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

Fourth Annual Report
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Prepared for

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

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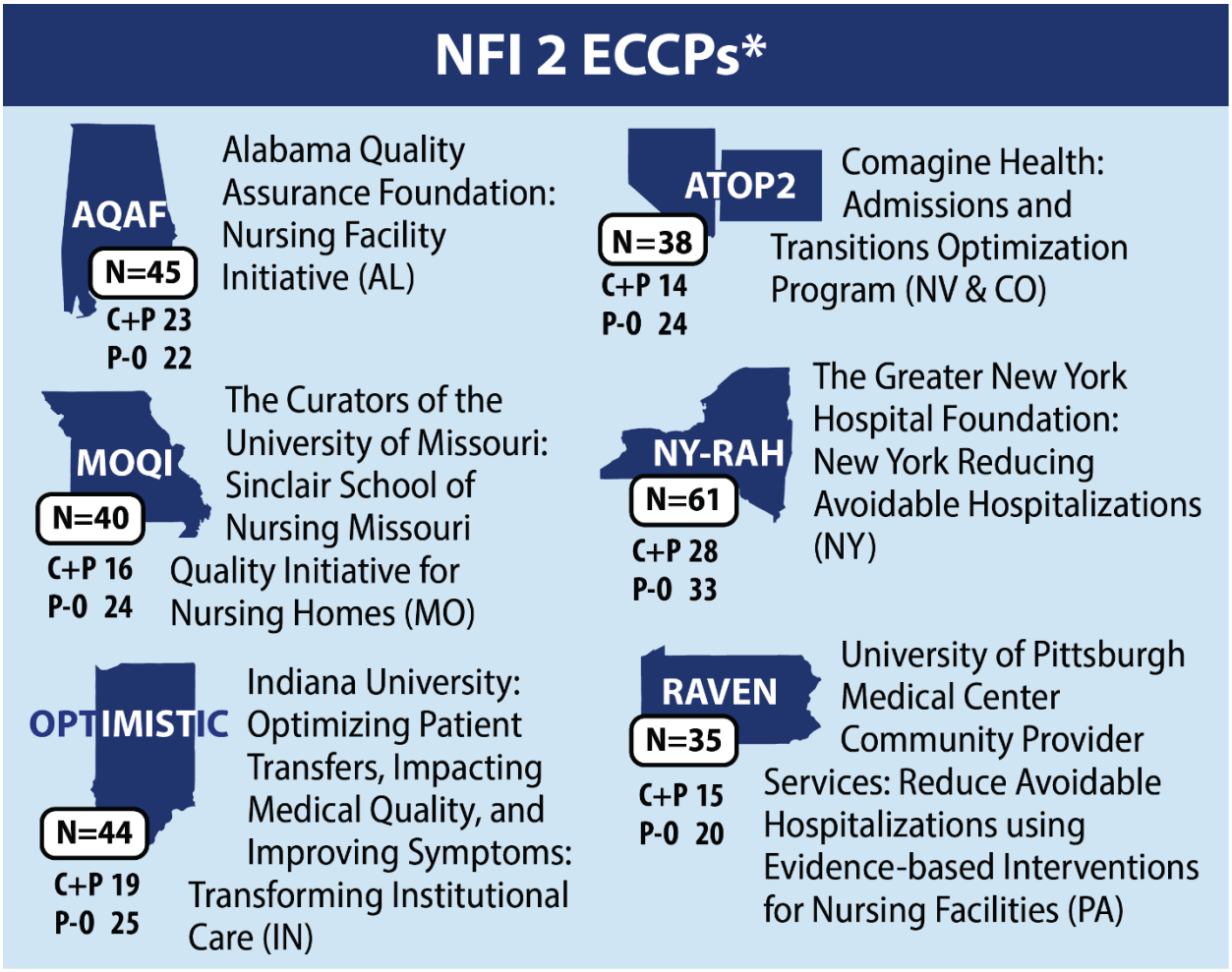
Key Evaluation Takeaways for Initiative Year 3

- *Initiative Year 3 findings indicate that the NFI 2 payment reform did not produce substantial changes in facility culture or practice, and, relative to the national comparison group, was not associated with desired changes in utilization, cost, and quality evaluation outcomes.*
- *Although most facility leadership, staff, and practitioners indicated support for NFI 2 and its goals, many reported that the opportunity to bill for on-site acute care under NFI 2 did not affect facility care patterns. Overall, NFI 2 billing has declined in FY 2019.*
- *The evidence suggests that most of the residents treated on-site would not have been hospitalized with or without the Initiative.*
- *Relative to the national comparison group, we did not observe reductions in hospital-related utilization associated with the payment incentives for residents in either the Clinical + Payment group or in the Payment-Only group.*

ES.1 Overview of the Initiative

In October 2016, the Centers for Medicare & Medicaid Services (CMS) began implementing the second phase of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents, adding a payment reform component to the original phase one design. This second phase of the Nursing Facility Initiative—herein referred to as NFI 2, or the Initiative—attempts to

reduce avoidable hospitalizations and associated expenditures among eligible[1] long-stay nursing facility (NF) residents by incentivizing participating NFs and practitioners to provide in-house acute care to residents with any of six qualifying conditions, rather than transferring them to the hospital. The incentive structure included Initiative-specific billing codes for facilities and practitioners to submit NFI 2 claims for Medicare reimbursement.



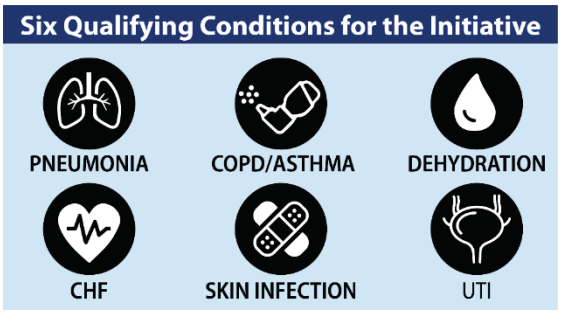
* N = number of participating nursing facilities at the start of NFI 2.

NOTE: C+P= Clinical + Payment; P-O= Payment-Only. The total number of facilities in the figure above are 263, however in many of the analyses for this report, including the difference-in-differences (DD) analyses, we included 259 facilities. More details are provided in Section L.4 of ***Appendix L***.

[1] The eligibility criteria for the Initiative are described in detail in ***Appendix L*** and include requirements to reside in the facility for 101 or more days, to have Medicare Part A and Part B fee-for-service status, and to not be enrolled in hospice.

CMS implemented the first phase, NFI 1, from 2012 to 2016 in seven ECCP (Enhanced Care and Coordination Provider) organizations. The final results from RTI's NFI 1 evaluation[2] found that for the intervention period 2014 to 2016, residents experienced an annual relative reduction of 17.0 percent in their probability of a potentially avoidable hospitalization, compared to a within-state comparison group. ECCP and facility interviewees attributed NFI 1 successes in reducing avoidable hospitalizations to increased facility-wide communication, early identification and treatment of resident changes in condition, and, in some ECCPs, clinical care provided by ECCP-hired advanced practice registered nurses (APRNs) and registered nurses (RNs). NFI 1 ECCPs and their participating facilities continued to NFI 2, adding the NFI 2 payment component to their existing NFI 1 clinical and educational models. Under NFI 2, the six ECCPs also started working with additional facilities that were new to phase 2 of the Initiative.

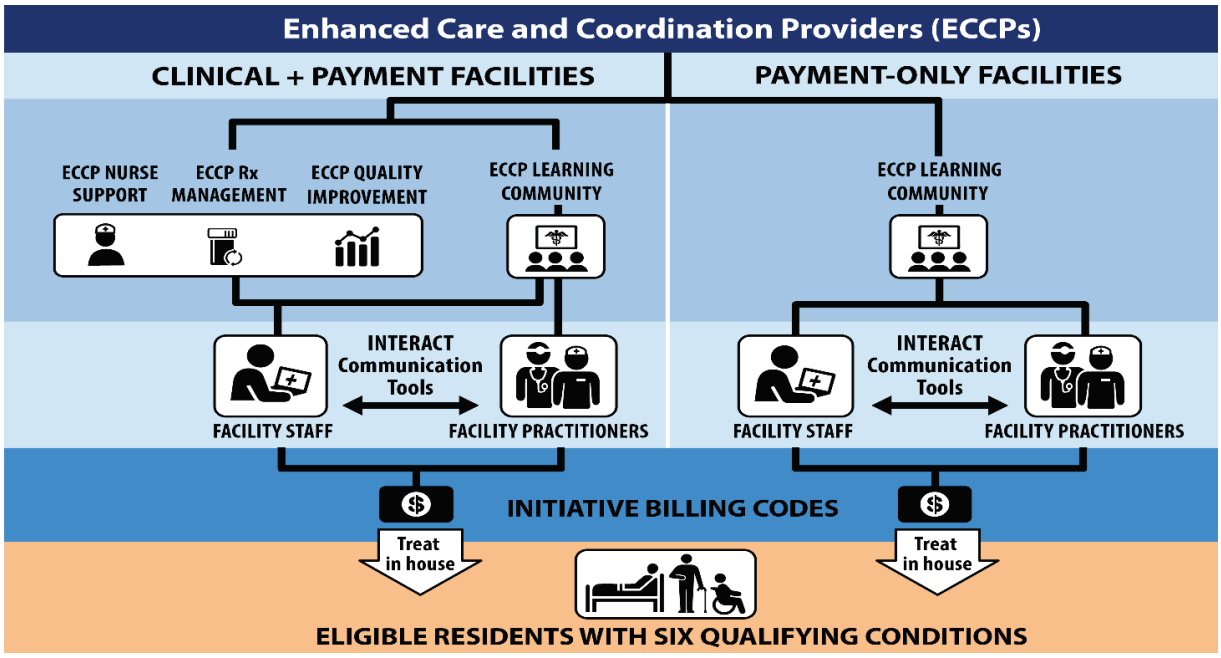
The NFI 2 payment model offers special Medicare billing codes to participating nursing facilities and practitioners (physicians, APRNs, and physician assistants). The billing codes act as a financial incentive for providing care in-house to eligible residents enrolled in Medicare fee-for-service (FFS), rather than transferring them to hospitals for treatment. To receive the financial incentive, facility staff and practitioners communicate (e.g., using INTERACT tools), assess, diagnose, certify for NFI 2 billing, and treat higher-acuity, long-stay residents who may have one of **six qualifying conditions** that account for a large proportion of potentially avoidable hospitalizations. These conditions are pneumonia, congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD)/asthma, skin infection, fluid/electrolyte disorder or dehydration (these terms used interchangeably), and urinary tract infections (UTI). Facilities receive an extra per diem payment for a period of in-house treatment, and practitioners receive a hospital-level visit payment when evaluating the patient for in-house treatment for any of the qualifying conditions.



Participating facilities implementing the clinical and educational interventions from NFI 1 in addition to the new NFI 2 payment model are referred to as the *Clinical + Payment* group. Facilities new to the Initiative and only implementing the payment model are referred to as the *Payment-Only* group. See ***Figure ES-1*** for a model of the payment intervention of NFI 2.

[2] RTI International. (2017, September). Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents: Final Report. Baltimore, MD: Centers for Medicare & Medicaid Services. https://downloads.cms.gov/files/cmmi/irahnfr-finalevalrpt.pdf

Figure ES-1. NFI 2 payment model



NOTE: Clinical + Payment models vary across ECCPs, including variation in the type of support facilities receive from the ECCP. As of Initiative Year 3, three ECCPs embedded full-time clinical staff in facilities, two ECCPs rotated clinical staff across multiple facilities, and one ECCP-embedded quality improvement specialist in facilities.

ES.2 Overview of Evaluation Methods

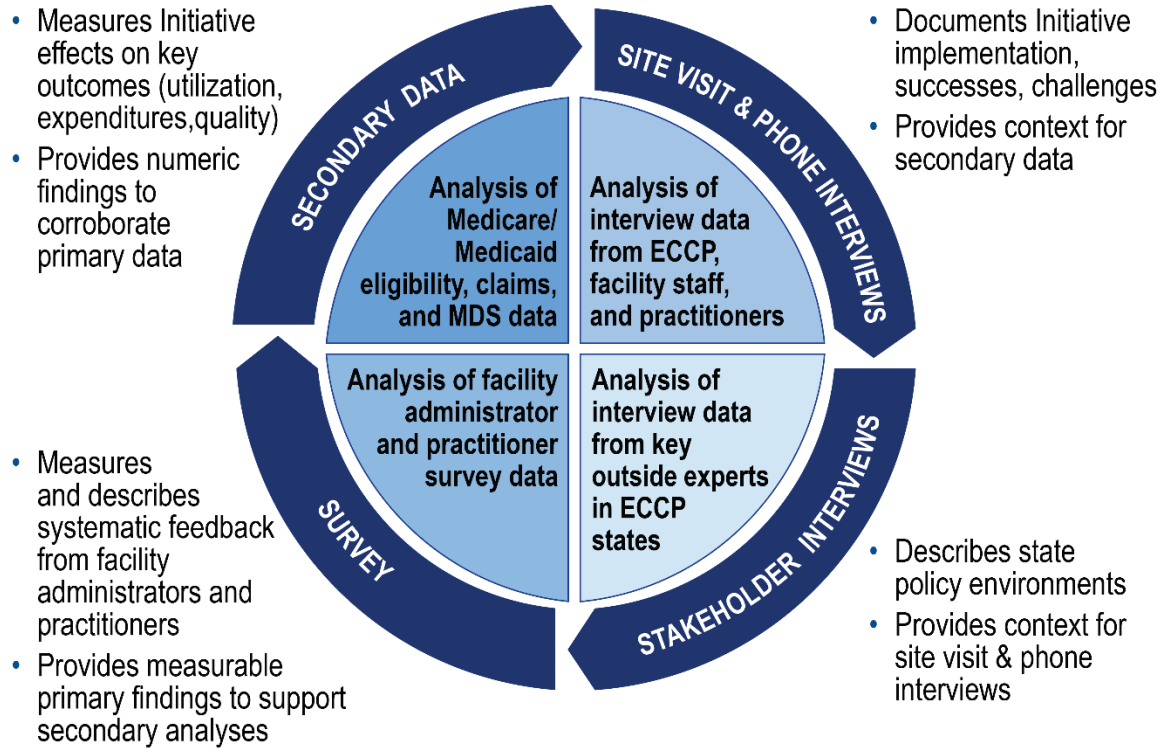
CMS contracts with RTI International to evaluate the Initiative using both primary and secondary data analyses. In this report, RTI assesses the effectiveness of the payment component of NFI 2 during Initiative Year 3, fiscal year (FY) 2019 (October 1, 2018 through September 30, 2019).[3] RTI addresses the following research questions:

- How was the Initiative implemented, and how do participating ECCP leadership and facility staff perceive Initiative effectiveness?
- What is the Initiative payment incentive effect on Medicare utilization and expenditures, particularly for hospital-related services, for the Clinical + Payment group and the Payment-Only group?
- How does the Initiative effect on Medicare utilization and expenditures vary by ECCP and type of intervention?
- How does the Initiative affect quality of care outcomes for eligible residents?
- How does the Initiative affect the mortality outcomes for eligible residents?
- What impact does the Initiative have on Medicaid expenditures?

[3] Initiative Year 3 and FY 2019 are used interchangeably throughout this report.

RTI uses a mixed-methods approach to provide a holistic understanding of NFI 2. Each component of the secondary quantitative analyses and primary data collection and analyses (i.e., site visits, telephone interviews, stakeholder interviews, and surveys) complements the other data sources as shown in ***Figure ES-2***.

Figure ES-2. Mixed-methods approach



RTI evaluates NFI 2 effects on utilization and expenditure measures for eligible residents by comparing them to a nationally derived non-Initiative population of nursing facility residents who would meet the Initiative eligibility criteria. RTI uses difference-in-differences (DD) multivariate regression modeling to estimate the Initiative effects.

In addition, RTI collects primary data from participants to provide critical context and to inform findings from quantitative data analyses. Primary data collection topics include understanding the roll-out and implementation of NFI 2, obtaining feedback on the six conditions eligible for payment under NFI 2, discussing experiences submitting NFI 2 claims and receiving payment, and evaluating the overall policy landscape and its potential impact on NFI 2 in each ECCP state.

> We estimate, independently, payment effects in two interventions:
> (1) adding payment to an existing clinical intervention (Clinical + Payment) and
> (2) introducing payment to a new group of participant facilities (Payment-Only).

ES.3 How Was NFI 2 Implemented by Facilities and Practitioners?

- *Although NFI 2 has been implemented widely within facilities, use of the billing codes decreased in Initiative Year 3.*
- *The payment component of NFI 2 did not incentivize substantial changes in facility culture or practice.*
- *Participating facilities provided and billed for on-site treatment mostly for residents who would not have been hospitalized absent the Initiative.*

Across ECCPs, most Clinical + Payment and Payment-Only facility interviewees shared that NFI 2 components (e.g., focus on early identification of the six clinical conditions) have been implemented fully throughout their facilities. Clinical + Payment interviewees noted that their ECCP-embedded staff still play a critical role in their facilities, helping support documentation for NFI 2 billing. Additionally, several of these interviewees shared that NFI 1 may have had a bigger effect on shifting facility culture, compared to NFI 2; where NFI 1 introduced the ECCP-embedded staff to help support and educate staff throughout the facilities, NFI 2 encouraged partnerships between ECCP-embedded staff and only a few key leadership and business team members who were responsible for NFI 2 claims submissions. Some Clinical + Payment facility interviewees added that because of these established facility culture changes in NFI 1, NFI 2 seemed to offer a financial reward for already entrenched care practices. Likewise, many Payment-Only interviewees unexpectedly noted that their facilities prioritized on-site care prior to their participation in NFI 2; again, these interviewees said the Initiative offered compensation for preexisting care practices.

Many Initiative Year 3 interviewees also noted that their facilities had submitted fewer NFI 2 claims compared to prior Initiative years. Claims analyses show that facility billing rates for on-site treatment decreased across all ECCPs in Initiative Year 3. Among Clinical + Payment facilities, billing decreased from an average of 1.46 episodes per 1,000 Initiative-eligible resident-days in Initiative Year 2 to 1.12 episodes in Initiative Year 3. Payment-Only facility billing dropped from 1.2 episodes in Initiative Year 2 to 0.84 in Initiative Year 3. The number of non-billing facilities also increased from 12 (11%) to 17 (15%) among the 111 current Clinical + Payment facilities and from 22 (15%) to 49 (33%) among the 148 current Payment-Only facilities. Likewise, practitioner billing rates decreased for nearly all ECCPs.

> Compared to last year, in Initiative Year 3, facility billing for on-site treatment decreased and more facilities were not billing at all. Practitioner billing rates decreased for nearly all ECCPs.

Interviewees offered numerous explanations for the decreased Initiative Year 3 billing. Most notably, facility staff and practitioners reported that the changes to the six qualifying conditions that CMS instituted in 2019 made it harder for residents to qualify, subsequently reducing opportunities to submit NFI 2 claims. Interviewees also noted fewer billing opportunities as a

result of Medicare managed care penetration that reduced the number of NFI 2-eligible facility residents. Specifically, interviewees in facilities with few eligible residents noted that NFI 2 billing was a lower priority. For AQAF and NY-RAH, interviewees highlighted recent ECCP model changes as creating some interruptions in facility NFI 2 billing processes, thus potentially contributing to reduced billing. Some interviewees across ECCPs also shared that the focus on early identification of the six conditions resulted in greater awareness and quicker intervention by facility staff and practitioners, thus improving overall care quality but limiting the number of exacerbations that met NFI 2 billing criteria.

Our results also suggest that most of the billing by practitioners and by facilities for providing on-site treatment for the six conditions did not actually represent substitution for avoided hospitalizations. Based on the relatively consistent rates of hospitalization for the six conditions before and during the Initiative, and the large amount of billing for providing on-site treatment during the Initiative, we conclude that most of the residents treated on-site would not have been hospitalized even if there were no Initiative. The residents treated on-site tended to be residents with less comorbid illness.

ES.4 What Was the Impact of NFI 2 on Key Resident Outcomes?

Impact on utilization and expenditures for residents in the Clinical + Payment group

- *Overall, combining all ECCPs, utilization of hospital-related services,[4] and associated expenditures did not decrease further than what was achieved in NFI 1, after accounting for the baseline trend.*
- *In fact, combining all ECCPs, there were a number of statistically significant, unfavorable increases in utilization and expenditures for Clinical + Payment group residents.*
- *In five of the six ECCPs, there was a pattern of unfavorable increases in utilization and expenditures, at least some of which were statistically significant.*

For Clinical + Payment facilities based on all ECCPs grouped together, we found a consistent pattern of statistically significant increases in hospital-related Medicare utilization and expenditure measures compared to the national comparison group**.** This includes increases in the probability of potentially avoidable hospitalizations (up 15.3%), for the six qualifying conditions (up 18.0%) and all-cause emergency department (ED) visits (up 15.2%) relative to nationally derived comparison group.

[4] Hospital-related services refer to hospitalizations, emergency department (ED) visits, and acute care transitions. Acute care transitions describe any transition from the nursing facility to the hospital, including transfers from the nursing facility for an inpatient admission, ED visit, or observation stay.

When examining each ECCP separately, we found that except for NY-RAH, eligible Clinical + Payment facility residents saw unfavorable, statistically significant increases for some hospital-related utilization measures relative to the national comparison group. For all ECCPs except NY-RAH (NY) and AQAF (AL), there were some unfavorable, statistically significant increases in hospital-related expenditure measures among residents.

Although results are discussed as favorable or unfavorable relative to the overall NFI 2 goals, for individual residents, hospitalizations may be necessary and clinically appropriate.

Table ES-1 presents a summary of estimated FY 2019 Initiative effects on hospital-related utilization and Medicare expenditures for eligible residents in Clinical + Payment facilities, relative to a nationally derived comparison group of nursing facility residents. Note that for some of the estimated Initiative effects in the individual ECCPs, the relative percent changes are very large. This is due to both the small number of residents in the individual ECCPs and the relative infrequency of some of these outcomes. Thus, small changes in percentage points or counts can result in large relative percent changes when the denominators are small. Further details are provided in ***Chapter 3***. Compared to findings based on FY 2017 and FY 2018 that we reported in previous annual reports, the findings reported here are less favorable.

Table ES-1. Clinical + Payment: Relative Initiative effect (percent change) on hospital-related utilization and expenditures, FY 2019

Measure	All ECCPs (all states)	AQAF (AL)	ATOP2 (NV)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Utilization per resident (probability of hospital-related utilization)							
Any hospitalization							
All-cause	−1.4	−6.2	−3.8	10.4	−3.7	−0.5	6.2
Potentially avoidable	15.3**	13.0	37.5**	16.6	1.4	11.5	45.4**
Six qualifying conditions	18.0*	24.8	44.2**	33.9	−17.2	9.2	84.2**
Any emergency department visit							
All-cause	15.2***	19.1*	15.4	26.2	8.1	5.5	27.2*
Potentially avoidable	16.9**	24.9*	23.8	38.4	6.1	16.2	13.0
Six qualifying conditions	11.4	−4.2	−21.4	135.9**	12.8	22.1	7.8
Any acute care transition							
All-cause	3.1	3.9	−0.3	13.9**	−1.2	−1.8	12.7
Potentially avoidable	10.7*	13.0	17.9	20.6	−1.5	11.7*	23.1
Six qualifying conditions	12.5	11.4	21.0	58.9***	−14.7	4.5	46.4*
Expenditures per resident-year							
Total Medicare expenditures	2.6	1.1	5.0	5.7	−0.6	1.6	7.0
Hospitalization expenditures							
All-cause	3.4	−0.8	−12.9	16.1	−1.5	9.3	15.5
Potentially avoidable	24.4**	19.2	39.7	10.6	12.8	25.4	69.0**
Six qualifying conditions	33.9**	35.8	86.5**	6.7	−6.1	65.5**	122.6**
Emergency department visit expenditures							
All-cause	4.2	11.5	−6.5	12.5	−3.1	−6.0	24.0
Potentially avoidable	11.7	25.4	4.8	30.8	0.8	1.9	9.8
Six qualifying conditions	15.2	14.3	61.9	64.5	−18.2	57.9	−1.3
Acute care transition expenditures							
All-cause	2.2	−3.1	−12.2	18.6*	−3.0	6.5	13.8
Potentially avoidable	24.5***	17.1	33.8	18.5	15.6	21.5	64.2**
Six qualifying conditions	34.6***	37.5	73.7	12.3	−7.5	64.7**	115.0**

*/**/*** = Significantly different from zero based on a *p*-value cutoff of 0.1/0.05/0.01.  is decrease.  is increase.

SOURCE: RTI analysis of Medicare claims data (RTI programs MS 110, MS 113, and MS 114; RTI folder: ykaganova\ar4\may_31\ms110; ykaganova\ar4\may_31\ms113; ykaganova\ar4\may_31\ms114).

NOTES: ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado.

For *utilization,* 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. For *expenditures,* 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. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure is small. In such cases, the relative Initiative effect should be interpreted with caution. All predictions are based on a difference-in-differences regression model with a national comparison group and adjusted for resident- and facility-level characteristics. *Acute care transitions* include hospitalizations, emergency department visits, or 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.

Impact on utilization and expenditures residents in the Payment-Only group

- *Overall, combining all ECCPs, utilization of hospital-related services and related expenditures did not decrease relative to the national comparison group.*
- *Combining all ECCPs, we observed a pattern of unfavorable increases for residents in Payment-Only facilities, most of which were not statistically significant.*
- *When looking at each ECCP individually, we observed consistent, unfavorable increases in utilization and expenditures, many of which were statistically significant in one ECCP. Patterns for the remaining five ECCPs were weaker and less consistent.*

Combining all ECCPs, for eligible residents in the Payment-Only group, there is weak evidence of increased utilization of hospital-related services relative to the national comparison group. There were increases that were not statistically significant for almost all measures, and a statistically significant increase in the probability of potentially avoidable hospitalizations (up 9.5%) in FY 2019. Analyzing Medicare expenditures, we found increases that were not statistically significant across all measures.

Examining each of the ECCPs separately, only eligible residents in participating AQAF facilities showed several unfavorable, statistically significant increases in hospital-related utilization and expenditure measures relative to the national comparison group. The ATOP2 and OPTIMISTIC models were each associated with one statistically significant favorable decrease and one statistically significant unfavorable increase in hospital-related expenditure measures for eligible residents. Payment-Only facilities in other ECCPs showed no statistically significant results.

Table ES-2 presents a summary of estimated FY 2019 Initiative effects on hospital-related utilization and expenditures for eligible residents in Payment-Only facilities, relative to the baseline trend. Compared to findings based on FY 2017 and FY 2018 that we reported in our previous annual reports, the findings reported here are less favorable.

Table ES-2. Payment-Only: Relative Initiative effect (percent change) on hospital-related utilization and expenditures, FY 2019

Measure	All ECCPs (all states)	AQAF (AL)	ATOP2 (CO)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Utilization per resident (probability of hospital-related utilization)							
Any hospitalization							
All-cause	1.1	7.7	11.7	1.1	−4.5	1.9	0.0
Potentially avoidable	9.5*	34.3**	7.4	−0.5	8.3	12.9	−1.5
Six qualifying conditions	8.3	40.6**	11.1	−15.5	11.3	6.4	6.0
Any emergency department visit							
All-cause	2.3	15.0*	2.0	1.7	0.1	7.1	−11.1
Potentially avoidable	−2.5	14.3	4.7	−6.5	−10.5	−0.1	−6.9
Six qualifying conditions	9.5	23.3	−4.5	13.3	3.7	27.3	−4.5
Any acute care transition							
All-cause	−0.1	6.9	5.2	2.9	−4.4	0.0	−4.5
Potentially avoidable	1.0	19.3**	2.4	−1.5	−5.3	3.9	−5.1
Six qualifying conditions	7.0	33.5**	−1.0	−8.4	7.4	14.0	2.5
Expenditures per resident-year							
Total Medicare expenditures	0.6	4.4	15.9**	4.4	1.7	−9.3**	−5.2
Hospitalization expenditures							
All-cause	2.9	23.8**	2.2	7.8	0.6	−2.3	−9.0
Potentially avoidable	7.8	58.9***	−15.0	14.4	6.7	−0.2	−19.0
Six qualifying conditions	4.4	95.6***	−16.2	−12.6	12.4	−18.5	−16.3
Emergency department visit expenditures							
All-cause	4.3	12.1	−16.4	13.2	3.2	35.8***	−27.1
Potentially avoidable	2.4	28.1	−32.3**	13.1	−9.5	24.4	−3.7
Six qualifying conditions	5.6	16.0	−30.8	19.6	10.0	27.4	3.0
Acute care transition expenditures							
All-cause	2.1	22.0**	−0.9	7.9	−1.1	−1.7	−9.8
Potentially avoidable	5.6	54.5***	−20.0	14.3	4.2	2.5	−22.8
Six qualifying conditions	1.5	91.5***	−19.7	−13.1	11.5	−19.9	−20.6

*/**/*** = Significantly different from zero based on a *p*-value cutoff of 0.1/0.05/0.01. is decrease. is increase.

SOURCE: RTI analysis of Medicare claims data (RTI programs MS 110, MS 113, and MS 114; RTI folder: ykaganova\ar4\may_31\ms110; ykaganova\ar4\may_31\ms113; ykaganova\ar4\may_31\ms114).

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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.

Impact on MDS-based quality measures

- *In Clinical + Payment facilities, the Initiative did not result in a consistent pattern of change in facility performance on MDS-based quality measures.*
- *The Initiative was associated with a higher-than-expected rate of undesirable events in the majority of the MDS-based quality measures for residents in Payment-Only facilities.*

Our analysis of FY 2019 data showed mixed results regarding the Initiative impact on select quality measures from the Minimum Data Set (MDS): falls with injury, self-reported moderate to severe pain, pressure ulcers, urinary tract infection (UTI), catheter inserted and left in bladder, decline in activities of daily living (ADLs), and antipsychotic medication use.

For residents in Clinical + Payment facilities, we found an unfavorable effect on one measure in models for all ECCPs combined: antipsychotic medication use. For individual ECCPs, we found some favorable and unfavorable statistically significant Initiative-associated effects on MDS-based quality measures, but there was no clear pattern for which measures were impacted.

For residents in Payment-Only facilities, analyses showed statistically significant unfavorable Initiative-associated effects in five out of seven MDS-based quality measures in models combining all ECCPs: one or more falls with injury, self-reported moderate to severe pain, UTI, decline in ADLs, and antipsychotic medication use. However, for most of the MDS-based quality measures, the unadjusted rate of unfavorable events remained lower among residents in Payment-Only facilities than residents in the national comparison group in all Initiative years.

Impact on resident mortality

- *Combining all ECCPs, the Initiative was not associated with a statistically significant impact on resident mortality in FY 2019.*

A new analysis presented in this annual report examines whether the Initiative had an impact on resident mortality. We examined unadjusted trends in resident mortality rates, evaluated outcomes for the subgroup of Initiative-eligible residents who received on-site treatment for the six conditions, conducted multivariate regression analysis similar to that for the other measures, and analyzed site visit and phone interview data. In analyses combining all ECCPs, for residents in Clinical + Payment and Payment-Only facilities, the Initiative was not associated with any statistically significant effect on mortality in FY 2019, though the unadjusted mortality rates were higher than the national comparison group.

Examining each ECCP separately, the Initiative was associated with a statistically significant increase in resident mortality in two Clinical + Payment ECCPs (AQAF and RAVEN), and in MOQI

Payment-Only facilities. Interview data neither elicited any explanation for these results nor suggested any evidence of an increase in mortality among eligible residents in ECCP facilities. Factors other than the Initiative might have accounted for the unfavorable results in these ECCPs.

ES.5 Discussion

Initiative Year 3 (FY 2019) findings indicate that the NFI 2 payment reform has not resulted in the intended effect of reducing avoidable hospitalizations to a meaningful degree. While there was a substantial amount of billing by practitioners and by facilities for providing on-site treatment for the six conditions, evidence suggests that most of the residents who received this treatment would not have been hospitalized absent the Initiative. There could be many reasons that the Initiative may not have had the intended impact of reducing avoidable hospitalizations, and interview findings highlight the importance of three reasons:

- First, structuring NFI 2 as a purely financial incentive may not be sufficient to effect change. Facilities have faced many challenges with Initiative billing and have seen a decline in their eligible populations, making many facilities believe that the extra payment is not worth the effort.
- Second, interviewees in both Clinical + Payment and Payment-Only facilities noted that NFI 2 often empowered only key staff to participate, instead of the whole facility as in NFI 1.
- Third, over time, the nursing facility environment has gotten more complex in terms of increasing resident acuity, staff retention challenges, and more payer choices, thus reducing the incentive for facilities to engage with NFI 2.

Throughout this report, evaluation results are discussed as favorable or unfavorable relative to the overall NFI 2 goals, However, it is important to note that for individual residents, hospitalizations may be necessary and clinically appropriate.

1. Overview

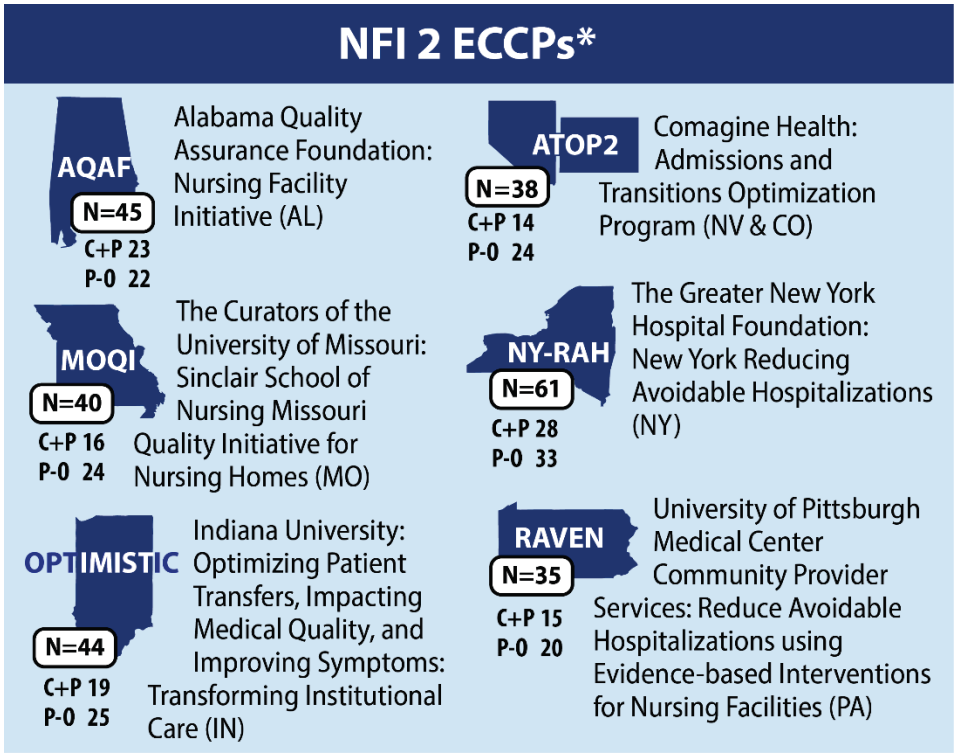
In October 2016, the Centers for Medicare & Medicaid Services (CMS) began implementing the second phase of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents—herein referred to as Nursing Facility Initiative 2 (NFI 2), or the Initiative. The primary goal of the Initiative is to improve the health and health care among long-stay facility residents and ultimately to reduce avoidable hospital admissions.

From 2012 to 2016, CMS implemented the first phase of the Initiative (known as NFI 1) , consisting of a series of facility-level clinical and educational interventions intended to improve detection, documentation, and communication of changes in residents' conditions. NFI 1 was also designed to improve processes for hospital transitions, medication review, and quality assurance.

Seven ECCPs (Enhanced Care and Coordination Providers), each working with selected facilities in one specific state (except for ATOP), designed and implemented models grounded in the overarching clinical and educational intervention components set forth by CMS for NFI 1. Each ECCP is an independent organization that works with its partnering nursing facilities to implement the Initiative.

NFI 1 was associated with statistically significant reductions in hospitalizations, potentially avoidable hospitalizations, ED visits, and potentially avoidable ED visits, along with statistically significant reductions in expenditures for all-cause hospitalizations and potentially avoidable

hospitalizations.[5] Note that this finding summarizes the results for all ECCPs combined, for the intervention period 2014 to 2016, and also using within-state comparison groups (not a national comparison group as in NFI 2). ECCP and facility interviewees attributed successes in reducing avoidable hospitalizations to increased facility-wide communication, early identification and treatment of resident changes in condition, and, in some ECCPs, clinical care provided by ECCP APRNs and RNs.

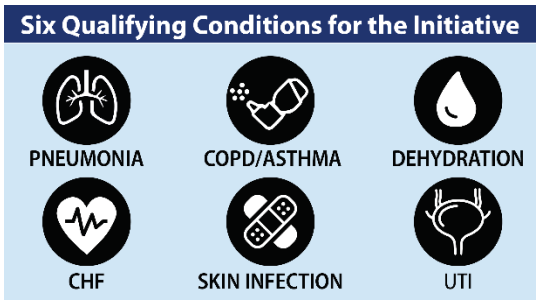


* N = number of participating nursing facilities at the start of NFI 2.
Note: C+P= Clinical + Payment; P-O= Payment-Only. The total number of facilities in the figure above are 263, however in many of the analyses for this report, including the difference-in-differences (DD) analyses, we included 259 facilities. More details are provided in Section L.4 of ***Appendix L***.

NFI 2 expands on the NFI 1 interventions with six of the original seven[6] ECCPs, adding a new Initiative-wide payment model and a second cohort of participating nursing facilities that do not receive the NFI 1 interventions. The NFI 2 payment model offers participating facilities the opportunity to submit claims with special Medicare billing codes. These codes serve as a financial incentive to nursing facilities and practitioners for providing care to eligible Medicare fee-for-

[5] RTI International. (2017, September). Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents: Final Report. Baltimore, MD: Centers for Medicare & Medicaid Services. https://downloads.cms.gov/files/cmmi/irahnfr-finalevalrpt.pdf

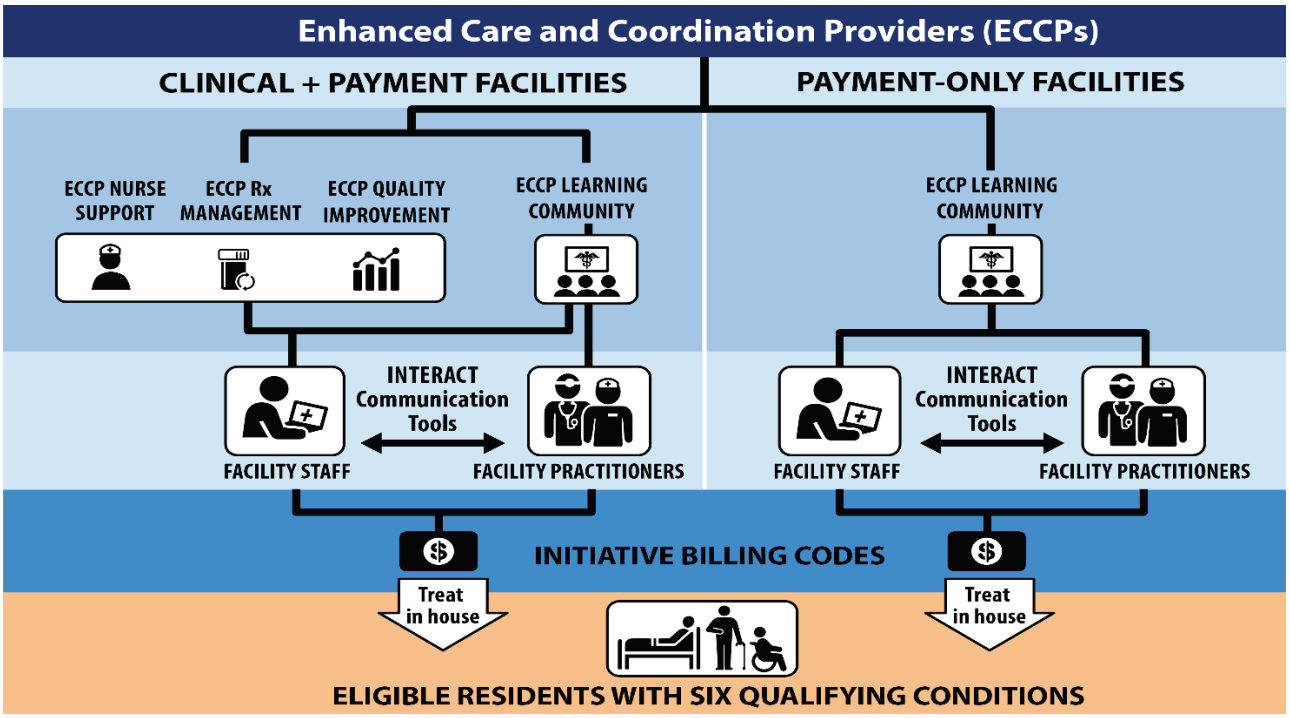
[6] CHI/Alegent Creighton Health in Nebraska participated in NFI 1 but not in NFI 2. Comagine Health continued to work with Nevada facilities from NFI 1, which then became Clinical + Payment facilities under NFI 2. Because of the limited number of facilities in Nevada, Comagine Health recruited Payment-Only facilities for NFI 2 from Colorado.



service (FFS) higher-acuity, long-stay residents in-house, rather than transferring these residents to hospitals for treatment. Participating nursing facilities and practitioners are eligible for the incentive.

To receive a financial incentive, facility staff and practitioners assess, diagnose, and treat residents who may have any of six qualifying conditions that account for a large proportion of potentially avoidable hospitalizations. These conditions are pneumonia, congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD)/asthma, skin infection, fluid/electrolyte disorder or dehydration (these terms used interchangeably), and urinary tract infections (UTIs). Participating facilities can then bill about $218 per patient per day under a Medicare Part B code created for the Initiative. Facilities receive extra per diem payments for a period of in-house treatment, and practitioners receive a hospital-level visit payment when evaluating patients for in-house treatment for the qualifying conditions. See ***Figure 1-1*** for a model of the NFI 2 payment incentive.

Figure 1-1. NFI 2 payment model



NOTE: Clinical + Payment models vary across ECCPs, including variation in the type of support facilities receive from the ECCP. As of Initiative Year 3, three ECCPs embedded full-time clinical staff in facilities, two ECCPs rotated clinical staff across multiple facilities, and one ECCP embedded quality improvement specialist in facilities.

Participating facilities that continued from NFI 1, referred to as the *Clinical + Payment* group,[7] are implementing both the clinical and educational interventions from NFI 1, plus the new NFI 2 payment model related to the six qualifying conditions.

The cohort of facilities new to the Initiative in NFI 2, referred to as the *Payment-Only* group, is implementing only the NFI 2 payment model related to the six qualifying conditions.

A comparison of the features of these two groups is shown in ***Table 1-1***.

Table 1-1. Comparison of participating facilities[8]

Clinical + Payment Group	Payment-Only Group
A subset of incumbent nursing facilities from NFI 1 that are adding the NFI 2 payment model	Newly recruited nursing facilities participating in NFI 2 payment model only
Continuing ECCP clinical and educational NFI 1 interventions	No ECCP clinical or educational NFI 1 interventions
ECCPs provide ongoing training to facility staff on the six qualifying conditions, new billing codes, and data collection activities	ECCPs support facilities on billing and data collection activities on an as-needed basis

NFI 1 = Nursing Facility Initiative 1; NFI 2 = Nursing Facility Initiative 2.

1.1 Overview of Evaluation Methods

CMS contracts with RTI to evaluate the Initiative using both primary and secondary quantitative data analyses. In this report, RTI assesses the effectiveness of the payment component of NFI 2, as of Initiative Year 3, FY 2019 (October 1, 2018 through September 30, 2019), addressing the following research questions:

- How was the Initiative implemented, and how do participating ECCP leadership and facility staff perceive Initiative effectiveness?
- What is the Initiative payment incentive effect on Medicare utilization and expenditures, particularly for hospital-related services, for the Clinical + Payment group and the Payment-Only group?

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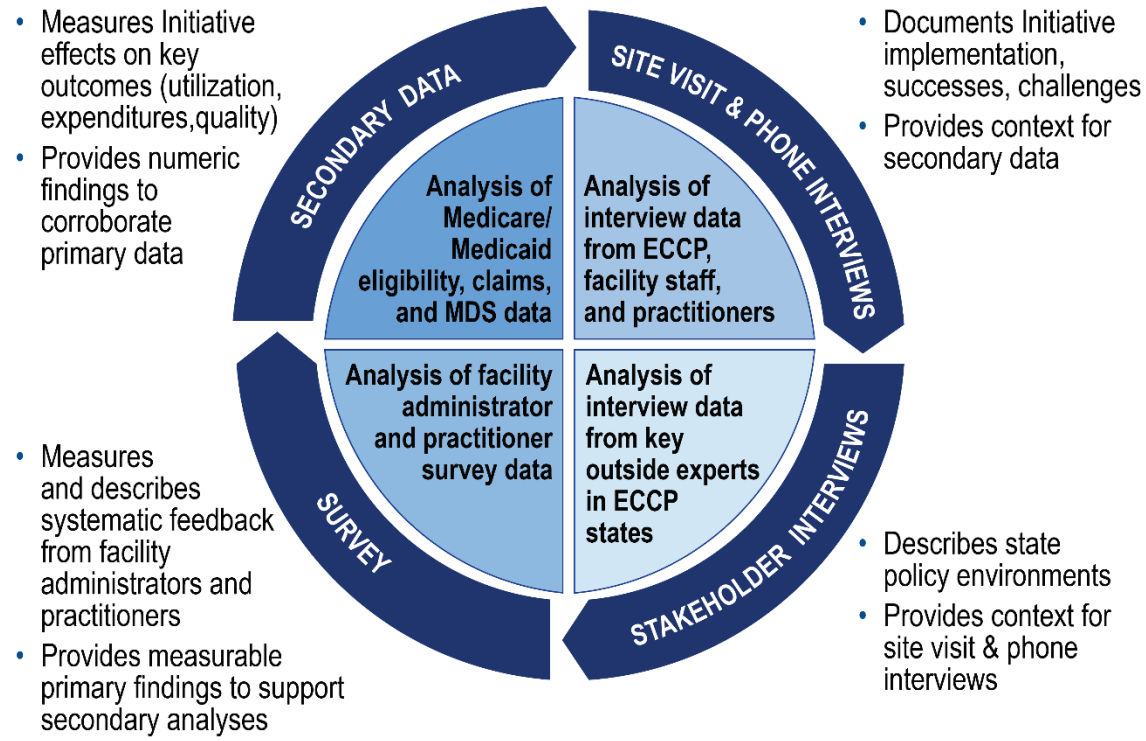
[7] Clinical + Payment models vary across ECCPs, including the type of support facilities receive from the ECCP. In Initiative Year 3, three ECCPs embedded full-time clinical staff in facilities, two ECCPs rotated clinical staff across multiple facilities, and one ECCP embedded quality improvement specialists in facilities.

[8] At the start of NFI 2 there were 263 participating facilities: 115 Clinical + Payment and 148 Payment-Only. Because of the intent-to treat design of the DD analysis (see more information in ***Appendix L***), the total number of facilities varies over time by data analysis type. The DD model includes 259 facilities: 111 Clinical + Payment and 148 Payment-Only. The primary data collection analyses include 243 facilities: 105 Clinical + Payment and 138 Payment-Only, slightly less than the DD analyses because of facility attrition since the start of NFI 2.

- How does the Initiative effect on Medicare utilization and expenditures vary by ECCP and type of intervention?
- How does the Initiative affect quality of care outcomes for participating residents?
- How does the Initiative affect the mortality of participating residents?
- What impact does the Initiative have on Medicaid expenditures?

The evaluation uses a mixed-methods approach to provide a more holistic understanding of NFI 2. Each component of the secondary quantitative analyses and primary data collection and analyses (i.e., site visits, telephone interviews, stakeholder interviews, surveys) complements the other data sources as shown in ***Figure 1-2***.

Figure 1-2. Mixed-methods approach



1.1.1 Primary Data Collection and Analysis

The primary data provide information on Initiative operations and give critical context to the findings from secondary data analyses. In this report, primary data were collected for Initiative Year 3[9] via the following activities:

- Site visits to each ECCP headquarters and a selection of participating Clinical + Payment facilities
- Telephone interviews with participating facilities from both the Clinical + Payment and Payment-Only groups
- Web survey of all participating nursing facility administrators (NFAs)
- Web survey of all participating practitioners (physicians, nurse practitioners, and physician assistants)
- Telephone interviews of key stakeholders across ECCP states
- Review of Sharing Collaborative activities and materials provided by ECCPs

Detailed descriptions of all primary data activities, including methods and findings, can be found in ***Appendices A–K***.

1.1.2 Quantitative Analyses

In this report, we used a wide range of secondary data sources (see ***Section 3***)—such as Medicare/Medicaid claims and eligibility files and MDS (Minimum Data Set) assessments—to evaluate NFI 2 effects on utilization, expenditures, and quality of care outcomes for eligible long-stay nursing facility residents in participating facilities.

To determine the Initiative effects, we compared residents eligible for the Initiative to a non-Initiative population of nursing facility residents who would meet the Initiative eligibility criteria. We used a difference-in-differences (DD) multivariate regression model for each intervention group (i.e., Clinical + Payment and Payment-Only), with separate analyses by ECCP as well as pooled analyses combining ECCPs for each intervention group. The DD technique compares changes over time among the Initiative residents to changes among the comparison residents to measure the impact of the Initiative.

All DD analyses control for relevant resident-level data (e.g., demographics, health profiles) and facility characteristics. A brief description of the evaluation methodology for Initiative Year 3 can be found in ***Section 3*** of this report and additional details can be found in ***Appendix L***.

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[9] Primary data reported herein were collected between January 1, 2019, and December 1, 2019, although all data collection focused on respondents' experiences during only Initiative Year 3 (October 1, 2018, through September 30, 2019).

1.2 Report Structure

The remainder of the report is organized as follows. ***Section 2*** presents findings related to how NFI 2 was implemented and how its effectiveness was perceived by ECCP leadership and facility staff. We highlight primary data findings related to Initiative Year 3 and FY 2019 billing data for both facilities and practitioners. Quantitative data findings regarding NFI 2 effects on Medicare/Medicaid utilization and expenditures, MDS-based quality measures, and mortality are presented in ***Section 3***. ***Section 4*** discusses overall findings for Initiative Year 3.

2. How Was NFI 2 Implemented by Facilities and Practitioners?

- *Although there were a substantial number of payments for on-site treatment, the majority of these payments were for residents who would not have been hospitalized.*
- *ECCP leaders perceived the Initiative as being effective, though facility interviewee perceptions were mixed. Interviewees noted that the payment component of NFI 2 has not initiated substantial facility care practice changes. Instead, the Initiative provided an additional financial award for many on-site care practices already in place.*
- *Claims analysis shows that Initiative related billing has decreased in Initiative Year 3 relative to prior years.*

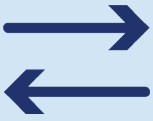
This chapter synthesizes findings from two separate data sources to describe NFI 2 implementation in Initiative Year 3. These two data sources are (1) the participating facility telephone interviews and ECCP and facility site visits conducted between January 1, 2019, and December 1, 2019, and (2) the Medicare claims analysis related to participating facility billing for Initiative Year 3. Key findings for Initiative Year 3 across both data sources are summarized in ***Figure 2-1***.

This chapter is organized as follows:

- ***Section 2.1*** introduces the implementation science approach to NFI 2 evaluation
- ***Sections 2.2 through 2.3*** summarize telephone and site visit interview findings for facilities and practitioners

- ***Sections 2.4 and 2.5*** present analysis of billing data for on-site acute treatment and for practitioner evaluation of residents in the facility (codes G9679–G9685) with associated interview context
- ***Sections 2.6 through 2.10*** discuss telephone and site visit interview findings for key stakeholders, the policy landscape, and sustainability plans for participating facilities.

Figure 2-1. Initiative Year 3 ECCP key findings on implementation

	Across ECCPs, facility interviewees highlighted that NFI 2 components (e.g., focus on early identification of change in condition) are applied facility-wide, therefore all residents—regardless of NFI 2 eligibility—benefit from the Initiative.
	NFI 2 communication, documentation, and focus on the six qualifying conditions have become routine in most ECCPs. NFI 2 has been less established in NY-RAH and AQAF Clinical + Payment facilities due to their respective ECCP model changes.
	Clinical + Payment facility interviewees noted that NFI 1 effected more change in facility practice toward treating residents in-house and led to more staff engagement compared to NFI 2.
	Payment-Only facilities described NFI 2 as an opportunity to receive compensation for clinical activities that existed prior to NFI 2, including early identification of changes in resident condition.
	ECCP interviewees noted that practitioner engagement remains challenging, as practitioners feel the financial incentive (i.e., practitioner billing code) is insufficient to motivate change in practice.
	Interviewees reported frustration with mid-Initiative criteria changes for the six qualifying conditions; the changes were challenging for staff to learn and made it harder for some diagnoses to qualify for NFI 2 billing (e.g., UTI).
	Some potentially avoidable hospitalizations have been attributed to non-Initiative factors, including family preferences for hospital care.
	Across ECCPs, NFI 2 billing has slowed. Interviewees reported such reasons as model changes, adjustments to NFI 2 six qualifying conditions, fewer Initiative-eligible residents, and facilities catching changes in condition before residents meet NFI 2 billing criteria.
	Pneumonia and UTI remain the most commonly billed conditions, accounting for over 60% of all NFI 2 billing. Billing varied across facilities, with an increasing number of facilities not billing at all in 2019 and an increasing proportion of all billing due to the top-billing facilities.

The billing trends for hospitalization and on-site treatment suggest that most residents treated on-site for the six conditions appear unlikely to have been hospitalized and were characterized by lower acuity than those treated in the hospital.

2.1 Adopting an Implementation Science Approach to the NFI 2 Evaluation

The section introduces the framework RTI uses to examine Initiative implementation. This implementation science approach, which will be explored in full detail in the final evaluation report, is applied to systematize understanding of NFI 2 implementation successes, challenges, and operations during the five-year period between 2016 and 2020.

As health services research efforts have focused on testing the effectiveness of new care delivery models, researchers have relied on implementation science to frame evidence-based study designs. The U.S. National Institutes of Health define implementation science as, "The study of methods to promote the adoption and integration of evidence-based practices, interventions, and policies into routine health care and public health settings."[10] Within implementation science, a host of frameworks helps explain relationships between evidence-based intervention participants and key stakeholders. As the Initiative approaches its conclusion, we conceptualize NFI 2 evaluation findings using the Consolidated Framework for Implementation Research (CFIR), which helps to untangle "what works where and why"[11] across participating nursing facilities and ECCPs.

The RTI evaluation applies an implementation science framework to systematize understanding of NFI 2 implementation successes, challenges, and operations during the five-year period between 2016 and 2020. This approach and associated findings will be described fully in the final evaluation report.

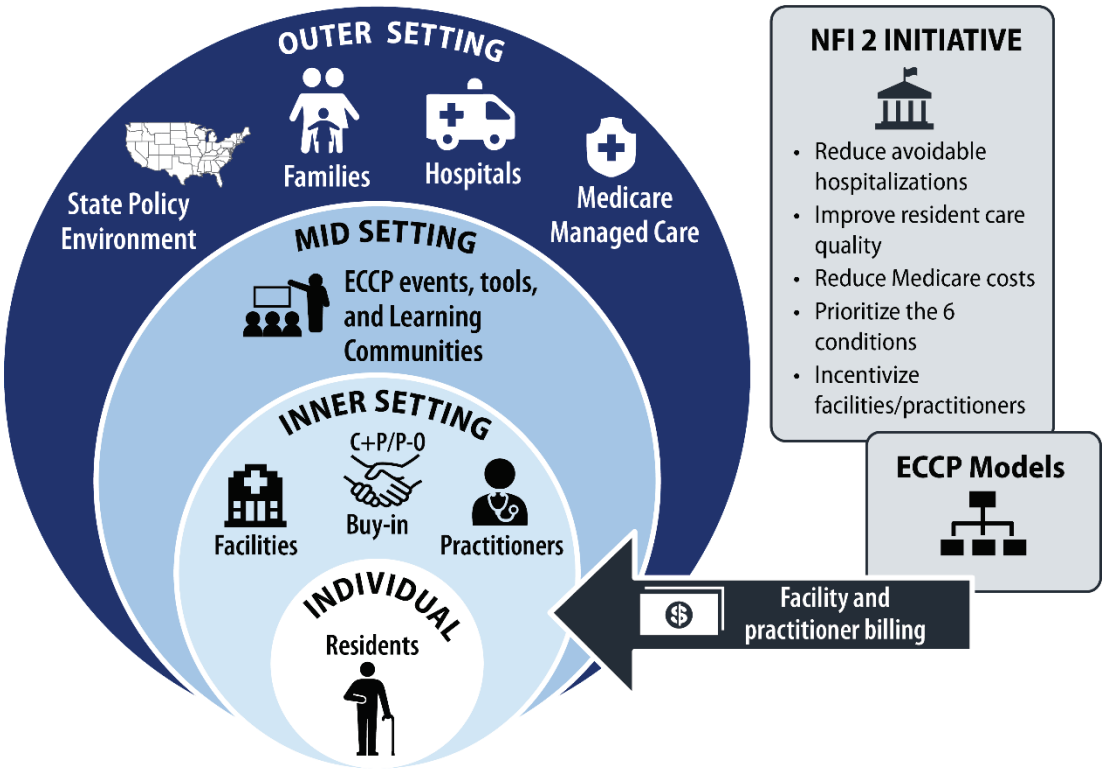
CFIR provides a structure for describing how NFI 2 components and stakeholders interact to achieve the underlying goal of reducing avoidable hospitalizations for nursing facility residents. CFIR positions individual residents within a series of broader settings (e.g., inner and outer settings) to describe how interactions within and across settings may affect overall Initiative implementation. For NFI 2, individual nursing facility residents are nested within participating NFI 2 facilities and cared for by participating NFI 2

[10] Fogarty International Center at the National Institutes of Health. (2019, May). Implementation science news, resources and funding for global health researchers. https://www.fic.nih.gov/ResearchTopics/Pages/ImplementationScience.aspx#:~:text=Implementation%20science%20is%20the%20study,care%20and%20public%20health%20settings

[11] Damschroder, L. J., Aron, D. C., Keith, R. E., Kirsh, S. R. Alexander, J. A., & Lowery, J. C. (2009). Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implementation Science, 4,* 50. https://doi.org/10.1186/1748-5908-4-50

practitioners (inner setting) who have worked to implement Initiative components, such as targeting the six conditions and documenting resident changes to submit NFI 2 claims. ECCPs (mid-setting) guide and support nursing facility leadership and practitioners to facilitate implementation within facilities, providing enhanced care to facility residents in clinical models and billing guidance in payment-only models. Lastly, the outer setting represents entities external to NFI 2 that may moderate the effects of the Initiative (i.e., state policies and hospital relationships). ***Figure 2-2*** shows how the CFIR applies to NFI 2.

Figure 2-2. NFI 2 viewed through the Consolidated Framework for Implementation Research



2.2 Initiative Implementation and ECCP Support of Partner Facilities Remains Strong, Though Model Changes in Two ECCPs Have Created Challenges

Participating Clinical + Payment and Payment-Only facilities, which represent the inner setting in the CFIR model, have focused on Initiative billing for the six clinical conditions since the start of NFI 2. All facilities also worked on improved communication (i.e., continued use of INTERACT tools) and documentation, and Clinical + Payment facilities continued various ECCP-specific efforts that carried over from NFI 1. During Initiative Year 3 telephone interviews, ATOP2, MOQI, OPTIMISTIC, and RAVEN interviewees described the Initiative as "routine," "status quo," or "part of everyday life."

The AQAF and NY-RAH ECCPs, which continued into NFI 2 as the two education-only ECCP models, instituted Initiative model changes in 2018 and 2019, respectively. These changes represented a shift

in how the facilities (CFIR inner setting) implemented the ECCP NFI 2 models (CFIR mid-setting). AQAF added a clinical component with part-time, hands-on registered nurses (RNs) providing direct care in their Clinical + Payment facilities, rather than their previous full-time, education-only RNs. Initiative Year 3 was the first full year that this new AQAF model was in effect, and facility interviewees provided mixed feedback on the model change. Some interviewees described the transition positively, though others noted that their facilities have not benefited from the model changes, especially the shift to having only a part-time AQAF RN. In contrast, NY-RAH retained education-only status but transitioned to focus solely on quality improvement efforts. Their model change process included removing NY-RAH RNs from participating Clinical + Payment facilities and replacing these nurses with Quality Improvement Specialists (QISs), most of whom had no clinical training. As these changes were still underway during our Initiative Year 3 site visit, several facility interviewees described difficulties transitioning. One NY-RAH Clinical + Payment facility administrator shared,

"Since [NY-RAH nurse] left, handing [NFI 2 tasks] over to us as a full-time responsibility—that has been challenging because [facility leaders] all have other jobs they are required to do."

The NY-RAH ECCP experienced timing challenges hiring QISs in Year 3, with many facility staff reporting gaps of 3 to 5 months in ECCP staffing. The ECCP also designed the QIS role to move away from supporting assistance with entering NFI 2 data and claims review. In the absence of this support, the responsibility for billing fell on the nursing facilities. Both factors account for the lack of claims (see ***Figures 2-3*** and ***2-4***) submitted by NY-RAH Clinical + Payment facilities.

For ATOP2, MOQI, OPTIMISTIC, and RAVEN Clinical + Payment facilities, ECCP RNs and APRNs have remained integral, providing support for facility NFI 2 documentation and continuing ongoing facility staff education. As in prior years, Initiative Year 3 facility interviewees noted the importance of having consistent ECCP nurse support to engage facility staff and facilitate practitioner buy-in with NFI 2. Contrasting the full-time presence of the RAVEN APRN with the pre-NFI challenges of trying to call physicians who may not be reached easily, one charge nurse shared,

"I'm a little scared [when RAVEN is over], … [the RAVEN nurse practitioner] makes herself so available, I don't know how she does it."

Particularly in facilities with higher rates of clinical staff or leadership turnover, interviewees described how ECCP nurses have provided continuity, serving as stopgaps to maintain NFI 2 priorities through facility staff transitions. One MOQI Clinical + Payment facility director of nurses (DON) described the importance of the MOQI APRN role as,

"…just having a practitioner there to support [facility staff] and bounce things off of - a second set of eyes."

Notably, facility interviewees described somewhat lower NFI 2 facility staff engagement when they experienced frequent ECCP nurse turnover or when ECCP nurses were present in the facilities less often (e.g., part-time).

In Payment-Only facilities across ECCPs, the NFI 2 model has remained largely unchanged over time. As of Initiative Year 3, facility interviewees across ECCPs described varying degrees of NFI 2 engagement, dependent on facility-specific characteristics, such as staff turnover rates and number of eligible NFI 2 residents.

All ECCPs continued to provide ongoing support for participating Clinical + Payment and Payment-Only facilities through webinars, e-mails, conference calls, and meetings. Interviewees described moderate to high participation in these activities across most ECCPs, and most facilities described the ECCP support as "somewhat" to "very" valuable.

2.3 Facilities and Practitioners Remain Engaged in NFI 2, Though Clinical + Payment Facilities Are Less Engaged Now Than in NFI 1

Across ECCPs, facility staff interviewees reported that Initiative engagement generally remains strong. Most facilities have improved or maintained strong communication practices and a focus on the six clinical conditions included in NFI 2. These efforts to communicate effectively and identify conditions early extend beyond the Initiative-eligible population to include all residents. As one OPTIMISTIC Clinical + Payment facility administrator said,

"[NFI 2] really enhances the clinical quality of the whole house."

Some Clinical + Payment interviewees asserted that NFI 2 engages facility staff less than NFI 1. In NFI 1 the focus on facility-wide identification of resident changes in condition reached the certified nursing assistants (CNAs), housekeeping, dietary, and other facility staff types, whereas NFI 2 offers fewer roles for nursing, direct care, and support staff. In most facilities, DONs or other members of the facility leadership team oversee NFI 2 documentation, and business office staff handle billing efforts, leaving other staff less engaged in NFI 2 compared to NFI 1. Likewise, Payment-Only facilities also noted that the primary work of documenting and billing NFI 2 conditions falls to leadership and billing staff, creating an NFI 2 "knowledge gap" between facility leadership and nursing and support staff. Although some of these gaps were deliberate ECCP choices: by not having facility staff focus on eligibility, there would be no chance of care bias or resident distinctions because of the Initiative. However, the net effect of not focusing on resident eligibility may have been lower facility staff awareness of and engagement with the Initiative.

Practitioner engagement remains variable across facilities and ECCPs, with most facility interviewees reporting moderate to low buy-in from facility physicians and moderate engagement from non-ECCP APRNs. The relationships between facility staff and practitioners represent NFI 2 implementation at the inner setting. Although most practitioner interviewees agreed with the notion of reducing avoidable hospitalizations, they shared that the NFI 2 practitioner billing process is arduous, the incentive is insufficient, and the timeframe for certifying conditions is too restrictive. Although leadership from all ECCPs and several facilities have attempted practitioner outreach (e.g., surveys, e-mails, telephone calls), practitioners remain somewhat willing to certify conditions for facility billing but hesitant to submit their own NFI 2 claims. For additional detail about practitioner engagement and adoption of the Initiative, see ***Appendix K***.

2.4 Multiple Factors Contributed to a Substantial Drop in Billing for On-Site Treatment

Across ECCPs and facilities, many Initiative Year 3 interviewees shared that billing rates had declined since the prior Initiative year. The 2019 claims data findings provide similar evidence noting a reduction in facility billing across ECCPs, as well as a decrease in practitioner billing.

Facility interviewees noted several reasons for the Initiative Year 3 billing decrease, highlighting challenges across all CFIR settings. Interviewees mentioned the changes to the NFI 2 six qualifying conditions most frequently as reasons for reductions in Year 3 billing. CMS instituted these criteria changes in consultation with ECCP medical directors and leaders to align NFI 2 criteria with other, existing standards of care. Facility interviewees and practitioners provided mostly negative feedback on the criteria changes. As one OPTIMISTIC Payment-Only facility administrator shared,

"The change to the criteria in UTI [urinary tract infections] was horrible. Removing altered mental status—that was the biggest for us. We have dementia patients, who over half are incontinent, and you notice those behavior changes first. That hurt us, and the financial impact was significant."

Additionally, facility interviewees worried that the change mid-Initiative created confusion and strain on nursing staff and resulted in more potential audits. A NY-RAH Payment-Only facility Medicare Director noted,

"[CMS] changed criteria and then [they] audit under old criteria."

The mid-Initiative revisions created stress for both facilities and ECCPs; facility leadership struggled to retrain staff and practitioners, and ECCPs rushed to publish revised support tools (e.g., NFI 2 facility guides). ECCPs also retrained their in-facility RNs and APRNs to offer additional Clinical +

Payment facility support for the new criteria. Overall, many ECCP and facility interviewees attributed reduced billing in Initiative Year 3 to these NFI 2 changes in the six qualifying conditions.

Below we discuss facility and practitioner billing over the years 2017–2019, examining each ECCP and each condition separately. We also offer detailed explanations for the decline in Initiative billing.

2.4.1 Compared to Initiative Year 2, Facility Billing Rates for On-site Treatment Decreased

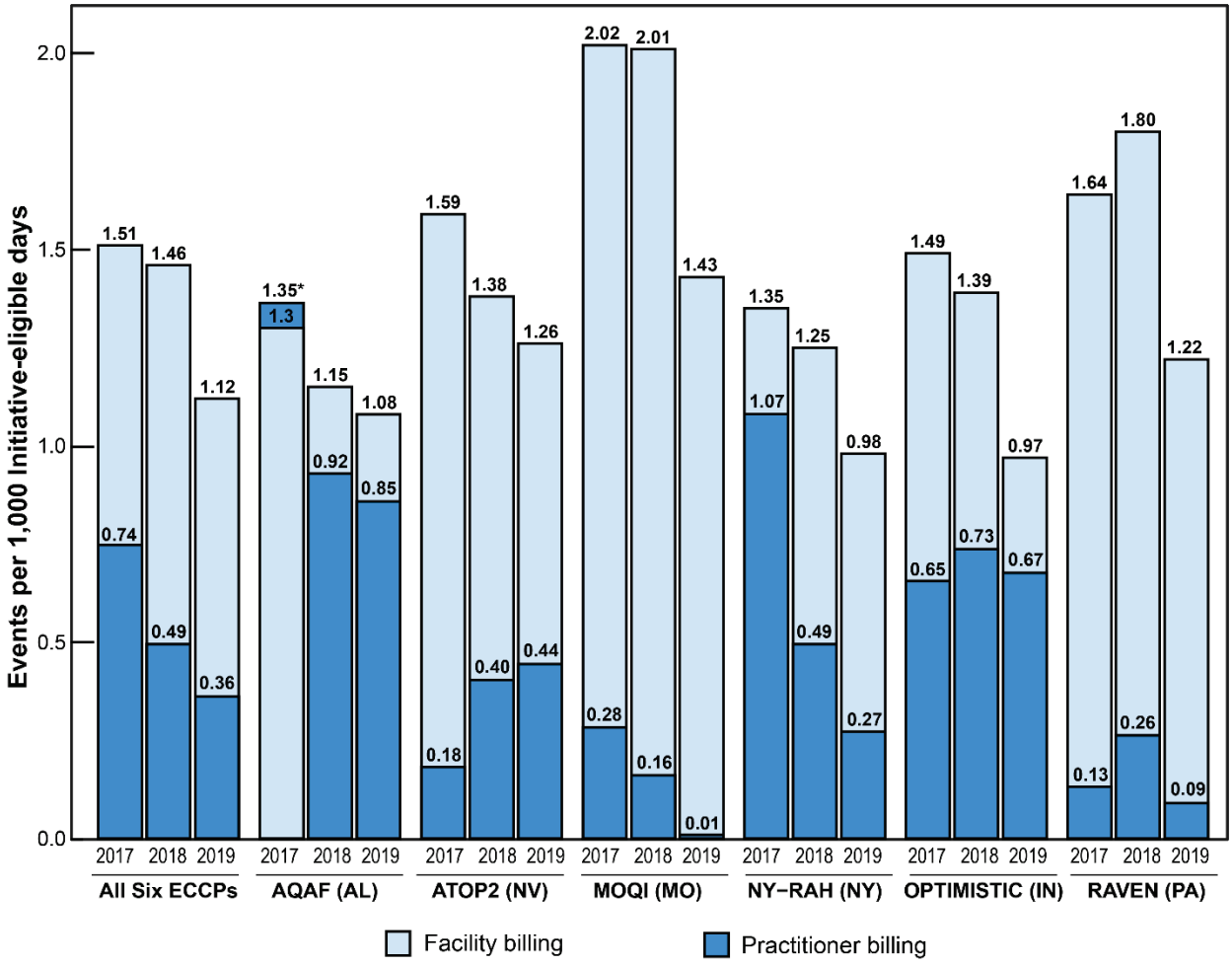
Compared to Initiative Year 2, facility billing rates for on-site treatment decreased across all ECCPs in Initiative Year 3. Facility billing rates were higher in Clinical + Payment facilities than in Payment-Only facilities, with the reverse pattern for practitioner billing. Clinical + Payment facility billing may have been higher compared to practitioner billing for some ECCPs because when ECCP nurses certify conditions to support facility billing, they do not submit an NFI 2 practitioner claim.

In Clinical + Payment facilities, billing decreased from an average 1.46 episodes per 1,000 Initiative-eligible resident-days in 2018 to 1.12 episodes in 2019 (***Figure 2-3***). Payment-Only facilities billed less often than Clinical + Payment facilities throughout NFI 2, and that trend continued in Initiative Year 3, decreasing from 1.20 episodes in 2018 to 0.84 episodes in 2019 (***Figure 2-4***).

Practitioner billing also decreased for all ECCPs except ATOP2, where practitioner billing increased in Initiative Year 3 compared to Initiative Year 2. Among Clinical + Payment facility practitioners, average billing decreased from 0.49 events per 1,000 Initiative-eligible resident-days in 2018 to 0.36 events on average in 2019. Among Payment-Only facility practitioners, billing fell from 0.89 events per 1,000 Initiative-eligible resident-days in 2018 to 0.73 events in 2019.

Facility billing rates varied notably among ECCPs. As an example, facility and practitioner billing rates in the NY-RAH and OPTIMISTIC Payment-Only facilities in 2019 were around double the rates in AQAF and more than double those of MOQI (***Figure 2-4***).

Figure 2-3. Clinical + Payment: Facility and practitioner billing for on-site treatment by ECCP, FY 2017–FY 2019

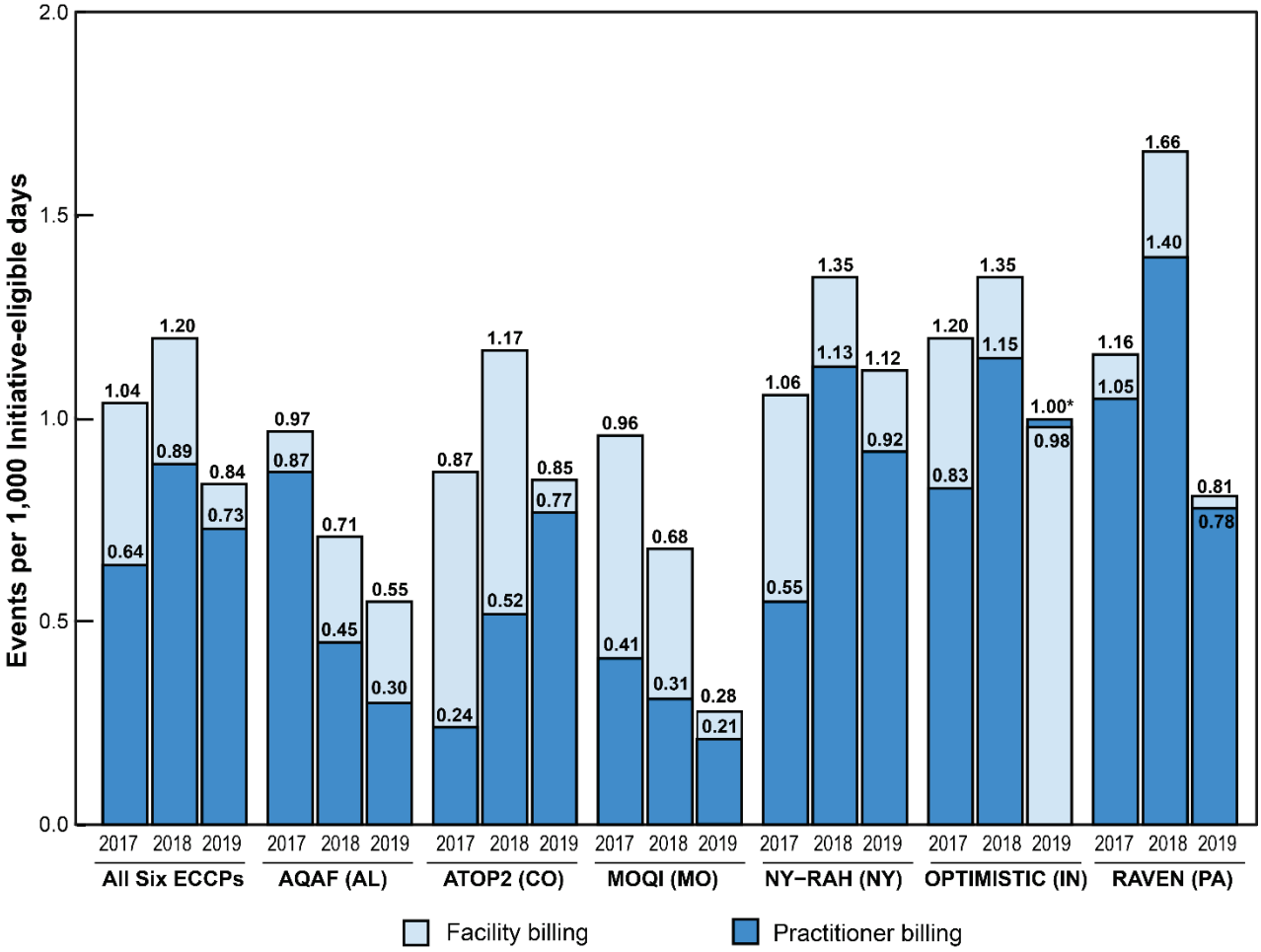


*In FY 2017 practitioner billing rates were higher on average than facility billing rates in AQAF.

SOURCE: RTI analysis of Medicare claims data (RTI program MS NBC 08; RTI folders: csaur\output\pah2_ar4_nbc_1; csaur\output\pah2_ar3_nbc_2; csaur\output\pah2_ar2_nbc_1)

NOTE: The sample used here includes all residents meeting NFI 2 eligibility requirements. This sample is slightly larger than the final analytic sample used in most of this report's analyses, which further excludes any resident with a missing covariate of interest. For further details on the sample selection process, please see Table L-3 in ***Appendix L***.

Figure 2-4. Payment-Only: Facility and practitioner billing for on-site treatment by ECCP, FY 2017–FY 2019



*In FY 2019 practitioner billing rates were higher on average than facility billing rates for OPTIMISTIC (IN).

SOURCE: RTI analysis of Medicare claims data (RTI program MS NBC 08; RTI folders: csaur\output\pah2_ar4_nbc_1; csaur\output\pah2_ar3_nbc_2; csaur\output\pah2_ar2_nbc_1)

NOTE: The sample used here includes all residents meeting NFI 2 eligibility requirements. This sample is slightly larger than the final analytic sample used in this report's multivariate analyses, which further excludes any resident with a missing covariate of interest. For further details on the sample selection process, please see Table L-3 in ***Appendix L***.

There was also great variation across facilities. Clinical + Payment facilities had consistently higher billing rates than Payment-Only facilities on average, though both averages decreased over the course of NFI 2 (***Table 2-1***). Although in 2019 the top 10 percent of billing facilities submitted fewer claims compared to 2018[12] (***Table 2-1***), a greater share of the total NFI 2 billing was attributed to the top billers in 2019 (***Table 2-2***). This is partly because the number of non-billing facilities increased. In Payment-Only facilities, the number of facilities submitting zero claims more than doubled from 22 non-billers in 2018 to 49 facilities in 2019—roughly a third of all Payment-Only facilities (***Table 2-2***). The growth in non-billing facilities and the increased concentration of billing among the top-billing facilities is shown in ***Figure 2-5***. ***Figure 2-5*** displays the cumulative percentages of episodes of on-site care accounted for by the cumulative percentage of all facilities. The more extreme curvature from 2017 through 2019 indicates the larger proportion of episodes occurring in the top-billing facilities.

> On average, Clinical + Payment facilities had consistently higher billing rates than Payment-Only facilities.

Table 2-1. All ECCPs: Facility-level distribution of episodes of on-site treatment, FY 2017–FY 2019

(all six qualifying conditions combined per 1,000 Initiative-eligible resident-days)

Groups	N	Mean	Std	Min	P5	P10	P25	P50 (median)	P75	P90	P95	Max
Clinical + Payment 2017	112	1.48	1.06	0.00	0.00	0.13	0.66	1.38	2.17	2.86	3.62	4.26
Clinical + Payment 2018	111	1.41	1.20	0.00	0.00	0.00	0.40	1.26	2.11	3.09	3.66	6.14
Clinical + Payment 2019	111	1.02	0.93	0.00	0.00	0.00	0.23	0.79	1.66	2.55	2.92	3.58
Payment-Only 2017	148	1.05	1.12	0.00	0.00	0.00	0.23	0.79	1.46	2.29	3.33	7.69
Payment-Only 2018	148	1.15	1.13	0.00	0.00	0.00	0.29	0.95	1.61	2.58	3.26	6.88
Payment-Only 2019	148	0.74	1.01	0.00	0.00	0.00	0.00	0.31	1.13	2.02	3.05	4.33

SOURCE: RTI analysis of Medicare claims data (RTI program MS NBC 08; RTI folders: csaur\output\pah2_ar4_nbc_1; csaur\output\pah2_ar3_nbc_2; csaur\output\pah2_ar2_nbc_1)

[12] Between 2018 and 2019, the 90th percentile, 95th percentile, and maximum all declined in both the Clinical + Payment and Payment-Only groups.

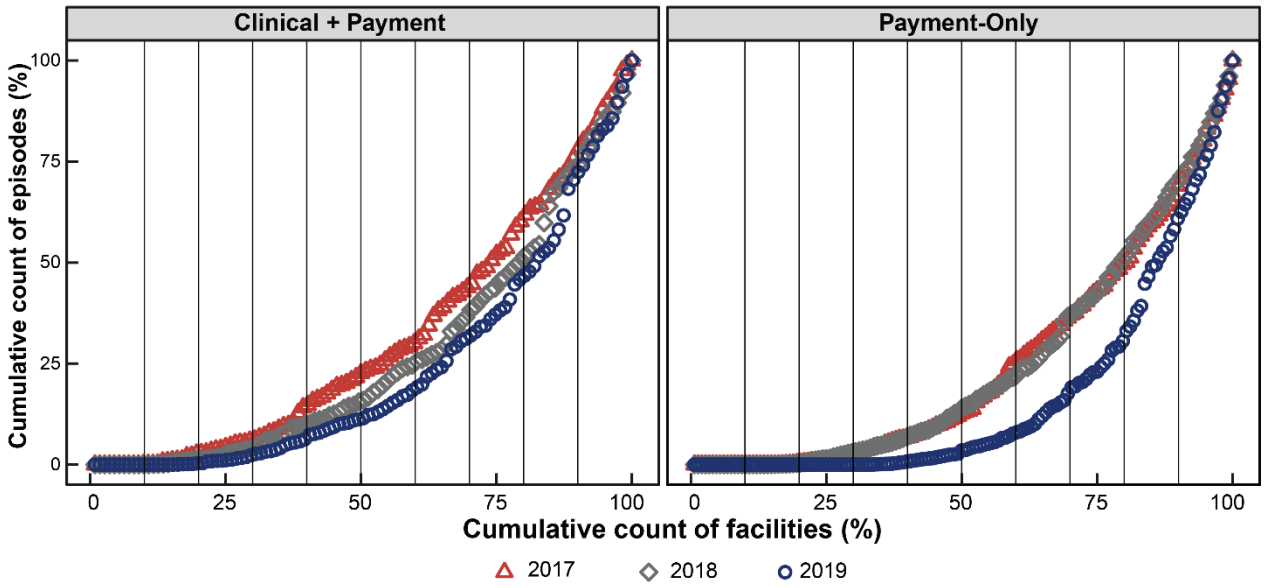
Table 2-2. All ECCPs: Non-billing facilities and episodes billed by the top 10% of facilities, FY 2017–FY 2019

Year	Number of Facilities		Number of Non-Billing Facilities (% of Total Facilities)		% Billing by Top 10% of Facilities	
	Clinical + Payment	Payment-Only	Clinical + Payment	Payment-Only	Clinical + Payment	Payment-Only
2017	112	148	9 (8.0)	23 (15.5)	24.0	31.0
2018	111	148	12 (10.8)	22 (14.9)	26.7	29.9
2019	111	148	17 (15.3)	49 (33.1)	29.5	39.1

SOURCE: RTI analysis of Medicare claims data (RTI program MS NBC 08; RTI folders: csaur\output\pah2_ar4_nbc_1; csaur\output\pah2_ar3_nbc_2; 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 separately for each year, for each of the Clinical + Payment and Payment-Only groups. For example, for the Clinical + Payment group in 2017, we selected the 12 facilities with the highest billing based on the rate of per 1,000 Initiative-eligible resident-days.

Figure 2-5. Concentration of episodes of on-site treatment, FY 2017–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI program MS 08; RTI folders: csaur\output\pah2_ar4_nbc_1; csaur\output\pah2_ar3_nb_2; csaur\output\pah2_ar2_nbc1)

NOTE: Facilities are ordered from fewest episodes to most based on the rate per 1,000 Initiative-eligible resident-days for all six qualifying conditions

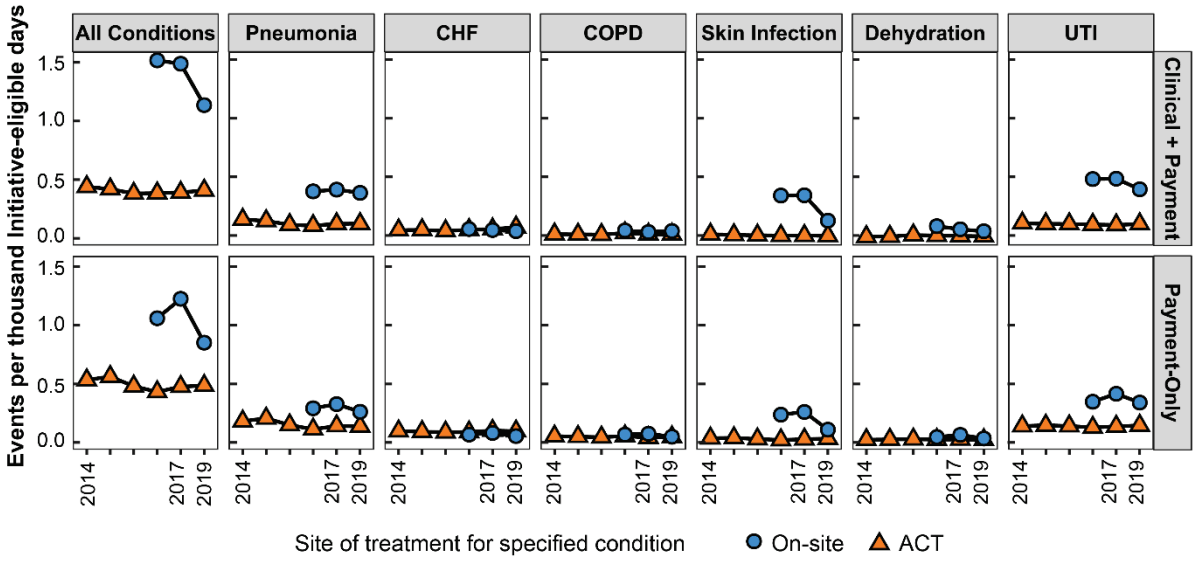
2.4.2 Pneumonia and UTI Continued to Be the Most Frequently Billed Conditions

In addition to the overall decrease in facility claims for on-site treatment, claims specific to each of the six conditions also decreased in Initiative Year 3[13]. ***Figure 2-6*** shows rates of facility billing for on-site treatment and provides rates of acute care transitions (ACTs) per 1,000 Initiative-eligible resident-days for context. *Acute care transitions* describe any transition from the nursing facility to the hospital, including transfers from the nursing facility for an inpatient admission, emergency department (ED) visit, or observation stay. ACT rates are included from 2014–2019; whereas on-site billing is tracked only from the beginning of NFI 2 (2017) through 2019. Most notably, facilities billed far fewer skin infections in 2019 compared to 2018. Similarly, average rates of on-site billing for pneumonia and UTIs decreased moderately, though these remain the two most-billed conditions and together account for over 60% of all billing. For these three conditions, the rates of billing for on-site treatment were much higher than the respective rates of ACT, so it was more common for residents to be treated on-site for these three conditions than to be transferred to the hospital, although for skin infections, this discrepancy declined dramatically in 2019. On-site billing for CHF and dehydration declined and stayed about the same for COPD. Overall, on-site billing for these three conditions remained low, around the same levels as the respective rates of ACT.

Facilities billed far fewer skin infections in 2019 compared to 2018. Billing for pneumonia and UTIs decreased moderately, though these remain the two most-billed conditions.

[13] There is a partial exception to this in that claims for on-site treatment for COPD actually increased between 2018 and 2019 in the Clinical + Payment group.

Figure 2-6. Acute care events for the six qualifying conditions per 1,000 Initiative-eligible resident-days, FY 2014–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI programs MS NBC 08 & MS 109; RTI folders: sarnold\output\pah2_ms109_ar4 - 5.13.2020; csaur\output\pah2_ar4_nbc_1; csaur\output\pah2_ar3_nbc_2; csaur\output\pah2_ar2_nbc_1)

NOTE: Dehydration and fluid/electrolyte disorder are used interchangeably. CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection; ACT = acute care transition.

2.4.3 Facilities Cited Revised Criteria, Reduced Number of Eligible Residents, and Other Reasons for Billing Decline

Facility interviewees provided several explanations for reduced Initiative Year 3 billing.

- **Revised NFI 2 Criteria for the Six Qualifying Conditions**: As noted above, the changes to the six qualifying conditions were named most often by facility interviewees as an explanation for submitting fewer NFI 2 claims. In fall 2018, CMS announced revised criteria for the six NFI 2 conditions which became effective in January 2019. Facility interviewees across ECCPs noted that the revised criteria led to reduced Initiative billing. Changes, such as removing altered mental status from the UTI criteria as a qualifying symptom and adding fever to the skin infection criteria as a required symptom, resulted in fewer resident conditions meeting NFI 2 requirements. ***Figure 2-7*** shows the changes to the criteria for the six qualifying conditions and provides clinical expert input on how the changes are likely to affect the number of cases that could be billed. More details on these changes are available in ***Appendix H***.

> Revisions to clinical criteria for the 6 qualifying conditions, introduced by CMS in spring of 2019, affected billing patterns.

- **Decline in the number of NFI 2-eligible residents**: Growth in Medicare managed care plans across most ECCP states resulted in reductions in the populations of eligible residents, reducing billing opportunities. Additionally, some facilities have seen growth in hospice and

palliative care services, further eroding their NFI 2 eligible resident populations. The eligible population decreased in nearly all ECCPs across both Clinical + Payment and Payment-Only facilities. ***Figure 2-8*** displays eligible beneficiary counts by ECCP and intervention group across all Initiative years.

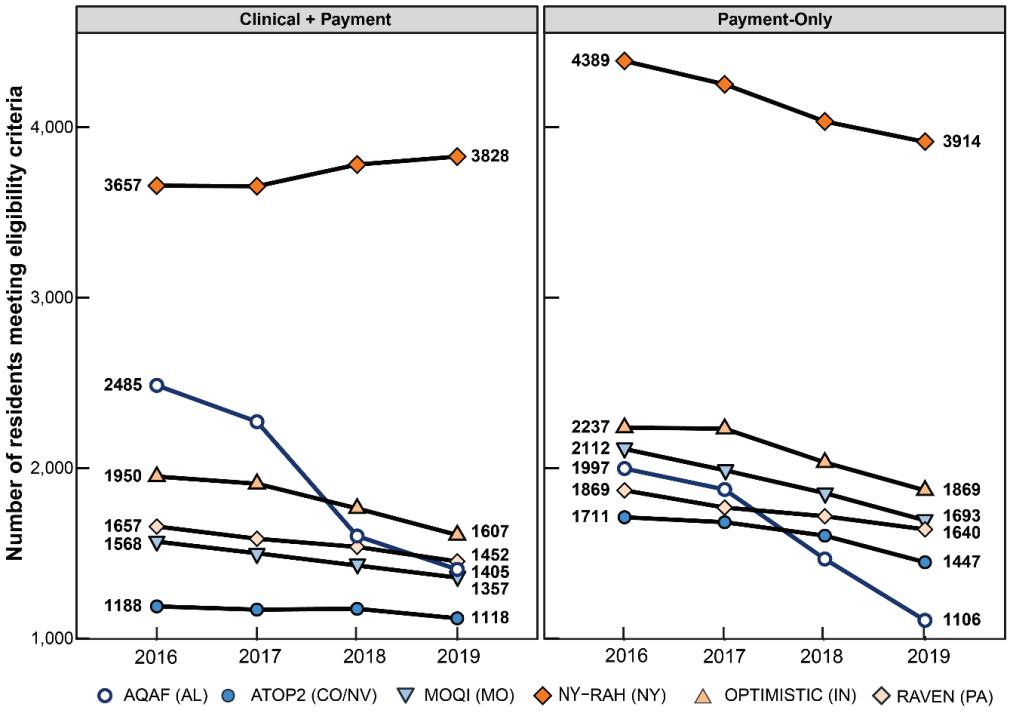
Figure 2-7. Changes to the criteria for the six qualifying conditions: Clinical expert review and actual billing impact

Condition		CHANGE in Condition Criteria	2019 Updated Criteria are MORE STRICT (+) or LESS STRICT (–) than original NFI 2?	Expect MORE BILLING (+) or LESS BILLING (–) as a result of 2019 changes?	Actual Change in Billing: Less Billing (↓), Much Less Billing (↓↓), Greatest Decrease in Billing (↓↓↓), or No Change (↔) from 2018 to 2019
	Acute care pneumonia—G9679	■ In sub-criteria, "Blood Oxygen saturation" level was revised to "Oxygen saturation" level			
	Congestive Heart Failure (CHF)—G9680	■ Chest x-ray criteria broadened to include edema and bilateral pleural effusions ■ BNP criteria adjusted ■ Weight gain added as a sub-criterion			
	Acute care chronic obstructive pulmonary disease (COPD)/asthma—G9681	■ Cough added as sub-criterion, symptoms updated to new or worsening ■ In sub-criteria, "Blood Oxygen saturation" level was revised to "Oxygen saturation" level			
	Skin Infection—G9682	■ Infection site can be either new or worsening of an existing site ■ Fever and elevated white blood cell count added as sub-criteria			

Condition		CHANGE in Condition Criteria	2019 Updated Criteria are MORE STRICT (+) or LESS STRICT (–) than original NFI 2?	Expect MORE BILLING (+) or LESS BILLING (–) as a result of 2019 changes?	Actual Change in Billing: Less Billing (↓), Much Less Billing (↓↓), Greatest Decrease in Billing (↓↓↓), or No Change (↔) from 2018 to 2019
	Fluid or Electrolyte Disorder—G9683	■ Condition name was adjusted from Dehydration to Fluid/Electrolyte Disorder ■ No criteria changes			
	Urinary Tract Infection (UTI)—G9684	■ Altered mental status was removed from sub-criteria ■ Catheter-associated symptoms were added under sub-criteria ■ Addition of prostate exam in males			

NOTE: This table includes substantial contributions and clinical feedback provided by project consultants Dr. Mary D. Naylor, PhD, RN, FAAN and Dr. Debra Saliba, MD, MPH, AGSF. The actual change in billing is based on the rate of billing per 1,000 resident-days as displayed in ***Figure 2-6***.

Figure 2-8. Eligible beneficiaries by ECCP, FY 2016–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI program AF 600; RTI folder: sarnold\output\pah2_af600_ar4 - 5.07.2020\eccpdetail_05152020)

- **Improved facility staff skills**: With the focus on identifying changes in the six qualifying conditions and treating residents in facilities, many facility interviewees described improved clinical skills among their nursing staff. Well-trained nurses were positioned to catch changes in condition before they exacerbated by (1) identifying and communicating resident changes early, and (2) improving capacity to test and treat residents in-house. Better trained nurses support the Initiative goal of improving care quality, but quicker identification of resident conditions also results in fewer facility billing opportunities, as resident conditions never reach the severity level to meet NFI 2 clinical criteria. Interviewees in some ECCPs acknowledged this tension and noted that NFI 2 includes a perverse incentive, offering more financial opportunities to facilities with higher volumes of sick residents, rather than rewarding facilities for keeping residents healthy.
- **Model changes**: For AQAF and NY-RAH facilities, recent NFI 2 model changes contributed to reduced billing. Clinical + Payment facilities noted that these transitions created billing challenges due to both turnover of ECCP RNs and the QI Specialist hiring lag for NY-RAH. As ECCP-embedded staff are integral to helping facilities gather needed documentation to submit NFI 2 claims, facilities submit fewer NFI 2 claims when they experience ECCP nurse turnover, transition, or absence. Payment-Only facilities also reported delays in their interactions with ECCPs, as ECCPs focused on adjusting the Clinical + Payment models.
- **Staff turnover**: As in prior years, facility interviewees across ECCPs and facilities mentioned that ongoing staff turnover creates challenges implementing and maintaining Initiative

components. Particularly with frequent turnover of key leaders (e.g., NFA, DON), facility interviewees said they may experience repeated Initiative starts and stops, reducing the number of NFI 2 claims submitted and making facility-wide buy-in challenging to sustain.

- **Fear of claims recoupment**: For most facilities across ECCPs, interviewees expressed low concern over NFI 2 claims recoupment. However, in a few isolated cases, facility administrators said that concern for errors in NFI 2 documentation and the subsequent potential for recoupment resulted in fewer episodes billed for their facilities.
- **Antibiotic stewardship:** Through Initiative Year 3, interviewees continued sharing concerns that their participation in antibiotic stewardship (AS) programs reduced the number of eligible days they could bill per episode (from 7 to 5) under NFI 2. Under AS guidelines, antibiotics can be given only for 5 days. Therefore, some facilities reported the number of Initiative-eligible days they could bill reduced when they withdrew antibiotics earlier to meet AS guidelines; interviewees noted this was true especially for UTI. This conflict in guidelines may have created some confusion for facility staff, resulting in less NFI 2 documentation. With less documentation in place, some facilities opted not to submit these conditions for NFI 2 billing.

2.4.4 Higher CNA Staffing Ratios Are Associated With More Facility Billing

To help understand which factors may have influenced the billing practices of facilities, we examined the relationship between facility billing and facility-level characteristics using regression analysis. We found that a higher rate of CNA staffing, measured using Payroll Based Journal (PBJ) data, was associated with higher NFI 2 billing.[14] It is possible that more CNAs result in more one-on-one time for any given CNA with any given resident; this additional time may contribute to quicker identification of resident changes in condition, and thus more NFI 2 billing opportunities. Although we reported above that facility staff including CNAs were less engaged in NFI 2 compared to NFI 1, interviewees noted that CNAs do continue to play an important role in noticing changes in condition. This analysis is described in more detail in ***Appendix M***.

Additionally, our multivariate analysis showed that facilities with more diverse resident populations (≥ 30% non-White) submitted significantly fewer NFI 2 claims. These facilities also may have other characteristics that reduce their ability to bill under the Initiative, such as higher staff turnover or related challenges (***Appendix I***).

[14] Nursing staffing rates were calculated from the Payroll Based Journal (PBJ). Additionally, in our analysis of variation in staffing and ACT rates by day of the week, we found that higher RN and LPN staffing rates were associated with lower ACTs overall and for any given day of the week (see ***Appendix Y***)

2.5 Many Residents Treated On-site Would Not Have Been Hospitalized Even in the Absence of the Initiative

NFI2 provided facilities with the opportunity to bill for delivering on-site treatment. The intent was that residents who would otherwise be treated in the hospital for the six qualifying conditions would instead be treated in the facility (***Section 3*** highlights Initiative effects on hospital-related utilization). In addition to avoiding some hospitalizations, facilities billed Medicare for treating residents who, although the residents met the clinical criteria for the six conditions, would not actually have been treated in the hospital. Our analysis strongly suggests that this occurred to a substantial degree.[15]

> Although there were a substantial number of payments for on-site treatment, the majority of these payments were for residents who would not have been hospitalized.

Following NFI 2 implementation, the rate of hospitalization (inpatient admissions) was about the same as prior to the Initiative, although a higher percentage of residents were treated on-site than were treated in the hospital for the six conditions (***Figure 2-9***). The percentage of residents treated in the hospital changed relatively little over the course of the Initiative implementation. The same pattern can be seen in ***Figure 2-10***, which displays hospitalizations in terms of a rate per 1,000 Initiative-eligible resident-days. Although the proportion of residents hospitalized in Clinical + Payment and Payment-Only facilities was lower compared to the national comparison group, this was true before the Initiative implementation as well. These findings indicate that although there were a substantial number of payments for on-site treatment, most of these payments were for residents who would not have been hospitalized. If on-site treatment was substituting for hospitalizations, then pre-NFI 2 hospitalization rates (2014–2016) would be much higher. The pattern is consistently seen also with the more expansive ACT measure as shown with percentages of residents in ***Figure 2-11*** and as a rate measured per 1,000 resident-days in ***Figure 2-12***. Our conclusion based on these findings is that of those residents receiving on-site nursing facility treatment, most would have been treated on-site even absent the Initiative.

These findings based on rates of on-site treatment and hospitalization align with interview findings regarding pre-NFI 2 efforts to keep residents in participating nursing facilities for care. Throughout NFI 2, interviewees across ECCPs and facilities noted that the payment components of NFI 2 have not produced substantial facility culture change; rather, many participating facilities already prioritized on-site nursing facility care. The Initiative provided an additional financial award for on-site care practices already in place. Identifying residents with the six qualifying conditions and

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[15] This argument is also articulated in Segelman et al. (2020), which is based on our findings from 2017 and 2018.

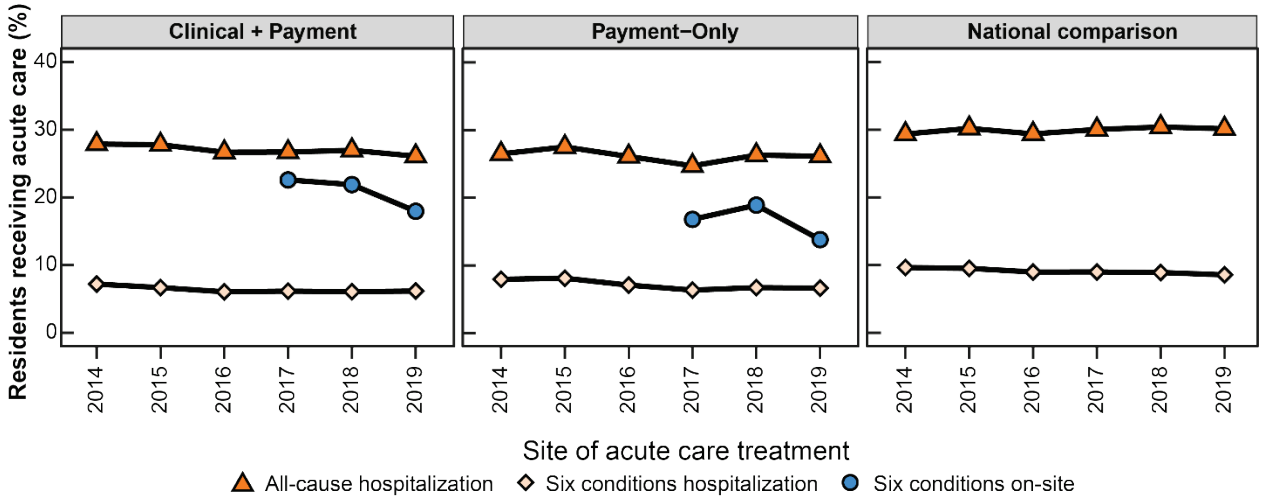
Segelman, M., Ingber, M., Feng, Z., Khatutsky, G., Bercaw, L., Gasdaska, A., Huber, B., & Voltmer, H. (2020). Treating in place: Acute care for long-stay residents in nursing facilities under a CMS initiative. Journal of the American Geriatrics Society. https://onlinelibrary.wiley.com/doi/10.1111/jgs.16901

treating them on-site when appropriate represents a good clinical practice. However, it is beyond the scope of this report to evaluate the appropriateness of providing reimbursement for care practices that were already in place.

As this mindset of facility-based care was already well established in many facilities, interviewees noted that efforts to reduce avoidable hospitalization benefited residents facility-wide, not just Initiative-eligible residents. It also is important to point out that besides reimbursing facilities for care practices that were already in place, payments from the Initiative may have impacted care in other ways which may or may not have resulted in avoided hospitalizations. For example, there is evidence from interviews that ECCP education efforts have increased facility staff confidence and competence, resulting in their ability to provide more acute care, including greater use of intravenous antibiotics.

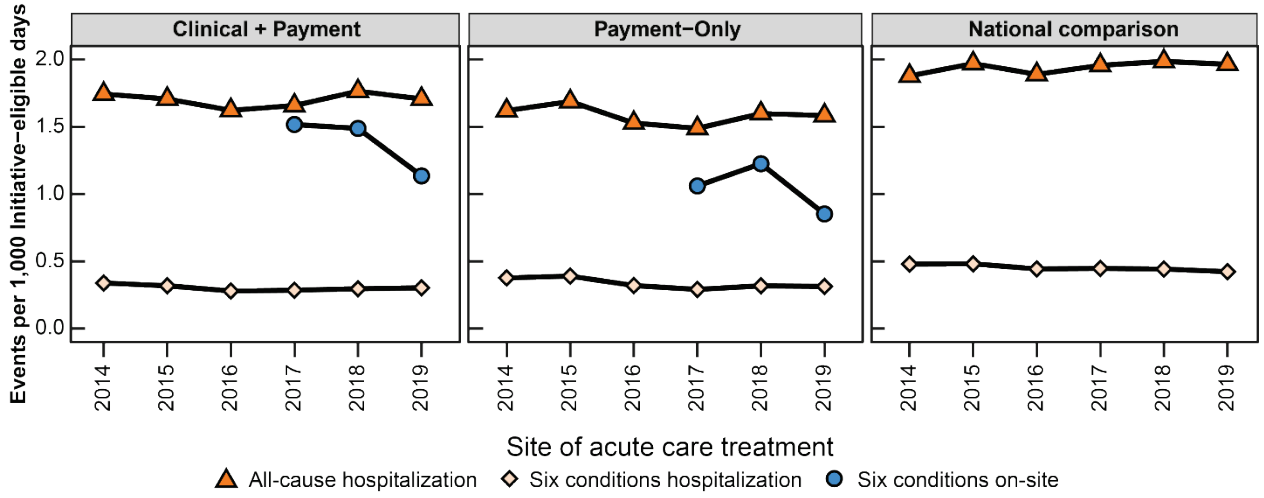
As described in detail in ***Appendix M***, we performed a correlation analysis to examine the relationship between facility-level billing for on-site treatment and facility-level rates of ACTs. If a large amount of on-site treatment substitution for hospital treatment was occurring, we would expect to see a strong inverse correlation. Again, our analysis did not indicate a large amount of substitution.

Figure 2-9. Percentage of Initiative-eligible residents treated on-site and in hospital (inpatient admissions), FY 2014–FY 2019



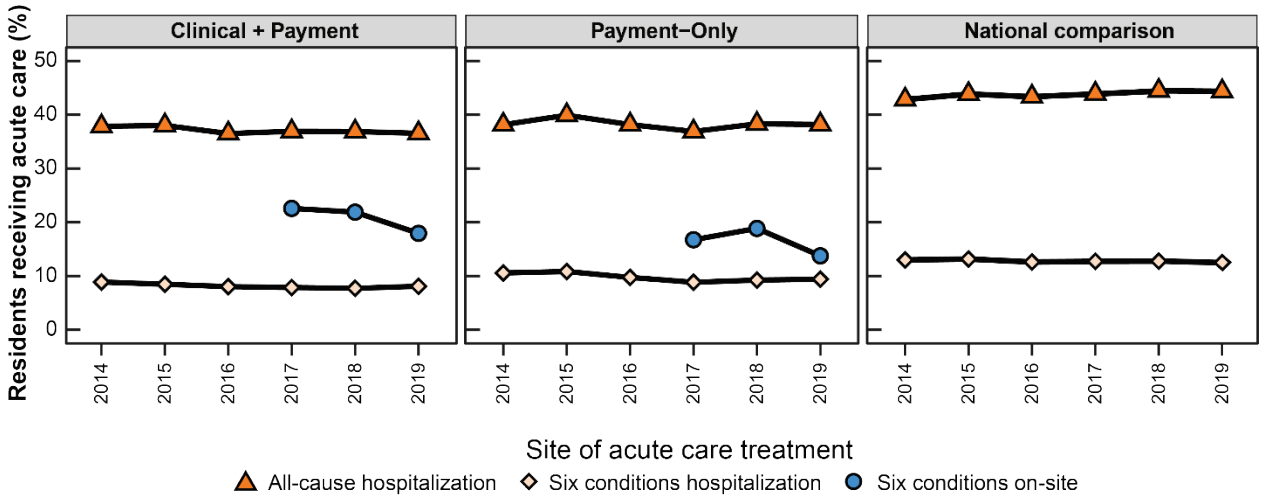
SOURCE: RTI analysis of Medicare claims data (RTI programs AF 800 & MS 109; RTI folders: csaur\output\pah2_ar3_af800_2c; csaur/output/pah2_ar4_af800_2; sarnold\output\pah2_ms109_ar4 - 5.13.2020)

Figure 2-10. Acute care events per 1,000 Initiative-eligible resident-days (inpatient admissions), FY 2014–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI programs MS NBC 08 & MS 109; RTI folders: csaur\output\pah2_ar2_nbc_2; csaur\output\pah2_ar3_nbc_4; casur\output\pah2_ar4_nbc_2; sarnold\output\pah2_ms109_ar4 - 5.13.2020)

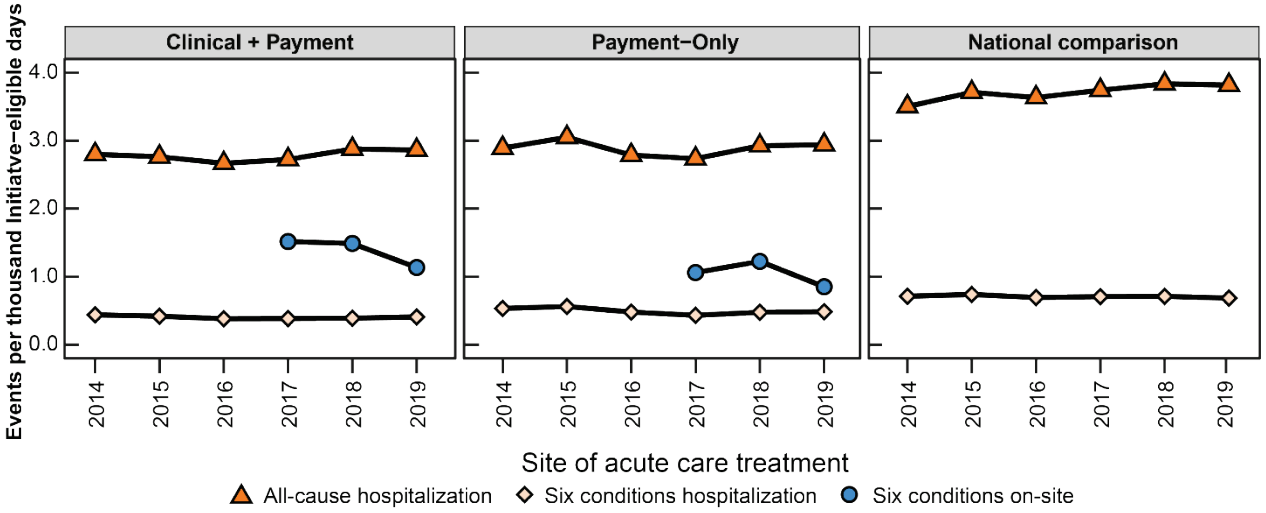
Figure 2-11. Percentage of Initiative-eligible residents treated on-site and in hospital (acute care transitions), FY 2014–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI programs AF 800 & MS 109; RTI folders: csaur\output\pah2_ar3_af800_2c; csaur/output/pah2_ar4_af800_2; sarnold\output\pah2_ms109_ar4 - 5.13.2020)

NOTE: ACT = Acute Care Transition

Figure 2-12. Acute care events per 1,000 Initiative-eligible resident-days (acute care transitions), FY 2014–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI programs MS NBC 08 & MS 109; RTI folders: csaur\output\pah2_ar2_nbc_2; csaur\output\pah2_ar3_nbc_4; casur\output\pah2_ar4_nbc_2; sarnold\output\pah2_ms109_ar4 - 5.13.2020)

NOTE: ACT = Acute Care Transition

2.5.1 Characteristics of Patients Treated On-Site and Those Treated in the Hospital

There are important clinical differences between residents treated on-site and those hospitalized for the six conditions.

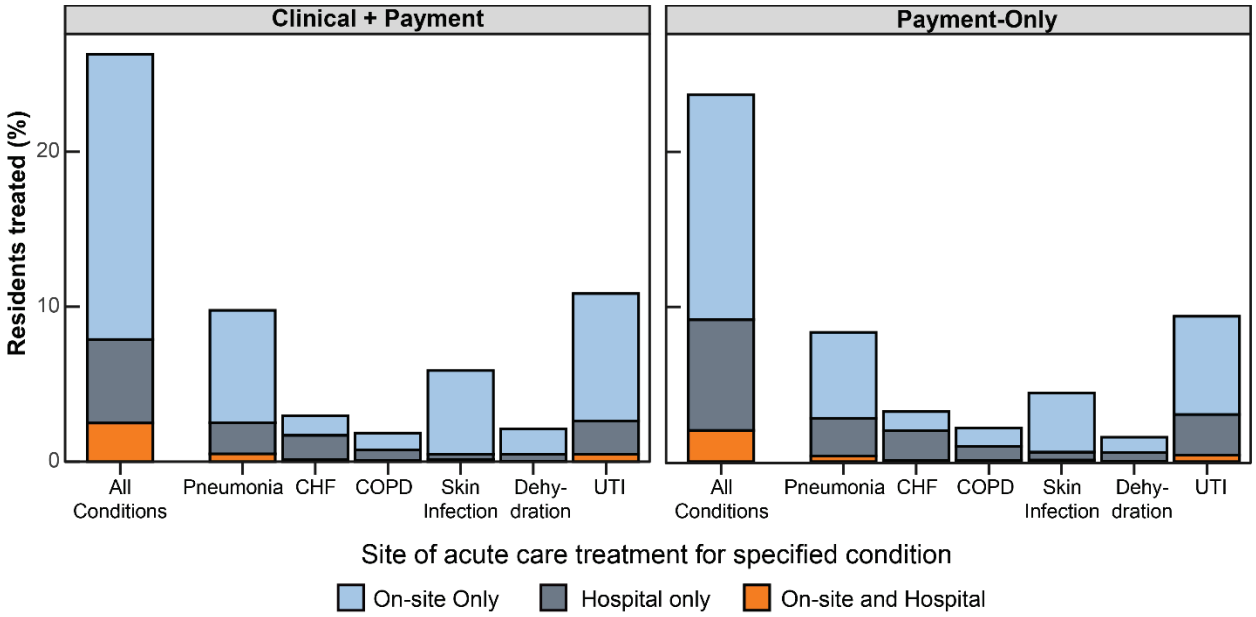
Consistent with the conclusion that most residents who were treated on-site would have remained on-site (and not hospitalized) absent the Initiative, we found important clinical differences between those treated on-site and those hospitalized for the six conditions. These differences suggest that higher-acuity cases were more likely to result in hospitalization, whereas residents with less serious conditions were treated in nursing facilities. To make these comparisons, we categorized residents into four groups **based on their treatment status for any of the six qualifying conditions**:

- *No acute care*: No on-site or in-hospital treatment for any of the six qualifying conditions (may include residents who had one of the conditions, but were not treated on-site with an NFI 2 episode or in the hospital)
- *On-site treatment only*: On-site treatment for one or more of the six qualifying conditions, but no in-hospital treatment for any of the six qualifying conditions
- *Hospital treatment only*: In-hospital treatment for one or more of the six qualifying conditions, but no on-site treatment for any of the six qualifying conditions

- *On-site and hospital treatment*: Both on-site and in-hospital treatment for one or more of the six qualifying conditions.

Across NFI 2 project years, roughly a quarter of eligible residents received treatment for one of the six qualifying conditions. ***Figure 2-13*** shows the percentage of Initiative-eligible residents with acute care episodes, either on-site, as an ACT, or both. Consistent with data in ***Figure 2-6***, it was much more common for residents to be treated on-site than in the hospital for pneumonia, skin infection, and UTI. It was equally common for residents to be treated on-site as in the hospital for CHF, COPD, and dehydration.

Figure 2-13. Percentage of Initiative-eligible residents treated on-site and in hospital for the six qualifying conditions, FY 2017–FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI programs AF 800 & NBC HV03; RTI folders: csaur\output\pah2_ar4_af800_2; mkluckman\output\ar4\HV03)

NOTE: Dehydration and fluid/electrolyte disorder are used interchangeably. CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection

Table 2-3 contrasts demographic characteristics and patient comorbidities[16] among these same four resident treatment categories. In Clinical + Payment facilities, residents treated solely on-site for one of the six conditions had an average Hierarchical Condition Category (HCC) count of 4.9, similar to those not treated for the six conditions (4.63) and much lower than residents treated only in the hospital (6.9) or treated both on-site and in the hospital (6.93). Payment-Only facility HCC scores followed a similar pattern. Notably, residents who were not hospitalized for the six conditions had higher levels of cognitive impairment than those treated in the hospital, as demonstrated both by

[16] The characteristics and comorbidities described in this section and ***Table 2-4*** are explained further in ***Appendix L***

the prevalence of dementia as well as cognitive function scale (CFS) scores. In Clinical + Payment facilities, residents receiving only on-site care had similar incidence of dementia (54.32%) as residents not treated for the six conditions (52.98%). However, the residents receiving hospital-only treatment had lower incidence of dementia (44.12%), as did residents receiving both on-site nursing facility and hospital care (40.75%). Again, Payment-Only facility findings exhibit a similar pattern. CFS scores for those not treated in the hospital for the six conditions were about 1.2, compared to about 1.0 for those who were treated in the hospital. Our findings are consistent with results from a recent study that showed fewer hospitalizations among NF residents with dementia.[17]

[17] Temkin-Greener, H., Cen, X., Hasselberg, M. J., & Li, Y. (2019). Preventable hospitalizations among nursing home residents with dementia and behavioral health disorders. JAMDA, 20(10):1280-1286.e1. doi:10.1016/j.jamda.2019.03.006

Table 2-3. Characteristics of residents by status of acute care received, FY 2017–FY 2019

(six qualifying conditions, all conditions combined)

Measure	No acute care for six qualifying conditions	On-site treatment only	Hospital treatment only	On-site and hospital treatment
Clinical + Payment				
Total N	23,782	5,937	1,743	805
Average age (years)	78.75	80.50	77.54	77.90
Percentage male	35.78	28.99	39.53	31.55
Percentage died	21.29	23.70	34.71	31.68
Percentage with dementia	52.98	54.32	44.12	40.75
Average Hierarchical Condition Categories (HCC) count	4.63	4.90	6.90	6.93
Percentage with end-stage renal disease (ESRD) dialysis status	4.16	2.09	8.78	4.60
Average body mass index (BMI) level	26.60	27.74	28.2	29.51
Average Cognitive Function Scale (CFS)	1.19	1.19	0.99	0.96
Average Activities of Daily Living (ADL) score (score range of 0–28)	17.42	17.56	17.6	17.23
Percentage with any acute care transition	30.12	36.4	100.00	100.00
Average total Medicare expenditures per resident-year ($)	18,062.60	25,340.24	49,658.18	58,746.27
Payment-Only				
Total N	27,603	5,248	2,581	732
Average age (years)	80.72	82.8	79.2	81.06
Percentage male	32.16	27.23	34.87	31.28
Percentage died	22.03	23.48	36.27	33.20
Percentage with dementia	55.48	56.69	44.29	43.31
Average HCC count	4.18	4.53	6.26	6.12
Percentage with ESRD dialysis status	2.79	1.71	7.32	2.73
Average BMI level	27.09	27.78	28.95	29.60
Average CFS	1.23	1.24	0.98	0.99
Average ADL score (score range of 0–28)	16.66	17.52	16.42	16.72
Percentage with any acute care transition	30.81	35.02	100.00	100.00
Average total Medicare expenditures per resident-year ($)	15,717.67	23,089.46	43,529.01	47,848.68

SOURCE: RTI analysis of Medicare claims data (RTI program AF800 and HV 01; RTI folder: mkluckman\output\ar4\HV01\pah2_ar4_ss_nbc_hv01_tables_060820)

NOTE: Unlike Medicare expenditures reported elsewhere in this report, the total Medicare expenditures in this table are not annualized. More details on some of the measures in this table are provided in ***Appendix L***.

2.6 ECCP Leaders Perceive the Initiative as Being Effective, Though Facility Perceptions Are Mixed

When asked about the effectiveness of NFI 2, all ECCP leadership interviewees described the Initiative as being a critical step toward reducing avoidable hospitalizations among nursing facility residents. ECCPs credited NFI 2 with helping to sharpen facility nurses' clinical skills, improving facility staff and practitioner communication, and increasing awareness of the benefits of on-site nursing facility care. Although ECCP interviewees acknowledged that the quantitative results vary, they believe that NFI 2 is shifting the facility mindset away from transferring residents for all changes in condition.

In contrast to ECCP (CFIR mid-setting) perceptions, facility interviewees (inner setting) presented more varied responses. Although most interviewees believed their facilities had sent fewer residents to hospitals since the Initiative began, many Clinical + Payment facilities indicated that they had already made substantial improvements in hospitalization rates during NFI 1. These interviewees noted that NFI 2 implementation had not yielded additional reductions. Similarly, many Payment-Only facilities noted that many aspects of the Initiative were similar to facility practices already in place. As one AQAF Payment-Only facility administrator shared,

"We were doing [NFI 2 components] already for the most part, but we do catch things earlier now."

Other facilities echoed this sentiment, adding that the main difference with NFI 2 is the opportunity to generate revenue for efforts to reduce hospitalizations.

2.7 The Initiative Landscape Continues to Evolve with Notable Growth in Medicare Managed Care Plans in Most ECCP States.

Across ECCPs, many facility interviewees reported continued or increased Medicare managed care plan penetration through Initiative Year 3. Payment-Only facility interviewees were somewhat more likely to note Medicare managed care growth; as one ATOP2 Payment-Only facility Business Office Manager shared,

"This year probably more so than any other year I've seen [specific plan name] managed care residents."

When interviewees were asked how the growth in Medicare managed care affected their facilities, responses varied across facilities and ECCPs. Some interviewees spoke positively about these managed care plans, noting that Medicare managed care brings certain benefits to facilities, such as additional practitioner presence. Others, including AQAF facilities with Simpra Medicare managed

care residents, noted that managed care and NFI 2 have similar structures, requirements, and financial benefits; interviewees shared that these similarities sometimes confuse facility nursing staff as to which residents are eligible for which types of coverage and billing. Some Medicare managed care plans provided lower reimbursement rates to facilities overall compared to traditional, fee-for-service (FFS) Medicare. One RAVEN facility billing manager offered,

"We would prefer to have traditional Medicare instead of [Medicare] managed care. Skilled days are shrinking with managed care, and that's the biggest part of our revenue."

A few interviewees across ECCPs also said that some Medicare managed care plans lack coverage for needed specialty services (e.g., certain therapies, vision coverage). Although opinions of Medicare managed care varied, many facility interviewees described Medicare managed care growth as expected, given what they perceive as a national movement away from FFS pay structures and toward more coordinated care models. For more information about national trends in the case-mix of FFS and managed care long-stay residents, see ***Appendix T***.

2.8 ECCPs Described Limited Interactions With CMS Through NFI 2

Through Initiative Year 3, most ECCPs reported minimal interaction with CMS. Early in the Initiative, ECCPs met with CMS and the implementation contractor through regular work group conference calls and web exchanges. As the project has continued, most ECCP interviewees agreed these meetings were helpful in the early stages of NFI 2 but seemed unnecessary as the Initiative continued. One notable exception is the annual in-person all-ECCP meeting, which all ECCP leaders said they appreciated as an opportunity to reconnect with other ECCPs.

2.9 State Policies and Hospital Relationships Have Had Minimal Effects on NFI 2 in Initiative Year 3

Apart from the general trends toward more managed care efforts, most ECCP interviewees reported relatively few changes to state policies in Initiative Year 3, indicating minimal effects of this component of the CFIR outer setting on the mid and inner settings in Initiative Year 3. As in prior years, most ECCP states have regional health coalitions that continue efforts to improve care quality across health care settings, and some of these efforts include priorities to reduce hospitalizations and hospital readmissions (***Appendix J***). Legislators in Indiana (OPTIMISTIC), Missouri (MOQI), and New York (NY-RAH) have worked to expand nurse practitioner scope of practice, which could encourage even more APRN opportunities in these states. Indiana passed legislation allowing APRNs to sign Physician Orders for Scope of Treatment (POST) forms to document resident end of life wishes, which may increase the incidence of POST forms among nursing facility residents statewide.

Missouri legislators have proposed measures for APRNs to practice independently, though that legislation has not yet been passed.

Likewise, facility interviewees noted that evolving care and payment structures also have had nominal effects on hospital relationships. About half of participating NFI 2 facilities across ECCPs mentioned strong relationships with local hospitals, including many facilities that are part of hospital Affordable Care Organizations (ACOs), though many of these relationships were said to be strong prior to NFI 2. Other facilities noted that participation in NFI 2 improved their relationships with local hospitals because the hospitals perceive these facilities as being partners in reducing readmissions.

2.10 Across ECCPs, Early Sustainability Plans Focus on Spreading Initiative Components to Other Facilities

All ECCP leaders shared that they plan to introduce Initiative components to other facilities through statewide conferences, business spin-off expansions, or other types of dissemination. These interviewees named improved communication and focusing on early identification of resident condition changes as key Initiative components that might be shared more broadly. Preliminary sustainability plans help describe the overall NFI 2 implementation process, in accordance with the CFIR model. For example, facility residents may be more likely to receive prompt attention for condition changes when facility staff and practitioners are aware of the benefits of avoiding unnecessary transfers. Likewise, better communication between nursing facilities (inner setting) and hospitals (outer setting) may lead to transfer policy changes. These cross-level interactions between facility staff, facility leadership, ECCPs, and other healthcare entities highlight the subtle ways in which the Initiative may improve overall care quality, even in the absence of reduced Medicare expenditures.

> Interactions among facility staff and leaders, ECCPs, and other health care providers may result in better overall resident care quality, regardless of whether NFI 2 Medicare savings were achieved.

3. What Was the Impact of NFI 2 on Key Resident Outcomes?

After accounting for Initiative and comparison group differences and trends prior to NFI 2:

- ***Medicare Utilization and expenditures**: There was evidence for unfavorable increases in hospital-related utilization and expenditures, especially for residents in the Clinical + Payment facilities, including an increase in the probability of potentially avoidable hospitalizations (up 15.3%).*
- ***MDS-Based quality measures:** The Initiative did not result in a consistent pattern of change in Clinical + Payment facility performance on MDS-based quality measures. In Payment-Only facilities, the Initiative was associated with a higher-than-expected rate of undesirable events in the majority of the measures.*
- ***Mortality:** The Initiative had no statistically significant effect on resident mortality in the six ECCPs combined.*
- ***Medicaid Expenditures:** The impact on Medicaid was unclear. Using a simulation-based approach, we estimated small changes in Medicaid nursing facility expenditures due to the Initiative. The direction depended on the simulation method: Medicaid nursing facility expenditures increased when using facility Initiative billing data to simulate effects on Medicaid claims for FY 2019; Medicaid nursing facility expenditures decreased when using regression model results, which showed higher Medicare hospital utilization.*

This section focuses on our key resident outcomes: Medicare utilization and expenditures, MDS-based quality measures, mortality, and Medicaid expenditures. When discussing Medicare utilization and expenditures, MDS-based quality measures, and mortality, we first provide the

overall context for our multivariate results by describing methodology and unadjusted trends for each outcome over FY 2014 through FY 2019. Our findings include analysis of pooled models that allow us to observe the overall impact of the Initiative on each outcome, separately for the Clinical + Payment intervention group and the Payment-Only intervention group, and for each ECCP separately to highlight variation in the Initiative effects across ECCPs. Throughout, we provide additional context from primary data collection findings to help interpret specific results (see ***Appendices B–G*** for detailed site visit findings). This chapter is organized as follows:

> Although results are discussed as favorable or unfavorable relative to the overall NFI 2 goals, for individual residents, hospitalizations may be necessary and clinically appropriate.

- ***Section 3.1*** looks at the impact of NFI 2 on hospital-related utilization and expenditures
- ***Section 3.2*** looks at the impact of NFI 2 on MDS-based quality measures
- ***Section 3.3*** looks at the impact of NFI 2 on mortality
- ***Section 3.4*** looks at the Initiative impact on Medicaid expenditures via simulation analysis.

3.1 NFI 2 Was Not Associated with Reductions in Hospital-Related Utilization and Expenditures

3.1.1 Overview and Methods

This subsection provides an overview of our CMS-approved NFI 2 evaluation methodology, followed by our findings. We used a DD multivariate regression approach to address these key research questions:

- What is the Initiative payment incentive effect on Medicare utilization and expenditures, particularly for hospital-related services, for the Clinical + Payment group and the Payment-Only group?
- How does the Initiative effect on Medicare utilization and expenditures vary by ECCP and type of intervention?

> When describing the Initiative effects from DD multivariate regressions, "reductions" or "increases" are always relative to changes in the national comparison group, after accounting for baseline trends.

Our evaluation is based on all Initiative-eligible residents in the Clinical + Payment and Payment-Only facilities, regardless of whether the residents were actually treated for the six conditions, unless otherwise noted. For the DD multivariate regression approach, we used a national group of nursing facility residents from non-Initiative states in each year (FY 2014–FY 2019) to be used as a uniform comparison group for all ECCPs. The comparison group included all

nursing facility residents in states that have not been involved with either NFI 1 or NFI 2, subject to both facility- and resident-level exclusion criteria.

The facility-level exclusions were based on criteria established by CMS for participation in the Initiative, plus other criteria designed to exclude facilities with unusual populations. The resident-level criteria ensured that comparison group residents would meet the same eligibility criteria as Initiative participants, such as being long-stay and enrolled in FFS Medicare. We also used propensity score methods to exclude outliers, residents from the national comparison group whose characteristics were very different from those of Initiative-participating residents.

In addition to the national comparison group, we created a within-state reference group (WSRG) to capture possible state-level policy or other changes for a sensitivity analysis. In ***Appendix W,*** we present the set of impact estimates relative to the WSRG. We present a more detailed description of our comparison group construction, including the use of resident-level propensity scores to trim outlier residents from the national comparison group, in ***Appendix L***.

The three years prior to the Initiative (FY 2014–FY 2016) served as the baseline period for the NFI 2 evaluation. Because we observed differing trends in the data during this baseline period, we incorporated different trends in our models. As explained further in ***Appendix L***, we assumed and estimated linear trends that continued from FY 2014 until FY 2017 and then flattened. We also present sensitivity analysis results assuming parallel trends with the average of FY 2014–FY 2016 as the baseline, and another sensitivity analysis using FY 2016 as the baseline year in ***Appendix W***.

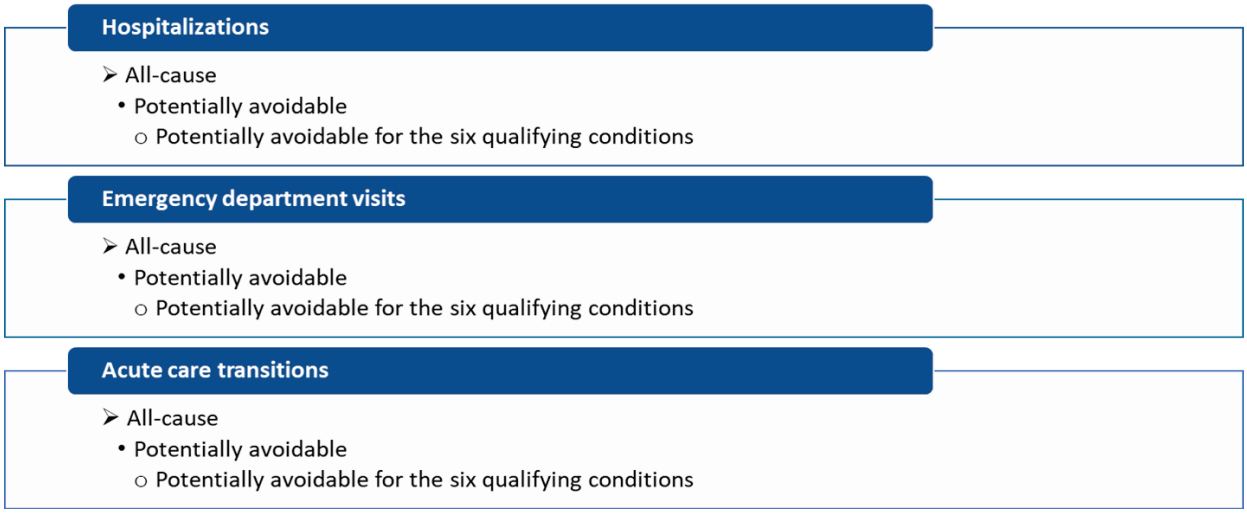
As described in ***Section 1***, the Clinical + Payment facilities employ a two-part intervention in which the clinical component began in 2012 as part of NFI 1, and the payment component began in 2016 as part of NFI 2. The Payment-Only facilities represent a new intervention that began in 2016.

In our evaluation, we focus on the impact of introducing payment in two interventions: (1) adding payment to an existing clinical intervention (Clinical + Payment), and (2) introducing payment to a new group of participant facilities (Payment-Only). Given differences in Initiative design and in the analytical approaches used for the NFI 1 and NFI 2 evaluations, we are not able to directly compare the effect of the clinical intervention alone (from NFI 1) to the effect of the payment intervention in NFI 2 in this report. We also cannot directly estimate the total effect of the compound intervention in Clinical + Payment facilities. Therefore, we cannot compare the combined effect of the clinical and the payment components to the payment component alone at this time. The final evaluation report will include these types of analyses.

The Initiative design and evaluation focus on the impact of introducing payment in two intervention groups: one with an ongoing existing clinical intervention (Clinical + Payment), and a new group without any clinical intervention (Payment-Only).

In this report, we evaluate Initiative impact on 9 types of resident-level hospital-related utilization events and 10 expenditure measures (the expenditures associated with each of the utilization events plus total Medicare expenditures) (***Figure 3-1***). For each utilization event, we considered both the probability of at least one event occurring and the count of all events,[18] for a total of 28 measures (9 probability, 9 count, and 10 expenditure). All these measures are based on Medicare claims data from each resident's Initiative-eligible period in each year. The expenditure measures were adjusted to reflect a full year, measured in dollars per resident-year. Total Medicare expenditures included a wide range of Medicare covered services (e.g., inpatient, skilled nursing care, Part D drugs, durable medical equipment, outpatient services).

Figure 3-1. Nine types of utilization events evaluated



To predict these outcomes, we performed multivariate analyses that controlled for relevant resident-level data such as resident demographic characteristics, health and functional status, and participation in other CMS initiatives or demonstrations and facility characteristics such as for-profit status and whether the facility was hospital based. For our FY 2019 analyses, we controlled for five factors not previously controlled for: facility-level MA penetration, HCC count per resident, yearly state-level percentages of deaths related to flu or pneumonia, participation in the Vermont All-Payer ACO Model, and participation in the Maryland Total Cost of Care Model. For more information on the covariates included in our models see ***Appendix L*** and for descriptive statistics on the final set of model covariates see ***Appendix N***.

As explained in ***Section 2****, acute care transitions* describe any transition from the nursing facility to the hospital, combining observation stays with hospitalizations and emergency department (ED)

[18] The probability and count outcomes are expected to yield similar results. The difference between the two is that counts account for residents with repeated utilization events.

visits. The data sources and precise definitions of each of these nine events are presented in ***Appendix L***.

Below, we present estimates of the Initiative effect on hospital-related utilization and expenditures, and on total Medicare expenditures, for each resident's Initiative-eligible period during FY 2019 (Initiative Year 3).

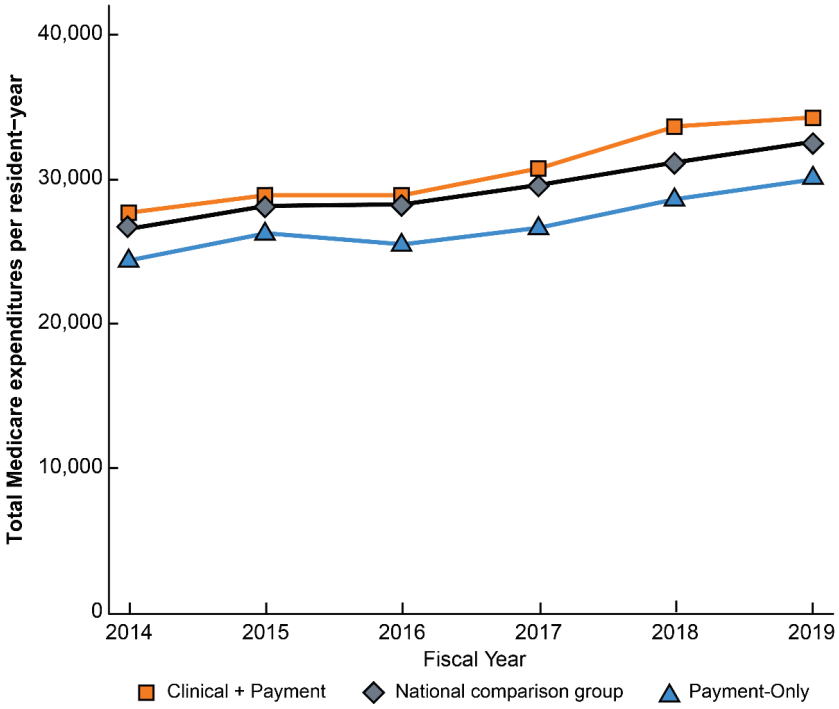
Additional in-depth results can be found in several appendices:

- ***Appendix N*** presents descriptive statistics for the covariates used in the multivariate models.
- ***Appendices O through Q*** present descriptive results for the utilization and expenditure measures.
- ***Appendix W*** provides results from sensitivity analyses including:
  - Using a WSRG to capture the influence of possible state-level policy changes
  - Using only one baseline year (2016) and assuming parallel trends.
  - Using the average of all three baseline years (2014–2016) and assuming parallel trends.
- ***Appendix X*** provides an example of complete multivariate regression results for one of the models.

3.1.2 Trends in Unadjusted Hospital-Related Utilization and Expenditures from FY 2014 to FY 2019

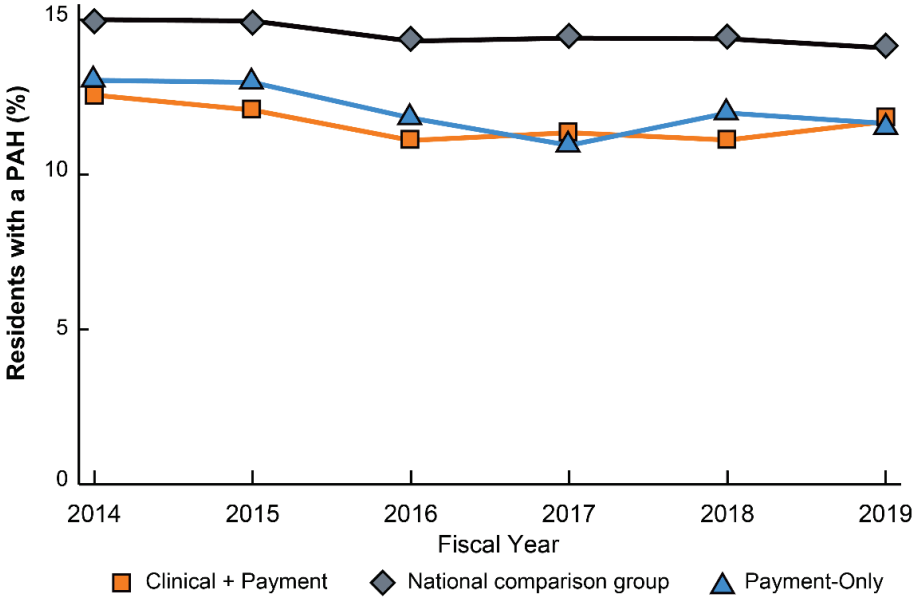
To provide context for the multivariate DD results below, we summarized trends in unadjusted utilization and expenditure measures. On most measures, residents in both Initiative groups had lower utilization (percentage of residents with a given outcome and rates per 1,000 resident-days) than residents in the national comparison group, and the Clinical + Payment and Payment-Only groups were similar to each other. This was true across FY 2014 through FY 2019. In general, utilization in 2019 when compared to 2016 (the final baseline year) was not substantially different and the hoped for decreases in utilization in the Initiative groups compared to the national comparison group were not apparent. Expenditures were typically highest for residents in the Clinical + Payment group, lower in the national comparison group, and lowest in the Payment-Only group, and noticeably increase over time in all the groups. These results are presented fully in ***Appendices O through Q***. ***Figure 3-2*** illustrates the trend of total Medicare expenditures and ***Figure 3-3*** illustrates the trend for the percentage of residents with a potentially avoidable hospitalization.

Figure 3-2. All ECCPs: Total Medicare expenditures per resident-year, 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 3-3. All ECCPs: Percentage of residents with a potentially avoidable hospitalization, 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: PAH = potentially avoidable hospitalization.

3.1.3 Overall Impact When Combining All ECCPs: Increase in Most Utilization and Expenditure Measures

- *Relative to the national comparison group, for eligible residents, neither the Clinical + Payment nor Payment-Only intervention resulted in favorable reductions in Medicare utilization and expenditures (beyond what was achieved in NFI 1 for the Clinical + Payment group).*
- *For eligible residents, there were a number of statistically significant increases in utilization and expenditures in Clinical + Payment facilities, and a pattern of increases in Payment-Only facilities, most of which were not statistically significant.*
- *Sensitivity analyses yielded weaker unfavorable patterns and confirmed absence of consistent favorable outcomes associated with the Initiative.*
- *Compared to our estimates of the impact of the Initiative on utilization and expenditures for FY 2017 and FY 2018, our estimates for FY 2019 were less favorable.*

Our DD results showed that, relative to the national comparison group, utilization of hospital-related services (hospitalizations, ED visits, and ACTs) increased for eligible residents in the Clinical + Payment group, and many of those unfavorable increases were statistically significant (see ***Tables 3-1 to 3-3***). We found a consistent pattern of statistically significant increases in the probability and count of potentially avoidable events associated with hospitalizations, ED visits, and ACTs. As an illustration, for eligible residents in the Clinical + Payment group, the probability of experiencing a potentially avoidable hospitalization in FY 2019 increased by 1.6 percentage points from a predicted probability of 10.3 percent absent the Initiative. This corresponded to a 15.3 percent relative increase in their predicted probability, as shown in ***Table 3-1***. Similarly, there was a 19.0 percent relative increase in a resident's count of potentially avoidable hospitalizations, as shown in ***Table 3-2***. Other utilization measures (probability) associated with statistically significant increases include potentially avoidable hospitalizations for the six qualifying conditions (up 18.0 percent), all-cause ED visits (up 15.2 percent), potentially avoidable ED visits (up 16.9 percent), and potentially avoidable ACTs for the six qualifying conditions (up 10.7 percent).

For residents in Clinical + Payment facilities, the increases in many hospital-related Medicare expenditure measures, including potentially avoidable hospitalization expenditures, were statistically significant**.** For example, the predicted expenditures for potentially avoidable hospitalizations were $2,325 per resident-year absent the Initiative. The intervention was associated with an increase of $567, a relative effect of 24.4 percent.

During Initiative Year 3 site visits and telephone interviews with facility staff, interviewees provided either positive or neutral feedback regarding Initiative effects on use of hospital-related services. None of the interviewees suggested that the ECCP efforts or Initiative components might actually have an unfavorable impact on hospital utilization. These interview findings, which

suggest improvements due to NFI 2, appear to run counter to the Medicare claims analysis results, although the Medicare claims analysis is based on DD analysis and is relative to a comparison group. It is possible that facilities may not have made substantial changes to their existing care practices as a direct effect of NFI 2. Rather, Clinical + Payment facilities may have changed their facility culture through NFI 1, such that veteran facility staff may have remembered those gains and confused them with progress made during NFI 2. Consequently, NFI 2 may be yielding fewer positive effects, instead offering only a financial incentive for care improvements that were established previously.

For eligible residents in the Payment-Only group, we did not see evidence for favorable decreases in utilization, and there was weak evidence of increased utilization of hospital-related services (see ***Tables 3-1 to 3-3***). There were increases that were not statistically significant for almost all measures and there was a statistically significant increase in the probability and count of a potentially avoidable hospitalization in FY 2019. Eligible residents in the Payment-Only group experienced an increase of 0.015 events per year from a predicted count of 0.13 events, which was an 11.2 percent relative increase. Analyzing Medicare expenditures, we found increases that were not statistically significant across all measures.

Payment-Only interviewees shared mostly neutral feedback regarding the Initiative. Many appreciated the overall Initiative goal of keeping residents on-site for care, but most did not feel the financial incentives supported facility culture change. Rather, the Initiative provided some opportunities for monetary reward to support care practices that existed prior to NFI 2. None of the interviewees suggested an unfavorable impact on hospital utilization.

In the within-state (WSRG) sensitivity analysis, described above, effect patterns were slightly less unfavorable for both the Clinical + Payment and Payment-Only groups. In the sensitivity analysis using 2016 as the baseline year for comparison, effect patterns were slightly less unfavorable for the Clinical + Payment group and very similar to the patterns in the main analysis for the Payment-Only group. In the third sensitivity analysis, which used the average of FY 2014–FY 2016 as the baseline, the effect patterns were much less unfavorable in both groups. However, there was no consistent indicator of a favorable effect of the Initiative in any of the sensitivity analyses. We return to the interpretation of these sensitivity analyses in ***Section 4*** and provide full results in ***Appendix W***.

Our DD results indicate that the Initiative was not associated with reductions in utilization of hospital-related services.

These findings dovetail with our conclusion in ***Section 2*** that of those residents receiving on-site nursing facility treatment, most would have been treated on-site even absent the Initiative. While in ***Section 2*** we concluded, based on observing rates of on-site and in-hospital treatment over time, that most of the on-site treatment was not substituting for in-hospital treatment, we could not determine if there was a reduction in hospital-related utilization.

In contrast, the results we present now allow us to make this additional statement that the Initiative was not associated with reductions in utilization of hospital-related services.

Compared to the findings for utilization and expenditures included in our earlier annual reports based on FY 2017[19] and FY 2018,[20] the results presented in this report for FY 2019 are less favorable. For the Clinical + Payment group, we did not find a pattern of favorable reductions in prior years, but in FY 2019 we saw a stronger pattern of unfavorable increases. For the Payment-Only group, we observed some statistically significant favorable reductions in utilization and expenditures in FY 2017. By FY 2018, this favorable pattern disappeared. In FY 2019, we observed a weak pattern of unfavorable increases.

[19] RTI International. (2019, March). Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents—Payment Reform. Baltimore, MD: Centers for Medicare & Medicaid Services. https://downloads.cms.gov/files/cmmi/rahnfr-phasetwo-secondannrpt.pdf

[20] RTI International. (2019, December). Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents—Payment Reform. Baltimore, MD: Centers for Medicare & Medicaid Services. https://downloads.cms.gov/files/rahnfr-phasetwo-thirdannrpt.pdf

Table 3-1. All ECCPs: Initiative effect on hospital-related utilization, FY 2019
(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	26.0	−0.4	−1.9	1.2	0.697	−1.4
Potentially avoidable	**10.3**	**1.6**	**0.3**	**2.9**	**0.044**	**15.3**
Six qualifying conditions	**5.2**	**0.9**	**0.0**	**1.8**	**0.084**	**18.0**
Any emergency department visit						
All-cause	**18.1**	**2.8**	**1.1**	**4.4**	**0.005**	**15.2**
Potentially avoidable	**9.8**	**1.7**	**0.5**	**2.8**	**0.018**	**16.9**
Six qualifying conditions	2.5	0.3	−0.3	0.8	0.415	11.4
Any acute care transition						
All-cause	35.9	1.1	−0.9	3.1	0.362	3.1
Potentially avoidable	**18.2**	**1.9**	**0.2**	**3.6**	**0.059**	**10.7**
Six qualifying conditions	7.4	0.9	−0.1	2.0	0.146	12.5
Payment-Only						
Any hospitalization						
All-cause	25.5	0.3	−1.1	1.6	0.737	1.1
Potentially avoidable	**10.9**	**1.0**	**0.2**	**1.9**	**0.050**	**9.5**
Six qualifying conditions	6.1	0.5	−0.3	1.3	0.297	8.3
Any emergency department visit						
All-cause	23.7	0.5	−1.0	2.1	0.565	2.3
Potentially avoidable	13.6	−0.3	−1.5	0.8	0.629	−2.5
Six qualifying conditions	3.8	0.4	−0.3	1.0	0.341	9.5
Any acute care transition						
All-cause	39.4	0.0	−1.7	1.6	0.984	−0.1
Potentially avoidable	21.5	0.2	−1.1	1.6	0.788	1.0
Six qualifying conditions	9.1	0.6	−0.4	1.6	0.296	7.0

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may_31\ms110).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, emergency department visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-2. All ECCPs: Initiative effect on hospital-related utilization, FY 2019

(count of events, per resident)

Measure	Predicted count absent the Initiative (events per year)	Absolute Initiative effect (events per year)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Hospitalizations						
All-cause	0.411	0.005	−0.029	0.038	0.825	1.1
Potentially avoidable	**0.122**	**0.023**	**0.006**	**0.041**	**0.029**	**19.0**
Six qualifying conditions	**0.059**	**0.014**	**0.003**	**0.025**	**0.043**	**23.5**
Emergency department visits						
All-cause	**0.266**	**0.044**	**0.015**	**0.074**	**0.014**	**16.7**
Potentially avoidable	**0.115**	**0.024**	**0.008**	**0.039**	**0.012**	**20.6**
Six qualifying conditions	0.026	0.003	−0.003	0.009	0.481	10.0
Acute care transitions						
All-cause	0.674	0.050	−0.005	0.105	0.136	7.4
Potentially avoidable	**0.239**	**0.045**	**0.017**	**0.072**	**0.007**	**18.7**
Six qualifying conditions	**0.085**	**0.016**	**0.002**	**0.030**	**0.053**	**19.0**
Payment-Only						
Hospitalizations						
All-cause	0.388	0.009	−0.017	0.035	0.559	2.4
Potentially avoidable	**0.130**	**0.015**	**0.003**	**0.026**	**0.040**	**11.2**
Six qualifying conditions	0.070	0.009	−0.001	0.018	0.139	12.1
Emergency department visits						
All-cause	0.353	0.020	−0.008	0.049	0.243	5.7
Potentially avoidable	0.168	0.000	−0.016	0.016	0.992	0.1
Six qualifying conditions	0.043	0.005	−0.003	0.012	0.292	10.8
Acute care transitions						
All-cause	0.744	0.026	−0.019	0.071	0.337	3.5
Potentially avoidable	0.299	0.015	−0.008	0.037	0.289	4.9
Six qualifying conditions	0.113	0.013	−0.001	0.026	0.124	11.2

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may_31\ms112).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, emergency department visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-3. All ECCPs: Initiative effect on Medicare expenditures, FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Absolute Initiative effect (dollars)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	34,022	888	−820	2,595	0.393	2.6
Hospitalization expenditures						
All-cause	10,546	363	−489	1,215	0.483	3.4
Potentially avoidable	**2,325**	**567**	**202**	**933**	**0.011**	**24.4**
Six qualifying conditions	**1,039**	**352**	**127**	**577**	**0.010**	**33.9**
Emergency department visit expenditures						
All-cause	286	12	−20	44	0.542	4.2
Potentially avoidable	110	13	−3	29	0.194	11.7
Six qualifying conditions	27	4	−4	12	0.380	15.2
Acute care transition expenditures						
All-cause	11,183	245	−723	1,213	0.677	2.2
Potentially avoidable	**2,469**	**604**	**225**	**983**	**0.009**	**24.5**
Six qualifying conditions	**1,069**	**370**	**147**	**592**	**0.006**	**34.6**
Payment-Only						
Total Medicare expenditures	30,085	187	−948	1,321	0.786	0.6
Hospitalization expenditures						
All-cause	8,277	238	−339	814	0.498	2.9
Potentially avoidable	2,199	171	−57	399	0.217	7.8
Six qualifying conditions	1,115	49	−128	226	0.649	4.4
Emergency department visit expenditures						
All-cause	338	15	−21	50	0.498	4.3
Potentially avoidable	143	3	−14	21	0.736	2.4
Six qualifying conditions	47	3	−7	12	0.657	5.6
Acute care transition expenditures						
All-cause	8,786	188	−404	780	0.602	2.1
Potentially avoidable	2,396	134	−106	375	0.359	5.6
Six qualifying conditions	1,188	18	−156	193	0.864	1.5

SOURCE: RTI analysis of Medicare claims data (RTI programs MS 113, MS 114; RTI folders: ykaganova\ar4\may_31\ms113; ykaganova\ar4\may_31\ms114).

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or 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 numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

3.1.4 Initiative Impact Across Individual ECCPs

- *Clinical + Payment facilities: Residents in five of the six ECCPs experienced a pattern of unfavorable increases in utilization and expenditures, some were statistically significant.*
- *Payment-Only facilities: Residents in one ECCP experienced consistent unfavorable changes in utilization and expenditures. Many of these changes were statistically significant. Patterns for the remaining five ECCPs were weaker and less consistent.*

Examining each ECCP separately, most Clinical + Payment facility residents experienced unfavorable, statistically significant increases in utilization and expenditures in FY 2019. For all ECCPs except NY-RAH, eligible Clinical + Payment facility residents saw unfavorable, statistically significant increases for some hospital-related utilization measures. For all ECCPs except NY-RAH and AQAF, there were unfavorable, statistically significant increases in some hospital-related expenditure measures among residents.

Examining each ECCP separately, Payment-Only facility residents did not experience consistent, statistically significant changes in utilization and expenditures in FY 2019. Eligible residents in participating AQAF facilities showed several unfavorable, statistically significant increases in hospital-related utilization and expenditure measures. The ATOP2 and OPTIMISTIC models were each associated with one favorable decrease and one unfavorable increase in hospital-related expenditure measures for eligible residents. Payment-Only facilities in other ECCPs showed no statistically significant results.

Initiative Impact for Alabama Quality Assurance Foundation (AQAF)

For AQAF's Clinical + Payment facility residents, participation in the Initiative was associated with unfavorable increases in ED visits and no statistically significant changes in other utilization or in Medicare expenditures in FY 2019 (see ***Tables 3-4 to 3-6***)**.** Both the probability and count of potentially avoidable ED visits showed statistically significant increases (up 24.9 percent and 33.9 percent, respectively), in addition to the probability of any all-cause ED visit (up 19.1 percent).

Expansion of Medicare managed care in ECCP states continued from prior years, reducing the number of Initiative-eligible residents.

Payment-Only facility residents experienced unfavorable changes in utilization of hospital-related services and Medicare expenditures. Most utilization and expenditure measures showed statistically significant increases in FY 2019, particularly for hospitalizations and acute care transitions (ACTs) that were potentially avoidable. Probability and count of potentially avoidable hospitalizations increased by 34.3 percent and 47.0 percent, respectively, while expenditures for potentially avoidable hospitalizations were up 58.9 percent.

Utilization and expenditures associated with potentially avoidable hospitalizations due to the six qualifying conditions increased significantly (probability and count up by 40.6 percent and 53.7 percent, respectively; expenditures up 95.6 percent). Counts and expenditures for all-cause hospitalizations were also up (22.7 percent and 23.8 percent, respectively). Similarly, utilization and expenditures due to potentially avoidable acute care transitions increased (probability and count up by 19.3 percent and 30.9 percent, respectively; expenditures up 54.5 percent) as did ACTs associated with the six qualifying conditions (probability and count up by 33.5 percent and 44.5 percent, respectively; expenditures up 91.5 percent). Counts and expenditures for all-cause ACTs also saw significant increases (22.6 percent and 22.0 percent). Probability and count of all-cause ED visits also showed significant increases (up 15.0 percent and 25.9 percent).

Given the 2018 ECCP model change announcement, AQAF facilities continued to adjust to the impact of the new model that introduced part-time clinical care in Clinical + Payment Facilities (described in ***Section 2.3***). Many staff were uncertain about these new changes. Furthermore, implementation of NFI 2 billing continued to be a challenge across facilities, and billing data confirms facility interviewee reports of limited or zero NFI 2 claims submissions in FY 2019 (see ***Section 2.4*** for details). Statewide expansion of managed care also continued from prior years, reducing the number of Initiative-eligible residents, and likely limiting the growth of NFI 2 billing in facilities. Although nearly all Clinical + Payment and Payment-Only interviewees described favorable outcomes for their residents, they were unsure whether fewer resident hospitalizations were attributable solely to NFI 2.

Table 3-4. AQAF (Alabama): Initiative effect on hospital-related utilization, FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	31.8	−2.0	−5.5	1.6	0.365	−6.2
Potentially avoidable	13.2	1.7	−1.7	5.1	0.413	13.0
Six qualifying conditions	6.0	1.5	−0.3	3.3	0.180	24.8
Any emergency department visit						
All-cause	**21.9**	**4.2**	**0.6**	**7.8**	**0.058**	**19.1**
Potentially avoidable	**13.2**	**3.3**	**0.1**	**6.5**	**0.091**	**24.9**
Six qualifying conditions	4.1	−0.2	−1.7	1.3	0.847	−4.2
Any acute care transition						
All-cause	41.9	1.6	−2.6	5.9	0.522	3.9
Potentially avoidable	23.3	3.0	−1.4	7.5	0.264	13.0
Six qualifying conditions	9.7	1.1	−1.1	3.3	0.410	11.4
Payment-Only						
Any hospitalization						
All-cause	27.1	2.1	−1.9	6.1	0.390	7.7
Potentially avoidable	**11.5**	**3.9**	**1.4**	**6.5**	**0.010**	**34.3**
Six qualifying conditions	**6.7**	**2.7**	**0.8**	**4.7**	**0.023**	**40.6**
Any emergency department visit						
All-cause	**25.8**	**3.9**	**0.5**	**7.3**	**0.062**	**15.0**
Potentially avoidable	15.2	2.2	−0.9	5.3	0.250	14.3
Six qualifying conditions	4.2	1.0	−0.6	2.6	0.322	23.3
Any acute care transition						
All-cause	42.4	2.9	−1.6	7.4	0.288	6.9
Potentially avoidable	**23.7**	**4.6**	**1.3**	**7.8**	**0.020**	**19.3**
Six qualifying conditions	**10.2**	**3.4**	**0.9**	**5.9**	**0.023**	**33.5**

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may_31\ms110).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-5. AQAF (Alabama): Initiative effect on hospital-related utilization, FY 2019

(count of events, per resident)

Measure	Predicted count absent the Initiative (events per year)	Absolute Initiative effect (events per year)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Hospitalizations						
All-cause	0.493	−0.032	−0.105	0.042	0.483	−6.4
Potentially avoidable	0.165	0.014	−0.033	0.061	0.627	8.4
Six qualifying conditions	0.068	0.017	−0.005	0.038	0.196	24.6
Emergency department visits						
All-cause	0.330	0.069	−0.003	0.142	0.117	21.0
Potentially avoidable	**0.154**	**0.052**	**0.003**	**0.102**	**0.083**	**33.9**
Six qualifying conditions	0.041	−0.001	−0.017	0.014	0.887	−3.2
Acute care transitions						
All-cause	0.825	0.037	−0.087	0.160	0.626	4.4
Potentially avoidable	0.325	0.057	−0.018	0.131	0.212	17.4
Six qualifying conditions	0.110	0.015	−0.011	0.041	0.356	13.4
Payment-Only						
Hospitalizations						
All-cause	**0.397**	**0.090**	**0.018**	**0.162**	**0.041**	**22.7**
Potentially avoidable	**0.131**	**0.062**	**0.029**	**0.094**	**0.002**	**47.0**
Six qualifying conditions	**0.074**	**0.040**	**0.014**	**0.066**	**0.012**	**53.7**
Emergency department visits						
All-cause	**0.358**	**0.093**	**0.040**	**0.146**	**0.004**	**25.9**
Potentially avoidable	0.181	0.035	−0.003	0.074	0.134	19.5
Six qualifying conditions	0.047	0.014	−0.004	0.032	0.210	29.8
Acute care transitions						
All-cause	**0.767**	**0.174**	**0.065**	**0.282**	**0.009**	**22.6**
Potentially avoidable	**0.312**	**0.096**	**0.034**	**0.159**	**0.011**	**30.9**
Six qualifying conditions	**0.121**	**0.054**	**0.017**	**0.090**	**0.015**	**44.5**

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may_31\ms112).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-6. AQAF (Alabama): Initiative effect on Medicare expenditures, FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Absolute Initiative effect (dollars)	90% CI		p-value§	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	30,076	327	−2,446	3,100	0.846	1.1
Hospitalization expenditures						
All-cause	8,556	−70	−1,276	1,136	0.924	−0.8
Potentially avoidable	2,257	433	−318	1,183	0.343	19.2
Six qualifying conditions	844	302	−16	620	0.118	35.8
Emergency department visit expenditures						
All-cause	272	31	−24	86	0.351	11.5
Potentially avoidable	108	27	−4	59	0.152	25.4
Six qualifying conditions	31	4	−12	21	0.646	14.3
Acute care transition expenditures						
All-cause	9,344	−294	−1,633	1,045	0.718	−3.1
Potentially avoidable	2,439	418	−342	1,178	0.365	17.1
Six qualifying conditions	863	324	−21	669	0.123	37.5
Payment-Only						
Total Medicare expenditures	27,023	1,177	−1,838	4,193	0.521	4.4
Hospitalization expenditures						
All-cause	**6,317**	**1,504**	**382**	**2,627**	**0.028**	**23.8**
Potentially avoidable	**1,593**	**939**	**488**	**1,390**	**0.001**	**58.9**
Six qualifying conditions	**717**	**685**	**384**	**987**	**0.000**	**95.6**
Emergency department visit expenditures						
All-cause	278	34	−39	106	0.446	12.1
Potentially avoidable	114	32	−6	71	0.170	28.1
Six qualifying conditions	43	7	−16	30	0.621	16.0
Acute care transition expenditures						
All-cause	**6,683**	**1,468**	**373**	**2,563**	**0.028**	**22.0**
Potentially avoidable	**1,732**	**944**	**499**	**1,389**	**0.001**	**54.5**
Six qualifying conditions	**749**	**685**	**413**	**958**	**0.000**	**91.5**

SOURCE: RTI analysis of Medicare claims data (RTI programs MS 113, MS 114; RTI folders: ykaganova\ar4\may_31\ms113; ykaganova\ar4\may_31\ms114).

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or 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 numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Initiative Impact for Admissions and Transitions Optimization Program (ATOP2)

For ATOP2 Clinical + Payment (Nevada) facility residents, participation in the Initiative was associated with unfavorable increases in potentially avoidable hospitalizations and one unfavorable increase in Medicare expenditures for FY 2019 (see ***Tables 3-7 to 3-9***)**.** The increases in the probability and count of potentially avoidable hospitalizations were statistically significant (up 37.5 percent and 48.8 percent, respectively), as were the probability and count of hospitalizations associated with six qualifying conditions (up 44.2 percent and 54.8 percent, respectively). The increase in Medicare expenditures associated with hospitalizations for the six qualifying conditions was also statistically significant (up 86.5 percent). The other 23 measures of utilization and expenditures showed a more mixed pattern of results but were not statistically significant.

ATOP2 interviewees reported higher engagement among Clinical + Payment facility staff compared to staff in Payment-Only facilities.

There was no consistent evidence that the Initiative was associated with changes in hospital-related utilization and Medicare expenditures for residents in ATOP2 Payment-Only (Colorado) facilities. Only increases in the count of all-cause hospitalizations and in total Medicare expenditures were statistically significant (up 16.9 percent and 15.9 percent, respectively). We also saw a general pattern of decreases across Medicare hospital-related expenditure measures with a statistically significant decrease in expenditures for potentially avoidable ED visits (down 32.3 percent). The statistically significant increase in total Medicare expenditures despite the decreases in hospital-related expenditures could be due to increases in expenditures not shown in the table, such as expenditures related to SNF services, physician services, durable medical equipment, and Part D prescription drugs.

ATOP2 interviewees reported more engagement among Clinical + Payment facility staff compared to staff in Payment-Only facilities. Clinical + Payment staff interviewees noted that their regular practitioners routinely and promptly certified the six qualifying conditions to facilitate NFI 2 billing. In contrast, staff in Payment-Only facilities were often unable to bill because of delays in practitioner certification, particularly due to concerns about recoupment. Also, in May 2019, major stakeholders convened to re-engage about half of the Payment-Only facilities that had suspended all ATOP2 activities in fall 2018 due to guidance they received from their corporate office. Billing data, as shown in ***Figure 2.4***, also confirmed that facility billing decreased for the Payment-Only group from FY 2018 to FY 2019 more than it did for the Clinical + Payment Group. Our finding of increased hospital-related utilization in the Clinical + Payment group specifically are challenging to interpret, given the different experiences of both groups.

Table 3-7. ATOP2 (Nevada/Colorado): Initiative effect on hospital-related utilization, FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	28.2	−1.1	−5.4	3.2	0.679	−3.8
Potentially avoidable	**8.7**	**3.3**	**1.2**	**5.4**	**0.011**	**37.5**
Six qualifying conditions	**4.4**	**1.9**	**0.7**	**3.2**	**0.011**	**44.2**
Any emergency department visit						
All-cause	19.0	2.9	−2.3	8.1	0.357	15.4
Potentially avoidable	9.3	2.2	−2.5	6.9	0.437	23.8
Six qualifying conditions	3.1	−0.7	−3.4	2.1	0.689	−21.4
Any acute care transition						
All-cause	39.3	−0.1	−7.0	6.8	0.981	−0.3
Potentially avoidable	16.9	3.0	−2.2	8.3	0.339	17.9
Six qualifying conditions	7.0	1.5	−1.8	4.7	0.451	21.0
Payment-Only						
Any hospitalization						
All-cause	18.2	2.1	−0.1	4.4	0.117	11.7
Potentially avoidable	7.4	0.6	−1.4	2.5	0.646	7.4
Six qualifying conditions	4.3	0.5	−1.1	2.1	0.627	11.1
Any emergency department visit						
All-cause	24.2	0.5	−2.8	3.7	0.803	2.0
Potentially avoidable	13.5	0.6	−2.2	3.5	0.717	4.7
Six qualifying conditions	6.3	−0.3	−1.8	1.3	0.765	−4.5
Any acute care transition						
All-cause	34.3	1.8	−1.4	4.9	0.356	5.2
Potentially avoidable	18.8	0.5	−2.7	3.6	0.816	2.4
Six qualifying conditions	9.3	−0.1	−2.6	2.4	0.953	−1.0

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may_31\ms110).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-8. ATOP2 (Nevada/Colorado): Initiative effect on hospital-related utilization, FY 2019

(count of events, per resident)

Measure	Predicted count absent the Initiative (events per year)	Absolute Initiative effect (events per year)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Hospitalizations						
All-cause	0.472	−0.007	−0.094	0.080	0.889	−1.6
Potentially avoidable	**0.098**	**0.048**	**0.018**	**0.077**	**0.008**	**48.8**
Six qualifying conditions	**0.047**	**0.026**	**0.012**	**0.040**	**0.002**	**54.8**
Emergency department visits						
All-cause	0.319	0.009	−0.107	0.125	0.900	2.8
Potentially avoidable	0.121	0.021	−0.037	0.080	0.549	17.6
Six qualifying conditions	0.034	−0.005	−0.034	0.025	0.797	−13.6
Acute care transitions						
All-cause	0.806	−0.012	−0.186	0.161	0.906	−1.5
Potentially avoidable	0.225	0.064	−0.013	0.141	0.168	28.6
Six qualifying conditions	0.080	0.023	−0.012	0.058	0.270	29.4
Payment-Only						
Hospitalizations						
All-cause	**0.248**	**0.042**	**0.000**	**0.084**	**0.097**	**16.9**
Potentially avoidable	0.088	0.006	−0.018	0.031	0.679	7.0
Six qualifying conditions	0.048	0.007	−0.012	0.025	0.564	13.5
Emergency department visits						
All-cause	0.361	0.023	−0.045	0.090	0.581	6.2
Potentially avoidable	0.179	0.005	−0.034	0.044	0.833	2.8
Six qualifying conditions	0.073	−0.004	−0.023	0.014	0.714	−5.7
Acute care transitions						
All-cause	0.615	0.058	−0.022	0.138	0.233	9.4
Potentially avoidable	0.267	0.012	−0.035	0.060	0.669	4.6
Six qualifying conditions	0.120	0.005	−0.025	0.034	0.791	4.0

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may_31\ms112).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, emergency department visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-9. ATOP2 (Nevada/Colorado): Initiative effect on Medicare expenditures, FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Absolute Initiative effect (dollars)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	34,827	1,742	−3,886	7,371	0.611	5.0
Hospitalization expenditures						
All-cause	14,953	−1,927	−6,428	2,573	0.481	−12.9
Potentially avoidable	2,015	799	−53	1,651	0.123	39.7
Six qualifying conditions	**898**	**776**	**145**	**1,407**	**0.043**	**86.5**
Emergency department visit expenditures						
All-cause	341	−22	−151	107	0.777	−6.5
Potentially avoidable	108	5	−56	66	0.888	4.8
Six qualifying conditions	17	11	−9	31	0.379	61.9
Acute care transition expenditures						
All-cause	15,665	−1,905	−7,463	3,654	0.573	−12.2
Potentially avoidable	2,193	742	−390	1,873	0.281	33.8
Six qualifying conditions	992	730	−82	1,543	0.139	73.7
Payment-Only						
Total Medicare expenditures	**20,775**	**3,306**	**1,106**	**5,506**	**0.013**	**15.9**
Hospitalization expenditures						
All-cause	5,277	117	−1,017	1,252	0.865	2.2
Potentially avoidable	1,686	−253	−794	288	0.442	−15.0
Six qualifying conditions	830	−135	−534	264	0.578	−16.2
Emergency department visit expenditures						
All-cause	476	−78	−213	57	0.340	−16.4
Potentially avoidable	**261**	**−84**	**−154**	**−15**	**0.045**	**−32.3**
Six qualifying conditions	106	−33	−68	3	0.131	−30.8
Acute care transition expenditures						
All-cause	5,841	−51	−1,216	1,115	0.943	−0.9
Potentially avoidable	2,014	−402	−909	105	0.192	−20.0
Six qualifying conditions	962	−190	−595	216	0.441	−19.7

SOURCE: RTI analysis of Medicare claims data (RTI programs MS 113, MS 114; RTI folder: ykaganova\ar4\may_31\ms113; ykaganova\ar4\may_31\ms114).

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, emergency department visits, or 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 numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Initiative Impact for Missouri Quality Initiative (MOQI)

In FY 2019, MOQI Clinical + Payment facility residents experienced unfavorable increases in ED visits and ACTs (see ***Tables 3-10 to 3-12***)**.** Both the probability and count of potentially avoidable ED visits associated with the six qualifying conditions showed statistically significant increases (up 135.9 percent and 149.6 percent, respectively), as did all-cause (up 13.9 percent and 19.8 percent, respectively) and potentially avoidable ACTs associated with six qualifying conditions (up 58.9 percent and 56.3 percent, respectively). The increase in the cost of all-cause ACTs was the only statistically significant expenditure measure (up 18.6 percent). Other measures indicate a general pattern of increases but were not statistically significant.

For residents in Payment-Only facilities, participation in the Initiative was not associated with any statistically significant changes in hospital-based utilization and expenditure measures in FY 2019. We found a mix of both increases and decreases in direction across all measures, and none of the effects were statistically significant.

> MOQI facility staff acknowledged that early recognition of resident changes in condition could have decreased billing opportunities as residents were treated before the condition worsened to meet the NFI 2 clinical criteria.

Interview data suggest that various factors impacted NFI 2 billing practices in MOQI facilities across both groups. Interviewees reported that facility leadership and staff turnover remained the largest factor decreasing Initiative buy-in and engagement, suggesting that consistent facility billing may be tied to low rates of leadership turnover. The full-time presence of APRNs in Clinical + Payment facilities also increased the likelihood of NFI 2 billing, which could help explain that MOQI Clinical + Payment facilities had the highest rate of facility billing for providing on-site treatment (***Figure 2-3***). Practitioner billing continued to vary in both groups, where Clinical + Payment facilities benefited from the presence of embedded ECCP APRNs while Payment-Only facilities relied on facility-supported primary care practitioners. Facility staff acknowledged that early recognition of resident changes in condition could have decreased the number of opportunities to bill because staff treat residents before the condition meets the NFI 2 clinical criteria.

Table 3-10. MOQI (Missouri): Initiative effect on hospital-related utilization, FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	22.0	2.3	−1.3	5.9	0.293	10.4
Potentially avoidable	9.3	1.5	−1.0	4.1	0.320	16.6
Six qualifying conditions	5.1	1.7	−0.4	3.8	0.173	33.9
Any emergency department visit						
All-cause	15.1	4.0	−0.3	8.2	0.126	26.2
Potentially avoidable	7.9	3.0	0.0	6.1	0.100	38.4
Six qualifying conditions	**1.5**	**2.0**	**0.6**	**3.3**	**0.018**	**135.9**
Any acute care transition						
All-cause	**31.1**	**4.3**	**0.7**	**7.9**	**0.047**	**13.9**
Potentially avoidable	15.7	3.2	−0.8	7.3	0.189	20.6
Six qualifying conditions	**6.1**	**3.6**	**1.4**	**5.8**	**0.008**	**58.9**
Payment-Only						
Any hospitalization						
All-cause	29.1	0.3	−3.0	3.6	0.870	1.1
Potentially avoidable	14.8	−0.1	−2.5	2.3	0.954	−0.5
Six qualifying conditions	8.9	−1.4	−3.2	0.5	0.219	−15.5
Any emergency department visit						
All-cause	28.7	0.5	−2.9	3.9	0.807	1.7
Potentially avoidable	17.5	−1.1	−3.9	1.6	0.494	−6.5
Six qualifying conditions	5.0	0.7	−1.4	2.7	0.596	13.3
Any acute care transition						
All-cause	44.1	1.3	−2.6	5.2	0.589	2.9
Potentially avoidable	26.9	−0.4	−4.2	3.4	0.861	−1.5
Six qualifying conditions	12.3	−1.0	−3.9	1.9	0.563	−8.4

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may_31\ms110).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, emergency department visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-11. MOQI (Missouri): Initiative effect on hospital-related utilization, FY 2019

(count of events, per resident)

Measure	Predicted count absent the Initiative (events per year)	Absolute Initiative effect (events per year)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Hospitalizations						
All-cause	0.327	0.048	−0.014	0.110	0.205	14.6
Potentially avoidable	0.109	0.024	−0.009	0.058	0.229	22.4
Six qualifying conditions	0.060	0.022	−0.002	0.046	0.125	37.4
Emergency department visits						
All-cause	0.214	0.048	−0.013	0.108	0.195	22.4
Potentially avoidable	0.087	0.036	−0.002	0.075	0.119	41.8
Six qualifying conditions	**0.014**	**0.021**	**0.007**	**0.034**	**0.011**	**149.6**
Acute care transitions						
All-cause	**0.535**	**0.106**	**0.007**	**0.205**	**0.078**	**19.8**
Potentially avoidable	0.198	0.060	−0.001	0.121	0.104	30.4
Six qualifying conditions	**0.074**	**0.042**	**0.014**	**0.070**	**0.015**	**56.3**
Payment-Only						
Hospitalizations						
All-cause	0.459	0.003	−0.080	0.085	0.958	0.6
Potentially avoidable	0.176	0.015	−0.018	0.049	0.453	8.7
Six qualifying conditions	0.106	−0.012	−0.035	0.011	0.377	−11.5
Emergency department visits						
All-cause	0.448	0.044	−0.019	0.108	0.251	9.9
Potentially avoidable	0.236	−0.012	−0.052	0.028	0.633	−4.9
Six qualifying conditions	0.062	0.007	−0.018	0.032	0.656	10.8
Acute care transitions						
All-cause	0.906	0.055	−0.065	0.174	0.455	6.0
Potentially avoidable	0.413	0.003	−0.054	0.060	0.937	0.7
Six qualifying conditions	0.170	−0.007	−0.047	0.033	0.771	−4.2

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may_31\ms112).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-12. MOQI (Missouri): Initiative effect on Medicare expenditures, FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Absolute Initiative effect (dollars)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	26,537	1,500	−909	3,909	0.306	5.7
Hospitalization expenditures						
All-cause	5,464	879	−113	1,870	0.145	16.1
Potentially avoidable	1,621	171	−407	750	0.626	10.6
Six qualifying conditions	960	64	−377	506	0.811	6.7
Emergency department visit expenditures						
All-cause	225	28	−44	101	0.524	12.5
Potentially avoidable	81	25	−11	60	0.247	30.8
Six qualifying conditions	21	13	−3	30	0.191	64.5
Acute care transition expenditures						
All-cause	**5,814**	**1,080**	**156**	**2,004**	**0.055**	**18.6**
Potentially avoidable	1,667	309	−228	846	0.344	18.5
Six qualifying conditions	962	118	−274	510	0.620	12.3
Payment-Only						
Total Medicare expenditures	27,167	1,209	−770	3,188	0.315	4.4
Hospitalization expenditures						
All-cause	6,952	541	−536	1,617	0.409	7.8
Potentially avoidable	2,205	317	−138	771	0.252	14.4
Six qualifying conditions	1,275	−161	−504	182	0.441	−12.6
Emergency department visit expenditures						
All-cause	407	54	−45	153	0.372	13.2
Potentially avoidable	181	24	−22	69	0.388	13.1
Six qualifying conditions	60	12	−18	41	0.516	19.6
Acute care transition expenditures						
All-cause	7,526	594	−481	1,670	0.363	7.9
Potentially avoidable	2,425	348	−190	886	0.288	14.3
Six qualifying conditions	1,375	−180	−551	191	0.426	−13.1

SOURCE: RTI analysis of Medicare claims data (RTI programs MS 113, MS 114; RTI folders: ykaganova\ar4\may_31\ms113; ykaganova\ar4\may_31\ms114).

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or 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 numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Initiative Impact for New York Reducing Avoidable Hospitalizations (NY-RAH)

For NY-RAH Clinical + Payment facility residents, there was no evidence that Initiative participation resulted in any statistically significant changes in hospital-based utilization or expenditure in FY 2019 (see ***Tables 3-13 to 3-15***)**.** Resident outcomes for utilization and expenditure measures showed a mixed direction of results, and none were statistically significant.

NY-RAH Payment-Only facility residents did not experience any statistically significant changes in their utilization or expenditures. The broader patterns of utilization and expenditure measures differed. Utilization measure results were mixed, while expenditures showed a general pattern of unfavorable increases.

In 2019, NY-RAH focused on a leaner quality improvement-oriented staffing model, employing non-clinical QISs instead of RNCCs.

During FY 2019, NY-RAH changed its ECCP model, directly affecting Initiative implementation in Clinical + Payment facilities**.** Though the model remains education-only, the ECCP decided to focus on a leaner, quality improvement-oriented staffing model, employing non-clinical QISs instead of Registered Nurse Care Coordinators (RNCCs). The transition negatively affected Clinical + Payment facilities' ability to sustain billing practices because of extended delays in filling the QIS positions, wherein facilities previously relied on RNCCs to facilitate billing documentation. Payment-Only facilities, not directly affected by the model change, continued to submit claims regularly, although interviewees noted that the updated criteria for the six qualifying conditions reduced billing opportunities, especially for residents with suspected UTIs.

Table 3-13. NY-RAH (New York): Initiative effect on hospital-related utilization, FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	27.7	−1.0	−4.2	2.2	0.607	−3.7
Potentially avoidable	11.0	0.2	−2.8	3.1	0.931	1.4
Six qualifying conditions	6.7	−1.2	−3.1	0.8	0.333	−17.2
Any emergency department visit						
All-cause	17.6	1.4	−1.6	4.4	0.440	8.1
Potentially avoidable	9.0	0.6	−1.3	2.4	0.621	6.1
Six qualifying conditions	1.8	0.2	−0.7	1.2	0.691	12.8
Any acute care transition						
All-cause	36.8	−0.4	−4.8	3.9	0.870	−1.2
Potentially avoidable	18.4	−0.3	−3.5	2.9	0.888	−1.5
Six qualifying conditions	8.4	−1.2	−3.5	1.0	0.369	−14.7
Payment-Only						
Any hospitalization						
All-cause	25.7	−1.2	−3.9	1.6	0.485	−4.5
Potentially avoidable	9.2	0.8	−0.7	2.2	0.376	8.3
Six qualifying conditions	5.2	0.6	−0.9	2.1	0.514	11.3
Any emergency department visit						
All-cause	21.2	0.0	−3.4	3.4	0.988	0.1
Potentially avoidable	12.0	−1.3	−3.7	1.1	0.387	−10.5
Six qualifying conditions	2.4	0.1	−0.9	1.1	0.880	3.7
Any acute care transition						
All-cause	38.1	−1.7	−5.0	1.6	0.406	−4.4
Potentially avoidable	18.9	−1.0	−3.5	1.5	0.506	−5.3
Six qualifying conditions	7.2	0.5	−1.3	2.3	0.623	7.4

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may_31\ms110).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-14. NY-RAH (New York): Initiative effect on hospital-related utilization, FY 2019

(count of events, per resident)

Measure	Predicted count absent the Initiative (events per year)	Absolute Initiative effect (events per year)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Hospitalizations						
All-cause	0.482	−0.035	−0.115	0.046	0.480	−7.2
Potentially avoidable	0.136	−0.003	−0.043	0.036	0.891	−2.4
Six qualifying conditions	0.081	−0.017	−0.043	0.009	0.280	−20.8
Emergency department visits						
All−cause	0.259	0.034	−0.018	0.087	0.285	13.2
Potentially avoidable	0.108	0.015	−0.008	0.037	0.288	13.4
Six qualifying conditions	0.020	0.001	−0.009	0.012	0.834	7.0
Acute care transitions						
All−cause	0.732	0.003	−0.115	0.122	0.965	0.4
Potentially avoidable	0.242	0.014	−0.039	0.066	0.673	5.6
Six qualifying conditions	0.102	−0.016	−0.047	0.014	0.383	−16.0
Payment-Only						
Hospitalizations						
All-cause	0.382	−0.012	−0.060	0.036	0.674	−3.2
Potentially avoidable	0.112	0.006	−0.015	0.026	0.658	4.9
Six qualifying conditions	0.057	0.010	−0.007	0.026	0.328	17.1
Emergency department visits						
All-cause	0.321	−0.009	−0.068	0.050	0.811	−2.7
Potentially avoidable	0.146	−0.019	−0.049	0.011	0.295	−13.1
Six qualifying conditions	0.025	0.002	−0.008	0.012	0.752	8.1
Acute care transitions						
All-cause	0.700	−0.024	−0.114	0.066	0.660	−3.4
Potentially avoidable	0.256	−0.013	−0.054	0.028	0.612	−4.9
Six qualifying conditions	0.082	0.011	−0.011	0.033	0.401	13.8

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may_31\ms112).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-15. NY-RAH (New York): Initiative effect on Medicare expenditures, FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Absolute Initiative effect (dollars)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	42,427	−260	−5,064	4,544	0.929	−0.6
Hospitalization expenditures						
All-cause	16,177	−248	−2,838	2,342	0.875	−1.5
Potentially avoidable	3,205	410	−612	1,431	0.509	12.8
Six qualifying conditions	1,872	−115	−774	544	0.774	−6.1
Emergency department visit expenditures						
All−cause	332	−10	−87	67	0.825	−3.1
Potentially avoidable	129	1	−39	41	0.967	0.8
Six qualifying conditions	27	−5	−20	10	0.576	−18.2
Acute care transition expenditures						
All−cause	17,117	−505	−3,618	2,607	0.789	−3.0
Potentially avoidable	3,331	518	−530	1,566	0.416	15.6
Six qualifying conditions	1,963	−147	−815	521	0.717	−7.5
Payment-Only						
Total Medicare expenditures	34,135	569	−1,700	2,838	0.680	1.7
Hospitalization expenditures						
All-cause	10,700	65	−1,361	1,491	0.941	0.6
Potentially avoidable	2,379	159	−351	669	0.608	6.7
Six qualifying conditions	1,184	147	−264	558	0.556	12.4
Emergency department visit expenditures						
All-cause	303	10	−48	68	0.781	3.2
Potentially avoidable	131	−12	−44	19	0.516	−9.5
Six qualifying conditions	28	3	−13	18	0.762	10.0
Acute care transition expenditures						
All-cause	11,213	−120	−1,655	1,416	0.898	−1.1
Potentially avoidable	2,567	108	−431	648	0.741	4.2
Six qualifying conditions	1,240	143	−269	555	0.567	11.5

SOURCE: RTI analysis of Medicare claims data (RTI programs MS 113 and MS 114; RTI folder: ykaganova\ar4\may_31\ms113; ykaganova\ar4\may_31\ms114).

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or 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 numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Initiative Impact for Optimizing Patient Transfers, Impacting Medical Quality, and Improving Symptoms: Transforming Institutional Care (OPTIMISTIC)

There were increases for most measures of hospital-related utilization and expenditures for OPTIMISTIC Clinical + Payment facility residents, a few of which were statistically significant (see ***Tables 3-16 to 3-18***)**.** Both the probability and count of potentially avoidable ACTs showed statistically significant increases (up 11.7% and 20.6%, respectively), as did the count of potentially avoidable hospitalizations (up 28.7%). Consistent with a broader pattern of increases, two expenditure measures associated with the six qualifying conditions showed statistically significant increases, hospitalizations (up 65.5%) and ACTs (up 64.7%).

In FY 2019, participation in the Initiative resulted in statistically significant changes in expenditures for residents in Payment-Only facilities, but the Initiative had no statistically significant effects on utilization. The direction of changes in Medicare expenditures was mixed, with two significant findings: a decrease in total Medicare expenditures (down 9.3 percent) and an increase in spending for all-cause ED visits (up 35.8 percent). Almost all utilization measures increased, but the changes were not statistically significant.

Overall, Clinical + Payment facility staff reported high satisfaction with their OPTIMISTIC RNs. In addition to providing education to facility staff, the RNs sometimes assisted in day-to-day activities, particularly when facilities experienced staff turnover or shortages. Most facilities thought resources and support provided by OPTIMISTIC were sufficient, but some Payment-Only facilities expressed desire for more education. Several interviewees from both Clinical + Payment and Payment-Only facilities also reported that their NFI 2 billing decreased compared to the prior year because of improved clinical ability of staff to recognize changes in condition, ongoing staff and physician turnover, and the change in NFI 2 criteria that reduced the number of billable UTIs and skin infections. Overall, many facility interviewees shared that they continue to view the Initiative as having a positive effect toward improving care for participating residents, though these improvements may not always translate into Medicare savings.

Both Clinical + Payment and Payment-Only OPTIMISTIC facilities reported that their NFI 2 billing decreased compared to the prior year.

Table 3-16. OPTIMISTIC (Indiana): Initiative effect on hospital-related utilization, FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	25.4	−0.1	−4.1	3.9	0.960	−0.5
Potentially avoidable	11.6	1.3	−1.2	3.9	0.393	11.5
Six qualifying conditions	5.4	0.5	−1.2	2.2	0.636	9.2
Any emergency department visit						
All−cause	21.6	1.2	−2.8	5.1	0.621	5.5
Potentially avoidable	11.5	1.9	−0.4	4.1	0.174	16.2
Six qualifying conditions	2.4	0.5	−0.6	1.7	0.445	22.1
Any acute care transition						
All−cause	39.0	−0.7	−4.7	3.2	0.764	−1.8
Potentially avoidable	**20.8**	**2.4**	**0.2**	**4.7**	**0.071**	**11.7**
Six qualifying conditions	8.0	0.4	−1.5	2.2	0.754	4.5
Payment-Only						
Any hospitalization						
All-cause	25.3	0.5	−1.9	2.9	0.749	1.9
Potentially avoidable	11.8	1.5	−0.3	3.4	0.178	12.9
Six qualifying conditions	6.3	0.4	−1.5	2.3	0.732	6.4
Any emergency department visit						
All-cause	24.2	1.7	−1.8	5.3	0.423	7.1
Potentially avoidable	15.4	0.0	−2.8	2.8	0.993	−0.1
Six qualifying conditions	3.7	1.0	−0.7	2.7	0.330	27.3
Any acute care transition						
All-cause	39.6	0.0	−3.3	3.3	0.998	0.0
Potentially avoidable	23.3	0.9	−2.0	3.8	0.608	3.9
Six qualifying conditions	8.8	1.2	−1.0	3.5	0.370	14.0

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may_31\ms110).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-17. OPTIMISTIC (Indiana): Initiative effect on hospital-related utilization, FY 2019

(count of events, per resident)

Measure	Predicted count absent the Initiative (events per year)	Absolute Initiative effect (events per year)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Hospitalizations						
All-cause	0.368	0.012	−0.065	0.089	0.792	3.3
Potentially avoidable	**0.122**	**0.035**	**0.001**	**0.069**	**0.095**	**28.7**
Six qualifying conditions	0.057	0.015	−0.007	0.037	0.267	26.1
Emergency department visits						
All−cause	0.292	0.038	−0.024	0.099	0.315	13.0
Potentially avoidable	0.131	0.021	−0.008	0.051	0.230	16.3
Six qualifying conditions	0.026	0.004	−0.007	0.015	0.560	15.4
Acute care transitions						
All−cause	0.657	0.048	−0.044	0.139	0.391	7.2
Potentially avoidable	**0.256**	**0.053**	**0.011**	**0.095**	**0.039**	**20.6**
Six qualifying conditions	0.083	0.018	−0.005	0.042	0.198	22.1
Payment-Only						
Hospitalizations						
All-cause	0.383	0.011	−0.031	0.052	0.672	2.8
Potentially avoidable	0.145	0.017	−0.007	0.041	0.240	11.9
Six qualifying conditions	0.076	0.005	−0.019	0.028	0.751	5.9
Emergency department visits						
All-cause	0.359	0.065	−0.003	0.133	0.115	18.2
Potentially avoidable	0.193	0.020	−0.028	0.068	0.500	10.2
Six qualifying conditions	0.043	0.013	−0.009	0.034	0.329	30.1
Acute care transitions						
All-cause	0.746	0.078	−0.009	0.165	0.139	10.5
Potentially avoidable	0.338	0.041	−0.018	0.100	0.255	12.1
Six qualifying conditions	0.118	0.018	−0.018	0.053	0.416	14.8

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may_31\ms112).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-18. OPTIMISTIC (Indiana): Initiative effect on Medicare expenditures, FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Absolute Initiative effect (dollars)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	35,887	583	−2,896	4,061	0.783	1.6
Hospitalization expenditures						
All-cause	8,663	803	−659	2,264	0.366	9.3
Potentially avoidable	2,658	674	−67	1,416	0.135	25.4
Six qualifying conditions	**866**	**567**	**173**	**961**	**0.018**	**65.5**
Emergency department visit expenditures						
All−cause	329	−20	−95	55	0.666	−6.0
Potentially avoidable	136	3	−34	39	0.908	1.9
Six qualifying conditions	28	16	−2	35	0.151	57.9
Acute care transition expenditures						
All−cause	9,333	603	−849	2,055	0.494	6.5
Potentially avoidable	2,929	629	−220	1,477	0.223	21.5
Six qualifying conditions	**898**	**581**	**172**	**990**	**0.020**	**64.7**
Payment-Only						
Total Medicare expenditures	**31,544**	**−2,929**	**−5,062**	**−796**	**0.024**	**−9.3**
Hospitalization expenditures						
All-cause	7,404	−172	−1,280	936	0.798	−2.3
Potentially avoidable	2,512	−4	−540	531	0.990	−0.2
Six qualifying conditions	1,297	−241	−704	222	0.393	−18.5
Emergency department visit expenditures						
All-cause	**315**	**113**	**43**	**183**	**0.008**	**35.8**
Potentially avoidable	143	35	−2	72	0.122	24.4
Six qualifying conditions	46	13	−11	36	0.374	27.4
Acute care transition expenditures						
All-cause	7,988	−138	−1,509	1,234	0.869	−1.7
Potentially avoidable	2,695	67	−507	642	0.847	2.5
Six qualifying conditions	1,374	−274	−726	179	0.319	−19.9

SOURCE: RTI analysis of Medicare claims data (RTI programs MS 113 and MS 114; RTI folder: ykaganova\ar4\may_31\ms113; ykaganova\ar4\may_31\ms114).

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or 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 numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Initiative Impact for University of Pittsburgh Medical Center Community Provider Services Program to Reduce Avoidable Hospitalizations (RAVEN)

RAVEN Clinical + Payment facility residents experienced statistically significant increases in multiple hospital-related utilization and expenditure measures in FY 2019 (see ***Tables 3-19 to 3-21***)**.** Consistent with a broader pattern of increases, approximately half of the measures showed statistically significant increases, with effects concentrated in measures related to hospitalizations and total ACTs. Probabilities and counts both increased for potentially avoidable hospitalizations (up 45.4 percent and 64.1 percent, respectively) and potentially avoidable hospitalizations due to the six qualifying conditions (up 84.2 percent and 127.2 percent, respectively), while counts of all-cause hospitalizations increased as well (up 20.4 percent). Additionally, probabilities and counts of potentially avoidable ACTs due to the six qualifying conditions increased (up 46.4 percent and 74.2 percent, respectively) while counts of potentially avoidable ACTs generally also increased (up 35.4 percent). Finally, the probability of all-cause ED visits increased (up 27.2 percent). Among the expenditure measures, both potentially avoidable hospitalizations and potentially avoidable hospitalizations due to the six conditions increased (up 69.0 percent and 122.6 percent, respectively). Additionally, expenditures for potentially avoidable ACTs and potentially avoidable ACTs due to the six conditions increased (up 64.2 percent and 115.0 percent, respectively).

Payment-Only NFI 2 facility residents did not experience statistically significant changes in hospital-related utilization and expenditures in FY 2019. Although results indicated a general pattern of favorable reductions across utilization and expenditure measures, none of these effects were statistically significant.

> RAVEN interviewees in Clinical +Payment facilities noted that staff and leadership turnover remained pervasive, often placing responsibility for the Initiative activities solely with the ECCP nurse.

The unfavorable RAVEN Clinical + Payment facility results were surprising given the general dedication to NFI 2 expressed by facility interviewees. Many felt that the reductions in utilization they have achieved in NFI 1 were difficult to improve upon, which may help to explain the NFI 2 findings. Interviewees also noted that facility staff and leadership turnover remained a pervasive issue, often placing responsibility for the Initiative activities solely with the ECCP nurse, with limited involvement from facility staff. Although staff in most facilities with APRNs remained highly engaged, other facilities may have had poorer relationships with their ECCP RNs, who were unable to write orders and certify conditions for NFI 2. Without RAVEN APRNs, who have the ability to assess changes in resident condition, prescribe antibiotics, or order resident lab work, facilities may have reverted to their "business as usual" routines of depending on other practitioners, who may be unengaged or not supportive of treating residents in-house, resulting in higher utilization and expenditures for some facilities. In contrast, Payment-Only facility interviewees often reported high engagement from all levels of staff, adding that they had established clinical practices prior to NFI 2 that encouraged them to treat in place whenever possible.

Table 3-19. RAVEN (Pennsylvania): Initiative effect on hospital-related utilization, FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	19.1	1.2	−1.2	3.6	0.420	6.2
Potentially avoidable	**7.4**	**3.4**	**0.9**	**5.9**	**0.026**	**45.4**
Six qualifying conditions	**2.9**	**2.5**	**0.7**	**4.2**	**0.023**	**84.2**
Any emergency department visit						
All−cause	**15.1**	**4.1**	**0.1**	**8.1**	**0.089**	**27.2**
Potentially avoidable	8.3	1.1	−1.7	3.9	0.528	13.0
Six qualifying conditions	2.3	0.2	−1.0	1.4	0.806	7.8
Any acute care transition						
All−cause	28.2	3.6	−1.0	8.1	0.195	12.7
Potentially avoidable	14.0	3.2	−0.8	7.3	0.187	23.1
Six qualifying conditions	**4.9**	**2.3**	**0.1**	**4.4**	**0.085**	**46.4**
Payment-Only						
Any hospitalization						
All-cause	27.1	0.0	−3.5	3.5	0.997	0.0
Potentially avoidable	12.9	−0.2	−2.7	2.3	0.901	−1.5
Six qualifying conditions	6.9	0.4	−2.0	2.8	0.780	6.0
Any emergency department visit						
All-cause	22.4	−2.5	−6.7	1.7	0.325	−11.1
Potentially avoidable	10.4	−0.7	−3.5	2.0	0.668	−6.9
Six qualifying conditions	3.4	−0.2	−1.7	1.4	0.869	−4.5
Any acute care transition						
All-cause	40.0	−1.8	−6.8	3.3	0.560	−4.5
Potentially avoidable	21.3	−1.1	−4.9	2.7	0.637	−5.1
Six qualifying conditions	10.0	0.3	−2.5	3.0	0.883	2.5

SOURCE: RTI analysis of Medicare claims data (RTI program MS 110; RTI folder: ykaganova\ar4\may_31\ms110).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-20. RAVEN (Pennsylvania): Initiative effect on hospital-related utilization, FY 2019

(count of events, per resident)

Measure	Predicted count absent the Initiative (events per year)	Absolute Initiative effect (events per year)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Hospitalizations						
All-cause	**0.283**	**0.058**	**0.002**	**0.114**	**0.091**	**20.4**
Potentially avoidable	**0.086**	**0.055**	**0.023**	**0.087**	**0.005**	**64.1**
Six qualifying conditions	**0.030**	**0.038**	**0.016**	**0.061**	**0.005**	**127.2**
Emergency department visits						
All−cause	0.211	0.064	−0.023	0.151	0.226	30.4
Potentially avoidable	0.097	0.011	−0.030	0.053	0.650	11.8
Six qualifying conditions	0.027	0.000	−0.016	0.016	0.990	0.4
Acute care transitions						
All−cause	0.491	0.118	−0.019	0.256	0.156	24.1
Potentially avoidable	**0.183**	**0.065**	**0.000**	**0.129**	**0.098**	**35.4**
Six qualifying conditions	**0.055**	**0.041**	**0.011**	**0.070**	**0.024**	**74.2**
Payment-Only						
Hospitalizations						
All-cause	0.465	−0.043	−0.122	0.037	0.376	−9.2
Potentially avoidable	0.163	−0.010	−0.042	0.023	0.621	−6.0
Six qualifying conditions	0.081	0.002	−0.028	0.033	0.897	3.0
Emergency department visits						
All-cause	0.324	−0.052	−0.125	0.021	0.240	−16.1
Potentially avoidable	0.112	−0.001	−0.037	0.035	0.961	−1.0
Six qualifying conditions	0.036	−0.001	−0.017	0.014	0.889	−3.6
Acute care transitions						
All-cause	0.791	−0.099	−0.218	0.021	0.176	−12.5
Potentially avoidable	0.276	−0.012	−0.064	0.040	0.705	−4.3
Six qualifying conditions	0.118	0.001	−0.035	0.037	0.966	0.8

SOURCE: RTI analysis of Medicare claims data (RTI program MS 112; RTI folder: ykaganova\ar4\may_31\ms112).

NOTE: 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays.

[§]Bold numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-21. RAVEN (Pennsylvania): Initiative effect on Medicare expenditures, FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Absolute Initiative effect (dollars)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	25,868	1,822	−1,247	4,891	0.329	7.0
Hospitalization expenditures						
All-cause	5,466	848	−216	1,911	0.190	15.5
Potentially avoidable	**1,191**	**822**	**271**	**1,372**	**0.014**	**69.0**
Six qualifying conditions	**393**	**481**	**150**	**812**	**0.017**	**122.6**
Emergency department visit expenditures						
All−cause	188	45	−21	111	0.259	24.0
Potentially avoidable	88	9	−31	48	0.719	9.8
Six qualifying conditions	33	0	−23	22	0.976	−1.3
Acute care transition expenditures						
All−cause	5,663	782	−538	2,103	0.330	13.8
Potentially avoidable	**1,300**	**835**	**204**	**1,465**	**0.029**	**64.2**
Six qualifying conditions	**425**	**488**	**161**	**816**	**0.014**	**115.0**
Payment-Only						
Total Medicare expenditures	31,636	−1,643	−5,336	2,049	0.464	−5.2
Hospitalization expenditures						
All-cause	8,272	−746	−2,261	770	0.418	−9.0
Potentially avoidable	2,492	−472	−1,041	96	0.172	−19.0
Six qualifying conditions	1,227	−200	−666	266	0.480	−16.3
Emergency department visit expenditures						
All-cause	317	−86	−178	6	0.125	−27.1
Potentially avoidable	90	−3	−31	25	0.847	−3.7
Six qualifying conditions	30	1	−18	20	0.936	3.0
Acute care transition expenditures						
All-cause	8,788	−862	−2,411	686	0.360	−9.8
Potentially avoidable	2,695	−615	−1,270	40	0.122	−22.8
Six qualifying conditions	1,294	−266	−761	228	0.376	−20.6

SOURCE: RTI analysis of Medicare claims data (RTI programs MS 113 and MS 114; RTI folder: ykaganova\ar4\may_31\ms113; ykaganova\ar4\may_31\ms114).

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident 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 mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or 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 numbers indicate values are significantly different from zero based on a p-value cutoff of 0.1.

3.2 NFI 2 Was Associated with Mixed Effects on MDS-Based Quality Measures

3.2.1 Overview and Methods

After accounting for Initiative and comparison group differences and trends prior to NFI 2:

- *For residents in Clinical + Payment facilities, the Initiative was not associated with any statistically significant changes in the majority of quality measures.*
- *For residents in Payment-Only facilities, the Initiative was associated with a higher-than-expected rate of undesirable events in five of the MDS-based quality measures.*

While the Initiative primarily aims to reduce avoidable hospitalizations and improve resident outcomes, it may have an impact on areas beyond this focal point. This includes specific MDS-based quality measures which overlap with some of the pathways that lead to, or prevent, a hospitalization of a resident. The Initiative may impact quality measures in a favorable or unfavorable way. For example, an intervention to reduce potentially avoidable hospitalizations for UTIs may result in better monitoring of indwelling catheter (catheter inserted and left in bladder) use, potentially leading to fewer UTIs. Or, the additional monitoring may lead to additional testing and a higher number of UTIs diagnosed. The Initiative might also lead the facility staff to focus on reducing particular conditions associated with avoidable hospitalizations, with other conditions not monitored as closely. Note that these MDS-based measures are also used in tools, such as Nursing Home Compare, to allow current and potential residents, family members, and facilities to better understand the quality of care provided by the facility.

The following MDS measures were examined in the regression analysis:

- Catheter inserted and left in bladder
- One or more falls with injury
- Self-reported moderate to severe pain
- Pressure ulcers Stage II or higher
- Decline in activities of daily living (ADLs)
- Urinary tract infection (UTI)
- Antipsychotic medication use

To evaluate the Initiative's impact on quality, we analyzed 10 MDS-based quality measures[21] using descriptive statistics (***Appendix R***) and used multivariate regression analysis to examine a smaller

[21] The measures included in both descriptive analyses and multivariate logistic regression analyses are catheter inserted and left in bladder, one or more falls with injury, self-report moderate to severe pain, pressure ulcers Stage II or higher, decline in activities of daily living (ADLs), UTI, and antipsychotic medication use. The measures included only in descriptive analyses are antianxiety or hypnotic medication use, weight loss, and physically restrained.

subset of seven of these measures[22] ***(Tables 3-22 through 3-28***). We calculated 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. All the examined outcomes are unfavorable (e.g., the resident had one or more falls with injury), so a lower score indicates better quality. The multivariate regression of MDS-based quality measures used the same model design as the utilization and expenditure analyses (***Appendix L***). The multivariate results were estimated relative to the national comparison group, after accounting for baseline trends from FY 2014 through FY 2016.

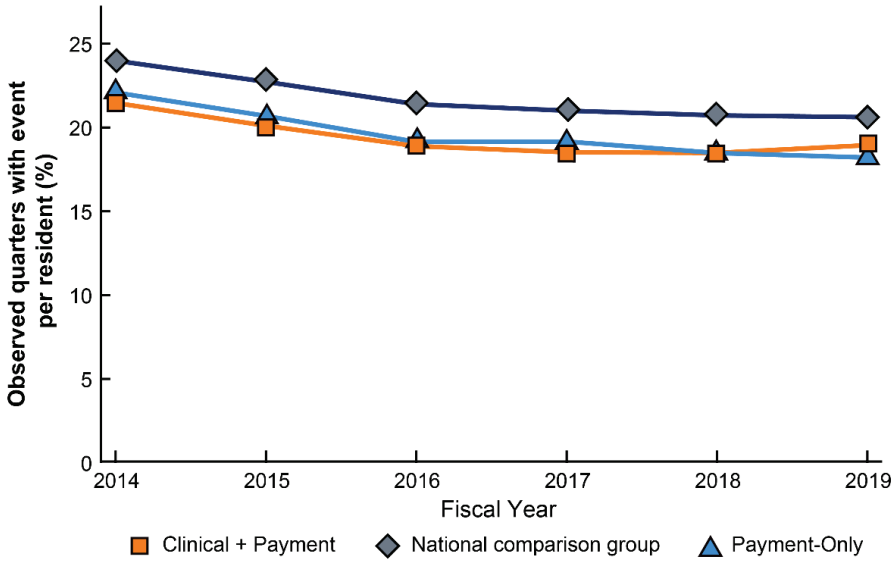
3.2.2 Trends in Unadjusted MDS-Based Quality Outcomes from FY 2014 to FY 2019

To provide context for the multivariate results below, we summarized trends of the unadjusted MDS-based quality outcomes. The descriptive statistics compare outcomes across FY 2014 to FY 2019 among Initiative-eligible residents in ECCP facilities (Clinical + Payment and Payment-Only, separately) and the national comparison group to identify the trends.

On most of the MDS-based quality measures, residents in both Initiative groups had fewer quarters with undesirable events than the national comparison group in FY 2016, prior to the start of NFI 2. In FY 2019, residents in the Initiative groups continued to have fewer quarters with undesirable events than residents in the national comparison group, though the difference from the national comparison group was smaller for residents in Payment-Only facilities on multiple quality measures. For most of the MDS-based quality measures, the percentage of quarters in which residents experienced undesirable events decreased or remained consistent over time, from FY 2014 to FY 2019, for the Initiative groups and national comparison group. The full descriptive results are available in ***Appendix R***. ***Figure 3-4*** shows the percentage of observed quarters per resident that a resident received antipsychotic medications as an example of the trends.

[22] These measures were selected due to their statistical characteristics allowing stable and meaningful results with the multivariate regression methodology.

Figure 3-4. 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_new).

3.2.3 Overall Initiative Impact on MDS-Based Quality Outcomes across All ECCPs

In FY 2019, for residents in Clinical + Payment facilities, we found no statistically significant Initiative-associated effects for six of the seven MDS-based quality measures for the pooled model combining the six ECCPs (***Table 3-22***). The Initiative was associated with a higher probability of residents receiving antipsychotic medication (unfavorable) in Clinical + Payment facilities than would be expected in the absence of the Initiative. The result suggests that for Initiative-eligible residents in Clinical + Payment facilities, the predicted probability of being on antipsychotic medication in FY 2019 absent the Initiative was 17.7 percent. Initiative participation was associated with higher-than-expected probability to receive this medication type by a statistically significant 1.4 percentage points. This represents a statistically significant 8.1 percent relative increase in the average resident's probability of being on antipsychotic medication. As shown in ***Figure 3-4***, the unadjusted rate of antipsychotic medication for residents in Clinical + Payment facilities was lower than in national comparison group facilities, declining similarly in all years until rising in 2019. The interviewees did not comment on any increased use of antipsychotic medications; rather, many interviewees across ECCPs indicated that the Initiative had encouraged lower use of antipsychotic medications.

For residents in Payment-Only facilities, five MDS-based quality measures showed a statistically significant higher-than-expected probability of undesirable events (***Table 3-22***). These results indicate that Initiative-eligible residents in the Payment-Only group experienced the following undesirable events more frequently than would be expected absent the Initiative in FY 2019: one

or more falls with injury, self-reported moderate to severe pain, UTI, decline in ADLs, and antipsychotic medication use.

The quality measure with the largest relative effect was UTI occurrence. The Initiative was associated with a statistically significant 0.8 percentage point higher-than-expected probability of UTI, a 37.8 percent relative effect. The increase in UTIs in Payment-Only facilities could have resulted, in part, from increased surveillance and reporting of the condition because it is one of the six conditions qualifying for incentive payment under NFI 2. The coding of the presence of UTIs in MDS assessments is distinct from NFI 2 billing requirements for UTIs and could have increased during NFI 2, despite the 2019 change in clinical criteria with more stringent NFI 2 billing requirements for UTIs. Despite these unfavorable results, our interviews with ECCPs did not elicit reports of any negative effects of the Initiative on their performance on MDS-based quality measures in Initiative Year 3.

Table 3-22. All ECCPs: Initiative effect on MDS-based quality measures, FY 2019

(percent of observed quarters with event per resident)

Measure	Predicted mean absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	11.8	0.5	−0.5	1.4	0.421	3.9
Self-reported moderate to severe pain	2.8	−0.1	−0.7	0.5	0.874	−2.2
Pressure ulcers Stage II or higher	4.1	−0.1	−0.4	0.3	0.823	−1.2
Urinary tract infection	1.9	0.2	−0.1	0.5	0.282	11.3
Catheter inserted and left in bladder	4.3	0.2	−0.2	0.6	0.324	5.6
Decline in ADLs	11.7	0.5	−0.6	1.7	0.453	4.6
Antipsychotic medication use	**17.7**	**1.4**	**0.1**	**2.8**	**0.082**	**8.1**
Payment-Only						
One or more falls with injury	**12.7**	**1.2**	**0.1**	**2.3**	**0.065**	**9.5**
Self-reported moderate to severe pain	**2.9**	**0.8**	**0.2**	**1.3**	**0.026**	**26.6**
Pressure ulcers Stage II or higher	3.4	0.1	−0.2	0.4	0.682	2.4
Urinary tract infection	**2.0**	**0.8**	**0.4**	**1.1**	**0.001**	**37.8**
Catheter inserted and left in bladder	4.9	0.1	−0.3	0.6	0.611	2.9
Decline in ADLs	**12.7**	**1.1**	**0.2**	**1.9**	**0.037**	**8.4**
Antipsychotic medication use	**16.6**	**1.7**	**0.7**	**2.8**	**0.007**	**10.3**

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID113; RTI folder: ykaganova\ar4\may_31\id113).

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per 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 national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution.

[§]Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

3.2.4 Initiative Impact on MDS-Based Quality Outcomes for Individual ECCPs

Analyzing individual ECCPs may help us identify more nuanced trends within and between the MDS-based quality measures. However, there was no clear pattern in the direction of change, nor which quality measures were impacted by the Initiative. The multivariate analysis did not provide evidence of quality improvement for eligible residents due to the Initiative beyond any quality improvement trend that simultaneously occurred nationally and preceded the Initiative (FY 2014 to FY 2016).

In the Clinical + Payment group, four ECCPs (AQAF, ATOP2, NY-RAH, and RAVEN) each had one to two quality measures that showed a statistically significant undesirable Initiative effect. Additionally, MOQI had four quality measures with a statistically significant undesirable association with the Initiative. Three ECCPs (MOQI, NY-RAH, and RAVEN) each had one quality measure with a statistically significant desirable association with the Initiative. No pattern was clearly evident in these findings.

> Among individual ECCPs, there was no clear pattern of change across the MDS-based quality measures, but the Initiative was associated with more unfavorable effects than favorable effects.

In the Payment-Only group, five ECCPs (AQAF, ATOP2, MOQI, NY-RAH, and RAVEN) each had one to two quality measures that showed a statistically significant undesirable association with the Initiative. These effects were spread across five quality measures. We found no statistically significant desirable associations with the Initiative on MDS-based quality measures in the Payment-Only group.

Table 3-23. AQAF (Alabama): Initiative effect on MDS-based quality measures, FY 2019

(percent of observed quarters with event per resident)

Measure	Predicted mean absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	14.8	1.1	−1.0	3.1	0.391	7.2
Self-reported moderate to severe pain	2.9	0.9	−1.2	3.0	0.496	29.8
Pressure ulcers Stage II or higher	2.7	0.2	−0.5	0.9	0.698	6.4
Urinary tract infection	**2.7**	**1.0**	**0.0**	**2.0**	**0.083**	**36.5**
Catheter inserted and left in bladder	2.9	0.5	−0.4	1.4	0.375	17.8
Decline in ADLs	12.3	−0.9	−4.0	2.2	0.624	−7.5
Antipsychotic medication use	**20.7**	**3.2**	**0.2**	**6.3**	**0.082**	**15.7**
Payment-Only						
One or more falls with injury	**11.0**	**2.6**	**0.4**	**4.7**	**0.048**	**23.3**
Self-reported moderate to severe pain	3.3	2.1	−0.6	4.8	0.203	63.6
Pressure ulcers Stage II or higher	2.9	−0.1	−1.0	0.7	0.786	−4.8
Urinary tract infection	1.9	0.5	−0.3	1.3	0.287	27.6
Catheter inserted and left in bladder	3.3	0.1	−0.8	1.0	0.859	3.0
Decline in ADLs	12.1	1.2	−0.9	3.3	0.351	10.0
Antipsychotic medication use	**19.1**	**3.1**	**0.6**	**5.7**	**0.045**	**16.4**

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID113; RTI folder: ykaganova\ar4\may_31\id113).

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per 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 national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution.

[§]Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-24. ATOP2 (Nevada/Colorado): Initiative effect on MDS-based quality measures, FY 2019

(percent of observed quarters with event per resident)

Measure	Predicted mean absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	12.3	0.4	−2.4	3.2	0.825	3.0
Self-reported moderate to severe pain	8.9	−2.7	−6.1	0.7	0.191	−30.4
Pressure ulcers Stage II or higher	3.7	0.7	−0.1	1.5	0.147	19.4
Urinary tract infection	1.4	0.4	−0.4	1.2	0.445	27.7
Catheter inserted and left in bladder	8.5	−0.6	−1.9	0.7	0.441	−7.0
Decline in ADLs	13.1	−1.7	−4.8	1.5	0.376	−12.9
Antipsychotic medication use	**17.5**	**5.1**	**1.5**	**8.6**	**0.019**	**29.0**
Payment-Only						
One or more falls with injury	13.9	2.8	−0.5	6.1	0.162	20.2
Self-reported moderate to severe pain	4.0	0.5	−1.3	2.2	0.662	11.4
Pressure ulcers Stage II or higher	2.3	0.8	−0.1	1.8	0.148	35.9
Urinary tract infection	**2.2**	**0.7**	**0.1**	**1.4**	**0.049**	**34.4**
Catheter inserted and left in bladder	6.5	0.8	−0.2	1.8	0.194	12.1
Decline in ADLs	13.4	−0.6	−3.0	1.7	0.671	−4.5
Antipsychotic medication use	15.2	0.8	−1.7	3.3	0.608	5.1

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID113; RTI folder: ykaganova\ar4\may_31\id113).

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per 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 national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution.

[§]Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-25. MOQI (Missouri): Initiative effect on MDS-based quality measures, FY 2019

(percent of observed quarters with event per resident)

Measure	Predicted mean absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	**16.0**	**−3.4**	**−6.6**	**−0.2**	**0.084**	**−21.2**
Self-reported moderate to severe pain	2.6	0.4	−0.8	1.6	0.559	16.1
Pressure ulcers Stage II or higher	3.0	0.6	−0.1	1.4	0.151	20.8
Urinary tract infection	**1.9**	**1.2**	**0.3**	**2.1**	**0.023**	**63.7**
Catheter inserted and left in bladder	**5.0**	**0.8**	**0.1**	**1.6**	**0.077**	**16.6**
Decline in ADLs	**9.3**	**4.1**	**1.5**	**6.7**	**0.010**	**44.1**
Antipsychotic medication use	**14.9**	**4.2**	**0.6**	**7.7**	**0.011**	**28.0**
Payment-Only						
One or more falls with injury	16.4	2.9	−0.9	6.8	0.206	18.0
Self-reported moderate to severe pain	**3.9**	**1.7**	**0.2**	**3.2**	**0.055**	**44.0**
Pressure ulcers Stage II or higher	2.2	0.6	−0.2	1.4	0.229	27.2
Urinary tract infection	**2.2**	**1.9**	**0.7**	**3.2**	**0.012**	**85.7**
Catheter inserted and left in bladder	3.6	0.0	−0.8	0.9	0.949	0.8
Decline in ADLs	13.2	1.0	−1.0	3.0	0.391	7.9
Antipsychotic medication use	19.5	1.7	−0.7	4.2	0.251	8.8

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID113; RTI folder: ykaganova\ar4\may_31\id113).

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per 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 national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution.

[§]Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-26. NY-RAH (New York): Initiative effect on MDS-based quality measures, FY 2019

(percent of observed quarters with event per resident)

Measure	Predicted mean absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	**7.6**	**1.8**	**0.4**	**3.2**	**0.031**	**23.9**
Self-reported moderate to severe pain	0.8	0.1	−0.3	0.6	0.683	14.3
Pressure ulcers Stage II or higher	6.0	−0.6	−1.6	0.5	0.378	−9.1
Urinary tract infection	1.8	−0.1	−0.6	0.5	0.860	−3.4
Catheter inserted and left in bladder	3.6	0.0	−0.8	0.8	0.947	0.8
Decline in ADLs	8.2	0.9	−0.7	2.5	0.370	11.0
Antipsychotic medication use	**13.6**	**−2.5**	**−4.6**	**−0.3**	**0.061**	**−18.0**
Payment-Only						
One or more falls with injury	10.6	−0.2	−1.6	1.2	0.807	−2.0
Self-reported moderate to severe pain	1.6	0.3	−0.4	1.0	0.501	17.6
Pressure ulcers Stage II or higher	4.6	0.0	−0.6	0.6	0.969	−0.2
Urinary tract infection	**1.9**	**0.9**	**0.2**	**1.6**	**0.030**	**48.4**
Catheter inserted and left in bladder	5.1	0.2	−0.7	1.1	0.726	3.9
Decline in ADLs	**10.3**	**1.8**	**0.4**	**3.2**	**0.030**	**17.8**
Antipsychotic medication use	17.4	1.3	−0.6	3.2	0.256	7.5

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID113; RTI folder: ykaganova\ar4\may_31\id113).

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per 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 national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution.

[§]Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-27. OPTIMISTIC (Indiana): Initiative effect on MDS-based quality measures, FY 2019

(percent of observed quarters with event per resident)

Measure	Predicted mean absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	15.3	−1.0	−3.2	1.3	0.475	−6.4
Self-reported moderate to severe pain	1.4	0.1	−1.0	1.3	0.841	9.9
Pressure ulcers Stage II or higher	3.4	0.7	−0.3	1.6	0.242	19.4
Urinary tract infection	1.6	−0.5	−1.3	0.2	0.249	−32.5
Catheter inserted and left in bladder	4.3	0.3	−0.5	1.1	0.529	7.1
Decline in ADLs	12.5	2.7	−0.5	5.9	0.167	21.5
Antipsychotic medication use	17.5	0.8	−2.5	4.0	0.701	4.3
Payment-Only						
One or more falls with injury	15.0	2.3	−0.5	5.0	0.181	15.1
Self-reported moderate to severe pain	2.4	0.5	−1.0	2.0	0.592	20.7
Pressure ulcers Stage II or higher	3.1	−0.4	−1.3	0.5	0.487	−12.3
Urinary tract infection	2.2	0.2	−0.7	1.0	0.759	7.3
Catheter inserted and left in bladder	4.6	−0.1	−1.0	0.8	0.866	−2.2
Decline in ADLs	14.2	1.3	−0.9	3.4	0.324	9.1
Antipsychotic medication use	16.2	0.6	−2.6	3.8	0.745	4.0

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID113; RTI folder: ykaganova\ar4\may_31\id113).

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per 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 national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution.

[§]Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table 3-28. RAVEN (Pennsylvania): Initiative effect on MDS-based quality measures, FY 2019

(percent of observed quarters with event per resident)

Measure	Predicted mean absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	**9.2**	**3.6**	**1.9**	**5.4**	**0.001**	**39.5**
Self-reported moderate to severe pain	3.9	−0.1	−1.8	1.7	0.954	−1.6
Pressure ulcers Stage II or higher	**3.5**	**−1.2**	**−2.0**	**−0.4**	**0.009**	**−34.7**
Urinary tract infection	2.1	0.1	−0.8	1.1	0.828	6.3
Catheter inserted and left in bladder	3.3	0.5	−0.5	1.5	0.420	14.5
Decline in ADLs	17.7	−1.4	−4.3	1.5	0.421	−8.0
Antipsychotic medication use	26.5	3.2	−0.5	6.9	0.151	12.1
Payment-Only						
One or more falls with injury	11.4	−1.2	−3.3	0.9	0.358	−10.4
Self-reported moderate to severe pain	4.7	0.0	−1.6	1.7	0.965	0.8
Pressure ulcers Stage II or higher	3.1	−0.2	−0.9	0.5	0.623	−6.5
Urinary tract infection	2.1	−0.1	−0.7	0.5	0.780	−4.8
Catheter inserted and left in bladder	5.8	−0.1	−1.6	1.5	0.920	−1.5
Decline in ADLs	15.7	0.6	−1.8	2.9	0.699	3.6
Antipsychotic medication use	**11.9**	**3.3**	**0.8**	**5.9**	**0.031**	**27.9**

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data (RTI program ID113; RTI folder: ykaganova\ar4\may_31\id113).

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per 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 national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (absolute Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution.

[§]Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

3.3 NFI 2 Was Not Associated with a Change in Resident Mortality Rates in FY 2019

3.3.1 Overview and Methods

We examined whether the Initiative was associated with any change in resident mortality. Although the Initiative was not expected to impact mortality, such an impact could occur for various reasons. For example, an increased focus on detecting and treating acute changes in conditions could lead to reduced mortality. On the other hand, there could be an unfavorable increase in mortality if the Initiative's focus on on-site treatment led to delays in needed hospitalizations or acute care. Alternatively, increased adoption of end-of-life (EOL) model components in ECCP Clinical + Payment facilities may result in better adherence to documenting resident and family wishes to reduce or remove life sustaining treatments which in turn could lead to an increase in mortality rates for residents. These ECCP model intervention components align with improved person-centeredness through both documenting and following residents' EOL treatment goals and preferences.

We used various analytic approaches to assess the impact of the Initiative on mortality among Initiative-eligible residents. We first examined unadjusted trends in resident mortality rates. Second, we evaluated mortality rates for Initiative-eligible residents who received on-site treatment for the six conditions against the expected trajectory. Third, we conducted DD multivariate regression analysis of resident mortality. Finally, we analyzed site visit and phone interview data to understand the potential impact of ECCP EOL model components on EOL care, including advanced care planning (ACP) and palliative or comfort care treatments.

For both the unadjusted trends and the DD models, the outcome was mortality within the fiscal year. The analysis used the same analytic sample characteristics and general model specifications as our multivariate analysis for utilization and expenditure outcomes. The covariates in this analysis were the same as used in the utilization and expenditure analyses (***Appendix L***). One complicating factor for using DD models to measure the impact of the Initiative on mortality is hospice use. Hospice use is an eligibility exclusion criterion for the Initiative overall. Furthermore, residents with hospice use are expected to be at a higher risk of dying than those without, and hospice use is unevenly distributed across Initiative and comparison groups. Residents can be included in our study sample and then enroll in hospice, ending their Initiative-eligible period, before dying. If we only counted deaths occurring during a resident's Initiative-eligible period, our estimates could be biased. To address this issue, we counted all deaths that occurred during the fiscal year regardless of whether the death occurred during or after an Initiative-eligible period. By using a broader timeframe to examine the mortality outcome, we count some deaths occurring long after a resident's Initiative-eligible period, but we expect such instances to be evenly distributed across samples. In separate analyses presented below to measure resident mortality

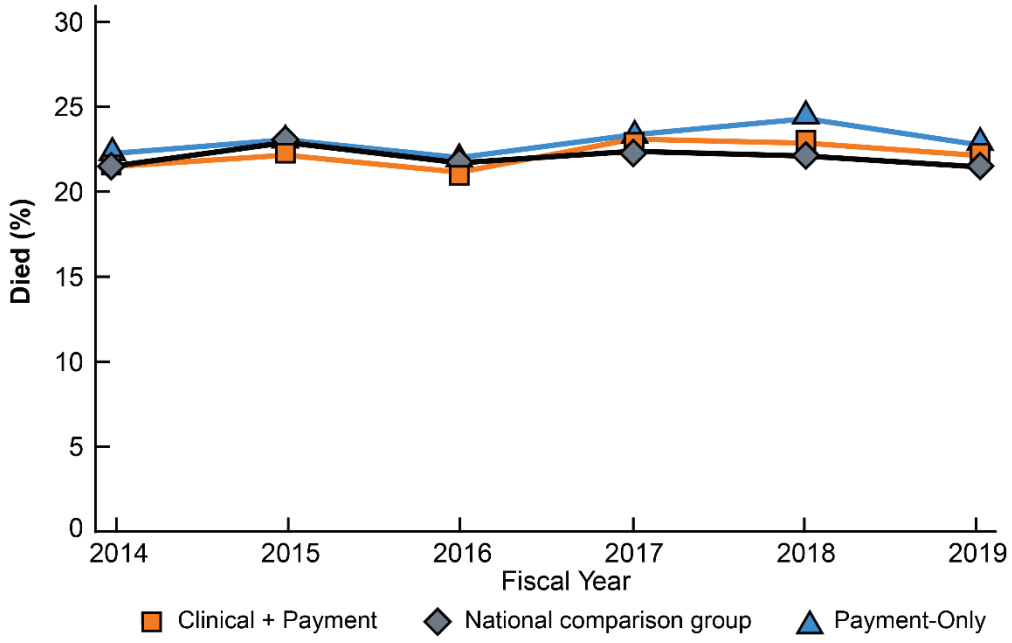
following on-site treatment, we used shorter timeframes (7 or 30 days following the end of a treatment episode).

3.3.2 Trends in Unadjusted Resident Mortality Rates from FY 2014 to FY 2019

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 and comparison group residents each year from FY 2014 to FY 2019. As explained above, we examined mortality within the fiscal year: deaths that occurred at any time during the fiscal year to compare the mortality trends from the base period (FY 2014–FY 2016) to the intervention period (FY 2017–FY 2019).

Figure 3-5 shows the trend of unadjusted mortality rate from FY 2014 to FY 2019 for the Payment-Only and the Clinical + Payment groups for all ECCPs combined and the national comparison group. ***Figures S-1*** to ***S-7*** in ***Appendix S*** show the same trends for each ECCP individually. The rates for the individual ECCPs with smaller sample sizes are subject to more variability.

Figure 3-5. All ECCPs: Percentage of residents who died each year, FY 2014–FY 2019



SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program AF600 and Tables_AR4_EOL; RTI folders: pgm\data\analytic\ar4, mkluckman\output\ar4\eol).

The mortality rates in all groups increased from FY 2016 to FY 2017, the first Initiative year, with a larger increase for the Initiative groups compared to the national comparison group. Mortality in the Payment-Only group increased further in FY 2018 before decreasing in FY 2019, while the mortality rates for Clinical + Payment and the national comparison group decreased slightly from FY 2017 to FY 2019. Relative to FY 2016, there was higher mortality across both intervention

groups in FY 2017 through FY 2019 in the six ECCPs combined, although the mortality rates were lower in FY 2019 than in FY 2017 or FY 2018. However, mortality rates for both intervention groups were higher than the national comparison group from FY 2017 through FY 2019.

3.3.3 Mortality Among Initiative-Eligible Residents Who Received On-Site Treatment

As part of our study of the Initiative impact on resident mortality, we performed three descriptive analyses to determine if Initiative residents that received on-site treatment for any of the six conditions (a subgroup of all of the eligible residents in Initiative facilities because many residents were never diagnosed with any of the six conditions) had higher than anticipated mortality. The reason for pursuing this analysis was the concern that an unintended consequence of the Initiative could be inappropriate delays in needed hospital treatment.

Although there was no true comparison group for residents treated on-site to allow us to make definite causal statements about this aspect of the Initiative impact on mortality, these analyses provide important context for understanding mortality among participating residents. Overall, none of the analyses indicated unexpectedly high mortality for those residents treated on-site.

Our analysis included the following steps, with more details on the rationale and methods provided in the subsections below:

1. We categorized residents based on their receipt of treatment for the six Initiative conditions and compared mortality during the year (FY 2019) for residents treated on-site to other eligible residents.
2. We measured the mortality rate within 7 and 30 days following on-site treatment.
3. We studied the rate of hospital treatment of residents following on-site treatment. Our rationale for this investigation was that a high rate of hospital treatment for residents following on-site treatment may indicate the initial decision to treat on-site was inappropriate or that the care provided to the resident was poor quality. This would be concerning and could also mean the Initiative led to increased mortality.

All analyses presented below are based on data from FY 2019. ***Appendix S*** includes additional annual analyses for FY 2017 through FY 2019 as well as pooled analyses across three years.

Analysis # 1 – Resident mortality by on-site treatment status

To compare resident mortality by on-site treatment status, we categorized Clinical + Payment and Payment-Only residents based on their receipt of treatment for the six qualifying conditions and calculated the percentage of residents who died during the fiscal year. Overall, mortality was higher for those treated on-site compared to those not treated at all for the six conditions. Mortality was much higher for those treated in the hospital for the six conditions. The finding of

higher mortality compared to those not treated at all does not necessarily suggest an adverse impact of the Initiative. The residents diagnosed and treated for one of the six qualifying conditions may have been sicker and at higher risk of dying than the residents not formally diagnosed with the symptoms meeting the Initiative criteria, and thus not treated for these conditions.

To perform the analysis, residents were divided into four groups based on whether they were treated on-site or in the hospital for the six conditions (as described in ***Section 2***). We also created similar groupings for each of the six qualifying conditions separately. For residents treated on-site, an Initiative-participating physician or an ECCP APRN diagnosed the six qualifying conditions. For those treated in the hospital for the six qualifying conditions, the diagnoses were based on Medicare hospital claims. To identify the six qualifying conditions, we used the same diagnosis codes as for the hospital utilization measures (***Appendix M***). In-hospital treatment included inpatient care, ED visits, or observation stays.

> Overall, mortality was higher for those treated on-site compared to those not treated at all for the six conditions. Mortality was much higher for those treated in the hospital for the six conditions.

As shown in ***Figure 3-6***, the mortality rate among residents who received on-site treatment for one of the six qualifying conditions was higher (24.1 and 21.7 percent in Clinical + Payment and Payment-Only, respectively) than for those who did not receive treatment for any of the six qualifying conditions (20.6 and 21.6 percent in Clinical + Payment and Payment-Only, respectively). Importantly, it was substantially lower than for those who were treated in the hospital for one of the six qualifying conditions. For the residents treated in the hospital, the mortality rate ranged between 29.3 percent and 34.4 percent for the two groups, depending on whether the resident was also treated on-site.

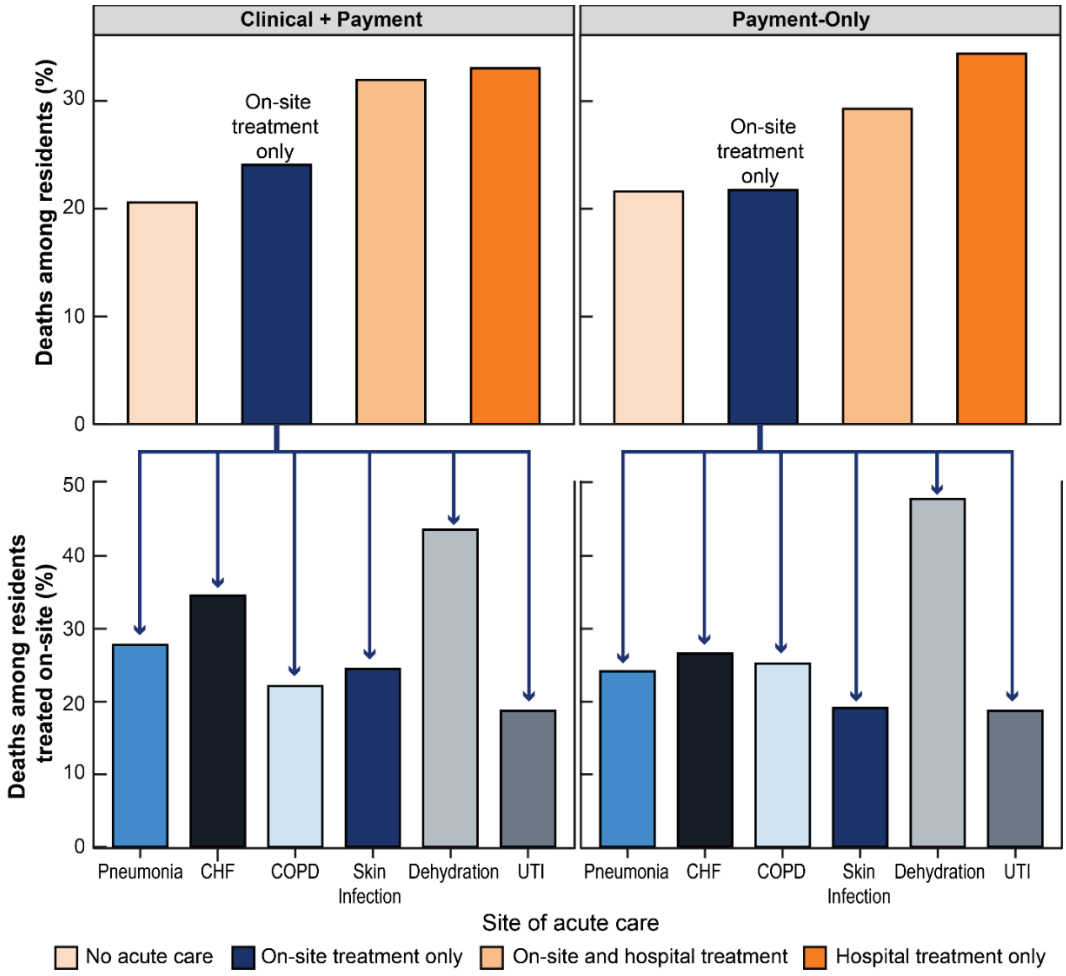
Mortality after on-site treatment varied by condition and was highest for dehydration followed by CHF (***Figure 3-6***). The high mortality for those treated for dehydration, along with their high rates of cognitive impairment, dementia, and functional impairment (see ***Appendix S***), suggest that those treated on-site for dehydration were a seriously ill population.

The finding of higher mortality for residents treated in the hospital is also consistent with what we heard during an interview with a participating ECCP. One NY-RAH ECCP leader described a large number of resident transfers from a ventilator unit at a large Clinical + Payment facility to the hospital, resulting in a substantial number of deaths, stating,

"Just the other day we discussed a nursing facility [where] 17 out of 19 transfers wound up dying in the hospital."

Another member of this team commented that two additional Clinical + Payment facilities had similar challenges, frequently transferring residents from ventilator units to hospitals. They noted there were missed opportunities to have advance directives in place preventing such transfers.

Figure 3-6. Residents mortality by treatment status for the six qualifying conditions, FY 2019



SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI programs AF 800 & NBC HV02; RTI folders: csaur\output\pah2_ar4_af800_2; mkluckman\output\ar4\HV02).

NOTE: Dehydration and fluid/electrolyte disorder are used interchangeably. CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection

Analysis # 2 – Mortality rate of residents following on-site treatment

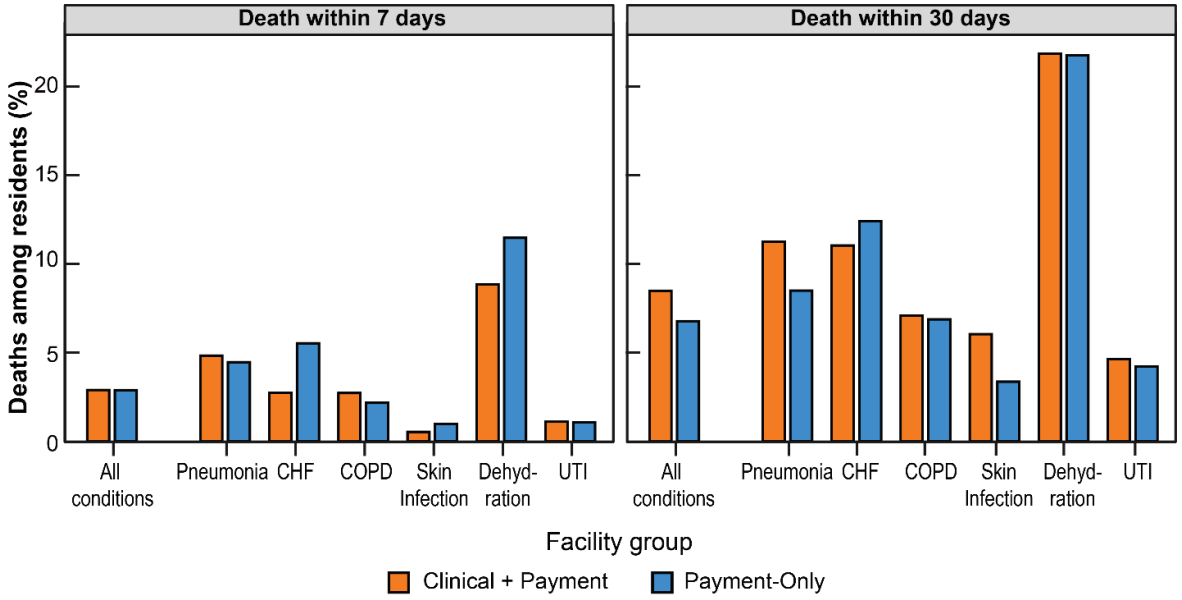
We examined mortality within 7 days and 30 days from the end of the treatment episode. A high mortality rate soon after on-site treatment could indicate that the initial decision to treat the resident on-site was inappropriate.[23] Unlike earlier resident-level analyses, these analyses were

[23] High mortality after on-site treatment could also indicate that these residents were at the end of life and benefited from avoiding an acute transition at that point.

conducted at the treatment episode level, so residents could be included more than once if they had more than one episode. ***Appendix S*** provides details of the analytical approach.

Within 7 days of treatment, 2.9 percent of both Clinical + Payment residents and Payment-Only residents died (***Figure 3-7***). Within 30 days, 8.5 percent of Clinical + Payment residents and 6.8 percent of Payment-Only residents died. Residents treated for dehydration had higher mortality after 7 and 30 days of treatment in both groups when compared to residents treated for other conditions. The explanations we offered above for the higher mortality for those treated for dehydration apply here as well. We also observed relatively higher mortality for residents treated for pneumonia and CHF compared to the other conditions. **With no comparison group, we cannot state whether these mortality rates were "too high," although the conditions with higher mortality make intuitive sense.**

Figure 3-7. Percent of residents that died within 7 and 30 days following on-site treatment, FY 2019



SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI programs AF 820 & NBC DH01; RTI folders: csaur\output\pah2_ar4_af810_1; mkluckman\output\ar4\DH01).

NOTE: Dehydration and fluid/electrolyte disorder are used interchangeably. CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection

Analysis # 3 – Hospital treatment of residents following on-site treatment

Parallel to our analysis of mortality following on-site treatment within 7 or 30 days, we investigated the extent of hospital treatment within 7 and 30 days following on-site treatment. We examined the incidence of any ACT to the hospital—whether for inpatient care, an ED visit, or an observation stay. A high rate of hospital treatment for

Our analysis did not find high rates of hospital treatment following on-site treatment for the six conditions.

residents following on-site treatment could indicate the initial decision to treat on-site was inappropriate or that poor quality care was provided. These possibilities would be concerning and could also increase the concern that the Initiative may be increasing mortality. Although there is no true comparison group for this analysis, we did compare the rate of hospital treatment following on-site treatment to the rate of a subsequent hospital treatment following an original hospital treatment for the six conditions (i.e., readmission). Overall, our findings did not indicate high rates of hospital treatment following on-site treatment for the six conditions.

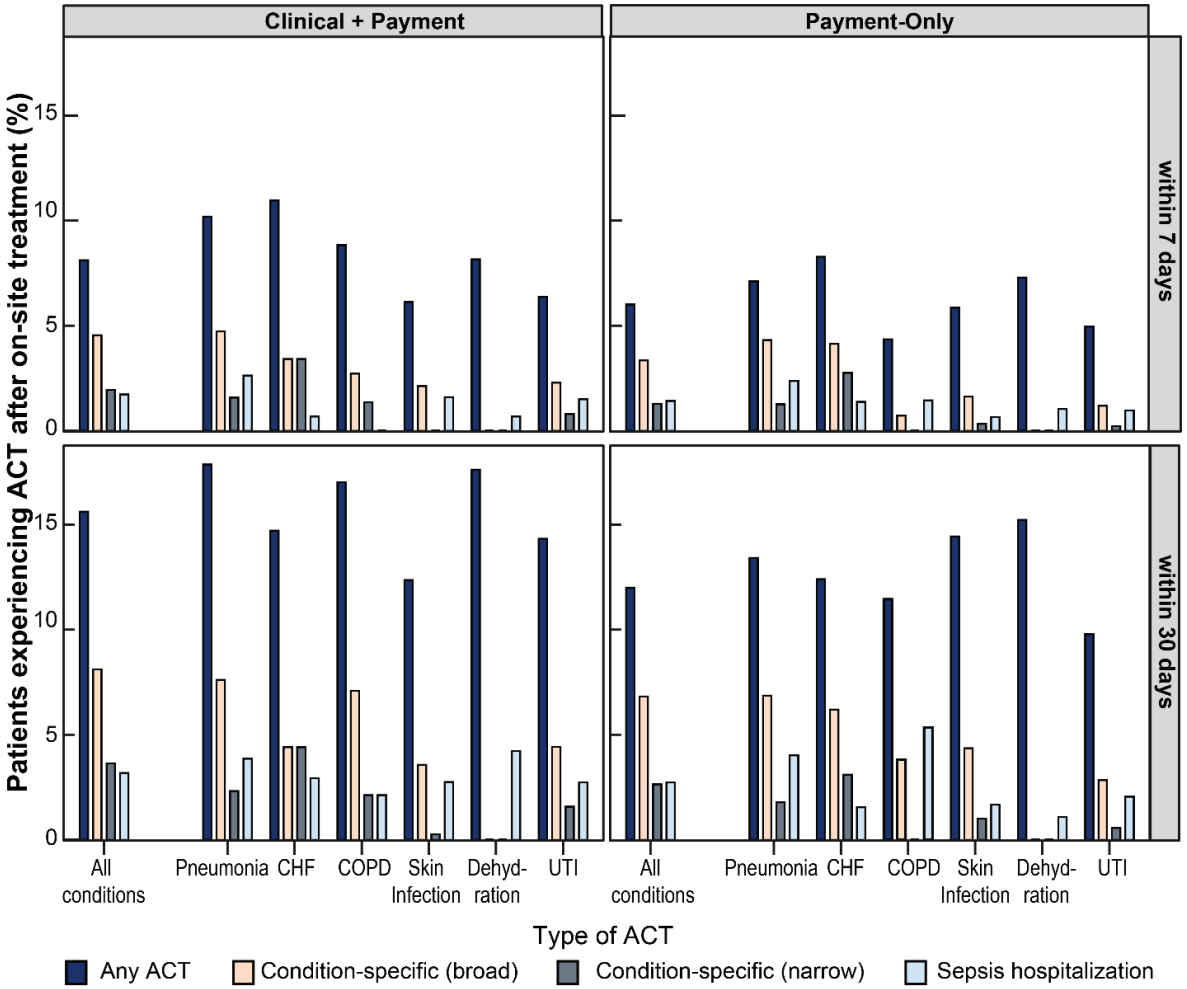
In measuring the incidence of ACTs, we used four measures: all-cause, a broader condition-specific measure, a narrower condition-specific measure (identical to what was used in the utilization and expenditure analyses), and sepsis. More details on these definitions are provided in ***Appendix S***. It is important to distinguish whether the hospital transfer was for one of the six qualifying conditions because if the hospitalization was for a different condition, it may not be related to the on-site treatment. Therefore, it is less likely to indicate that the resident should have been hospitalized instead of receiving on-site treatment. A caveat is that comparing principal diagnosis coded on the hospital claim to the on-site diagnosis only provides partial information. These two sources of information 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.

Four ACT measures following on-site treatment:
1. All-cause ACT
2. A broader condition-specific measure
3. A narrower condition-specific measure
4. Sepsis

As demonstrated in *Figure 3-8*, hospital treatment following on-site treatment was uncommon and typically happened less often in Payment-Only facilities. In the Clinical + Payment group, residents had an ACT within 7 days after 8.1 percent of episodes, and an ACT within 30 days after 15.6 percent of episodes. In the Payment-Only group, the rates of ACT following on-site treatment within 7 and 30 days were slightly lower at 6.0 percent and 12.0 percent of episodes. In both groups, while only a minority of these ACTs were for the six qualifying conditions narrowly defined, about half were for the six conditions broadly defined.

As explained above, we conducted an analysis to measure the rates of hospital treatment following an initial hospital treatment (ACT) for the six conditions to compare to the rate of hospital treatment following on-site treatment. **The rate of admission following on-site treatment was substantially lower than the rate of readmission following treatment in the hospital for each of the six conditions, which partially alleviates the concern that on-site treatment may have been inappropriate**. More details on this analysis are provided in ***Appendix S***.

Figure 3-8. Percentage of residents who had hospital treatment (any acute care transitions) within 7 and 30 days following on-site treatment, FY 2019



SOURCE: RTI analysis of Medicare claims data (RTI programs AF 810 & NBC DH01; RTI folders: csaur\output\pah2_ar4_af810_1; mkluckman\output\ar4\DH01).

NOTE: Dehydration and fluid/electrolyte disorder are used interchangeably. CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection; ACT = acute care transition

3.3.4 Potential Impact of the Initiative on Mortality Rates Among Initiative-Eligible Residents

- *In both the Clinical + Payment and Payment-Only groups, DD models show the Initiative had no statistically significant effect on mortality in FY 2019 in the six ECCPs combined.*

To further understand how the Initiative affects mortality rates among all Initiative-eligible residents, including those not treated on-site, we conducted multivariate DD regression analysis. This analysis estimated the Initiative's impact on mortality within the fiscal year using data from FY 2014 to FY 2019, for all Initiative-eligible residents in the ECCP facilities (separately for Clinical + Payment and Payment-Only). ***Appendix S*** presents additional sensitivity models to estimate the Initiative impact on mortality.

We present estimates of the Initiative effect on mortality in FY 2019 relative to the national comparison group, using the trend from FY 2014 to FY 2016 as the base period (***Table 3-1***). The absolute Initiative effect measured the change in mortality risk among Initiative-eligible residents in the intervention group and is presented as the change in percentage points from the predicted probability of mortality risk without the Initiative. Positive effects indicate that the Initiative was associated with a relative increase in mortality rate, and negative effects indicate that the Initiative is associated with a relative decrease in mortality rate, compared to the national comparison group.

The Initiative had no statistically significant effect on mortality in the six ECCPs combined. In the Clinical + Payment group, the relative effect of the Initiative on expected mortality rate was an unfavorable 4.4 percent increase. Similarly, in the Payment-Only group, the relative effect on mortality rate was an unfavorable increase of 3.1 percent. Neither of the effects were statistically significant.

In the Clinical + Payment group, participating in the Initiative was associated with a statistically significant unfavorable increase in mortality for residents in AQAF and RAVEN facilities in FY 2019. The individual ECCP relative effects ranged from a 4.4 percent decrease in mortality rate for ATOP2 (largest favorable decrease), which was not statistically significant, to a statistically significant 15.5 percent increase in mortality rate for AQAF (largest unfavorable increase).

In the Payment-Only group, participating in the Initiative was associated with a statistically significant unfavorable increase in mortality for residents in MOQI facilities in FY 2019. The relative effect of the Initiative ranged from a 7.7 percent decrease in mortality in ATOP2 (not statistically significant) to a 14.4 percent increase in mortality in MOQI.

Table 3-29. Initiative effect on mortality, FY 2019

(probability of mortality among residents)

Measure	Predicted probability absent the Initiative (percent)	Absolute Initiative effect (percentage points)	90% CI		p-value[§]	Relative effect (percent)
Clinical + Payment						
All ECCPs (6 states)	21.2	0.9	−0.2	2.0	0.171	4.4
AQAF (AL)	**21.8**	**3.4**	**0.1**	**6.6**	**0.091**	**15.5**
ATOP2 (NV)	20.6	−0.9	−4.9	3.1	0.707	−4.4
MOQI (MO)	21.5	−0.4	−3.5	2.8	0.852	−1.7
NY-RAH (NY)	21.1	0.6	−1.5	2.7	0.620	2.9
OPTIMISTIC (IN)	21.4	2.2	−0.1	4.6	0.122	10.5
RAVEN (PA)	**19.5**	**1.9**	**0.7**	**3.1**	**0.008**	**9.7**
Payment-Only						
All ECCPs (6 states)	22.1	0.7	−0.4	1.8	0.315	3.1
AQAF (AL)	21.6	1.3	−1.5	4.2	0.449	6.1
ATOP2 (CO)	23.6	−1.8	−5.6	2.0	0.434	−7.7
MOQI (MO)	**19.8**	**2.9**	**0.3**	**5.4**	**0.064**	**14.4**
NY-RAH (NY)	21.6	1.4	−0.2	2.9	0.144	6.3
OPTIMISTIC (IN)	22.9	0.1	−2.5	2.6	0.966	0.3
RAVEN (PA)	23.2	−0.2	−4.6	4.2	0.929	−1.0

SOURCE: RTI analysis of Medicare eligibility and enrollment data (RTI program: JF_030_AR4_Modeling_Mortality; RTI folder: ykaganova\ar4\may_13\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 national 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) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here.

[§]Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

3.3.5 ECCP End-of-Life Model Components at Participating Facilities

- *In many Clinical + Payment facilities, ECCP APRNs continued having conversations on EOL care practices and approaches with residents and family members.*
- *The interview data did not elicit any explanation or contextual evidence to explain the unfavorable higher mortality for eligible residents in some of the ECCP facilities.*

We analyzed the 2019 telephone and site visit interview data focused on the ECCP EOL care model components to add context to our mortality results presented in ***Section 3.3.4***. Although measuring the effect of the Initiative on EOL care outcomes was not a primary goal of the evaluation, facility interview protocols included questions about this topic. We did not ask specifically about changes in mortality; rather, we examined the facility's perceptions of the effect of the ECCP's EOL model components to better understand the degree of their implementation.

Our findings indicated that three clinical care models with embedded ECCP APRNs in Clinical + Payment facilities—MOQI, OPTIMISTIC, and RAVEN—continued their focus on improving the quality of conversations with residents and families regarding ACP. Nursing facility staff from these ECCPs often reported their ECCP nurses as better equipped to discuss EOL and palliative care topics while a few facilities noted the ECCP nurses were working with social workers to change the quality of these conversations and documentation. Some interviewees suggested that better understanding of EOL trajectories and quality of life issues among residents and families provided by ECCP APRNs increased open discussions among residents, and family members, about resident goals of care, while also improving documentation of resident goals and preferences, and reducing unnecessary hospitalizations.

> MOQI, OPTIMISTIC, and RAVEN, Clinical + Payment models with embedded ECCP APRNs, continued their focus on improving the quality of advance care planning conversations with residents and families. We found little evidence of such activities in other ECCPs.

Among Clinical + Payment facilities in the other three ECCPs—AQAF, ATOP, and NY-RAH—we found little evidence of continued ECCP EOL care processes in 2019. ECCP model changes account for some of this difference over time. NY-RAH, which prior to 2019 had a strong focus on EOL care, changed their staffing model in 2019. This diminished their focus on EOL model components. Most Quality Improvement Specialists, who replaced the previous NY-RAH RNs, had no clinical training or knowledge of EOL care. As a result, very few NY-RAH facilities commented on NFI 2 having a direct effect on EOL outcomes in 2019. AQAF also changed models to include direct care in 2018, though there were no 2019 reports of any changes in the frequency or type of EOL or palliative care provided to residents in AQAF Clinical + Payment facilities, thus providing no explanation for

this ECCP's significant increase in mortality (***Table 3-29***). No ATOP facility staff shared descriptions of the ECCP's EOL model components.

Among Payment-Only facilities, across all ECCPs, we found no evidence of any ECCP-specific EOL interventions in 2019. Payment-Only facility staff generally described the Initiative as not having a direct effect on EOL care and instead described positive, indirect effects of NFI 2. Examples include some facilities increasing their focus on ACP as a way to decrease hospital transfers; others discussed NFI 2 as having a positive affect by allowing more time for discussions with residents and families about resident EOL goals and preferences.

Although our evaluation did identify some EOL activities attributable to NFI 2 among the Clinical + Payment Facilities, these activities did not represent a change from previous years. Because we have no direct measures of EOL care or ACP, we have no conclusive evidence that links the NFI 2 EOL activities to the statistically significant mortality increases found in the AQAF or RAVEN Clinical + Payment facilities. Likewise, there was no evidence that MOQI's EOL activities had any effect on their Payment-Only facilities' processes or statistically significant outcomes (***Table 3-29***). We found minimal evidence of new external factors, such as state-level policy changes, that may have affected 2019 mortality rates across ECCPs (***Appendix S***). Across all ECCPs, facility staff also described continued resistance among some residents and families for on-site treatment (***Appendix S***). In summary, the interview data provide limited evidence of ECCP-prescribed facility-level EOL interventions, but no specific evidence that these activities led to an increase in mortality among Initiative-eligible residents.

3.4 NFI 2 had Minimal Impact on Nursing Facility Medicaid Expenditures

- *Using simulation-based approaches, we estimated that changes in nursing facility Medicaid expenditures due to the Initiative were minimal.*
- *Estimated Medicaid expenditures increased slightly when using Nursing Facility Initiative billing data to simulate the upper-bound impact of more days of in-facility treatment. Estimated nursing facility Medicaid expenditures decreased slightly when using regression model hospitalization results, owing to more days in the hospital and fewer in the nursing home.*

The primary goals of NFI 2 are to reduce potentially avoidable hospitalizations and ED visits among nursing facility residents and reduce associated Medicare expenditures. ***Section 3.1*** of this report provides estimates of the NFI 2 impact on Medicare expenditures. In this section, we focus on the effects of NFI 2 on Medicaid expenditures associated with hospitalizations due to the six qualifying conditions. Medicaid claims for FY 2019 were not yet available, so we calculated impact estimates using simulation approaches.

We used two approaches to address the following research question: Do residents of participating nursing facilities, either in the Clinical + Payment group or the Payment-Only group, have lower Medicaid payments attributable to NFI 2 in FY 2019? The first approach used NFI 2 facility bills to Medicare for in-house treatment for the six qualifying conditions to estimate changes in long-stay Medicaid expenditures due to presumed avoided hospitalizations. The second approach used results from the Medicare DD regression models to estimate changes in nursing facility Medicaid expenditures due to estimated changes in the number of hospitalizations associated with the six qualifying conditions. In both methods the effect on long-term care spending was the target.

We first describe the role of bed hold policies, which can affect Medicaid payments when residents are hospitalized. We then describe the simulation results based on the billing approach and the modeling approach, respectively. Additional details about the methodology and bed hold policies are provided in ***Appendix V*.**

3.4.1 ECCP State Medicaid Bed Hold Policies and Per Diem Rates

- *State bed hold policies and per diem rates vary by state, and these variations affect the Initiative impact on Medicaid Expenditures.*

When a dually eligible resident is hospitalized, inpatient hospital care is generally covered by Medicare, not Medicaid. However, some states have policies under which Medicaid continues to pay the nursing facility for "holding" the bed while a resident is hospitalized. Therefore, if NFI 2 succeeds in treating some residents in the nursing facility who would otherwise have been hospitalized, then the impact on Medicaid expenditures would depend on the presence of the bed hold policy for hospitalizations. For states that do not have a bed hold policy for hospitalization, any days that residents avoided spending in the hospital would result in an increase in Medicaid spending for nursing facility services, because the resident remained in the nursing facility. For states with a bed hold policy, Medicaid may have paid the nursing facility for some or all of the hospital days (in full or partial per diem rates), therefore hospitalizations avoided would have a small or no impact on Medicaid spending. Bed hold policies vary across the ECCP states in terms of the number of hospitalization days for bed hold payment, any requirements related to occupancy rates, and the amount paid (see ***Appendix V*** for a summary of policy details).

Note that under the logic that avoided hospitalizations result in residents spending more days in facility beds, the intended effect of the Initiative may lead to an increase in Medicaid costs. Paradoxically, an increase in

ECCP states with a Bed Hold Policy for Medical Care (Hospital):

- Alabama (AQAF)
- New York (NY-RAH)
- Pennsylvania (RAVEN)

hospitalizations would reduce Medicaid facility costs. There are other costs to Medicaid that could increase if residents are hospitalized, such as the beneficiary cost share on Medicare hospital bills. The actual amount paid by Medicaid is not on Medicare bills. Actual Medicaid claims data, not currently available, are needed for that estimate because state policies on paying the beneficiary share vary greatly and can vary by the Medicare paid amount for the service.

3.4.2 Estimated Medicaid Expenditures Based on Facility Initiative Billing Data: Simulation Approach #1

- *Estimated Medicaid expenditures increased slightly when using billing data to simulate the upper-bound impact of NFI 2.*

As shown in ***Table 3-30***, for Clinical + Payment facilities, the additional Medicaid payments for avoided hospital stays if we assume 100 percent of bills for Initiative acute care episodes represented more days in a facility because of an avoided hospital stay ranged from $0 (NY-RAH) to $661 per resident (ATOP2). This represents the largest potential impact based on the data. If we assume that none of the bills represented avoided hospital stays, the additional net Medicaid payments due to in-house treatment would have been $0. Because we do not know the extent to which bills truly represented avoided hospitalizations, we show results using a range of assumptions (100% to 0%) in ***Appendix V***.

As an example of our analyses, in AQAF Clinical + Payment nursing facilities, if 100 percent of the facility claims were counted as avoided hospitalizations (average 7.75 days each), the additional Medicaid payments associated with 1,084 dually eligible Initiative residents staying in the nursing facility for in-house treatment of a targeted condition would have been $467,953. However, the Alabama bed hold policy covers 4 days, just less than half of the mean estimated hospital length of stay of 7.75 days. This means Medicaid would have paid $241,524 to the nursing facilities to hold beds if 100 percent of the residents were hospitalized. Taking the bed hold payments into account, the NFI 2 net impact on nursing facility Medicaid payments would be an additional $226,429 or $209 per resident. If we assume that none of the bills represented avoided hospital stays, the additional net Medicaid payments due to in-house treatment at AQAF Clinical + Payment nursing facilities would have been $0.

For NY-RAH, the bed hold policy covers the full per diem for more days than an average hospital stay. Therefore, Medicaid payments due to in-house treatment would be the same as what would have been paid to hold the bed.

For the Payment-Only group, the additional nursing facility Medicaid payments for avoided hospital stays, assuming each bill represented an avoided hospital stay, ranged from $0 (NY-RAH) to $330 per resident (OPTIMISTIC). If we assume that none of the bills represented avoided

hospital stays, the additional net nursing facility Medicaid payments due to in-house treatment would have been $0.

Using AQAF as an example again, avoiding hospital stays with an estimated average length of stay of 6.3 days for the Payment-Only residents would have resulted in additional Medicaid expenditures of $157,963 for the 856 dually eligible Initiative residents to be treated in-house. After accounting for the bed hold policy Medicaid expenditures ($100,294), the additional Medicaid expenditures due to the NFI 2 would have been $57,669 or $68 per resident. If none of the bills represented avoided hospital stays, the additional Medicaid expenditures due to the NFI 2 for residents would have been $0.

In summary, estimated nursing facility Medicaid expenditures increased slightly when we used billing data to simulate the upper-bound impact of NFI 2. When residents spend days in the facility rather than the hospital the total per diem payments rise, but the difference gets smaller when bed hold amounts are larger. For the Clinical + Payment ECCPs, our analyses using billing data estimate that NFI 2 was associated with increased nursing facility Medicaid payments between $2,156,510 (average of $266 per resident) and $0. For the Payment-Only facilities, our analyses using the billing data estimated that NFI 2 was associated with an overall increase in nursing facility Medicaid payments of between $1,199,283 (average of $136 per resident) and $0. As previously noted, our analyses did not estimate cost sharing that might be paid by Medicaid for hospitalizations.

Table 3-30. Estimated upper-bound nursing facility Medicaid expenditures due to NFI 2 billing data

State (ECCP)	Number of dually eligible residents	Number of facility bills	Additional upper-bound nursing facility Medicaid payments due to avoided hospital days (dollars)	Upper-bound nursing facility Medicaid payments for bed holds if the resident was hospitalized (dollars)	Upper-bound impact on nursing facility Medicaid payments if each bill represented one avoided hospital stay	
					Total (dollars)	Per resident (dollars)
Clinical + Payment						
AQAF (Alabama)	1,084	283	467,953	241,524	226,429	209
ATOP2 (Nevada)	839	261	554,355	0	554,355	661
MOQI (Missouri)	1,046	388	490,231	0	490,231	468
NY-RAH (New York)	2,808	615	1,408,027	1,408,027	0	0
OPTIMISTIC (Indiana)	1,222	282	478,906	0	478,906	392
RAVEN (Pennsylvania)	1,122	385	609,890	203,301	406,589	363
TOTAL	8,121	2,214	4,009,361	1,852,852	2,156,510	-
Payment-Only						
AQAF (Alabama)	856	118	157,963	100,294	57,669	67
ATOP2 (Colorado)	1,103	235	342,731	0	342,731	311
MOQI (Missouri)	1,302	92	94,492	0	94,492	73
NY-RAH (New York)	2,912	833	1,549,438	1,549,438	0	0
OPTIMISTIC (Indiana)	1,440	344	475,570	0	475,570	330
RAVEN (Pennsylvania)	1,249	266	343,233	114,413	228,820	183
TOTAL	8,862	1,888	2,963,428	1,764,145	1,199,283	-

SOURCE: RTI analysis of Medicaid claims data (RTI programs AF350, AF700, NBC_2, MS109; RTI folder 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).

NOTE: ***Appendix V*** presents the estimates of nursing facility Medicaid expenditure impact based on different percentages (100%, 75%, 50%, 25%, 0%) of episodes billed representing avoided hospitalizations.

3.4.3 Estimated Medicaid Expenditures Based on Modeling Data: Simulation Approach #2

- *Estimated Medicaid expenditures decreased slightly when using the regression hospitalization model results indicating more days in the hospital and fewer in the nursing home.*

As shown in ***Table 3-31***, for the Clinical + Payment group, the regression models for three ECCPs (AQAF, MOQI, and OPTIMISTIC) estimated small increases in hospitalizations for the six qualifying conditions. This meant that NFI 2 may have reduced Medicaid payments slightly in these ECCPs due to fewer days for residents in the nursing facilities.

For NY-RAH facilities, the model estimated a small decrease of −0.017 hospitalizations per resident in hospitalizations averaged over the 2,808 dually eligible Initiative residents. This resulted in an estimated 349 additional days in the facilities, and an increase of $103,052 in nursing facility Medicaid payments. However, because New York offers bed hold payments for 14 days per year per resident if occupancy of the nursing facility is high, all of these Medicaid payments may be paid to the facility regardless of whether the resident was in the hospital. Therefore, the impact of NFI 2 on Medicaid nursing facility expenditures for NY-RAH facilities is estimated to be $0.

For ATOP2 facilities, the model estimated a statistically significant increase, rather than a decrease, in hospitalizations. This resulted in an estimated 159 fewer nursing facility days for the 839 residents. The reduction in nursing facility days resulted in an estimated reduction of $43,746 in nursing facility Medicaid payments. Nevada does not offer bed hold payments, so the NFI 2 effect was −$43,746 overall or −$52 per resident.

For RAVEN facilities, the model estimated a statistically significant increase in hospitalizations. The reduction in nursing facility days due to increased hospital stays resulted in an estimated reduction of $63,717 in nursing facility Medicaid payments. After accounting for bed hold payments, the NFI 2 effect was −$42,478 overall for the 1,122 residents or −$38 per resident.

For the Payment-Only group, the regression model estimated four states have small increases in hospitalizations. This resulted in small reductions in nursing facility Medicaid payments (ATOP2, OPTIMISTIC, RAVEN) or no change in payments due to the bed hold policy (NY-RAH).

Among AQAF facilities, the model estimated a significant increase in hospitalizations with an associated reduction in nursing facility Medicaid payments of $18,543 for 856 residents or $22 per resident. For MOQI facilities, the model estimated a non-significant decrease in hospitalizations with an NFI 2 impact of increased Medicaid payments of $16,664 for 1,302 residents.

In summary, estimated nursing facility Medicaid expenditures decreased slightly when using DD model results to simulate the impact of NFI 2. Using the DD model results, for the Clinical + Payment ECCPs, we estimate nursing facility Medicaid payments decreased $156,057 (an average decrease of $19 per resident). For the Payment-Only facilities we estimate nursing facility Medicaid payments decreased by $26,125 (average decrease of $3 per resident). As previously noted, our analyses did not consider cost sharing that might be paid by Medicaid associated with hospitalizations.

Table 3-31. Estimated nursing facility Medicaid expenditures due to NFI 2 based on Medicare expenditures modeling

State (ECCP)	Number of dually eligible residents	Absolute Initiative Effect (events per year)	Difference in the Number of Hospital stays	Additional Medicaid payments (dollars)	Bed hold Medicaid payments (dollars)	Impact on Medicaid payments (dollars)	Impact on Medicaid payments per resident (dollars)
Clinical + Payment							
AQAF (Alabama)	1,084	0.017	+ 18.4	−28,721	15,716	−13,005	−12
ATOP2 (Nevada)	839	**0.026*** **	+ 21.8	−43,746	0	−43,746	−52
MOQI (Missouri)	1,046	0.022	+ 23.0	−27,435	0	−27,435	−26
NY-RAH (New York)	2,808	−0.017	− 47.7	103,052	−103,052	0	0
OPTIMISTIC (Indiana)	1,222	0.015	+ 18.3	−29,394	0	−29,394	−24
RAVEN (Pennsylvania)	1,122	**0.038*** **	+ 42.6	−63,717	21,239	−42,478	−38
TOTAL	8,121	-	+76.4	−89,960	−66,097	−156,057	-
Payment-Only							
AQAF (Alabama)	856	**0.040** **	+34.2	−47,744	29,201	−18,543	−22
ATOP2 (Colorado)	1,103	0.007	+7.7	−11,686	0	−11,686	−11
MOQI (Missouri)	1,302	−0.012	-15.6	16,664	0	16,664	13
NY-RAH (New York)	2,912	0.010	+29.1	−56,242	56,242	0	0
OPTIMISTIC (Indiana)	1,440	0.005	+7.2	−10,333	0	−10,333	−7

(continued)

Table 3-31. Estimated nursing facility Medicaid expenditures due to NFI 2 based on Medicare expenditures modeling (continued)

State (ECCP)	Number of dually eligible residents	Absolute Initiative Effect (events per year)	Difference in the Number of Hospital stays	Additional Medicaid payments (dollars)	Bed hold Medicaid payments (dollars)	Impact on Medicaid payments (dollars)	Impact on Medicaid payments per resident (dollars)
RAVEN (Pennsylvania)	1,249	0.002	+2.5	−3,341	1,114	−2,227	−2
TOTAL	8,862	-	+65.1	−112,682	86,557	−26,125	-

*/**/*** = Significantly different from zero based on a p-value cutoff of 0.1/0.05/0.01

SOURCE: RTI analysis of Medicaid claims data (RTI programs AF350, AF700, NBC_2, MS109; RTI folder 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).

3.4.4 Summary

Using billing data to estimate the upper-bound impact of NFI 2, if each bill represented an avoided hospitalization, nursing facility Medicaid payments would have increased slightly because we considered facility bills to indicate fewer hospital stays, and thus more days in the nursing facility. In contrast, the DD models allowed the NFI 2 impact to be fewer hospitalizations or additional hospitalizations, and simulation results showed most ECCP groups with higher Medicare hospitalizations and lower nursing facility Medicaid payments. While the direction of the impact differed for the two simulation approaches, the impact was estimated to be minimal. Note that if the Initiative impact is favorable to Medicare the result is slightly unfavorable to Medicaid; when the Medicare Impact is unfavorable there is a slight savings to Medicaid.

For the Clinical + Payment ECCPs, if we assumed each bill represented an avoided hospitalization, our analyses estimate that NFI 2 was associated with increased nursing facility Medicaid 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 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 nursing facility Medicaid 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 nursing facility Medicaid payments (average decrease of $3 per resident). As previously noted, our analyses did not consider cost sharing associated with hospitalizations.

Analyses of Medicaid claims data for 2019, when they become available, will provide more accurate estimates of the impact, including addressing cost-sharing estimates. FY 2016 Medicaid claims are available, and we report results of descriptive analyses of these data in **Appendix U**.

4. Discussion

4.1 Why Didn't the Initiative Reduce Avoidable Hospitalizations?

According to our Medicare claims-based DD analyses and interview findings from Initiative Year 3 (FY 2019), NFI 2 does not appear to have delivered the intended effect of reducing avoidable hospitalizations to a meaningful degree. ECCP and facility interviewees underscore strong support for the goal of reducing hospitalizations; yet, NFI 2 has not seemed to motivate substantial change in facility care practices compared to facilities nationally. These findings are consistent with results from prior NFI 2 years, though the overall effects seem to be less favorable in Initiative Year 3.

Although our analysis found a substantial amount of billing by facilities and by practitioners for providing on-site treatment for the six qualifying conditions, the evidence based on the rates of hospitalizations and on-site treatment over time suggests that most of the residents treated on-site would not have been hospitalized in any case, even if there were no Initiative. The residents treated on-site tended to be residents with less comorbid illness than those treated in the hospital for the six conditions.

While the Initiative may have largely been reimbursing facilities for providing treatment for the six qualifying conditions to residents who would not have been hospitalized otherwise, there is some evidence that facilities increased their ability to provide more acute care, including greater use of intravenous antibiotics. However, there is also substantial evidence that the Initiative provided financial compensation for care practices that were already in place, either during NFI 1 or prior to

either Initiative. It is beyond the scope of this report to evaluate the appropriateness of this reimbursement.

There may be many reasons for the lack of reductions in avoidable hospitalizations, though the following three explanations may be most aligned with what interviewees shared. The first two are related to the overall design of the Initiative, while the third speaks to the changing nursing facility policy environment.

First, structuring NFI 2 purely as a financial incentive may not be sufficient to effect change. Facilities reported numerous challenges early in NFI 2 with coordinating how to document and submit correct NFI 2 claims. Facilities with external billing agencies or corporate-based billers faced even more challenges in explaining NFI 2 G-codes to individuals not directly involved with on-site NFI 2 facility activities. Over time, we would have expected NFI 2 billing to become easier or at least more routinized; instead, claims submissions declined over time. The decline likely was not due to billing processes, but rather due to a variety of factors that reduced opportunities to submit NFI 2 claims, including changes in the NFI 2 clinical criteria and decrease in the pool of Initiative-eligible residents due to growth of Medicare managed care.

NFI 2 represents additional work for facility staff in documenting resident changes of condition and ensuring that documentation aligns with NFI 2 criteria for the six qualifying conditions. There is extra time and labor in submitting the claims themselves. From a cost-benefit perspective, some interviewees reported that the Initiative was not worth the effort; the potential revenue simply did not justify the up-front documentation and billing labor effort. Moreover, many facilities have not seen the financial impact at all: for example, some facilities never received direct NFI 2 reimbursements because their corporate billing structures dictated that the corporate offices receive all Medicare disbursements. For facilities with high rates of staff or leadership turnover, NFI 2 billing could not be prioritized, leaving many facilities to submit few, if any, NFI 2 claims. Other facilities had too few Initiative-eligible residents, largely due to Medicare managed care or hospice growth. Interview data also revealed that the staff often caught and treated the Initiative conditions before they exacerbated to the level required for NFI 2 claims submission, further eroding the opportunity for any financial benefits. Therefore, for many facilities, financial gains were absent or not strong enough to affect the outcomes. In contrast, the NFI 1 intervention reduced inpatient hospitalizations by placing additional resources in nursing facilities, even without a direct financial incentive.

Second, Clinical + Payment interviewees highlighted the point that NFI 1 targeted facility-wide, systemic changes via training and education for “whole house” staff. According to interview findings, NFI 1 empowered all staff—CNAs, housekeepers, dieticians, nurses—and even visiting families, to have a role in caring for residents. All staff had opportunities to report changes in <u>all</u> health conditions via Stop and Watch or similar tools, and that helped engage participating facilities fully. In contrast, both Clinical + Payment and Payment-Only interviewees noted that NFI

2 is focused on submitting claims for the six specific conditions. Although interviewees agreed those are the right conditions to prioritize, they disagreed with some aspects of the clinical criteria and the narrow focus on billing. The NFI 2 model empowered only key staff (e.g., DON, business manager) to review NFI 2 documentation and submit claims, leaving the remaining staff largely uninvolved in the Initiative. Interviewees used phrases like, "throwing money at the problem" to describe the billing experience in NFI 2, compared with the more systematic, facility-wide education and clinical care models employed in NFI 1. Consequently, overall engagement in NFI 2 seemed to be lower, particularly in Clinical + Payment facilities compared to engagement in NFI 1.

Third, thinking about the overall policy environment, nursing facilities nationwide have seen substantial changes since the early days of NFI 1. Interviewees noted repeatedly that the care landscape has shifted to include higher-acuity residents, more residents younger than 65 years of age, and more diverse payment structures (i.e., less FFS and more managed care). In addition, interviewees have noted that other payment and incentive models, such as Institutional Special Needs Plans (I-SNPs) and ACOs, have a growing presence in facilities, reducing the importance of the NFI 2 Initiative. ACOs seek to reduce the cost of care, with a focus on hospitalizations. MA plans, and I-SNPs in particular, can pay facilities extra for acute care on-site, while impinging on their Medicare capitation amounts much less than hospitalizations would. When nursing home owners have financial interests in I-SNPs the incentives are complex. Many of these payment models offer facilities similar benefits, such as additional clinical staff support, more care coordination, and competitive payments, leading to fewer incentives for facilities to engage with NFI 2. NFI 1 provided tailored facility education and clinical care support to participating facilities, and NFI 2 offered a financial opportunity. However, as the landscape continues shifting, the Initiative has become less unique, and the ability to reduce hospitalizations above and beyond what is considered "usual care" has become more challenging when usual care includes the effects of all these other models and initiatives.

4.2 Interpreting the Findings of Unfavorable Initiative Impacts on Utilization and Expenditures

Besides a lack of reductions in key outcomes, we found some evidence from the DD analyses for increases in some hospital-related utilization and expenditure measures, which are both unfavorable and counterintuitive. These findings were more unfavorable than the findings from FY 2017 and FY 2018 that were reported in previous annual reports. In contrast, ECCP and facility interviewees reported no unfavorable impacts of the Initiative on hospitalizations. Integrating the results of our DD analyses with the interview data, it is not definitive that the Initiative itself caused unfavorable outcomes. Rather, other structural factors and challenges, such as substantial facility staff turnover, could be associated with these results.

When interpreting these results, it is important to keep two methodological constraints in mind, which serve to further mitigate concern about the unfavorable results. First, both Clinical +

Payment and Payment-Only facilities were starting off during the baseline period (2014–2016) with lower levels of most hospital-related utilization and expenditure measures than the national comparison group[24]. For Clinical + Payment facilities, the lower utilization rate is partly the result of NFI 1 interventions. Our DD regression models measure *changes* in the outcomes relative to existing *baseline levels*. They do not account for the fact that it may be easier to reduce a measure from a high level to a medium level than from a medium level to a low level.

Second, our results account for *different baseline trends* between the intervention and comparison groups. This makes it harder from a statistical perspective to achieve reductions where utilization or expenditures decreased between 2014 and 2016 in the intervention group. This especially impacts the Clinical + Payment group, where several ECCPs had strong reductions in utilization or expenditures during 2014–2016 due to NFI 1. A more detailed discussion of this point is presented in our second annual report.[25]

These methodological constraints provide an important perspective for the unfavorable increases in utilization and expenditures that we observed when analyzing data for all ECCPs combined and some of the individual ECCPs. For example, in RAVEN Clinical + Payment facilities, where we observed a particularly unfavorable pattern of increases, there were both low rates of and decreases in utilization and expenditures in the baseline period. The unfavorable results we observed in OPTIMISTIC and MOQI can also be partly explained by decreases in utilization and expenditures in the baseline period. In the case of OPTIMISTIC, there were also low rates for these measures in the baseline period.

We addressed these methodological issues by performing sensitivity analyses, which we describe in ***Section 3*** and offer further details in ***Appendix W***. In the first sensitivity analysis, we compared the intervention group to a WSRG instead of the national comparison group. While the main reason for using the WSRG was to account for state-level policy changes, it also helps address the concern about different baseline levels. Residents in the WSRG generally had utilization levels that were closer to the intervention facilities (results not shown) than the national comparison group. In the second sensitivity analysis, we used 2016 as the baseline year without accounting for baseline trends. Similarly, the third sensitivity analysis used the average of 2014-2016 without accounting for baseline trends. While some of the unfavorable effect patterns were diminished with these alternative specifications, these sensitivity analyses did not provide consistent evidence for reductions in hospital-related utilization or expenditures. Based on these sensitivity analyses, we conclude that while some of the unfavorable increases can possibly be attributed to the

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[24] Clinical + Payment facilities actually had higher total Medicare expenditures and expenditures for all-cause hospitalizations compared to the national comparison group.

[25] RTI International. (2019, March). Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents—Payment Reform. Baltimore, MD: Centers for Medicare & Medicaid Services. https://downloads.cms.gov/files/cmmi/rahnfr-phasetwo-secondannrpt.pdf

methodological issues we have described, the lack of association of the Initiative with favorable decreases in utilization and expenditures is not an artifact of statistical modeling.

Regarding the increases in total Medicare expenditures associated with the Initiative that we found, albeit not statistically significant, part of the reason for these increases could be the nursing facility billing for providing on-site treatment. Based on the results presented in ***Section 3***, total Medicare expenditures increased by about $888 per resident-year in the Clinical + Payment group and $187 per resident-year in the Payment-Only group. As shown in ***Appendix L***, there were 10,110 residents from the Clinical + Payment group and 11,055 from the Payment-Only group included in the expenditure analyses. Multiplying $888 by 10,110 and $187 by 11,055 yields about $9M and $2M, respectively. Because each resident represents on average less than one full resident-year (around 250 resident-days as per ***Appendix N***), expenditures increased by about 70% as much as this—around $6M and $1.5M, respectively. As shown in more detail in ***Appendix M***, the total expenditures associated with billing for on-site treatment plus billing by practitioners was around $8M for both Initiative groups combined. Therefore, most of the estimated increases in total Medicare expenditures associated with the Initiative could be accounted for by the combined amount billed by Initiative facilities and practitioners for on-site treatment of eligible residents for the six qualifying conditions.

4.3 Possible Unintended Consequences of the Initiative

Our analysis of FY 2019 data showed mixed results regarding the Initiative impact on MDS-based quality measures. We found few favorable and statistically significant effects in individual ECCPs in the Clinical + Payment group, and several unfavorable and statistically significant effects both in individual ECCPs and across all ECCPs combined. For residents in Payment-Only facilities, we found unfavorable and statistically significant effects in five out of seven MDS-based quality measures in pooled analyses combining all ECCPs.

Descriptive analyses of trends in the 10 MDS-based quality measures over time add context to the multivariate analysis results. The unadjusted prevalence of 8 of 10 of these undesirable outcomes has generally been decreasing in the national comparison group from FY 2014 to FY 2019 (see descriptive statistics in ***Appendix P, Table P-1***). These trends indicate an overall improvement in quality over time, unrelated to the Initiative. The trends are mixed in the intervention groups. In the Clinical + Payment group, the prevalence of adverse outcomes trended downward in 7 of 10 measures, and in the Payment-Only group, the prevalence trended downward in 5 of 10 measures.

Despite these mixed trends over time, the Initiative group quality measure scores were lower (indicating higher quality) than the national comparison group for most of the quality measures across all years measured. The lower baseline prevalence of adverse outcomes among Initiative-eligible residents, coupled with decreasing prevalence over time in the national comparison group,

may make it harder for NFI 2 facilities to achieve further quality improvement relative to the national comparison group.

Resident mortality is another important outcome analyzed for this evaluation. To understand the effect of NFI 2 on mortality among Initiative-eligible residents in FY 2019, we conducted descriptive and multivariate analyses, as well as analyses of interview data from primary data collection. For residents in both Initiative groups, we found no statistically significant association of the Initiative with mortality in all ECCPs combined. We found a statistically significant higher-than-expected mortality associated with the Initiative for residents in facilities in two Clinical + Payment ECCPs (AQAF and RAVEN) and one Payment-Only ECCP (MOQI).

Factors other than the Initiative may account for these unfavorable mortality results. Although our analyses adjusted for selected confounders, it is possible that the elevated mortality risk among those residents relative to the national comparison group is driven by factors that are unrelated to the Initiative. These factors may include unmeasured selection bias toward a sicker or higher-acuity case-mix of the Initiative-eligible resident population because of other unobserved mortality risk factors, or confounders not captured in our current models. A possible reason for selection bias is increased Medicare Advantage (MA) penetration, as described below. Also, disease severity is not always captured by ICD-10 codes.

Further, we do not have data to quantify and control for palliative care practices and outcomes. Increased palliative care practices may improve quality of care and quality of life while simultaneously leading to a higher mortality rate. For example, an acute event might trigger advance care planning discussions with a resident, potentially leading to selection of life-limiting treatment options. Some ECCP APRNs in Clinical + Payment facilities reported working with eligible residents and their families on updating residents' advance directives after major health changes. In this case, variation between the intervention groups and national comparison group may have impacted mortality risk.

4.4 Impact of Medicare Advantage (MA) on the Initiative and Evaluation

Growth in MA has affected the eligible population for NFI 2 by progressively decreasing the number of eligible FFS residents who could participate in the Initiative over time. MA penetration increased over time for each group, but with larger increases in the Initiative groups than in the comparison group. Clinical + Payment facilities had the highest MA penetration, followed by Payment-Only, and the national comparison group had the lowest in 2019 ***(Appendix N)***.

Across Clinical + Payment and Payment-Only facilities, interviewees indicated substantial MA plan growth in most ECCP states in recent years. Facility interviewees shared that some MA plans recruit enrollees by partnering with facilities. These plans have developed relationships with facilities to help identify residents or families to reach for MA plan enrollment. Although

interviewees did not elaborate on this point, it is possible that some MA plans offer incentives to facilities (e.g., additional care coordination, provision of an MA plan APRN) to increase MA plan enrollment. This growth often has the net effect of reducing eligible NFI 2 residents in facilities, and interviewees shared that when few residents are eligible, facilities become much less engaged in the Initiative. Exit interviews with facilities that have stopped participating in NFI 2 also indicated that small numbers of eligible residents were a primary reason for discontinuing facility NFI 2 participation.

One way the growth of MA could impact the evaluation of the Initiative is by causing selection bias. Selection bias could occur if healthier beneficiaries tend to enroll in MA plans, resulting in more clinically complex residents remaining among the eligible Medicare FFS population, and if this occurs differentially in the Initiative and comparison groups. There is some evidence that this occurred, at least regarding the mortality analyses, which focus on Initiative-eligible FFS residents and MA residents who would have been eligible but for their MA status. The mortality rate was generally lower among MA enrollees than among Initiative-eligible residents (***Appendix S***), and as noted above, MA penetration increased more in the Initiative groups than the comparison group. 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.

Another way we investigated the possibility of selection bias was by comparing the case-mix of the overall long-stay MA population to the FFS populations in the Clinical + Payment, Payment-Only, and non-intervention/national comparison group facilities using MDS assessment data (***Appendix T***). These analyses differ from the mortality analyses presented in ***Appendix S*** because the focus is on the overall long-stay population, regardless of other eligibility criteria for the Initiative—for instance, we include all long-stay FFS residents in Clinical + Payment facilities, not just the eligible FFS residents. FFS residents in Clinical + Payment facilities tended to have higher prevalences of the examined MDS conditions compared to MA residents, FFS residents in non-intervention facilities, and FFS residents in Payment-Only facilities. However, there was no clear evidence of differential acuity among MA residents, FFS residents in non-intervention facilities, and FFS residents in Payment-Only facilities. These findings provide some evidence of the severity of case-mix among long-stay FFS residents in Clinical + Payment facilities, where MA penetration was highest, but do not support differences among other groups.

We also examined the case-mix of the overall long-stay MA population and FFS population (a combination of the FFS residents in both Clinical + Payment and Payment-Only facilities and non-intervention facilities), regardless of other eligibility criteria for the Initiative (***Appendix T***). For some characteristics and conditions (percent with diabetes, hip fracture, obstructive uropathy) the MA and FFS populations were similar over time. The MA population showed greater impairment in the areas of cognitive functioning, ADLs, and urinary and bowel incontinence. Some medical conditions, such as percentage with pressure ulcers, UTIs, or viral hepatitis were consistently lower

in the MA population. These findings provide limited evidence of "cherry picking" of lower-acuity residents by MA plans. It is possible that the case-mix comparison of the overall long-stay population differs from what we would find if the analyses were limited to eligible residents or those that would have been eligible but for MA status.

One explanation for why MA plans had residents with greater cognitive and functional impairment, but lower prevalence of conditions like pressure ulcers and UTIs, is that MA plans could be providing better care and thus reducing the incidence of new conditions. MA plans could be especially incentivized to treat conditions associated with potentially avoidable hospitalizations in-house.

In addition, coding of comorbidities by MA plan practitioners may differ from that of FFS practitioners. CMS has documented that MA plans have systematically more intensive coding for many conditions, making some comparisons difficult.[26] Although our analyses were limited to conditions that were based on independent assessments or testing, or more objective clinical criteria in the medical record, the data may still reflect differences between MA and FFS residents due to variation in coding intensity.

We addressed the potential selection bias in our analyses for all the outcomes we studied, by adjusting for the facility-level percentage of residents in MA plans in the DD models. However, this adjustment may not fully account for the selection bias, and there may be other unobserved risk factors that are not measurable in available administrative data.

In models of resident mortality, higher MA penetration in a facility was statistically significantly associated with a higher resident mortality rate for the FFS Initiative-eligible residents in that facility (results not shown). This result is consistent with selection bias and might suggest that the remaining FFS population is more clinically complex in ways that are not accounted for by the HCC and disease indicators currently in our model. Despite this apparent clinical complexity, in DD models of hospital-related utilization, higher facility-level MA penetration was statistically significantly associated with lower utilization among Initiative-eligible residents (results not shown). A potential explanation for this finding could be a spillover effect of having a high percentage of MA residents in a facility, wherein a facility might have a culture more oriented towards avoiding hospitalizations and treating residents in-house. Across the seven MDS-based quality measures, there was not a clear pattern to indicate that higher facility-level MA penetration is a risk factor or protective factor in this set of quality measures (results not shown).

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[26] Centers for Medicare and Medicaid Services. (2020.) Announcement of Calendar Year (CY) 2020 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter. https://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Announcements-and-Documents-Items/2020Announcement. See Section J.

4.5 Impact of the Initiative on Nursing Facility Medicaid Expenditures

We conducted simulation analyses to estimate the changes in Medicaid nursing facility spending due to the Initiative, because 2019 Medicaid claims data are not yet available. If hospitalizations decreased under NFI 2, Medicaid nursing facility expenditures would increase due to the increase in the number of nursing facility days among facilities in states that do not have bed hold policies. Among facilities with state bed hold policies, the impact of the NFI 2 was expected to be smaller or show no difference in Medicaid nursing facility expenditures. As previously noted, our analyses could not consider cost sharing that might be paid by Medicaid for hospitalizations.

Using billing data, we assumed each facility bill represented an avoided hospital stay, and estimate that Medicaid payments in each ECCP increased slightly or did not change. Overall, for the Clinical + Payment ECCPs, our analyses using billing data estimate that NFI 2 was associated with increased Medicaid nursing facility payments between $2,156,510 (average of $266 per resident) and $0. For the Payment-Only facilities overall, our analyses estimated that NFI 2 was associated with an increase in Medicaid nursing facility payments of between $1,199,283 (average of $136 per resident) and $0.

When using estimated effects on hospitalizations from the multivariate regression DD models, some nursing facilities had slightly higher Medicaid nursing facility payments and others had slightly lower Medicaid nursing facility payments. Overall, we estimate Medicaid nursing facility expenditures decreased slightly due to higher hospitalizations and thus fewer nursing facility days. For the Clinical + Payment facilities, we estimate Medicaid nursing facility payments decreased $156,057 (an average decrease of $19 per resident). For the Payment-Only facilities we estimate Medicaid nursing facility payments decreased overall by $26,125 (average decrease of $3 per resident).

Overall, we estimate that NFI 2 had a minimal impact on Medicaid nursing facility expenditures, and that the impact varied by state due to bed hold policies and per diem rates. We note that these simulations are based on billing data and Medicare data analyses. We will have a more accurate understanding of the impact on Medicaid nursing facility expenditures when the Medicaid claims for FY 2019 become available.