Impact of More Primary Care Visits on Commercial Health Care Costs

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ABSTRACT

OBJECTIVE: To evaluate the relationship between the frequency of routine primary care visits and total health care expenditures among commercially insured adults.

STUDY DESIGN: Retrospective cross-sectional statistical analysis of a nationally representative data set of health care utilization and expenditures over a 2-year period.

METHODS: We used multivariate regression analysis to evaluate the association between the annualized number of visits with a primary care physician for routine care and total health care expenditures for commercially insured adults younger than 65 years, adjusting for underlying clinical complexity measured through risk scoring. Data were drawn from information collected by the Agency for Healthcare Research and Quality between 2021 and 2022.

RESULTS: For a sample cohort of 3879 participants, more frequent primary care visits were associated with incremental reductions in expenditures only for participants with high underlying clinical complexity. A relative risk level of approximately 2 times the average commercially insured adult was identified as an inflection point, above which cost reductions vs counterfactual prediction were observed, up to a limited number of visits.

CONCLUSIONS: Our results show a relationship between primary care visit frequency and health care expenditures with similar directionality and risk dependency as has been observed in other studies for Medicare-insured adults. This finding suggests that certain commercial populations may benefit from risk-stratified, high-touch primary care models like those being employed for some Medicare populations. The health care cost reduction benefits of these models appear premised more on clinical need than coverage type. Demonstrating this relationship is useful for health care providers, insurers, and policy makers who are developing advanced primary care models.

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Primary care plays a critical role in providing preventive services, managing chronic conditions, and coordinating patient care. The US invests a smaller share of its total health care spend in primary care than other high-income nations,[1] but it is becoming increasingly recognized that more investment in primary care could aid in mitigating health care expenditures. How should this additional investment be implemented?

For Medicare-eligible patients, there is an emerging answer. The frequency and consistency of patient interactions with primary care has been confirmed as influential on health outcomes and the overall costs of care in Medicare populations. Some innovative primary care models claim that high-frequency visits are negatively correlated with downstream, higher-acuity utilization.[2,3] Other research looking at broader populations has established that this association exists within Medicare-eligible patients overall.[4,5] Literature has described that, in general, patients with high levels of clinical complexity—whether Medicare-eligible patients in general relative to the rest of the population or higher-risk patients within Medicare—tend to benefit more from more frequent engagement with primary care.[4]

The impact of primary care visit frequency within commercially insured populations has not yet been assessed in the literature, although many of these patients have clinical risk and utilization comparable to the same Medicare cohorts that are proposed to benefit from high-touch primary care models. This study attempts to bridge this gap by exploring the relationship between primary care visit frequency and health care expenditures within a nationally representative, commercially insured population.

METHODS

We employed a retrospective cross-sectional design using data from the Medical Expenditure Panel Survey (MEPS). MEPS is a nationally representative survey conducted annually by the Agency for Healthcare Research and Quality to collect information on health care utilization and expenditures. Much of the information is reported by households and supplemented by data from their

TAKEAWAY POINTS

In a nationally representative data set, we found that more frequent routine primary care visits are associated with cost reductions for commercially insured adults with high clinical complexity.

- Populations with at least double the mean clinical risk score for commercially insured adults appear to benefit from greater visit frequency.
- Optimizing the visit frequency across clinical risk segments is associated with lower overall costs for the population.
- Although similar results have been demonstrated in Medicare, ours is the first demonstration to our knowledge in commercially insured adults.
- Clinical decision makers should consider ways to encourage visits for higher-risk patients.

medical providers, such as amounts paid by insurers. MEPS has been leveraged in past research to predict health care expenditures using patient-level demographics and diagnosed conditions.[6]

Our study population was selected from a 2-year snapshot of care delivered from January 2021 through December 2022. The sample included participants who (1) were surveyed in both study years; (2) self-reported their health insurance status as being covered under a commercial policy and not Medicare, Medicaid, or other public coverage; (3) reported any office- or facilities-based utilization during the year; and (4) were between the ages of 18 and 64 years. A total of 3879 survey participants met these criteria and had a mean annual total cost of care of $7688.

Key Variables

Both the predictive and outcome variables used in this study were measured in the same period. Primary care visits were identified by practitioner specialty and the categorization of care received. To account for differential patient disease burdens, we calculated a risk score to predict cost based solely on a patient's chronic conditions reported in MEPS. The primary outcome for this study was total health care expenditures, measured as a mean value per member per month ($PMPM).

Primary care visit frequency. Primary care visit frequency was measured as the number of office-based visits conducted per year in which the participant (1) saw a practitioner in 1 of the following specialties: family practice, general practice, geriatrics, internal medicine, nurse practitioner, obstetrics/gynecology, or pediatrics[7]; and (2) recorded the best category for care received as a general checkup or wellness exam.[8] These visits represent routine care, annual wellness visits, and evaluation and management without a new diagnosis, and they are referred to as *routine visits* herein. Other studies have evaluated self-reported visit categorization in MEPS for accuracy and found high accordance with corresponding claims data.[9] The sample reported 5683 visits that fit these criteria during the study period, or 0.73 per person per year.

We separately identified other visits with those same provider specialties in which the care provided was classified as diagnosis, treatment, or acute/emergent conditions, herein referred to as *acute visits*. The sample reported 4875 visits that fit these criteria during the study period, or 0.63 per person per year. The most common types of acute visits were for issues such as urinary tract infections, upper respiratory infections, sinusitis, and COVID-19. This visit category also included some new diagnoses for chronic conditions including hypertension, diabetes, and musculoskeletal pain. We hypothesized that acute visits would have a different association with cost than routine primary care visits, and as such, we included both categories as separate covariates in our analysis.

Risk score. To assess outcomes in the context of underlying clinical need, we developed a risk adjustment factor derived from diagnosis codes reported in MEPS. These diagnoses are obtained in MEPS through multiple pathways: self-identification in which the participant is asked whether they have ever been diagnosed with a condition; as a reported reason for a particular medical event such as an office visit, hospital visit, or prescribed medicine; and through supplemental information recorded by health care providers.

The risk scores used in this study are based on the Hierarchical Condition Category (HCC) risk adjustment model v24 published by CMS. The HCC model is used by CMS to predict the health care costs of Medicare enrollees and assign risk adjustment factors to individual Medicare Advantage enrollees, which influence capitated payments to insurers. Coefficients are assigned to each HCC based on the relative anticipated health care utilization and cost attributable to their conditions. HCCs are only eligible to receive a coefficient if the conditions are chronic and require ongoing management, are associated with high health care costs or morbidity, are sufficiently prevalent in the Medicare population, have predictive value for future utilization, and can be reliably documented in claims data.[10]

To construct risk scores for participants in our sample, we first isolated all 3-digit *International Statistical Classification of Diseases, Tenth Revision* (*ICD-10*) diagnosis codes reported in any health care encounter during the study period, including any office-based visits, inpatient or outpatient hospital stays, emergency department visits, home health visits, or prescribed medicines. Those 3-digit *ICD-10* codes were then cross-referenced against the CMS HCC final model mappings to identify the HCC(s) that correspond with each diagnosis code, if any. Risk scores were then calculated as the sum of unique HCC coefficients for which a participant has the corresponding diagnoses. We linearly normalized this metric to have a sample mean of 1.0.

The CMS HCC model presumes a high degree of specificity regarding diagnoses (at the 7-digit *ICD-10* code level). Some simplifying techniques were required to enable application of the model to the more aggregated diagnostic information available in MEPS (limited to the 3-digit level in *ICD-10*). Details on these techniques are provided in the **eAppendix** (available at **ajmc.com**).

Health care expenditures. Total health care expenditures were calculated for each participant by summing their total medical and pharmacy expenses during the study period, summarized as a $PMPM rate. These include amounts paid by the insurer and the patient's own cost share. Expenditures are reported by the households of MEPS survey respondents and supplemented by information from their medical providers.

Analytical Methodology

All analyses were conducted using R 4.1.2 (R Foundation for Statistical Computing). Multivariable regression models were fitted using the R Stats Package version 3.6.2. We considered a 2-sided *P* value less than .05 as statistically significant.

TABLE 1. Selected Descriptive Characteristics of the Sample Cohort (N = 3879)

Variable	Minimum	Mean	Maximum	SD
Age in years	18.00	43.91	64.00	13.19
Total health care expenses ($PMPM)	0.67	640.66	55,201.17	1578.02
Specialist visits per year[a]	0.00	1.59	45.00	3.23
ED visits per year	0.00	0.14	6.00	0.38
IP admissions per year	0.00	0.05	2.50	0.20
Routine primary care visits per year	0.00	0.73	28.00	1.07
Acute primary care visits per year	0.00	0.63	42.50	1.49

ED, emergency department; IP, inpatient; $PMPM, value per member per month.

[a]Specialist visits were defined as any office-based visit with a medical doctor who does not specialize in primary care.

Sources: Agency for Healthcare Research and Quality; authors' analyses.

TABLE 2. Summary Statistics of Risk Scores Assigned to Participants

Risk scores	n	25th percentile	Mean	75th percentile
All participants[a]	3879	0.00	1.00	1.55
Participants with nonzero risk scores[b]	1555	0.86	2.49	3.22
Participants who received care for the following HCCs:				
Diabetes, with or without chronic complications	309	3.13	4.32	4.70
Major depressive, bipolar, and paranoid disorders	222	1.55	2.87	3.85
Breast, prostate, and other cancers	100	1.67	2.70	4.23
Rheumatoid arthritis, other inflammatory diseases	79	2.05	4.81	6.36
Vascular disease, with or without complications	56	2.65	4.83	6.14
Chronic obstructive pulmonary disease	31	0.69	4.03	6.52

HCC, Hierarchical Condition Category.

[a]Risk scores are normalized to have a mean of 1.00 for the entire study cohort.

[b]60% of participants had a risk score of 0.00.

Sources: Agency for Healthcare Research and Quality and CMS; authors' analyses.

RESULTS

The study cohort had 3879 participants. Descriptive information about the demographics and health care utilization of this sample is available in **Table 1**. The mean number of annual routine visits was 0.73, and the mean number of annual acute visits was 0.63. Participants also had a mean of 1.59 office-based visits with other non–primary care specialists per year, but many of the most clinically complex participants had several such visits.

Risk scores were assigned to each MEPS participant based on their diagnoses and the CMS HCC algorithm. Overall, approximately 40% of the sample population was given a risk score; the remaining 60% were assigned a risk score of 0 because they did not report any chronic diagnoses in the study year that mapped to an HCC. Of those participants who did have diagnoses eligible for HCCs, the mean risk score was 2.49. **Table 2** provides summary statistics on the distribution of risk scores and some of the most common diagnoses in the sample. Overall, risk scores were highly correlated with expenditures ($r = 0.37$).

MEPS assigns sample weights to each individual participant so that the data can be used to generate estimates that are representative of the greater US population. These weights consider survey nonresponse, attrition, and limitations to the sampling design and are calibrated using demographic factors such as highest degree of education, census region, metropolitan statistical area status, race/ethnicity, sex, and age.

Sample-weighted least squares multivariable regression analysis was used to predict total health care expenditures. To assess how the impact of primary care may vary by degree of patient risk, we included 2 interaction terms: the simple products of a patient's risk score times their routine visit frequency and of a patient's risk score times their acute visit frequency. These interactions can be interpreted as additive modifiers to the simple coefficients for their respective visit types. For example, the routine visit interaction's coefficient can be multiplied by a risk score and then added to the base routine visit coefficient to obtain the net predicted effect of each incremental routine visit. Quadratic forms of the covariates for risk, routine visits, acute visits, and their interactions were also considered to test for nonlinear relationships and diminishing effectiveness of incremental visits.

The results of the estimation are described in **Table 3**. Participants with total health care expenditures above the sample's 99th percentile (the equivalent of approximately $80,000 per year) were set to the 99th percentile value to mitigate the impact of high-cost outliers. It is important to note that the expenditures predicted are measured within the same study period, as are the predictor variables. The estimation is, therefore, primarily one of near-term (< 2-year) associations, which may be indicative of longer-term trends.

The estimation yielded an adjusted R^2 of 0.20; much of the sample's variance in nominal expenditures remains unexplained

TABLE 3. Summary of Multivariable Regression Estimating Total Health Care Expenditures

	Total health care expenditures $PMPM (N = 3879)[a]		
Coefficient	**Estimate**	**95% CI**	***P***
Intercept	60.72	−38.99 to 160.44	.23
Age	3.31	1.10-5.51	< .01
Female	113.61	55.69-171.54	< .01
Risk score	255.86	220.05-291.68	< .01
Risk score^2	−5.77	−8.57 to −2.97	< .01
No. of routine visits[b]	81.86	46.85-116.87	< .01
No. of routine visits × risk score	−54.06	−76.26 to −31.86	< .01
(No. of routine visits × risk score)^2	1.26	0.83-1.69	< .01
No. of acute visits[b]	93.21	66.17-120.26	< .01
No. of acute visits × risk score	17.47	1.34-33.60	.03
(No. of acute visits × risk score)^2	−0.19	−0.36 to −0.02	.03

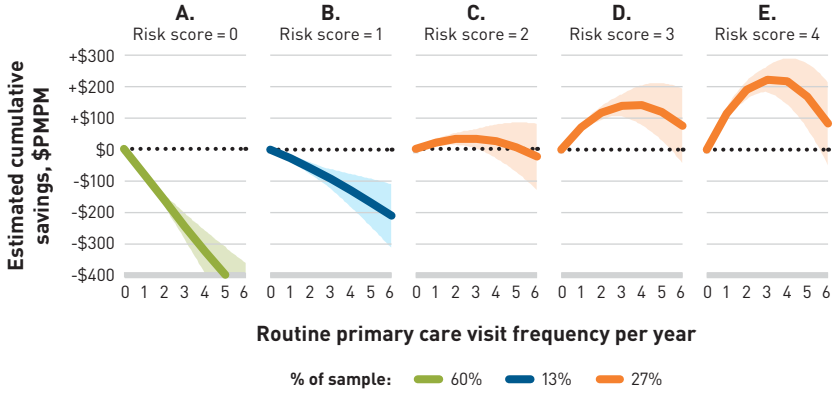
$PMPM, value per member per month.

[a]Medical Expenditure Panel Survey person-level survey weights applied via weighted least squares regression. $R^2 = 0.20$; adjusted $R^2 = 0.20$; residual SE = 940.91.

[b]Mean number of visits with primary care providers per year.

Sources: Agency for Healthcare Research and Quality and CMS; authors' analyses.

FIGURE. Modeled Savings on Total Expenditures vs Routine Visit Frequency, Stratified by Risk Score[a]



$PMPM, value per member per month.

[a]Additional routine visits per year were associated with an increase in cost for patients with the lowest clinical complexity but with cost savings for patients with the highest clinical complexity. Shading indicates 95% CIs.

Sources: Agency for Healthcare Research and Quality and CMS; authors' analyses.

by risk adjustment and primary care utilization. However, both the risk score (255.86; 95% CI, 220.05-291.68; $P < .01$) and number of routine primary care visits per year (81.86; 95% CI, 46.85-116.87; $P < .01$) were significantly predictive of cost. The impact on predicted expenditures of more frequent routine primary care visits had a significant negative interaction with risk (−54.06; 95% CI, −76.26 to −31.86; $P < .01$). Additional visits were associated with an increase in cost for patients with the lowest clinical complexity, whereas additional visits were associated with cost savings for patients with the highest clinical complexity. The implied inflection point—the level of risk at which additional routine visits become predictive of cost savings—was approximately 2 times the sample mean risk.

Unlike routine primary care visits, acute visits were not associated with cost savings for high-complexity patients. Rather, acute visits appear to be indicative of health care expenditures beyond the costs of the visits themselves, presumably due to follow-up care for new diagnoses and new prescriptions for acute issues.

The quadratic form of the interaction between routine visits and patient risk score also added predictive value (1.26; 95% CI, 0.83-1.69; $P < .01$). This result implies a convex fit between routine visit frequency and its relationship with total health care expenditures; as the number of visits per year increases, there are diminishing savings associated. Predictions for various ranges of routine primary care visit frequencies by patient risk level are illustrated in the **Figure**.

There was also indication that savings on utilization besides primary care may be achieved at risk levels lower than 2.0. For example, at a risk level of 1.2, or 20% above the sample mean, this estimation would predict a participant's first routine primary care visit to be accompanied by an increase in annual health care expenditures of approximately $226. That value is less than the mean expenditure of $267 for a routine visit itself in the sample. This suggests that for some patients, more frequent interactions with primary care could be linked to cost savings on other sources of care, but at an amount less than the cost of the primary care visits themselves.

DISCUSSION

Our analysis found a significant association between primary care visit frequency and health care costs within a nationally representative sample of commercial patients, wherein the incremental predicted effect of more routine visits varied by clinical risk. These findings suggest that for patients with underlying clinical complexity, cost savings vs prediction are often achieved for those with more frequent, nonacute interactions with primary care. At an inflection point of approximately twice the sample mean risk score, the predicted overall savings of additional routine visits transitioned from negative to positive. For participants with twice the sample mean risk score, our model predicted a maximum cost savings

of approximately $34 PMPM (95% CI, $12-$56) at 2 to 3 visits per year. For participants with 4 times the sample mean risk score, that maximum was $224 PMPM (95% CI, $173-$275) at 3 to 4 visits per year. The sample had limited representation of commercially insured participants receiving more than 6 routine primary care visits per year (< 1%); therefore, our model is not appropriate to assess higher frequencies of visits. Roughly 7% of participants in the sample had risk scores of 4 or greater.

These results are consistent with prior studies finding a significant association between primary care visit frequency, inherent risk, and costs among Medicare-eligible patients.[4] Our finding of a comparable link among higher-risk commercial patients suggests that the value of more frequent visits to primary care is driven more by underlying patient clinical risk than the coverage model.

For patients with lower clinical risk, we found that additional routine and acute visits were associated with higher overall expenditures. These patients are less likely to have immediately impactable sources of health care costs outside primary care, and, as such, this positive relationship is in large part derived from the cost of the primary care visits themselves. It is important to note that the intention of much preventive care for healthy individuals is to mitigate avoidable disease burden over a longer-term window, for which benefits will seldom manifest in the same calendar year as the intervention.

Limitations

For some calculations, we relied on self-reported measures of health care utilization and insurance status from MEPS, which may not always be accurate. Our data set lacked the granularity to determine additional attributes of primary care visits such as length of visit, preexisting relationships with the provider, patient experience, and quality of care provided. These factors are integral to primary care quality, and their omission limited our ability to comprehensively measure the value of visits.

Additionally, our approach to calculating risk scores using MEPS-reported diagnoses may not have captured the full spectrum of patient complexity. This is especially true given that the CMS HCC algorithm is developed to predict health care expenditures in the Medicare fee-for-service population.[10] Assessing risk through HCCs may also have less predictive value in a commercially insured population because a smaller share of this population has diagnosed chronic conditions and thorough medical claims history.

Finally, our results do not establish causality. Because this was a retrospective analysis, we could not determine whether unobserved factors influenced both the frequency of primary care visits and the total cost of those visits. For instance, some physicians may foster stronger patient engagement, which mitigates downstream costs while only incidentally resulting in more frequent encounters. Thus, we cannot determine with certainty whether increasing the number of visits for a given patient will directly lead to a change in their expenditures. Future research should pursue controlled study designs to establish estimates of causality.

CONCLUSIONS

Our results raise important considerations about the optimal frequency and type of primary care engagement in commercially insured populations. Higher-risk patients could benefit from more frequent routine visits, potentially resulting in lower overall health care expenditures. High-touch primary care models currently used in Medicare populations could be appropriate for commercial patients as well. Accurate risk stratification will be important because (1) a smaller share of a typical commercial population will have threshold levels of clinical risk compared with an average Medicare population and (2) there appears to be a declining marginal effect for incremental visits even for those beyond the threshold clinical risk. Nevertheless, understanding this relationship can help health care providers, insurers, and policy makers consider advanced primary care models in commercially insured populations. ■

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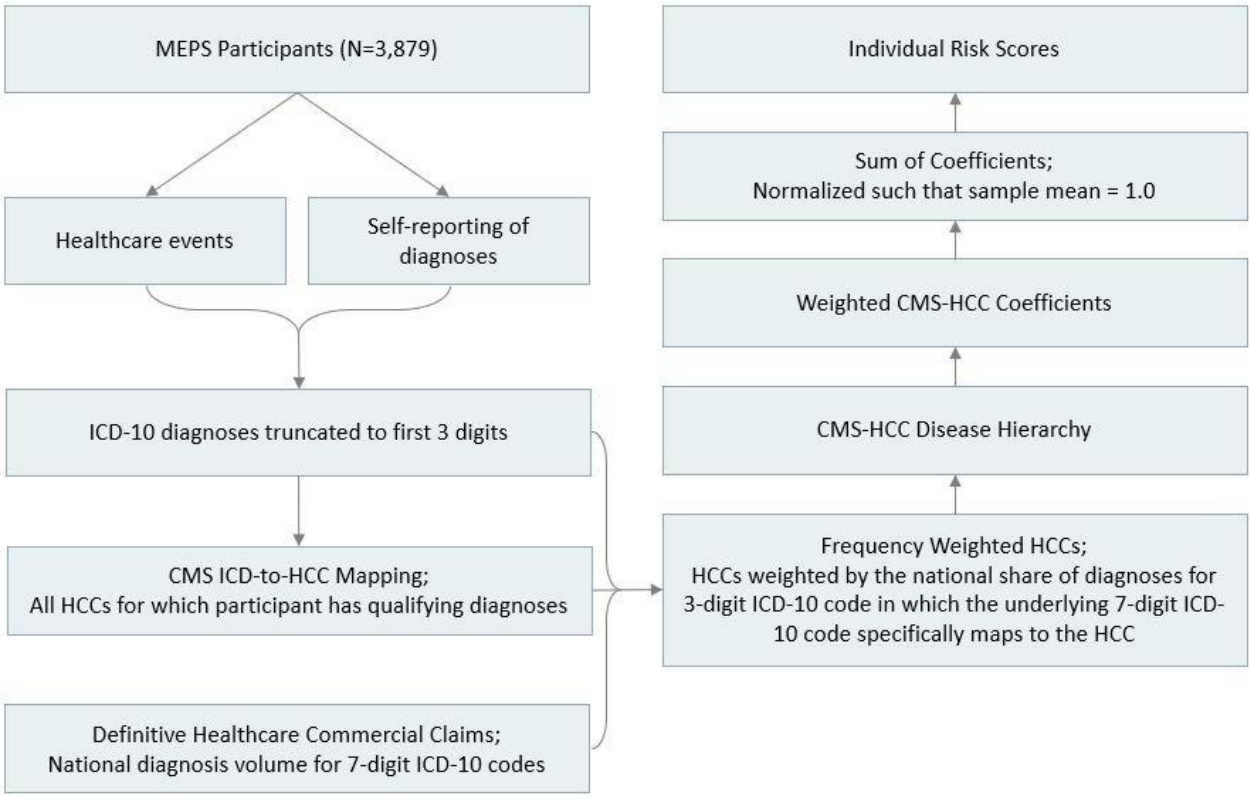
eAppendix

Details on Methodology for Risk Score Calculating using MEPS Diagnoses

The following figure provides and overview of the methodology for develop risk scores for the included sample:



In some select cases, a 3-digit ICD-10 code reported by MEPS can represent one of several possible 7-digit ICD-10 codes (those that share the same first 3 characters) which, at that granularity, do not all qualify for a single HCC. In such cases, we assigned weights to the possible HCC(s) to represent the national share of commercially covered diagnoses for the 3-digit ICD-10 code in which the underlying 7-digit ICD-10 code specifically maps to that HCC. For example, if a participant had a 3-digit ICD-10 diagnosis of E11, which could represent either of the diabetes HCCs with or without chronic complications, the participant will receive a weighted average between the two HCCs which skews towards diabetes with chronic complications, since that is the more common diagnosis nationally. This approach makes a key

assumption in these cases that the relative distribution of precise diagnoses among MEPS participants with a particular 3-digit ICD-10 code approximately mirrors the corresponding national distribution.

Weights are obtained using national commercial claims data provided by Definitive Healthcare's Atlas Dataset, which aggregates an estimated 70% of all US-based commercial claims in 2021 across all places of service.

Although risk-adjustment in non-claims survey data has been accomplished in past works with approaches that rely on factors such as demographics, self-reported health status, and select chronic conditions, to our knowledge, the estimation of RAF scores using MEPS-reported diagnoses as described in this study has not been explored in existing literature.

Documentation of the CMS-HCC model methodology has substantiated that its application to a working-age population could be appropriate if properly normalized (i.e., general multiplier that elicits a mean score of 1.0).[1] However, one potential limitation of this approach is not capturing diagnoses unreported in MEPS. When applied to MEPS participants who reported having Medicare coverage, the average risk score calculated using this methodology, multiplied by CMS' published 2019 Normalization Factor was approximately 0.91, less than the 1.00 obtained by CMS using Medicare claims. This implies that we do not capture the full extent of all participants' clinical risk using MEPS diagnoses. Conversely, it also suggests that what we do capture is within 10% of what is visible through Medicare claims.

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