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INCLUSIVITY IN PEOPLE, METHODS, AND OUTCOMES

RESEARCH ARTICLE

Association Between Capitated Payments and Preventive Care Among U.S. Adults

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Introduction: There is increasing interest in using capitation rather than fee for service to promote primary care and population health. The goal of this study was to examine the association between practice reimbursement mix (majority fee for service versus majority capitation versus other) and receipt of common preventive screening examinations and health counseling from 2012 to 2018.

Methods: Using the National Ambulatory Medical Care Survey, a retrospective cross-sectional study of 24,864 visits with primary care clinicians among patients aged 18–75 years without a cancer diagnosis was conducted. The main dependent measures were age- and sex-appropriate receipt of breast cancer screening, osteoporosis screening, cervical cancer screening, chlamydia testing, colon cancer screening, diabetes screening, and hyperlipidemia screening as well as 3 health counseling items. Multivariable logistic regression was performed to assess the association between reimbursement mix and receipt of preventive care, adjusted for patient, visit, and practice characteristics.

Results: Majority capitation reimbursement was associated with a greater likelihood of receiving breast cancer screening (AOR=2.11, 95% CI=1.16, 3.84, $p=0.014$) and osteoporosis screening (AOR=4.34, 95% CI=1.74, 10.8, $p=0.0017$) than majority fee-for-service or other reimbursement mixes. Reimbursement mix was not associated with the likelihood of receiving 9 other preventive care or health counseling services.

Conclusions: Larger amounts of capitation reimbursement may improve some but not all aspects of preventive care compared with fee for service.

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INTRODUCTION

There is renewed interest in using primary care capitation to achieve the triple aim of improving the experience of care, improving population health, and reducing the costs of health care.^{1,2} Capitation reimburses clinicians a fixed amount for each enrolled patient—an approach that differs from fee-for-service (FFS) approaches that reimburse clinicians for each service rendered.

Over the last 5 years, policymakers have proposed or implemented a number of primary care payment models within the traditional Medicare Program that seek to

improve health and patient experience outcomes using capitation-like incentives, such as Comprehensive Primary Care Plus and, more recently, primary care first.³

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Capitation is the dominant method of reimbursement of managed care organizations in Medicaid programs nationwide⁴ and is included in employer-sponsored health plans.⁵ The coronavirus disease 2019 (COVID-19) pandemic has further highlighted the potential benefit of capitation as a reimbursement method by revealing the vulnerability of a system that depends on FFS payments tied to face-to-face encounters, which were abruptly minimized for public health benefit.²

The benefits of capitation may be particularly salient for preventive services provided in primary care settings. Although these services are a critical component of better health outcomes, as few as 8% of Americans aged >35 years have received all recommended, age-appropriate preventive services.^{6,7} By removing incentives to achieve a certain volume of visits, capitated models may permit clinicians (and practices) the time and flexibility to more effectively partner with patients on preventive care.⁸ Capitation may also promote activities that support prevention and comprehensiveness, such as education and counseling on lifestyle factors, and team members, such as health coaches and peer navigators, who are either not captured or nonbillable under FFS. Indeed, evidence from the 1990s suggested that capitation was associated with a greater likelihood to receive health counseling and other preventive services.^{9,10} More recent work has suggested higher quality preventive and chronic disease care among practices with fully capitated or blended FFS and capitation models than FFS.^{11,12} Although our study does not include community health center (CHC) data, related research on the impact of capitation on preventive care in CHCs has recently emerged in 2 states. In Oregon, transition from FFS to a per-member-per-month capitated payment model for select CHCs in 2013–2016 did not negatively impact delivery of preventive care but also did not consistently improve care across preventive care measures.¹³ These findings were similar to an evaluation of Washington State's experiment with prospective capitated payments for federally qualified health centers in 2017.¹⁴

However, there may also be limits to the benefits of capitation. Results from a meta-analysis from the 1990s yielded mixed results about the impact of HMOs on healthcare quality, although the generalizability of these studies in today's care delivery setting may be limited.¹⁵ From 2012 to 2016, greater capitation than FFS reimbursement was not associated with quality of care for patients with hypertension, diabetes, or chronic kidney disease.¹⁶ Concerns also remain that capitation incentives could lead to reduced primary care access for patients, stinting of care, selection of healthy patients, and other unintended consequences.¹⁷ Although traditional capitation showed mixed effects on cost and

quality, it was associated with worse patient satisfaction—and the backlash against HMOs in the 1990s.¹⁷

Despite much speculation, there are major gaps in the evidence for whether or not capitation promotes preventive care, and the evidence that does exist either dates back several decades^{9,15} or is limited in scope to state-specific experiments.^{12–14} Given the continued need to promote preventive care and guard against unintended consequences amid ongoing payment and care delivery changes, contemporary data are needed about the relationships between capitation reimbursement and receipt of preventive care in the U.S. at large. Thus, the specific aim of this study was to assess whether higher levels of capitation (than of FFS or other reimbursement mixes) were associated with a greater likelihood of receipt of guideline-recommended preventive care among visits to ambulatory clinics in the U.S.

METHODS

Study Sample

Outpatient visits from January 1, 2012 to December 31, 2018 were evaluated using the National Ambulatory Medical Care Survey (NAMCS) (excluding the year 2017 given unavailability of data), a nationally representative data set of U.S. office-based patient visits managed by the U.S. Centers for Disease Control and Prevention. NAMCS utilizes a stratified, 2-probability sample of nonfederal, office-based physicians and is described elsewhere.¹⁸ From this sample, visits with primary care clinicians were identified among patients aged 18–75 years without a cancer diagnosis ($n=39,933$). These visits were identified by a response of *yes* to *Are you the patient's primary care provider?* on the ambulatory care survey.

Measures

On the basis of a similar study design evaluating the quality of chronic disease care,¹⁶ the exposure was the proportion of a practice's patient care reimbursement accounted for by capitation versus FFS, categorized as either majority capitation (>50%), majority FFS (>50%), or other reimbursement mixes (mutually exclusive categories). Surveyed physicians were asked to estimate the percentage of patient care revenue received by their practice that came from FFS, capitation, case rates, or other.¹⁸ These estimates were then categorized as blank, unknown, refused to answer, ≤25%, 26%–50%, 51%–75%, or >75%. There were 12,546 visits (31%) in which respondents answered *blank* or *unknown* for the practice's percentage of reimbursement from capitation and FFS. Patient, visit, and practice characteristics were found to be similar between the visits with known and

blank/unknown reimbursement information; thus, a complete case analysis was conducted.

Study covariates included patient characteristics, visit factors, and practice characteristics. The following patient characteristics were assessed: age, sex, race and ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, non-Hispanic other), insurance type (private, Medicare, Medicaid, other), and the number of chronic diseases (arthritis, asthma, cerebrovascular disease, congestive heart failure, chronic renal failure, chronic obstructive pulmonary disease, depression, diabetes, hyperlipidemia, hypertension, ischemic heart disease, obesity, and/or osteoporosis). The following visit characteristics were assessed: survey year and visit duration (in minutes). Finally, practice characteristics assessed included rurality (metropolitan statistical area versus non-metropolitan statistical area), region of the U.S. (Northeast, Midwest, South, West), and practice ownership (physician, medical/academic health center, or insurance company/health plan/HMO). A small number of visits ($n=2,523$) with missing or erroneous data on covariates (number of chronic diseases, visit duration, practice ownership, and practice region) were excluded, and mean imputation was performed on 4,917 visits with missing or erroneous BMI data.

Following previous work,^{16,19} U.S. Preventive Services Task Force guidelines²⁰ from 2012 to 2018 were used to identify outcomes of interest for 7 preventive services: breast cancer screening with mammography (for women aged 50–74 years), osteoporosis screening with bone density testing (for women aged ≥ 65 years), cervical cancer screening with Papanicolaou smear or human papillomavirus (for women aged 21–65 years; human papillomavirus alone not counted for those aged 21–29 years), chlamydia testing (for women aged 18–24 years), colon cancer screening with colonoscopy or sigmoidoscopy (for individuals aged 50–75 years), diabetes screening with HbA1c testing (for individuals aged 40–70 years with BMI >25 kg/m²), and hyperlipidemia screening with cholesterol testing (for individuals aged 40–75 years). Four additional outcomes were assessed regarding lifestyle and chronic disease prevention: diet/nutrition or exercise counseling for populations at increased risk for cardiovascular disease (BMI >25 kg/m² and risk factors for cardiovascular disease), weight reduction counseling for patients with BMI >30 kg/m², and family planning/contraception counseling for women of reproductive age. The primary outcome was the proportion of visits in which a guideline-recommended screening test or counseling item was provided. The numerator was the total number of orders for each screening test or reported episodes of counseling given, and the denominator was the total number of visits

among eligible patients on the basis of the age, sex, and risk factor parameters mentioned earlier. Thus, visits not in the targeted population (such as whether mammography was ordered in a visit for a woman aged <50 years) were excluded.

Statistical Analysis

To assess the association between reimbursement mix (majority FFS [ref] versus majority capitation versus other) and receipt of each preventive service or health counseling item, we performed survey-weighted multivariable logistic regression, adjusted for the patient, visit, and practice covariates described earlier, for each eligible patient group. Statistical tests were 2 tailed and considered significant at $\alpha=0.05$. Comparisons of the patient, visit, and practice covariates at majority FFS versus majority capitation practices were conducted using standardized mean differences (SMDs) owing to large sample sizes. Analyses were conducted using R (Version 2022.07.1).²¹ The study was exempted from IRB on the basis of institutional policy and use of publicly available data.

RESULTS

The sample consisted of 1,339 visits to majority capitation practices, 19,409 visits to majority FFS practices, and 4,116 visits to other reimbursement mix practices. There were differences in patient and practice characteristics between visits to practices with majority FFS and to those with majority capitation revenue (Table 1). Patients seen at practices with majority FFS reimbursement were more likely to be White (78.5% vs 57.5%) and less likely to be non-Hispanic Black (9.4% vs 15.1%), Hispanic (7.6% vs 16.2%), or non-Hispanic other (4.5% vs 11.4%) than patients seen at majority capitation practices (SMD= -0.22 , meaningful at $>|0.1|$).²² The patients seen at majority FFS and majority capitation practices were similarly likely to have hypertension (38.6% vs 41.0%), hyperlipidemia (29.6% vs 33.3%), or diabetes (11.8% vs 13.1%), and patients at majority FFS practices had a lower average number of chronic diseases (1.55 vs 1.74, SMD= -0.13). Visits occurring at majority FFS practices were less often located in the Western region of the U.S. (22.0% vs 48.0%) and more often located in the Midwest (28.8% vs 14.3%) or South (35.9% vs 25.0%) (SMD= -0.25). Finally, majority FFS practices were less often owned by an insurance company, health plan, HMO, or other than majority capitation practices (12.8% vs 27.0%, SMD= -0.15).

In adjusted analysis (Figure 1), majority capitation reimbursement was associated with a greater likelihood

Table 1. Patient and Provider Characteristics by Reimbursement Composition (N=24,864)

Reimbursement type	Majority FFS (n=19,409)	Majority capitation (n=1,339)	Other reimbursement mixes (n=4,116)	SMD ^a
Mean visit length (SD)	21.5 (11.3)	22.0 (9.9)	21.9 (11.3)	-0.05
Mean age (SD)	50.8 (15.5)	51.4 (15.9)	48.9 (16.2)	-0.04
Female, n (%)	11,353 (58.5%)	791 (59.1%)	2,525 (61.4%)	0.006
Race and ethnicity				-0.22
Non-Hispanic White	15,240 (78.5%)	768 (57.5%)	2,814 (68.4%)	
Non-Hispanic Black	1,830 (9.4%)	202 (15.1%)	617 (15.0%)	
Hispanic	1,476 (7.6%)	217 (16.2%)	509 (12.4%)	
Non-Hispanic other ^b	863 (4.5%)	152 (11.4%)	176 (4.3%)	
Insurance type				-0.06
Private insurance	11,910 (61.4%)	754 (56.3%)	2,340 (56.9%)	
Medicare	4,761 (24.5%)	333 (24.9%)	950 (23.1%)	
Medicaid	1,636 (8.4%)	150 (11.2%)	519 (12.6%)	
Other payment source ^c	1,102 (5.7%)	102 (7.6%)	307 (7.5%)	
Hypertension	7,487 (38.6%)	549 (41.0%)	1,395 (33.9%)	-0.02
Hyperlipidemia	5,749 (29.6%)	446 (33.3%)	1,014 (24.6%)	-0.04
Diabetes	2,285 (11.8%)	178 (13.3%)	493 (12.0%)	-0.02
Mean number of chronic diseases (SD) ^d	1.55 (1.48)	1.74 (1.58)	1.38 (1.43)	-0.13
Visits in MSA, n (%) ^e	15,905 (82.0%)	1,151 (86.0%)	3,439 (83.3%)	0.04
Practice region				-0.25
Northeast	2,588 (13.3%)	171 (12.8%)	707 (17.2%)	
Midwest	5,590 (28.8%)	191 (14.3%)	811 (19.7%)	
South	6,967 (35.9%)	335 (25.0%)	1,688 (41.0%)	
West	4,264 (22.0%)	642 (48.0%)	910 (22.1%)	
Practice ownership				-0.15
Physician or physician Group	14,549 (75.0%)	821 (61.3%)	3,207 (77.9%)	
Medical/academic health center	2,368 (12.2%)	157 (11.7%)	336 (8.2%)	
Insurance company, health plan, HMO, or others	2,492 (12.8%)	361 (27.0%)	573 (13.9%)	

^aSMD was calculated comparing majority FFS with majority capitation given that these were the subgroups of interest, and SMD is validated for 2 groups.

^bIncludes Asian, Native Hawaiian/Pacific Islander, American Indian/Alaska Native, and more than 1 race reported.

^cIncludes worker's compensation, self-pay, charity care, and others.

^dIncludes arthritis, asthma, cerebrovascular disease, congestive heart failure, chronic renal failure, COPD, depression, diabetes, hyperlipidemia, hypertension, ischemic heart disease, obesity, and/or osteoporosis.

^ePractice based in MSA.

COPD, chronic obstructive pulmonary disease; MSA, metropolitan statistical area; SMD, standardized mean difference.

of receiving breast cancer screening with mammography (AOR=2.11, 95% CI=1.16, 3.84, $p=0.014$) and of receiving osteoporosis screening with bone density testing (AOR=4.34, 95% CI=1.74, 10.8, $p=0.0017$) than majority FFS reimbursement (ref) or other reimbursement mixes. Capitation was not associated with differences in the likelihood of cervical cancer screening (AOR=1.13, 95% CI=0.32, 4.01, $p=0.85$), colon cancer screening with colonoscopy (AOR=2.17, 95% CI=0.84, 5.63, $p=0.11$), chlamydia testing (AOR=1.57, 95% CI=0.25, 9.85, $p=0.63$), diabetes screening for those aged 40–70 years with BMI >25 kg/m² without a diagnosis of diabetes (AOR=1.89, 95% CI=1.00, 3.56, $p=0.05$), or lipid screening for adults aged more than 40–75 years without hyperlipidemia (AOR=1.15, 95%

CI=0.81, 1.65, $p=0.43$) compared with majority FFS or other reimbursement mixes.

Majority capitation reimbursement was not associated with differences in counseling on diet/nutrition for patients with cardiovascular disease risk factors and BMI >25 kg/m² (AOR=0.88, 95% CI=0.42, 1.84, $p=0.66$), exercise for the same patient population (AOR=1.20, 95% CI=0.53, 2.68, $p=0.66$), weight reduction for patients with BMI >25 kg/m² (AOR=0.71, 95% CI=0.33, 1.52, $p=0.38$), or family planning/contraceptive use for female patients of reproductive age (AOR=0.59, 95% CI=0.16, 2.27, $p=0.45$) (Figure 1). For all counseling topics, greater visit length was significantly associated with greater odds of receipt of counseling.

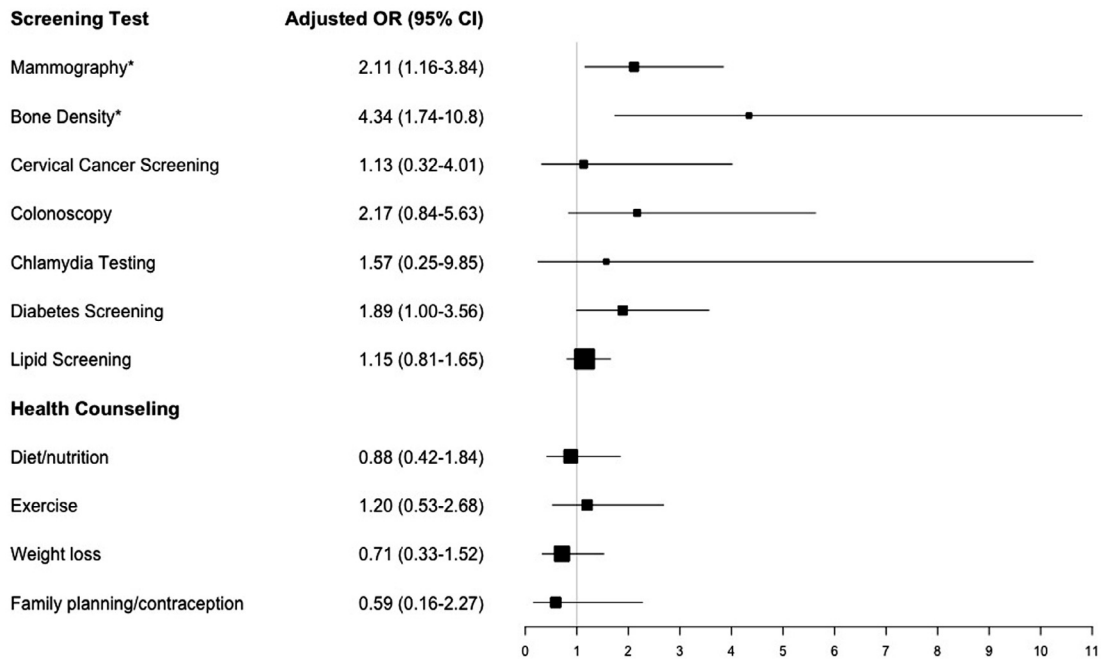


Figure 1. FFS versus adjusted analysis of the association between majority capitation reimbursement and receipt of preventive care and health counseling services for U.S. adults.

Note: Regression models were adjusted for patient factors (age, sex, race and ethnicity, insurance type, comorbidities), visit factors (survey year, visit duration), and practice characteristics (rurality, region of U.S., practice ownership). The asterisk (*) denotes significance at $p < 0.05$.

DISCUSSION

In this 6-year analysis of a nationally representative set of outpatient visits among U.S. adults, adults receiving care from majority capitation practices were more likely to receive guideline-concordant breast cancer and osteoporosis screening than adults receiving care from practices with majority FFS or other reimbursement mixes. There were no associations observed between care from majority capitation practices and the likelihood of receipt of 9 other preventive services or counseling activities.

Taken together, these findings contrast previous work from the managed care era of the 1990s, which showed that capitation was associated with increased receipt of preventive and health counseling services.⁹ Potential reasons for these differences include changes in payment models in the last 3 decades, such as the structure of capitation incentives (e.g., contract duration, quality incentives, and overall reimbursement amount under capitation versus other reimbursement methods).² Breast cancer and osteoporosis screening were 2 preventive care items assessed that are unique to middle-aged to older women, so this may be a demographic more readily engaged in care with or outreached to by majority capitation practices. Despite not including CHC data,

our findings were consistent with analyses from the contemporary era evaluating transitions to capitated payment models in Oregon and Washington State CHCs, which have shown inconsistent improvements in preventive care measures but no significant decrements in quality.^{13,14} Interestingly, Ukhanova et al.’s finding of increased provision of mammography for eligible individuals under capitated payments was replicated in our study.¹³

Our study’s findings highlight that capitation is not a 1-size-fits-all solution to promoting preventive care. Capitation design considerations and other solutions may be needed. If capitation holds promise for promoting preventive care, it may not be through influence over individual ordering decisions on the part of physicians. Instead, capitation may influence the receipt of care by encouraging integration and innovations in the delivery of preventive services,¹⁰ such as the use of cancer screening registries, peer navigators, or other forms of care management, which this study was not poised to examine.

In addition, the likelihood of receiving preventive care did not decrease for any service or activity with a greater capitation mix—findings that are encouraging amid concerns that capitation could increase the risk of stunting on care or decrease access to care. These findings are particularly reassuring from an equity standpoint given

the trend observed of non-White patients being more likely to be seen by practices with majority capitation reimbursement. Furthermore, in view of concerns that capitation could lead to the selection of healthier patients (cherry picking) or avoidance of patients with more complex diseases (lemon dropping),²³ this study showed that majority capitation practices cared for a comparable proportion of patients with hypertension, hyperlipidemia, or diabetes and for patients with a higher average number of chronic diseases than practices with majority FFS or other reimbursement mixes.

Limitations

This study has limitations. First, as with all observational analyses, this study was subject to residual confounding. However, the intent of this analysis was to describe an association that could inform future work, not draw causal conclusions. Second, there was the possibility of survey-related recall or reporting bias. However, this study used a national data set with a large sample size of visits from a wide range of practices, which has been used in many previous studies. Third, lack of more granular data precluded more specific calculations of capitation revenue, but reimbursement mix proportions are the predominant way that practices and organizations evaluate reimbursement, and this approach has precedent in previous work as previously cited. Fourth, NAMCS was designed to avoid surveying the same physicians across years to reduce reporting burden and lacks provider or practice identifiers. Thus, baseline data on reimbursement mix and preventive care measure performance for the same set of practices were not available to compare with data from subsequent time periods. Although this precludes the ability to analyze how longitudinal reimbursement mix covaries with rates of preventive care, findings from this study nonetheless provide a relevant health system–level description that could be extended in future studies assessing provider- and practice-specific dynamics. Fifth, the survey data lacked information on specific clinical capabilities that support preventive care (e.g., registries, population health management, health coaches), an area for future work. Sixth, NAMCS data limitations precluded the inability to distinguish between screening and diagnostic tests ordered, but this likely represented a small proportion of the tests under consideration, as well as the inclusion of CHCs in this analysis, which should be a topic of additional study. Finally, this study was not designed to examine the impact of the Affordable Care Act on preventive care delivery, and the Affordable Care Act may be a contributing factor to the increase in breast cancer and osteoporosis screening observed in this study rather than capitation alone.

CONCLUSIONS

To the researchers' knowledge, this study is the first to evaluate the relationship between capitation and receipt of preventive care for U.S. adults in the contemporary value-based era. Compared with patients seen in practices with majority FFS, patients seen in majority capitation practices from 2012 to 2018 were more likely to receive guideline-concordant breast cancer and osteoporosis screening but were neither more nor less likely to receive any other of 9 preventive care or health counseling services. These findings are relevant to practice and policy leaders considering how to use payment incentives to improve preventive care.

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