29.7	17.8	14.5	14.3	15.0	13.9	15.2
Physically restrained	1.4	0.9	0.4	0.2	0.2	0.1	0.4	0.6	0.2	0.0	0.2	0.0
Weight loss	6.6	6.6	6.6	5.7	5.4	5.7	6.5	5.7	5.9	6.4	6.2	5.9
Antianxiety or hypnotic medication use	23.0	21.9	21.0	19.5	21.9	20.4	21.0	19.9	19.4	18.9	18.2	20.3

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID117; RTI folder: ykaganova\ar4\id117)

## APPENDIX S

### MORTALITY ANALYSIS AMONG NURSING FACILITY RESIDENTS, FY 2014 TO FY 2019

In this appendix, we present more detailed analyses of resident mortality, beyond those that appear in **Section 3** of the main report. This appendix is organized as follows:

- **Section S.1** presents trends in resident mortality rates from FY 2014 to FY 2019 by ECCP.
- **Section S.2** presents sensitivity analyses of resident mortality using alternative difference-in-differences models.
- **Section S.3** presents an examination of resident mortality in the Medicare Advantage population, which is excluded from NFI 2.
- **Section S.4** presents descriptive analyses relating to mortality for residents treated on-site for the six conditions, for each year and pooled years FY 2017 through FY 2019.
- **Section S.5** presents primary data collection findings relating to end-of-life and palliative care.

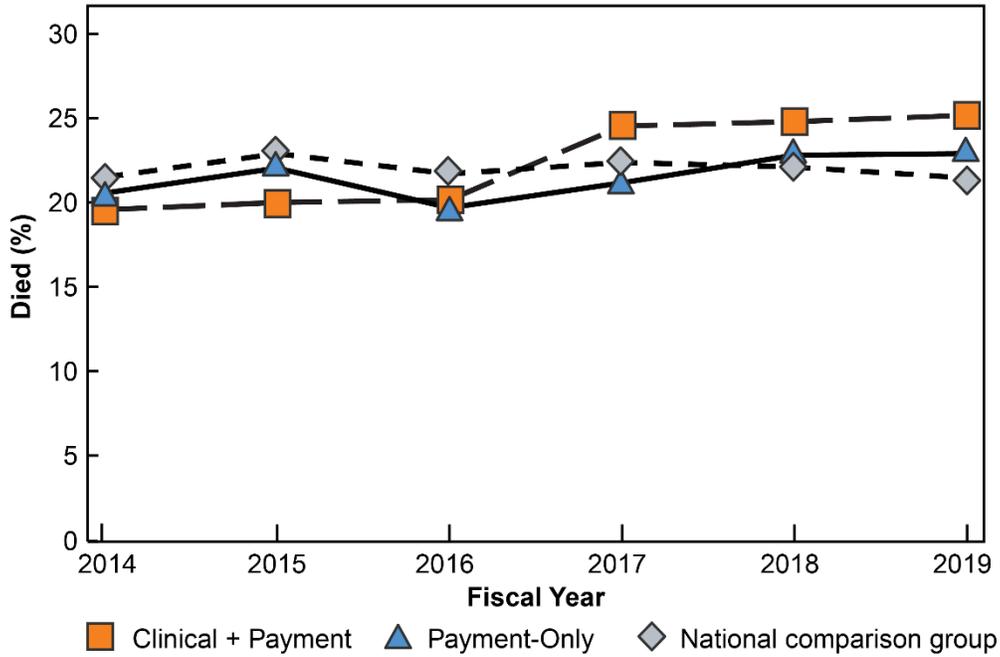
#### **S.1 Trend in Resident Mortality Rates from FY 2014 to FY 2019**

*(Key results presented in Section 3.3.2 of the main report)*

We conducted descriptive analyses to understand the mortality trends for Initiative-eligible residents in each intervention group and in the national comparison group. The analyses include Initiative-eligible residents each year from FY 2014 to FY 2019 and the national comparison group for the same period. We examined “mortality within fiscal year,” which is deaths that occurred at any time during the fiscal year. **Figure 3-4** in the main report presents the trends for mortality rates among residents in Clinical + Payment and Payment-Only groups for combined ECCPs and residents in the national comparison group.

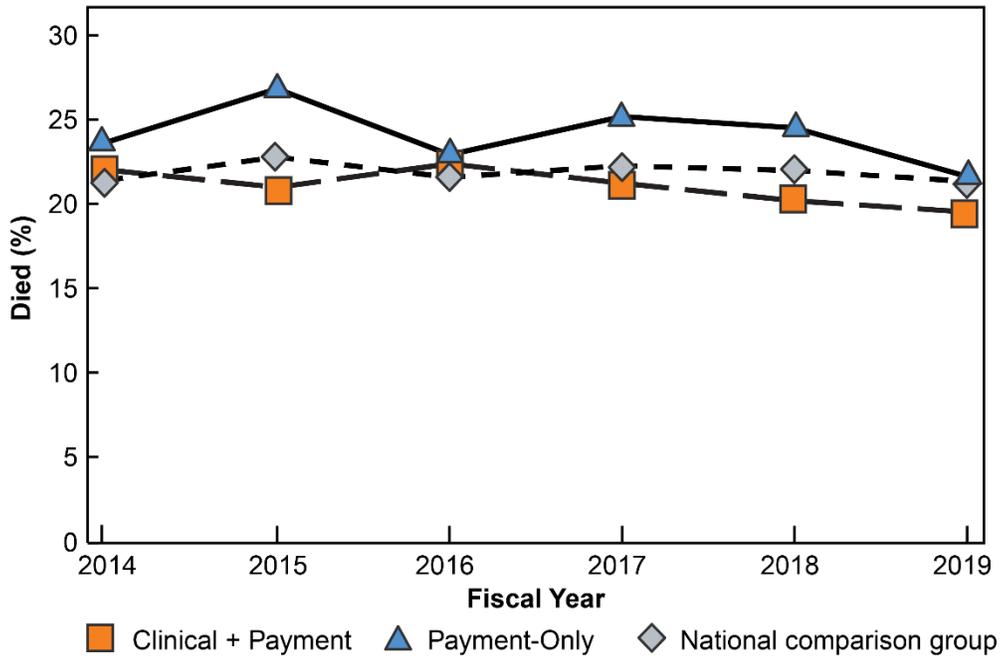
**Figures S-1** through **S-6** present the trend in resident mortality for each ECCP individually. The rates for the individual ECCPs with smaller sample sizes are subject to more variability.

**Figure S-1. AQAF (AL): Percentage of residents who died each year, FY 2014–FY 2019**



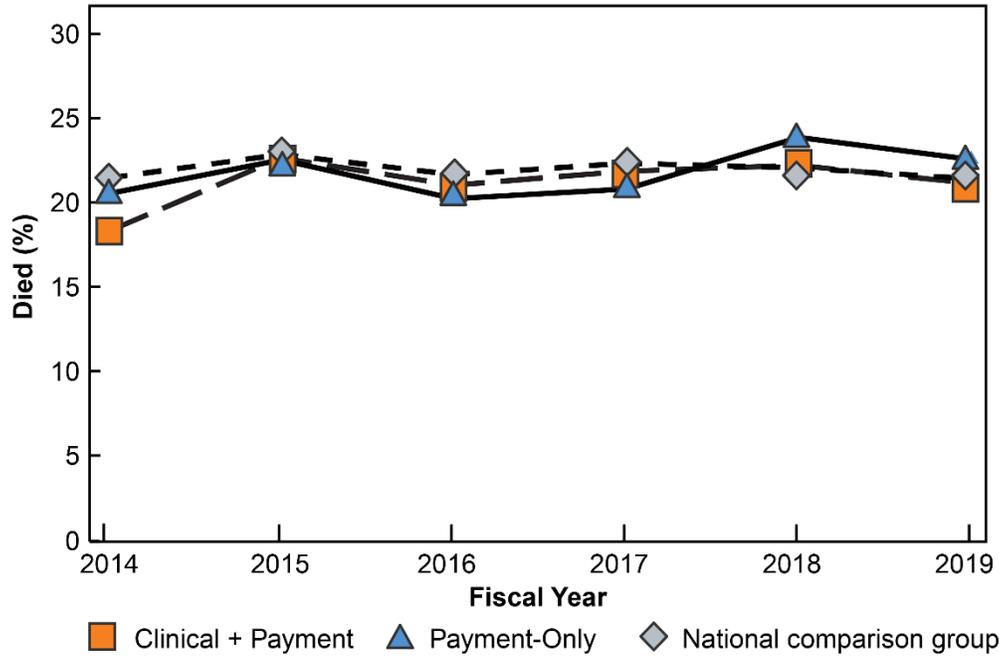
SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program AF600; RTI folder: mkluckman/output/ar4/eol).

**Figure S-2. ATOP2 (NV/CO): Percentage of residents who died each year, FY 2014–FY 2019**



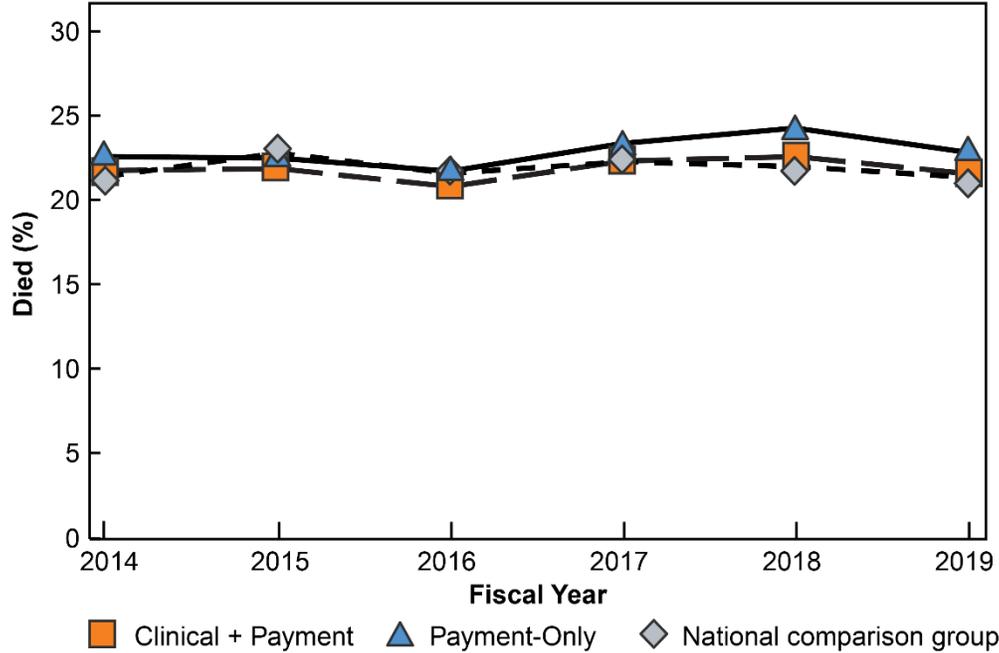
SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program AF600; RTI folder: mkluckman/output/ar4/eol).

**Figure S-3. MOQI (MO): Percentage of residents who died each year, FY 2014–FY 2019**



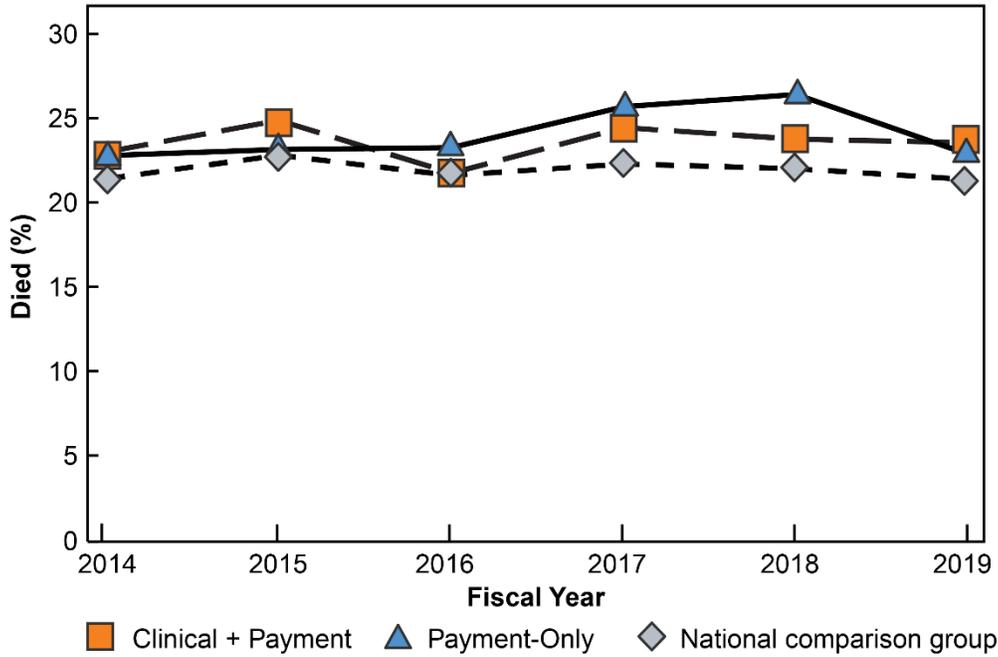
SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program AF600; RTI folder: mkluckman/output/ar4/eol).

**Figure S-4. NY-RAH (NY): Percentage of residents who died each year, FY 2014–FY 2019**



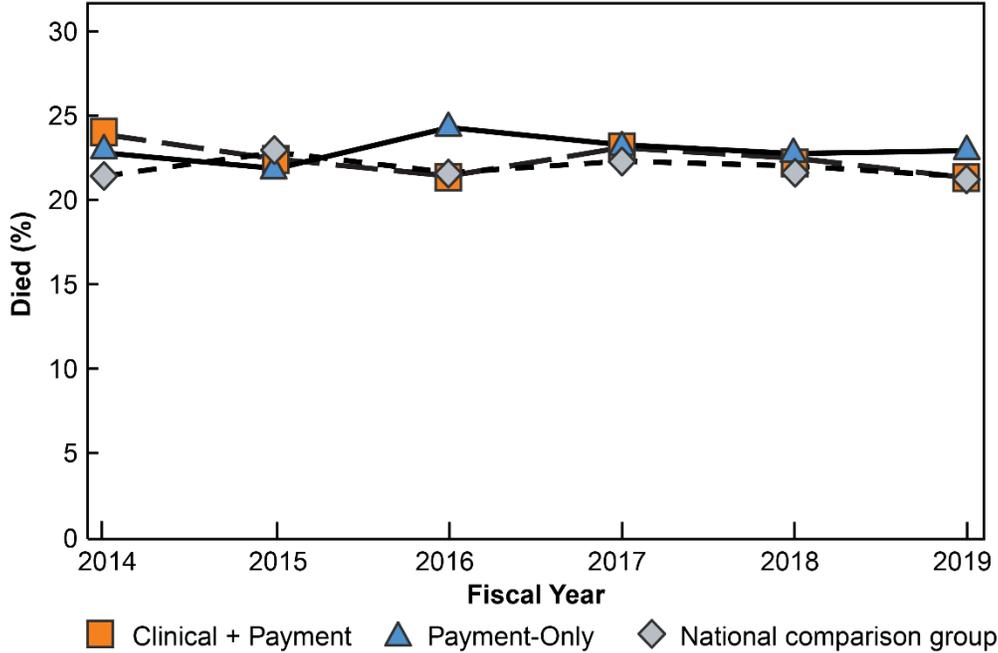
SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program AF600; RTI folder: mkluckman/output/ar4/eol).

**Figure S-5. OPTIMISTIC (IN): Percentage of residents who died each year, FY 2014–FY 2019**



SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program AF600; RTI folder: mkluckman/output/ar4/eol).

**Figure S-6. RAVEN (PA): Percentage of residents who died each year, FY 2014–FY 2019**



SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program AF600; RTI folder: mkluckman/output/ar4/eol).

## S.2 Sensitivity Analyses Using Alternative Difference-in-Differences Models

We conducted three sensitivity analyses to confirm the robustness of our difference-in-differences (DD) results. The main model examining resident mortality is presented in **Section 3** of the main report. Our sensitivity analyses are only performed on the samples that combined ECCPs within Clinical + Payment and Payment-Only groups and are not performed for each ECCP separately.

The sensitivity analyses, presented in **Table S-1**, are as follows:

- Using the within state reference group (WSRG) as the comparison group
- Using FY 2016 as the baseline year
- Using the average of FY 2014 to FY 2016 as the baseline period.

When comparing to the WSRG instead of the national comparison group, we find a statistically significant higher-than-expected mortality rate in both the Clinical + Payment and Payment-Only groups. This is in contrast to the main model that uses a national comparison group and did not show a statistically significant difference in mortality rate. State trends in resident mortality rates differ from national trends, and this result may indicate that resident mortality in ECCP facilities deviated more from ECCP state trends than from the national resident mortality trend.

When using FY 2016 as the baseline year, or using the average of FY 2014 to FY 2016 as the baseline instead of using FY 2014 to FY 2016 with a linear trend, we observe a higher-than-expected resident mortality rate in both the Clinical + Payment and Payment-Only groups, but the increases are not statistically significant. These results are similar to the results in the main analytic model that uses FY 2014 to FY 2016 with a linear trend as the baseline.

**Table S-1. Initiative effects on resident mortality: Comparing alternative approaches, FY 2019**

(probability of mortality among residents)

Sensitivity analysis	Predicted probability absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
<b>Clinical + Payment</b>						
Within state reference group	<b>20.5</b>	<b>1.6</b>	<b>0.5</b>	<b>2.8</b>	<b>0.018</b>	<b>8.0</b>
2016 as baseline year	21.3	0.9	-0.1	1.9	0.146	4.1
Average of 2014–2016 as base	21.5	0.6	-0.3	1.4	0.263	2.7
<b>Payment-Only</b>						
Within state reference group	<b>21.3</b>	<b>1.4</b>	<b>0.3</b>	<b>2.6</b>	<b>0.038</b>	<b>6.7</b>
2016 as baseline year	21.9	0.9	0.0	1.8	0.102	4.1
Average of 2014–2016 as base	22.1	0.7	-0.2	1.5	0.185	3.0

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program JF\_030\_AR4\_Modeling\_Mortality; RTI folder: ykaganova/ar4/may\_31/ms110).

NOTES: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of mortality during the fiscal year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of mortality with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted probability absent the Initiative). Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

### S.3 Resident Mortality in the Medicare Advantage Population

We compared the changes and differences in the proportion of long-stay nursing facility residents who enrolled in a Medicare Advantage (MA) plan between intervention groups and the national comparison group. If MA enrollees tend to be healthier than the traditional fee-for-service (FFS) Medicare population, nursing facilities and states with a higher MA enrollment might have a sicker FFS Medicare facility resident population eligible for the Initiative. If MA enrollment increased at a different rate across groups, that could lead to changes in the case-mix among Initiative-eligible residents in the intervention groups relative to those in the national comparison group.

For this analysis, we used two samples: first, Initiative-eligible residents as were used in other analyses in this report; second, long-stay residents enrolled in an MA plan, who met other Initiative eligibility criteria. We sought to examine:

1. What was the trend in MA enrollment from FY 2014 through FY 2019?
2. Did MA enrollment change differently in Initiative and comparison groups?
3. What is the difference in mortality rates between Initiative-eligible residents and MA residents?

**Table S-2** shows the count of residents in each sample and resident mortality rates for each sample, in the national comparison group. **Tables S-3** and **S-4** show these results for the Clinical + Payment group and Payment-Only group, respectively, and **Tables S-5 to S-16** show results for individual ECCPs.

MA enrollment increased over time in each group, but at different rates, concurrent with a decline in the number of FFS Initiative-eligible residents over time. Overall, the Clinical + Payment group had the highest ratio of MA residents to Initiative-eligible residents, increasing from 38.8 in the base period (FY 2014–FY 2016) to 55.1 in the combined first three years of NFI 2 (FY 2017–FY 2019).<sup>37</sup> The Payment-Only group had the biggest change (increase) from the base period, increasing from 27.1 to 45.1. In the national comparison group, the ratio of MA residents to Initiative-eligible residents was 27.0 in the base period and 37.0 in the first three years of NFI 2, which is a smaller change than either of the Initiative groups.

The mortality rate was generally lower among MA residents than among Initiative-eligible residents in each Initiative group and the national comparison group. For example, in facilities in the Clinical + Payment group in FY 2019, the mortality rate among MA residents was 2.1 percentage points lower than the mortality rate among Initiative-eligible residents (20.0 percent compared with 22.1 percent). In Payment-Only facilities, the mortality rate among MA residents was 1.8 percentage points lower than the mortality rate among Initiative-eligible residents in FY 2019 (21.0 percent compared with 22.8 percent). In the national comparison group, the mortality rate among MA residents was 20.1 in 2019 compared with 21.5 among Initiative-eligible residents, a 1.4 percentage point difference.

Overall, these analyses suggest that the increase in MA penetration may have led to changes in the mortality risk of Initiative-eligible residents compared to the comparison group, and thus caused selection bias. This effect could potentially be the result of “cherry-picking” of lower-acuity residents by MA plans, leading to an increase in the relative risk of mortality among Initiative-eligible FFS residents in ECCP facilities compared to the base period and to the national comparison group.

To help address this potential selection bias, we adjusted for MA penetration at the facility level in our DD models. Nonetheless, this may not fully resolve the potential bias created by the differences in growth of MA between the intervention and comparison groups, as we note in **Section 4.4**.

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<sup>37</sup> The ratio of MA residents to Initiative-eligible residents is calculated by dividing the count of MA residents by the count of Initiative-eligible residents. Specifically, these ratios for the Clinical + Payment group use counts provided in **Table S-3**. The ratio for the base period is calculated as (sum of counts of MA residents 2014-2016)/(sum of counts of Initiative-eligible residents 2014-2016); the ratio for the first three years of NFI 2 is calculated using years 2017-2019.

**Table S-2. National comparison group: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	728,716	21.5	159,229	20.3
2015	683,120	22.9	197,962	20.6
2016	666,154	21.7	203,573	20.6
2017	646,925	22.4	216,319	20.9
2018	625,193	22.1	231,508	20.7
2019	592,937	21.5	243,008	20.1

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-3. All ECCPs, Clinical + Payment: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	12,581	21.5	4,354	20.7
2015	12,346	22.2	4,674	19.3
2016	11,787	21.2	5,222	19.5
2017	11,494	23.1	5,419	20.4
2018	10,622	22.9	6,002	18.9
2019	10,151	22.1	6,374	20.0

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-4. All ECCPs, Payment-Only: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	14,504	22.3	3,507	20.4
2015	14,187	23.1	3,863	21.6
2016	13,695	22.0	4,101	20.3
2017	13,100	23.4	4,692	22.4
2018	11,986	24.3	5,499	22.1
2019	11,078	22.8	6,103	21.0

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-5. AQAF (AL), Clinical + Payment: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	2,391	19.6	347	19.9
2015	2,425	20.0	325	18.5
2016	2,411	20.2	352	17.9
2017	2,218	24.5	540	19.8
2018	1,532	24.8	1,165	15.2
2019	1,355	25.2	1,334	18.4

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-6. AQAF (AL), Payment-Only: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	2,072	20.6	106	15.1
2015	2,001	22.0	127	22.1
2016	1,950	19.7	142	14.1
2017	1,814	21.2	252	16.3
2018	1,403	22.8	628	14.5
2019	1,070	22.9	934	15.2

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-7. ATOP2 (NV), Clinical + Payment: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	1,142	22.2	190	23.7
2015	1,118	21.1	176	16.5
2016	1,058	22.5	200	20.0
2017	1,082	21.4	199	17.6
2018	1,093	20.3	208	19.7
2019	1,049	19.6	236	17.8

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-8. ATOP2 (CO), Payment-Only: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	1,786	23.7	517	18.6
2015	1,722	27.0	618	21.2
2016	1,645	23.0	662	23.1
2017	1,601	25.3	692	21.7
2018	1,506	24.6	732	26.4
2019	1,379	21.8	793	20.6

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-9. MOQI (MO), Clinical + Payment: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	1,548	18.4	358	22.1
2015	1,604	22.7	375	21.6
2016	1,513	21.1	520	20.8
2017	1,442	21.9	602	19.1
2018	1,357	22.3	669	21.4
2019	1,308	21.2	677	24.4

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-10. MOQI (MO), Payment-only: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	2,187	20.6	284	21.8
2015	2,179	22.6	328	20.4
2016	2,056	20.3	362	18.2
2017	1,928	20.9	439	21.6
2018	1,790	23.9	498	20.9
2019	1,628	22.6	555	19.6

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-11. NY-RAH (NY), Clinical + Payment: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	3,906	21.9	1,970	17.9
2015	3,598	22.0	2,308	18.2
2016	3,328	20.9	2,681	18.1
2017	3,403	22.4	2,601	20.1
2018	3,499	22.7	2,334	18.6
2019	3,510	21.7	2,375	18.2

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-12. NY-RAH (NY), Payment-Only: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	4,424	22.7	1,398	19.3
2015	4,284	22.6	1,556	23.1
2016	4,101	21.8	1,671	19.9
2017	3,912	23.5	1,912	21.6
2018	3,696	24.4	2,124	23.3
2019	3,640	22.9	2,159	23.7

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-13. OPTIMISTIC (IN), Clinical + Payment: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	1,987	23.1	359	22.6
2015	1,979	25.0	423	20.3
2016	1,877	21.8	437	20.6
2017	1,813	24.5	429	21.5
2018	1,656	23.9	540	22.8
2019	1,527	23.6	649	21.3

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-14. OPTIMISTIC (IN), Payment-Only: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	2,264	22.9	446	25.6
2015	2,242	23.2	472	21.4
2016	2,154	23.4	503	21.3
2017	2,149	25.8	553	23.5
2018	1,966	26.5	634	20.7
2019	1,800	22.9	737	21.9

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-15. RAVEN (PA), Clinical + Payment: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	1,607	24.0	1,130	24.4
2015	1,622	22.5	1,067	21.4
2016	1,600	21.5	1,032	22.8
2017	1,536	23.2	1,048	22.1
2018	1,485	22.6	1,086	20.0
2019	1,402	21.4	1,103	22.9

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

**Table S-16. RAVEN (PA), Payment-Only: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019**

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	1,771	22.9	756	20.6
2015	1,759	21.9	762	19.7
2016	1,789	24.4	761	20.2
2017	1,696	23.4	844	26.4
2018	1,625	22.8	883	22.8
2019	1,561	23.0	925	20.9

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program Tables\_AR4\_EOL; RTI folder: mkluckman/output/ar4/EOL).

## S.4 Supplemental Analyses for Mortality Among Initiative-Eligible Residents Who Received On-Site Treatment

*(Key results presented in Section 3.3.3 of the main report)*

In **Section 3.3.3** of the main report, we present three descriptive analyses relating to mortality for residents treated on-site for the six conditions. While in the main report, results for only FY 2019 were displayed, in this appendix we display results for FY 2017 through FY 2019, including a pooled analysis across three years. Three sets of analyses are presented below:

- Analysis # 1: Resident mortality by on-site treatment status
- Analysis # 2: Mortality rate of residents following on-site treatment
- Analysis # 3: Hospital treatment of residents following on-site treatment

We performed Analysis # 1 at the resident level, using the same sample as reported in **Appendix L** (see **Table L-3**), limited only to those who were in the Initiative facilities (68,431 residents across the years 2017-2019). We performed Analysis # 2 and Analysis # 3 based on episodes of on-site treatment, so only those residents treated on-site were included, and residents could have multiple treatment episodes. For these analyses, there were 5,225 episodes of on-site treatment for FY 2019, 7,528 episodes for FY 2018, and 7,883 episodes for FY 2017. We excluded episodes that lack sufficient follow up time in the year. Thus, an episode for a resident discharged in September (last month of the fiscal year) would not be included when calculating the percentage of episodes where the resident died within 30 days. As an example, there were 5,100 and 4,840 residents included in the 7 and 30 day follow up analyses, respectively, for FY 2019.

### S.4.1 Analysis # 1—Resident mortality by on-site treatment status

**Tables S-17** through **S-20** show the percentage of residents who died during FY 2017 through FY 2019 separately and pooled. **Table S-19** directly corresponds to **Figure 3-5** in **Section 3.3.3**. Patterns are similar across years but we note a higher percentage of Payment-only residents treated on-site only that died in 2018.

**Table S-17. Resident mortality by treatment status for the six qualifying conditions, FY 2017**

(all conditions combined, and each condition separately)

Subset		Clinical + Payment				Payment-Only			
		No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
All conditions	Total	8,308	2,281	591	314	10,026	1,914	880	280
	% died	21.77	23.19	37.23	30.89	22.31	21.94	35.68	31.43
Pneumonia	Total	10,396	823	210	65	12,068	717	268	47
	% died	22.26	26.97	47.62	29.23	22.73	26.50	40.30	38.30
CHF	Total	11,142	167	171	14	12,683	166	239	12
	% died	22.63	34.73	41.52	35.71	22.87	28.92	43.51	58.33
COPD/asthma	Total	11,244	140	101	9	12,783	158	147	12
	% died	23.02	20.71	33.66	44.44	23.37	16.46	27.89	33.33
Skin infection	Total	10,708	728	31	27	12,479	559	51	11
	% died	23.42	18.13	22.58	29.63	23.46	20.57	25.49	27.27
Dehydration	Total	11,194	240	56	4	12,894	128	76	2
	% died	22.63	42.08	37.50	0	23.1	39.06	38.16	50.00
UTI	Total	10,181	1,014	241	58	11,936	787	322	55
	% died	23.32	19.72	28.63	20.69	23.58	18.55	26.71	23.64

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCES: RTI analysis of Medicare eligibility and enrollment data (RTI program AF 800 SS, SS NBC HV 02; RTI folder: mkluckman\output\ar4\HV02).

**Table S-18. Resident mortality by treatment status for the six qualifying conditions, FY 2018**

(all conditions combined, and each condition separately)

Subset		Clinical + Payment				Payment-Only			
		No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
All conditions	Total	7,723	2,078	574	247	8,887	1,990	838	271
	% died	21.44	23.97	33.8	32.39	22.11	26.13	38.78	37.64
Pneumonia	Total	9,547	801	226	48	10,877	740	316	53
	% died	21.78	29.09	38.5	60.42	23.01	31.76	48.42	39.62
CHF	Total	10,319	136	159	8	11,564	171	238	13
	% died	22.47	31.62	38.36	62.50	23.56	35.67	50.84	46.15
COPD/asthma	Total	10,454	96	63	9	11,724	163	87	12
	% died	22.89	19.79	23.81	11.11	24.24	26.38	27.59	25.00
Skin infection	Total	9,860	712	36	14	11,333	578	54	21
	% died	23.03	20.37	19.44	35.71	24.57	19.03	27.78	14.29
Dehydration	Total	10,409	163	48	2	11,750	158	74	4
	% died	22.43	45.40	37.50	50.00	23.80	50.63	44.59	50.00
UTI	Total	9,449	900	223	50	10,765	857	305	59
	% died	22.99	20.22	28.70	20.00	24.21	24.74	24.59	32.20

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCES: RTI analysis of Medicare eligibility and enrollment data (RTI program AF 800 SS, SS NBC HV 02; RTI folder: mkluckman\output\ar4\HV02).

**Table S-19. Resident mortality by treatment status for the six qualifying conditions, FY 2019**

(all conditions combined, and each condition separately; numbers correspond to *Figure 3-5* in the main report)

Subset		Clinical + Payment				Payment-Only			
		No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
All conditions	Total	7,751	1,578	578	244	8,690	1,344	863	181
	% died	20.6	24.08	33.04	31.97	21.61	21.73	34.41	29.28
Pneumonia	Total	9,169	713	217	52	10,196	551	296	35
	% died	21.23	27.77	36.41	42.31	22.05	24.14	43.24	31.43
CHF	Total	9,846	110	176	19	10,748	109	213	8
	% died	21.54	34.55	45.45	36.84	22.39	26.61	38.97	25
COPD/asthma	Total	9,969	113	60	9	10,871	103	98	6
	% died	22.13	22.12	20.00	33.33	22.7	25.24	25.51	16.67
Skin infection	Total	9,802	302	44	3	10,746	246	80	6
	% died	22.11	24.50	11.36	0	22.84	19.11	22.50	16.67
Dehydration	Total	9,976	133	42	0	10,948	69	59	2
	% died	21.76	43.61	40.48	0	22.49	47.83	40.68	50.00
UTI	Total	9,137	741	227	46	10,069	646	322	41
	% died	22.28	18.76	28.19	15.22	22.89	18.73	26.40	21.95

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCES: RTI analysis of Medicare eligibility and enrollment data (RTI program AF 800 SS, SS NBC HV 02; RTI folder: mkluckman\output\ar4\HV02).

**Table S-20. Resident mortality by treatment status for the six qualifying conditions, FY 2017–FY 2019**

(all conditions combined, and each condition separately)

Subset		Clinical + Payment				Payment-Only			
		No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment	No acute care (for six qualifying conditions)	On-site treatment only	Hospital treatment only	On-site and hospital treatment
All conditions	Total	23,782	5,937	1743	805	27,603	5,248	2581	732
	% died	21.29	23.70	34.71	31.68	22.03	23.48	36.27	33.20
Pneumonia	Total	29,112	2337	653	165	33,141	2008	880	135
	% died	21.78	27.94	40.74	42.42	22.61	27.79	44.20	37.04
CHF	Total	31,307	413	506	41	34,995	446	690	33
	% died	22.23	33.66	41.90	41.46	22.95	30.94	44.64	45.45
COPD/asthma	Total	31,667	349	224	27	35,378	424	332	30
	% died	22.7	20.92	27.23	29.63	23.46	22.41	27.11	26.67
Skin infection	Total	30,370	1742	111	44	34,558	1383	185	38
	% died	22.87	20.15	17.12	29.55	23.63	19.67	24.86	18.42
Dehydration	Total	31,579	536	146	6	35,592	355	209	8
	% died	22.29	43.47	38.36	16.67	23.15	45.92	41.15	50.00
UTI	Total	28,767	2,655	691	154	32,770	2290	949	155
	% died	22.88	19.62	28.51	18.83	23.57	20.92	25.92	26.45

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCES: RTI analysis of Medicare eligibility and enrollment data (RTI program AF 800 SS, SS NBC HV 02; RTI folder: mkluckman\output\ar4\HV02).

## S.4.2 Analysis # 2—Mortality rate of residents following on-site treatment

**Tables S-21** through **S-24** show the percentage of residents who died within 7 and 30 days during FY 2017 through FY 2019 separately, as well as pooled. Note that **Table S-23** directly corresponds to **Figure 3-6** in **Section 3.3.3**.

**Table S-21. Percentage of residents that died within 7 and 30 days following on-site treatment, FY 2017**

Condition	Intervention group	Percent of residents that died within 7 days	Percent of residents that died within 30 days
All conditions	Clinical + Payment	3.05	7.33
	Payment-Only	3.10	7.84
Pneumonia	Clinical + Payment	5.13	10.51
	Payment-Only	5.50	11.56
CHF	Clinical + Payment	2.79	10.89
	Payment-Only	6.02	10.78
COPD/asthma	Clinical + Payment	2.17	6.47
	Payment-Only	3.21	7.43
Skin infection	Clinical + Payment	0.98	3.26
	Payment-Only	1.31	5.44
Dehydration	Clinical + Payment	9.83	19.35
	Payment-Only	5.19	19.72
UTI	Clinical + Payment	1.63	4.73
	Payment-Only	1.42	4.19

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program SS ACT AF820; RTI folder: mkluckman\output\ar4\DH01).

**Table S-22. Percentage of residents that died within 7 and 30 days following on-site treatment, FY 2018**

Condition	Intervention group	Percent of residents that died within 7 days	Percent of residents that died within 30 days
All conditions	Clinical + Payment	2.68	7.04
	Payment-Only	4.06	8.87
Pneumonia	Clinical + Payment	5.18	10.48
	Payment-Only	6.02	12.86
CHF	Clinical + Payment	2.82	10.12
	Payment-Only	6.75	13.72
COPD/asthma	Clinical + Payment	0.73	3.17
	Payment-Only	4.00	9.95
Skin infection	Clinical + Payment	1.19	4.21
	Payment-Only	0.65	2.70
Dehydration	Clinical + Payment	5.73	20.43
	Payment-Only	11.98	23.78
UTI	Clinical + Payment	1.41	4.16
	Payment-Only	2.90	6.08

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program SS ACT AF820; RTI folder: mkluckman\output\ar4\DH01).

**Table S-23 Percentage of residents that died within 7 and 30 days following on-site treatment, FY 2019**

(numbers correspond to **Figure 3-6** in the main report)

Condition	Intervention group	Percent of residents that died within 7 days	Percent of residents that died within 30 days
All conditions	Clinical + Payment	2.89	8.48
	Payment-Only	2.88	6.77
Pneumonia	Clinical + Payment	4.83	11.25
	Payment-Only	4.46	8.49
CHF	Clinical + Payment	2.74	11.03
	Payment-Only	5.52	12.40
COPD/asthma	Clinical + Payment	2.72	7.09
	Payment-Only	2.17	6.87
Skin infection	Clinical + Payment	0.53	6.04
	Payment-Only	0.98	3.36
Dehydration	Clinical + Payment	8.84	21.83
	Payment-Only	11.46	21.74
UTI	Clinical + Payment	1.10	4.63
	Payment-Only	1.08	4.21

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program SS ACT AF820; RTI folder: mkluckman\output\ar4\DH01).

**Table S-24 Percentage of residents that died within 7 and 30 days following on-site treatment, FY 2017–FY 2019**

Condition	Intervention group	Percent of residents that died within 7 days	Percent of residents that died within 30 days
All conditions	Clinical + Payment	2.88	7.53
	Payment-Only	3.41	7.98
Pneumonia	Clinical + Payment	5.06	10.72
	Payment-Only	5.41	11.22
CHF	Clinical + Payment	2.79	10.67
	Payment-Only	6.19	12.34
COPD/asthma	Clinical + Payment	1.92	5.72
	Payment-Only	3.27	8.27
Skin infection	Clinical + Payment	0.99	4.10
	Payment-Only	0.98	3.93
Dehydration	Clinical + Payment	8.36	20.26
	Payment-Only	9.50	21.96
UTI	Clinical + Payment	1.41	4.50
	Payment-Only	1.87	4.90

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program SS ACT AF820; RTI folder: mkluckman\output\ar4\DH01).

### S.4.3 Analysis # 3—Hospital treatment of residents following on-site treatment

**Tables S-25** through **S-28** show the percentage of residents who had an ACT within 7 and 30 days following on-site treatment for one of the 6 qualifying conditions during FY 2017 through FY 2019 separately as well as pooled. **Table S-27** directly corresponds to **Figure 3-7** in **Section 3.3.3**.

We used four measures to examine the incidence of ACT following on-site treatment. While these were defined in the main report, we present additional details:

1. **Any ACT:** Any ACT occurring within 7 or 30 days is counted.
2. **Condition specific (broad) ACT:** This included additional ACTs with diagnoses similar or directly related to any of the six qualifying conditions based on ICD-10 codes. We introduced the broader definition because we were concerned that many hospitalizations could be related to the original on-site episode even if the hospitalizations do not fit into the narrow list of codes that directly parallel the required clinical criteria for Initiative eligibility for on-site treatment. These were defined for all six conditions combined as well as for each one separately. These are added to the ICD-10 codes used to narrowly define the six Initiative conditions. For the measure applied to the six conditions combined we included the following:

- a. All ICD-10 codes beginning with “A”
  - b. All ICD-10 codes beginning with “B”
  - c. E50-E68, and E86-E87
  - d. I05–I52 **except** I10, I12, I15 and I16
  - e. All ICD-10 codes beginning with “J” **except** J33–J39
  - f. All ICD-10 codes beginning with “L” **except** L63–L69, L76, and L93
3. **Condition specific (narrow) ACT:** This was defined the same way we defined ACTs for the six qualifying conditions throughout this report as explained in **Appendix L**.
  4. **Sepsis:** We measured hospitalizations (not emergency department visits or observation stays) with a principal diagnosis indicating sepsis. The most common ICD-10 code is A419 but we included any used to define the Medicare Severity Diagnosis Related Group (MS DRG) for sepsis on the CMS website.<sup>38</sup> Note that this was only measured in FY 2019.

Note that the principal diagnosis coded on the hospital claim and the claim for on-site treatment are coded by different providers for different purposes. For example, complex patients with multimorbidity could be treated by the facility because they meet the requirements for one of the six qualifying conditions. When subsequently hospitalized, they could present with the same constellation of health conditions but may be coded with a principal diagnosis for a different, non-Initiative condition. Thus, our condition-specific measures could miss some cases.

We further analyzed the predictors for two of these four hospital-related transition measures following on-site treatment for FY 2017-2019. **Table S-29** shows selected odds ratio point estimates based on separate logistic regressions modeling the likelihood of any acute care transition, and the likelihood of hospitalization due to sepsis, within 30 days after being treated on-site. Additional variables, including 77 HCC categories, were included as control variables and not reported below.

As described in the main report, we studied the rates of readmission following in-hospital treatment for the six conditions. **Table S-30** shows the percentage of residents who had a readmission following in-hospital treatment for the six conditions during FY 2017 - 2018. We looked both at all-cause readmissions and readmissions for the six conditions, all within 7 and 30 days. Readmissions for the six conditions were defined using the narrow ACT definition above, consistent with how the six conditions were defined in other parts of the report. For the condition-specific measures, a resident was identified as having a readmission for one of the six qualifying conditions only if they were readmitted for the same condition.

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<sup>38</sup> Centers for Medicare & Medicaid Services. (2019). ICD-10-CM/PCS MS-DRG v37.0 Definitions Manual. [https://www.cms.gov/icd10m/version37-fullcode-cms/fullcode\\_cms/P0327.html](https://www.cms.gov/icd10m/version37-fullcode-cms/fullcode_cms/P0327.html)

**Table S-25. Percentage of residents who had hospital treatment (any acute care transitions) within 7 and 30 days following on-site treatment, FY 2017**

Condition	Type of acute care transition	Clinical + Payment		Payment-Only	
		Percent of residents that had an ACT within 7 days	Percent of residents that had an ACT within 30 days	Percent of residents that had an ACT within 7 days	Percent of residents that had an ACT within 30 days
All conditions	Any ACT	7.70	14.68	5.90	12.07
	Condition specific (broad)	4.77	8.97	3.30	6.60
	Condition specific (narrow)	1.75	3.41	1.66	3.39
	Inpatient hospitalizations for sepsis	2.15	3.76	0.99	2.18
Pneumonia	Any ACT	8.82	17.00	7.51	13.78
	Condition specific (broad)	4.68	8.31	4.13	6.89
	Condition specific (narrow)	1.17	2.39	1.38	2.11
	Inpatient hospitalizations for sepsis	2.52	4.39	1.48	2.78
CHF	Any ACT	13.02	21.29	4.63	13.24
	Condition specific (broad)	3.26	4.46	1.39	2.94
	Condition specific (narrow)	2.33	3.47	1.39	2.94
	Inpatient hospitalizations for sepsis	4.19	8.42	0.46	1.47
COPD/ asthma	Any ACT	9.24	20.00	6.88	16.83
	Condition specific (broad)	4.89	10.00	3.21	6.93
	Condition specific (narrow)	1.09	1.76	0.92	1.49
	Inpatient hospitalizations for sepsis	1.09	2.35	0.46	1.49
Skin infection	Any ACT	5.41	11.88	5.10	10.60
	Condition specific (broad)	2.26	4.63	0.92	2.51
	Condition specific (narrow)	0.59	1.16	0.52	0.84
	Inpatient hospitalizations for sepsis	1.18	2.63	0.39	1.67
Dehydration	Any ACT	13.22	19.00	9.09	15.49
	Condition specific (broad)	0.34	1.43	0.00	0.00
	Condition specific (narrow)	0.00	0.72	0.00	0.00
	Inpatient hospitalizations for sepsis	3.73	4.66	2.60	3.52
UTI	Any ACT	6.29	12.21	4.70	10.01
	Condition specific (broad)	3.04	5.04	1.60	3.43
	Condition specific (narrow)	0.85	1.30	0.62	1.24
	Inpatient hospitalizations for sepsis	2.05	3.36	0.98	2.10

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data (RTI program SS ACT AF810; RTI folder: mkluckman\output\ar4\DH01).

**Table S-26. Percentage of residents who had hospital treatment (any acute care transitions) within 7 and 30 days following on-site treatment, FY 2018**

Condition	Type of acute care transition	Clinical + Payment		Payment-Only	
		Percent of residents that had an ACT within 7 days	Percent of residents that had an ACT within 30 days	Percent of residents that had an ACT within 7 days	Percent of residents that had an ACT within 30 days
All conditions	Any ACT	6.92	13.81	6.20	12.55
	Condition specific (broad)	4.11	7.38	3.78	7.45
	Condition specific (narrow)	1.57	2.94	1.45	3.19
	Inpatient hospitalizations for sepsis	1.62	3.05	1.53	2.90
Pneumonia	Any ACT	8.19	13.32	7.37	13.93
	Condition specific (broad)	4.33	7.05	4.25	7.29
	Condition specific (narrow)	0.85	1.67	1.14	2.36
	Inpatient hospitalizations for sepsis	2.17	3.53	2.39	4.07
CHF	Any ACT	6.78	14.88	7.17	11.50
	Condition specific (broad)	1.13	1.79	1.69	3.10
	Condition specific (narrow)	0.56	1.19	1.27	2.65
	Inpatient hospitalizations for sepsis	1.69	3.57	1.69	2.65
COPD/ asthma	Any ACT	10.22	21.43	8.44	15.17
	Condition specific (broad)	5.11	11.90	4.00	6.16
	Condition specific (narrow)	3.65	5.56	1.33	2.37
	Inpatient hospitalizations for sepsis	1.46	3.17	1.78	2.37
Skin infection	Any ACT	6.08	14.12	4.15	11.32
	Condition specific (broad)	2.06	3.99	1.82	4.18
	Condition specific (narrow)	0.65	0.91	0.65	1.08
	Inpatient hospitalizations for sepsis	0.98	2.28	1.17	2.96
Dehydration	Any ACT	10.42	16.13	10.42	16.22
	Condition specific (broad)	0.00	0.00	0.52	0.54
	Condition specific (narrow)	0.00	0.00	0.52	0.54
	Inpatient hospitalizations for sepsis	4.17	4.84	2.60	2.70
UTI	Any ACT	5.63	12.71	5.30	11.37
	Condition specific (broad)	1.80	3.83	1.33	2.95
	Condition specific (narrow)	0.39	0.98	0.41	0.78
	Inpatient hospitalizations for sepsis	1.25	2.85	0.83	2.08

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data (RTI program SS ACT AF810; RTI folder: mkluckman\output\ar4\DH01).

**Table S-27. Percentage of residents who had hospital treatment (any acute care transitions) within 7 and 30 days following on-site treatment, FY 2019**

(numbers correspond to **Figure 3-7** in the main report)

Condition	Type of acute care transition	Clinical + Payment		Payment-Only	
		Percent of residents that had an ACT within 7 days	Percent of residents that had an ACT within 30 days	Percent of residents that had an ACT within 7 days	Percent of residents that had an ACT within 30 days
All conditions	Any ACT	8.12	15.61	6.01	12.00
	Condition specific (broad)	4.55	8.11	3.35	6.82
	Condition specific (narrow)	1.95	3.64	1.29	2.64
	Inpatient hospitalizations for sepsis	1.73	3.18	1.42	2.73
Pneumonia	Any ACT	10.19	17.86	7.11	13.41
	Condition specific (broad)	4.73	7.61	4.32	6.86
	Condition specific (narrow)	1.58	2.32	1.26	1.79
	Inpatient hospitalizations for sepsis	2.63	3.86	2.37	4.02
CHF	Any ACT	10.96	14.71	8.28	12.40
	Condition specific (broad)	3.42	4.41	4.14	6.20
	Condition specific (narrow)	3.42	4.41	2.76	3.10
	Inpatient hospitalizations for sepsis	0.68	2.94	1.38	1.55
COPD/ asthma	Any ACT	8.84	17.02	4.35	11.45
	Condition specific (broad)	2.72	7.09	0.72	3.82
	Condition specific (narrow)	1.36	2.13	0.00	0.00
	Inpatient hospitalizations for sepsis	0.00	2.13	1.45	5.34
Skin infection	Any ACT	6.13	12.36	5.86	14.43
	Condition specific (broad)	2.13	3.57	1.63	4.36
	Condition specific (narrow)	0.00	0.27	0.33	1.01
	Inpatient hospitalizations for sepsis	1.60	2.75	0.65	1.68
Dehydration	Any ACT	8.16	17.61	7.29	15.22
	Condition specific (broad)	0.00	0.00	0.00	0.00
	Condition specific (narrow)	0.00	0.00	0.00	0.00
	Inpatient hospitalizations for sepsis	0.68	4.23	1.04	1.09
UTI	Any ACT	6.38	14.32	4.96	9.78
	Condition specific (broad)	2.29	4.42	1.19	2.84
	Condition specific (narrow)	0.80	1.58	0.22	0.57
	Inpatient hospitalizations for sepsis	1.50	2.74	0.97	2.05

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data (RTI program SS ACT AF810; RTI folder: mkluckman\output\ar4\DH01).

**Table S-28. Percentage of residents who had hospital treatment (any acute care transitions) within 7 and 30 days following on-site treatment, FY 2017–FY 2019**

Condition	Type of acute care transition	Clinical + Payment		Payment-Only	
		Percent of residents that had an ACT within 7 days	Percent of residents that had an ACT within 30 days	Percent of residents that had an ACT within 7 days	Percent of residents that had an ACT within 30 days
All conditions	Any ACT	7.54	14.61	6.04	12.24
	Condition specific (broad)	4.48	8.18	3.50	6.98
	Condition specific (narrow)	1.74	3.30	1.49	3.13
	Inpatient hospitalizations for sepsis	1.86	3.36	1.30	2.60
Pneumonia	Any ACT	9.02	16.00	7.35	13.74
	Condition specific (broad)	4.58	7.66	4.23	7.03
	Condition specific (narrow)	1.18	2.12	1.26	2.12
	Inpatient hospitalizations for sepsis	2.43	3.93	2.06	3.59
CHF	Any ACT	10.41	17.39	6.52	12.34
	Condition specific (broad)	2.60	3.56	2.17	3.76
	Condition specific (narrow)	2.04	2.96	1.67	2.86
	Inpatient hospitalizations for sepsis	2.42	5.34	1.17	1.97
COPD/ asthma	Any ACT	9.40	19.45	6.88	14.89
	Condition specific (broad)	4.27	9.61	2.93	5.88
	Condition specific (narrow)	1.92	2.97	0.86	1.47
	Inpatient hospitalizations for sepsis	0.85	2.52	1.20	2.76
Skin infection	Any ACT	5.80	12.86	4.83	11.55
	Condition specific (broad)	2.16	4.20	1.41	3.53
	Condition specific (narrow)	0.52	0.91	0.54	0.97
	Inpatient hospitalizations for sepsis	1.17	2.51	0.76	2.22
Dehydration	Any ACT	11.20	17.79	9.28	15.75
	Condition specific (broad)	0.16	0.66	0.23	0.24
	Condition specific (narrow)	0.00	0.33	0.23	0.24
	Inpatient hospitalizations for sepsis	3.15	4.61	2.26	2.63
UTI	Any ACT	6.08	12.96	5.00	10.45
	Condition specific (broad)	2.41	4.45	1.38	3.08
	Condition specific (narrow)	0.68	1.26	0.43	0.88
	Inpatient hospitalizations for sepsis	1.62	3.01	0.92	2.08

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data (RTI program SS ACT AF810; RTI folder: mkluckman\output\ar4\DH01).

**Table S-29. Acute care transitions within 30 days of on-site treatment and hospitalizations within 30 days due to sepsis: selected odds ratios, FY 2017–FY 2019**

Characteristic	Any ACTs within 30 days of on-site treatment			Any hospitalization within 30 days of on-site treatment due to sepsis		
	OR	95% CI		OR	95% CI	
HCC count = 3–4	1.145	0.97	1.351	1.333	0.924	1.924
HCC count = 5–7	1.476	1.203	1.812	1.328	0.869	2.031
HCC count >= 8	1.457	1.068	1.988	1.132	0.618	2.071
% MA residents = 10–19.9	0.977	0.866	1.103	0.933	0.737	1.181
% MA residents = 20–29.9	0.972	0.839	1.125	0.802	0.599	1.074
% MA residents >= 30	1.03	0.888	1.194	0.852	0.636	1.142
Male, <65	1.572	1.186	2.084	1.326	0.788	2.232
Female, 65–69	1.599	1.186	2.155	1.036	0.579	1.853
Male, 65–69	1.425	1.015	2.000	1.068	0.547	2.085
Female, 70–74	1.786	1.336	2.389	1.817	1.065	3.102
Male, 70–74	1.652	1.204	2.266	1.456	0.809	2.62
Female, 75–79	1.589	1.198	2.108	1.49	0.875	2.538
Male, 75–79	1.816	1.339	2.463	2.113	1.214	3.677
Female, 80–84	1.337	1.015	1.762	1.062	0.623	1.811
Male, 80–84	2.071	1.526	2.812	1.806	1.012	3.223
Female, 85–89	1.455	1.109	1.909	1.137	0.673	1.923
Male, 85–89	1.556	1.123	2.157	2.185	1.215	3.929
Female, 90–94	1.345	1.015	1.783	1.288	0.749	2.214
Male, 90–94	1.292	0.893	1.87	0.93	0.428	2.019
Female, 95+	1.345	0.983	1.842	0.697	0.345	1.408
Male, 95+	2.125	1.313	3.437	2.193	0.897	5.357
Black, Non-Hispanic	1.453	1.252	1.685	1.348	1.022	1.778
Asian	1.563	1.139	2.145	2.29	1.396	3.758
Hispanic	1.741	1.364	2.222	1.819	1.179	2.808
Other race/ethnicity	1.515	1.157	1.984	1.477	0.911	2.393
Dementia	0.965	0.869	1.071	0.99	0.802	1.222
Anemia	1.024	0.932	1.125	1.15	0.955	1.386

(continued)

**Table S-29. Acute care transitions within 30 days of on-site treatment and hospitalizations within 30 days due to sepsis: selected odds ratios, FY 2017–FY 2019 (continued)**

Characteristic	Any ACTs within 30 days of on-site treatment			Any hospitalization within 30 days of on-site treatment due to sepsis		
	OR	95% CI		OR	95% CI	
BMI < 18.5	0.778	0.624	0.971	0.67	0.433	1.037
BMI = 25–29.9	1.008	0.899	1.132	0.788	0.623	0.996
BMI ≥ 30	0.949	0.842	1.069	0.897	0.709	1.135
ADL score = 8–14	0.765	0.638	0.918	0.97	0.63	1.494
ADL score = 15–21	0.711	0.605	0.836	1.079	0.737	1.58
ADL score = 22–28	0.688	0.562	0.842	1.446	0.938	2.229
Urban non-metropolitan	1.038	0.902	1.194	0.834	0.607	1.144
Rural	1.341	0.923	1.947	1.155	0.534	2.5
Resident’s mood assessment (PHQ)	0.993	0.993	0.98	0.997	0.971	1.023
Full-dual eligibility	1.007	0.862	1.175	1.009	0.727	1.4
Original eligibility due to disability	0.986	0.87	1.116	1.002	0.788	1.275
For-profit nursing facility	0.869	0.774	0.976	1.168	0.922	1.478

OR = odds ratios; HCC= hierarchical condition categories; ADL = activities of daily living; BMI = body mass index; CFS = cognitive function scale; ESRD = end-stage renal disease; PHQ = patient health questionnaire.

SOURCE: RTI analysis of Medicare claims data (RTI program AF810; RTI folder: mkluckman\output\ar4\AF810).

NOTE: Reference categories are Female <65, Non-Hispanic White, BMI = 18.5 – 24.9, ADL = 0-7, and Urban Metropolitan.

**Table S-30 Percentage of residents with a readmission following in-hospital treatment for the six conditions, FY 2017–FY 2018**

Subset	Clinical + Payment							Payment-Only					
	Readmission within 7 days			Readmission within 30 days				Readmission within 7 days			Readmission within 30 days		
	Initial admissions	All-cause	The six conditions	Initial admissions	All-cause	The six conditions	Initial admissions	All-cause	The six conditions	Initial admissions	All-cause	The six conditions	
All conditions	N	1994	213	76	1877	503	173	2717	375	147	2545	661	247
	%	100.00	10.68	3.81	100.00	26.80	9.22	100.00	13.80	5.41	100.00	25.97	9.71
Pneumonia	N	589	67	24	557	144	38	762	119	48	723	186	64
	%	100.00	11.38	4.07	100.00	25.85	6.82	100.00	15.62	6.30	100.00	25.73	8.85
CHF	N	388	40	9	369	99	28	563	77	26	529	140	38
	%	100.00	10.31	2.32	100.00	26.83	7.59	100.00	13.68	4.62	100.00	26.47	7.18
COPD/Asthma	N	205	20	4	191	58	12	293	40	8	276	77	14
	%	100.00	9.76	1.95	100.00	30.37	6.28	100.00	13.65	2.73	100.00	27.90	5.07
Skin infection	N	110	11	2	102	24	4	145	23	8	136	40	7
	%	100.00	10.00	1.82	100.00	23.53	3.92	100.00	15.86	5.52	100.00	29.41	5.15
Dehydration	N	107	14	0	101	25	0	158	19	1	147	33	2
	%	100.00	13.08	0.00	100.00	24.75	0.00	100.00	12.03	0.63	100.00	22.45	1.36
UTI	N	595	61	7	557	153	19	796	97	13	734	185	29
	%	100.00	10.25	1.18	100.00	27.47	3.41	100.00	12.19	1.63	100.00	25.20	3.95

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data (RTI program SS ACT AF830; RTI folder: csaur\output\pah2\_ar4\_af830\_1).

## S.5 Primary Data Collection—End-of-Life and Palliative Care

### S.5.1 Introduction

In this section we provide supplementary detail for the interview findings reported in **Section 3.3** of this report as nursing facility end-of-life (EOL) and palliative care practices and approaches could potentially affect mortality rates. We conducted this analysis to provide NFI 2 context and background for the ongoing analyses of the mortality rates among Initiative residents in each of the participating ECCPs. EOL and palliative care treatments are often used for older adults with serious illnesses, who are frail or have terminal conditions, and who may experience pain and benefit from palliative treatments. Advance care planning (ACP) allows residents the ability to express their values and detail goals, wishes, and preferences for treatment through written documentation and medical orders.<sup>39</sup>

### S.5.2 Methods

We reviewed notes from all site visit and telephone interviews with ECCPs, facility staff, and stakeholders conducted during the first 3 years of NFI 2 (2017 to 2019) to understand the implementation of ECCP EOL/palliative model components across all facilities.

To assess the potential effect of the EOL and palliative care model components on facility processes or outcomes, we reviewed 2017 to 2019 telephone and site visit interview data. We examined how many facilities stated that NFI 2 impacted their EOL and palliative care approaches and linked them to those stated impacts to improvements in resident care or dying experiences. These discussions typically followed this question to nursing facility administrators (NFAs), directors of nursing (DONs), or practitioners, ***“What effect do you think the Phase 2 Initiative is having on end-of-life care and advance care planning in participating facilities?”***

We have categorized quotes using three main categories related to how facility staff perceived the EOL model components. This includes: (a) facility staff that perceived the Initiative as having a direct effect, (b) versus those who thought the Initiative had no effect, and (c) those facilities that attributed their EOL or palliative care processes to other factors beyond their NFI 2 activities.

**Section 5.5.3** summarizes our key take-aways by Clinical + Payment and Payment-Only facilities among the ECCPs. In the overall findings (**Section A.5.5**), we have categorized quotes into three categories to demonstrate how facility staff perceived the ECCP’s EOL model components: (a) the Initiative had a direct effect, (b) the Initiative had no effect, and (c) EOL care practices are not attributable to NFI 2.

Terminology related to EOL and palliative care varies across states. States have adopted variants on the Provider Order for Life-Sustaining Treatment (POLST) form and often use different naming

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<sup>39</sup> Advancing Expert Care. (n.d.). Advance Care Planning. <https://advancingexpertcare.org/ACP>

conventions. Indiana uses the Physician Order for Scope of Treatment (POST); Missouri uses the Transportable Physician Order for Patient Preferences (TROPP); Nevada uses the POLST; New York uses the Medical Order for Life-Sustaining Treatment (MOLST); and Pennsylvania uses a state-specific version of the POLST (PA-POLST). For easy reference in this report, we will refer to all of these forms as POLST.

### **S.5.3 Key Take-aways**

Overall, we found that the Initiative, particularly in the Clinical + Payment group, led to more conversations and education among staff, residents, and resident families on topics related to EOL and palliative care, including the use of ACP tools, as well as on wider issues of resident quality of life. As a result, these conversations and education promoted better acceptance and more desirable practices around EOL care and ACP. This is especially true of three ECCPs: MOQI, OPTIMISTIC, and RAVEN. Analysis of the qualitative data collected for this project found no evidence of any detrimental or undesirable NFI 2-related practices that could have affected resident mortality.

For NFI 2, across all 3 years, our findings revealed that many more Clinical + Payment, compared to few Payment-Only facilities, reported that the Initiative had an effect on EOL, ACP, and palliative care. However, the degree of focus on this model component varied, with some Clinical + Payment facilities commenting that NFI 2 had either had a strong effect or had little to no effect. Many Clinical + Payment facilities agreed that EOL care model components were a carryover from NFI 1. We found little evidence for any ECCP-specific EOL and palliative care focus among any Payment-Only facilities: few Payment-Only facilities stated the Initiative was having a direct effect on EOL care.

Among Clinical + Payment facilities, engagement with EOL, ACP, and palliative care model elements was strongest among three ECCPs: MOQI, OPTIMISTIC, and RAVEN. Although ATOP2 had some limited EOL activities, facility interviewees did not indicate a strong focus. NY-RAH had an EOL model component and more activities in the first 2 years of NFI 2, but with their mid-Initiative pivot to a quality improvement model and subsequent elimination of the Registered Nurse Care Coordinator (RNCC) position, these efforts had limited reach in Initiative Year 3. Evidence also showed that AQAF had little to no engagement with EOL and palliative care model components throughout NFI 2.

Several non-Initiative factors may influence EOL, ACP, and palliative care practices or outcomes in nursing facilities. For example, new or changing state policies and regulations or corporate policies all can be aimed at improving EOL care among nursing facilities. Non-Initiative factors reported in the interview data included:

- At the start of NFI 2, Indiana, New York, and Nevada amended their laws to permit APRNs and PAs to sign their ACP forms (e.g., POLST), which previously required a physician's signature. This change may have increased the number of forms signed or updated

because facility-based APRNs are typically more widely available than physicians, especially among the Clinical + Payment facilities with embedded ECCP APRNs.

- New York has non-Initiative state and local programs directed at EOL and palliative care in nursing facilities, which may affect Clinical + Payment, Payment-Only, and comparison facilities.
- Several chain-owned facilities have their own corporate EOL care programs, but the interviews provided limited information on the specifics.
- Cultural attitudes and family pressure continue to influence EOL outcomes. All ECCPs reported some level of family resistance to treating residents at the facility, in addition to family hesitance toward EOL, ACP, or palliative care.

#### **S.5.4 ECCP NFI 2 EOL and Palliative Care Model Components**

All ECCP models, with the exception of ATOP2, described a continued focus on EOL processes in their NFI 2 operations plans for their Clinical + Payment facilities. These ECCPs sought to provide continued ACP education and training to facility staff, including education and training on EOL conversations and documenting advance directives using state-specific forms. MOQI, OPTIMISTIC, and RAVEN (direct care models) had the most robust EOL care plans. NY-RAH, the single ECCP without a direct care model component, also had a strong EOL focus planned for NFI 2.

These four ECCP models also sought to increase ACP adoption among the Clinical + Payment facilities. In the three direct care models, APRNs could complete the required documentation, whereas for NY-RAH, RNs could only provide guidance on completing the POLST. OPTIMISTIC, RAVEN, and NY-RAH planned continued monitoring of which residents had a completed POLST form. NY-RAH and RAVEN also planned to continue quarterly data reports to facilities, including information on resident EOL planning status prior to hospital transfers. NY-RAH discontinued requiring Clinical + Payment facilities to document information that would inform their quarterly Palliative Care Reports in Year 3.

#### **S.5.5 Primary Data Collection Findings**

##### ***Clinical + Payment Facilities***

**Interviewees reporting NFI 2 is having a direct effect on EOL care.** Through the first 2 years of the Initiative (FY 2016 to FY 2017), Clinical + Payment facilities in MOQI, OPTIMISTIC, and RAVEN reported that the Initiative had improved EOL care conversations with the help of their ECCP APRNs. Others said NFI 2 had increased the number of residents with ACP documentation (MOQI, NY-RAH, OPTIMISTIC, and RAVEN). The following examples detail how NFI 2 impacted EOL care planning processes.

- A MOQI DON stated, *“I love the effect that [NFI 2] is having. [We are] finally having the conversation around end-of-life care. [ECCP APRN] is having those conversations.”*

- An OPTIMISTIC DON said of their ECCP nurse, *“On a routine basis, the OPTIMISTIC RN is here in the facility. She helps support the clinical staff as it relates to advance care planning with residents and their loved one.”*

These selected quotes show little change in 2019, among MOQI and OPTIMISTIC.

- [MOQI NFA] *“I think one of the things this project has helped with is the advance directives. End-of-life decisions, what CPR looks like. It is really [because] of the Initiative, that we are keeping folks here, [they are] not going to the hospital and we are doing the things we can do here. Being in their home (i.e., the nursing facility) and having the caregivers (i.e., facility staff) they are familiar with giving that care.”*
- [OPTIMISTIC] *“[The model] really enhances the clinical quality of the whole house. The focus on the six conditions, the education piece and additional [ECCP] nurse helps with the documentation and advanced directive. She is an enormous plus.”*

Likewise, ECCP nurses gave examples of how they are able to help the residents and families among their assigned facilities with the ACP.

- RAVEN ECCP Nurse: *I think there’s far more [Do No Resuscitate (DNR) orders] and comfort-only-measures than there were 3 years ago.*
- OPTIMISTIC ECCP APRN: *The [APRN] is wonderful as well. It is nice to have an outside person to help evaluate residents. They are great with talking to families about EOL and to the families in general. They are great to have for care plan meetings as well.*

**Interviewees reporting NFI 2 is not having a direct effect on EOL care.** Several facilities indicated that NFI 2 was not driving change for EOL care process but was having an indirect effect (i.e., supporting existing practices) or facing some continued barriers.

- A MOQI medical director said, *“Challenges are massive...for acceptance of death...the ECCP RN works on it and tries to have these talks [with residents and family].”*
- An NY-RAH NFA, said *“The [current] palliative care program dovetails with NY-RAH.”* A DON added, *“We have been expanding the palliative care program”* but did not attribute that directly to NY-RAH.

**Interviewees reporting NFI 2 EOL effects are not attributable to NFI 2 efforts.** NY-RAH, which had a stronger EOL care model in the first 2 years of NFI 2, shifted from a RN ECCP staffing model to a Quality Improvement Staff (QIS) model in 2019. We learned from Clinical + Payment staff that most QIS did not have a clinical or nursing background. This is likely a reason why NY-RAH facilities indicated the Initiative was having less of an effect on EOL care in 2019 and 2020. ECCP leadership indicated some QIS were focused on increasing ACP documentation but only one facility commented on this process as a success.

Some nursing facilities we interviewed for each ECCP stated that NFI 2 (i.e., the facility payment component) was not having an effect on EOL care planning.

- A NY-RAH DON said, *“It has provoked a lot more discussion about end-of-life care. I don’t think it’s the transition to Phase 2 and financial reimbursement; it’s more the continuum of education.”*
- Likewise, an OPTIMISTIC DON stated, *“I think it [the EOL and ACP focus] mirrors the Phase 1 piece. I don’t think the mindset, or the focus has changed with the reimbursement piece. In my buildings, the mindset was that this was the right thing to do for the right reasons.”*

In addition to the qualitative data, we documented through our site visits and phone interviews with ECCPs that three (OPTIMISTIC, NY-RAH, and RAVEN) had collected and provided data about EOL and palliative care from their participating Clinical + Payment facilities since NFI 1. Since 2016, NY-RAH has seen very little change in the percentage of residents with a DNR order, a Do Not Hospitalize (DNH) order, or both; however, the ECCP has seen an increase in the percentage of eligible residents who selected a Do Not Intubate (DNI) order (increasing from 26 percent in 2016 to 34 percent in 2018) and No Enteral Feeding (increasing from 15 percent in 2016 to 22 percent in 2018). Notably, the percentage of residents with a completed POLST has increased from 37 percent in 2016 to 57 percent in 2019. However, the percentage of residents electing full treatment (e.g., no advance directives) also increased (from 31 percent in 2016 to 40 percent in 2018).

### **Payment-Only Facilities**

**Interviewees reporting NFI 2 is having a direct effect on EOL care.** Compared to Clinical + Payment facilities, few staff at Payment-Only facilities reported that NFI 2 had a direct effect on EOL care. Leadership from two MOQI facilities and one RAVEN facility described a focus to educate residents and families with the goal to shift residents from full-code status (i.e., transfer to the hospital preferred) to a palliative approach.

- A MOQI facility medical director stated, *“[We] get people who are no codes [and] educate families on comfort care.”*
- Similarly, a RAVEN NFA said of the effect, *“[RAVEN] is having a decent impact because we were trying to get on the conversations about code status. We are getting in front of it more than we were before.”*

**Interviewees reporting NFI 2 is not having a direct effect on EOL care.** More Payment-Only facilities than Clinical + Payment facilities stated that NFI 2 was not directly affecting EOL care.

- A MOQI NFA stated, *“I can’t say we have seen much of effect on end-of-life care.”*

**Interviewees reporting NFI 2 EOL effects are not attributable to NFI 2 efforts.** Some Payment-Only facility leaders also commented that NFI 2 was adding to their current processes but not directly affecting their EOL and palliative care processes. The following quotes indicate many Payment-Only facilities already had something in place before NFI 2, and there was a weaker influence by NFI 2 on their EOL care and ACP processes.

- An ATOP2 NFA stated, *“ATOP is one of the reasons we’ve helped push for that stuff [palliative care], but it’s not the only one so I say it has helped. But I don’t think it’s a major pushing force on anything.”*
- A NY-RAH NFA stated, *“I think we are having a greater awareness and presence the way we are approaching residents going to the hospital. Managing the advance care planning component there is a trickle down [effect].”*

### **S.5.6 Non-Initiative Factors Affecting EOL and Palliative Care Processes**

Across all the ECCPs, facility staff and stakeholders identified several non-Initiative factors influencing EOL and palliative care: statewide changes to ACP forms, cultural considerations and family response, and additional corporate or other state or local initiatives that may affect EOL or palliative care programs and goals in nursing facilities. We have summarized interview findings around these three themes in the following sections.

Multiple ECCP states (Indiana, Missouri, Nevada, and New York) implemented changes to their POLST requirements during NFI 2. Missouri changed its ACP form (the TROPP) to allow emergency room physicians to follow the EOL and palliative care wishes of admitted patients. In Indiana, New York, and Nevada, a change allowed physician extenders (APRNs or PAs) to approve a resident’s treatment selection with a final review by physicians, whereas Missouri already had a similar policy in place. ECCPs with direct care models (ATOP2 and OPTIMISTIC) reported a more direct impact by this policy change. A few Clinical + Payment facilities in two ECCPs commented on how their participation in NFI 2 helped them adjust to these regulatory changes.

Other factors outside of the Initiative may affect resident EOL outcomes and mortality. NY-RAH had the largest number of Clinical + Payment and Payment-Only facilities reporting other non-Initiative factors potentially influencing EOL and palliative care outcomes. Both groups of facilities reported engagement with the New York Delivery System Reform Incentive Payment (DSRIP) Program, which has a similar goal of reducing hospitalizations. The DSRIP Program has existed since NFI 1 and has continued into NFI 2. An interview with a key stakeholder revealed that two DSRIP Provider Performing System (PPS) projects were focused on increasing palliative care and ACP in the general community, including NF/skilled nursing facility (SNF) settings. Three NY-RAH Clinical + Payment facilities in the same geographic region reported strong cooperative relationships with their local hospitals to improve ACP and palliative care treatment; all three also participate in the same DSRIP PPS. Leadership at one Clinical + Payment facility also indicated that the DSRIP PPS they participate in has invested in palliative care training for the full community, potentially including both NFs enrolled in the Initiative and hospitals, SNFs, or other health care settings.

Facility staff across every ECCP, including Clinical + Payment and Payment-Only facilities, described the significant influence of families on EOL care, including ACP and palliative care decision making. Many interviewees described families as reticent to get involved in these ACP care conversations, even if they are eager to avoid crisis scenarios.

### **S.5.7 Conclusion**

This analysis has shown that most EOL and palliative care model components are affecting ACP practices among some Clinical + Payment ECCPs rather than Payment-Only facilities. We identified little to no evidence for EOL and palliative care efforts in Payment-Only facilities, although a few stated that the Initiative is having a direct and indirect effect on EOL and palliative care practices. Multiple other non-Initiative factors may affect EOL and palliative care at any time across all ECCP and comparison facilities. Although NFI 2 has some impact on how EOL and palliative care planning is progressing in Clinical + Payment facilities, we found no evidence of a link between NFI 2 and the observed trends in mortality among both facility groups.

## APPENDIX T

### CHARACTERISTICS OF LONG-STAY RESIDENTS IN MEDICARE ADVANTAGE PLANS

#### T.1 Overview

RTI's primary data collection findings, as described in **Section 2.7**, report notable growth in Medicare managed care/Medicare Advantage (MA) plans in most ECCP states. Beyond traditional MA plans, special needs plans (SNPs) are a subset of MA specifically designed for high-needs populations. For instance, long-stay nursing facility residents can qualify for institutional SNPs (I-SNPs). Other SNP types include dual eligible (D-SNPs), fully integrated dual eligible (FIDE-SNPs), and chronic condition (C-SNPs). As part of the broader national context in which NFI 2 operates, growth in MA could affect the eligible population for NFI 2 by progressively decreasing the number of eligible fee-for-service (FFS) residents who could participate in the Initiative. Moreover, if there is selection of healthier residents into MA plans, this could lead to more clinically complex residents remaining among the eligible Medicare FFS population (see **Section 4.3**). While our main multivariate analyses adjust for facility-level MA penetration, population differences in the characteristics of long-stay residents in FFS and MA plans over time could also affect our analyses.

Given the limited literature on MA penetration in the long-term care population of nursing facility residents, our analysis aims to (1) describe national MA enrollment trends in this population, as well as the FFS population from which our intervention group and comparison group are selected; and (2) compare the demographic and clinical characteristics of MA residents and Medicare FFS residents.

#### T.2 Methods

The MDS (Minimum Data Set) 3.0 was used to identify long-stay nursing facility residents whose cumulative days in a facility exceeded 100 days. To profile the MA and FFS populations, we used the cross-section of residents who met this criterion in Quarter 3 of each fiscal year, April–June of 2011–2019. Data on resident demographic characteristics (age, sex, race/ethnicity), medical conditions (i.e., active diagnoses), and resident functioning addressing cognitive impairment and activities of daily living were obtained from MDS. Then we merged the MDS data with Medicare data to identify resident information on dual eligibility, their enrollment in a traditional FFS or MA plan, and their enrollment in specific SNPs.

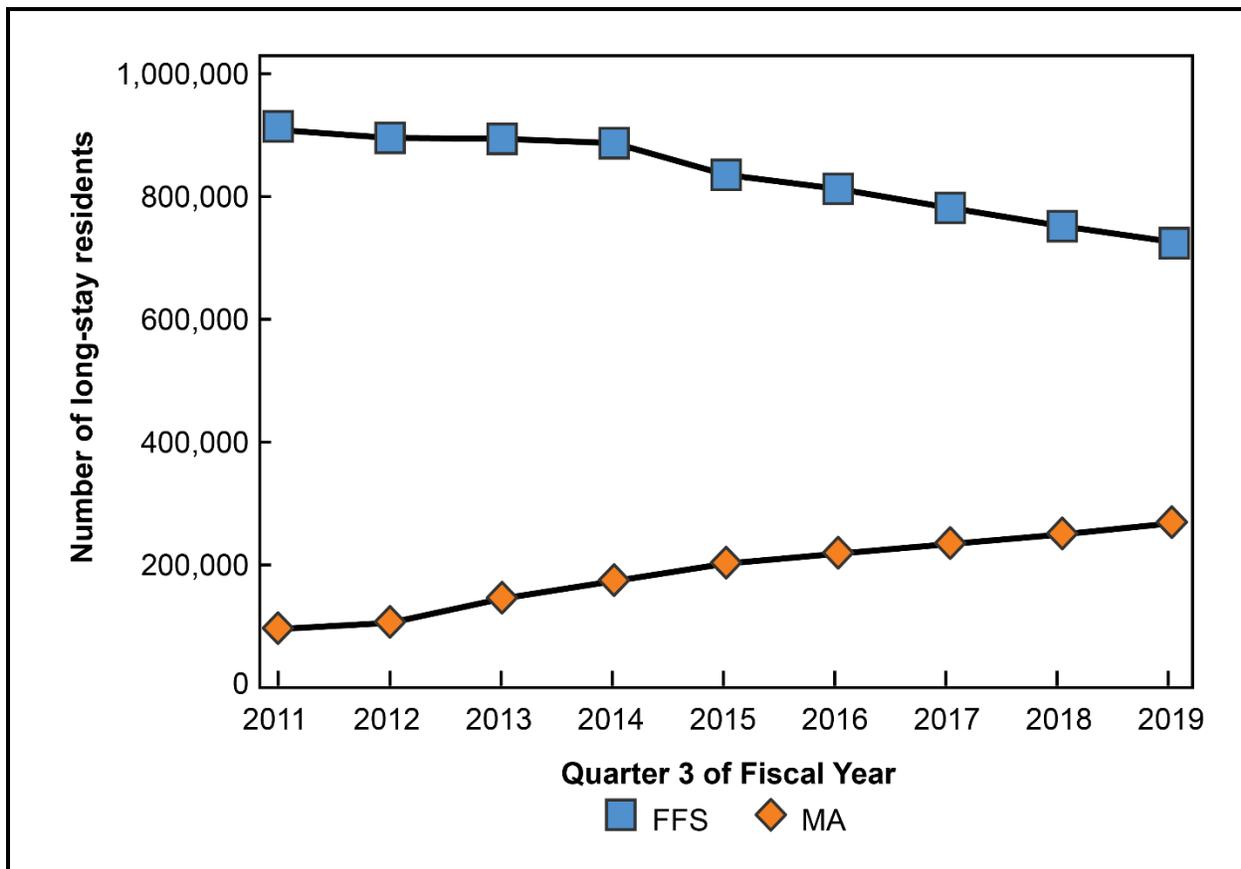
To describe national managed care enrollment trends and to compare the characteristics of MA and Medicare FFS residents, we broadened our population to include all long-stay residents, regardless of any other NFI 2 eligibility criteria. These residents may have been excluded from our main evaluation multivariate analysis due to MA enrollment or other exclusion criteria, such as receiving hospice care. Our study design also differed because this analysis only includes residents who were long-stay in Quarter 3 of each fiscal year, whereas the main evaluation multivariate analysis also includes any residents that were long-stay for some part of a year other than Quarter 3. Thus, our study population differs from the one analyzed in our main evaluation multivariate analysis findings (presented in **Section 3**) and the mortality analyses presented in **Appendix S**.

Resident characteristics are also drawn solely from the MDS (except for dual eligibility status); for example, the data on medical conditions are not based on the Hierarchical Condition Categories (HCCs) drawn from Medicare data presented in **Appendix L**. In addition, we profiled residents in the same quarter of each year, including some years prior to NFI 2, to understand broader trends in managed care. Although we present tables that include FFS residents in Clinical + Payment and Payment-Only facilities (prior to other NFI 2 exclusion criteria being applied), and FFS residents from other facilities (from which the national comparison group is selected, after exclusions are applied), the broader MA population is not directly analogous to these intervention and national comparison groups. We are looking at the groups more broadly and the changes over time.

### T.3 Results

**Figure T-1** shows the number of FFS and MA beneficiaries in Q3 of 2011 through 2019. We see a steady increase in the number of long-stay MA residents over time, and a corresponding decrease in long-stay FFS residents.

**Figure T-1. Number of FFS and MA long-stay residents, Q3 of FY 2011–FY 2019**



FFS = Fee-for-service; MA = Medicare Advantage.

SOURCE: RTI analysis of Medicare Claims data (RTI program MA060; RTI folder: mkluckman\output\ar4\MA060).

Finally, we present descriptive tables comparing groups of interest over time. Note that due to changes in the MDS instrument, data on some conditions are not available from 2011 to 2014.

- **Tables T-1** and **T-2** compare the resident characteristics of FFS and MA beneficiaries from 2011 to 2019.
- **Tables T-3** and **T-4** compare the FFS residents in Clinical + Payment, Payment-Only, and other, non-intervention facilities to MA residents from 2014 to 2019.
- **Tables T-5** and **T-6** compare the residents in the different types of SNPs from 2011 to 2019.
- **Tables T-7** and **T-8** compare the MA residents in SNPs and non-SNPs from 2011 to 2019.

Overall, we do see the enrollment in MA plans increasing over time (**Tables T-1** and **T-2**). However, examining residents' health and cognitive status, we do not find consistent evidence suggesting that long-stay FFS residents had worse acuity compared to MA residents, either for all Initiative years, or more recently. Instead, there was no consistent pattern in acuity between the MA and FFS residents. For approximately a third of the health conditions (percent with diabetes, hip fracture, obstructive uropathy), MA residents and FFS residents had about the same prevalence over time. For another third of the conditions, MA residents had greater impairment in the areas of cognitive functioning, ADLs, and urinary and bowel incontinence, and for the last third, FFS residents had a higher prevalence of some conditions (percentage with pressure ulcers, UTIs, or viral hepatitis). Note that both MA and FFS long-stay residents were included in this analysis, regardless of other Initiative eligibility criteria; thus the study population differed from the mortality analyses presented in **Appendix S**. As described in **Section 4.4**, it is possible that the case-mix of the MA and FFS long-stay residents differs from what we would find if the analyses were limited to Initiative-eligible residents or those that would have been eligible but for MA status.

As can be seen in **Tables T-3** and **T-4**, residents in Clinical + Payment facilities tended to have greater acuity over time compared to MA residents, non-intervention FFS residents, and residents in Payment-Only facilities. Residents of these Clinical + Payment facilities consistently had the highest prevalence for just over a third of the listed conditions. For the remaining conditions, there were no other consistent patterns. Thus, there is little evidence of differential acuity among MA residents, non-intervention FFS residents, and residents in Payment-Only facilities.

**Table T-1. Characteristics of FFS and MA long-stay residents, Q3 of FY 2011–FY 2014**

Characteristic (%)	Q3 2011		Q3 2012		Q3 2013		Q3 2014	
	FFS	MA	FFS	MA	FFS	MA	FFS	MA
N	908,541	95,475	895,548	105,634	894,016	145,061	887,058	173,649
Mean Age (years)	81.22	83.11	81.13	82.98	80.75	82.81	80.62	82.74
Female	70.21	71.80	69.85	71.48	69.08	71.31	68.42	70.95
Non-Hispanic White	80.98	81.78	80.47	81.71	79.66	81.44	79.26	81.08
Non-Hispanic Black	12.65	11.98	12.89	12.04	13.32	11.75	13.47	12.00
Non-Hispanic Asian	1.34	1.85	1.41	1.78	1.50	1.79	1.57	1.76
Hispanic	4.30	3.76	4.49	3.89	4.74	4.43	4.89	4.58
Non-Hispanic Other	0.73	0.63	0.73	0.57	0.78	0.58	0.81	0.58
Full Dual	77.27	77.80	78.56	79.00	79.07	78.52	79.31	77.93
Frequently or Always Urinary Incontinent	59.62	63.24	60.53	63.57	60.49	63.18	60.47	62.96
Frequently or Always Bowel Incontinent	50.04	51.67	51.04	52.47	51.68	53.43	52.54	53.93
Pressure Ulcers	7.35	7.18	6.96	6.72	6.75	6.67	6.54	6.58
Obstructive Uropathy	0.64	0.65	0.69	0.68	0.83	0.78	0.90	0.87
UTI	8.04	7.40	7.64	6.92	6.52	6.11	5.82	5.53
Viral Hepatitis	—	—	—	—	—	—	—	—
Diabetes	32.26	31.68	32.58	32.35	33.12	32.65	33.25	32.80
Hip Fracture	1.97	2.01	1.83	1.84	1.84	1.91	1.85	1.94
Aphasia	4.58	4.80	4.61	4.86	4.67	4.57	4.72	4.47
Dementia	47.90	51.12	47.54	50.47	47.49	50.34	47.98	50.86
Paraplegia	—	—	—	—	—	—	0.80	0.70
Multiple Sclerosis	1.34	1.37	1.39	1.38	1.43	1.40	1.46	1.43
Any Cognitive Impairment	73.94	75.02	71.65	72.85	70.68	71.76	70.13	71.20
Cognitively Intact	24.39	23.52	26.09	25.06	27.20	26.25	27.88	26.87
Mildly Impaired	21.11	20.71	20.49	20.84	20.71	20.82	20.81	20.86
Moderately Impaired	37.31	38.15	35.94	36.49	35.66	36.54	35.34	36.38
Severely Impaired	17.20	17.62	17.49	17.60	16.43	16.39	15.97	15.89
Mean ADL Score	17.01	17.53	17.22	17.69	17.19	17.69	17.17	17.63

ADL = activities of daily living; COPD = chronic obstructive pulmonary disease; PTSD = post-traumatic stress disorder; UTI = urinary tract infection; Q3=quarter 3 of fiscal year; FFS = Fee-for-service; MA = Medicare Advantage; — = not measured in specific year.

SOURCE: RTI analysis of Medicare Claims data (RTI program MA060; RTI folder: mkluckman\output\ar4\MA060).

**Table T-2. Characteristics of FFS and MA long-stay residents, Q3 of FY 2015–FY 2019**

Characteristic (%)	Q3 2015		Q3 2016		Q3 2017		Q3 2018		Q3 2019	
	FFS	MA								
N	835,350	202,134	812,500	218,276	781,486	233,999	751,781	249,661	725,781	268,146
Mean Age (years)	80.53	81.95	80.44	81.80	80.18	81.66	79.89	81.40	79.70	81.04
Female	67.91	69.86	67.39	69.28	66.64	68.95	65.90	68.2	65.07	67.60
Non-Hispanic White	79.22	79.12	79.28	77.49	78.64	77.64	77.98	77.38	77.57	76.99
Non-Hispanic Black	13.44	13.34	13.43	14.11	13.74	14.19	14.08	14.53	14.19	15.12
Non-Hispanic Asian	1.58	1.88	1.64	1.94	1.75	1.89	1.85	1.86	1.97	1.80
Hispanic	4.92	5.02	4.80	5.80	5.01	5.65	5.19	5.58	5.33	5.42
Non-Hispanic Other	0.83	0.65	0.85	0.66	0.86	0.63	0.90	0.65	0.95	0.67
Full Dual	78.38	79.57	79.14	81.50	79.06	80.96	79.69	81.67	79.92	82.47
Frequently or Always Urinary Incontinent	60.89	62.96	61.24	63.78	61.48	64.04	61.48	64.16	61.52	63.76
Frequently or Always Bowel Incontinent	53.54	55.07	54.42	56.57	55.33	57.48	56.39	58.57	57.19	59.40
Pressure Ulcers	6.53	6.48	6.31	6.00	6.28	5.94	6.19	5.99	6.14	5.83
Obstructive Uropathy	1.01	1.04	1.29	1.32	1.64	1.68	1.90	1.95	2.19	2.21
UTI	5.22	4.81	4.37	3.90	3.69	3.26	2.97	2.65	2.79	2.40
Viral Hepatitis	0.51	0.39	0.58	0.48	0.71	0.56	0.78	0.65	0.87	0.73
Diabetes	33.42	33.34	33.55	33.88	33.90	34.00	34.31	34.41	34.66	34.95
Hip Fracture	1.86	1.89	1.78	1.75	1.92	1.96	2.02	2.06	2.16	2.17
Aphasia	4.70	4.47	4.66	4.46	4.76	4.47	4.94	4.50	5.06	4.57
Dementia	48.33	50.93	49.16	52.51	48.89	52.18	48.92	52.11	48.95	51.99
Paraplegia	0.84	0.75	0.89	0.79	0.89	0.82	0.94	0.83	0.95	0.83
Multiple Sclerosis	1.48	1.56	1.51	1.57	1.54	1.58	1.56	1.63	1.56	1.68
Any Cognitive Impairment	69.58	70.31	68.96	70.20	68.32	69.73	67.99	69.31	67.93	68.84
Cognitively Intact	28.43	27.83	29.20	28.11	29.85	28.56	30.18	29.01	30.28	29.52
Mildly Impaired	21.09	20.99	21.17	21.16	21.28	21.32	21.77	21.81	22.17	22.03
Moderately Impaired	35.07	35.77	34.60	35.88	34.31	35.61	34.14	35.32	34.36	35.56
Severely Impaired	15.42	15.41	15.03	14.85	14.55	14.51	13.91	13.87	13.19	12.89
Mean ADL Score	17.17	17.50	17.11	17.46	16.99	17.32	16.88	17.19	16.76	17.00

ADL = activities of daily living; COPD = chronic obstructive pulmonary disease; PTSD = post-traumatic stress disorder; UTI = urinary tract infection; Q3=quarter 3 of fiscal year; FFS = Fee-for-service; MA = Medicare Advantage; — = not measured in specific year.

SOURCE: RTI analysis of Medicare Claims data (RTI program MA060; RTI folder: mkluckman\output\ar4\MA060).

**Table T-3. Characteristics of Clinical + Payment, Payment-Only, other FFS, and MA long-stay residents, Q3 of FY 2014–FY 2016**

Characteristic (%)	Q3 2014				Q3 2015				Q3 2016			
	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA
N	10,955	12,415	863,688	173,649	10,542	11,958	812,850	202,134	10,250	11,859	790,391	218,276
Mean Age (years)	80.14	81.86	80.61	82.74	79.65	81.67	80.52	81.95	79.51	81.67	80.43	81.80
Female	69.77	71.29	68.37	70.95	68.64	70.25	67.87	69.86	67.80	70.38	67.34	69.28
Non-Hispanic White	73.15	82.58	79.29	81.08	72.97	82.64	79.25	79.12	73.81	82.31	79.3	77.49
Non-Hispanic Black	19.49	12.77	13.40	12.00	19.70	12.47	13.38	13.34	19.29	12.97	13.36	14.11
Non-Hispanic Asian	1.20	0.71	1.59	1.76	1.22	1.06	1.6	1.88	1.27	1.04	1.65	1.94
Hispanic	5.14	3.51	4.90	4.58	4.85	3.50	4.94	5.02	4.37	3.29	4.83	5.80
Non-Hispanic Other	1.01	0.43	0.81	0.58	1.25	0.33	0.83	0.65	1.25	0.39	0.86	0.66
Full Dual	85.17	81.52	79.20	77.93	85.49	82.63	78.23	79.57	85.18	82.25	79.02	81.5
Frequently or Always Urinary Incontinent	64.09	63.84	60.38	62.96	63.81	63.63	60.81	62.96	64.38	64.01	61.16	63.78
Frequently or Always Bowel Incontinent	59.18	52.87	52.45	53.93	60.16	53.19	53.46	55.07	60.25	55.65	54.33	56.57
Pressure Ulcers	7.33	6.00	6.53	6.58	7.09	5.95	6.53	6.48	6.78	5.84	6.31	6.00
Obstructive Uropathy	0.89	1.39	0.9	0.87	1.08	1.29	1.00	1.04	1.54	1.31	1.29	1.32
UTI	4.74	5.07	5.84	5.53	4.22	4.15	5.25	4.81	3.33	3.18	4.40	3.9
Viral Hepatitis	—	—	—	—	0.48	0.45	0.52	0.39	0.68	0.5	0.58	0.48
Diabetes	34.15	32.05	33.25	32.8	35.05	32.13	33.41	33.34	34.56	32.24	33.56	33.88
Hip Fracture	1.35	1.50	1.87	1.94	1.26	1.52	1.87	1.89	1.24	1.43	1.79	1.75
Aphasia	5.73	5.29	4.7	4.47	5.36	5.04	4.69	4.47	4.71	4.94	4.66	4.46

(continued)

**Table T-3. Characteristics of Clinical + Payment, Payment-Only, other FFS, and MA long-stay residents, Q3 of FY 2014–FY 2016 (continued)**

Characteristic (%)	Q3 2014				Q3 2015				Q3 2016			
	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA
Dementia	50.75	51.68	47.89	50.86	50.54	53.23	48.23	50.93	50.22	52.69	49.09	52.51
Paraplegia	0.78	0.73	0.80	0.70	0.88	0.76	0.84	0.75	0.80	0.76	0.90	0.79
Multiple Sclerosis	1.95	1.36	1.45	1.43	2.03	1.40	1.47	1.56	2.04	1.45	1.50	1.57
Any Cognitive Impairment	68.36	70.27	70.15	71.20	68.39	69.75	69.59	70.31	67.61	70.06	68.96	70.20
Cognitively Intact	29.51	27.83	27.86	26.87	29.36	28.24	28.42	27.83	30.28	28.43	29.20	28.11
Mildly Impaired	20.23	20.20	20.83	20.86	20.94	21.10	21.09	20.99	21.06	20.99	21.18	21.16
Moderately Impaired	33.36	36.14	35.35	36.38	33.39	34.97	35.09	35.77	34.13	35.40	34.59	35.88
Severely Impaired	16.91	15.84	15.96	15.89	16.31	15.70	15.4	15.41	14.52	15.18	15.03	14.85
Mean ADL Score	17.90	17.66	17.16	17.63	17.83	17.44	17.15	17.50	17.64	17.33	17.10	17.46

ADL = activities of daily living; COPD = chronic obstructive pulmonary disease; PTSD = post-traumatic stress disorder; UTI = urinary tract infection; Q3 = quarter 3 of fiscal year; MA = Medicare Advantage; FFS = Fee-for-service; — = not measured in specific year.

SOURCE: RTI analysis of Medicare Claims data (RTI program MA060; RTI folder: mkluckman\output\ar4\MA060).

**Table T-4. Characteristics of Clinical + Payment, Payment-Only, other FFS, and MA long-stay residents, Q3 of FY 2017–FY 2019**

Characteristic (%)	Q3 2017				Q3 2018				Q3 2019			
	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA
N	10,081	11,190	760,215	233,999	9,121	10,240	732,420	249,661	8,915	9,569	707,297	268,146
Mean Age	79.30	81.41	80.17	81.66	79.12	81.46	79.87	81.4	78.82	81.10	79.69	81.04
Female	67.39	69.72	66.59	68.95	65.69	69.46	65.85	68.2	65.32	68.41	65.03	67.60
Non-Hispanic White	72.98	81.92	78.66	77.64	71.32	82.18	78.00	77.38	70.67	82.41	77.59	76.99
Non-Hispanic Black	19.74	13.21	13.66	14.19	20.03	12.83	14.02	14.53	19.76	12.31	14.14	15.12
Non-Hispanic Asian	1.53	1.18	1.76	1.89	2.15	1.18	1.86	1.86	2.51	1.33	1.97	1.80
Hispanic	4.85	3.39	5.04	5.65	5.58	3.44	5.21	5.58	6.23	3.62	5.35	5.42
Non-Hispanic Other	0.90	0.30	0.87	0.63	0.93	0.39	0.91	0.65	0.83	0.33	0.96	0.67
Full Dual	84.53	81.13	78.96	80.96	85.41	82.55	79.58	81.67	86.49	82.88	79.8	82.47
Frequently or Always Urinary Incontinent	65.05	63.11	61.41	64.04	65.76	63.62	61.40	64.16	66.67	63.79	61.42	63.76
Frequently or Always Bowel Incontinent	62.04	55.06	55.24	57.48	64.81	56.46	56.28	58.57	66.06	57.90	57.07	59.40
Pressure Ulcers	7.09	5.89	6.28	5.94	7.01	5.88	6.19	5.99	6.62	5.88	6.14	5.83
Obstructive Uropathy	1.64	1.87	1.64	1.68	1.79	1.91	1.90	1.95	2.29	2.22	2.19	2.21
UTI	2.46	3.20	3.72	3.26	2.25	2.81	2.98	2.65	2.08	2.71	2.80	2.40
Viral Hepatitis	0.77	0.46	0.71	0.56	0.93	0.47	0.78	0.65	1.12	0.54	0.88	0.73
Diabetes	35.08	32.65	33.91	34.00	35.00	32.59	34.33	34.41	35.49	33.33	34.67	34.95
Hip Fracture	1.20	1.64	1.94	1.96	1.27	1.86	2.03	2.06	1.18	1.95	2.18	2.17
Aphasia	4.58	4.92	4.76	4.47	4.36	4.88	4.94	4.50	4.32	4.82	5.07	4.57
Dementia	49.21	52.22	48.84	52.18	49.63	53.07	48.86	52.11	49.53	51.23	48.92	51.99

(continued)

**Table T-4. Characteristics of Clinical + Payment, Payment-Only, other FFS, and MA long-stay residents, Q3 of FY 2017–FY 2019 (continued)**

Characteristic (%)	Q3 2017				Q3 2018				Q3 2019			
	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA	Clinical + Payment (FFS)	Payment-Only (FFS)	Other FFS	MA
Paraplegia	0.88	0.63	0.90	0.82	0.92	0.69	0.94	0.83	1.18	0.65	0.95	0.83
Multiple Sclerosis	1.98	1.55	1.54	1.58	2.00	1.57	1.55	1.63	1.96	1.64	1.55	1.68
Any Cognitive Impairment	67.59	69.66	68.31	69.73	67.48	70.29	67.97	69.31	66.85	68.73	67.94	68.84
Cognitively Intact	30.11	28.82	29.86	28.56	30.56	28.28	30.21	29.01	31.38	29.61	30.28	29.52
Mildly Impaired	21.93	21.41	21.27	21.32	21.61	21.74	21.78	21.81	21.37	22.11	22.18	22.03
Moderately Impaired	32.98	35.55	34.31	35.61	33.82	36.08	34.11	35.32	33.33	35.99	34.35	35.56
Severely Impaired	14.98	14.22	14.55	14.51	14.01	13.89	13.90	13.87	13.91	12.29	13.19	12.89
Mean ADL Score	17.61	17.10	16.98	17.32	17.67	16.99	16.87	17.19	17.49	16.89	16.75	17.00

ADL = activities of daily living; COPD = chronic obstructive pulmonary disease; PTSD = post-traumatic stress disorder; UTI = urinary tract infection; Q3 = quarter 3 of fiscal year; MA = Medicare Advantage; FFS – Fee-for-service; — = not measured in specific year.

SOURCE: RTI analysis of Medicare Claims data (RTI program MA060; RTI folder: mkluckman\output\ar4\MA060).

**Table T-5. Characteristics of MA long-stay residents by SNP status, Q3 of FY 2011–FY 2014**

Characteristic (%)	Q3 2011		Q3 2012		Q3 2013		Q3 2014	
	Non-SNP MA	SNP						
N	51,621	43,476	58,656	46,482	85,315	58,968	104,062	68,605
Mean Age (years)	83.84	82.22	83.80	81.94	83.66	81.57	83.63	81.40
Female	70.42	73.47	70.49	72.79	70.49	72.50	70.43	71.81
Non-Hispanic White	85.38	77.50	86.02	76.27	86.10	74.65	86.07	73.47
Non-Hispanic Black	9.40	15.07	9.06	15.82	8.86	15.97	8.96	16.60
Non-Hispanic Asian	1.98	1.70	1.74	1.83	1.63	2.05	1.54	2.10
Hispanic	2.75	4.94	2.75	5.34	2.98	6.54	2.99	7.01
Non-Hispanic Other	0.49	0.79	0.43	0.75	0.44	0.79	0.43	0.82
Full Dual	62.90	95.45	65.41	96.09	66.32	96.05	66.13	95.72
Frequently or Always Urinary Incontinent	62.42	64.33	62.72	64.72	62.19	64.71	61.93	64.61
Frequently or Always Bowel Incontinent	50.76	52.86	51.18	54.18	52.01	55.62	52.56	56.15
Pressure Ulcers	7.90	6.33	7.41	5.84	7.21	5.90	7.14	5.71
Obstructive Uropathy	0.70	0.59	0.68	0.66	0.79	0.77	0.91	0.81
UTI	8.18	6.48	7.37	6.35	6.64	5.35	6.08	4.71
Viral Hepatitis	—	—	—	—	—	—	—	—
Diabetes	29.81	33.93	30.25	35.01	30.46	35.86	30.56	36.23
Hip Fracture	2.42	1.54	2.23	1.35	2.27	1.39	2.31	1.38
Aphasia	4.42	5.27	4.58	5.18	4.23	5.06	4.10	5.06
Dementia	50.09	52.36	49.12	52.16	49.22	52.02	49.71	52.67
Paraplegia	—	—	—	—	—	—	0.54	0.95
Multiple Sclerosis	1.05	1.76	1.04	1.81	1.05	1.92	1.11	1.92
Any Cognitive Impairment	75.58	74.39	73.64	71.87	72.69	70.50	72.07	69.98
Cognitively Intact	23.03	24.08	24.20	26.12	25.23	27.63	25.92	28.21
Mildly Impaired	20.72	20.66	20.89	20.76	21.19	20.26	21.07	20.50
Moderately Impaired	39.13	36.99	37.76	34.87	37.58	35.08	37.46	34.81
Severely Impaired	17.12	18.28	17.15	18.25	16.01	17.03	15.54	16.48
Mean ADL Score	17.58	17.48	17.75	17.63	17.70	17.69	17.68	17.57

ADL = activities of daily living; COPD = chronic obstructive pulmonary disease; PTSD = post-traumatic stress disorder; UTI = urinary tract infection; Q3 = quarter 3 of fiscal year; SNP = Special Needs Plan; MA = Medicare Advantage; — = not measured in specific year.

SOURCE: RTI analysis of Medicare Claims data (RTI program MA060; RTI folder: mkluckman\output\ar4\MA060).

**Table T-6. Characteristics of MA long-stay residents by SNP status, Q3 of FY 2015–FY 2019**

Characteristic (%)	Q3 2015		Q3 2016		Q3 2017		Q3 2018		Q3 2019	
	Non-SNP MA	SNP								
N	129,668	71,334	137,159	79,895	145,977	86,628	148,040	99,831	150,873	115,057
Mean Age (years)	82.32	81.28	82.30	80.95	82.31	80.57	82.32	80.04	82.17	79.60
Female	69.04	71.35	68.56	70.53	68.55	69.64	67.93	68.65	67.33	68.03
Non-Hispanic White	82.57	72.83	80.90	71.59	81.51	71.05	81.80	70.77	81.66	70.85
Non-Hispanic Black	11.54	16.60	11.98	17.77	11.81	18.23	11.43	19.14	11.62	19.69
Non-Hispanic Asian	1.73	2.15	1.78	2.22	1.63	2.34	1.59	2.28	1.53	2.16
Hispanic	3.67	7.49	4.78	7.59	4.51	7.61	4.58	7.09	4.57	6.56
Non-Hispanic Other	0.49	0.94	0.57	0.83	0.54	0.77	0.60	0.72	0.62	0.73
Full Dual	70.89	95.24	72.98	96.03	72.20	95.65	71.97	95.94	72.16	95.87
Frequently or Always Urinary Incontinent	61.84	65.10	62.80	65.54	63.19	65.57	63.46	65.35	63.31	64.53
Frequently or Always Bowel Incontinent	53.92	57.31	55.45	58.66	56.44	59.37	57.43	60.45	58.48	60.76
Pressure Ulcers	6.89	5.73	6.35	5.38	6.32	5.28	6.45	5.33	6.36	5.14
Obstructive Uropathy	1.10	0.92	1.42	1.15	1.84	1.40	2.16	1.63	2.45	1.91
UTI	5.11	4.26	4.21	3.35	3.48	2.88	2.83	2.40	2.51	2.24
Viral Hepatitis	0.30	0.54	0.38	0.64	0.44	0.75	0.46	0.93	0.53	1.00
Diabetes	31.75	36.26	32.28	36.66	32.26	36.98	32.25	37.66	32.65	37.97
Hip Fracture	2.11	1.47	2.05	1.23	2.26	1.43	2.42	1.53	2.60	1.61
Aphasia	4.22	4.94	4.25	4.84	4.24	4.87	4.23	4.92	4.32	4.91
Dementia	49.98	52.73	51.84	53.7	51.72	53.05	51.81	52.65	52.03	52.01
Paraplegia	0.61	1.01	0.68	0.99	0.69	1.04	0.66	1.08	0.62	1.11
Multiple Sclerosis	1.36	1.93	1.37	1.91	1.35	1.96	1.36	2.01	1.39	2.06
Any Cognitive Impairment	71.04	69.10	71.25	68.47	70.96	67.75	70.87	67.14	70.85	66.34
Cognitively Intact	27.07	29.08	26.98	29.96	27.24	30.67	27.31	31.34	27.34	32.21
Mildly Impaired	21.21	20.58	21.51	20.51	21.51	20.98	21.92	21.62	22.22	21.76
Moderately Impaired	36.50	34.49	36.76	34.43	36.71	33.81	36.86	33.15	37.47	33.17
Severely Impaired	15.22	15.85	14.75	15.10	14.54	14.54	13.91	13.89	12.98	12.85
Mean ADL Score	17.48	17.54	17.47	17.46	17.36	17.27	17.28	17.07	17.14	16.84

ADL = activities of daily living; COPD = chronic obstructive pulmonary disease; PTSD = post-traumatic stress disorder; UTI = urinary tract infection; Q3 = quarter 3 of fiscal year; SNP = Special Needs Plan; MA = Medicare Advantage; — = not measured in specific year.

SOURCE: RTI analysis of Medicare Claims data (RTI program MA060; RTI folder: mkluckman\output\ar4\MA060).

**Table T-7. Characteristics of long-stay residents by SNP type, Q3 of FY 2011–FY 2014**

Characteristic (%)	Q3 2011				Q3 2012				Q3 2013				Q3 2014			
	I-SNP	D-SNP	C-SNP	FIDE-SNP	I-SNP	D-SNP	C-SNP	FIDE-SNP	I-SNP	D-SNP	C-SNP	FIDE-SNP	I-SNP	D-SNP	C-SNP	FIDE-SNP
N	23,269	19,429	713	—	25,596	4,919	816	15,023	33,948	9,600	1,366	13,865	41,293	11,182	1,771	14,187
Mean Age (years)	81.86	82.78	79.28	—	81.59	78.00	78.59	84.04	81.59	77.92	77.71	84.48	81.55	77.90	77.21	84.30
Female	74.20	72.96	63.39	—	72.99	67.09	65.81	74.72	72.71	69.07	66.54	74.98	72.1	68.58	63.98	74.58
Non-Hispanic White	73.67	82.79	58.45	—	72.48	65.21	57.07	87.54	72.87	61.83	55.74	90.04	72.61	58.53	54.08	90.39
Non-Hispanic Black	19.41	9.27	31.81	—	20.17	20.36	33.71	5.84	19.00	20.59	34.73	3.41	18.93	21.09	35.73	3.78
Non-Hispanic Asian	1.24	2.30	0.57	—	1.39	3.49	0.38	2.10	1.41	3.98	0.15	2.49	1.38	5.93	0.64	1.34
Hispanic	4.94	4.79	8.74	—	5.26	9.83	8.71	3.76	6.04	12.51	9.08	3.19	6.39	12.95	9.21	3.71
Non-Hispanic Other	0.74	0.87	0.43	—	0.70	1.11	0.13	0.75	0.68	1.10	0.30	0.87	0.68	1.50	0.35	0.78
Full Dual	93.89	98.03	76.16	—	94.87	96.61	81.13	98.80	95.30	95.85	83.46	99.29	95.04	95.34	84.30	99.38
Frequently or Always Urinary Incontinent	66.88	61.55	57.22	—	67.25	56.88	57.35	63.39	67.58	57.42	56.22	63.63	67.37	57.49	55.17	63.51
Frequently or Always Bowel Incontinent	58.50	46.24	49.79	—	59.20	48.87	50.25	47.63	59.55	52.96	52.49	48.19	59.55	53.16	53.64	49.02
Pressure Ulcers	6.35	6.18	9.68	—	5.90	7.20	10.07	5.09	5.71	7.27	9.08	5.08	5.51	6.96	9.15	4.84
Obstructive Uropathy	0.42	0.78	0.70	—	0.54	0.71	0.49	0.86	0.68	0.72	0.95	1.04	0.75	0.80	1.36	0.92
UTI	6.41	6.49	7.71	—	6.25	7.64	8.09	6.00	5.18	5.99	7.39	5.09	4.44	5.03	7.85	4.86
Viral Hepatitis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Diabetes	33.16	33.78	62.13	—	34.30	39.38	65.44	33.14	34.82	39.46	67.79	32.72	34.88	39.26	74.53	32.88
Hip Fracture	1.47	1.61	1.40	—	1.16	1.85	1.47	1.48	1.21	1.71	2.12	1.54	1.24	1.73	1.75	1.45
Aphasia	6.04	4.44	2.81	—	5.96	4.17	2.83	4.30	5.89	4.07	2.86	3.96	5.80	3.96	3.39	3.97
Dementia	55.62	48.83	43.34	—	55.75	41.50	41.03	50.18	56.34	40.50	39.31	50.82	56.77	40.72	39.66	51.90
Paraplegia	—	—	—	—	—	—	—	—	—	—	—	—	0.98	1.05	0.28	0.90

(continued)

**Table T-7. Characteristics of long-stay residents by SNP type, Q3 of FY 2011–FY 2014 (continued)**

Characteristic (%)	Q3 2011				Q3 2012				Q3 2013				Q3 2014			
	I-SNP	D-SNP	C-SNP	FIDE-SNP												
Multiple Sclerosis	2.02	1.48	0.42	—	2.07	1.71	0.86	1.44	2.24	1.77	0.29	1.41	2.19	1.66	0.34	1.56
Any Cognitive Impairment	76.19	72.25	74.11	—	73.74	64.98	69.76	71.11	72.79	64.98	65.52	69.29	72.08	64.98	64.58	68.57
Cognitively Intact	22.35	26.12	24.23	—	24.51	31.96	26.63	26.94	25.64	32.27	31.61	28.95	26.42	32.26	32.18	29.75
Mildly Impaired	19.67	21.69	25.11	—	19.96	23.08	25.95	21.16	19.68	21.97	24.44	20.14	19.7	21.93	26.13	21.07
Moderately Impaired	38.05	35.59	40.73	—	35.88	31.19	36.28	34.23	36.32	32.41	33.95	34.05	36.35	32.55	32.62	32.35
Severely Impaired	19.93	16.59	9.93	—	19.64	13.77	11.14	17.68	18.37	13.35	10.00	16.86	17.53	13.26	9.07	16.83
Mean ADL Score	18.02	16.90	15.85	—	18.17	16.82	16.45	17.06	18.20	17.12	16.54	16.94	17.98	17.11	16.58	16.88

ADL = activities of daily living; COPD = chronic obstructive pulmonary disease; PTSD = post-traumatic stress disorder; UTI = urinary tract infection; Q3 = quarter 3 of fiscal year; I-SNP = Institutional Special Needs Plan; D-SNP = Dual Eligible Special Needs Plan; C-SNP = Chronic Condition Special Needs Plans; FIDE-SNP = Fully Integrated Special Needs Plans; — = not measured in specific year.

SOURCE: RTI analysis of Medicare Claims data (RTI program MA060; RTI folder: mkluckman\output\ar4\MA060).

**Table T-8. Characteristics of long-stay residents by SNP type, Q3 of FY 2015–FY 2019**

Characteristic (%)	Q3 2015				Q3 2016				Q3 2017				Q3 2018				Q3 2019			
	I-SNP	D-SNP	C-SNP	FIDE-SNP																
N	43,499	11,442	2,103	14,079	51,058	12,236	2,384	13,971	55,761	14,179	2,360	14,019	66,211	16,405	2,629	14,229	77,162	20,132	2,696	14,338
Mean Age	81.56	77.81	77.49	83.83	81.25	77.58	77.22	83.57	80.90	77.23	77.2	83.29	80.34	76.95	77.21	82.85	79.93	76.71	77.25	82.56
Female	71.85	68.16	65.10	73.40	70.71	68.27	63.59	73.20	69.91	67.30	64.15	72.13	68.98	66.28	62.50	71.11	68.30	66.49	60.91	70.37
Non-Hispanic White	72.15	59.15	54.15	89.02	71.13	58.25	53.78	88.14	70.92	58.82	53.07	87.34	70.97	59.61	53.39	86.14	71.24	61.39	55.60	85.43
Non-Hispanic Black	18.32	21.38	35.60	4.41	19.42	22.53	34.65	4.55	19.81	22.43	34.15	4.80	20.60	22.50	33.20	5.66	20.99	22.95	31.07	5.58
Non-Hispanic Asian	1.46	5.49	0.78	1.76	1.61	5.46	1.12	1.86	1.66	5.40	1.12	2.15	1.59	5.25	1.25	2.27	1.54	4.61	1.10	2.27
Hispanic	7.19	12.40	9.13	4.09	7.13	12.16	10.15	4.75	7.06	11.65	11.23	4.92	6.36	10.96	11.81	5.11	5.74	9.43	11.73	5.82
Non-Hispanic Other	0.87	1.58	0.34	0.72	0.70	1.61	0.30	0.70	0.55	1.70	0.43	0.79	0.48	1.69	0.35	0.83	0.48	1.62	0.50	0.90
Full Dual	94.54	94.84	84.97	99.3	95.81	95.59	84.19	99.25	95.42	95.83	85.34	98.10	95.76	96.00	84.98	98.76	95.59	96.00	84.90	99.27
Frequently or Always Urinary Incontinent	68.03	57.23	56.06	63.96	68.02	57.71	57.13	64.98	68.31	57.49	56.57	64.64	68.21	56.43	57.13	64.07	67.31	55.89	56.19	63.76
Frequently or Always Bowel Incontinent	61.02	52.80	53.88	50.16	61.90	54.23	55.20	51.39	62.76	53.67	56.23	52.30	63.46	54.74	59.11	53.36	63.90	53.92	57.42	54.31
Pressure Ulcers	5.50	7.49	8.51	4.65	5.00	6.64	9.65	4.97	5.00	6.51	9.15	4.44	4.93	6.61	9.55	4.84	4.84	6.02	9.01	4.78
Obstructive Uropathy	0.87	1.03	0.95	0.99	1.08	1.36	1.51	1.15	1.33	1.61	1.69	1.41	1.55	1.89	2.05	1.57	1.80	2.17	2.49	2.02
UTI	4.02	4.75	5.61	4.41	3.12	3.57	5.29	3.64	2.63	3.25	4.79	3.15	2.23	2.54	4.11	2.63	2.06	2.60	3.67	2.39
Viral Hepatitis	0.50	1.01	0.72	0.29	0.56	1.25	0.50	0.41	0.65	1.35	0.81	0.53	0.85	1.66	0.72	0.53	0.94	1.51	0.93	0.58
Diabetes	34.77	39.07	72.8	32.94	35.08	39.36	74.58	33.51	35.36	39.88	74.49	33.95	36.42	39.46	74.40	34.34	36.68	40.44	73.81	34.26
Hip Fracture	1.37	1.97	1.66	1.37	1.10	1.67	2.02	1.15	1.33	1.91	1.87	1.32	1.36	2.24	2.13	1.41	1.47	2.09	2.15	1.51
Aphasia	5.67	3.84	3.28	3.83	5.36	4.19	4.07	3.64	5.47	4.13	3.65	3.51	5.46	4.21	4.26	3.39	5.35	4.38	3.78	3.61
Dementia	56.61	40.68	41.13	52.46	57.43	41.47	42.23	52.84	56.80	41.89	40.9	51.77	56.25	41.94	40.26	50.95	55.64	40.97	42.19	50.38
Paraplegia	1.06	1.17	0.43	0.84	1.02	1.12	0.46	0.86	1.07	1.15	0.42	0.91	1.12	1.22	0.49	0.81	1.16	1.08	0.48	0.95
Multiple Sclerosis	2.19	1.62	0.43	1.61	2.12	1.68	0.38	1.62	2.17	1.65	0.42	1.70	2.18	1.66	0.42	1.94	2.25	1.67	0.37	1.88
Any Cognitive Impairment	71.06	64.10	64.31	67.92	70.04	63.61	64.70	67.80	69.39	63.04	63.55	66.91	68.63	62.34	64.7	66.47	68.07	60.67	61.93	66.35

(continued)

**Table T-8. Characteristics of long-stay residents by SNP type, Q3 of FY 2015–FY 2019 (continued)**

Characteristic	Q3 2015				Q3 2016				Q3 2017				Q3 2018				Q3 2019			
	I-SNP	D-SNP	C-SNP	FIDE-SNP																
Cognitively Intact	27.49	32.98	32.44	30.40	28.73	33.83	32.96	30.58	29.40	34.32	34.67	31.33	30.18	35.39	32.87	31.75	30.79	37.03	36.00	32.15
Mildly Impaired	19.73	22.25	25.01	21.20	19.75	22.13	24.28	21.29	20.12	22.86	25.82	21.74	21.19	22.40	26.52	21.88	21.37	22.77	24.01	22.00
Moderately Impaired	35.66	32.03	32.55	33.07	35.48	31.71	32.73	33.15	34.88	31.26	30.43	32.74	33.78	31.31	31.62	32.72	34.12	30.04	31.25	33.02
Severely Impaired	17.11	12.74	9.99	15.33	16.04	12.32	10.02	14.99	15.60	11.56	9.09	14.19	14.85	10.89	8.99	13.65	13.73	10.17	8.74	12.83
Mean ADL Score	17.97	17.02	16.55	16.78	17.82	16.92	16.65	16.76	17.67	16.51	16.58	16.63	17.39	16.29	16.53	16.61	17.14	15.98	16.33	16.54

ADL = activities of daily living; COPD = chronic obstructive pulmonary disease; PTSD = post-traumatic stress disorder; UTI = urinary tract infection; Q3 = quarter 3 of fiscal year; I-SNP = Institutional Special Needs Plan; D-SNP = Dual Eligible Special Needs Plan; C-SNP = Chronic Condition Special Needs Plans; FIDE-SNP = Fully Integrated Special Needs Plans; — = not measured in specific year.

SOURCE: RTI analysis of Medicare Claims data (RTI program MA060; RTI folder: mkluckman\output\ar4\MA060).

## APPENDIX U

### MEDICAID EXPENDITURES FOR INITIATIVE-ELIGIBLE RESIDENTS IN FY 2016

The primary goals of NFI 2 are to reduce potentially avoidable hospitalizations and emergency department (ED) visits among nursing facility residents, and associated Medicare expenditures. If the Initiative is successful in reducing hospital admissions, residents would spend additional days in the nursing facility, which could increase Medicaid costs. On the other hand, reduced cost-sharing responsibilities due to avoided hospitalizations have the potential to reduce Medicaid costs. In this section, we report on Medicaid expenditures for Initiative-eligible residents who are dually eligible for Medicare and Medicaid using FY 2016 data, which were the most recent data available for this study. Analyses of more recent data will be conducted when those data become available. We begin with a brief summary of data limitations, and then describe the analysis methodology and results.

#### U.1 Data Source and Quality

We obtained the FY 2016 Transformed Medicaid Statistical Information System (T-MSIS) Analytic Files (TAF) in March 2020.<sup>40</sup> Medicaid is a state-administered program, and each state submits data to CMS, including enrollment, service utilization, and payment data. The claims files are Inpatient, Other service (outpatient institutional and professional), Long-term care, and Pharmacy (RX). CMS, through a contractor, examined the quality of claims data from each state, and classified the data with labels of low, medium, or high concern, unusable, or unclassified. The unclassified category may refer to data that are either not applicable to a state; indicate there were not enough TAF or benchmark data for a reliable analysis; or indicate a methodological issue prevented a state's data from being classified into one of the four categories. The criteria for classifying the level of concern about the data is described in detail at <https://www.medicaid.gov/dq-atlas/landing/topics/info>.

For the seven Initiative states, data quality varied for enrollment benchmarking, claims completeness, and expenditures. As shown in **Table U-1**, Alabama and Indiana data have low data quality concerns generally, whereas Missouri data are generally either unclassified or unusable. For all Initiative states except Missouri, the completeness for Long-term care claims is classified as low concern; Missouri's Long-term care claims data are considered unusable. For Inpatient claims and Other service claims, data completeness concerns were low to medium for most Initiative states, with exceptions being Nevada with quality concerns considered high and Missouri with unusable Other service data. For expenditure data, the data quality concerns were low or medium for most Initiative states except for Colorado and Pennsylvania, which had high concerns, and Missouri with some unclassified data concerns. The quality concerns for service utilization data for the seven states were low for most states. In addition to being considered unusable, as described

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<sup>40</sup> There have been multiple releases of the FY 2016 TAF data. We used the data available in March 2020 (Release 1) for these analyses.

in more detail below, Long-term claims data for Missouri were generally not available and thus not reported. For the remaining states, we matched a high proportion of our sample's MDS data records with nursing facility claims (before removing managed care claims) and thus analyzed these data, recognizing that there may be data quality issues. In addition to using the CMS quality classifications, we reviewed the data in more detail and by month. We found several anomalies and observed few or no Long-term claims for New York and Pennsylvania for at least 3 months; therefore, we do not report summary expenditure data from New York and Pennsylvania in addition to Missouri.

**Table U-1. Data quality concerns among the NFI 2 Initiative states**

Topic	Alabama	Colorado	Indiana	Missouri	Nevada	New York	Pennsylvania
<b>Enrollment Benchmarking</b>							
Medicaid beneficiaries	Low	Unusable	Medium	Unusable	Low	Medium	Medium
Dual-Eligible beneficiaries	Low	High	Low	Unusable	High	High	High
New eligible beneficiaries	Unclassified	Unusable	Low	Unclassified	Low	Low	Unusable
<b>Claim Completeness</b>							
LT	Low	Low	Low	Unusable	Low	Low	Low
IP	Low	Medium	Low	Low	High	Medium	Low
OT	Medium	Medium	Low	Unusable	High	Low	Low
<b>Expenditures</b>							
FFS exp	Low	High	Low	Medium	Low	Medium	Low
Payment consistency LT	Medium	High	Low	Unclassified	Medium	Low	High
Payment consistency IP	Low	High	Low	Low	Medium	Low	High
Payment consistency OT	Low	Low	Low	Unclassified	Low	Low	Low
<b>Service use</b>							
Diagnosis code LT	Low	Low	Low	Low	Low	Low	Low
Diagnosis code IP	Low	Low	Low	Low	Low	Low	Low
Diagnosis code OT	Low	Low	Low	Unclassified	Low	Low	Low
Type of service LT	Low	Low	Low	Unclassified	Low	Low	Low
Type of service IP	Low	Low	Low	High	Medium	Low	Low
Type of service OT	Low	Low	Low	Unclassified	Low	Low	Low
Place of service	Low	Low	Low	Unclassified	Low	Medium	Low
Admission date LT	Low	Low	Low	Low	Low	Medium	Low
Admission date IP	Low	Low	Low	Low	Low	Low	Low
Discharge date LT	Low	Unusable	Low	Unusable	Unusable	Medium	Unusable
Discharge date IP	Low	Low	High	Low	Low	Low	Low

LT = Long-term care claims; IP = Inpatient claims; OT = Other claims; FFS = Fee-for service.

NOTE: These criteria apply only to the analysis of the IP, OT, and RX files. Ratings are for the data at the time we accessed them.

SOURCE: Medicaid Data Quality Assessments (DQAtlas; URL: <https://www.medicaid.gov/dq-atlas/landing/topics/info>). Accessed on 11/30/2020

## U.2 Methods

Here we describe our process of validating the data to determine what data could not be used to calculate Medicaid expenditures. We began by identifying the sample in NFI 2 participating nursing facilities. We started by selecting the long-stay Initiative-eligible residents who were Medicare beneficiaries from the MDS data. We then identified beneficiaries with dual status at any time in the year using the dual status code reported by Medicare (**Table U-2**). Next, we attempted to find a match for each of the dual-eligible beneficiaries in the Medicaid Beneficiary Summary File using combinations of social security number, health insurance claim number, gender, and date of birth. During the matching process, we found a small number of these dual-eligible beneficiaries that matched to more than one person in the Medicaid Beneficiary Summary File, and we selected the best match so that we only had one match per resident. As shown in **Table U-2**, we identified most beneficiaries across the Initiative states, ranging from 92.9 percent for RAVEN (Pennsylvania) to 99.2 percent for AQAF (Alabama).

After identifying a match, we searched for nursing facility claims for each resident, excluding resident claims data that were not from the assigned nursing facility’s state. When we restricted the match to Medicaid nursing facility claims in the assigned state, we found that MOQI (Missouri) had few claims, which was not unexpected based on the data quality review classifying Missouri data as “unusable.” For the remaining states, the claims match rate ranged from 87.3 percent for NY-RAH (New York) to 97.6 percent for AQAF (Alabama). In the final step of selecting the sample, we identified residents with comprehensive or long-term Medicaid managed care for one or more months and excluded their records from Medicaid expenditure calculations, because their Medicaid payment data may not be complete. Overall, 8.3 percent (or 1,482) of all residents had comprehensive or long-term Medicaid managed care. By ECCP, few eligible residents were in Medicaid managed care programs; the exception was NY-RAH (New York), where we found 22 percent of dual-eligible residents had Medicaid managed care.

Given the lack of available nursing facility claims for Missouri, we excluded data from this state for our analyses of Medicaid expenditures. For the remaining states, our matched Medicaid sample includes between 67.3 percent (NY-RAH) and 96.9 percent (AQAF) of the original sample of Initiative-eligible residents who are also dual-eligible beneficiaries.

**Table U-2. Sample selection process for Medicaid expenditure analyses, FY 2016**

ECCP (State)	Identified as Initiative-eligible & Dual (Initial Sample, N)	Matched to Medicaid Enrollment Record		Had Nursing Facility Claims		Not Enrolled in Medicaid Managed Care (Final Sample)	
		N	%	N	%	N	%
AQAF (AL)	3,823	3,793	99.2	3,733	97.6	3,703	96.9
ATOP2 (CO)	1,292	1,258	97.4	1,229	95.1	1,151	89.1
ATOP2 (NV)	941	926	98.4	916	97.3	916	97.3
MOQI (MO)	2,931	2,773	94.6	1	< 0.01	1	< 0.01
NY-RAH (NY)	6,853	6,397	93.3	5,981	87.3	4,615	67.3
OPTIMISTIC (IN)	3,406	3,326	97.7	3,260	95.7	3,256	95.6
RAVEN (PA)	3,125	2,902	92.9	2,789	89.2	2,785	89.1

SOURCE: RTI analysis of Medicaid TAF for FY 2016 (RTI program MDCCD084\_Create finder file using MDS and Medicaid data updated TAF file 2016).

NOTE: N’s in this table are lower than those in **Appendix L, Table L-2** and **L-3**, because we further limited the sample to Medicaid-eligible residents

Our analyses of Medicaid payments included all payments made for any claim in an exposure period for Initiative-eligible residents. We identified the service categories of interest and selected claims for nursing facility stays, inpatient stays, pharmacy, and other services. We identified ED visits and observation stays using revenue codes and visit codes. After summing the claims at the resident level, we observed a few residents had negative values as total Medicaid payments, which we believed to be erroneous data, so we excluded those resident records from the expenditure analyses. Only 0.13 percent (23 residents) were excluded due to negative expenditures, all of which were from NY-RAH (New York). As noted above, after also reviewing the number of claims by month, we noted few or no claims for at least 3 months for NY-RAH (New York) and RAVEN (Pennsylvania), and thus do not report these data due to missing data concerns.

We calculated a mean annualized Medicaid expenditure per beneficiary for the individual ECCP by Clinical + Payment and Payment-Only groups. To calculate the annualized Medicaid expenditures, we determined the total exposure period for each resident, and adjusted the expenditures to represent an annual amount. Thus, annualized Medicaid expenditures represent Medicaid expenditures for a year based on the spending for the observed periods.

We calculated total expenditures and expenditures per service category base on the Inpatient, Other services, Long-term, and the Pharmacy files. The total Medicaid expenditures included the following subcategories: nursing facility, hospitalization, emergency department, observation stays, pharmacy and other claims from the files. Acute care transfer expenditures are the sum of Medicaid payments for hospitalization, emergency department, and observation stays combined. For expenditures related to hospitalizations, emergency department visits, observation stays, and acute care transfers, we calculated expenditures for all cases (i.e., all-cause) and then expenditures for potentially avoidable events as defined for our study, based on ICD diagnosis codes reported in the claims.

### **U.3 Summary of Results**

The average per beneficiary per year (PBPY) Medicaid expenditures are presented in **Table U-3**. Among individual ECCPs in the Clinical + Payment group, the average PBPY Medicaid expenditures for residents ranged from \$31,656 for OPTIMISTIC (Indiana) to \$52,968 for AQAF (Alabama). These are the Medicaid payment amounts averaged over users and non-users of services and are, for many service types, cost-sharing amounts for Medicare primary payer claims.

As expected, the largest expenditures were for nursing facility claims. For the Clinical + Payment group, nursing facility expenditures per resident ranged from a mean of \$28,763 for OPTIMISTIC (Indiana) to \$49,557 for AQAF (Alabama). Hospitalization costs PBPY for potentially avoidable events ranged from a mean of \$8 for OPTIMISTIC (Indiana) to \$166 for ATOP2 (Nevada). Expenditures PBPY for pharmacy claims ranged from a mean of \$17 for AQAF (Alabama) to \$346 for ATOP2 (Nevada). Other services expenditures PBPY ranged from a mean of \$1,969 for ATOP2 (Nevada) to \$2,807 for AQAF (Alabama). Average PBPY spending for observation stays, ED visits, and capitated services were low.

Among individual ECCPs in the Payment-Only group, the average PBPY Medicaid expenditures ranged from \$25,830 for OPTIMISTIC (Indiana) to \$55,264 for ATOP2 (Colorado). Nursing facility expenditures ranged from a mean of \$23,478 for OPTIMISTIC (Indiana) to \$51,988 for ATOP2 (Colorado). Hospitalization costs PBPY for potentially avoidable events ranged from a mean of \$3 for ATOP2 (Colorado) to a mean of \$264 for AQAF (Alabama). PBPY expenditures for pharmacy claims ranged from a mean of \$11 for ATOP2 (Colorado) to \$221 for OPTIMISTIC (Indiana). Other services expenditures PBPY ranged from a mean of \$2,078 for OPTIMISTIC (Indiana) to \$3,258 in ATOP2 (Colorado). Average PBPY spending for observation stays, ED visits, and capitated services were generally low.

Overall, OPTIMISTIC (Indiana) had the lowest PBPY Medicaid expenditure in the Payment-Only and the Clinical + Payment groups for FY 2016. Standard deviations were large, indicating a wide range of expenditures at the resident level related to residents with zero use of some services.

As noted above, we were unable to report expenditures for MOQI, NY-RAH, and RAVEN due to low availability of long-term claims overall (MOQI) and concerns about missing data (NY-RAH, RAVEN). Further, data quality concerns for the remaining states described in the introduction should be considered when interpreting these results.

**Table U-3. Medicaid expenditures per beneficiary per year (PBPY), FY 2016 (dollars)**

Measure	AQAF (AL)	ATOP2 (NV/CO)	OPTIMISTIC (IN)
<b>Clinical +Payment</b>			
Number of Initiative-eligible residents	2,029	916	1,567
Exposure days (days of Initiative eligibility in FY), mean	278.4	265.8	245.7
Total Medicaid expenditures, dollars, mean (SD)	52,968 (15,960)	39,517 (35,622)	31,656 (24,184)
Medicaid expenditures excluding the nursing home expenditure, mean (SD)	3,411 (7,441)	2,621 (5,815)	2,893 (7,392)
Nursing facility Medicaid expenditures (Only), mean (SD)	49,557 (16,743)	36,895 (35,216)	28,763 (24,119)
All-cause, mean (SD)	586 (3,101)	303 (2,941)	30 (266)
Potentially avoidable, mean (SD)	138 (1,103)	166 (2,599)	8 (111)
Emergency department visit expenditures, dollars			
All-cause, mean (SD)	1 (11)	3 (42)	0 (0)
Potentially avoidable, mean (SD)	<1 (9)	2 (34)	0 (0)
All-cause observation stays, mean (SD)	< 1 (9)	2 (41)	1 (13)
Potentially avoidable observation stays, mean (SD)	< 1 (9)	1 (34)	0 (0)
All-cause, mean (SD)	587 (3,101)	306 (2,941)	30 (267)
Potentially avoidable, mean (SD)	138 (1,103)	167 (2,599)	8 (111)

(continued)

**Table U-3. Medicaid expenditures per beneficiary per year (PBPY), FY 2016 (dollars)  
(continued)**

Measure	AQAF (AL)	ATOP2 (NV/CO)	OPTIMISTIC (IN)
<b>Clinical +Payment</b>			
Capitated services, mean (SD)	0 (0)	8 (7)	2 (60)
Pharmacy claims, mean (SD)	17 (57)	346 (3,220)	201 (596)
Crossover claims, mean (SD)	2,106 (5,705)	1,444 (3,962)	838 (3,128)
Other services, mean (SD)	2,807 (6,479)	1,969 (3,547)	2,663 (7,378)
<b>Payment-Only</b>			
Number of Initiative-eligible residents	1,674	1,151	1,689
Exposure days, mean	274.2	259.1	257.9
Total Medicaid expenditures, mean (SD)	54,296 (16,505)	55,264 (19,254)	25,830 (24,076)
Medicaid expenditure (without the nursing home expenditure), mean (SD)	3,361 (9,536)	3,276 (5,768)	2,353 (5,902)
Medicaid expenditure (Nursing facility only), mean (SD)	50,934 (16,912)	51,988 (19,249)	23,478 (23,763)
Hospitalization expenditures			
All-cause hospitalization, mean (SD)	695 (5,222)	6 (142)	50 (490)
Potentially avoidable hospitalization, mean (SD)	264 (4,745)	3 (118)	11 (258)
All-cause hospitalization, mean (SD)	< 1 (<1)	<1 (12)	1 (33)
Potentially avoidable hospitalization, mean (SD)	0 (0)	< 1 (12)	1 (23)
Observation expenditures			
All-cause observation stays, mean (SD)	0 (0)	0 (0)	2 (41)
Potentially avoidable observation stays, mean (SD)	0 (0)	0 (0)	0 (0)
All-cause, mean (SD)	695 (5,222)	7 (142)	53 (493)
Potentially avoidable, mean (SD)	264 (4,745)	4 (119)	11 (260)
Capitated services, mean (SD)	0 (0)	341 (510)	1 (48)
Pharmacy claims, mean (SD)	23 (64)	11 (186)	221 (756)
Crossover claims, mean (SD)	2,028 (5,765)	809 (1,698)	762(1,931)
Other services, mean (SD)	2,644 (7,581)	3,258 (5746)	2,078 (5,753)

SOURCE: RTI analysis of Medicaid TAF for FY 2016 (RTI program MDCD111\_Calculating Medicaid Payments).

NOTES: Missouri data are not reported in the table as the Medicaid nursing facility data for Missouri are not available. New York and Pennsylvania data are not reported due to concerns about missing data for 3 or more months in FY 2016 data files. All the expenditures have been rounded.

## **APPENDIX V**

### **SIMULATION OF NFI 2 IMPACT ON FY 2019 MEDICAID LONG-TERM CARE EXPENDITURES: METHODOLOGY**

In **Section 3.4** of the main report, we describe results from our simulation analyses showing NFI 2 had minimal impact on FY 2019 Medicaid nursing facility expenditures. In this appendix, we provide additional details about the data we used to conduct the simulation analyses, including the state per diem rates and bed hold policies, our methodology, and results of sensitivity analyses. In these simulations, which do not use Medicaid data, it was not possible to estimate any effects of Medicaid payments for cost sharing on Medicare bills.

#### **V.1 State Per Diems and Bed Hold Policies**

To calculate the impact of NFI 2 on Medicaid nursing facility expenditures for our simulation analyses, we used the state-specific average per diem rates and applied the state's bed hold policy. As shown in **Table V-1**, per diem rates vary by state, from \$163.03 per day in Missouri to \$295.32 per day in New York. Policies regarding bed holds when a resident is hospitalized also vary, with some states not paying to hold a bed while others cover varying hospitalization days or portions of hospitalization days.

#### **V.2 Estimated FY 2019 Medicaid Expenditures Based on Facility Billing Data: Simulation Approach #1**

The premise of this simulation is that each facility bill for an episode for acute care treatment on-site represents a hospitalization for one of the six conditions or, alternatively, some proportion of the Initiative bills represents avoided hospitalizations.

The analyses we conducted were based on NFI 2 billing data for the six qualifying conditions and results are reported in **Table 3-30** in **Section 3.4** of the main report. For this analysis, we used the following data for each ECCP group to estimate the Initiative impact on Medicaid nursing facility expenditures:

- Number of dual-eligible Initiative residents
- Number of facility bills for episodes of any of the six qualifying conditions for dually eligible Initiative residents
- Average hospital length of stay for residents hospitalized with one of the qualifying conditions
- State-specific per diem and the state-specific bed hold policy.

**Table V-1. State Medicaid per diem expenditures, bed hold policies, and implications on Medicaid expenditures**

State (ECCP)	Mean state Medicaid per diem <sup>1</sup>	Bed hold policy for medical leave (Hospital) <sup>2</sup>	Implications for Medicaid expenditures if there are changes in hospitalization rates
Alabama (AQAF)	Average of \$213.21/day	4 days/visit.	Avoided hospital days would increase Medicaid expenditures due to additional nursing facility days and be offset due to the bed hold policy. Additional hospital days would decrease Medicaid expenditures due to fewer nursing facility days and be offset due to the bed hold policy.
Colorado (ATOP2)	\$231.39/day	Medicaid does not pay bed hold for medical leave.	Any changes in Medicaid expenditures due to additional or fewer nursing facility days would not be offset by bed hold payments.
Nevada (ATOP2)	\$274.27/day	Medicaid does not pay bed hold for medical leave.	Avoided hospital days would increase Medicaid expenditures due to additional nursing facility days and be offset due to the bed hold policy. Additional hospital days would decrease Medicaid expenditures due to fewer nursing facility days and be offset due to the bed hold policy.
Missouri (MOQI)	Average of \$163.03/day	Medicaid does not pay bed hold for medical leave.	Any changes in Medicaid expenditures due to additional or fewer nursing facility days would not be offset by bed hold payments.
New York (NY-RAH)	Average of \$295.32/day	14 days/year; subject to per diem rate adjustment each year; no distinction is made between hospital days and non-medical days. Facilities must have a 95% or greater census upon resident hospitalization. <sup>3</sup>	Avoided hospital days would increase Medicaid expenditures due to additional nursing facility days and be offset due to the bed hold policy. Additional hospital days would decrease Medicaid expenditures due to fewer nursing facility days and be offset due to the bed hold policy.
Indiana (OPTIMISTIC)	Average of \$219.44/day	Medicaid does not pay bed hold for medical leave.	Any changes in Medicaid expenditures due to additional or fewer nursing facility days would not be offset by bed hold payments.
Pennsylvania (RAVEN)	Average of \$204.51/day	15 days/visit; expenditure rate is 1/3 of current per diem nursing facility rate IF current occupancy rate is 85% or greater.	Avoided hospital days would increase Medicaid expenditures due to additional nursing facility days and be offset due to the bed hold policy. Additional hospital days would decrease Medicaid expenditures due to fewer nursing facility days and be offset due to the bed hold policy.

<sup>1</sup> Per Diem Sources—AL: Personal communication, Alabama Medicaid Agency, 6/30/2020; CO: [AHCA \(2017\)](#); NV: [AHCA \(2017\)](#); MO: [MO Dept. of Social Services \(2019\)](#); NY: [NY Dept. of Health \(2019\)](#); IN: [Myers and Stauffer, LC \(2020\)](#); PA: [PA Dept. of Human Services \(2020\)](#).

<sup>2</sup> Bed Hold Policy Sources—All states: [The National Long-Term Care Ombudsman Resource Center \(2019\)](#).

<sup>3</sup> We are aware of the possible implementation of legislation to remove the NY bed hold policy for nursing facility residents not receiving hospice care and over the age of 21. This legislation is not in effect as of February 2020.

We used a three-step approach to calculate the Medicaid nursing facility expenditures using billing data:

- The first step involved calculating the additional Medicaid nursing facility expenditures based on avoided hospital days by multiplying the number of bills, the mean hospital length of stay, and the state-specific per diem. This product represents the additional expenditures due to additional days in the nursing facility substituting for hospital days.
- Second, we calculated the bed hold payments so we could account for Medicaid nursing facility expenditures that would have been paid, and not paid, for days in a hospital under the limitations of each state's policies (**Table V-1**). The bed hold expenditures were calculated by multiplying the number of avoided hospitalizations, the number of bed hold days covered by the state, and the per diem.
- The third step, which results in the estimated NFI 2 impact on Medicaid nursing facility expenditures, was calculated as the difference between the additional Medicaid nursing facility expenditures incurred due to avoided hospital stays and the expenditures that would have occurred even if there were a hospitalization due to the bed hold policies. Given that the number of residents by ECCP group varies, we also calculated the Medicaid nursing facility expenditure per resident, which can be compared across groups.

We do not know the true extent to which bills represent avoided hospitalizations, and the analyses in the main report represent the largest potential impact based on the data. Based on our analysis of Medicare hospital claims and billing frequency, we believe the impact may not be this large, so we conducted sensitivity analyses. In **Table V-2**, we report the sensitivity analysis showing the impact of NFI 2 on Medicaid nursing facility expenditures with varying assumptions that 100 percent, 75 percent, 50 percent, 25 percent, or 0 percent of the facility bills represent avoided hospitalizations. These sensitivity analyses show that the impact for Clinical + Payment facilities could potentially range from as high as \$661 per resident (ATOP2) to \$0 per resident (all ECCPs). For Payment-Only facilities, the sensitivity analyses results ranged from \$330 per resident (OPTIMISTIC) to \$0 per resident (all ECCPs).

**Table V-2. Estimated impact on Medicaid expenditures by percentage of bills that represent avoided hospitalizations**

ECCP (State)	Number	Medicaid expenditures (dollars) if percent of bills that represent avoided hospital stays was									
		100%		75%		50%		25%		0%	
		Total	Per resident	Total	Per resident	Total	Per resident	Total	Per resident	Total	Per resident
<b>Clinical + Payment</b>											
AQAF (AL)	1,084	226,429	209	169,822	157	113,215	104	56,607	52	0	0
ATOP2 (NV)	839	554,355	661	415,766	495	277,177	330	138,589	165	0	0
MOQI (MO)	1,046	490,231	468	367,673	351	245,116	234	122,558	117	0	0
NY-RAH (NY)*	2,808	0	0	0	0	0	0	0	0	0	0
OPTIMISTIC (IN)	1,222	478,906	393	359,179	294	239,453	196	119,726	98	0	0
RAVEN (PA)	1,122	406,589	363	304,942	272	203,295	181	101,647	91	0	0
TOTAL	8,121	2,156,510	—	1,617,382	—	1,078,256	—	539,127	—	0	—
<b>Payment-Only</b>											
AQAF (AL)	856	57,669	67	43,252	25	28,835	34	14,417	17	0	0
ATOP2 (CO)	1,103	342,731	311	257,048	117	171,366	155	85,683	78	0	0
MOQI (MO)	1,302	94,492	73	70,869	27	47,246	36	23,623	18	0	0
NY-RAH (NY)*	2,912	0	0	0	0	0	0	0	0	0	0
OPTIMISTIC (IN)	1,440	475,570	330	356,678	124	237,785	165	118,893	83	0	0
RAVEN (PA)	1,249	228,820	183	171,615	69	114,410	92	57,205	46	0	0
TOTAL	8,862	1,199,283	—	899,462	—	599,642	—	299,821	—	0	—

\* Our analyses use state-specific average lengths of stay for all estimates. Individual stay lengths vary and some longer stays could result in a value higher than 0.

SOURCE: RTI analysis of Medicaid claims data (RTI programs AF350, AF700, NBC\_2, MS109; RTI folders: csaur\output\pah2\_ar4\_af350\_1, csaur\output\pah2\_ar4\_af700\_1, csaur\output\pah2\_ar4\_nbc\_2, sarnold\output\pah2\_ms109\_ar4 – 5.13.2020).

### V.3 Estimated Medicaid Costs Based on Modeling Data: Simulation Approach #2

The second simulation approach estimated the impact of NFI 2 on Medicaid nursing facility expenditures using the results from the Difference-in-difference (DD) regression models for FY 2019 (**Table 3-31** in **Section 3.4**). For this analysis, we used the following data for each ECCP group to estimate the Initiative impact on Medicaid nursing facility expenditures:

- Number of dual-eligible Initiative residents
- DD model estimate predicting the Initiative effect on hospitalizations for any of the six qualifying conditions
- Average hospital length of stay for residents hospitalized with one of the qualifying conditions
- State-specific per diem and the state-specific bed hold policy.

For each ECCP group, we estimated the change in the number of hospitalizations for any of the six qualifying conditions due to NFI 2, and then calculated the estimated change in Medicaid nursing facility expenditures due to time not in the facilities during these hospitalizations. We note that, depending on the ECCP group, the DD models indicate reductions or increases in the number of hospitalizations. Decreases in hospitalizations will tend to increase Medicaid paid facility days and increases will tend to decrease Medicaid paid days.

We used a three-step approach to calculate the Medicaid nursing facility expenditures using DD model data for each ECCP:

- In the first step, we calculated the additional Medicaid nursing facility expenditures based on avoided or additional hospital days by multiplying the number of dually eligible Initiative residents, the model's estimated change in the number of hospitalizations, the mean hospital length of stay, and the state-specific per diem. This product represents the additional expenditures due to additional days in the nursing facility or lower expenditures due to fewer days in the nursing facility.
- Second, we calculated expenditures for bed holds to account for Medicaid nursing facility expenditures associated with hospitalizations. The bed hold expenditures were calculated by multiplying the change in the number of hospitalizations, the number of bed hold days covered by the state, and the per diem.
- The third step, which results in the estimated NFI 2 impact on Medicaid nursing facility expenditures (**Table V-3**), was calculated as the difference between the Medicaid nursing facility expenditures associated with reduced or increased hospital stays and the expenditures associated with bed hold policies. Given that the number of residents by ECCP group varies, we also calculated the Medicaid nursing facility expenditure per resident, which can be compared across groups.

**Table V-3. Estimated Medicaid expenditure changes due to NFI 2 based on NFI 2 impact on Medicare hospitalizations**

State (ECCP)	Number of dually eligible residents	Total impact on Medicaid payments (dollars)	Impact on Medicaid payments per resident (dollars)
<b>Clinical + Payment</b>			
AQAF (Alabama)	1,084	-13,005	-12
ATOP2 (Nevada)	839	-43,746	-52
MOQI (Missouri)	1,046	-27,435	-26
NY-RAH (New York)	2,808	0	0
OPTIMISTIC (Indiana)	1,222	-29,394	-24
RAVEN (Pennsylvania)	1,122	-42,478	-38
TOTAL	8,121	-156,057	-
<b>Payment-Only</b>			
AQAF (Alabama)	856	-18,543	-22
ATOP2 (Colorado)	1,103	-11,686	-11
MOQI (Missouri)	1,302	16,664	13
NY-RAH (New York)	2,912	0	0
OPTIMISTIC (Indiana)	1,440	-10,333	-7
RAVEN (Pennsylvania)	1,249	-2,227	-2
TOTAL	8,862	-26,125	-

- indicates the value is not applicable.

SOURCES: RTI analysis of Medicaid claims data (RTI programs AF350, AF700, NBC\_2, MS109; RTI folders: csaur\output\pah2\_ar4\_af350\_1, csaur\output\pah2\_ar4\_af700\_1, csaur\output\pah2\_ar4\_nbc\_2, sarnold\output\pah2\_ms109\_ar4 – 5.13.2020).

In summary, the direction of the impact differed for the two simulation approaches, but the estimated impact for both approaches was minimal. Our findings show that when we use billing data to estimate the impact of NFI 2, Medicaid nursing facility payments increased slightly. Under this approach, we assumed each bill represents an avoided hospitalization; we considered facility bills to indicate fewer hospital stays, and thus more days in the nursing facility. In contrast, the DD model simulations found the NFI 2 impacts to vary between fewer hospitalizations or additional hospitalizations; most ECCP groups had higher Medicare hospitalizations and lower Medicaid nursing facility payments.

For the Clinical + Payment ECCPs, if we assumed each bill represents an avoided hospitalization, our analyses estimate that NFI 2 was associated with increased Medicaid nursing facility payments between \$2,156,510 (average of \$266 per resident) and \$0. Using the DD model results, the Clinical + Payment ECCPs had an estimated decrease in Medicaid nursing facility payments of \$156,057 (an average decrease of \$19 per resident).

For the Payment-Only facilities, our analyses using the billing data estimated that NFI 2 was associated with an overall increase in Medicaid nursing facility payments of between \$1,199,283 (average of \$136 per resident) and \$0. Using the DD model results, the Payment-Only facilities had an overall estimated decrease of \$26,125 in Medicaid nursing facility payments (average decrease of \$3 per resident).

Analyses of Medicaid claims data for 2019, when they become available, will provide a different estimate of the impact. We have begun analysis of the quality of the Medicaid data using FY 2016 Medicaid claims that were available for analysis; we report results of descriptive analyses of these data in **Appendix U**.

## APPENDIX W SENSITIVITY ANALYSES

We conducted three sensitivity analyses to confirm the robustness of our results. Our sensitivity analyses were only performed for all ECCPs combined and not for each ECCP separately. As in prior reports, we present the sensitivity analysis using the within-state reference group (WSRG), and the sensitivity analysis using FY 2016 as the baseline year. In this report, we also present the results of a third sensitivity analysis. This sensitivity analysis is very similar to the sensitivity analysis using FY 2016 as the baseline year with parallel trends assumed, except it uses the average of FY 2014 to FY 2016 as the baseline period instead of just FY 2016. Aside from the stated differences the models were the same as the DD models used for the main analysis.

We first present a side-by-side comparison of the relative effect estimates from the main analysis and those from the sensitivity analyses using the WSRG, using FY 2016 as the baseline year, and using the average of 2014–2016 as our base period separately for each of our three model types:

- **Table W-1:** Probability of hospital-related utilization
- **Table W-2:** Count of hospital-related utilization events
- **Table W-3:** Medicare Expenditures

Complete results for the sensitivity analysis using the WSRG for both the Clinical + Payment and Payment-Only facilities are presented in **Tables W-4, W-5, and W-6** for the probability, count, and expenditure models, respectively.

Complete results for the sensitivity analysis using FY 2016 as the baseline year for both the Clinical + Payment and Payment-Only facilities are displayed in **Tables W-7, W-8, and W-9** for the probability, count, and expenditure models, respectively.

Complete results for the sensitivity analysis using the average of FY 2014–FY 2016 as our base period for both intervention groups are in **Tables W-10, W-11, and W-12** for the probability, count, and expenditure models, respectively.

When comparing to the WSRG instead of the national comparison group, the pattern of increases that we observed in utilization and expenditure measures in the Clinical + Payment group remains, although it slightly weakened, reducing the number of statistically significant increases. In the Payment-Only group, the weak evidence of increased utilization of hospital-related services weakens further. There are no longer any statistically significant unfavorable increases in any of the utilization or expenditure outcomes, although the general pattern of increases remains. We do not use the WSRG as a main comparison group because there were spillover effects in the Initiative states from the ECCPs often trying to spread good practices, particularly when the ECCPs were also Quality Improvement Organizations.

When using FY 2016 as the baseline year instead of using FY 2014–FY 2016 with a linear trend, we found that the consistent pattern of increases in the utilization and expenditure measures in the Clinical + Payment group slightly weakened, with the increases in the probability and count of potentially avoidable hospitalizations for the six qualifying conditions no longer being statistically significant. In the Payment-Only group, the effect patterns remain very similar when comparing to the results of the main analysis.

In the Clinical + Payment group, when using the average of FY 2014–FY 2016 as the baseline instead of using FY2014–FY 2016 with a linear trend, the pattern of increases observed in the outcome measures significantly weakens. Although unfavorable increases in most of the utilization and expenditure outcomes remain, there are no longer any statistically significant increases in any of the hospital-related utilization measures. There are even statistically significant favorable decreases in the probability and count of all-cause hospitalizations. In the Payment-Only group, a pattern of favorable reductions emerged. However, none of the reductions were statistically significant.

Ignoring the trend during the years from 2014 through 2016 is especially problematic for the Clinical + Payment Group because, during this time, the facilities were implementing the NFI 1 Initiative, which changed patterns of care as the Initiative matured.

**Table W-1. All ECCPs: Initiative effect on probability of hospital-related utilization per resident by sensitivity analysis type, FY 2019**

[Relative effect (percent)]

Measure	Main analysis	Sensitivity analysis using within-state reference group	Sensitivity analysis using 2016 as baseline year	Sensitivity analysis using average of 2014–2016 as base
<b>Clinical + Payment</b>				
<b>Any hospitalization</b>				
All-cause	-1.4	-1.1	-3.9	<b>-6.6**</b>
Potentially avoidable	<b>15.3**</b>	<b>13.2*</b>	<b>10.4*</b>	3.9
Six qualifying conditions	<b>18.0*</b>	15.3	9.7	1.3
<b>Any ED visit</b>				
All-cause	<b>15.2***</b>	<b>11.5**</b>	<b>8.7*</b>	2.2
Potentially avoidable	<b>16.9**</b>	<b>12.2*</b>	<b>12.8**</b>	8.5
Six qualifying conditions	11.4	7.3	7.5	10.1
<b>Any acute care transition</b>				
All-cause	3.1	2.2	-0.1	-3.6
Potentially avoidable	<b>10.7*</b>	8.4	6.6	1.8
Six qualifying conditions	12.5	10.9	6.5	2.2
<b>Payment-Only</b>				
<b>Any hospitalization</b>				
All-cause	1.1	1.4	1.7	-1.9
Potentially avoidable	<b>9.5*</b>	7.5	<b>7.4*</b>	0.4
Six qualifying conditions	8.3	6.0	7.4	-1.3
<b>Any ED visit</b>				
All-cause	2.3	-0.7	1.4	-2.0
Potentially avoidable	-2.5	-6.2	-1.6	-3.6
Six qualifying conditions	9.5	5.8	6.4	2.6
<b>Any acute care transition</b>				
All-cause	-0.1	-0.8	0.7	-2.0
Potentially avoidable	1.0	-1.0	0.8	-3.2
Six qualifying conditions	7.0	5.6	4.6	-2.6

\*/\*\*/\*\* = Significantly different from zero based on a p-value cutoff of 0.1/0.05/0.01.

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may\_31\ms110).

NOTES: The relative Initiative effect is the absolute Initiative effect (percentage points) divided by the mean predicted probability of experiencing the event under the scenario that the intervention did not occur. All predictions are based on difference-in-differences regression models with either a national comparison group or a WSRG and adjusted for resident-level and facility-level characteristics. *Acute care transitions* include hospitalizations, ED visits, and observation stays.

**Table W-2. All ECCPs: Initiative effect on count of hospital-related utilization per resident by sensitivity analysis type, FY 2019**

[Relative effect (percent)]

Measure	Main analysis	Sensitivity analysis using within-state reference group	Sensitivity analysis using 2016 as baseline year	Sensitivity analysis using average of 2014–2016 as base
<b>Clinical + Payment</b>				
<b>Hospitalizations</b>				
All-cause	1.1	0.0	-3.1	<b>-6.4*</b>
Potentially avoidable	<b>19.0**</b>	<b>16.5*</b>	<b>11.3*</b>	4.0
Six qualifying conditions	<b>23.5**</b>	<b>20.9*</b>	14.4	4.0
<b>ED visits</b>				
All-cause	<b>16.7**</b>	<b>12.2*</b>	<b>9.3*</b>	4.2
Potentially avoidable	<b>20.6**</b>	<b>15.5*</b>	<b>14.3**</b>	8.5
Six qualifying conditions	10.0	5.6	5.8	7.7
<b>Acute care transitions</b>				
All-cause	7.4	4.7	1.7	-2.8
Potentially avoidable	<b>18.7***</b>	<b>14.8**</b>	<b>11.8**</b>	5.0
Six qualifying conditions	<b>19.0*</b>	15.9	10.7	3.4
<b>Payment-Only</b>				
<b>Hospitalizations</b>				
All-cause	2.4	1.4	2.2	-3.4
Potentially avoidable	<b>11.2**</b>	8.9	<b>8.6*</b>	0.4
Six qualifying conditions	12.1	9.9	<b>11.0*</b>	-0.7
<b>ED visits</b>				
All-cause	5.7	1.7	3.4	-1.7
Potentially avoidable	0.1	-4.2	0.5	-2.2
Six qualifying conditions	10.8	6.4	8.6	5.0
<b>Acute care transitions</b>				
All-cause	3.5	1.0	2.4	-2.9
Potentially avoidable	4.9	1.4	3.9	-1.4
Six qualifying conditions	11.2	8.3	9.5	0.7

\*/\*\*/\*\* = Significantly different from zero based on a p-value cutoff of 0.1/0.05/0.01.

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may\_31\ms112).

NOTES: The relative Initiative effect is the absolute Initiative effect (counts of events) divided by the mean predicted count of events under the scenario that the intervention did not occur. All predictions are based on difference-in-differences regression models with either a national comparison group or a WSRG and adjusted for resident-level and facility-level characteristics.

*Acute care transitions* include hospitalizations, ED visits, and observation stays.

**Table W-3. All ECCPS: Initiative effect on Medicare expenditures by sensitivity analysis type, FY 2019**

[Relative effect (percent)]

Measure	Main analysis	Sensitivity analysis using within-state reference group	Sensitivity analysis using 2016 as baseline year	Sensitivity analysis using average of 2014 –2016 as base
<b>Clinical + Payment</b>				
<b>Total Medicare expenditures</b>	2.6	3.3	0.8	0.0
<b>Hospitalization expenditures</b>				
All-cause	3.4	4.1	-0.7	-3.0
Potentially avoidable	<b>24.4**</b>	<b>20.3**</b>	<b>17.8**</b>	<b>11.6*</b>
Six qualifying conditions	<b>33.9**</b>	<b>32.7**</b>	<b>25.5**</b>	14.3
<b>ED visit expenditures</b>				
All-cause	4.2	1.4	-0.3	-3.0
Potentially avoidable	11.7	6.7	6.3	3.5
Six qualifying conditions	15.2	9.5	7.7	7.0
<b>Acute care transition expenditures</b>				
All-cause	2.2	2.9	-2.2	-4.4
Potentially avoidable	<b>24.5***</b>	<b>20.6**</b>	<b>17.3**</b>	<b>11.3*</b>
Six qualifying conditions	<b>34.6***</b>	<b>33.5***</b>	<b>25.4**</b>	<b>14.5*</b>
<b>Payment-Only</b>				
<b>Total Medicare expenditures</b>	0.6	1.3	1.5	-0.6
<b>Hospitalization expenditures</b>				
All-cause	2.9	3.6	2.6	-3.6
Potentially avoidable	7.8	4.3	8.2	1.4
Six qualifying conditions	4.4	3.6	7.9	-2.8
<b>ED visit expenditures</b>				
All-cause	4.3	1.8	1.2	-1.8
Potentially avoidable	2.4	-1.9	-0.2	-2.7
Six qualifying conditions	5.6	0.4	3.1	6.0
<b>Acute care transition expenditures</b>				
All-cause	2.1	2.9	1.8	-3.9
Potentially avoidable	5.6	2.4	5.6	0.4
Six qualifying conditions	1.5	0.8	4.7	-4.1

\*/\*\*/\*\* = Significantly different from zero based on a *p*-value cutoff of 0.1/0.05/0.01.

ED = emergency department.

SOURCES: RTI analysis of Medicare claims data (RTI program MS 113 and 114; RTI folders: ykaganova\ar4\may\_31\ms113 and ykaganova\ar4\may\_31\ms114).

NOTES: The relative Initiative effect is the absolute Initiative effect (dollars) divided by the mean predicted expenditures under the scenario that the intervention did not occur. All predictions are based on difference-in-differences regression models with either a national comparison group or a WSRG and adjusted for resident-level and facility-level characteristics. *Acute care transitions* include hospitalizations, ED visits, and observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

**Table W-4. All ECCPs: Initiative effect on probability of hospital-related utilization per resident: Sensitivity analysis using a within-state reference group, FY 2019**

Measure	Predicted probability absent the initiative (percent)	Absolute initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
<b>Clinical + Payment</b>						
<b>Any hospitalization</b>						
All-cause	25.9	-0.3	-1.8	1.3	0.764	-1.1
Potentially avoidable	<b>10.5</b>	<b>1.4</b>	<b>0.1</b>	<b>2.7</b>	<b>0.085</b>	<b>13.2</b>
Six qualifying conditions	5.3	0.8	-0.1	1.7	0.142	15.3
<b>Any ED visit</b>						
All-cause	<b>18.7</b>	<b>2.2</b>	<b>0.5</b>	<b>3.8</b>	<b>0.035</b>	<b>11.5</b>
Potentially avoidable	<b>10.2</b>	<b>1.2</b>	<b>0.0</b>	<b>2.4</b>	<b>0.087</b>	<b>12.2</b>
Six qualifying conditions	2.5	0.2	-0.4	0.8	0.601	7.3
<b>Any acute care transition</b>						
All-cause	36.2	0.8	-1.2	2.9	0.520	2.2
Potentially avoidable	18.6	1.6	-0.2	3.3	0.142	8.4
Six qualifying conditions	7.5	0.8	-0.3	1.9	0.210	10.9
<b>Payment-Only</b>						
<b>Any hospitalization</b>						
All-cause	25.4	0.4	-1.0	1.7	0.668	1.4
Potentially avoidable	11.0	0.8	-0.1	1.7	0.131	7.5
Six qualifying conditions	6.3	0.4	-0.5	1.2	0.460	6.0
<b>Any ED visit</b>						
All-cause	24.4	-0.2	-1.8	1.4	0.859	-0.7
Potentially avoidable	14.1	-0.9	-2.1	0.4	0.242	-6.2
Six qualifying conditions	3.9	0.2	-0.4	0.9	0.573	5.8
<b>Any acute care transition</b>						
All-cause	39.7	-0.3	-2.0	1.4	0.749	-0.8
Potentially avoidable	21.9	-0.2	-1.6	1.2	0.800	-1.0
Six qualifying conditions	9.2	0.5	-0.5	1.6	0.417	5.6

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may\_31\ms110).

NOTES: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a WSRG and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted probability absent the Initiative). *Acute care transitions* include hospitalizations, ED visits, and observation stays. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

**Table W-5. All ECCPs: Initiative effect on count of hospital-related utilization events per resident: Sensitivity analysis using a within-state reference group, FY 2019**

Measure	Predicted count absent the initiative (events per year)	Absolute initiative effect (events per year)	90% CI		p-value	Relative effect (percent)
<b>Clinical + Payment</b>						
<b>Hospitalizations</b>						
All-cause	0.415	0.000	-0.034	0.035	0.993	0.0
Potentially avoidable	<b>0.125</b>	<b>0.021</b>	<b>0.003</b>	<b>0.039</b>	<b>0.060</b>	<b>16.5</b>
Six qualifying conditions	<b>0.060</b>	<b>0.013</b>	<b>0.001</b>	<b>0.024</b>	<b>0.072</b>	<b>20.9</b>
<b>ED visits</b>						
All-cause	<b>0.277</b>	<b>0.034</b>	<b>0.003</b>	<b>0.065</b>	<b>0.074</b>	<b>12.2</b>
Potentially avoidable	<b>0.120</b>	<b>0.019</b>	<b>0.002</b>	<b>0.035</b>	<b>0.058</b>	<b>15.5</b>
Six qualifying conditions	0.027	0.002	-0.005	0.008	0.694	5.6
<b>Acute care transitions</b>						
All-cause	0.691	0.033	-0.024	0.090	0.346	4.7
Potentially avoidable	<b>0.247</b>	<b>0.036</b>	<b>0.008</b>	<b>0.064</b>	<b>0.033</b>	<b>14.8</b>
Six qualifying conditions	0.087	0.014	0.000	0.028	0.108	15.9
<b>Payment-Only</b>						
<b>Hospitalizations</b>						
All-cause	0.392	0.005	-0.022	0.033	0.740	1.4
Potentially avoidable	0.133	0.012	0.000	0.024	0.113	8.9
Six qualifying conditions	0.072	0.007	-0.003	0.017	0.238	9.9
<b>ED visits</b>						
All-cause	0.367	0.006	-0.024	0.037	0.742	1.7
Potentially avoidable	0.176	-0.007	-0.025	0.010	0.484	-4.2
Six qualifying conditions	0.044	0.003	-0.005	0.011	0.537	6.4
<b>Acute care transitions</b>						
All-cause	0.763	0.008	-0.040	0.055	0.793	1.0
Potentially avoidable	0.309	0.004	-0.020	0.028	0.762	1.4
Six qualifying conditions	0.116	0.010	-0.004	0.024	0.261	8.3

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may\_31\ms112).

NOTES: The *predicted count absent the Initiative* is the mean of the predicted counts of events, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a WSRG and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted counts with and without the intervention. *The relative effect = (absolute Initiative effect) / (predicted count absent the Initiative)*. *Acute care transitions* include hospitalizations, ED visits, and observation stays. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

**Table W-6. All ECCPs: Initiative effect on Medicare expenditures: Sensitivity analysis using a within-state reference group, FY 2019**

Measure	Predicted expenditure absent the initiative (dollars)	Absolute initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
<b>Clinical + Payment</b>						
<b>Total Medicare expenditures</b>	33,799	1,111	-626	2,847	0.293	3.3
<b>Hospitalization expenditures</b>						
All-cause	10,477	433	-439	1,304	0.414	4.1
Potentially avoidable	<b>2,404</b>	<b>488</b>	<b>110</b>	<b>866</b>	<b>0.034</b>	<b>20.3</b>
Six qualifying conditions	<b>1,048</b>	<b>343</b>	<b>114</b>	<b>572</b>	<b>0.014</b>	<b>32.7</b>
<b>ED visit expenditures</b>						
All-cause	294	4	-29	38	0.838	1.4
Potentially avoidable	115	8	-9	25	0.459	6.7
Six qualifying conditions	29	3	-5	11	0.585	9.5
<b>Acute care transition expenditures</b>						
All-cause	11,100	327	-660	1,314	0.585	2.9
Potentially avoidable	<b>2,549</b>	<b>524</b>	<b>134</b>	<b>915</b>	<b>0.027</b>	<b>20.6</b>
Six qualifying conditions	<b>1,077</b>	<b>361</b>	<b>135</b>	<b>588</b>	<b>0.009</b>	<b>33.5</b>
<b>Payment-Only</b>						
<b>Total Medicare expenditures</b>	29,876	396	-775	1,567	0.578	1.3
<b>Hospitalization expenditures</b>						
All-cause	8,219	296	-298	890	0.412	3.6
Potentially avoidable	2,273	97	-144	337	0.508	4.3
Six qualifying conditions	1,124	40	-142	222	0.717	3.6
<b>ED visit expenditures</b>						
All-cause	346	6	-30	43	0.782	1.8
Potentially avoidable	150	-3	-21	15	0.791	-1.9
Six qualifying conditions	49	0	-10	10	0.976	0.4
<b>Acute care transition expenditures</b>						
All-cause	8,717	257	-355	868	0.490	2.9
Potentially avoidable	2,470	60	-194	314	0.698	2.4
Six qualifying conditions	1,196	10	-170	190	0.927	0.8

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 113 and 114; RTI folders: ykaganova\ar4\may\_31\ms113 and ykaganova\ar4\may\_31\ms114).

NOTES: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the residents in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a WSRG and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted expenditure absent the Initiative). *Acute care transitions* include hospitalizations, ED visits, and observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

**Table W-7. All ECCPs: Initiative effect on probability of hospital-related utilization per resident: Sensitivity analysis using FY 2016 as baseline year, FY 2019**

Measure	Predicted probability absent the initiative (percent)	Absolute initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
<b>Clinical + Payment</b>						
<b>Any hospitalization</b>						
All-cause	26.7	-1.0	-2.2	0.2	0.154	-3.9
Potentially avoidable	<b>10.8</b>	<b>1.1</b>	<b>0.0</b>	<b>2.2</b>	<b>0.086</b>	<b>10.4</b>
Six qualifying conditions	5.6	0.5	-0.2	1.3	0.241	9.7
<b>Any ED visit</b>						
All-cause	<b>19.2</b>	<b>1.7</b>	<b>0.3</b>	<b>3.1</b>	<b>0.053</b>	<b>8.7</b>
Potentially avoidable	<b>10.1</b>	<b>1.3</b>	<b>0.3</b>	<b>2.3</b>	<b>0.035</b>	<b>12.8</b>
Six qualifying conditions	2.5	0.2	-0.3	0.7	0.508	7.5
<b>Any acute care transition</b>						
All-cause	37.1	-0.1	-1.7	1.6	0.958	-0.1
Potentially avoidable	18.9	1.2	-0.2	2.7	0.152	6.6
Six qualifying conditions	7.8	0.5	-0.4	1.4	0.348	6.5
<b>Payment-Only</b>						
<b>Any hospitalization</b>						
All-cause	25.3	0.4	-0.7	1.5	0.524	1.7
Potentially avoidable	<b>11.1</b>	<b>0.8</b>	<b>0.1</b>	<b>1.5</b>	<b>0.061</b>	<b>7.4</b>
Six qualifying conditions	6.2	0.5	-0.2	1.1	0.234	7.4
<b>Any ED visit</b>						
All-cause	23.9	0.3	-1.0	1.7	0.684	1.4
Potentially avoidable	13.4	-0.2	-1.2	0.8	0.719	-1.6
Six qualifying conditions	3.9	0.2	-0.2	0.7	0.408	6.4
<b>Any acute care transition</b>						
All-cause	39.1	0.3	-1.1	1.7	0.740	0.7
Potentially avoidable	21.5	0.2	-1.0	1.3	0.808	0.8
Six qualifying conditions	9.3	0.4	-0.4	1.2	0.388	4.6

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may\_31\ms110).

NOTES: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted probability absent the Initiative). *Acute care transitions* include hospitalizations, ED visits, and observation stays. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

**Table W-8. All ECCPs: Initiative effect on count of hospital-related utilization events per resident: Sensitivity analysis using FY 2016 as baseline year, FY 2019**

Measure	Predicted count absent the initiative (events per year)	Absolute initiative effect (events per year)	90% CI	p-value	Relative effect (percent)	
<b>Clinical + Payment</b>						
Hospitalizations						
All-cause	0.428	-0.013	-0.040	0.013	0.412	-3.1
Potentially avoidable	<b>0.131</b>	<b>0.015</b>	<b>0.001</b>	<b>0.029</b>	<b>0.087</b>	<b>11.3</b>
Six qualifying conditions	0.063	0.009	0.000	0.019	0.117	14.4
ED visits						
All-cause	<b>0.284</b>	<b>0.026</b>	<b>0.001</b>	<b>0.052</b>	<b>0.089</b>	<b>9.3</b>
Potentially avoidable	<b>0.121</b>	<b>0.017</b>	<b>0.004</b>	<b>0.031</b>	<b>0.034</b>	<b>14.3</b>
Six qualifying conditions	0.027	0.002	-0.004	0.007	0.611	5.8
Acute care transitions						
All-cause	0.712	0.012	-0.032	0.057	0.651	1.7
Potentially avoidable	<b>0.254</b>	<b>0.030</b>	<b>0.007</b>	<b>0.052</b>	<b>0.028</b>	<b>11.8</b>
Six qualifying conditions	0.091	0.010	-0.002	0.022	0.176	10.7
<b>Payment-Only</b>						
Hospitalizations						
All-cause	0.388	0.009	-0.013	0.030	0.505	2.2
Potentially avoidable	0.134	0.011	0.001	0.022	0.061	8.6
Six qualifying conditions	0.071	0.008	0.000	0.016	0.099	11.0
ED visits						
All-cause	0.361	0.012	-0.014	0.038	0.436	3.4
Potentially avoidable	0.168	0.001	-0.013	0.015	0.921	0.5
Six qualifying conditions	0.044	0.004	-0.002	0.009	0.269	8.6
Acute care transitions						
All-cause	0.752	0.018	-0.022	0.057	0.460	2.4
Potentially avoidable	0.302	0.012	-0.008	0.031	0.324	3.9
Six qualifying conditions	0.115	0.011	0.000	0.022	0.106	9.5

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may\_31\ms112).

NOTES: *The predicted count absent the Initiative* is the mean of the predicted counts of events, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted counts with and without the intervention. *The relative effect* = (absolute Initiative effect) / (predicted count absent the Initiative). Acute care transitions include hospitalizations, ED visits, and observation stays. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

**Table W-9. All ECCPs: Initiative effect on Medicare expenditures: Sensitivity analysis using FY 2016 as baseline year, FY 2019**

Measure	Predicted expenditure absent the initiative (dollars)	Absolute initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
<b>Clinical + Payment</b>						
Total Medicare expenditures	<b>34,629</b>	<b>277</b>	<b>-1,009</b>	<b>1,564</b>	<b>0.723</b>	<b>0.8</b>
Hospitalization expenditures						
All-cause	10,961	-75	-775	626	0.861	-0.7
Potentially avoidable	<b>2,449</b>	<b>436</b>	<b>128</b>	<b>744</b>	<b>0.02</b>	<b>17.8</b>
Six qualifying conditions	<b>1,105</b>	<b>281</b>	<b>87</b>	<b>476</b>	<b>0.017</b>	<b>25.5</b>
ED visit expenditures						
All-cause	299	-1	-27	26	0.959	-0.3
Potentially avoidable	116	7	-7	21	0.386	6.3
Six qualifying conditions	29	2	-4	9	0.569	7.7
Acute care transition expenditures						
All-cause	11,666	-261	-1,046	525	0.585	-2.2
Potentially avoidable	<b>2,614</b>	<b>453</b>	<b>141</b>	<b>765</b>	<b>0.017</b>	<b>17.3</b>
Six qualifying conditions	<b>1,143</b>	<b>290</b>	<b>100</b>	<b>481</b>	<b>0.012</b>	<b>25.4</b>
<b>Payment-Only</b>						
Total Medicare Expenditures	<b>29,790</b>	<b>456</b>	<b>-485</b>	<b>1,398</b>	<b>0.425</b>	<b>1.5</b>
Hospitalization Expenditures						
All-cause	8,273	216	-259	692	0.454	2.6
Potentially avoidable	2,186	179	-6	364	0.112	8.2
Six qualifying conditions	1,075	85	-53	223	0.310	7.9
ED visit expenditures						
All-cause	348	4	-26	34	0.823	1.2
Potentially avoidable	147	0	-14	14	0.970	-0.2
Six qualifying conditions	48	1	-6	9	0.754	3.1
Acute care transition expenditures						
All-cause	8,784	159	-334	652	0.596	1.8
Potentially avoidable	2,391	133	-66	333	0.272	5.6
Six qualifying conditions	1,149	53	-80	187	0.509	4.7

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 113 and 114; RTI folder: ykaganova\ar4\may\_31\ms113 and ykaganova\ar4\may\_31\ms114).

NOTES: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the residents in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted expenditure absent the Initiative). *Acute care transitions* include hospitalizations, ED visits, and observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

**Table W-10. All ECCPs: Initiative effect on probability of hospital-related utilization per resident: Sensitivity analysis using the average of FY 2014–FY 2016 as the base period, FY 2019**

Measure	Predicted probability absent the initiative (percent)	Absolute initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
<b>Clinical + Payment</b>						
Any hospitalization						
All-cause	<b>27.4</b>	<b>-1.8</b>	<b>-3.0</b>	<b>-0.6</b>	<b>0.012</b>	<b>-6.6</b>
Potentially avoidable	11.4	0.5	-0.4	1.3	0.400	3.9
Six qualifying conditions	6.0	0.1	-0.6	0.7	0.836	1.3
Any ED visit						
All-cause	20.4	0.4	-0.9	1.8	0.591	2.2
Potentially avoidable	10.5	0.9	-0.1	1.9	0.135	8.5
Six qualifying conditions	2.5	0.2	-0.2	0.7	0.326	10.1
Any acute care transition						
All-cause	38.4	-1.4	-3.0	0.2	0.156	-3.6
Potentially avoidable	19.8	0.4	-0.9	1.7	0.647	1.8
Six qualifying conditions	8.1	0.2	-0.6	1.0	0.707	2.2
<b>Payment-Only</b>						
Any hospitalization						
All-cause	26.3	-0.5	-1.5	0.6	0.443	-1.9
Potentially avoidable	11.8	0.0	-0.7	0.8	0.923	0.4
Six qualifying conditions	6.7	-0.1	-0.7	0.5	0.802	-1.3
Any ED visit						
All-cause	24.7	-0.5	-1.7	0.7	0.508	-2.0
Potentially avoidable	13.7	-0.5	-1.4	0.4	0.372	-3.6
Six qualifying conditions	4.0	0.1	-0.3	0.5	0.697	2.6
Any acute care transition						
All-cause	40.1	-0.8	-2.1	0.5	0.329	-2.0
Potentially avoidable	22.4	-0.7	-1.8	0.4	0.279	-3.2
Six qualifying conditions	10.0	-0.3	-1.0	0.5	0.553	-2.6

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may\_31\ms110).

NOTES: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted probability absent the Initiative). *Acute care transitions* include hospitalizations, ED visits, and observation stays. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

**Table W-11. All ECCPs: Initiative effect on count of hospital-related utilization events per resident: Sensitivity analysis using the average of FY 2014–FY 2016 as the base period, FY 2019**

Measure	Predicted count absent the initiative (events per year)	Absolute initiative effect (events per year)	90% CI		p-value	Relative effect (percent)
<b>Clinical + Payment</b>						
Hospitalizations						
All-cause	<b>0.444</b>	<b>-0.029</b>	<b>-0.054</b>	<b>-0.003</b>	<b>0.067</b>	<b>-6.4</b>
Potentially avoidable	0.140	0.006	-0.006	0.017	0.440	4.0
Six qualifying conditions	0.070	0.003	-0.006	0.011	0.583	4.0
ED visits						
All-cause	0.298	0.012	-0.012	0.037	0.403	4.2
Potentially avoidable	0.127	0.011	-0.002	0.024	0.168	8.5
Six qualifying conditions	0.026	0.002	-0.002	0.007	0.455	7.7
Acute care transitions						
All-cause	0.745	-0.021	-0.063	0.022	0.421	-2.8
Potentially avoidable	0.270	0.013	-0.006	0.033	0.267	5.0
Six qualifying conditions	0.097	0.003	-0.007	0.014	0.598	3.4
<b>Payment-Only</b>						
Hospitalizations						
All-cause	0.411	-0.014	-0.035	0.007	0.286	-3.4
Potentially avoidable	0.145	0.001	-0.009	0.010	0.931	0.4
Six qualifying conditions	0.079	-0.001	-0.008	0.007	0.906	-0.7
ED visits						
All-cause	0.380	-0.006	-0.032	0.019	0.671	-1.7
Potentially avoidable	0.172	-0.004	-0.017	0.009	0.637	-2.2
Six qualifying conditions	0.045	0.002	-0.003	0.007	0.466	5.0
Acute care transitions						
All-cause	0.793	-0.023	-0.062	0.016	0.331	-2.9
Potentially avoidable	0.318	-0.004	-0.024	0.015	0.704	-1.4
Six qualifying conditions	0.125	0.001	-0.009	0.011	0.890	0.7

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may\_31\ms112).

NOTES: *The predicted count absent the Initiative* is the mean of the predicted counts of events, for the residents in the intervention group, under the scenario that the intervention did not occur. *The Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted counts with and without the intervention. *The relative effect* = (*absolute Initiative effect*) / (*predicted count absent the Initiative*). *Acute care transitions* include hospitalizations, ED visits, and observation stays. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

**Table W-12. All ECCPs: Initiative effect on Medicare expenditures: Sensitivity analysis using the average of FY 2014–FY 2016 as the base period, FY 2019**

Measure	Predicted expenditure absent the initiative (dollars)	Absolute initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
<b>Clinical + Payment</b>						
Total Medicare expenditures	<b>34,886</b>	<b>17</b>	<b>-1,149</b>	<b>1,184</b>	<b>0.981</b>	<b>0.0</b>
Hospitalization expenditures						
All-cause	11,256	-343	-996	311	0.388	-3.0
Potentially avoidable	<b>2,599</b>	<b>302</b>	<b>34</b>	<b>569</b>	<b>0.063</b>	<b>11.6</b>
Six qualifying conditions	1,223	175	-2	351	0.104	14.3
ED visit expenditures						
All-cause	307	-9	-35	17	0.557	-3.0
Potentially avoidable	119	4	-9	18	0.614	3.5
Six qualifying conditions	30	2	-4	8	0.551	7.0
Acute care transition expenditures						
All-cause	11,950	-523	-1,208	163	0.210	-4.4
Potentially avoidable	<b>2,767</b>	<b>312</b>	<b>35</b>	<b>590</b>	<b>0.064</b>	<b>11.3</b>
Six qualifying conditions	<b>1,262</b>	<b>183</b>	<b>4</b>	<b>363</b>	<b>0.093</b>	<b>14.5</b>
<b>Payment-Only</b>						
Total Medicare Expenditures	<b>30,420</b>	<b>-169</b>	<b>-1,066</b>	<b>728</b>	<b>0.757</b>	<b>-0.6</b>
Hospitalization Expenditures						
All-cause	8,830	-318	-776	141	0.254	-3.6
Potentially avoidable	2,343	33	-142	208	0.756	1.4
Six qualifying conditions	1,202	-33	-160	93	0.666	-2.8
ED visit expenditures						
All-cause	359	-6	-33	20	0.697	-1.8
Potentially avoidable	151	-4	-17	9	0.612	-2.7
Six qualifying conditions	46	3	-4	9	0.479	6.0
Acute care transition expenditures						
All-cause	9,335	-364	-855	127	0.223	-3.9
Potentially avoidable	2,526	11	-175	196	0.925	0.4
Six qualifying conditions	1,263	-51	-176	73	0.496	-4.1

ED = emergency department.

SOURCE: RTI analysis of Medicare claims data (RTI program MS 113 and 114: RTI folders: ykaganova\ar4\may\_31\ms113 and ykaganova\ar4\may\_31\ms114).

NOTES: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the residents in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted expenditure absent the Initiative). *Acute care transitions* include hospitalizations, ED visits, and observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

**APPENDIX X**  
**COMPLETE MULTIVARIATE LOGISTIC REGRESSION RESULTS, POTENTIALLY**  
**AVOIDABLE HOSPITALIZATION, FY 2019**

**Table X-1** shows coefficient estimates ( $\beta$ ), robust standard errors (SE), and p-values (p) from the complete logistic regression model predicting the probability of any potentially avoidable hospitalization per resident in FY 2019. For illustration, we use the results from the pooled model combining all ECCPs for the Payment-Only group. Most of the outcome models were of this form.

**Table X-1. All ECCPs, Payment-Only: Complete multivariate regression results of the probability of a potentially avoidable hospitalization per resident, FY 2019**

Parameter	Any potentially avoidable hospitalizations		
	$\beta$	SE	p
Intervention group	-0.299	0.105	0.004
Within-state reference group (WSRG)	-0.237	0.097	0.014
Year count (2014 = 0, 2015 = 1, 2016 = 2, 2017 = 3, 2018 = 3, 2019 = 3)	-0.039	0.004	<0.001
Year count * Intervention group	-0.045	0.021	0.030
Year count * WSRG	-0.017	0.007	0.023
FY 2017	0.042	0.010	<0.001
FY 2018	0.014	0.011	0.184
FY 2019	-0.031	0.011	0.005
FY 2017 * Intervention group	-0.033	0.050	0.511
FY 2018 * Intervention group	0.105	0.057	0.064
FY 2019 * Intervention group	0.109	0.056	0.051
FY 2017 * WSRG	0.030	0.019	0.107
FY 2018 * WSRG	0.046	0.019	0.016
FY 2019 * WSRG	0.022	0.020	0.281
Proportion of deaths due to flu/pneumonia	0.605	0.609	0.320
HCC count = 3–4	0.237	0.005	<0.001
HCC count = 5–7	0.459	0.008	<0.001
HCC count >= 8	0.507	0.013	<0.001
% MA residents = 10–19.9	-0.086	0.007	<0.001
% MA residents = 20–29.9	-0.135	0.010	<0.001
% MA residents >= 30	-0.194	0.011	<0.001
Exposure days 1–89	-0.427	0.005	<0.001
Exposure days 90–179	0.207	0.005	<0.001
Exposure days 180–269	0.370	0.005	<0.001
Exposure days 270–364	0.554	0.005	<0.001

(continued)

**Table X-1. All ECCPs, Payment-Only: Complete multivariate regression results of the probability of a potentially avoidable hospitalization per resident, FY 2019 (continued)**

Parameter	Any potentially avoidable hospitalizations		
	$\beta$	SE	p
Male, <65	-0.089	0.010	<0.001
Female, 65–69	0.060	0.011	<0.001
Male, 65–69	0.001	0.012	0.963
Female, 70–74	0.133	0.010	<0.001
Male, 70–74	0.062	0.011	<0.001
Female, 75–79	0.180	0.010	<0.001
Male, 75–79	0.142	0.011	<0.001
Female, 80–84	0.204	0.010	<0.001
Male, 80–84	0.198	0.011	<0.001
Female, 85–89	0.220	0.010	<0.001
Male, 85–89	0.262	0.011	<0.001
Female, 90–94	0.187	0.010	<0.001
Male, 90–94	0.271	0.013	<0.001
Female, 95+	0.094	0.012	<0.001
Male, 95+	0.216	0.019	<0.001
Black, non-Hispanic	0.038	0.007	<0.001
Asian	0.029	0.020	0.154
Hispanic	0.116	0.017	<0.001
Other race/ethnicity	-0.025	0.012	0.033
Dementia	0.011	0.004	0.009
Anemia	0.086	0.004	<0.001
BMI <18.5	-0.089	0.007	<0.001
BMI = 25–29.9	0.006	0.004	0.117
BMI $\geq$ 30	0.069	0.004	<0.001
ADL score = 8–14	0.077	0.006	<0.001
ADL score = 15–21	-0.015	0.006	0.017
ADL score = 22–28	-0.102	0.008	<0.001
CFS= 1 (Mildly impaired)	-0.038	0.004	<0.001
CFS= 2 (Moderately impaired)	-0.046	0.005	<0.001
CFS= 3 (severely impaired)	-0.108	0.008	<0.001
Urban Non-Metropolitan	0.107	0.009	<0.001
Rural	0.275	0.024	<0.001

(continued)

**Table X-1. All ECCPs, Payment-Only: Complete multivariate regression results of the probability of a potentially avoidable hospitalization per resident, FY 2019 (continued)**

Parameter	Any potentially avoidable hospitalizations		
	$\beta$	SE	p
Resident's mood assessment (PHQ)	0.005	0.001	<0.001
Neurogenic Bladder	0.088	0.010	<0.001
Obstructive Uropathy	-0.011	0.015	0.470
Community Based Care Transition Program (CCTP)	0.541	0.033	<0.001
Comprehensive ESRD Care (CEC)	-0.029	0.031	0.357
Comprehensive Primary Care Initiative (CPCI)	-0.219	0.041	<0.001
Comprehensive Primary Care Plus (CPC+), non-SSP Participants	-0.238	0.029	<0.001
Comprehensive Primary Care Plus (CPC+), SSP Participants	-0.266	0.031	<0.001
Financial Alignment Initiative	0.137	0.031	<0.001
Next Generation Accountable Care Organization (NGACO)	0.042	0.013	0.001
Pioneer Accountable Care Organization	-0.010	0.016	0.525
Medicare Shared Savings Program	-0.013	0.006	0.031
Vermont All-Payer ACO Model	0.023	0.140	0.872
Maryland Total Cost of Care, Primary Care Program	-0.302	0.213	0.157
Pre period * HIV/AIDS (HCC 1)	-0.113	0.040	0.004
Post period * HIV/AIDS (HCC 1)	0.042	0.036	0.244
Pre period * Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock (HCC 2)	0.013	0.007	0.069
Post period * Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock (HCC 2)	-0.021	0.008	0.005
Pre period * Opportunistic Infections (HCC 6)	0.047	0.025	0.057
Post period * Opportunistic Infections (HCC 6)	0.025	0.030	0.411
Pre period * Metastatic Cancer and Acute Leukemia (HCC 8)	-0.017	0.022	0.437
Post period * Metastatic Cancer and Acute Leukemia (HCC 8)	-0.057	0.022	0.010
Pre period * Lung and Other Severe Cancers (HCC 9)	0.044	0.018	0.016
Post period * Lung and Other Severe Cancers (HCC 9)	-0.002	0.020	0.912
Pre period * Lymphoma and Other Cancers (HCC 10)	0.036	0.018	0.051
Post period * Lymphoma and Other Cancers (HCC 10)	-0.004	0.020	0.829
Pre period * Colorectal, Bladder, and Other Cancers (HCC 11)	-0.026	0.015	0.079
Post period * Colorectal, Bladder, and Other Cancers (HCC 11)	-0.047	0.017	0.004
Pre period * Breast, Prostate, and Other Cancers and Tumors (HCC 12)	-0.042	0.011	<0.001

(continued)

**Table X-1. All ECCPs, Payment-Only: Complete multivariate regression results of the probability of a potentially avoidable hospitalization per resident, FY 2019 (continued)**

Parameter	Any potentially avoidable hospitalizations		
	$\beta$	SE	p
Post period * Breast, Prostate, and Other Cancers and Tumors (HCC 12)	-0.038	0.011	0.001
Pre period * Diabetes with Acute Complications (HCC 17)	0.160	0.018	<0.001
Post period * Diabetes with Acute Complications (HCC 17)	0.302	0.018	<0.001
Pre period * Diabetes with Chronic Complications (HCC 18)	0.161	0.006	<0.001
Post period * Diabetes with Chronic Complications (HCC 18)	0.149	0.005	<0.001
Pre period * Diabetes without Complication (HCC 19)	0.051	0.006	<0.001
Post period * Diabetes without Complication (HCC 19)	0.010	0.008	0.204
Pre period * Protein-Calorie Malnutrition (HCC 21)	-0.016	0.008	0.036
Post period * Protein-Calorie Malnutrition (HCC 21)	0.023	0.008	0.005
Pre period * Other Significant Endocrine and Metabolic Disorders (HCC 23)	0.045	0.009	<0.001
Post period * Other Significant Endocrine and Metabolic Disorders (HCC 23)	0.076	0.009	<0.001
Pre period * End-Stage Liver Disease (HCC 27)	0.040	0.023	0.085
Post period * End-Stage Liver Disease (HCC 27)	0.070	0.025	0.006
Pre period * Cirrhosis of Liver (HCC 28)	0.007	0.023	0.754
Post period * Cirrhosis of Liver (HCC 28)	0.053	0.021	0.013
Pre period * Chronic Hepatitis (HCC 29)	0.058	0.029	0.048
Post period * Chronic Hepatitis (HCC 29)	0.045	0.026	0.078
Pre period * Intestinal Obstruction/Perforation (HCC 33)	0.047	0.010	<0.001
Post period * Intestinal Obstruction/Perforation (HCC 33)	0.035	0.011	0.001
Pre period * Chronic Pancreatitis (HCC 34)	0.090	0.033	0.007
Post period * Chronic Pancreatitis (HCC 34)	0.035	0.034	0.299
Pre period * Inflammatory Bowel Disease (HCC 35)	0.091	0.021	<0.001
Post period * Inflammatory Bowel Disease (HCC 35)	0.034	0.021	0.108
Pre period * Bone/Joint/Muscle Infections/Necrosis (HCC 39)	-0.005	0.012	0.666
Post period * Bone/Joint/Muscle Infections/Necrosis (HCC 39)	0.003	0.012	0.817
Pre period * Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 40)	0.021	0.009	0.025
Post period * Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 40)	0.034	0.010	<0.001
Pre period * Severe Hematological Disorders (HCC 46)	0.143	0.020	<0.001
Post period * Severe Hematological Disorders (HCC 46)	0.080	0.022	<0.001

(continued)

**Table X-1. All ECCPs, Payment-Only: Complete multivariate regression results of the probability of a potentially avoidable hospitalization per resident, FY 2019 (continued)**

Parameter	Any potentially avoidable hospitalizations		
	$\beta$	SE	p
Pre period * Disorders of Immunity (HCC 47)	0.076	0.015	<0.001
Post period * Disorders of Immunity (HCC 47)	0.099	0.015	<0.001
Pre period * Coagulation Defects and Other Specified Hematological Disorders (HCC 48)	0.013	0.007	0.090
Post period * Coagulation Defects and Other Specified Hematological Disorders (HCC 48)	0.006	0.008	0.413
(Pre period * Drug/Alcohol Psychosis (HCC 54)	-0.105	0.017	<0.001
Post period * Drug/Alcohol Psychosis (HCC 54)	-0.125	0.025	<0.001
Pre period * Drug/Alcohol Dependence (HCC 55)	-0.020	0.015	0.180
Post period * Drug/Alcohol Dependence (HCC 55)	-0.039	0.012	0.001
Pre period * Schizophrenia (HCC 57)	0.026	0.011	0.018
Post period * Schizophrenia (HCC 57)	0.067	0.011	<0.001
Pre period * Major Depressive, Bipolar, and Paranoid Disorders (HCC 58)	0.041	0.006	<0.001
Post period * Major Depressive, Bipolar, and Paranoid Disorders (HCC 58)	0.044	0.006	<0.001
Pre period * Quadriplegia (HCC 70)	0.151	0.017	<0.001
Post period * Quadriplegia (HCC 70)	0.193	0.015	<0.001
Pre period * Paraplegia (HCC 71)	0.141	0.019	<0.001
Post period * Paraplegia (HCC 71)	0.138	0.019	<0.001
Pre period * Spinal Cord Disorders/Injuries (HCC 72)	-0.007	0.018	0.716
Post period * Spinal Cord Disorders/Injuries (HCC 72)	-0.006	0.021	0.787
Pre period * Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease (HCC 73)	-0.012	0.048	0.804
Post period * Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease (HCC 73)	0.084	0.049	0.089
Pre period * Cerebral Palsy (HCC 74)	-0.096	0.022	<0.001
Post period * Cerebral Palsy (HCC 74)	-0.088	0.021	<0.001
Pre period * Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy (HCC 75)	-0.029	0.019	0.127
Post period * Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy (HCC 75)	-0.063	0.018	<0.001
Pre period * Muscular Dystrophy (HCC 76)	-0.012	0.052	0.814

(continued)

**Table X-1. All ECCPs, Payment-Only: Complete multivariate regression results of the probability of a potentially avoidable hospitalization per resident, FY 2019 (continued)**

Parameter	Any potentially avoidable hospitalizations		
	$\beta$	SE	p
Post period * Muscular Dystrophy (HCC 76)	0.065	0.055	0.238
Pre period * Multiple Sclerosis (HCC 77)	0.072	0.017	<0.001
Post period * Multiple Sclerosis (HCC 77)	0.038	0.018	0.034
Pre period * Parkinson's and Huntington's Diseases (HCC 78)	0.021	0.008	0.008
Post period * Parkinson's and Huntington's Diseases (HCC 78)	0.035	0.008	<0.001
Pre period * Seizure Disorders and Convulsions (HCC 79)	0.159	0.006	<0.001
Post period * Seizure Disorders and Convulsions (HCC 79)	0.169	0.007	<0.001
Pre period * Coma, Brain Compression/Anoxic Damage (HCC 80)	-0.156	0.018	<0.001
Post period * Coma, Brain Compression/Anoxic Damage (HCC 80)	-0.090	0.016	<0.001
Pre period * Respiratory Arrest (HCC 83)	0.194	0.045	<0.001
Post period * Respiratory Arrest (HCC 83)	0.180	0.054	0.001
Pre period * Cardio-Respiratory Failure and Shock (HCC 84)	0.254	0.007	<0.001
Post period * Cardio-Respiratory Failure and Shock (HCC 84)	0.282	0.007	<0.001
Pre period * Congestive Heart Failure (HCC 85)	0.229	0.005	<0.001
Post period * Congestive Heart Failure (HCC 85)	0.212	0.006	<0.001
Pre period * Acute Myocardial Infarction (HCC 86)	-0.006	0.011	0.575
Post period * Acute Myocardial Infarction (HCC 86)	0.025	0.010	0.010
Pre period * Unstable Angina and Other Acute Ischemic Heart Disease (HCC 87)	0.077	0.012	<0.001
Post period * Unstable Angina and Other Acute Ischemic Heart Disease (HCC 87)	0.072	0.014	<0.001
Pre period * Angina Pectoris (HCC 88)	0.053	0.014	<0.001
Post period * Angina Pectoris (HCC 88)	0.046	0.013	<0.001
Pre period * Specified Heart Arrhythmias (HCC 96)	0.084	0.005	<0.001
Post period * Specified Heart Arrhythmias (HCC 96)	0.084	0.005	<0.001
Pre period * Cerebral Hemorrhage (HCC 99)	-0.134	0.015	<0.001
Post period * Cerebral Hemorrhage (HCC 99)	-0.110	0.015	<0.001
Pre period * Ischemic or Unspecified Stroke (HCC 100)	-0.052	0.007	<0.001
Post period * Ischemic or Unspecified Stroke (HCC 100)	-0.060	0.008	<0.001
Pre period * Hemiplegia/Hemiparesis (HCC 103)	0.000	0.008	0.957
Post period * Hemiplegia/Hemiparesis (HCC 103)	-0.003	0.008	0.693

(continued)

**Table X-1. All ECCPs, Payment-Only: Complete multivariate regression results of the probability of a potentially avoidable hospitalization per resident, FY 2019 (continued)**

Parameter	Any potentially avoidable hospitalizations		
	$\beta$	SE	p
Pre period * Monoplegia, Other Paralytic Syndromes (HCC 104)	0.039	0.028	0.167
Post period * Monoplegia, Other Paralytic Syndromes (HCC 104)	0.011	0.032	0.733
Pre period * Atherosclerosis of the Extremities with Ulceration or Gangrene (HCC 106)	0.130	0.013	<0.001
Post period * Atherosclerosis of the Extremities with Ulceration or Gangrene (HCC 106)	0.082	0.013	<0.001
Pre period * Vascular Disease with Complications (HCC 107)	0.016	0.011	0.138
Post period * Vascular Disease with Complications (HCC 107)	0.015	0.011	0.175
Pre period * Vascular Disease (HCC 108)	-0.007	0.006	0.241
Post period * Vascular Disease (HCC 108)	-0.016	0.006	0.008
Pre period * Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 110 or HCC 111)	0.303	0.005	<0.001
Post period * Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 110 or HCC 111)	0.260	0.006	<0.001
Pre period * Fibrosis of Lung and Other Chronic Lung Disorders (HCC 112)	0.168	0.022	<0.001
Post period * Fibrosis of Lung and Other Chronic Lung Disorders (HCC 112)	0.095	0.025	<0.001
Pre period * Aspiration and Specified Bacterial Pneumonias (HCC 114)	0.359	0.008	<0.001
Post period * Aspiration and Specified Bacterial Pneumonias (HCC 114)	0.337	0.009	<0.001
Pre period * Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 115)	0.234	0.022	<0.001
Post period * Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 115)	0.318	0.013	<0.001
Pre period * Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 122)	0.017	0.017	0.324
Post period * Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 122)	0.133	0.018	<0.001
Pre period * Exudative Macular Degeneration (HCC 124)	-0.025	0.014	0.081
Post period * Exudative Macular Degeneration (HCC 124)	-0.009	0.015	0.534
Pre period * Acute Renal Failure (HCC 135)	0.320	0.006	<0.001
Post period * Acute Renal Failure (HCC 135)	0.340	0.006	<0.001
Pre period * Chronic Kidney Disease, Stage 5 (HCC 136)	0.031	0.022	0.154

(continued)

**Table X-1. All ECCPs, Payment-Only: Complete multivariate regression results of the probability of a potentially avoidable hospitalization per resident, FY 2019 (continued)**

Parameter	Any potentially avoidable hospitalizations		
	$\beta$	SE	p
Post period * Chronic Kidney Disease, Stage 5 (HCC 136)	0.080	0.025	0.002
Pre period * Chronic Kidney Disease, Severe (Stage 4) (HCC 137)	0.178	0.018	<0.001
Post period * Chronic Kidney Disease, Severe (Stage 4) (HCC 137)	0.165	0.017	<0.001
Pre period * Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone (HCC 157)	0.178	0.015	<0.001
Post period * Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone (HCC 157)	0.157	0.014	<0.001
Pre period * Pressure Ulcer of Skin with Full Thickness Skin Loss (HCC 158)	0.077	0.011	<0.001
Post period * Pressure Ulcer of Skin with Full Thickness Skin Loss (HCC 158)	0.058	0.010	<0.001
Pre period * Chronic Ulcer of Skin, Except Pressure (HCC 161)	0.067	0.008	<0.001
Post period * Chronic Ulcer of Skin, Except Pressure (HCC 161)	0.078	0.009	<0.001
Pre period * Severe Head Injury or Major Head Injury (HCC 166 or HCC 167)	0.097	0.014	<0.001
Post period * Severe Head Injury or Major Head Injury (HCC 166 or HCC 167)	0.083	0.015	<0.001
Pre period * Vertebral Fractures without Spinal Cord Injury (HCC 169)	0.082	0.012	<0.001
Post period * Vertebral Fractures without Spinal Cord Injury (HCC 169)	0.078	0.013	<0.001
Pre period * Hip Fracture/Dislocation (HCC 170)	0.242	0.008	<0.001
Post period * Hip Fracture/Dislocation (HCC 170)	0.299	0.009	<0.001
Pre period * Complications of Specified Implanted Device or Graft (HCC 176)	-0.081	0.010	<0.001
Post period * Complications of Specified Implanted Device or Graft (HCC 176)	-0.074	0.009	<0.001
Pre period * Artificial Openings for Feeding or Elimination (HCC 188)	0.185	0.009	<0.001
Post period * Artificial Openings for Feeding or Elimination (HCC 188)	0.105	0.010	<0.001
Pre period * Amputation Status, Lower Limb/Amputation Complications (HCC 189)	0.152	0.015	<0.001
Post period * Amputation Status, Lower Limb/Amputation Complications (HCC 189)	0.122	0.015	<0.001

(continued)

**Table X-1. All ECCPs, Payment-Only: Complete multivariate regression results of the probability of a potentially avoidable hospitalization per resident, FY 2019 (continued)**

Parameter	Any potentially avoidable hospitalizations		
	$\beta$	SE	p
ESRD patient with dialysis status	0.447	0.010	<0.001
ESRD patients after transplant who are not on dialysis after transplant	0.414	0.044	<0.001
Full-dual eligibility	0.151	0.006	<0.001
Original eligibility due to disability	0.051	0.005	<0.001
Nursing facility in the hospital	-0.076	0.029	0.009
For-profit nursing facility	0.062	0.009	<0.001
Arkansas	0.358	0.034	<0.001
Arizona	-0.258	0.050	<0.001
Connecticut	-0.331	0.036	<0.001
Delaware	-0.005	0.069	0.942
Florida	-0.009	0.032	0.792
Georgia	0.111	0.033	0.001
Iowa	-0.043	0.031	0.161
Idaho	-0.476	0.056	<0.001
Illinois	0.109	0.029	<0.001
Kansas	0.094	0.036	0.010
Kentucky	0.112	0.035	0.001
Louisiana	0.474	0.037	<0.001
Massachusetts	-0.212	0.028	<0.001
Maryland	-0.315	0.031	<0.001
Maine	-0.457	0.047	<0.001
Michigan	-0.288	0.032	<0.001
Minnesota	-0.118	0.036	0.001
Missouri	0.381	0.039	<0.001
Montana	-0.312	0.060	<0.001
North Carolina	-0.194	0.030	<0.001
North Dakota	-0.181	0.051	<0.001
New Hampshire	-0.406	0.053	<0.001
New Jersey	-0.103	0.033	0.002
New Mexico	-0.107	0.054	0.050
Ohio	-0.130	0.029	<0.001
Oklahoma	0.275	0.034	<0.001

(continued)

**Table X-1. All ECCPs, Payment-Only: Complete multivariate regression results of the probability of a potentially avoidable hospitalization per resident, FY 2019 (continued)**

Parameter	Any potentially avoidable hospitalizations		
	$\beta$	SE	p
Oregon	-0.313	0.054	<0.001
Rhode Island	-0.289	0.043	<0.001
South Carolina	0.022	0.042	0.605
South Dakota	-0.075	0.050	0.131
Tennessee	0.042	0.036	0.239
Texas	0.082	0.026	0.002
Utah	-0.511	0.075	<0.001
Virginia	-0.232	0.034	<0.001
Vermont	-0.375	0.080	<0.001
Washington	-0.638	0.041	<0.001
Wisconsin	-0.246	0.035	<0.001
West Virginia	-0.134	0.043	0.002
Wyoming	-0.185	0.072	0.011
Alabama	0.377	0.098	<0.001
Indiana	0.187	0.096	0.051
Missouri	0.368	0.095	<0.001
Colorado	-0.237	0.102	0.020
New York	0.021	0.095	0.825
Pennsylvania	0.094	0.096	0.325
Constant	-2.891	0.059	<0.001

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may\_31\ms110).

NOTES: The year count parameter is correctly specified. The year count parameter allows for a linear trend. We assume a linear trend through the base period, but we do not assume this trend continues through the years of NFI 2. See **Appendix L** for more information.

## APPENDIX Y

### ACUTE CARE TRANSITION RATES AMONG LONG-STAY NURSING FACILITY RESIDENTS AND FACILITY STAFFING LEVELS: VARIATION BY DAY OF WEEK

#### Y.1 Overview

In this appendix, we examine how acute care transition (ACT) rates and staffing levels vary by day of the week among long-stay nursing facility residents in the NFI 2 Clinical + Payment, Payment-Only, national comparison, and within-state reference groups.

While several studies have analyzed the impact of staffing levels on a variety of nursing home resident outcomes, newly available data from the Centers for Medicare & Medicaid Services (CMS) Payroll-Based Journal (PBJ) allows for a more granular analysis by day of week.<sup>41</sup> Recently, analyses in *Kaiser Health News* and *Health Affairs* used the PBJ data to confirm the previously anecdotal assertion that nursing home staffing rates are, on average, lower on the weekends compared to weekdays.<sup>42,43</sup>

The analyses presented in this appendix explore whether lower nursing home staffing levels on weekends are accompanied by higher rates of transfer to acute care hospitals on those days, and how daily patterns vary across NFI 2 intervention groups. We provide an overview of our analytic approach (**Section Y.2**), the results of our descriptive analyses (**Section Y.3**), and a brief discussion of our multivariate findings (**Section Y.4**).

#### Y.2 Methods

We utilized descriptive and multivariate analyses to examine the variation by day of the week in nursing home staffing and in the rate of several ACT types among long-stay nursing facility residents.

##### Y.2.1 Data Sources

We obtained Medicare data (eligibility, enrollment, claims, and assessments) from the CMS Integrated Data Repository (IDR). Resident assessment data were acquired from the MDS (Minimum Data Set) 3.0. Facility characteristics were captured using data from the CASPER

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<sup>41</sup> CMS first implemented the PBJ in 2016 as required by Section 6106 of the Affordable Care Act (ACA). The ACA requires nursing facilities to electronically submit staffing information based on payroll and other auditable data. (Source: Centers for Medicare and Medicaid Services. Electronic staffing data submission Payroll-Based Journal: long-term care facility manual [Internet]. Baltimore (MD): CMS; [revised 2015 Oct 8; cited 2020 Aug 13]. Available from: <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Downloads/PBJ-Policy-Manual-Final-V25-11-19-2018.pdf>)

<sup>42</sup> Rau, J. (2018). Feds Order More Weekend Inspections of Nursing Homes to Catch Understaffing. *Kaiser Health News*.

<sup>43</sup> Geng, F., Stevenson, D. G., & Grabowski, D. C. (2019). Daily Nursing Home Staffing Levels Highly Variable, Often Below CMS Expectations. *Health Affairs (Project Hope)*, 38(7), 1095–1100. <https://doi.org/10.1377/hlthaff.2018.05322>

(Certification and Survey Provider Enhanced Reporting) system and NHC (Nursing Home Compare). Daily staffing data were obtained from the PBJ system.

## **Y.2.2 Analytic Sample and File Structure**

Our initial underlying resident sample consisted of the population used in Medicare utilization and cost analyses in the NFI 2 Fourth Annual Report, specifically for FY 2019 (October 1, 2018, to September 30, 2019). The initial facility sample included all facilities in the PBJ dataset that could be paired with the resident sample.

For all facilities included in this sample, we calculated facility-level average daily ACT rates and average daily staffing levels. That is, for each facility, we calculated average rates of ACTs and staffing levels, for each day of the week (Mondays, Tuesdays, etc.) in FY 2019. This facility-day-of-week data structure allows us to examine whether and how the ACT rate and staffing level vary by day of the week.

Beginning with our full dataset (N=13,636 facilities), we excluded facilities from this analysis for several reasons. To ensure sufficient sample size, we excluded facilities with, on average, fewer than 20 NFI 2 eligible residents on any day of the week in FY 2019 (N = 3,147 facilities). We also excluded facilities that did not have complete data in the PBJ for FY 2019 (N = 895 facilities). We excluded hospital-based facilities (N = 395 facilities) as the patient acuity and staffing mix in these facilities are different from freestanding facilities. As we cannot identify the number of staffing hours spent only on NFI 2 eligible residents, we calculated staffing levels for all facility residents using the MDS daily census count data in the PBJ, regardless of NFI 2 eligibility, as the denominator. ACT rates are calculated only for the long-stay residents that meet the NFI 2 eligibility criteria. A small number of facilities (N = 4 facilities) were removed from the analytic sample because the MDS census count was below the number of residents eligible for NFI 2. This was likely due to an error in the MDS count data for those facilities. Our final sample consisted of 9,718 nursing facilities—each with seven observations, one for each day of the week—for a total of 68,026 facility-day observations.

## **Y.2.3 Key Variables of Interest**

We calculated daily facility-level ACT rates per 1,000 Initiative-eligible resident-days using Medicare fee-for-service claims obtained from the IDR. ACTs included inpatient hospitalizations, outpatient emergency department (ED) visits, and observation stays combined. We calculated ACT rates separately for categories of ACT including all-cause, potentially avoidable, and potentially avoidable transfers due to the six qualifying conditions. Specifically, for each facility, we summed a respective ACT measure for NFI 2 eligible residents occurring on a particular day of the week in FY 2019 (e.g., all inpatient hospitalizations that occurred on Mondays in FY 2019 in a particular facility), multiplied by 1,000, and divided that sum by the number of Initiative-eligible resident-days that occurred on that particular day of the week (e.g., on Mondays in FY 2019) in that facility. For each facility we calculated an average ACT rate for each day of the week (e.g., Mondays, Tuesdays, Wednesdays, Thursdays, Fridays, Saturdays and Sundays) for FY 2019.

We calculated daily nursing facility staffing levels using the PBJ publicly reported data. We examined staffing levels separately for registered nurses (RNs), licensed practical nurses (LPNs) and certified nursing assistants (CNAs), and for these categories combined. The count of facility-level staffing quarter-hours reported in the PBJ data was then divided by the total number of resident-days at the given facility collected from the MDS to produce quarter-hours per resident-day (QHPRD) measures. The QHPRD measures were then aggregated by day of the week for each facility to produce daily average QHPRD per staff category (e.g., mean RN QHPRD on Tuesdays for each given facility). We further created two categorical variables for each facility for each day of the week indicating the percentage of that day of the week in FY 2019 (e.g., Mondays in FY 2019) that a medical director or other physician (MD) or non-physician clinician such as advanced practice registered nurse or physician assistant (collectively referred to as APRN) was present in the facility (e.g., 0% of Mondays, 1–50% of Mondays, >50% of Mondays).

#### **Y.2.4 Analyses**

##### ***Descriptive Statistics***

We used basic descriptive statistics to examine the variations in the facility-level ACT rates and staffing levels by day of the week in FY 2019. These descriptive statistics are presented for the following groups of facilities:

- Clinical + Payment facilities, all ECCPs combined
- Payment-Only facilities, all ECCPs combined
- Facilities in the combined national comparison group and within-state reference group (WSRG)

##### ***Multivariate Analyses***

We used a linear model with random effects and standard errors clustered at the facility-level, with each category of the daily ACT rates described above as the dependent variable. Our primary model included the following independent variables: indicators for days of the week (using Wednesday as the reference category); staffing QHPRD separately for RNs, LPNs, and CNAs; and two categorical variables indicating the percentage of each weekday (e.g., Monday) that a medical director or an APRN, respectively, is present in the facility.

The model also controlled for several facility-level variables that may influence hospital use and the quality of care provided to nursing facility residents: resident census count (1–49, 50–99, 100–199, >199); profit status (for-profit, not-for-profit); corporate ownership; location of the facility (metropolitan, urban non-metropolitan, or rural); the average percentage of residents in the facility matching NFI 2 eligibility criteria on each given day of the week in deciles; the percentage of residents in the facility with advanced care directives in deciles; an aggregate measure for the overall case-mix of residents at the facility; and indicators for whether the facility was in the Clinical + Payment group and Payment-Only group, respectively. Additionally, we included indicator variables to control for state-level fixed effects excluding those states not in the NFI 2 dataset: Alaska, Hawaii, the District of Columbia, and Nebraska.

### ***Sensitivity Analyses***

In addition to the analyses using the primary regression model described above, we conducted two separate sensitivity analyses.

First, we considered an alternative model that included interaction terms between the RN QHPRD, LPN QHPRD, and CNA QHPRD variables and day of the week indicator variables. For clarity of interpretation, the day of week indicators were retained, but the overall staffing effects variables were removed, which allows the coefficients of the interacted terms to capture the entirety of the effect of staffing on ACTs. These interaction terms give specific estimates of the effect of a change of one quarter hour of staff time on each particular day of the week, rather than an average effect over all days of the week. While the primary model reports an average staffing effect over the course of the week, the purpose of this analysis was to reveal the differential effect of RN, LPN, and CNA staffing on the ACT rate on each specific day of the week.

Second, we explored whether the weekend and weekday patterns of ACTs may differ due to hospital transfers being planned or unplanned. Planned transfers might be more commonly scheduled for weekdays compared to a weekend. We investigated this hypothesis by examining the rates of emergency department/observation stays (likely unplanned) as compared to inpatient hospitalizations by day of the week. In addition, we examined potentially avoidable inpatient admissions and created a proxy variable for nonavoidable inpatient admissions. Specifically, we examined four dependent variables, each calculated separately for each day of the week and measured as the rate of the following events per 1,000 resident-days: all-cause inpatient admissions; all-cause ED and/or observation stays; potentially avoidable inpatient hospitalizations; and nonavoidable inpatient hospitalizations (defined as all-cause inpatient hospitalizations minus potentially avoidable hospitalizations).

### **Y.3 Descriptive Results**

**Table Y-1** shows the ACT rate per 1,000 Initiative-eligible resident-days by category of ACT (all-cause, potentially avoidable, and potentially avoidable due to the six qualifying conditions). We present average rates for each day of the week, separately for the Clinical + Payment, Payment-Only, and national comparison/WSRG groups. **Table Y-2** shows the ACT rate per 1,000 Initiative-eligible resident-days, for four additional types of ACT (all-cause hospitalization, all-cause emergency department/observations stays [ED/OBS], potentially avoidable hospitalization, and nonavoidable hospitalizations). **Table Y-3** shows staffing QHPRD, by staff type and day of week. **Table Y-4** shows the counts and percentages of facilities in each group by the levels of MD and APRN staffing on each day of the week, on average. **Table Y-5** displays the average facility characteristics for our analytic sample.

We found that fewer ACTs occurred during the weekend as compared to weekdays. Potentially avoidable ACTs and ACTs due to any of the six qualifying conditions followed the same pattern; these outcomes also had lower mean daily rates on weekends as compared to weekdays. Additionally, we observed a spike in ACTs immediately before the weekend, with the peak occurring on Fridays.

As expected, our findings show lower staffing on weekends as compared to weekdays for all staff types individually and combined. Nurse staffing was highest Tuesday through Thursday, was slightly lower on Mondays and Fridays, and dropped more precipitously on weekends.

Facilities in the Clinical + Payment, Payment-Only, and national comparison group/WSRGs all have similar patterns for daily ACT rates and staffing levels, despite differences between the groups in the values of these measures on any given day of the week.

**Table Y-1. Average daily acute care transitions rates by category of ACT, FY 2019**

(per 1,000 resident-days)

	ACT, all-cause		ACT, potentially avoidable		ACT, due to 6 qualifying conditions	
	Mean	(SD)	Mean	(SD)	Mean	(SD)
<b>Clinical + Payment</b>						
Monday	3.427	(1.887)	1.346	(0.903)	0.460	(0.446)
Tuesday	3.184	(1.902)	1.147	(0.841)	0.447	(0.454)
Wednesday	3.103	(1.628)	1.096	(0.732)	0.420	(0.424)
Thursday	3.327	(1.732)	1.321	(0.862)	0.496	(0.514)
Friday	3.287	(1.815)	1.248	(0.736)	0.505	(0.500)
Saturday	2.901	(1.690)	1.111	(0.903)	0.446	(0.503)
Sunday	2.453	(1.485)	1.068	(0.812)	0.410	(0.517)
Weekday average	3.266	(1.792)	1.231	(0.820)	0.465	(0.468)
Weekend average	2.677	(1.603)	1.089	(0.857)	0.428	(0.509)
<b>Payment-Only</b>						
Monday	3.211	(1.751)	1.302	(0.922)	0.554	(0.481)
Tuesday	3.077	(1.629)	1.177	(0.803)	0.403	(0.440)
Wednesday	3.273	(1.885)	1.284	(0.964)	0.512	(0.554)
Thursday	3.170	(1.965)	1.198	(1.017)	0.462	(0.541)
Friday	3.240	(1.857)	1.283	(0.962)	0.536	(0.537)
Saturday	2.784	(1.631)	1.250	(1.127)	0.492	(0.520)
Sunday	2.630	(1.670)	1.100	(0.947)	0.513	(0.624)

(continued)

**Table Y-1. Average daily acute care transitions rates by category of ACT, FY 2019 (continued)**  
(per 1,000 resident-days)

	ACT, all-cause		ACT, potentially avoidable		ACT, due to 6 qualifying conditions	
	Mean	(SD)	Mean	(SD)	Mean	(SD)
<b>National comparison &amp; WSRG</b>						
Weekday average	3.194	(1.817)	1.249	(0.935)	0.493	(0.514)
Weekend average	2.707	(1.649)	1.175	(1.041)	0.502	(0.573)
Monday	4.049	(2.301)	1.647	(1.235)	0.721	(0.780)
Tuesday	4.054	(2.378)	1.627	(1.236)	0.710	(0.778)
Wednesday	4.037	(2.339)	1.609	(1.225)	0.705	(0.765)
Thursday	3.993	(2.297)	1.608	(1.224)	0.694	(0.773)
Friday	4.102	(2.316)	1.656	(1.224)	0.726	(0.773)
Saturday	3.457	(2.007)	1.453	(1.127)	0.630	(0.702)
Sunday	3.359	(2.010)	1.421	(1.147)	0.642	(0.745)
Weekday average	4.047	(2.327)	1.629	(1.229)	0.711	(0.774)
Weekend average	3.408	(2.009)	1.437	(1.137)	0.636	(0.724)

SD = standard deviation, WSRG = within state reference group.

SOURCE: RTI analysis of Medicare claims and PBJ data (RTI program PBJ01\_NS\_Descriptive; RTI folder:\PBJ and hospitalization\Results and QC).

**Table Y-2. Average daily acute care transitions rates by type of ACT, FY 2019**

(per 1,000 resident-days)

	All-cause hospitalization		All-cause ED/Observation		Potentially avoidable hospitalization		Nonavoidable hospitalization	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
<b>Clinical + Payment</b>								
Monday	2.017	(1.319)	1.410	(1.017)	0.736	(0.618)	1.282	(0.952)
Tuesday	2.017	(1.178)	1.167	(0.999)	0.749	(0.603)	1.268	(0.836)
Wednesday	1.827	(0.997)	1.276	(1.025)	0.617	(0.505)	1.210	(0.807)
Thursday	2.037	(1.237)	1.291	(0.929)	0.755	(0.673)	1.281	(0.830)
Friday	2.080	(1.288)	1.207	(0.990)	0.740	(0.582)	1.339	(1.028)
Saturday	1.622	(1.146)	1.279	(1.033)	0.579	(0.521)	1.043	(0.882)
Sunday	1.304	(0.839)	1.149	(0.942)	0.482	(0.428)	0.822	(0.673)
Weekday average	1.996	(1.207)	1.270	(0.992)	0.719	(0.599)	1.276	(0.892)
Weekend average	1.463	(1.014)	1.214	(0.988)	0.530	(0.478)	0.932	(0.790)
<b>Payment-Only</b>								
Monday	1.747	(1.144)	1.463	(1.022)	0.636	(0.532)	1.111	(0.827)
Tuesday	1.597	(0.996)	1.481	(1.091)	0.528	(0.449)	1.068	(0.809)
Wednesday	1.744	(1.091)	1.530	(1.148)	0.619	(0.554)	1.125	(0.913)
Thursday	1.727	(1.101)	1.443	(1.225)	0.592	(0.584)	1.135	(0.896)
Friday	1.778	(1.141)	1.463	(1.091)	0.642	(0.614)	1.136	(0.849)
Saturday	1.395	(0.936)	1.390	(1.142)	0.583	(0.562)	0.811	(0.719)
Sunday	1.365	(0.930)	1.265	(1.119)	0.535	(0.539)	0.829	(0.703)

(continued)

**Table Y-2. Average daily acute care transitions rates by type of ACT, FY 2019 (continued)**

(per 1,000 resident-days)

	All-cause hospitalization		All-cause ED/Observation		Potentially avoidable hospitalization		Nonavoidable hospitalization	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
<b>National comparison &amp; WSRG</b>								
Weekday average	1.718	(1.094)	1.476	(1.114)	0.603	(0.549)	1.115	(0.858)
Weekend average	1.380	(0.931)	1.327	(1.130)	0.559	(0.550)	0.820	(0.710)
Monday	2.093	(1.379)	1.956	(1.512)	0.780	(0.735)	1.313	(1.022)
Tuesday	2.158	(1.475)	1.896	(1.525)	0.782	(0.754)	1.376	(1.099)
Wednesday	2.129	(1.463)	1.907	(1.477)	0.767	(0.732)	1.363	(1.099)
Thursday	2.088	(1.428)	1.905	(1.460)	0.757	(0.731)	1.331	(1.068)
Friday	2.123	(1.444)	1.980	(1.482)	0.790	(0.749)	1.333	(1.064)
Saturday	1.694	(1.163)	1.763	(1.392)	0.637	(0.636)	1.057	(0.884)
Sunday	1.617	(1.117)	1.742	(1.408)	0.616	(0.630)	1.001	(0.844)
Weekday average	2.118	(1.438)	1.929	(1.492)	0.775	(0.741)	1.343	(1.071)
Weekend average	1.655	(1.141)	1.753	(1.400)	0.626	(0.633)	1.029	(0.865)

SD = standard deviation, ED=Emergency Department, WSRG= within state reference group.

SOURCE: RTI analysis of Medicare claims and PBJ data (RTI program PBJ01\_NS\_Descriptive; RTI folder:\PBJ and hospitalization\Results and QC).

**Table Y-3. Average daily clinical staff quarter-hours by staff type, FY 2019**

(per resident-day)

	RN		LPN		CNA		Total nursing staff		MD		APRN	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
<b>Clinical + Payment</b>												
Monday	2.542	(0.946)	3.505	(1.066)	9.385	(1.992)	15.432	(2.525)	0.038	(0.080)	0.037	(0.098)
Tuesday	2.632	(1.018)	3.607	(1.085)	9.621	(1.994)	15.860	(2.587)	0.041	(0.084)	0.037	(0.099)
Wednesday	2.673	(0.977)	3.656	(1.087)	9.764	(1.983)	16.093	(2.523)	0.041	(0.084)	0.036	(0.098)
Thursday	2.610	(1.016)	3.592	(1.087)	9.632	(1.988)	15.835	(2.574)	0.047	(0.095)	0.037	(0.092)
Friday	2.492	(0.940)	3.514	(1.063)	9.403	(1.928)	15.410	(2.461)	0.037	(0.077)	0.035	(0.097)
Saturday	1.373	(0.706)	3.019	(0.827)	8.750	(1.800)	13.142	(2.205)	0.006	(0.015)	0.006	(0.022)
Sunday	1.341	(0.680)	2.971	(0.832)	8.548	(1.775)	12.859	(2.146)	0.003	(0.008)	0.005	(0.019)
Weekday average	2.590	(0.978)	3.575	(1.075)	9.561	(1.974)	15.726	(2.538)	0.041	(0.084)	0.036	(0.096)
Weekend average	1.357	(0.691)	2.995	(0.828)	8.649	(1.786)	13.001	(2.175)	0.005	(0.012)	0.005	(0.020)
<b>Payment-Only</b>												
Monday	2.763	(0.996)	3.435	(0.956)	9.173	(1.723)	15.370	(2.236)	0.038	(0.071)	0.035	(0.100)
Tuesday	2.838	(1.026)	3.567	(0.991)	9.444	(1.790)	15.849	(2.325)	0.045	(0.070)	0.037	(0.103)
Wednesday	2.883	(1.054)	3.589	(1.021)	9.568	(1.842)	16.041	(2.421)	0.041	(0.079)	0.040	(0.105)
Thursday	2.815	(1.024)	3.537	(0.992)	9.438	(1.807)	15.791	(2.339)	0.035	(0.068)	0.034	(0.102)
Friday	2.703	(0.943)	3.421	(0.938)	9.192	(1.738)	15.316	(2.221)	0.028	(0.059)	0.032	(0.094)
Saturday	1.537	(0.795)	2.969	(0.866)	8.444	(1.451)	12.951	(1.858)	0.003	(0.013)	0.003	(0.021)
Sunday	1.518	(0.824)	2.954	(0.885)	8.264	(1.474)	12.736	(1.865)	0.005	(0.024)	0.003	(0.024)
Weekday average	2.800	(1.008)	3.510	(0.980)	9.363	(1.782)	15.674	(2.320)	0.037	(0.070)	0.035	(0.101)
Weekend average	1.528	(0.808)	2.961	(0.874)	8.354	(1.462)	12.843	(1.861)	0.004	(0.019)	0.003	(0.023)

(continued)

**Table Y-3. Average daily clinical staff quarter-hours by staff type, FY 2019 (continued)**

(per resident-day)

	RN		LPN		CNA		Total nursing staff		MD		APRN	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
<b>National comparison &amp; WSRG</b>												
Monday	2.553	(1.199)	3.593	(1.198)	9.055	(1.823)	15.200	(2.491)	0.028	(0.078)	0.014	(0.059)
Tuesday	2.624	(1.233)	3.675	(1.219)	9.273	(1.839)	15.572	(2.532)	0.030	(0.067)	0.014	(0.057)
Wednesday	2.651	(1.247)	3.710	(1.235)	9.365	(1.845)	15.726	(2.550)	0.031	(0.069)	0.014	(0.058)
Thursday	2.596	(1.220)	3.665	(1.220)	9.289	(1.839)	15.551	(2.531)	0.028	(0.069)	0.013	(0.055)
Friday	2.500	(1.176)	3.573	(1.187)	9.071	(1.818)	15.144	(2.481)	0.025	(0.062)	0.012	(0.053)
Saturday	1.487	(0.832)	3.001	(0.984)	8.519	(1.757)	13.007	(2.241)	0.005	(0.026)	0.002	(0.018)
Sunday	1.471	(0.824)	2.969	(0.976)	8.349	(1.760)	12.789	(2.233)	0.004	(0.024)	0.001	(0.014)
Weekday Average	2.585	(1.216)	3.643	(1.213)	9.211	(1.837)	15.439	(2.527)	0.029	(0.069)	0.013	(0.056)
Weekend Average	1.479	(0.828)	2.985	(0.980)	8.434	(1.761)	12.898	(2.240)	0.005	(0.025)	0.001	(0.016)

RN = registered nurse, LPN = licensed practical nurse, CNA = certified nursing assistant, MD = medical director or other physician, APRN = Non-physician clinicians, WSRG = within state reference group, SD = standard deviation.

SOURCE: RTI analysis of Medicare claims and PBJ data (RTI program PBJ01\_NS\_Descriptive; RTI folder:\PBJ and hospitalization\Results and QC).

**Table Y-4. Proportion of days in FY 2019 a clinician is present in a facility, by day of week and clinician type**

	MD, percentage of days present in facility						APRN, percentage of days present in facility					
	0% of days		1%–49% of days		50%–100% of days		0% of days		1%–49% of days		50%–100% of days	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>Clinical + Payment</b>												
Monday	35	36.1	42	43.3	20	20.6	73	75.3	9	9.3	15	15.5
Tuesday	31	32.0	45	46.4	21	21.6	73	75.3	9	9.3	15	15.5
Wednesday	27	27.8	45	46.4	25	25.8	73	75.3	11	11.3	13	13.4
Thursday	25	25.8	48	49.5	24	24.7	73	75.3	9	9.3	15	15.5
Friday	34	35.1	41	42.3	22	22.7	74	76.3	9	9.3	14	14.4
Saturday	64	66.0	29	29.9	4	4.1	81	83.5	12	12.4	4	4.1
Sunday	66	68.0	30	30.9	1	1.0	84	86.6	9	9.3	4	4.1
<b>Payment-Only</b>												
Monday	43	33.6	53	41.4	32	25.0	107	83.6	4	3.1	17	13.3
Tuesday	35	27.3	59	46.1	34	26.6	105	82.0	7	5.5	16	12.5
Wednesday	44	34.4	50	39.1	34	26.6	106	82.8	3	2.3	19	14.8
Thursday	44	34.4	50	39.1	34	26.6	107	83.6	5	3.9	16	12.5
Friday	52	40.6	49	38.3	27	21.1	106	82.8	6	4.7	16	12.5
Saturday	93	72.7	34	26.6	1	0.8	120	93.8	7	5.5	1	0.8
Sunday	95	74.2	31	24.2	2	1.6	118	92.2	9	7.0	1	0.8

(continued)

**Table Y-4. Proportion of days in FY 2019 a clinician is present in a facility, by day of week and clinician type (continued)**

	MD, percentage of days present in facility						APRN, percentage of days present in facility					
	0% of days		1%–49% of days		50%–100% of days		0% of days		1%–49% of days		50%–100% of days	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>National comparison &amp; WSRG</b>												
Monday	4067	42.8	3862	40.7	1564	16.5	8315	87.6	659	6.9	519	5.5
Tuesday	3599	37.9	4297	45.3	1597	16.8	8299	87.4	717	7.6	477	5.0
Wednesday	3391	35.7	4353	45.9	1749	18.4	8271	87.1	744	7.8	478	5.0
Thursday	3668	38.6	4287	45.2	1538	16.2	8298	87.4	734	7.7	461	4.9
Friday	3922	41.3	4107	43.3	1464	15.4	8369	88.2	686	7.2	438	4.6
Saturday	6790	71.5	2525	26.6	178	1.9	9070	95.5	381	4.0	42	0.4
Sunday	6953	73.2	2417	25.5	123	1.3	9121	96.1	349	3.7	23	0.2

MD = medical director or other physician, APRN = Non-physician clinicians, WSRG = within state reference group.

SOURCE: RTI analysis of Medicare claims and PBJ data (RTI program PBJ01\_NS\_Descriptive; RTI folder:\PBJ and hospitalization\Results and QC).

NOTE: This table shows categorical variables created for each facility for each day of the week indicating the percentage of that day of the week in FY 2019 (e.g., Mondays in FY 2019) that a medical director or other physician (MD) or non-physician clinician such as an advanced practice registered nurse (APRN) or physician assistant was present on that day of the week in the facility (e.g., 0% of Mondays, 1–50% of Mondays, >50% of Mondays). For example, in the combined national comparison & WSRG groups, 42.8% of facilities had no MD present on any Monday in FY 2019, 40.7% had an MD present on 1–49% of Mondays in FY 2019, and 16.5% of facilities had an MD present on more than half of all Mondays in FY 2019.

**Table Y-5. Facility characteristics, FY 2019**

	Clinical + Payment		Payment-Only		National comparison & WSRG	
	N	%	N	%	N	%
Number of facilities meeting inclusion criteria	97	100.0	128	100.0	9,493	100.0
Location						
Metropolitan	85	87.6	90	70.3	6,732	70.9
Urban non-metropolitan	11	11.3	35	27.3	2,422	25.5
Rural	1	1.0	3	2.3	339	3.6
For-profit	67	69.1	85	66.4	7,133	75.1
Corporation	67	69.1	98	76.6	6,893	72.6
Resident census						
1–49	1	1.0	0	0.0	1,067	11.2
50–99	19	19.6	47	36.7	4,806	50.6
100–199	58	59.8	72	56.3	3,266	34.4
200 and above	19	19.6	9	7.0	354	3.7
	Mean	(SD)	Mean	(SD)	Mean	(SD)
Percentage of facility residents meeting eligibility requirements for NFI 2	41.3	(14.1)	46.6	(14.4)	50.2	(15.9)
Percentage of facility residents with advance directives	49.4	(34.8)	56.6	(38.2)	55.4	(38.0)
Case-mix index	12.097	(0.952)	11.489	(1.100)	11.666	(1.278)

SD = standard deviation, WSRG = within state reference group.

SOURCE: RTI analysis of Medicare claims and PBJ data (RTI program PBJ01\_NS\_Descriptive; RTI folder:\PBJ and hospitalization\Results and QC).

#### Y.4 Multivariate Regression Model Results

**Table Y-6** shows the full regression model results for ACT rate per 1,000 Initiative-eligible resident-days, by category of ACT (all-cause, potentially avoidable, and due to the six qualifying conditions). **Tables Y-7** through **Y-9** were included as part of our sensitivity analysis. **Table Y-7** shows the results for the same outcomes as **Table Y-6**, with interaction terms between RN/LPN/CNA staffing and day of week indicators, which were included as part of our sensitivity analysis. **Table Y-8** shows multivariate results for ACT rate per 1,000 Initiative-eligible resident-days, for four additional types of ACT (all-cause hospitalization, all-cause ED/OBS stays, potentially avoidable hospitalization, and nonavoidable hospitalizations). Similarly, **Table Y-9** shows results for these outcomes, with interaction terms between RN/LPN/CNA staffing and day of week indicators included.

Our analysis found that ACT rates are, on average, lower on weekends compared to weekdays. We also found that, overall, nursing facilities with higher RN staffing levels had lower ACT rates, while, all else equal, LPN staffing rates were associated with higher ACT rates. After controlling for nurse staffing levels and other facility-level characteristics, there is a statistically significant drop in ACT rates on weekend days compared to Wednesday rates. This suggests that lower staffing levels cannot fully explain the difference in ACT rates between weekdays and weekends. Furthermore, nursing facilities that participated in NFI 2 had lower ACT rates than facilities in the national comparison group and WSRG, after controlling for other facility characteristics.

In our sensitivity analysis, we looked explicitly at the interaction between indicators for each day of the week paired with RN, LPN, and CNA staffing rates. While our findings in this sensitivity analysis were consistent with our primary findings, we found that the magnitude of the decrease in ACT rates associated with the same amount of RN staffing increase (by one-quarter hour) is smaller on weekends, and not statistically significant. That is to say, all other things being equal, a 15-minute increase of RN staffing in a facility on a Saturday or Sunday is not associated with a statistically significant reduction in the ACT rate, while that same increase in staffing on a weekday is associated with a significant reduction in the ACT rate. This may be due to lower variability in nurse staffing hours on weekends. Additionally, results across other ACT categories (potentially avoidable, and potentially avoidable due to the six conditions) were consistent with the findings for total ACTs. We found additional differences in the association between RN staffing and ACTs to ED/OBS stays as compared to inpatient hospitalizations. While a unit increase in RN staffing was associated with a statistically significant decline in the rate of ED/OBS visits on the weekends (just as on the weekdays), it was associated with statistically significant increases in inpatient hospitalization (overall and nonavoidable).

**Table Y-6. Multivariate regression results associated with acute care transitions rates, FY 2019**  
(per 1,000 Initiative-eligible days)

Variable	ACT, all-cause			ACT, potentially avoidable			ACT, due to 6 qualifying conditions		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Monday	0.003	(0.022)	0.899	**0.035	(0.014)	0.011	*0.017	(0.009)	0.061
Tuesday	0.011	(0.022)	0.608	0.015	(0.014)	0.282	0.004	(0.009)	0.690
Wednesday	Reference			Reference			Reference		
Thursday	-0.048**	(0.022)	0.029	-0.002	(0.013)	0.865	-0.011	(0.009)	0.236
Friday	0.048**	(0.023)	0.035	0.041***	(0.014)	0.003	0.023**	(0.009)	0.013
Saturday	-0.676***	(0.036)	0.000	-0.191***	(0.019)	0.000	-0.072***	(0.012)	0.000
Sunday	-0.784***	(0.037)	0.000	-0.227***	(0.019)	0.000	-0.060***	(0.012)	0.000
Resident census (0 to 50 residents)	0.192***	(0.065)	0.003	0.128***	(0.034)	0.000	0.091***	(0.022)	0.000
Resident census (50 to 100 residents)	Reference			Reference			Reference		
Resident census (100 to 200 residents)	-0.226***	(0.036)	0.000	-0.125***	(0.016)	0.000	-0.070***	(0.009)	0.000
Resident census (over 200 residents)	-0.304***	(0.074)	0.000	-0.211***	(0.029)	0.000	-0.114***	(0.016)	0.000
Metropolitan	Reference			Reference			Reference		
Urban non-metropolitan	0.554***	(0.043)	0.000	0.370***	(0.022)	0.000	0.243***	(0.013)	0.000
Rural	0.680***	(0.106)	0.000	0.496***	(0.057)	0.000	0.346***	(0.037)	0.000
For-profit	0.552***	(0.040)	0.000	0.140***	(0.020)	0.000	0.073***	(0.012)	0.000
Corporate owned	-0.118***	(0.037)	0.001	-0.021	(0.017)	0.207	-0.007	(0.010)	0.510
Percentage of facility residents meeting NFI 2 eligibility criteria (10% increment)	-0.076***	(0.012)	0.000	0.007	(0.006)	0.227	0.013***	(0.003)	0.000
Percentage of residents with advanced directives (10% increment)	-0.034***	(0.005)	0.000	-0.009***	(0.002)	0.000	-0.003*	(0.001)	0.043
Case-mix index	0.133***	(0.016)	0.000	0.021***	(0.007)	0.002	0.018***	(0.004)	0.000

(continued)

**Table Y-6. Multivariate regression results associated with acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	ACT, all-cause			ACT, potentially avoidable			ACT, due to 6 qualifying conditions		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Daily RN QHPRD	-0.110***	(0.017)	0.000	-0.043***	(0.008)	0.000	-0.010**	(0.005)	0.033
Daily LPN QHPRD	0.104***	(0.017)	0.000	0.041***	(0.008)	0.000	0.024***	(0.005)	0.000
Daily CNA QHPRD	-0.046***	(0.010)	0.000	-0.017***	(0.005)	0.001	-0.002	(0.003)	0.471
MD not present on day-of-week	Reference			Reference			Reference		
MD present up to 50% of day-of-week	0.003	(0.019)	0.875	0.003	(0.011)	0.742	0.002	(0.007)	0.817
MD present over 50% of day-of-week	-0.045*	(0.025)	0.075	-0.013	(0.015)	0.401	-0.007	(0.010)	0.456
APRN not present on day-of-week	Reference			Reference			Reference		
APRN present up to 50% of day-of-week	0.054	(0.046)	0.239	0.025	(0.024)	0.314	0.015	(0.015)	0.300
APRN present over 50% of day-of-week	-0.049	(0.043)	0.261	-0.035	(0.023)	0.132	-0.030**	(0.014)	0.033
Intervention group P-O	-0.324**	(0.131)	0.013	-0.117*	(0.061)	0.053	-0.064**	(0.032)	0.047
Intervention group C+P	-0.340**	(0.149)	0.022	-0.117*	(0.060)	0.050	-0.060**	(0.029)	0.036
Located in Alabama	-0.665***	(0.136)	0.000	0.080	(0.062)	0.197	-0.110***	(0.036)	0.002
Located in Arkansas	0.484***	(0.166)	0.004	0.567***	(0.080)	0.000	0.129***	(0.046)	0.005
Located in Arizona	0.033	(0.501)	0.947	0.090	(0.133)	0.499	-0.094	(0.064)	0.144
Located in California	Reference			Reference			Reference		
Located in Colorado	-0.592***	(0.169)	0.000	-0.177**	(0.073)	0.015	-0.178***	(0.043)	0.000
Located in Connecticut	-0.834***	(0.122)	0.000	-0.132***	(0.051)	0.010	-0.167***	(0.028)	0.000
Located in Delaware	-0.206	(0.232)	0.374	0.215**	(0.109)	0.048	0.050	(0.064)	0.435
Located in Florida	-0.101	(0.090)	0.261	0.195***	(0.037)	0.000	-0.018	(0.022)	0.392

(continued)

**Table Y-6. Multivariate regression results associated with acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	ACT, all-cause			ACT, potentially avoidable			ACT, due to 6 qualifying conditions		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in Georgia	-0.373***	(0.127)	0.003	0.066	(0.056)	0.240	-0.062*	(0.033)	0.055
Located in Iowa	-0.452***	(0.123)	0.000	-0.033	(0.056)	0.556	-0.011	(0.036)	0.770
Located in Idaho	-0.960***	(0.219)	0.000	-0.250**	(0.105)	0.018	-0.173**	(0.069)	0.013
Located in Illinois	0.276**	(0.110)	0.012	0.379***	(0.049)	0.000	0.140***	(0.030)	0.000
Located in Indiana	-0.393***	(0.111)	0.000	0.078	(0.049)	0.111	-0.053*	(0.029)	0.068
Located in Kansas	0.396***	(0.153)	0.010	0.331***	(0.079)	0.000	0.087*	(0.051)	0.088
Located in Kentucky	0.374***	(0.135)	0.006	0.475***	(0.063)	0.000	0.127***	(0.039)	0.001
Located in Louisiana	1.185***	(0.147)	0.000	0.799***	(0.072)	0.000	0.317***	(0.044)	0.000
Located in Massachusetts	-0.592***	(0.105)	0.000	-0.052	(0.041)	0.199	-0.102***	(0.025)	0.000
Located in Maryland	-0.653***	(0.125)	0.000	-0.106**	(0.048)	0.028	-0.119***	(0.029)	0.000
Located in Maine	-0.575***	(0.174)	0.001	0.002	(0.084)	0.978	-0.034	(0.064)	0.599
Located in Michigan	-0.354***	(0.113)	0.002	-0.078*	(0.045)	0.083	-0.122***	(0.027)	0.000
Located in Minnesota	0.036	(0.254)	0.886	0.075	(0.098)	0.440	0.011	(0.066)	0.866
Located in Missouri	0.062	(0.117)	0.594	0.295***	(0.053)	0.000	0.090***	(0.033)	0.006
Located in Mississippi	0.978***	(0.168)	0.000	0.655***	(0.077)	0.000	0.188***	(0.045)	0.000
Located in Montana	-0.379	(0.240)	0.114	-0.074	(0.110)	0.505	-0.144**	(0.069)	0.036
Located in North Carolina	-0.606***	(0.110)	0.000	0.006	(0.046)	0.898	-0.093***	(0.027)	0.001
Located in North Dakota	-0.738***	(0.168)	0.000	-0.130	(0.086)	0.130	-0.083	(0.061)	0.177
Located in New Hampshire	-0.708***	(0.195)	0.000	-0.116	(0.107)	0.281	-0.146**	(0.067)	0.029

(continued)

**Table Y-6. Multivariate regression results associated with acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	ACT, all-cause			ACT, potentially avoidable			ACT, due to 6 qualifying conditions		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in New Jersey	-0.739***	(0.107)	0.000	-0.072	(0.046)	0.118	-0.121***	(0.025)	0.000
Located in New Mexico	0.075	(0.244)	0.760	0.306**	(0.124)	0.014	0.007	(0.065)	0.912
Located in Nevada	-0.561**	(0.250)	0.025	-0.144	(0.100)	0.149	-0.192***	(0.067)	0.004
Located in New York	-0.719***	(0.103)	0.000	-0.135***	(0.040)	0.001	-0.138***	(0.023)	0.000
Located in Ohio	-0.747***	(0.107)	0.000	-0.056	(0.046)	0.221	-0.098***	(0.027)	0.000
Located in Oklahoma	1.027***	(0.168)	0.000	0.682***	(0.079)	0.000	0.304***	(0.049)	0.000
Located in Oregon	0.900**	(0.401)	0.025	0.304*	(0.175)	0.083	0.174	(0.127)	0.169
Located in Pennsylvania	-1.061***	(0.096)	0.000	-0.302***	(0.039)	0.000	-0.182***	(0.023)	0.000
Located in Rhode Island	-0.514**	(0.230)	0.026	0.123	(0.107)	0.252	-0.080*	(0.046)	0.082
Located in South Carolina	-0.368**	(0.145)	0.011	0.048	(0.064)	0.456	-0.015	(0.035)	0.678
Located in South Dakota	-1.005***	(0.188)	0.000	-0.209*	(0.099)	0.035	-0.127*	(0.074)	0.084
Located in Tennessee	-0.605***	(0.130)	0.000	0.105**	(0.060)	0.079	-0.057	(0.035)	0.103
Located in Texas	-0.152	(0.097)	0.118	0.251***	(0.042)	0.000	0.047*	(0.026)	0.069
Located in Utah	-0.558**	(0.263)	0.034	-0.112	(0.132)	0.398	-0.222***	(0.068)	0.001
Located in Virginia	-0.903***	(0.125)	0.000	-0.156***	(0.052)	0.003	-0.149***	(0.028)	0.000
Located in Vermont	-0.285	(0.222)	0.199	0.144	(0.136)	0.289	-0.025	(0.086)	0.776
Located in Washington	-0.391**	(0.163)	0.017	0.017	(0.072)	0.815	-0.045	(0.044)	0.310
Located in Wisconsin	-0.193	(0.140)	0.169	0.074	(0.063)	0.244	0.025	(0.041)	0.538
Located in West Virginia	-0.545***	(0.173)	0.002	0.027	(0.084)	0.752	-0.061	(0.053)	0.246

(continued)

**Table Y-6. Multivariate regression results associated with acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	ACT, all-cause			ACT, potentially avoidable			ACT, due to 6 qualifying conditions		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in Wyoming	-0.440*	(0.234)	0.060	0.078	(0.147)	0.593	-0.078	(0.089)	0.378
Constant	3.221***	(0.264)	0.000	1.232***	(0.111)	0.000	0.320***	(0.068)	0.000

ACT = acute care transition,  $\beta$  = coefficient, SE = standard error, p = p-value, RN = registered nurse, LPN = licensed practical nurse, CNA = certified nursing assistant, MD = medical director or other physician, APRN = non-physician clinicians, P-O = Payment-Only, C+P = Clinical + Payment.

\*/\*\*/\*\* = Significantly different from zero based on a p-value cutoff of 0.1/0.05/0.01.

SOURCE: RTI analysis of Medicare claims and PBJ data (RTI program BH\_PBJ01\_Multivariate; RTI folder:\PBJ and hospitalization\Results and QC\multivariate analysis).

**Table Y-7. Multivariate regression results (including day of week interactions) associated with daily acute care transitions rates, FY 2019**

(per 1,000 Initiative-eligible days)

Variable	ACT, all-cause			ACT, potentially avoidable			ACT, due to 6 qualifying conditions		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Monday	-0.061	(0.139)	0.661	-0.011	(0.084)	0.895	0.085	(0.058)	0.141
Tuesday	-0.194	(0.137)	0.156	-0.050	(0.086)	0.561	-0.064	(0.058)	0.268
Wednesday	Reference			Reference			Reference		
Thursday	-0.182	(0.138)	0.187	-0.113	(0.083)	0.177	-0.024	(0.055)	0.658
Friday	-0.030	(0.139)	0.826	0.050	(0.085)	0.551	-0.047	(0.057)	0.415
Saturday	-1.003***	(0.139)	0.000	-0.339***	(0.085)	0.000	-0.114**	(0.055)	0.037
Sunday	-1.005***	(0.140)	0.000	-0.254***	(0.083)	0.002	-0.006	(0.055)	0.919
Resident census (0 to 50 residents)	0.184***	(0.065)	0.005	0.126***	(0.034)	0.000	0.090***	(0.022)	0.000
Resident census (50 to 100 residents)	Reference			Reference			Reference		
Resident census (100 to 200 residents)	-0.221***	(0.036)	0.000	-0.124***	(0.016)	0.000	-0.070***	(0.009)	0.000
Resident census (over 200 residents)	-0.298***	(0.073)	0.000	-0.210***	(0.029)	0.000	-0.114***	(0.016)	0.000
Metropolitan	Reference			Reference			Reference		
Urban non-metropolitan	0.558***	(0.043)	0.000	0.371***	(0.022)	0.000	0.244***	(0.013)	0.000
Rural	0.680***	(0.106)	0.000	0.496***	(0.057)	0.000	0.347***	(0.037)	0.000
For-profit	0.560***	(0.040)	0.000	0.141***	(0.020)	0.000	0.073***	(0.012)	0.000
Corporate owned	-0.120***	(0.037)	0.001	-0.022	(0.017)	0.198	-0.007	(0.010)	0.507
Percentage of facility residents meeting NFI 2 eligibility criteria (10% increment)	-0.074***	(0.012)	0.000	0.007	(0.006)	0.205	0.013***	(0.003)	0.000
Percent of residents with advanced directives (10% increment)	-0.034***	(0.005)	0.000	-0.009***	(0.002)	0.000	-0.003**	(0.001)	0.045
Case-mix index	0.131***	(0.016)	0.000	0.020***	(0.007)	0.003	0.018***	(0.004)	0.000

(continued)

**Table Y-7. Multivariate regression results (including day of week interactions) associated with daily acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	ACT, all-cause			ACT, potentially avoidable			ACT, due to 6 qualifying conditions		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
MD not present on day-of-week	Reference			Reference			Reference		
MD present up to 50% of day-of-week	0.002	(0.019)	0.906	0.003	(0.011)	0.768	0.001	(0.007)	0.846
MD present over 50% of day-of-week	-0.044*	(0.025)	0.085	-0.012	(0.015)	0.417	-0.007	(0.010)	0.475
APRN not present on day-of-week	Reference			Reference			Reference		
APRN present up to 50% of day-of-week	0.051	(0.046)	0.263	0.024	(0.024)	0.332	0.015	(0.015)	0.307
APRN present over 50% of day-of-week	-0.040	(0.044)	0.355	-0.032	(0.023)	0.165	-0.029**	(0.014)	0.039
Initiative group: Payment-Only	-0.325**	(0.131)	0.013	-0.118*	(0.061)	0.053	-0.064**	(0.032)	0.046
Initiative group: Clinical + Payment	-0.337**	(0.149)	0.023	-0.116*	(0.060)	0.052	-0.059**	(0.029)	0.038
Daily RN QHPRD*Monday	-0.072***	(0.022)	0.001	-0.028**	(0.012)	0.017	-0.009	(0.007)	0.207
Daily RN QHPRD*Tuesday	-0.098***	(0.022)	0.000	-0.040***	(0.012)	0.001	-0.014*	(0.007)	0.053
Daily RN QHPRD*Wednesday	-0.124***	(0.021)	0.000	-0.053***	(0.011)	0.000	-0.010	(0.007)	0.179
Daily RN QHPRD*Thursday	-0.113***	(0.021)	0.000	-0.045***	(0.011)	0.000	-0.017**	(0.007)	0.019
Daily RN QHPRD*Friday	-0.095***	(0.022)	0.000	-0.046***	(0.012)	0.000	-0.009	(0.007)	0.213
Daily RN QHPRD*Saturday	-0.015	(0.025)	0.566	-0.020	(0.015)	0.174	0.002	(0.009)	0.867
Daily RN QHPRD*Sunday	-0.001	(0.026)	0.969	-0.000	(0.015)	0.974	0.006	(0.009)	0.494
Daily LPN QHPRD*Monday	0.121***	(0.021)	0.000	0.052***	(0.011)	0.000	0.019***	(0.007)	0.009
Daily LPN QHPRD*Tuesday	0.121***	(0.021)	0.000	0.052***	(0.011)	0.000	0.028***	(0.007)	0.000
Daily LPN QHPRD*Wednesday	0.090***	(0.022)	0.000	0.026**	(0.011)	0.019	0.018**	(0.007)	0.011
Daily LPN QHPRD*Thursday	0.092***	(0.021)	0.000	0.044***	(0.011)	0.000	0.023***	(0.007)	0.002
Daily LPN QHPRD*Friday	0.095***	(0.022)	0.000	0.034***	(0.012)	0.003	0.029***	(0.007)	0.000

(continued)

**Table Y-7. Multivariate regression results (including day of week interactions) associated with daily acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	ACT, all-cause			ACT, potentially avoidable			ACT, due to 6 qualifying conditions		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Daily LPN QHPRD*Saturday	0.103***	(0.023)	0.000	0.049***	(0.012)	0.000	0.037***	(0.008)	0.000
Daily LPN QHPRD*Sunday	0.063***	(0.023)	0.006	0.019	(0.013)	0.138	0.014*	(0.009)	0.094
Daily CNA QHPRD*Monday	-0.072***	(0.013)	0.000	-0.027***	(0.007)	0.000	-0.009**	(0.005)	0.049
Daily CNA QHPRD*Tuesday	-0.049***	(0.013)	0.000	-0.021***	(0.007)	0.004	0.003	(0.005)	0.486
Daily CNA QHPRD*Wednesday	-0.051***	(0.013)	0.000	-0.014**	(0.007)	0.048	-0.001	(0.005)	0.750
Daily CNA QHPRD*Thursday	-0.041***	(0.013)	0.001	-0.012*	(0.007)	0.099	0.000	(0.005)	0.974
Daily CNA QHPRD*Friday	-0.054***	(0.013)	0.000	-0.021***	(0.007)	0.004	0.002	(0.005)	0.732
Daily CNA QHPRD*Saturday	-0.041***	(0.012)	0.001	-0.013*	(0.007)	0.064	-0.005	(0.004)	0.236
Daily CNA QHPRD*Sunday	-0.041***	(0.013)	0.001	-0.020***	(0.007)	0.005	-0.010**	(0.005)	0.040
Located in Alabama	-0.667***	(0.136)	0.000	0.081	(0.062)	0.196	-0.110***	(0.036)	0.002
Located in Arkansas	0.505***	(0.166)	0.002	0.572***	(0.080)	0.000	0.130***	(0.046)	0.005
Located in Arizona	0.002	(0.500)	0.998	0.082	(0.134)	0.541	-0.097	(0.064)	0.132
Located in California	Reference			Reference			Reference		
Located in Colorado	-0.636***	(0.170)	0.000	-0.188***	(0.073)	0.010	-0.182***	(0.043)	0.000
Located in Connecticut	-0.863***	(0.123)	0.000	-0.139***	(0.051)	0.006	-0.170***	(0.028)	0.000
Located in Delaware	-0.256	(0.231)	0.269	0.203*	(0.109)	0.062	0.046	(0.064)	0.468
Located in Florida	-0.120	(0.090)	0.181	0.191***	(0.037)	0.000	-0.019	(0.022)	0.374
Located in Georgia	-0.362***	(0.127)	0.004	0.069	(0.056)	0.222	-0.063*	(0.033)	0.054
Located in Iowa	-0.478***	(0.123)	0.000	-0.039	(0.056)	0.483	-0.013	(0.036)	0.725
Located in Idaho	-0.986***	(0.219)	0.000	-0.256**	(0.105)	0.015	-0.174**	(0.069)	0.012
Located in Illinois	0.240**	(0.111)	0.030	0.369***	(0.049)	0.000	0.137***	(0.030)	0.000

(continued)

**Table Y-7. Multivariate regression results (including day of week interactions) associated with daily acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	ACT, all-cause			ACT, potentially avoidable			ACT, due to 6 qualifying conditions		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in Indiana	-0.408***	(0.111)	0.000	0.074	(0.049)	0.131	-0.055*	(0.029)	0.060
Located in Kansas	0.381**	(0.154)	0.013	0.327***	(0.079)	0.000	0.086*	(0.051)	0.094
Located in Kentucky	0.360***	(0.135)	0.008	0.471***	(0.063)	0.000	0.126***	(0.039)	0.001
Located in Louisiana	1.210***	(0.147)	0.000	0.805***	(0.072)	0.000	0.317***	(0.044)	0.000
Located in Massachusetts	-0.621***	(0.105)	0.000	-0.060	(0.041)	0.144	-0.104***	(0.025)	0.000
Located in Maryland	-0.693***	(0.125)	0.000	-0.116**	(0.048)	0.016	-0.122***	(0.029)	0.000
Located in Maine	-0.625***	(0.173)	0.000	-0.010	(0.084)	0.906	-0.036	(0.064)	0.573
Located in Michigan	-0.375***	(0.113)	0.001	-0.082*	(0.045)	0.067	-0.123***	(0.027)	0.000
Located in Minnesota	-0.005	(0.253)	0.985	0.066	(0.098)	0.501	0.009	(0.066)	0.887
Located in Missouri	0.063	(0.118)	0.590	0.295***	(0.053)	0.000	0.089***	(0.033)	0.007
Located in Mississippi	0.975***	(0.168)	0.000	0.655***	(0.077)	0.000	0.188***	(0.045)	0.000
Located in Montana	-0.420*	(0.242)	0.082	-0.084	(0.111)	0.447	-0.148**	(0.069)	0.032
Located in North Carolina	-0.612***	(0.111)	0.000	0.004	(0.046)	0.922	-0.094***	(0.027)	0.000
Located in North Dakota	-0.754***	(0.168)	0.000	-0.134	(0.086)	0.120	-0.084	(0.062)	0.173
Located in New Hampshire	-0.738***	(0.194)	0.000	-0.124	(0.107)	0.250	-0.148**	(0.067)	0.027
Located in New Jersey	-0.772***	(0.108)	0.000	-0.080*	(0.046)	0.082	-0.124***	(0.025)	0.000
Located in New Mexico	0.047	(0.244)	0.848	0.298**	(0.124)	0.016	0.004	(0.065)	0.950
Located in Nevada	-0.589**	(0.252)	0.019	-0.151	(0.100)	0.132	-0.195***	(0.068)	0.004
Located in New York	-0.732***	(0.103)	0.000	-0.138***	(0.040)	0.001	-0.139***	(0.023)	0.000
Located in Ohio	-0.757***	(0.107)	0.000	-0.059	(0.046)	0.203	-0.099***	(0.027)	0.000
Located in Oklahoma	1.037***	(0.168)	0.000	0.684***	(0.079)	0.000	0.304***	(0.049)	0.000

(continued)

**Table Y-7. Multivariate regression results (including day of week interactions) associated with daily acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	ACT, all-cause			ACT, potentially avoidable			ACT, due to 6 qualifying conditions		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in Oregon	0.888**	(0.404)	0.028	0.301*	(0.176)	0.087	0.174	(0.127)	0.169
Located in Pennsylvania	-1.084***	(0.096)	0.000	-0.307***	(0.039)	0.000	-0.184***	(0.023)	0.000
Located in Rhode Island	-0.564**	(0.232)	0.015	0.110	(0.108)	0.307	-0.084**	(0.046)	0.069
Located in South Carolina	-0.368**	(0.145)	0.011	0.048	(0.064)	0.452	-0.015	(0.035)	0.676
Located in South Dakota	-1.034***	(0.189)	0.000	-0.216**	(0.100)	0.030	-0.129*	(0.074)	0.079
Located in Tennessee	-0.605***	(0.130)	0.000	0.105*	(0.060)	0.078	-0.057	(0.035)	0.102
Located in Texas	-0.144	(0.098)	0.139	0.252***	(0.042)	0.000	0.046*	(0.026)	0.076
Located in Utah	-0.609**	(0.264)	0.021	-0.125	(0.133)	0.347	-0.226***	(0.068)	0.001
Located in Virginia	-0.907***	(0.125)	0.000	-0.157***	(0.052)	0.002	-0.150***	(0.028)	0.000
Located in Vermont	-0.312	(0.222)	0.160	0.138	(0.136)	0.310	-0.026	(0.086)	0.761
Located in Washington	-0.438***	(0.163)	0.007	0.005	(0.072)	0.942	-0.048	(0.044)	0.277
Located in Wisconsin	-0.245*	(0.141)	0.083	0.061	(0.064)	0.339	0.022	(0.041)	0.595
Located in West Virginia	-0.552***	(0.173)	0.001	0.026	(0.084)	0.759	-0.061	(0.053)	0.245
Located in Wyoming	-0.505	(0.233)	0.030	0.062	(0.146)	0.673	-0.084	(0.089)	0.346
Constant	3.378***	(0.278)	0.000	1.291***	(0.123)	0.000	0.334***	(0.076)	0.000

ACT = acute care transition,  $\beta$  = coefficient, SE = standard error, p = p-value, RN = registered nurse, LPN = licensed practical nurse, CNA = certified nursing assistant, MD = medical director or other physician, APRN = non-physician clinicians, P-O = Payment-Only, C+P = Clinical + Payment.

\*/\*\*/\*\* = Significantly different from zero based on a p-value cutoff of 0.1/0.05/0.01.

SOURCE: RTI analysis of Medicare claims and PBJ data (RTI program BH\_PBJ01\_Multivariate; RTI folder:\PBJ and hospitalization\Results and QC\multivariate analysis).

**Table Y-8. Multivariate regression results associated with types of acute care transitions rates, FY 2019**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Monday	-0.036**	(0.015)	0.020	0.037**	(0.015)	0.012	0.014	(0.009)	0.133	-0.050***	(0.012)	0.000
Tuesday	0.027*	(0.015)	0.079	-0.016	(0.015)	0.302	0.015	(0.009)	0.106	0.012	(0.012)	0.319
Wednesday	Reference			Reference			Reference			Reference		
Thursday	-0.040***	(0.015)	0.009	-0.008	(0.015)	0.594	-0.009	(0.009)	0.319	-0.031***	(0.012)	0.010
Friday	-0.008	(0.016)	0.586	0.055***	(0.015)	0.000	0.023**	(0.009)	0.012	-0.032***	(0.012)	0.010
Saturday	-0.454***	(0.022)	0.000	-0.220***	(0.023)	0.000	-0.135***	(0.012)	0.000	-0.317***	(0.017)	0.000
Sunday	-0.534***	(0.023)	0.000	-0.249***	(0.023)	0.000	-0.158***	(0.012)	0.000	-0.375***	(0.017)	0.000
Resident census (0 to 50 residents)	0.068**	(0.033)	0.039	0.123***	(0.044)	0.005	0.050***	(0.016)	0.002	0.018	(0.022)	0.425
Resident census (50 to 100 residents)	Reference			Reference			Reference			Reference		
Resident census (100 to 200 residents)	-0.055***	(0.021)	0.008	-0.171***	(0.022)	0.000	-0.048***	(0.009)	0.000	-0.007	(0.015)	0.642
Resident census (over 200 residents)	0.025	(0.049)	0.607	-0.326***	(0.038)	0.000	-0.060***	(0.018)	0.001	0.087**	(0.037)	0.020
Metropolitan	Reference			Reference			Reference			Reference		
Urban non-metropolitan	-0.073***	(0.021)	0.000	0.629***	(0.029)	0.000	0.031***	(0.010)	0.003	-0.103***	(0.014)	0.000
Rural	0.048	(0.051)	0.351	0.633***	(0.072)	0.000	0.128***	(0.028)	0.000	-0.079**	(0.033)	0.015
For-profit	0.308***	(0.021)	0.000	0.235***	(0.025)	0.000	0.073***	(0.010)	0.000	0.231***	(0.015)	0.000

(continued)

**Table Y-8. Multivariate regression results associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Corporate owned	-0.075***	(0.020)	0.000	-0.043*	(0.023)	0.056	-0.013	(0.009)	0.146	-0.062***	(0.014)	0.000
Percentage of facility residents meeting NFI 2 eligibility criteria (10% increment)	-0.061***	(0.007)	0.000	-0.015**	(0.007)	0.050	-0.007**	(0.003)	0.031	-0.054***	(0.005)	0.000
Percentage of residents with advanced directives (10% increment)	-0.019***	(0.003)	0.000	-0.014***	(0.003)	0.000	-0.005***	(0.001)	0.000	-0.014***	(0.002)	0.000
Case-mix index	0.113***	(0.009)	0.000	0.020**	(0.010)	0.038	0.026***	(0.004)	0.000	0.087***	(0.007)	0.000
Daily RN QHPRD	-0.041***	(0.010)	0.000	-0.064***	(0.010)	0.000	-0.015***	(0.005)	0.001	-0.023***	(0.007)	0.002
Daily LPN QHPRD	0.077***	(0.010)	0.000	0.032***	(0.010)	0.002	0.026***	(0.004)	0.000	0.054***	(0.008)	0.000
Daily CNA QHPRD	-0.026***	(0.005)	0.000	-0.029***	(0.007)	0.000	-0.007***	(0.003)	0.007	-0.023***	(0.004)	0.000
MD not present on day-of-week	Reference			Reference			Reference			Reference		
MD present up to 50% of day-of-week	0.001	(0.012)	0.917	0.003	(0.012)	0.804	0.003	(0.007)	0.682	-0.001	(0.009)	0.936
MD present over 50% of day-of-week	-0.041**	(0.017)	0.018	-0.006	(0.017)	0.715	-0.012	(0.010)	0.217	-0.030**	(0.013)	0.024
APRN not present on day-of-week	Reference			Reference			Reference			Reference		

(continued)

**Table Y-8. Multivariate regression results associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
APRN present up to 50% of day-of-week	0.027	(0.028)	0.328	0.031	(0.031)	0.312	0.016	(0.015)	0.280	0.012	(0.021)	0.550
APRN present over 50% of day-of-week	-0.020	(0.029)	0.482	-0.038	(0.029)	0.188	-0.021	(0.015)	0.173	-0.009	(0.022)	0.688
Intervention group P-O	-0.137**	(0.068)	0.043	-0.184**	(0.076)	0.016	-0.043	(0.029)	0.144	-0.093*	(0.049)	0.060
Intervention group C+P	-0.143*	(0.086)	0.095	-0.192**	(0.079)	0.015	-0.027	(0.035)	0.447	-0.113*	(0.059)	0.056
Located in Alabama	-0.571***	(0.084)	0.000	-0.099	(0.080)	0.212	-0.015	(0.040)	0.700	-0.558***	(0.056)	0.000
Located in Arkansas	-0.251***	(0.085)	0.003	0.744***	(0.113)	0.000	0.096**	(0.039)	0.014	-0.342***	(0.057)	0.000
Located in Arizona	-0.664***	(0.218)	0.002	0.687**	(0.337)	0.042	-0.228***	(0.058)	0.000	-0.441**	(0.180)	0.015
Located in California	Reference			Reference			Reference			Reference		
Located in Colorado	-0.859***	(0.088)	0.000	0.259**	(0.109)	0.018	-0.308***	(0.035)	0.000	-0.556***	(0.064)	0.000
Located in Connecticut	-0.787***	(0.074)	0.000	-0.056	(0.069)	0.418	-0.194***	(0.031)	0.000	-0.598***	(0.054)	0.000
Located in Delaware	-0.493***	(0.149)	0.001	0.272**	(0.121)	0.024	0.028	(0.072)	0.691	-0.529***	(0.093)	0.000
Located in Florida	-0.146**	(0.064)	0.023	0.050	(0.047)	0.285	0.059**	(0.026)	0.021	-0.204***	(0.045)	0.000
Located in Georgia	-0.519***	(0.079)	0.000	0.128*	(0.076)	0.091	-0.083**	(0.034)	0.013	-0.443***	(0.055)	0.000
Located in Iowa	-0.599***	(0.074)	0.000	0.144*	(0.075)	0.053	-0.134***	(0.031)	0.000	-0.467***	(0.052)	0.000
Located in Idaho	-1.032***	(0.098)	0.000	0.073	(0.160)	0.651	-0.342***	(0.049)	0.000	-0.691***	(0.073)	0.000
Located in Illinois	-0.172**	(0.071)	0.015	0.432***	(0.064)	0.000	0.073**	(0.029)	0.012	-0.253***	(0.050)	0.000
Located in Indiana	-0.560***	(0.070)	0.000	0.148**	(0.063)	0.020	-0.078***	(0.029)	0.007	-0.491***	(0.049)	0.000

(continued)

**Table Y-8. Multivariate regression results associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in Kansas	-0.099	(0.082)	0.223	0.500***	(0.104)	0.000	0.023	(0.038)	0.547	-0.121**	(0.056)	0.030
Located in Kentucky	-0.301***	(0.077)	0.000	0.669***	(0.085)	0.000	0.031	(0.034)	0.370	-0.335***	(0.053)	0.000
Located in Louisiana	0.204**	(0.081)	0.012	0.976***	(0.095)	0.000	0.237***	(0.038)	0.000	-0.034	(0.057)	0.543
Located in Massachusetts	-0.652***	(0.068)	0.000	0.045	(0.060)	0.458	-0.099***	(0.028)	0.000	-0.560***	(0.048)	0.000
Located in Maryland	-0.644***	(0.084)	0.000	-0.022	(0.062)	0.722	-0.181***	(0.031)	0.000	-0.469***	(0.064)	0.000
Located in Maine	-0.842***	(0.103)	0.000	0.284**	(0.110)	0.010	-0.231***	(0.046)	0.000	-0.604***	(0.073)	0.000
Located in Michigan	-0.384***	(0.074)	0.000	0.022	(0.062)	0.723	-0.103***	(0.029)	0.000	-0.284***	(0.052)	0.000
Located in Minnesota	-0.405***	(0.131)	0.002	0.435***	(0.156)	0.005	-0.129**	(0.051)	0.011	-0.280***	(0.106)	0.008
Located in Missouri	-0.224***	(0.074)	0.002	0.284***	(0.067)	0.000	0.067**	(0.031)	0.033	-0.292***	(0.051)	0.000
Located in Mississippi	0.214**	(0.092)	0.020	0.757***	(0.106)	0.000	0.254***	(0.041)	0.000	-0.044	(0.063)	0.487
Located in Montana	-0.685***	(0.105)	0.000	0.302*	(0.169)	0.075	-0.222***	(0.049)	0.000	-0.466***	(0.076)	0.000
Located in North Carolina	-0.733***	(0.070)	0.000	0.118*	(0.065)	0.069	-0.153***	(0.028)	0.000	-0.584***	(0.050)	0.000
Located in North Dakota	-0.625***	(0.096)	0.000	-0.099	(0.104)	0.343	-0.099*	(0.051)	0.053	-0.520***	(0.062)	0.000
Located in New Hampshire	-0.752***	(0.099)	0.000	0.038	(0.123)	0.759	-0.198***	(0.050)	0.000	-0.557***	(0.069)	0.000
Located in New Jersey	-0.619***	(0.072)	0.000	-0.137**	(0.058)	0.019	-0.117***	(0.029)	0.000	-0.510***	(0.051)	0.000
Located in New Mexico	-0.543***	(0.107)	0.000	0.614***	(0.169)	0.000	-0.187***	(0.045)	0.000	-0.358***	(0.078)	0.000

(continued)

**Table Y-8. Multivariate regression results associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in Nevada	-0.342*	(0.195)	0.079	-0.240	(0.152)	0.114	-0.098	(0.079)	0.214	-0.254*	(0.148)	0.087
Located in New York	-0.606***	(0.070)	0.000	-0.124**	(0.054)	0.022	-0.154***	(0.026)	0.000	-0.457***	(0.051)	0.000
Located in Ohio	-0.724***	(0.069)	0.000	-0.040	(0.061)	0.516	-0.148***	(0.028)	0.000	-0.584***	(0.048)	0.000
Located in Oklahoma	0.052	(0.096)	0.587	0.973***	(0.109)	0.000	0.156***	(0.044)	0.000	-0.104	(0.065)	0.111
Located in Oregon	-0.359**	(0.166)	0.030	1.277***	(0.276)	0.000	-0.180**	(0.074)	0.015	-0.171	(0.107)	0.111
Located in Pennsylvania	-0.750***	(0.066)	0.000	-0.329***	(0.050)	0.000	-0.187***	(0.026)	0.000	-0.571***	(0.046)	0.000
Located in Rhode Island	-0.617***	(0.126)	0.000	0.109	(0.140)	0.438	-0.109**	(0.053)	0.040	-0.507***	(0.101)	0.000
Located in South Carolina	-0.594***	(0.084)	0.000	0.217**	(0.088)	0.014	-0.070*	(0.039)	0.072	-0.529***	(0.056)	0.000
Located in South Dakota	-0.651***	(0.109)	0.000	-0.353***	(0.118)	0.003	-0.076	(0.054)	0.158	-0.576***	(0.076)	0.000
Located in Tennessee	-0.652***	(0.079)	0.000	0.027	(0.075)	0.720	-0.062*	(0.036)	0.086	-0.600***	(0.055)	0.000
Located in Texas	-0.457***	(0.066)	0.000	0.289***	(0.054)	0.000	-0.027	(0.027)	0.313	-0.436***	(0.045)	0.000
Located in Utah	-0.790***	(0.127)	0.000	0.222	(0.163)	0.172	-0.254***	(0.065)	0.000	-0.541***	(0.083)	0.000
Located in Virginia	-0.879***	(0.071)	0.000	-0.042	(0.079)	0.599	-0.221***	(0.030)	0.000	-0.666***	(0.050)	0.000
Located in Vermont	-0.718***	(0.104)	0.000	0.424**	(0.172)	0.014	-0.175***	(0.047)	0.000	-0.548***	(0.081)	0.000
Located in Washington	-0.787***	(0.083)	0.000	0.392***	(0.111)	0.000	-0.253***	(0.033)	0.000	-0.537***	(0.061)	0.000
Located in Wisconsin	-0.589***	(0.080)	0.000	0.392***	(0.087)	0.000	-0.116***	(0.035)	0.001	-0.477***	(0.057)	0.000
Located in West Virginia	-0.838***	(0.096)	0.000	0.280**	(0.116)	0.016	-0.221***	(0.041)	0.000	-0.622***	(0.069)	0.000

(continued)

**Table Y-8. Multivariate regression results associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in Wyoming	-0.641***	(0.139)	0.000	0.195	(0.167)	0.243	-0.081	(0.077)	0.296	-0.565***	(0.088)	0.000
Constant	1.586***	(0.163)	0.000	1.703***	(0.152)	0.000	0.552***	(0.065)	0.000	1.062***	(0.120)	0.000

ED/OBS = emergency department visit and/or observation stay,  $\beta$  = coefficient, SE = standard error, p = p-value, RN = registered nurse, LPN = licensed practical nurse, CNA = certified nursing assistant, MD = medical director or other physician, APRN = non-physician clinicians, P-O = Payment-Only, C+P = Clinical + Payment.

\*/\*\*/\*\* = Significantly different from zero based on a p-value cutoff of 0.1/0.05/0.01.

SOURCE: RTI analysis of Medicare claims and PBJ data (RTI program BH\_PBJ01\_Multivariate; RTI folder:\PBJ and hospitalization\Results and QC\multivariate analysis).

**Table Y-9. Multivariate regression results (including day of week interactions) associated with types of acute care transitions rates, FY 2019**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Monday	-0.066	(0.096)	0.491	0.004	(0.090)	0.961	-0.017	(0.055)	0.755	-0.049	(0.076)	0.519
Tuesday	-0.050	(0.097)	0.607	-0.146	(0.092)	0.116	0.043	(0.056)	0.441	-0.094	(0.080)	0.240
Wednesday	Reference			Reference			Reference			Reference		
Thursday	0.010	(0.097)	0.917	-0.192**	(0.090)	0.032	0.003	(0.054)	0.950	0.007	(0.078)	0.932
Friday	-0.031	(0.097)	0.748	0.001	(0.094)	0.989	0.038	(0.055)	0.494	-0.068	(0.076)	0.374
Saturday	-0.587***	(0.093)	0.000	-0.414***	(0.093)	0.000	-0.199***	(0.054)	0.000	-0.384***	(0.074)	0.000
Sunday	-0.654***	(0.094)	0.000	-0.347***	(0.092)	0.000	-0.158***	(0.052)	0.003	-0.492***	(0.076)	0.000
Resident census (0 to 50 residents)	0.063*	(0.033)	0.057	0.121***	(0.044)	0.006	0.049***	(0.016)	0.003	0.015	(0.022)	0.510
Resident census (50 to 100 residents)	Reference			Reference			Reference			Reference		
Resident census (100 to 200 residents)	-0.052**	(0.021)	0.012	-0.169***	(0.022)	0.000	-0.048***	(0.009)	0.000	-0.005	(0.015)	0.746
Resident census (over 200 residents)	0.028	(0.049)	0.562	-0.325***	(0.038)	0.000	-0.059***	(0.018)	0.001	0.088**	(0.037)	0.017
Metropolitan	Reference			Reference			Reference			Reference		
Urban non-metropolitan	-0.070***	(0.021)	0.001	0.630***	(0.029)	0.000	0.032***	(0.010)	0.002	-0.101***	(0.014)	0.000
Rural	0.048	(0.051)	0.348	0.633***	(0.072)	0.000	0.128***	(0.028)	0.000	-0.079**	(0.033)	0.016
For-profit	0.312***	(0.021)	0.000	0.237***	(0.025)	0.000	0.073***	(0.010)	0.000	0.234***	(0.015)	0.000
Corporate owned	-0.076***	(0.020)	0.000	-0.044*	(0.023)	0.054	-0.014	(0.009)	0.139	-0.062***	(0.014)	0.000

(continued)

**Table Y-9. Multivariate regression results (including day of week interactions) associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Percentage of facility residents meeting NFI 2 eligibility criteria (10% increment)	-0.060***	(0.007)	0.000	-0.015**	(0.008)	0.049	-0.007**	(0.003)	0.036	-0.054***	(0.005)	0.000
Percent of residents with advanced directive (10% increment)	-0.019***	(0.003)	0.000	-0.014***	(0.003)	0.000	-0.005***	(0.001)	0.000	-0.014***	(0.002)	0.000
Case-mix index	0.112***	(0.010)	0.000	0.020**	(0.010)	0.041	0.025***	(0.004)	0.000	0.086***	(0.007)	0.000
MD not present on day-of-week	Reference			Reference			Reference			Reference		
MD present up to 50% of day-of-week	0.000	(0.012)	0.968	0.003	(0.012)	0.793	0.002	(0.007)	0.727	-0.001	(0.009)	0.916
MD present over 50% of day-of-week	-0.040**	(0.017)	0.022	-0.005	(0.017)	0.749	-0.011	(0.010)	0.236	-0.029**	(0.013)	0.027
APRN not present on day-of-week	Reference			Reference			Reference			Reference		
APRN present up to 50% of day-of-week	0.025	(0.028)	0.376	0.031	(0.031)	0.313	0.015	(0.015)	0.308	0.011	(0.021)	0.603
APRN present over 50% of day-of-week	-0.014	(0.029)	0.627	-0.036	(0.029)	0.211	-0.019	(0.015)	0.219	-0.005	(0.022)	0.814
Intervention group P-O	-0.138**	(0.068)	0.042	-0.184**	(0.076)	0.016	-0.043	(0.029)	0.142	-0.093*	(0.049)	0.060
Intervention group C+P	0.141	(0.085)	0.100	-0.191**	(0.079)	0.015	-0.026	(0.035)	0.459	-0.112**	(0.059)	0.059
Daily RN QHPRD*Monday	-0.005	(0.013)	0.700	-0.067***	(0.014)	0.000	-0.003	(0.007)	0.721	-0.002	(0.010)	0.821

(continued)

**Table Y-9. Multivariate regression results (including day of week interactions) associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Daily RN QHPRD*Tuesday	-0.053***	(0.014)	0.000	-0.044***	(0.014)	0.001	-0.028***	(0.007)	0.000	-0.025**	(0.011)	0.023
Daily RN QHPRD*Wednesday	-0.046***	(0.014)	0.001	-0.078***	(0.014)	0.000	-0.016**	(0.007)	0.023	-0.030***	(0.011)	0.006
Daily RN QHPRD*Thursday	-0.056***	(0.013)	0.000	-0.057***	(0.014)	0.000	-0.022***	(0.007)	0.003	-0.034***	(0.010)	0.001
Daily RN QHPRD*Friday	-0.038***	(0.014)	0.007	-0.057***	(0.014)	0.000	-0.016**	(0.008)	0.030	-0.021**	(0.011)	0.045
Daily RN QHPRD*Saturday	0.034**	(0.016)	0.030	-0.048***	(0.018)	0.007	0.007	(0.009)	0.466	0.028**	(0.013)	0.026
Daily RN QHPRD*Sunday	0.037**	(0.016)	0.020	-0.038**	(0.017)	0.029	0.013	(0.009)	0.137	0.024*	(0.013)	0.051
Daily LPN QHPRD*Monday	0.086***	(0.014)	0.000	0.041***	(0.014)	0.002	0.033***	(0.007)	0.000	0.057***	(0.011)	0.000
Daily LPN QHPRD*Tuesday	0.083***	(0.014)	0.000	0.045***	(0.013)	0.001	0.023***	(0.007)	0.001	0.063***	(0.011)	0.000
Daily LPN QHPRD*Wednesday	0.072***	(0.014)	0.000	0.025**	(0.013)	0.064	0.019***	(0.007)	0.005	0.055***	(0.012)	0.000
Daily LPN QHPRD*Thursday	0.063***	(0.014)	0.000	0.036***	(0.013)	0.007	0.024***	(0.007)	0.001	0.043***	(0.010)	0.000
Daily LPN QHPRD*Friday	0.085***	(0.014)	0.000	0.018	(0.014)	0.198	0.029***	(0.007)	0.000	0.058***	(0.010)	0.000
Daily LPN QHPRD*Saturday	0.080***	(0.014)	0.000	0.032**	(0.015)	0.039	0.042***	(0.008)	0.000	0.042***	(0.011)	0.000

(continued)

**Table Y-9. Multivariate regression results (including day of week interactions) associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Daily LPN QHPRD*Sunday	0.054***	(0.014)	0.000	0.018	(0.015)	0.239	0.015*	(0.008)	0.052	0.042***	(0.011)	0.000
Daily CNA QHPRD*Monday	-0.041***	(0.008)	0.000	-0.039***	(0.008)	0.000	-0.010**	(0.004)	0.016	-0.034***	(0.006)	0.000
Daily CNA QHPRD*Tuesday	-0.021***	(0.008)	0.008	-0.036***	(0.009)	0.000	-0.006	(0.004)	0.182	-0.018***	(0.006)	0.002
Daily CNA QHPRD*Wednesday	-0.027***	(0.008)	0.001	-0.033***	(0.009)	0.000	-0.005	(0.004)	0.285	-0.025***	(0.006)	0.000
Daily CNA QHPRD*Thursday	-0.026***	(0.008)	0.001	-0.023***	(0.009)	0.007	-0.006	(0.004)	0.149	-0.023***	(0.006)	0.000
Daily CNA QHPRD*Friday	-0.032***	(0.008)	0.000	-0.030***	(0.009)	0.001	-0.010**	(0.004)	0.021	-0.025***	(0.006)	0.000
Daily CNA QHPRD*Saturday	-0.030***	(0.007)	0.000	-0.020**	(0.008)	0.015	-0.009**	(0.004)	0.020	-0.024***	(0.005)	0.000
Daily CNA QHPRD*Sunday	-0.022***	(0.007)	0.002	-0.028***	(0.008)	0.001	-0.009**	(0.004)	0.035	-0.018***	(0.005)	0.001
Located in Alabama	-0.570***	(0.084)	0.000	-0.099	(0.080)	0.212	-0.014	(0.040)	0.724	-0.557***	(0.056)	0.000
Located in Arkansas	-0.238***	(0.086)	0.005	0.749***	(0.113)	0.000	0.099**	(0.039)	0.012	-0.335***	(0.058)	0.000
Located in Arizona	-0.684***	(0.217)	0.002	0.680**	(0.337)	0.044	-0.233***	(0.058)	0.000	-0.453**	(0.180)	0.012
Located in California	Reference			Reference			Reference			Reference		
Located in Colorado	-0.885***	(0.088)	0.000	0.249**	(0.109)	0.023	-0.313***	(0.035)	0.000	-0.572***	(0.065)	0.000
Located in Connecticut	-0.804***	(0.075)	0.000	-0.063	(0.069)	0.366	-0.197***	(0.031)	0.000	-0.607***	(0.054)	0.000
Located in Delaware	-0.522***	(0.148)	0.000	0.261**	(0.121)	0.031	0.022	(0.072)	0.758	-0.546***	(0.093)	0.000

(continued)

**Table Y-9. Multivariate regression results (including day of week interactions) associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in Florida	-0.157**	(0.065)	0.015	0.045	(0.047)	0.334	0.058**	(0.026)	0.025	-0.211***	(0.045)	0.000
Located in Georgia	-0.512***	(0.079)	0.000	0.132*	(0.076)	0.083	-0.081**	(0.034)	0.016	-0.438***	(0.055)	0.000
Located in Iowa	-0.613***	(0.075)	0.000	0.139*	(0.075)	0.064	-0.136***	(0.031)	0.000	-0.475***	(0.052)	0.000
Located in Idaho	-1.046***	(0.098)	0.000	0.066	(0.160)	0.681	-0.343***	(0.049)	0.000	-0.699***	(0.073)	0.000
Located in Illinois	-0.194***	(0.072)	0.007	0.424***	(0.064)	0.000	0.068**	(0.029)	0.019	-0.266***	(0.050)	0.000
Located in Indiana	-0.569***	(0.071)	0.000	0.145**	(0.064)	0.023	-0.079***	(0.029)	0.006	-0.496***	(0.049)	0.000
Located in Kansas	-0.107	(0.082)	0.191	0.496***	(0.104)	0.000	0.022	(0.039)	0.561	-0.126**	(0.056)	0.024
Located in Kentucky	-0.308***	(0.078)	0.000	0.666***	(0.085)	0.000	0.030	(0.034)	0.381	-0.339***	(0.053)	0.000
Located in Louisiana	0.218***	(0.081)	0.007	0.982***	(0.095)	0.000	0.240***	(0.038)	0.000	-0.025	(0.057)	0.656
Located in Massachusetts	-0.669***	(0.068)	0.000	0.038	(0.060)	0.528	-0.103***	(0.028)	0.000	-0.570***	(0.048)	0.000
Located in Maryland	-0.667***	(0.084)	0.000	-0.031	(0.063)	0.624	-0.186***	(0.031)	0.000	-0.482***	(0.064)	0.000
Located in Maine	-0.869***	(0.103)	0.000	0.271**	(0.110)	0.014	-0.236***	(0.046)	0.000	-0.621***	(0.073)	0.000
Located in Michigan	-0.394***	(0.074)	0.000	0.017	(0.062)	0.780	-0.105***	(0.029)	0.000	-0.290***	(0.052)	0.000
Located in Minnesota	-0.427***	(0.131)	0.001	0.425***	(0.156)	0.006	-0.132***	(0.051)	0.009	-0.294***	(0.106)	0.005
Located in Missouri	-0.223***	(0.074)	0.003	0.285***	(0.067)	0.000	0.068**	(0.032)	0.032	-0.292***	(0.051)	0.000
Located in Mississippi	0.213**	(0.092)	0.021	0.757***	(0.106)	0.000	0.255***	(0.041)	0.000	-0.044	(0.063)	0.490
Located in Montana	-0.709***	(0.105)	0.000	0.293*	(0.170)	0.085	-0.226***	(0.049)	0.000	-0.481***	(0.077)	0.000
Located in North Carolina	-0.736***	(0.071)	0.000	0.117*	(0.065)	0.072	-0.153***	(0.028)	0.000	-0.585***	(0.050)	0.000
Located in North Dakota	-0.632***	(0.097)	0.000	-0.103	(0.104)	0.326	-0.099*	(0.051)	0.055	-0.525***	(0.062)	0.000

(continued)

**Table Y-9. Multivariate regression results (including day of week interactions) associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in New Hampshire	-0.770***	(0.099)	0.000	0.031	(0.123)	0.802	-0.201***	(0.051)	0.000	-0.568***	(0.068)	0.000
Located in New Jersey	-0.638***	(0.072)	0.000	-0.144**	(0.058)	0.014	-0.121***	(0.029)	0.000	-0.521***	(0.051)	0.000
Located in New Mexico	-0.560***	(0.108)	0.000	0.607***	(0.169)	0.000	-0.190***	(0.045)	0.000	-0.369***	(0.078)	0.000
Located in Nevada	-0.359*	(0.196)	0.067	-0.246	(0.152)	0.106	-0.102	(0.079)	0.198	-0.263*	(0.149)	0.077
Located in New York	-0.613***	(0.070)	0.000	-0.126**	(0.054)	0.020	-0.155***	(0.027)	0.000	-0.460***	(0.051)	0.000
Located in Ohio	-0.729***	(0.069)	0.000	-0.042	(0.061)	0.496	-0.149***	(0.028)	0.000	-0.586***	(0.049)	0.000
Located in Oklahoma	0.057	(0.096)	0.552	0.976***	(0.109)	0.000	0.157***	(0.044)	0.000	-0.102	(0.066)	0.122
Located in Oregon	-0.364***	(0.168)	0.030	1.273***	(0.276)	0.000	-0.180**	(0.075)	0.016	-0.175	(0.108)	0.107
Located in Pennsylvania	-0.763***	(0.066)	0.000	-0.334***	(0.050)	0.000	-0.189***	(0.026)	0.000	-0.579***	(0.046)	0.000
Located in Rhode Island	-0.645***	(0.127)	0.000	0.096	(0.141)	0.493	-0.113**	(0.053)	0.032	-0.525***	(0.101)	0.000
Located in South Carolina	-0.593***	(0.084)	0.000	0.217**	(0.088)	0.014	-0.068*	(0.039)	0.078	-0.527***	(0.056)	0.000
Located in South Dakota	-0.666***	(0.110)	0.000	-0.359***	(0.118)	0.002	-0.077	(0.054)	0.149	-0.585***	(0.076)	0.000
Located in Tennessee	-0.652***	(0.080)	0.000	0.028	(0.075)	0.713	-0.061*	(0.036)	0.089	-0.599***	(0.055)	0.000
Located in Texas	-0.453***	(0.066)	0.000	0.292***	(0.054)	0.000	-0.027	(0.027)	0.327	-0.434***	(0.046)	0.000
Located in Utah	-0.819***	(0.128)	0.000	0.211	(0.163)	0.196	-0.260***	(0.065)	0.000	-0.559***	(0.084)	0.000
Located in Virginia	-0.880***	(0.071)	0.000	-0.042	(0.079)	0.597	-0.221***	(0.030)	0.000	-0.666***	(0.050)	0.000
Located in Vermont	-0.733***	(0.105)	0.000	0.418**	(0.172)	0.015	-0.178***	(0.047)	0.000	-0.556***	(0.081)	0.000
Located in Washington	-0.814***	(0.084)	0.000	0.381***	(0.111)	0.001	-0.258***	(0.033)	0.000	-0.553***	(0.061)	0.000

(continued)

**Table Y-9. Multivariate regression results (including day of week interactions) associated with types of acute care transitions rates, FY 2019 (continued)**

(per 1,000 Initiative-eligible days)

Variable	All-cause hospitalization			All-cause ED/OBS			Potentially avoidable hospitalization			Nonavoidable hospitalization		
	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p	$\beta$	(SE)	p
Located in Wisconsin	-0.619***	(0.081)	0.000	0.380***	(0.087)	0.000	-0.122***	(0.035)	0.001	-0.495***	(0.057)	0.000
Located in West Virginia	-0.840***	(0.096)	0.000	0.279**	(0.116)	0.016	-0.220***	(0.041)	0.000	-0.623***	(0.069)	0.000
Located in Wyoming	-0.679***	(0.138)	0.000	0.180	(0.167)	0.281	-0.089	(0.077)	0.252	-0.588***	(0.087)	0.000
Constant	1.640***	(0.176)	0.000	1.801***	(0.163)	0.000	0.559***	(0.074)	0.000	1.107***	(0.131)	0.000

ED/OBS = emergency department visit and/or observation stay,  $\beta$  = coefficient, SE = standard error, p = p-value, RN = registered nurse, LPN = licensed practical nurse, CNA = certified nursing assistant, MD = medical director or other physician, APRN = Non-physician clinicians, P-O = Payment-Only, C+P = Clinical + Payment.

\*/\*\*/\*\*\* = Significantly different from zero based on a p-value cutoff of 0.1/0.05/0.01.

SOURCE: RTI analysis of Medicare claims and PBJ data (RTI program BH\_PBJ01\_Multivariate; RTI folder:\PBJ and hospitalization\Results and QC\multivariate analysis).