

# Data Quality Impacts of the Transition from In-person to Phone Data Collection in Response to the COVID-19 Pandemic for the Medicare Current Beneficiary Survey (MCBS)

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## BACKGROUND

The MCBS is a continuous, multipurpose survey of a nationally representative sample of the Medicare population that is conducted by the Centers for Medicare & Medicaid Services (CMS) through a contract with NORC at the University of Chicago (NORC). Since 1991, the MCBS has served as the leading source of information on the Medicare program and its impact on beneficiaries. MCBS interviews were historically conducted in-person but transitioned to phone beginning in 2020 in response to the COVID-19 pandemic.

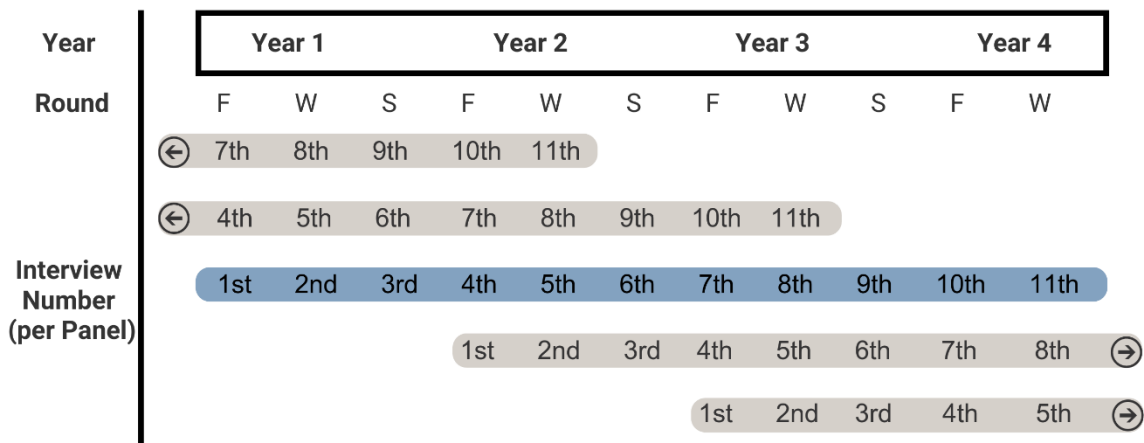
The MCBS collects data on beneficiaries' health care needs, costs, and experiences, and links their survey responses to administrative records and claims data to improve the accuracy and completeness of

estimates of their health care costs and utilization. The MCBS uses a round-based rotating panel design to collect data at three points per year (referred to as the winter, summer, and fall rounds) over four years for beneficiaries living in community (e.g., households) and facility settings (Figure 1). This working paper focuses on differences in the MCBS data collected by phone for beneficiaries living in the community in Winter and Fall 2020 compared to data collected in-person during prior rounds.

## KEY FINDINGS

- Although lack of an experimental design makes it difficult to distinguish mode effects from pandemic impacts, there were statistically significant decreases in health care utilization and cost reporting in the Winter and Fall 2020 following the transition of the MCBS from in-person to phone interviews. 
- There were also statistically significant increases in nonresponse on items such as the number of prescription medicine pills and the Medicare payment amount in the Winter and Fall 2020 MCBS phone interviews. 

**Figure 1.** MCBS Round-Based Rotating Panel Design



NOTES: F stands for fall. W stands for winter. S stands for summer. Each panel participates in up to 11 interviews over four years.

## MCBS Data Collection Mode Transition

In response to the COVID-19 pandemic, MCBS in-person data collection was paused in mid-March of 2020. Following a short pilot testing period, the MCBS Community interviews resumed via phone and continued via phone throughout most of 2021. This rapid transition from in-person to phone data collection was required to protect the health and safety of respondents and interviewers during the COVID-19 pandemic, as well as to continue to collect timely data on the Medicare population.<sup>1</sup> However, this unplanned mode change did not allow for in-depth field testing, the incorporation of an experimental design, or an evaluation before large-scale implementation (i.e., techniques that would typically be applied before mode changes)<sup>i,ii,iii</sup> and the lack of an experimental design makes it difficult to distinguish mode effects with pandemic impacts.<sup>iv,v</sup>

## MCBS Cost and Utilization Data Collection

The MCBS covers a wide range of topics including health care cost and utilization. MCBS Community interviews take place with either the beneficiary or a knowledgeable proxy respondent (often a family member, caregiver, or friend). The MCBS was originally designed to be conducted in-person, in part because it relies heavily on documentation to collect the complex cost data that are associated with the individual health care events reported during the MCBS Community interview. It is typically easier for trained interviewers to extract details from this documentation than to ask respondents to do so. Interviewers are trained to locate specific details about utilization and costs within documentation such as insurance statements and medicine bottles.

## COST AND UTILIZATION DATA COLLECTION

- During each MCBS Community interview, respondents report every *individual* health care event that occurred since the last interview, such as inpatient admissions, provider visits, prescription medicines, and medical equipment rentals.
- For each reported health care event, MCBS respondents report the associated charges and payments.
- MCBS interviewers request documentation such as medicine bottles, insurance statements, bills, and receipts to find and record details about these events and their costs, including dollar amounts and claim numbers.

Once the MCBS Community interviews resumed via phone in the winter round of 2020, qualitative feedback from field interviewing staff indicated that some MCBS respondents found it difficult to sort through billing and insurance statements and other documentation to locate and report specific details about costs. Thus, in response to the mode transition, the following modifications were made to the MCBS Community Questionnaire:

- The Summer 2020 MCBS Community interview (conducted between May and August 2020) was shortened and excluded all collection of health care utilization and cost information.
- The Fall 2020 MCBS Community interview (conducted between September and December 2020) re-introduced the cost and utilization questionnaire sections but included an “escape hatch” mechanism that allowed interviewers to skip over some or all cost data collection when respondents were fatigued or frustrated. The reference period was also expanded to capture the utilization and cost information that was not collected in the Summer 2020 interview.

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<sup>1</sup> To understand the impact of the COVID-19 pandemic on the Medicare population, CMS conducted three MCBS COVID-19 Rapid Response Community Supplements in Summer 2020, Fall 2020, and Winter 2021. For more information: <https://www.cms.gov/data-research/research/medicare-current-beneficiary-survey>.

These questionnaire changes complicate analysis of the impact of the mode transition as they intentionally create missing data that are attributable to interviewer and/or respondent behavior.

### Research Questions

The MCBS is a leading source of information on Medicare beneficiaries, so it is important to understand how this transition from in-person to phone interviews may be related to the quality of MCBS cost and utilization data. This working paper seeks to understand this by studying the following research questions:

- Did the data collected by phone depart from historical trends in the quantity of health care utilization and costs reported and item-level response?
- Was the transition from in-person to phone data collection associated with changes in respondents' ability to recall or willingness to provide detailed information about health care utilization and costs?

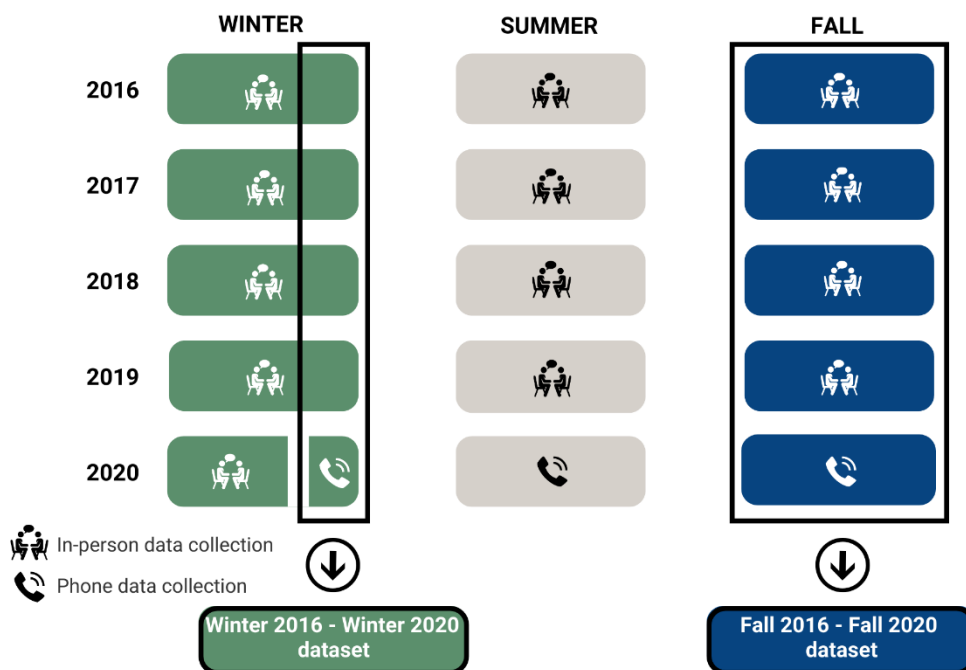
### METHODS

#### Data Sources

This analysis used round-based raw data collected in MCBS Community interviews during the Winter 2016-2020 and Fall 2016-2020 rounds (Figure 2). The mode transition occurred during the Winter 2020 data collection period, with Winter 2020 Community data collected in-person during weeks 1-11 and via phone during weeks 12-16. For comparability over time, this analysis was limited to the data collected from week 12 through the end of the round for all five winter rounds. The raw round-based data (instead of the final, cleaned, and annualized MCBS data) were used for all years to ensure timely analysis. "Noise" that resulted from the use of raw data should be comparable across rounds.

Note that summer round data were not included in this analysis because cost and utilization data were not collected in the Summer 2020 MCBS Community interview.

**Figure 2.** MCBS Mode Transition Timing and Data Sources



## Analysis and Methods

To study changes in response patterns, this analysis compared the MCBS data collected via phone due to the pandemic to the MCBS data collected in person during prior rounds. Specifically, historical data from the four prior years (2016-2019) were compared to the 2020 phone data (for the respective round) to assess trends in key outcomes of interest over time. For the purposes of this working paper, the following *selected* outcomes are presented below:

- Changes in reported health care utilization (i.e., events) and costs:<sup>2</sup>
  - ▶ Mean number of health care events reported
  - ▶ Mean number of health care costs reported
- Changes in item-level nonresponse on details about reported health care events and costs:
  - ▶ Prescription medicine pill quantity
  - ▶ Total Medicare payment amount

The framework for evaluating these changes used both regression models and T-tests. This analysis first used regression models to evaluate the stability of response patterns in prior years, which provided historical context for any changes observed after the mode transition. This analysis then compared the newly collected data from the Winter and Fall 2020 phone interviews against the combined pool of data from the prior Winter and Fall rounds using pooled T-tests (at 0.05, 0.01, and 0.001 significance levels). The results of these T-tests are the focus of this working paper.

Notably, count-based outcomes (e.g., mean number of health care events reported) may vary based on the length of time between interviews, especially for the Fall 2020 data due to the absence of cost and utilization data collection in Summer 2020. As such, this analysis presents standardized counts of events and costs reported per 100 days in the reference period. Additionally, 2016 and 2017 data for prescription medicine pill quantity are not presented because these data are not comparable to subsequent rounds due to a questionnaire change.

As noted above, this analysis used the raw round-based data collected in the Winter 2016-2020 and Fall 2016-2020 interviews. The MCBS Community interviews collect data about health care events and costs that have occurred since the last interview, and some interviews include reference periods spanning multiple calendar years.<sup>3</sup> In addition, because it often takes time for beneficiaries to receive medical bills and insurance statements, the MCBS allows for cost information to be collected up to two rounds after corresponding events are reported. These data are annualized before release on the MCBS Cost Supplement File Limited Data Set (LDS) so that each release corresponds to a calendar year. As such, the majority of events and costs reported in the Winter 2016-2020 and Fall 2016-2020 interviews appear in the 2016-2020 MCBS Cost Supplement File LDS releases, however, some of these data may be included in the 2015 and 2021 LDS releases as well.

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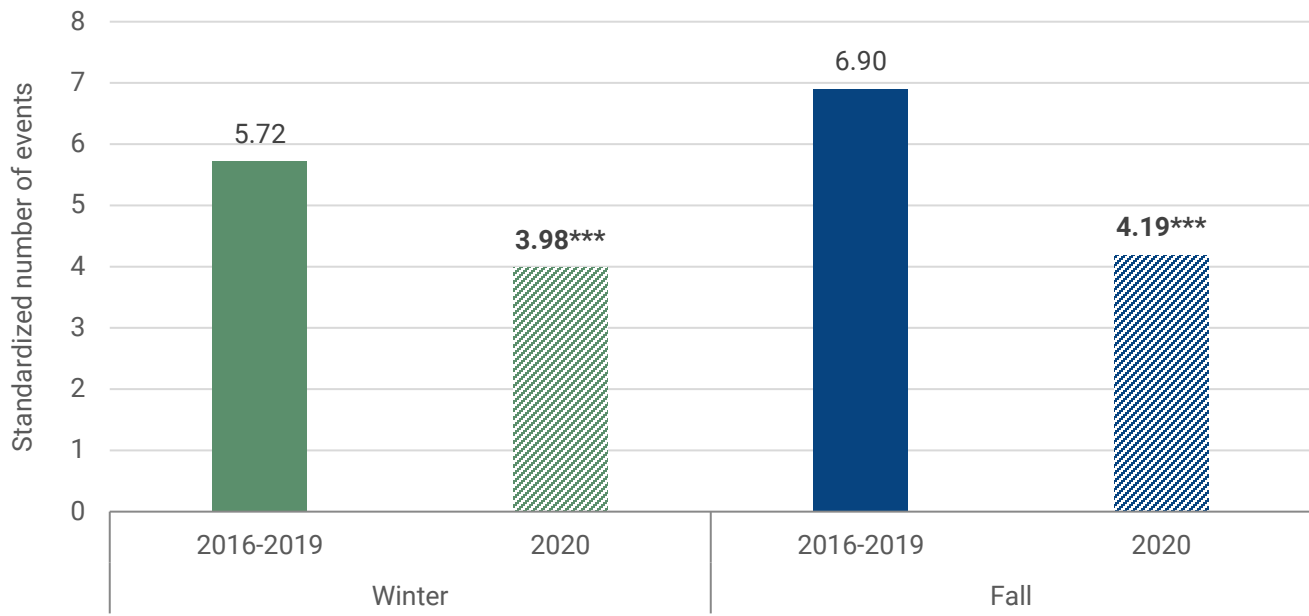
<sup>2</sup> Since MCBS respondents are asked about the costs associated with reported health care events, the mean number of events reported and the mean number of costs reported are related for each beneficiary, however, these counts may vary since a single event can be associated with multiple costs and vice versa.

<sup>3</sup> Reference periods for winter round interviews include part of the prior calendar year and through 2018, a limited number of fall round interviews were collected in January of the following year and included some events and costs from that subsequent year.

## RESULTS

There were statistically significant decreases in the average number of events reported by MCBS respondents in the Winter 2020 and Fall 2020 phone interviews compared to prior rounds, respectively.

**Figure 3.** Mean number of health care events reported per 100 reference period days, Winter 2016-2020 and Fall 2016-2020



\* Indicates  $p < 0.05$ . \*\* Indicates  $p < 0.01$ . \*\*\* Indicates  $p < 0.001$ .

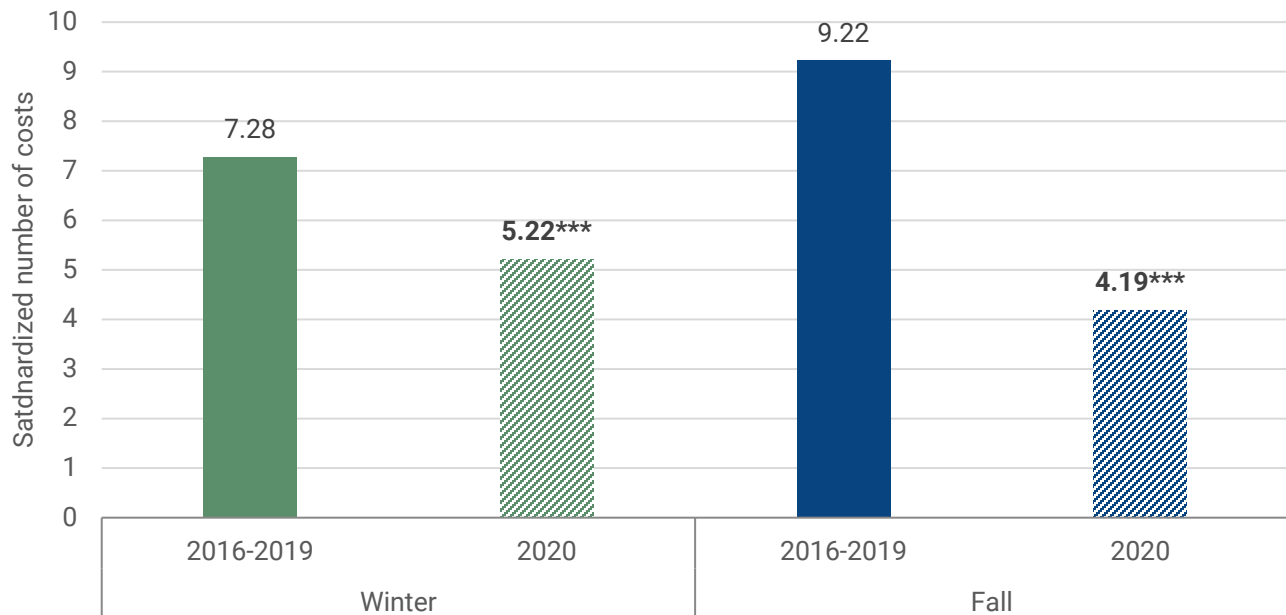
SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey, Round-based data, 2016–2020.

NOTES: Estimates reflect the unweighted average number of events reported per 100 reference period days and were based on raw round-based data for Medicare beneficiaries who completed an MCBS Community interview in the respective round. Beneficiaries answered questions themselves or by proxy. The “2016-2019” estimates reflect the unweighted average number of events in the 2016, 2017, 2018, and 2019 rounds. The Winter estimates reflect Community interviews that were completed from Week 12 through the end of the round, not all MCBS Community interviews completed that round. See Appendix A, Table 1 for the N sizes and standard errors for each round.

- Between Winter 2016 and Winter 2019, MCBS respondents reported an average of 5.72 health care events per 100 reference period days, compared to 3.98 events in Winter 2020.
- Similarly, between Fall 2016 and Fall 2019, MCBS respondents reported an average of 6.90 health care events per 100 reference period days, compared to 4.19 events in Fall 2020.

There were statistically significant decreases in the average number of costs<sup>4</sup> reported by MCBS respondents in the Winter 2020 and Fall 2020 phone interviews compared to prior rounds, respectively.

**Figure 4.** Mean number of health care costs reported per 100 reference period days, Winter 2016-2020 and Fall 2016-2020



\* Indicates  $p < 0.05$ . \*\* Indicates  $p < 0.01$ . \*\*\* Indicates  $p < 0.001$ .

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey, Round-based data, 2016–2020.

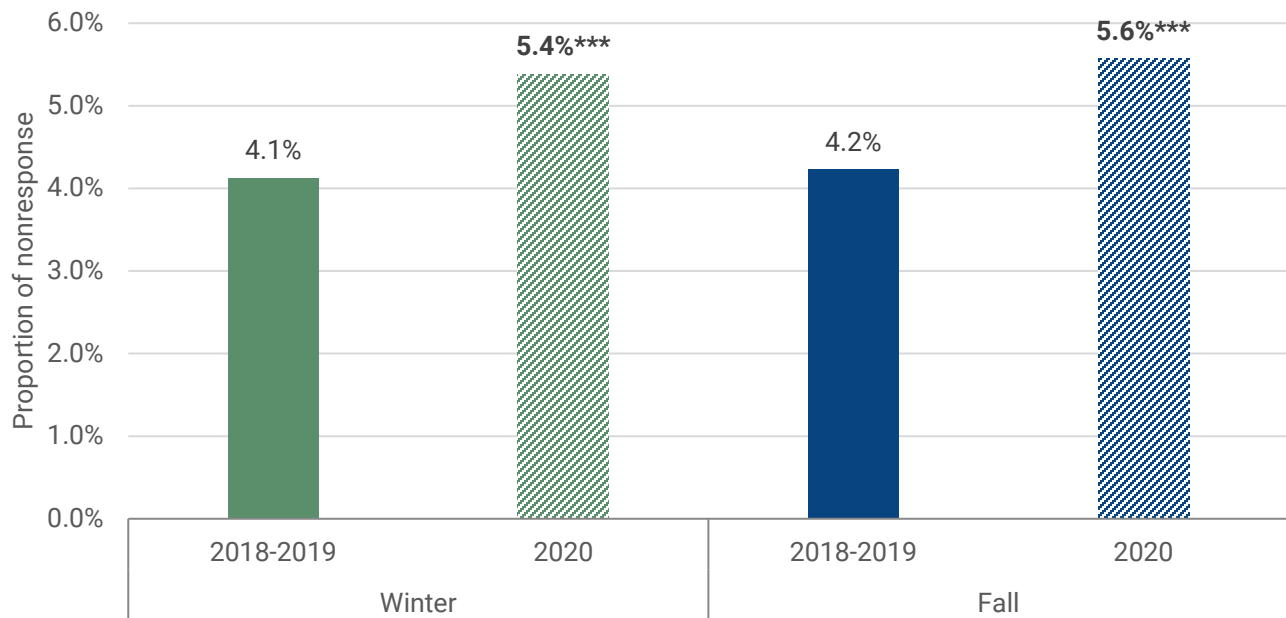
NOTES: Estimates reflect the unweighted average number of costs reported per 100 reference period days and were based on raw round-based data for Medicare beneficiaries who completed an MCBS Community interview in the respective round. Beneficiaries answered questions themselves or by proxy. The “2016-2019” estimates reflect the unweighted average number of costs in the 2016, 2017, 2018, and 2019 rounds. The Winter estimates reflect Community interviews that were completed from Week 12 through the end of the round, not all MCBS Community interviews completed that round. See Appendix A, Table 1 for the N sizes and standard errors for each round.

- In Winter 2020, MCBS respondents reported 5.22 health care costs per 100 reference period days, compared to an average of 7.28 costs between Winter 2016 and Winter 2019.
- Similarly, in Fall 2020, MCBS respondents reported 4.19 health care costs per 100 reference period days, compared to an average of 9.22 costs between Fall 2016 and Fall 2019.

<sup>4</sup> In most cases, the unit of measure for health care costs is relatively straightforward, with a single event corresponding to a single cost based on documentation such as an insurance statement, bill, or receipt. However, the relationship between events and costs is sometimes more complex. For example, two visits to the same provider might be reported as separate events but combined into a single cost if both visits appeared on a single bill. In addition, a single event may be associated with multiple costs if 1) multiple aspects of care within a single visit resulted in multiple bills (e.g., an office visit with medical tests sent to an external lab) or 2) the event was covered by multiple sources of payment (e.g., the beneficiary received separate statements from two different insurers for the same medical event).

There were slight but statistically significant increases in item-level nonresponse for the quantity of prescription medicine pills obtained<sup>5</sup> in the Winter 2020 and Fall 2020 phone interviews compared to prior rounds, respectively.<sup>6</sup>

**Figure 5.** Item-level nonresponse for prescription medicine pill quantity, Winter 2018-2020 and Fall 2018-2020



\* Indicates  $p < 0.05$ . \*\* Indicates  $p < 0.01$ . \*\*\* Indicates  $p < 0.001$ .

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey, Round-based data, 2018–2020.

NOTES: Estimates reflect the unweighted proportion of reported prescription medicine events in pill form with item-level nonresponse for pill quantity and were based on raw round-based data for Medicare beneficiaries who completed an MCBS Community interview in the respective round. Beneficiaries answered questions themselves or by proxy. The “2018-2019” estimates reflect the unweighted average proportion of nonresponse in the 2018 and 2019 rounds. The Winter estimates reflect Community interviews that were completed from Week 12 through the end of the round, not all MCBS Community interviews completed that round. See Appendix A, Table 2 for the N sizes and standard errors for each round.

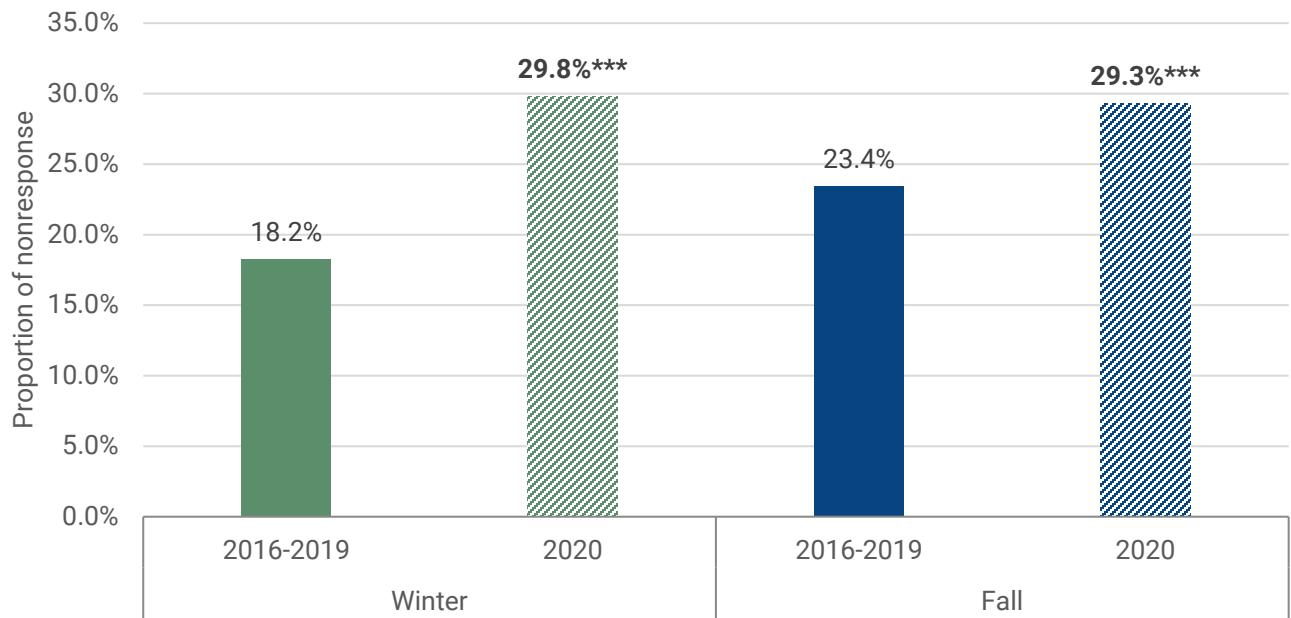
- Item-level nonresponse for the quantity of pills in a prescription medicine bottle increased from an average of 4.1% between Winter 2018 and Winter 2019 to 5.4% in Winter 2020.
- Similarly, item-level non-response for the quantity of pills in a prescription medicine bottle increased from an average of 4.2% between Fall 2018 and Fall 2019 to 5.6% in Fall 2020.

<sup>5</sup> The MCBS collects the quantity of each prescription medicine beneficiaries obtain, including a single question about pill quantity for pill medicines and a two-part question about both amount and unit for non-pill medicines (e.g., 100 ml). Figure 5 focuses on the item-level nonresponse for pill medicines, but item-level nonresponse also increased for the amount and unit indicators for non-pill medicines in the Winter 2020 and Fall 2020 phone interviews compared to prior rounds.

<sup>6</sup> The 2016 and 2017 data for prescription medicine pill quantity are not presented in this analysis because these data are not comparable to subsequent rounds due to a questionnaire change.

**There were statistically significant increases in item-level nonresponse for total Medicare payment amount in the Winter 2020 and Fall 2020 phone interviews compared to prior rounds, respectively.**

**Figure 6.** Item-level nonresponse for total Medicare payment amount, Winter 2016-2020 and Fall 2016-2020



\* Indicates  $p < 0.05$ . \*\* Indicates  $p < 0.01$ . \*\*\* Indicates  $p < 0.001$ .

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey, Round-based data, 2016–2020.

NOTES: Estimates reflect the unweighted proportion of reported statement costs with item-level nonresponse for the total Medicare payment amount and were based on raw round-based data for Medicare beneficiaries who completed an MCBS Community interview in the respective round. Beneficiaries answered questions themselves or by proxy. The “2016-2019” estimates reflect the unweighted average proportion of nonresponse in the 2016, 2017, 2018 and 2019 rounds. The Winter estimates reflect Community interviews that were completed from Week 12 through the end of the round, not all MCBS Community interviews completed that round. See Appendix A, Table 3 for the N sizes and standard errors for each round.

- Item-level nonresponse for the total Medicare payment amount increased from an average of 18.2% between Winter 2016 and Winter 2019 to 29.8% in Winter 2020.
- Similarly, item-level nonresponse for the total Medicare payment amount increased from an average of 23.4% between Fall 2016 and Fall 2019 to 29.3% in Fall 2020.



## DISCUSSION

This analysis found decreases in respondents' reporting of health care utilization and costs in both the Winter 2020 and Fall 2020 Community interviews, which likely reflects a combination of pandemic impacts and mode effects. The changes in event reporting correspond to actual decreases in utilization during the pandemic; other studies have found evidence of substantial decreases in utilization and spending due to pandemic-related restrictions and beneficiary behavior.<sup>7, vi, vii</sup> The decreases found in the MCBS data were smaller in Winter 2020 than later in the year because the time period over which respondents recalled utilization in the Winter 2020 interviews included multiple months of pre-pandemic utilization (i.e., since respondents' Fall 2019 interviews). There were also decreases in the reporting of health care costs in both the Winter 2020 and Fall 2020 Community interviews. These decreases were likely due to a combination of a) lower utilization during the pandemic (noted above) and b) difficulties associated with the increased burden for respondents to collect and report cost data via phone:

- Qualitative feedback from field staff suggested many respondents found it burdensome to sort through statements and other documentation to provide requested details, even with supportive guidance from interviewers over the phone.
- The new "escape hatch" functionality added to the MCBS Community Questionnaire in Fall 2020 allowed interviewers to bypass some or all of the cost data collection.
- Some respondents may have intentionally failed to report cost details by passively refusing, although this behavior was relatively rare.

The observed decreases in item-level response for prescription medicine information and statement details likely indicate the presence of mode effects, as the transition to phone interviews transferred the burden of extracting key information from documentation and medicine bottles from the trained interviewers to the respondents. The potential for increased respondent burden and fatigue during phone interviews has implications for all surveys that collect detailed information based on respondent recall supported by documentation. Lack of physical access to documentation will continue to be a barrier to overcome in phone interviewing, particularly for beneficiaries with high levels of health care utilization and/or complicated insurance statements.

Since the initial switch to phone-only interviewing in March 2020, MCBS data continued to be collected by phone throughout 2020 and most of 2021 with a gradual return to some in-person interviewing beginning in November 2021. MCBS data collection will include both phone and in-person interviewing going forward, so understanding the implications of phone interviewing and the impact of data collection mode on response and data quality continues to be an important consideration for the MCBS.<sup>8</sup>

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<sup>7</sup> For example, a June 2021 issue brief from the Assistant Secretary for Planning and Evaluation's (ASPE) Office of Health Policy found that Medicare Fee-for-Service (FFS) utilization and spending decreased sharply in March and April of 2020, with total claims decreasing by 48 percent and total claim payments decreasing by 33 percent for the two-week period ending 4/8/2020 relative to 2019; while services "rebounded" later in the year, there was a cumulative 3 percent decrease in total claims and 6.5 percent decrease in claim payments in 2020 compared to 2019.<sup>vi</sup> Similarly, a June 2022 Kaiser Family Foundation (KFF) issue brief found that total Medicare FFS spending decreased by 5.8 percent, or \$21.4 billion, between 2019 and 2020, with the largest decreases by dollar amount found for inpatient hospital services (\$7.9 billion), outpatient hospital services (\$5.1 billion), and evaluation & management visits (\$3.7 billion) and the largest decreases by share of spending found for procedures (13.1 percent) and imaging (12.9 percent).<sup>vii</sup>

<sup>8</sup> Discussion of additional follow-up analysis of the mode transition and its impact on the final 2020 and 2021 MCBS data can be found in Section 9.3 of the *2021 MCBS Methodology Report* available here: <https://www.cms.gov/files/document/2021-mcbs-methodology-report.pdf>

## **Limitations**

This analysis has several notable limitations. Due to the lack of an experimental design, it is difficult to fully isolate the mode effects (i.e., changes due to the data collection mode) from the pandemic effects (i.e., actual changes in utilization). This analysis also used raw round-based data, not the final, clean, annualized MCBS data. While the use of raw data across all rounds of data collection enables comparisons of estimates over time, a small number of cases may be present in this analysis that would ultimately be found ineligible and removed from the final data. Finally, MCBS interviews completed later in the data collection round may over-represent beneficiaries who are in poorer health or have higher health care utilization because these beneficiaries are harder to reach and require more contact attempts. While the Winter round analysis was limited to only the final weeks of data collection to enable comparisons across all five Winter rounds, these results may not be generalizable to the full Medicare population.

## APPENDIX A: DETAILED TABLES

**Table 1.** Mean number of health care events and costs reported per 100 reference period days, Winter 2016-2020 and Fall 2016-2020

Round(s)	Mean number of health care events reported Estimate (SE)	Mean number of health care costs reported Estimate (SE)
Winter 2016-2019 ( <i>N</i> =13,004)	5.72 (0.05)	7.28 (0.07)
Winter 2020 ( <i>N</i> =1,874)	3.98 (0.10) <sup>***</sup>	5.22 (0.12) <sup>***</sup>
Fall 2016-2019 ( <i>N</i> =29,291)	6.90 (0.04)	9.22 (0.05)
Fall 2020 ( <i>N</i> =7,936)	4.19 (0.04) <sup>***</sup>	4.19 (0.05) <sup>***</sup>

\* Indicates  $p < 0.05$ . \*\* Indicates  $p < 0.01$ . \*\*\* Indicates  $p < 0.001$ .

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey, Round-based data, 2016–2020.

NOTES: Estimates reflect the unweighted average number of events and costs reported per 100 reference period days and were based on raw round-based data for Medicare beneficiaries who completed an MCBS Community interview in the respective round. Beneficiaries answered questions themselves or by proxy. The “2016-2019” estimates reflect the unweighted average number of events and costs in the 2016, 2017, 2018, and 2019 rounds. The Winter counts reflect the number of MCBS Community interviews that were completed from Week 12 through the end of the round, not the total number of MCBS Community interviews completed that round. Additionally, the Fall counts reflect the number of completed Community interviews among Continuing Panel respondents only, not Incoming Panel respondents (i.e., respondents completing their first MCBS interview that round), since cost and utilization data are not collected in the Baseline MCBS interview.

**Table 2.** Item-level nonresponse for prescription medicine pill quantity, Winter 2018-2020 and Fall 2018-2020

Round(s)	Estimate – % (SE)
Winter 2018-2019 ( <i>N</i> =14,600)	4.1 (0.2)
Winter 2020 ( <i>N</i> =2,985)	5.4 (0.5) <sup>***</sup>
Fall 2018-2019 ( <i>N</i> =44,085)	4.2 (0.1)
Fall 2020 ( <i>N</i> =21,176)	5.6 (0.2) <sup>***</sup>

\* Indicates  $p < 0.05$ . \*\* Indicates  $p < 0.01$ . \*\*\* Indicates  $p < 0.001$ .

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey, Round-based data, 2018–2020.

NOTES: Estimates reflect the unweighted proportion of reported prescription medicine events in pill form with item-level nonresponse for pill quantity and were based on raw round-based data for Medicare beneficiaries who completed an MCBS Community interview in the respective round. Beneficiaries answered questions themselves or by proxy. The “2018-2019” estimates reflect the unweighted average proportion of nonresponse in the 2018 and 2019 rounds.

**Table 3.** Item-level nonresponse for total Medicare payment amount, Winter 2016-2020 and Fall 2016-2020

Round(s)	Estimate – % (SE)
Winter 2016-2019 ( <i>N</i> =66,403)	18.2 (0.2)
Winter 2020 ( <i>N</i> =6,709)	29.8 (0.8) <sup>***</sup>
Fall 2016-2019 ( <i>N</i> =137,758)	23.4 (0.2)
Fall 2020 ( <i>N</i> =22,590)	29.3 (0.4) <sup>***</sup>

\* Indicates  $p < 0.05$ . \*\* Indicates  $p < 0.01$ . \*\*\* Indicates  $p < 0.001$ .

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey, Round-based data, 2016–2020.

NOTES: Estimates reflect the unweighted proportion of reported statement costs with item-level nonresponse for the total Medicare payment amount and were based on raw round-based data for Medicare beneficiaries who completed an MCBS Community interview in the respective round. Beneficiaries answered questions themselves or by proxy. The “2016-2019” estimates reflect the unweighted average proportion of nonresponse in the 2016, 2017, 2018, and 2019 rounds.

## ABOUT THE AUTHORS

This working paper was written under contract number 75FCMC19D0092 by Meredith Passero and Becky Reimer of NORC at the University of Chicago, in collaboration with Nicholas Schluterman at the Centers for Medicare & Medicaid Services (CMS) Office for Enterprise Data and Analytics (OEDA).

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