


# BMJ Open Quality High-performing primary care clinics across high-need, high-cost Medicare populations

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## ABSTRACT

**Background** To reduce spending and improve quality, some primary care clinics in the USA have focused on high-need, high-cost (HNHC) Medicare beneficiaries, which include clinically distinct subpopulations: older adults with frailty, adults under 65 years with disability and beneficiaries with major complex chronic conditions. Nationally, the extent to which primary care clinics are high-performing 'Bright Spots'—clinics that achieve favourable outcomes at lower costs across HNHC beneficiary subpopulations—is not known.

**Objective** To determine the prevalence of primary care clinics that perform highly on commonly used cost or quality measures for HNHC subpopulations.

**Design and participants** Cross-sectional study using Medicare claims data from 2014 to 2015.

**Main measures** Annual spending, avoidable hospitalisations for ambulatory care-sensitive conditions, treat-and-release emergency department visits, all-cause 30-day unplanned hospital readmission rates and healthy days at home. Clinics were high performing when they ranked in the top quartile of performance for ≥4 measures for an HNHC subpopulation. 'Bright Spot' clinics were in the top quartile of performance for ≥4 measures across all the HNHC subpopulations.

**Key results** A total of 2770 primary care clinics cared for at least 10 beneficiaries from each of the three HNHC subpopulations (adults under 65 with disability, older adults with frailty and beneficiaries with major complex chronic conditions). Less than 4% of clinics were high performing for each HNHC subpopulation; <0.5% of clinics were in the top quartile for all five measures for a given subpopulation. No clinics met the definition of a primary care 'Bright Spot'.

**Conclusions** High-performing primary care clinics that achieved favourable health outcomes or lower costs across subpopulations of HNHC beneficiaries in the Medicare programme in 2015 were rare. Efforts are needed to support primary care clinics in providing optimal care to HNHC subpopulations.

## INTRODUCTION

Clinicians are increasingly accountable for the accumulated healthcare costs and quality of care of their patients in the USA. Many current alternative payment models (APMs) assign responsibility for managing total costs specifically to primary care clinics, which

## WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ High-need, high-cost (HNHC) patients—which the National Academy of Medicine recognises as three clinically distinct subpopulations, including older adults with frailty, adults under 65 with disability and older beneficiaries with major complex chronic conditions—are expensive to care for and at risk of poor outcomes. The extent to which primary care clinics provide high-quality, cost-effective care for these Medicare beneficiaries is poorly understood.

## WHAT THIS STUDY ADDS

⇒ Using Medicare data, this study found that high-performing primary care clinics that achieve favourable health outcomes or lower costs for HNHC beneficiaries were rare.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ As clinical leaders and policymakers seek to identify and scale optimal models of primary care for HNHC beneficiaries, further work is needed to support primary care clinics in offering optimal care to meet the unique needs of HNHC beneficiaries.

may be best positioned to coordinate care.<sup>1</sup> To reduce spending and improve quality, primary care clinics have increasingly focused on targeting efforts towards Medicare high-need, high-cost (HNHC) beneficiaries, given that these beneficiaries are by definition expensive to care for and at risk for poorer outcomes. However, providing optimal care for HNHC beneficiaries can present unique challenges for primary care clinicians given the diversity of needs.<sup>2–7</sup> A recent national report by the National Academy of Medicine (NAM) advocated for recognising that the HNHC population is not homogenous but rather consists of clinically distinct subpopulations, including older adults with frailty, adults under 65 with disability and older beneficiaries with major complex chronic conditions.<sup>2 3 7 8</sup>

Since HNHC subpopulations have distinct needs that are challenging to meet, primary

care clinics may struggle to deliver optimal care for more than one subpopulation; some clinics may specialise in care for a single HNHC subpopulation, orienting their approach to meet select types of needs.<sup>6</sup> Alternatively, it is possible that primary care clinics that are effective in caring for one subpopulation may be successful in caring for multiple subpopulations, serving everyone with excellence. Primary care 'Bright Spots'—clinics that achieve better outcomes at lower costs across HNHC subpopulations—may exist and would be critical to learn from. Understanding the extent to which primary care clinics achieve high-quality care for different HNHC populations is essential for informing emerging care models and approaches to learning. However, limited empirical evidence is available to guide these efforts.

In this study, we used national Medicare data to answer the following key questions. First, for a given priority subpopulation of HNHC beneficiaries as defined by the NAM framework (including adults under 65 with disability, older adults with frailty and beneficiaries with major complex chronic conditions), what proportion of primary care clinics are high performing on care quality or costs? Second, what proportion of clinics are 'Bright Spot' primary care clinics, meaning clinics that perform highly for all three HNHC subpopulations?

## METHODS

### Definition of HNHC beneficiary subpopulations

We used national Medicare claims data (parts A and B) from 2 years (2014 and 2015). The first year was used to categorise beneficiaries into the study cohort and the second year to examine spending and outcomes. Using 2014 data, we segmented beneficiaries into three HNHC subpopulations, defined by the NAM High-Need Patient Framework to be mutually exclusive: adults under 65 with disability, older adults with frailty and beneficiaries with major complex chronic conditions.<sup>7</sup> Of note, a recent systematic review by the Agency for Healthcare Research and Quality (AHRQ) supported the use of patient characteristics, which was informed by the NAM segmentation framework, to identify HNHC patient populations.<sup>9</sup>

These groups were categorised in a mutually exclusive way using a waterfall-type approach. The first group identified was the adults under 65 with disability, which were defined as the Medicare beneficiaries under the age 65 who primarily qualify for Medicare due to a disability (as determined by the Social Security Administration) or have a specific condition like end-stage renal disease or amyotrophic lateral sclerosis. For beneficiaries not assigned to the first group, the next group identified was the older adults with frailty group, which were defined as the Medicare beneficiaries with at least two of the following 12 frailty indicators identifiable with billing codes: abnormal gait, protein-calorie malnutrition, adult failure to thrive, cachexia, debility, difficulty walking, history of falls, muscular wasting/disuse atrophy, decubitus ulcer, senility without psychosis and a code for certain types of

equipment (cane, walker, bath equipment, etc). Finally, the major complex chronic conditions subpopulation was defined as the Medicare beneficiaries with at least three of nine major complex chronic conditions. The nine major complex chronic conditions were the following: acute myocardial infarction/ischaemic heart disease, renal failure, heart failure, dementia, chronic obstructive pulmonary disease/interstitial lung disease, serious mental illness, arrhythmias, stroke or diabetes. Of note, these major chronic conditions have been previously identified as key chronic disease groups outlined by the Centers for Medicare & Medicaid Services (CMS). These three populations were recognised as Medicare beneficiaries that are at risk for being among the costliest to care for in a given year (in the top 10% costliest group across parts A and B spending).<sup>2</sup>

### Attribution of beneficiaries to primary care clinics

We attributed each HNHC beneficiary to a primary care clinician using a set of outpatient codes for evaluation and management visits to a physician's tax identification number, as is done by the CMS Medicare Shared Savings Program. Primary care physicians (PCPs) were defined as those with a primary specialty of family practice, general practice, geriatric medicine and internal medicine. We limited our analysis to primary care clinics, defined as clinics where 50% or more of the physicians were PCPs. Next, we determined the number of primary care clinics that had at least 10 beneficiaries of each one of the three HNHC subpopulations. The threshold of 10 beneficiaries was chosen given that this yearly threshold matches closely to the yearly threshold set by the CMS to attribute quality of care related to readmissions and mortality across hospitals, which are then used for determining financial penalties and bonuses under US value-based payment models (specifically 25 clinical episodes over a 3-year period).<sup>10-12</sup> As a sensitivity analysis, we repeated our analyses limited to clinics that had at least 30 beneficiaries of all three subpopulations.

### Analysis

First, we used 2014 data to identify the three different HNHC populations as described above. Each HNHC beneficiary was then attributed to a primary care clinic also as noted above. Next, we used year 2015 to calculate average costs and average rates across the different quality measures for each primary care clinic. We then calculated standardised costs for all beneficiaries from January 2015 to December 2015 using the CMS method, which helps adjust for regional variation in reimbursements and effectively assigns the same prices across all regions. To limit the impact of extreme outliers, we applied Winsorization of the top 1% most expensive beneficiaries and brought their costs to the 99% of spending. Next, we used a patient-level multivariable linear regression model to determine risk-adjusted costs. Models adjusted for patient characteristics, including age, sex, race, dual Medicaid status and comorbidities (using the Chronic Conditions

Data Warehouse (CCW) definition of comorbidities). We included random effects for clinics to limit the impact of small clinics falling into the extremes by using shrinkage estimates.

For each practice, we then calculated mean, risk-adjusted estimates across the following four patient outcomes. These measures were selected because they have been widely used previously in the literature and are used commonly in US government programmes to assess the quality of patient care, such as in value-based programmes implemented by the CMS. The four measures used included: (1) rate of avoidable hospitalisations as defined by the AHRQ ambulatory care-sensitive conditions (ACSCs),<sup>13</sup> (2) all-cause emergency department (ED) visit rate that did not result in a hospitalisation ('treat-and-release' ED visits),<sup>14</sup> (3) all-cause 30-day unplanned hospital readmission rates<sup>15</sup> and, finally, (4) number of 'healthy days at home' (HDAH). HDAH is a comprehensive measure developed by the Medicare Payment Advisory Committee that accounts for all interactions beneficiaries have with the healthcare system by tabulating the risk-adjusted number of days within a year that beneficiaries are at home and not interacting with the healthcare system (hospitals, EDs, inpatient rehabilitative centres or skilled nursing facilities).<sup>16</sup>

The analysis for each of the five different outcomes was performed in two stages: (1) a patient-level mixed-effects regression model was used to calculate a performance measure for each practice; and (2) these practice-level performance measures were then ordered across practices and used to determine which practices were in the best quartile, and used to calculate correlation coefficients between performance measures of different outcomes.

In the first stage, for standardised costs, we first Winsorized patient-level costs at the 99th percentile to reduce the impact of outliers and then ran a mixed-effects linear regression model on the Winsorized, standardised costs after log transformation. The model included random effects for practices, and included fixed covariates for patient age, sex, race, frailty, months alive and individual CCW. For each practice, the random effect for the practice was used to calculate the 'predicted' cost of a patient if they were seen at that particular practice.<sup>17</sup> The model was also used to calculate the 'expected' cost of a patient if they were seen at a typical practice. The ratio of the 'predicted' to the 'expected' cost quantifies how much better or worse a particular practice is compared with average. Finally, these ratios were multiplied by the cost of an average patient in order to restore the proper units (dollars per patient), although this rescaling does not affect the rank ordering of practices. For readmissions, the first stage was identical except that there was no need for Winsorization and a mixed-effects logistic regression was used. Similarly, for the rate of avoidable hospitalizations, no Winsorization was done, and a mixed-effects negative binomial model was used. Finally, for HDAH and ED visits, patient-level data included both 2015 and 2016 and were Winsorized at the 99th percentile before

mixed-effects linear regressions were used to estimate the ratio of predicted to expected outcomes.

Next, we ranked each practice and calculated Spearman correlations between the rankings for yearly risk-adjusted costs and the four quality measures for their attributed HNHC beneficiary populations. We then ranked clinics across each spending and quality measure for each high-need beneficiary person. Top quartile of performance for each measure was defined as clinics in the lowest quartile of mean annual spending per high-need person, lowest quartile of avoidable hospitalisations per person, lowest quartile of ED visit rates, lowest quartile of 30-day all-cause hospital readmission rates and highest quartile of mean number of HDAH.

We defined high-performing clinics in two ways. First, examining performance for a single HNHC subpopulation, we considered a clinic high performing when the clinic was ranked in the top quartile of performance across the majority or all ( $\geq 4$ ) quality or cost measures for a given subpopulation. Second, examining performance across all three HNHC subpopulations, we considered a clinic a primary care 'Bright Spot' when the clinic was ranked in the top quartile of performance across the majority or all ( $\geq 4$ ) quality or cost measures for all three subpopulations. Quartiles of performance were used given that they are commonly used to evaluate performance of clinicians and hospitals in health services research as well as used by CMS to evaluate hospital performance on pay-for-performance programmes like the Hospital Acquired-Condition Reduction Program.<sup>18-22</sup>

Analyses for this study were performed using SAS (V.9.4).

### Patient and public involvement

While patients were not actively involved in the design of this study, the experiences of disadvantaged patients (eg, older adults, frail adults, adults with disability, adults with major complex chronic conditions) were central to the design and implementation of this study. This study fundamentally aims to bring greater transparency to the experience of care for these patients and inform system improvements to their care trajectory.

## RESULTS

### Beneficiary and practice subpopulations

The total study sample included 853 327 beneficiaries enrolled in Medicare across 2 years in 2014 and 2015. Of these, 331 371 were categorised as adults under 65 with disability, 258 894 as older adults with frailty and 263 062 as beneficiaries with major complex chronic conditions. Characteristics of the beneficiary subpopulations differed as shown in [table 1](#). The adults under 65 with disability group included a higher proportion of racial and ethnic minorities and beneficiaries receiving disability benefits; the older adults with frailty group included a greater proportion of females, older age and higher rates

**Table 1** Characteristics of beneficiaries across high-need, high-cost subpopulations

	Adults under 65 with disability	Older adults with frailty	Beneficiaries with major complex chronic conditions
Beneficiaries assigned to primary care clinic (n)	331 371	258 894	263 062
Mean age (SD)	52.4 (9.8)	81.7 (8.5)	79.5 (7.9)
Sex (%)			
Male	48.1	33.1	47.4
Female	51.9	66.9	52.6
Race (%)			
Non-Hispanic white	67.3	81.7	83.4
Non-Hispanic black	19.4	9.1	7.5
Hispanic	9.4	5.8	5.7
Other	3.9	3.4	3.5
Original reason for entitlement (%)			
Old age and survivor's insurance	–	86.4	85.0
Disability insurance benefits (DIB)	96.4	13.3	14.6
End-stage renal disease (ESRD)	1.4	0.2	0.2
Both DIB and ESRD	2.2	0.2	0.2
Region (based on practice location) (%)			
Northeast	18.7	21.3	19.5
Midwest	19.0	17.1	17.2
South	45.8	44.8	44.7
West	15.2	15.7	17.5
Select chronic conditions			
Number of chronic conditions (SD)	3.5 (2.7)	6.8 (3.0)	7.2 (2.5)
Acute myocardial infarction (%)	0.7	1.8	2.1
Alzheimer's disease and related disorders (%)	5.1	45.9	27.1
Atrial fibrillation (%)	2.8	20.3	33.6
Chronic kidney disease (%)	19.0	44.4	51.8
Chronic obstructive pulmonary disease (%)	15.6	25.1	33.2
Heart failure (%)	12.9	42.1	56.5
Diabetes (%)	33.8	42.6	46.7
Ischaemic heart disease (%)	21.8	55.1	80.7
Depression (%)	36.0	35.3	28.0
Rheumatoid arthritis/osteoarthritis (%)	33.8	64.4	46.3
Stroke/transient ischaemic attack (%)	3.7	12.1	10.6
Asthma (%)	14.7	16.2	21.8
Hyperlipidaemia (%)	42.9	58.8	72.2
Hypertension (%)	54.5	83.4	88.0

P values were statistically significant at  $p < 0.001$  when comparing across the three subpopulations across all categories.

of Alzheimer's disease, rheumatoid arthritis/osteoarthritis and anaemia; and beneficiaries with major complex chronic conditions group had the greatest number of chronic conditions per beneficiary and highest rates of diabetes, ischaemic heart disease and hypertension.

Only a subset of primary care clinics cared for a sizeable number of HNHC beneficiaries. For example, 7733 clinics had at least 10 beneficiaries from the adults under 65 with disability group, 6046 clinics had at least 10 beneficiaries from the older adults with frailty group and 6567 clinics had at least 10 beneficiaries from beneficiaries with major complex chronic conditions group (online supplemental table 1). Across all three subpopulations, there were 2770 primary care clinics that cared for at least 10 beneficiaries from all three HNHC subpopulations (ie, 10 adults under 65 with disability, 10 older adults with frailty and 10 beneficiaries with major complex chronic conditions). When this attribution was increased to at least 30 beneficiaries, the number of clinics was lower; only 616 clinics had at least 30 beneficiaries from each of the three subpopulations.

### High performance across multiple measures within a subpopulation

Among the primary care clinics with at least 10 beneficiaries of a specific subpopulation, only a small group of clinics were ranked as high performing for a given subpopulation. 3.3% of primary care clinics met the definition for high performing (ie, in the top quartile

of performance for any combination of four or more measures) for adults under 65 with disability, 3.2% for older adults with frailty and 3.5% for beneficiaries with major complex chronic conditions (table 2). For each of the three HNHC subpopulations, <0.5% of clinics were in the top quartile for all five measures. When limiting to clinics with at least 30 beneficiaries across a specific subpopulation, the proportion of clinics ranking as high performing across different sets of measures was similar (online supplemental table 2).

### Correlation of cost and quality measure ranking across clinics for different HNHC subpopulations

We further evaluated correlation of ranking of clinics across different measures. Within a given subpopulation, primary care practice performance ranking across two different measures exhibited different levels of correlation depending on the set of measures (table 3). For instance, lower average annual spending was correlated with lower hospital readmission rates across subpopulations (Pearson's correlation coefficient 0.12 adults under 65 with disability, 0.24 older adults with frailty, 0.16 major complex chronic, all  $p < 0.0001$ ). HDAH, which notably was expected to show negative correlation with other measures, and average annual spending displayed the strongest relationship across all three subpopulations ( $-0.30$  adults under 65 with disability,  $-0.42$  older adults with frailty,  $-0.46$  major complex chronic, all  $p < 0.0001$ ).

**Table 2** Proportion of primary care clinics ranked as high performing across multiple measures by high-need, high-cost subpopulations

	High-performing clinics, n (%)*		
	Adults under 65 with disability	Older adults with frailty	Beneficiaries with major complex chronic conditions
Overall			
Any combination of $\geq 4$ measures	91 (3.3)	89 (3.2)	97 (3.5)
All 5 measures	9 (0.3)	7 (0.3)	14 (0.5)
Example combinations			
Annual spending and avoidable hospitalisations	205 (7.4)	240 (8.7)	242 (8.7)
Annual spending, avoidable hospitalisations and ED visits	82 (3.0)	65 (2.3)	89 (3.2)
Annual spending and healthy days at home	209 (7.5)	276 (10.0)	253 (9.1)
Hospital readmissions and avoidable hospitalisations	214 (7.7)	209 (7.5)	195 (7.0)

\*Results were limited to primary care clinics that had at least 10 beneficiaries from all three subpopulations (2770 clinics). High-performing clinics were defined as those in the top quartile of performance across listed measures for a given patient subpopulation (ie, lowest average annual spending per high-need person, lowest rate of avoidable hospitalisations per high-need person, lowest ED visit rates, lowest hospital readmission rates and highest number of healthy days at home). Of note, if the quality measures were independent of each other, we would expect 6.25% of clinics to be in the top quartiles of any 2 measures and 3.125% to be in the top quartiles of any 3 quality measures. ED, emergency department.

**Table 3** Pearson's correlation coefficients across primary care clinics by measure and subpopulation†

	Average annual spending	Avoidable hospitalisations	ED visit rates	Hospital readmission rates	Healthy days at home
<b>Adults under 65 with disability</b>					
Average annual spending	1	0.12***	0.22***	0.12***	-0.30***
Avoidable hospitalisations		1	0.09***	0.25***	-0.05**
ED visit rates			1	0.03	-0.10***
Hospital readmission rates				1	-0.18***
Healthy days at home					1
<b>Older adults with frailty</b>					
Average annual spending	1	0.17***	0.01	0.24***	-0.42***
Avoidable hospitalisations		1	0.17***	0.21***	-0.12***
ED visit rates			1	-0.07**	-0.03
Hospital readmission rates				1	-0.13***
Healthy days at home					1
<b>Beneficiaries with major complex chronic conditions</b>					
Average annual spending	1	0.20***	0.15***	0.16***	-0.46***
Avoidable hospitalisations		1	0.15***	0.23***	-0.11***
ED visit rates			1	-0.01	-0.07***
Hospital readmission rates				1	-0.17***
Healthy days at home					1

†Results were limited to primary care clinics that had at least 10 beneficiaries from all three subpopulations (2770 clinics). Pearson's correlation coefficients were calculated based on the ranking of primary care clinics across different sets of cost or quality measures. \*\*p<0.01, \*\*\*p<0.001. ED, emergency department.

### High performance on cost and quality measures across multiple subpopulations

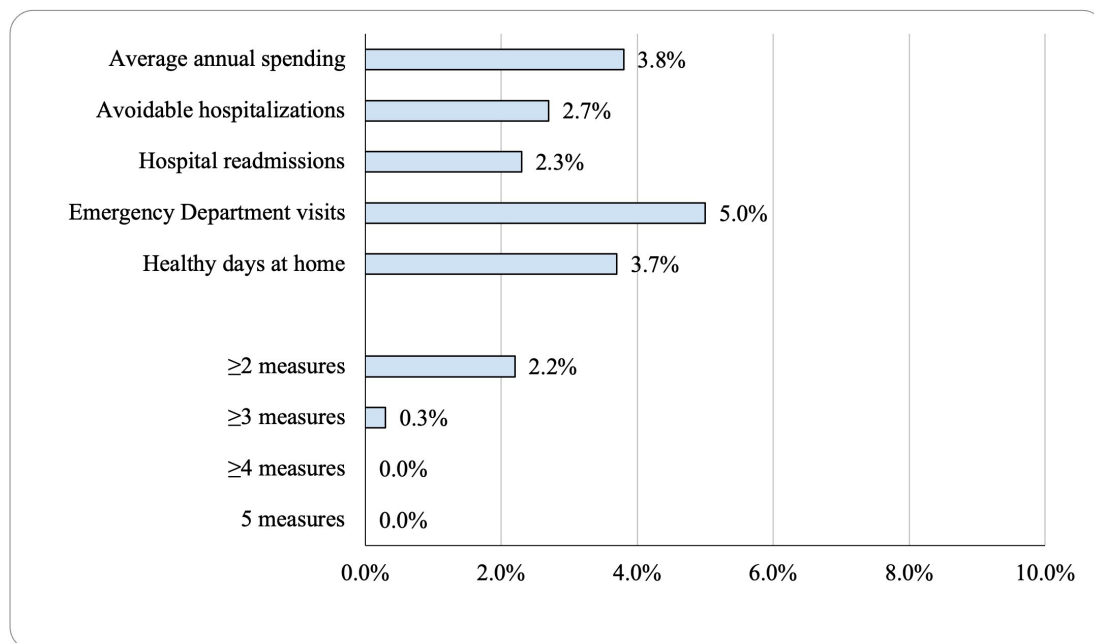
We evaluated how high-performing primary care clinics ranked for a given cost or quality measure across different subpopulations. Few primary care clinics ranked highly on a given measure across multiple subpopulations. For example, 2.7% of clinics were in the lowest quartile of avoidable hospitalisations for adults under 65 with disability, older adults with frailty and beneficiaries with major complex chronic conditions (figure 1). The proportion was lowest for hospital readmission (2.3%) and highest for average annual spending (3.8%). 2.2% of clinics were in the top quartile for the same two or more measures across all three HNHC subpopulations. No clinics met the definition of a primary care 'Bright Spot', meaning they were in the top quartile of performance for the same four or more measures across all three subpopulations. Rates were similar when limiting to clinics with at least

30 beneficiaries across a specific subpopulation (online supplemental figure 1).

### DISCUSSION

Across a national sample of Medicare beneficiaries, we found a small proportion of primary care clinics ranked as high performing on commonly used cost or quality measures for any of the three HNHC priority subpopulations (adults under 65 with disability, older adults with frailty and beneficiaries with major complex chronic conditions). Furthermore, 'Bright Spot' primary care clinics—those that achieve favourable health outcomes or lower costs for four or more measures consistently across subpopulations of HNHC beneficiaries—did not exist in the Medicare population.

In the USA, primary care clinics appear to have difficulty achieving high performance in caring for multiple



**Figure 1** Proportion of primary care clinics ranked as high performing across all three high-need, high-cost patient subpopulations. Results were limited to primary care clinics that had at least 10 beneficiaries from all three subpopulations (2770 clinics). High-performing clinics were defined as those in the top quartile of performance across listed measures for all three high-need patient subpopulations (ie, lowest average annual spending per high-need person, lowest rate of avoidable hospitalisations per high-need person, lowest emergency department (ED) visit rates, lowest hospital readmission rates and highest number of healthy days at home). '≥X measures' refers to clinics ranked as high performing across all three high-need, high-cost patient subpopulations for a combination of the same X number of measures.

distinct HNHC subpopulations. This finding was observed in the primary analysis, and it was further supported by a sensitivity analysis limiting it to clinics with at least 30 beneficiaries across a specific subpopulation. While this observation runs counter to the popular notion that certain primary care tools and interventions (eg, annual wellness visits, chronic care management, transitional care management, which have varying degrees of evidence about their benefits) may be ideal for multiple high-need populations (ie, older adults with frailty, adults under 65 with disability and beneficiaries with major complex chronic conditions),<sup>23 24</sup> this observation might not be entirely surprising, given the heterogeneity in the needs of these subpopulations. For example, a robust literature has documented the relationship between frailty and outcomes,<sup>25–27</sup> and growing evidence has identified the benefits of interventions for older adults with frailty such as in-person screening assessments (eg, grip strength, walking tests), exercise programmes (eg, flexibility, balance and resistance training), nutrition initiatives (eg, protein and micronutrient supplementation, individualised nutritional counselling) and individually tailored geriatric care (eg, multidisciplinary team planning including assessment of home setting)<sup>28</sup>; such interventions may reduce unnecessary spending and utilisation by preventing costly episodes, such as a hospitalisation for a fracture from a mechanical fall.<sup>29</sup> By contrast, another subpopulation—beneficiaries under 65 with disability—often has very different needs, in part caused by high rates of mental illness driving hospitalisations.<sup>2</sup>

Clinics that optimally care for these beneficiaries may have embedded behavioural health clinicians in primary care settings, implemented care management support programmes and adopted unique funding models (eg, Medicaid waivers, global or capitation payments) to counter low reimbursement for behavioural health services.<sup>30</sup> Our study extends the literature by providing evidence which suggests that it is challenging for any given primary care clinic to perform relatively well across multiple subpopulations.

This study also found that primary care clinics are unlikely to be high performing for four or more measures for the same subpopulation. Furthermore, correlations across performance measures were relatively low, suggesting that primary care clinics seldom perform stably across healthcare outcomes. Several possible explanations may account for these observations. First, measures may be relatively unrelated or, in some cases, inversely related. It is possible that high performance on one measure, such as annual spending, may be achieved through levers such as reduced utilisation of high-cost medications or skilled nursing facilities, rather than through utilisation captured by other metrics, such as ED visits or hospitalisations. Alternatively, high performance on some measures may actually be optimally achieved through low performance on other metrics; for example, a practice may achieve high performance on HDAH through a robust care management programme, which may mean that a practice may invest in more intense and costlier outpatient services. Such trade-offs may underlie



findings that care coordination programmes rarely are the primary reason for reduced spending in value-based payment programmes in the USA.<sup>31 32</sup> It is also possible that for some clinics focusing on performing well on one aspect of quality precludes attention to high performance on other quality measures.

Second, high performance on quality and cost measures may variably depend on factors beyond the control of primary care clinics. For instance, given higher rates of social needs and poverty are associated with greater Medicare spending and poorer health outcomes for some conditions at the regional level (eg, higher rates of mortality, shorter life expectancy),<sup>33 34</sup> the availability of a robust local social safety net and community resources (eg, transportation services, access to healthy foods, affordable housing) may influence performance on some measures more than others. Additionally, evidence suggests that in certain clinical scenarios the ability to access specialty care (eg, cardiologist for new-onset heart failure) can be an important determinant of performance on quality metrics<sup>35–38</sup>; the extent to which specialists are involved in value-based APMs could also influence cost and efficiency metrics (ie, the degree to which specialty care increases costs).<sup>39</sup> Beyond outpatient determinants, the quality of care a patient receives in the hospital can also be an essential determinant of both short-term and long-term measures.<sup>40 41</sup>

A final possibility is that commonly used quality measures derived from claims data have limited reliability and validity; imperfect measures of quality may therefore be uncorrelated. Prior work has suggested various limitations of claims-based quality measures. Existing measures tend to focus on point-in-time measurements rather than episodes of care.<sup>42</sup> Some metrics assess highly similar elements of care quality while other aspects remain unobserved.<sup>42 43</sup> In some cases, metrics suffer from methodological flaws, such as systemic misclassification, random misclassification or oversimplification (ie, composite measures that distort underlying differences).<sup>44</sup> The possibility that such issues affect the measures selected in this study would be concerning given these measures are widely relied on, including multiple being considered for or actively used as measures of quality and performance in large-scale, government-run APMs.<sup>45</sup> However, it is important to note that a survey conducted on the practices deemed to be performing better on these same quality measures was found to have a greater number of strategies related to care coordination and management, screening of risk factors and screening for mental health disorders.<sup>46</sup>

Multiple clinical practice and policy implications emerge from this study. The challenges primary care clinics appear to face across the board in caring for HNHC patients emphasise the need for systematic reform. For policymakers and payers, the study's observations necessitate attention to help primary care clinics better serve these populations. Policymakers can work to invest in resources for primary care clinics (eg, ensuring

sufficient time with beneficiaries, enabling funding to hire needed support staff) and infrastructure (eg, easily accessible information such as lists of HNHC beneficiaries with outcomes, best practice sharing with other clinics) that allow for delivering care that meets the unique needs of each beneficiary group. The study also suggests the potential benefits of investing in specific clinics with unique resources to care for HNHC populations; policymakers and payers can take steps to reduce barriers to operating such clinics, including streamlining funding streams that are normally disparate (eg, for accessing healthy foods, behavioural health) and facilitating the shift to risk-bearing payment models that allow primary care clinics more flexibility in making decisions to meet their patients' specific needs.<sup>6</sup> For researchers, given the aforementioned potential limitations of claims-based quality measures, this study highlights the need for further research identifying and development of stronger measurement systems specifically for the quality of care for HNHC patient populations. For primary care clinics, these findings highlight the imperative of taking an intentional approach to identifying HNHC beneficiaries and to tailoring care to each subpopulation's needs in order to achieve high performance for each group. Given the examined outcomes are affected by circumstances that are often outside the primary care clinic's immediate control, it is especially important for primary care clinics to work towards integrating and coordinating care for these HNHC populations.

Our study has several important limitations. First, this is an observational study that cannot definitively conclude causal findings. Second, this study uses measures based on administrative claims data to reflect quality of care, but these measures focus on utilisation and cost, creating limitations. For example, the definition of preventable events and spending may not necessarily reflect truly preventable episodes, although this methodology developed by AHRQ to define potentially avoidable events related to ACSCs. However, these measures represent commonly used claims-based measures that are widely used in many value-based programmes in the USA (eg, including by CMS) to evaluate quality. Future research should examine additional measures, including ones reflecting patient experience. Third, as a physician's tax identification number was used for patient attribution, it is possible that clinics with varying performance could be grouped under the same tax identification number; however, we followed the methodology used by the CMS Medicare Shared Savings Program. Fourth, data are from 2014 and 2015, which may not reflect newer trends in primary care. However, it is unlikely that the challenges in providing optimal care for HNHC patients observed in this study have resolved in recent years; it is even possible that trends in burnout and staffing shortages among primary care clinics through the COVID-19 pandemic have worsened these issues.<sup>47</sup> Fifth, quartiles were used to present the performance data in this study; while such cut-offs allowed for analysing and interpreting a large



amount of information in a concise way, future research can examine other ways of defining high performance. Sixth, we limited our analyses to clinics with 10 or more HNHC beneficiaries and excluded many smaller primary care clinics and solo clinics. This was an intentional decision given that we required a certain number of beneficiaries to identify performance more reliably across the different quality measures.

## CONCLUSION

We found few primary care clinics in 2015 ranked in the top quartile of performance on costs and commonly defined measures of high-quality care for multiple subpopulations of HNHC beneficiaries, which included the adults under 65 with disability, older adults with frailty and beneficiaries with major complex chronic conditions populations. Even for a given HNHC subpopulation, a limited number of clinics performed well across multiple domains of spending of claims-based quality measures. As clinical leaders and policymakers seek to identify and scale optimal models of primary care for HNHC beneficiaries, these findings suggest an urgent need for structural reforms that better support primary care clinics in offering high quality of care across different HNHC beneficiary populations.

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