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RESEARCH ARTICLE

Use of High- and Low-Value Care Among Traditional Medicare Beneficiaries With and Without Medigap

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ABSTRACT

Objectives: To quantify the additional health care spending associated with Medigap coverage among traditional Medicare (TM) beneficiaries and assess whether this spending is disproportionately allocated to high-value versus low-value services.

Study Setting and Design: We conducted a repeated cross-sectional study.

Data Sources and Analytical Sample: We analyzed TM beneficiaries with and without Medigap from the 2013–2021 Medical Expenditure Panel Survey. Inverse probability of treatment weighting (IPTW) was applied to balance observed covariates between TM beneficiaries with and without Medigap.

Principal Findings: Our sample comprised 16,619 TM beneficiaries with and without Medigap. After applying IPTW, TM beneficiaries with and without Medigap were well balanced across observed covariates. TM beneficiaries with Medigap had $1062 (346–1779) higher annual Medicare spending than TM beneficiaries without Medigap. Higher spending among Medigap enrollees was primarily driven by outpatient visits ($453 [148–758]) and prescription drugs ($572 [223–921]). However, Medigap coverage was not consistently associated with greater use of either high-value or low-value services. Among high-value services, TM beneficiaries with Medigap had higher utilization of age-appropriate colorectal cancer screening (1.4 [0.7–2.0] percentage points) and influenza vaccination (1.5 [0.3–2.6]), but lower use of HbA1c measurement (−2.8 [−4.7, −1.0]). Among low-value services, TM beneficiaries with Medigap had greater use of prostate cancer screening (6.4 [0.5–12.2]) and nonsteroidal anti-inflammatory drug use for hypertension, heart failure, or kidney disease (3.2 [2.1–4.4]), but lower use of age-appropriate colorectal cancer screening (−4.2 [−5.1, −3.3]) and opioid prescriptions for back pain (−6.2 [−8.3, −4.2]). No significant differences were observed in the remaining services.

Conclusions: Medigap coverage is associated with higher health care spending among TM beneficiaries, but does not consistently promote high- or low-value care. These findings highlight the need for policy reforms that provide incentives to supplemental insurance plans to encourage evidence-based service use and discourage spending on unnecessary care.

1 | Introduction

Traditional Medicare (TM) beneficiaries often face substantial financial risk due to high deductibles, copayments, and the lack of an annual cap on out-of-pocket spending. These cost-sharing burdens can lead to care avoidance and financial hardship for many older adults [1]. To mitigate these financial risks, a substantial portion of TM beneficiaries purchase Medigap, private supplemental insurance that covers cost-sharing obligations under Medicare Parts A and B. In 2022, approximately 42% of

Summary

- What is known on this topic?
  - Medigap supplemental coverage lowers out-of-pocket costs for traditional Medicare (TM) beneficiaries, leading to higher health care spending.
  - However, it remains unclear whether this additional spending is allocated to high- or low-value care.
- What this study found?
  - TM beneficiaries with Medigap had 12% higher Medicare spending than those without Medigap.
  - Medigap coverage was associated with higher use of 2 of 10 high-value and 2 of 12 low-value services, indicating no systematic or selective promotion of high- or low-value care.
  - This highlights the need for policy reforms that align supplemental insurance incentives to encourage high-value service use and discourage low-value care.

TM beneficiaries were enrolled in Medigap plans, incurring an average monthly premium of $217, or roughly $2604 annually [2].

Medigap fills the coverage gaps in TM by paying for beneficiaries' cost-sharing expenses, often reducing out-of-pocket spending on Medicare-covered services to nearly zero. These policies, however, do not cover services excluded from TM, such as long-term care, dental care, or prescription drugs. Structurally, Medigap plans are standardized and regulated under federal and state law but are offered by private insurers. Each plan type (Plans A–N) provides a defined set of benefits that supplements, but does not modify, Medicare coverage. Unlike privately administered Medicare Advantage plans, Medigap does not use utilization management strategies such as provider networks and prior authorization to control service use or costs. Beneficiaries may see any provider who accepts Medicare, and Medigaps' role is limited to reimbursing cost-sharing obligations after Medicare pays its share.

Medigap coverage provides substantial financial protection by reducing out-of-pocket costs, but may also increase health care utilization and spending by removing financial barriers at the point of care. Earlier research documented both adverse selection and moral hazard associated with Medigap coverage [3–5]. However, more recent evidence suggests that adverse selection into Medigap is limited, while moral hazard effects remain substantial [6]. Specifically, Medigap coverage increases annual per capita Medicare spending by 22%–24% without corresponding improvements in health outcomes. These spending increases were particularly pronounced among healthier beneficiaries [6, 7]. A critical, yet understudied, policy question is whether this additional spending reflects greater utilization of high-value, evidence-based care—the benefits of which may emerge over time—or whether it primarily reflects greater use of low-value services that offer limited or no clinical benefit.

Understanding the composition of Medigap-induced spending has direct and significant implications for the design of these policy reforms. If Medigap coverage disproportionately promotes the use of low-value care, policy solutions may prioritize restructuring financial incentives to discourage unnecessary utilization while preserving access to clinically appropriate care. Conversely, if the additional spending primarily facilitates access to high-value, evidence-based services, reform efforts may focus on expanding supplemental coverage more equitably, coupled with complementary policies to ensure Medicares' fiscal sustainability while promoting better health outcomes for beneficiaries. The extent to which Medigap-induced spending reflects high- versus low-value utilization depends on beneficiaries' responsiveness to cost sharing and their ability to distinguish between clinically beneficial and low-yield services.

In this study, we aimed to inform these ongoing policy debates by conducting two primary analyses. First, we quantified the additional health care spending attributable to Medigap coverage by estimating differences in Medicare spending between TM beneficiaries with and without Medigap. Second, we assessed whether this additional spending was disproportionately allocated to high-value, evidence-based services or to low-value, potentially unnecessary services. We hypothesized that those with Medigap had higher health care spending than those without Medigap and these differences are attributable to both use of high and low-value care.

2 | Methods

2.1 | Data

We conducted a repeated cross-sectional study using data from the 2013–2021 Medical Expenditure Panel Survey (MEPS), a nationally representative survey of the US civilian noninstitutionalized population. Although individuals are not followed longitudinally, pooling data across years allows for population-level comparisons over time. MEPS data are collected from interviews with individual households and their members, supplemented by data provided by hospitals, physicians, home healthcare providers, and pharmacies that have offered care to those same subjects and by their employers [8]. We used the following MEPS datasets: the full-year consolidated data files, outpatient visits files, office-based medical provider visit files, prescribed medicine files, and medical conditions files.

The Institutional Review Board at [Korea] University deemed this study exempt because it used publicly available, deidentified data. This study followed the STROBE reporting guideline.

2.2 | Sample

We identified TM beneficiaries enrolled in both Part A and Part B. Those with other forms of supplemental coverage—including Medicaid, Medicare Advantage, or employer-sponsored insurance—were excluded from the analysis to isolate the population eligible for Medigap enrollment.

2.3 | Outcomes

We assessed two types of outcomes. First, we measured annual total and service-specific Medicare spending, defined as expenditures on health care services covered by Medicare, excluding insurance premium payments. Service-specific spending included expenditures for inpatient admissions, outpatient visits, emergency room visits, and prescription drugs. Although differences in spending between TM beneficiaries with and without Medigap coverage have been examined in prior studies [6, 7], our intent was to update these analyses more recent data and different methodological approaches to assess the consistency of our findings with previous research. Second, following prior research using MEPS [9, 10], we examined the utilization of 10 specific high-value services and 12 specific low-value services. High-value care was categorized into three domains: (1) cancer screenings (age-appropriate breast [11], cervical [12], and colorectal cancer screening [13]), (2) diagnostic and preventive tests (dental examination, blood pressure measurement [14], cholesterol measurement [15], and influenza vaccine [16]), and (3) diabetes care measures (HbA1c, foot, and eye examinations) [17]. Low-value care was also categorized into three domains: (1) cancer screenings (age-appropriate cervical [12], colorectal [13], and prostate cancer screening [18]), (2) medication use measures (antibiotic for acute upper respiratory infection [19, 20], antibiotic for influenza [19], use of benzodiazepine for depression [21], use of opioid for back pain [22], use of opioid for headache [23], and use of nonsteroidal anti-inflammatory drug [NSAID] for individuals with hypertension, heart failure, or chronic kidney disease [21]), and (3) imaging tests (magnetic resonance imaging [MRI] or computed tomography [CT] for back pain, radiograph for back pain, and MRI or CT for headache) [24, 25]. For several preventive services, evidence supports high value within certain age ranges (such as breast cancer screening for women aged 50–74 years and colorectal cancer screening for individuals aged 50–75 years) but not for older populations. Specifically, screening for cervical, colorectal, and prostate cancers is considered low value among elderly adults (such as women older than 65 years for cervical cancer screening, individuals older than 80 years for colorectal cancer screening, and men older than 70 years for prostate cancer screening) [26–28]. Therefore, for the analysis of low-value service use among elderly adults, we included binary measures of these three additional low-value services. For each service, we identified the eligible population (the denominator) based on age, sex, and clinical conditions as determined by the 3-digit codes of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) or the Tenth Revision, Clinical Modification (ICD-10-CM). We then determined whether eligible individuals received specific services (the numerator). Detailed definitions for each utilization measure are presented in eTable A. Health care spending was analyzed as continuous outcomes, while utilization measures were analyzed as binary outcomes.

2.4 | Primary Independent Variable

We identified Medigap enrollment using detailed records of respondent-reported supplemental insurance coverage from the MEPS Person Round Plan File. Specifically, we used a variable that directly indicates whether an individual was enrolled in Medigap.

2.5 | Covariates

To adjust for differences in sample characteristics, we included the following covariates: age, sex, self-reported race/ethnicity, employment status, marital status, education, family income, supplemental coverage (vision, dental, and prescription drug coverage), US census region, chronic conditions, functional disability, self-reported physical and mental health status, and health-related quality of life as measured by the SF-12 Physical Component Summary and Mental Component Summary scores. Chronic conditions were identified based on the criteria developed by the Multiple Chronic Conditions working group within the U.S. Department of Health and Human Services' Office of the Assistant Secretary for Health. Nineteen conditions commonly encountered in clinical practice were included, and the total number of chronic conditions was categorized into four groups: 0, 1–2, 3–5, and 6 or more. Functional disability was assessed using six questions on difficulty performing functional tasks, with responses categorized into three levels: none (no difficulties), moderate (1–2 difficulties), and severe (3 or more difficulties) [29]. Self-reported health status was measured using five categories, ranging from excellent to poor; for analysis, responses were dichotomized as good health (excellent, very good, or good) versus fair or poor health. Health-related quality of life was assessed using the 12-Item Short Form Survey (SF-12), which produces two summary scores: the PCS and MCS. The PCS reflects physical functioning, bodily pain, and general health, while the MCS reflects emotional well-being, social functioning, and mental health. Both scores range from 0 to 100, with higher scores indicating better health-related quality of life.

2.6 | Statistical Analyses

Although evidence suggests that adverse selection into Medigap is limited [6], TM beneficiaries with Medigap differ from those without Medigap [30]; therefore, simple unadjusted comparisons may produce biased estimates. To address potential selection bias, we employed a propensity score–based approach. Specifically, we calculated inverse probability of treatment weights (IPTW) based on the likelihood of Medigap enrollment, using a range of demographic, socioeconomic, and health status variables described above, as well as year fixed effects. Although various matching methods are available, many require excluding unmatched individuals, thereby reducing the sample size. In contrast, IPTW achieves covariate balance by reweighting observations without substantially altering the sample size. Given the modest sample size in our study, this approach was more appropriate for our analysis. Covariate balance between TM beneficiaries with and without Medigap was assessed in the IPTW-weighted sample using standardized mean differences, with values below 0.1 indicating adequate balance. We also examined the propensity score model results to further explore factors associated with Medigap enrollment.

IPTW was then applied in regression models to estimate adjusted differences in outcomes. To account for the skewed distribution of spending data, two-part models were used to analyze health care spending with the applied weights. The first part employed a logistic regression model to estimate the probability of incurring any spending, while the second part used a generalized linear model with a log link and gamma distribution to estimate spending among individuals with positive expenditures. In both models, IPTW replaced the original survey weights to achieve covariate balance. Logistic regression models were used to assess health care utilization using the applied weights. All models adjusted for individual-level characteristics and year fixed effects. Adjusted mean spending and utilization were calculated for each group by holding covariates constant, and differences in adjusted means were then estimated to enable direct comparisons between TM beneficiaries with and without Medigap.

We conducted a sensitivity analysis restricted to TM beneficiaries aged 65 years and older because our study sample included some individuals younger than 65 who qualify for Medicare—a group that differs substantially from older beneficiaries—and because 15 states do not offer Medigap coverage to individuals under 65 years of age. All analyses incorporated MEPS survey weights to generate nationally representative estimates.

3 | Results

Our sample comprised 16,619 TM beneficiaries, including 3446 with Medigap and 13,173 without Medigap (mean [SD] age 72.7 [8.8] years, 54.5% women) (Table 1). Prior to applying IPTW, differences in weighted sample characteristics were observed between TM beneficiaries with and without Medigap. After IPTW adjustment, however, the groups were well balanced across all observed covariates. Standardized mean differences for all covariates were below 0.1. The estimated propensity scores for Medigap enrollment, based on observable characteristics before applying IPTW, showed substantial overlap between the two groups (eFigure A).

We identified several individual-level characteristics significantly associated with Medigap enrollment, which served as the basis for estimating the IPTW (Table 2). Compared with beneficiaries under age 65, older adults had substantially higher likelihood of enrolling in Medigap, with 22.0 percentage point (95% CI: 17.0–26.9) for ages 65–74, 23.8 (15.7–32.0) for ages 75–84, and 24.8 (19.8–29.6) for ages 85 and older. Racial and ethnic minority beneficiaries were significantly less likely to have Medigap coverage relative to non-Hispanic White beneficiaries, including Hispanic (−10.1 [−12.8, −7.5]), non-Hispanic Black (−19.3 [−26.1, −12.4]), and non-Hispanic Asian (−11.3 [−16.7, −6.0]) groups. Higher educational attainment was modestly associated with Medigap enrollment; beneficiaries with an advanced degree had higher likelihood compared to those with a high school education or less (5.3 [0.5–10.1]), whereas college graduates did not differ significantly. Income was positively associated with Medigap enrollment: beneficiaries with incomes at 200%–399% of the federal poverty level (FPL) had higher likelihood (3.1 [0.6–5.6]), and those at ≥400% of FPL had even higher likelihood (6.2 [3.6–8.7]), compared to those with incomes <200% of FPL. Among supplemental coverage types, dental coverage was negatively associated with Medigap enrollment (−6.7 [−7.8, −5.7]), while vision and prescription drug coverage were not significantly associated. The number of chronic conditions was positively associated with Medigap enrollment, with beneficiaries having six or more chronic conditions exhibiting substantially higher likelihood (8.1 [5.9–10.3]) compared to those with no chronic conditions. Functional disability, self-reported physical and mental health status, and health-related quality of life measures were not significantly associated with Medigap enrollment.

We found that TM beneficiaries with Medigap had higher annual Medicare spending compared to those without Medigap (Table 3). For total spending, the mean annual spending was $9210 for those with Medigap and $8261 for those without Medigap, yielding an adjusted difference of $1062 (95% CI: 346–1779). Higher spending among Medigap enrollees was also observed for outpatient visits and prescription drugs. For outpatient visits, the mean annual spending was $3177 for those with Medigap and $2737 for those without Medigap, with an adjusted difference of $453 (148–758). For prescription drugs, the mean annual spending was $2397 for those with Medigap and $1876 for those without Medigap, with an adjusted difference of $572 (223–921). No significant differences were observed in spending for inpatient admissions or emergency room visits.

We also found that Medigap coverage was associated with both higher and lower use of certain high-value and low-value services; however, no consistent or systematic pattern of association was observed. Among high-value services, TM beneficiaries with Medigap had higher utilization of age-appropriate colorectal cancer screening (adjusted difference: 1.4 [0.7–2.0] percentage points) and influenza vaccination (1.5 [0.3–2.6] percentage points), but lower use of HbA1c measurement (−2.8 [−4.7, −1.0] percentage points) than those without Medigap (Table 4). Among low-value services, TM beneficiaries with Medigap had greater use of prostate cancer screening (6.4 [0.5–12.2] percentage points) and nonsteroidal anti-inflammatory drug use for hypertension, heart failure, or kidney disease (3.2 [2.1–4.4] percentage points), but fewer use of age-appropriate colorectal cancer screening (−4.2 [−5.1, −3.3] percentage points), antibiotics for influenza (−4.9 [−6.5, −3.4] percentage points), and opioid prescriptions for back pain (−6.2 [−8.3, −4.2] percentage points) than those without Medigap (Table 5). No significant differences were observed for the remaining services.

These findings were consistent with those from the analysis restricted to TM beneficiaries aged 65 years and older (eTable B).

4 | Discussion

Controlling Medicare expenditures is a top federal policy priority. Understanding how spending is distributed across services is critical to ongoing reform efforts aimed at curbing Medicare's growth while improving care quality and maintaining beneficiaries' financial protection. Policy strategies to achieve these goals include provider-facing initiatives—such as alternative payment models that counteract the volume-driven incentives of fee-for-service—and patient-facing approaches, such as benefit

TABLE 1 | Sample characteristics of TM beneficiaries without and with Medigap.

Characteristics	Weighted %				
	Before IPTW		After IPTW		
	TM beneficiaries without Medigap ($N = 13,173$)	TM beneficiaries with Medigap ($N = 3446$)	TM Medicare beneficiaries without Medigap ($N = 13,173$)	TM beneficiaries with Medigap ($N = 3446$)	Standardized mean difference
Age					
< 65	10.0	2.0	8.2	8.9	−0.025
65–74	47.9	50.8	48.6	48.6	−0.000
75–84	30.3	34.3	31.2	31.1	0.004
85+	11.7	12.9	12.0	11.4	0.016
Female	54.1	55.5	54.4	54.2	0.004
Race/ethnicity					
Non-Hispanic white	81.1	92.3	83.7	83.5	0.007
Hispanic	4.9	2.1	4.3	4.0	0.013
Non-Hispanic black	8.9	2.4	7.4	8.5	−0.038
Non-Hispanic Asian	2.6	1.4	2.4	2.3	0.005
Non-Hispanic other or multiple	2.4	1.8	2.2	1.8	0.028
Employed	8.8	12.8	9.8	10.0	−0.007
Married	56.8	62.0	58.0	58.0	0.000
Education					
High school or lower	11.2	6.6	10.1	9.7	0.012
College graduate	46.0	43.0	45.3	45.4	0.000
Advanced degree	42.8	50.4	44.6	44.9	−0.006
Family income					
< 200% of	30.9	20.4	28.4	27.5	0.021
200%–399% of FPL	29.2	27.8	28.9	29.4	−0.009
≥ 400% of FPL	39.8	51.8	42.6	43.1	−0.010

(Continues)

TABLE 1 | (Continued)

Characteristics	Weighted %				
	Before IPTW		After IPTW		
	TM beneficiaries without Medigap ($N = 13,173$)	TM beneficiaries with Medigap ($N = 3446$)	TM Medicare beneficiaries without Medigap ($N = 13,173$)	TM beneficiaries with Medigap ($N = 3446$)	Standardized mean difference
Supplemental coverage					
Vision	15.1	16.2	15.5	17.7	−0.060
Dental	14.3	13.4	14.1	17.0	−0.079
Prescription drug	23.7	29.0	25.1	27.9	−0.063
US census region					
Northeast	17.2	19.3	17.7	19.0	−0.032
Midwest	21.1	32.1	23.7	23.1	0.013
South	42.1	32.5	39.9	40.1	−0.004
West	19.6	16.1	18.7	17.8	0.022
Number of chronic conditions[a]					
0	22.8	25.6	23.0	25.6	−0.061
1–2	29.8	28.1	29.3	28.3	0.021
3–5	9.1	8.7	9.0	9.5	−0.015
6+	0.4	0.7	0.5	0.6	−0.009
Functional disability[b]					
None	53.5	59.3	54.9	55.2	−0.006
Moderate	35.1	31.6	34.3	33.7	0.012
Severe	11.4	9.1	10.8	11.1	−0.009
Self-reported good health[c]					
Physical health	78.3	84.9	79.8	79.6	0.005
Mental health	87.2	90.8	88.1	88.3	−0.008

(Continues)

TABLE 1 | (Continued)

Characteristics	Weighted %				
	Before IPTW		After IPTW		
	TM beneficiaries without Medigap (N=13,173)	TM beneficiaries with Medigap (N=3446)	TM Medicare beneficiaries without Medigap (N=13,173)	TM beneficiaries with Medigap (N=3446)	Standardized mean difference
Health-related quality of life[d]					
Physical component score	38 (17)	40 (16)	38 (17)	38 (17)	0.016
Mental component score	47 (18)	50 (16)	48 (18)	48 (18)	−0.002

Note: The analytic sample included Traditional Medicare beneficiaries enrolled in both Part A and Part B. We excluded individuals who were dually eligible for Medicaid, enrolled in Medicare Advantage, or covered by employer-sponsored supplemental insurance. To adjust for differences in observable characteristics between Medigap enrollees and non-enrollees, we estimated inverse probability of treatment weights (IPTW) based on the propensity to enroll in Medigap after controlling for individual-level covariates and year fixed effects. Survey weights were applied to ensure that the results are representative of the U.S. Medicare population.

Abbreviations: FPL, federal poverty level; IPTW, inverse probability of treatment weighting; TM, traditional Medicare.

[a]Chronic conditions were identified based on the criteria developed by the Multiple Chronic Conditions working group within the U.S. Department of Health and Human Services' Office of the Assistant Secretary for Health. Nineteen conditions commonly encountered in clinical practice were included: hypertension, congestive heart failure, coronary artery disease, cardiac arrhythmias, hyperlipidemia, stroke, arthritis, asthma, cancer, chronic kidney disease, chronic obstructive pulmonary disease, dementia, depression, diabetes, hepatitis, human immunodeficiency virus, osteoporosis, schizophrenia, and substance use disorders. The total number of chronic conditions was categorized into four groups: 0, 1–2, 3–5, and 6 or more.

[b]Functional disability was assessed using six questions regarding difficulty with functional tasks. Responses were categorized into three levels: none (no difficulties), moderate (1–2 difficulties), and severe (3 or more difficulties).

[c]Self-reported health status was measured using five categories, ranging from excellent to poor. For analysis, responses were dichotomized as good health (excellent, very good, or good) versus fair or poor health.

[d]Health-related quality of life was assessed using the 12-Item Short Form Survey (SF-12), which generates two summary scores: the Physical Component Summary (PCS) and the Mental Component Summary (MCS). The PCS reflects physical functioning, bodily pain, and general health, while the MCS reflects emotional well-being, social functioning, and mental health. Both scores range from 0 to 100, with higher scores indicating better health-related quality of life.

redesigns that encourage appropriate care while discouraging unnecessary utilization.

By substantially reducing or eliminating cost sharing, Medigap lowers beneficiaries' marginal cost of care at the point of service, thereby decreasing price sensitivity. This reduction in financial barriers can increase the use of both necessary and unnecessary services. Our analyses demonstrate that on average, TM beneficiaries with Medigap incurred $1062 higher annual per capita Medicare spending than those without Medigap. When extrapolated to approximately 12.5 million Medigap enrollees in 2022 [2], this difference corresponds to an estimated $13.3 billion in additional annual spending—an arithmetic extrapolation rather than a formal national cost estimate. Notably, this higher spending was not preferentially directed toward high- or low-value services, raising concerns about the efficiency of Medigap coverage.

Much of the spending increase was concentrated in outpatient visits and prescription drug use rather than inpatient hospitalizations or emergency department visits. Prior research has shown that Medigap coverage increases annual per capita Medicare spending by 22%–24% without clear improvements in health outcomes [6, 7]. Our estimated increase (12%) was smaller, likely reflecting differences in data sources, populations, and analytic methods. Previous research employed quasi-experimental designs that more effectively addressed unobserved confounding, whereas our approach relied on adjustment for observable characteristics. If residual confounding persists, our estimates may understate the true magnitude of the association between Medigap coverage and spending. These results suggest that Medigap primarily lowers barriers to routine outpatient care, leading to higher ambulatory utilization. Because Medigap does not directly cover prescription drugs, the observed increase in drug spending likely reflects downstream effects of greater outpatient care, such as more prescribing or improved adherence.

Our findings further demonstrated that Medigap coverage was associated with greater use of only 2 out of 10 high-value services and 2 out of 12 low-value services, indicating no consistent pattern of service targeting by value. This aligns with prior evidence that expanding insurance coverage alone—without mechanisms to differentiate the clinical value of care—does not necessarily advance value-based care goals [31]. Current CMS efforts to reduce spending on low-value care in TM spending include the Center for Medicare and Medicaid Innovation's (CMMI) recently announced Wasteful and Inappropriate Service Reduction (WISeR) model, which will engage technology companies to develop prior authorization tools aimed at curbing services that fall outside CMS coverage determinations. Other policy options, such as benefit redesign through value-based insurance models that tie cost-sharing to clinical benefit, similarly seek to improve the efficiency, quality, and long-term fiscal sustainability of the Medicare program [32–34].

Consistent with prior research [35–40], more generous coverage, such as Medigap, does not exclusively result in more use of high-value services. For example, Connecticut's Health Enhancement Program, which eliminated cost-sharing for primary care visits,

TABLE 2 | Regression estimates of factors associated with Medigap enrollment among TM beneficiaries.

Characteristics	Marginal effects (95% CI)	*p*
Age		
<65	REF	
65–74	22 (17, 26.9)	<0.001
75–84	23.8 (15.7, 32)	<0.001
85+	24.7 (19.8, 29.6)	<0.001
Female	1.6 (1.1, 2)	<0.001
Race/ethnicity		
Non-Hispanic white	REF	
Hispanic	−10.1 (−12.8, −7.5)	<0.001
Non-Hispanic black	−19.3 (−26.1, −12.4)	<0.001
Non-Hispanic Asian	−11.3 (−16.7, −6)	0.002
Non-Hispanic other or multiple	−2.6 (−10.8, 5.6)	0.463
Employed	1.4 (−0.3, 3.2)	0.095
Married	4.8 (−0.1, 9.7)	0.055
Education		
High school or lower	REF	
College graduate	3.5 (−1.7, 8.7)	0.151
Advanced degree	5.3 (0.5, 10.1)	0.035
Family income		
<200% of FPL	REF	
200%–399% of FPL	3.1 (0.6, 5.6)	0.024
≥400% of FPL	6.2 (3.6, 8.7)	0.001
Supplementary coverage		
Vision	0.6 (−3.1, 4.2)	0.721
Dental	−6.7 (−7.8, −5.7)	<0.001
Prescription drug	5.9 (−0.2, 12)	0.055
US census region		
Northeast	REF	
Midwest	5 (0, 10)	0.05
South	−5 (−9.9, 0)	0.051
West	−5.6 (−10.1, −1)	0.025
Number of chronic conditions		
0	REF	
1–2	−0.2 (−4.1, 3.7)	0.907
3–5	0.9 (−0.6, 2.4)	0.193
6+	8.1 (5.9, 10.3)	<0.001
Functional disability		
None	REF	
Moderate	−1.2 (−4.2, 1.8)	0.371
Severe	−0.6 (−3.4, 2.2)	0.607
Self-reported good health		
Physical health	1.1 (−5.2, 7.3)	0.694
Mental health	−0.1 (−3.2, 3.1)	0.956
Health-related quality of life		
Physical component score	0 (0, 0.1)	0.309
Mental component score	0.1 (0, 0.1)	0.137

Note: To adjust for differences in observable characteristics between Medigap enrollees and non-enrollees, we estimated inverse probability of treatment weights (IPTW) based on the propensity to enroll in Medigap after controlling for individual-level covariates and year fixed effects. Survey weights were applied to ensure that the results are representative of the U.S. Medicare population.
Abbreviations: FPL, federal poverty level; TM, traditional Medicare.

was associated with increases in both high- and low-value service use attributable to those visits [35]. In contrast, less generous coverage, such as in high-deductible health plans, reduces the use of both high- and low-value care [37]. These patterns illustrate a fundamental limitation of traditional benefit designs in which patient out-of-pocket requirements fail to distinguish between necessary and unnecessary care. This underscores the need for more nuanced, value-based insurance designs that align consumer cost-sharing with the clinical value—rather than the cost—of services [41]. Applying such principles to Medigap could improve its clinical efficiency and fiscal sustainability while supporting Medicare's broader goal of delivering high-quality, cost-effective care.

4.1 | Limitations

This study has several limitations. First, the sample was restricted to the non-institutionalized U.S. population, which may limit the generalizability of the findings to institutionalized populations, such as nursing home residents or individuals residing in long-term care facilities. Second, insurance coverage information was based on self-reported survey data, which may introduce recall bias and measurement error. For example, our estimate of Medigap enrollment was somewhat lower than national benchmarks [2], suggesting potential underreporting or misclassification. Additionally, the estimated spending difference associated with Medigap coverage was smaller than those reported in prior studies [6, 7], possibly reflecting differences in data sources, populations, or measurement methods. Third, while we applied IPTW to adjust for observable differences between TM beneficiaries with and without Medigap based on a wide range of demographic, socioeconomic, and health-related

TABLE 3 | Differences in Medicare spending between TM beneficiaries without and with Medigap.

Outcome	Mean (SD)		Adjusted differences, $ (95% CI)
	TM beneficiaries without Medigap	TM beneficiaries with Medigap	
Medicare spending			
Total	8261 (17,838)	9210 (16,932)	1062 (346, 1779)
Inpatient admissions	2624 (10,464)	2479 (9513)	86 (−289, 461)
Outpatient visits	2737 (9977)	3177 (7702)	453 (148, 758)
ER visits	218 (930)	218 (841)	9 (−27, 46)
Prescription drugs	1876 (6485)	2397 (8004)	572 (223, 921)

Note: Two-part models were used to estimate Medicare spending among Traditional Medicare (TM) beneficiaries with and without Medigap. The first part employed a logistic regression model to estimate the probability of any spending, while the second part used a generalized linear model (GLM) with a log link and gamma distribution to estimate spending among individuals with positive expenditures. All models adjusted for individual-level characteristics and year fixed effects. Inverse probability of treatment weighting (IPTW) was applied to account for differences in baseline characteristics between groups. Adjusted mean spending was calculated for each group by holding covariates constant, and differences in adjusted mean spending were then estimated to facilitate direct comparisons between beneficiaries with and without Medigap. The results are reported as adjusted differences in the table. Survey weights were applied to ensure that the estimates were representative of the U.S. Medicare population.
Abbreviations: ER, emergency room; TM, traditional Medicare.

TABLE 4 | Differences in use of high-value care among TM beneficiaries without and with Medigap.

Outcome	TM beneficiaries without Medigap		TM beneficiaries with Medigap		Adjusted differences, percentage points (95% CI)
	Eligible sample, *N*	Percentage of recipients (weighted %)	Eligible sample, *N*	Percentage of recipients (weighted %)	
Cancer screening					
Breast cancer screening	1258	53.4	363	56.1	1.9 (−5.9, 9.7)
Cervical cancer screening	1463	75.8	334	80.7	3.6 (−4.1, 11.4)
Colorectal cancer screening	2959	72.3	641	75.0	1.4 (0.7, 2)
Diagnostic and preventive testing					
Dental checkup	13,173	51.2	3446	53.5	2 (−0.1, 4.1)
Blood pressure measurement	6013	92.7	1384	93.5	0.7 (−0.4, 1.8)
Cholesterol measurement	4852	97.9	1136	98.7	0.7 (−1, 2.5)
Influenza vaccine	6056	73.8	1422	75.4	1.5 (0.3, 2.6)
Diabetes care					
HbA1c measurement	1826	87.2	404	84.9	−2.8 (−4.7, −1)
Foot examination	2455	73.7	510	75.1	0.7 (−2.8, 4.2)
Eye examination	2424	73.5	499	73.8	0.1 (−1.9, 2)

Note: Logistic regression models were used to estimate the use of high-value care among Traditional Medicare beneficiaries with and without Medigap while controlling for individual-level characteristics and year fixed effects. Inverse probability of treatment weighting (IPTW) was applied to adjust for differences in baseline characteristics between groups. Adjusted mean utilization was calculated for each group by holding covariates constant, and differences in adjusted mean utilization were estimated to allow for direct comparisons of high-value care use between beneficiaries with and without Medigap. The results are presented as adjusted differences in the table. Survey weights were applied to ensure that the estimates were representative of the U.S. Medicare population.
Abbreviation: TM, traditional Medicare.

TABLE 5 | Differences in use of low-value care among TM beneficiaries without and with Medigap.

Outcome	TM beneficiaries without Medigap		TM beneficiaries with Medigap		Adjusted differences, percentage points (95% CI)
	Eligible sample, *N*	Percentage of recipients (weighted %)	Eligible sample, *N*	Percentage of recipients (weighted %)	
Cancer screening					
Cervical cancer screening	2171	19.6	608	20.7	0.6 (−0.8, 2)
Colorectal cancer screening	993	7.8	271	3.3	−4.2 (−5.1, −3.3)
Prostate cancer screening	1181	59.6	326	66.4	6.4 (0.5, 12.2)
Medication use					
Antibiotics for acute upper respiratory infection	958	30.8	295	24.8	−3.9 (−13.3, 5.4)
Antibiotics for influenza	425	15.7	107	13.7	−4.9 (−6.5, −3.4)
Benzodiazepine for depression	1597	27.8	449	26.3	−0.2 (−7.8, 7.3)
Opioid for back pain	453	7.2	112	6.9	−6.2 (−8.3, −4.2)
Opioid for headache	1886	19.6	483	15.2	−3 (−13.1, 7)
NSAID use for hypertension, heart failure, or kidney disease	3235	8.7	739	12.0	3.2 (2.1, 4.4)
Imaging use					
MRI/CT for back pain	1886	11.3	483	11.0	0 (−1.3, 1.2)
Radiograph for back pain	1886	14.9	483	16.1	0.9 (−2.3, 4.1)
MRI/CT for headache	453	7.2	112	7.7	−0.1 (−3.7, 3.5)

Note: Logistic regression models were used to estimate the use of low-value care among Traditional Medicare beneficiaries with and without Medigap while controlling for individual-level characteristics and year fixed effects. Inverse probability of treatment weighting (IPTW) was applied to adjust for differences in baseline characteristics between groups. Adjusted mean utilization was calculated for each group by holding covariates constant, and differences in adjusted mean utilization were estimated to allow for direct comparisons of low-value care use between beneficiaries with and without Medigap. The results are presented as adjusted differences in the table. Survey weights were applied to ensure that the estimates were representative of the U.S. Medicare population.
Abbreviations: CT, computed tomography; MRI, magnetic resonance imaging; NSAID, nonsteroidal anti-inflammatory drug; TM, traditional Medicare.

factors, residual confounding due to unmeasured or unobserved variables may remain. For instance, substantial regional variation may exist, but MEPS provides only limited geographic information and therefore could not adjust for more granular geographic categories. Therefore, these results should not be interpreted as causal associations. Fourth, there are multiple types of Medigap plans that vary substantially in cost-sharing requirements and the level of financial protection provided, which may have differential effects on spending and utilization. However, due to data limitations in MEPS, we were unable to distinguish between specific Medigap plan types. Fifth, Medigap premiums were not included in the Medicare spending estimates because MEPS reports premiums for all insurance coverage combined, preventing the identification of premium amounts specific to Medigap enrollment. Sixth, although Medigap policies have evolved in subsequent years, we used data from 2013 to ensure a sufficient sample size. Because the denominators used in our analyses for both high- and low-value measures were limited to individuals with specific conditions, the resulting sample sizes were relatively small. Seventh, there are inherent limitations in the measurement of high- and low-value care. Our analysis focused on a specific subset of high- and low-value services, and the findings may not be generalizable to other services or broader care categories. Also, several utilization measures were based on self-reported data, which are susceptible to reporting inaccuracies. Furthermore, our ability to fully identify exclusion criteria for low-value care was limited by the nature of the MEPS data, which reports medical conditions using 3-digit ICD diagnosis codes. This level of diagnostic granularity may limit the ability to capture competing diagnoses, comorbid conditions, or clinical red flags that would otherwise refine the identification of low-value care. Finally, some findings warrant cautious interpretation. Although IPTW adjusted for observed differences, unmeasured confounding may remain. For example, the negative association between Medigap coverage and low-value colorectal cancer screening likely reflects beneficiary characteristics rather than a direct plan effect. Because Medigap serves as supplemental insurance without utilization management, it is unlikely to directly limit service use. Instead, beneficiaries with higher socioeconomic status, greater health literacy, and better

access to primary care may be more likely to adhere to screening guidelines, and their physicians may likewise follow evidence-based recommendations.

5 | Conclusions

In this repeated cross-sectional study, we found that Medigap coverage was associated with higher health care spending among TM beneficiaries, but was not consistently associated with differential use of high- or low-value services. These findings suggest that current Medigap plan structures may contribute to higher utilization without selectively encouraging clinically beneficial care. As policymakers consider reforms to improve the value and sustainability of Medicare, incorporating provider and patient-facing strategies that better align supplemental insurance incentives—encouraging the use of evidence-based, high-value services while reducing low-value care—to provide financial protection for beneficiaries, support program sustainability, and enhance care quality.

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Conflicts of Interest

Dr. Fendrick directs the University of Michigan Center for Value-Based Insurance Design. He reports providing consulting services to AbbVie, CareFirst Blue Cross Blue Shield, Centivo, Clover Health, Community Oncology Association, Covered California, Elektra Health, EmblemHealth, Employee Benefit Research Institute, Exact Sciences, GRAIL, Health[at]Scale Technologies, HealthCorum, Hygieia, MedZed Inc., Merck and Company, Mother Goose Health, Phathom Pharmaceuticals, Sempre Health, Silver Fern Healthcare, US Department of Defense, Virginia Center for Health Innovation, Wellth, Yale-New Haven Health System; holding equity interest in Health[at] Scale Technologies, HealthCorum, Mother Goose Health, Sempre Health, Wellth Inc., and Zansors; receiving research support from the Agency for Healthcare Research and Quality, West Health Policy Center, Arnold Ventures, National Pharmaceutical Council, Patient-Centered Outcomes Research Institute, Pharmaceutical Research and Manufacturers of America, the Robert Wood Johnson Foundation, the state of Michigan, and the Centers for Medicare and Medicaid Services; serving as coeditor for the American Journal of Managed Care; and maintaining a partnership at VBID Health.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Appendix S1:** eTable A. Measures for high- and low-value care. eTable B. Differences in use of high- and low-value care among TM beneficiaries (aged 65 years and older) without and with Medigap. eFigure A. Propensity scores determination.