THE PRACTICE OF MEDICINE

High Levels Of Capitation Payments Needed To Shift Primary Care Toward Proactive Team And Nonvisit Care

ABSTRACT Capitated payments in the form of fixed monthly payments to cover all of the costs associated with delivering primary care could encourage primary care practices to transform the way they deliver care. Using a microsimulation model incorporating data from 969 US practices, we sought to understand whether shifting to team- and non-visit-based care is financially sustainable for practices under traditional fee-for-service, capitated payment, or a mix of the two. Practice revenues and costs were computed for fee-for-service payments and a range of capitated payments, before and after the substitution of team- and non-visit-based services for low-complexity in-person physician visits. The substitution produced financial losses for simulated practices under fee-for-service payment of $42,398 per full-time-equivalent physician per year; however, substitution produced financial gains under capitated payment in 95 percent of cases, if more than 63 percent of annual payments were capitated. Shifting to capitated payment might create an incentive for practices to increase their delivery of team- and non-visit-based primary care, if capitated payment levels were sufficiently high.

Primary care reform initiatives such as the patient-centered medical home seek to increase primary care practices’ capacity to provide continuous and coordinated whole-person care that addresses the majority of the patient’s needs.1 To achieve this goal in the context of growing chronic disease burdens and a constrained primary care physician workforce in the United States, reform initiatives seek to enable practices to implement a variety of health management strategies to provide care to larger numbers of patients and to allow for alternative methods of delivering care that might be both more effective and more convenient for patients.2–4 These strategies include shifting time and resources from in-person visits with a physician to more team-based services (for example, nurse or educator visits) and offering non-visit-based care using electronic or telephone communications.4–7 Such approaches to care may increase access and convenience for patients, while allowing practices to invest in more robust population health management activities to improve health outcomes.

However, team-based and non-visit-based services are not reimbursed under traditional fee-for-service (FFS) payment. Recently, public and private payers have offered primary care practices partially or fully capitated payments (that is, per member per month payments for outpatient primary care services only, excluding...
Capitated payments are of interest in part because they could enable practices to take on more patients by replacing some routine care visits with non-visit-based care strategies. However, it remains unclear whether and to what degree shifting to capitated payment would enable primary care practices to take on enough new patients to make team- and non-visit-based care financially sustainable. The resulting financial uncertainty has limited practices’ participation in non-visit-based care initiatives.

Addressing the financial uncertainties of practices has been difficult because publicly available financial data on capitated primary care practices is limited, and studies of capitated contracting arrangements are rare. In addition, most capitated primary care practices are embedded within capitated delivery systems, so data on them have limited applicability to practices funded by traditional FFS payment.

In this study we used a validated simulation model to estimate the financial implications for practices of shifting to team- and non-visit-based care under traditional fee-for-service, full capitation for primary care services, or a combination of the two types of payment. We also estimated the impact of incorporating additional payments from shared savings arrangements such as accountable care organization (ACO) contracts.

Study Data And Methods

MODEL AND DATA We used a validated micro-simulation model, which analyzes individual primary care practices and the patients they serve, to estimate primary care practice revenues and costs. We focused on office- or hospital-based ambulatory care internal medicine practices, excluding practices that operated only as urgent care centers. We obtained data from the Medical Group Management Association’s Cost and Revenue Survey, a stratified national survey including 969 primary care practices that asked about their staffing, patients’ use of the practice, productivity, revenue, and costs. We repeatedly sampled the survey data with replacement, to estimate the national distribution of primary care practice utilization, revenues, and costs per full-time-equivalent (FTE) physician per year as inputs to our models. These inputs are shown in Exhibit 1. We simulated a total of 40,078 practices that collectively had 240,960 FTE physicians.

PRACTICE UTILIZATION We simulated practice utilization by sampling the distribution of unique patients and encounters per FTE physician per year from the weighted survey data. We simulated patients’ age, sex, race/ethnicity, income, and type of insurance coverage (private, Medicare, Medicaid or other government, or self-pay) to match state and national Census Bureau data, as shown in online Appendix Exhibit 2. We assigned International Classification of Diseases, Ninth Revision (ICD-9), diagnostic codes that indicated common comorbidities and utilization rates to simulated patients by sampling from the codes and rates for 33,162 respondents to the 2013 Medical Expenditure Panel Survey with the corresponding demographic and insurance profile. Finally, we distributed the patients among simulated practices within each state to match the number of unique patients and encounters per FTE physician at each practice. Notably, we sampled from the non-linear variation in patients per FTE physician, conditional on support-staff FTEs, to account for economies of scale in practice capacity.

PRACTICE REVENUES AND COSTS We estimated payment for medical services by sampling from the Current Procedural Terminology (CPT) codes and associated payment per encounter from the weighted survey data. Payment per encounter reflected the payer and work relative value units (RVUs), with a budget-neutrality adjuster; practice expense RVUs; and malpractice RVUs adjusted by geographic practice cost index. Since practices require time to amass revenue to hire additional staff members, we modeled revenue gains from capitation on a monthly time step, instead of assuming that practices would have capital to hire or invest without new revenues. We estimated practice costs by sampling from the service cost estimates in the weighted survey data, which included physician and staff salaries, benefits, and overhead expenditures.

Our primary outcome was net surplus per FTE physician per year, computed as the difference between revenue and expenditures per FTE physician per year at each practice, after accounting for physician salary (also estimated from the survey data). We did not assume that having a surplus would necessarily increase physician salaries; instead, we assumed that any surplus would be spent as the practice deemed appropriate. We excluded nonmedical revenues and costs, such as returns on investment, research grants, and legal settlements.

The methods we used to validate the model are shown in Appendix Exhibit 5. From physician-visit-based to team- and non-visit-based care A principal strategy that capitated practices can use to maintain or increase revenue when providing team- or non-visit-based care is to increase their capacity to care for additional patients while still offering all care needed by their patients. We therefore com-
pared net surplus per FTE physician per year before and after low-complexity physician visits were replaced by team- and non-visit-based services that freed up capacity in the practice to care for additional patients.

We conservatively defined two types of low-complexity visits, based on the National Ambulatory Medical Care Survey (NAMCS) classification scheme: visits for routine chronic problem without flare and visits for new acute care problems. In both types of visits, the physician might counsel the patient but would not prescribe medications or order laboratory or imaging studies other than simple point-of-care diagnostic tests. Using NAMCS data, we identified the top twenty principal diagnoses (by ICD-9 code) for visiting a primary care practice and estimated what portion of visits for those twenty diagnoses would qualify as low-complexity visits.

We estimated the revenue and cost changes of substituting alternative types of visits for low-complexity in-person physician visits. Specifically, for people with diabetes or hypertension, we substituted in-person nurse visits, and for patients with other chronic illnesses, we substituted a nurse telephone or e-mail visit. We subjected all acute care visits to nurse telephone triage. We substituted a physician telephone or e-mail visit for an in-person physician visit in cases in which an exam or point-of-care laboratory test is not typically considered necessary. We substituted an in-person nurse visit in cases in which an exam or point-of-care laboratory test is typically considered necessary.

In-person nurse visits were simulated as lasting twenty minutes with an additional ten minutes for documentation; nurse and physician telephone or e-mail visits were simulated as lasting ten minutes, per patient, including documentation time; and nurse telephone triage was simulated as requiring fifteen minutes per patient, including documentation time. We note that these estimates are conservative, to ensure a high standard of care.

We estimated changes in revenue by calculating the number of physician encounter slots freed up, after the time needed for telephone and e-mail visits was accounted for. We used a physician productivity rate of 24.4 minutes per freed-up slot, estimated from the survey data, and we used existing patient encounter and physician payment rates shown in Exhibit 1.

Finally, we calculated the additional costs of team- and non-visit-based care. We added staff salaries and associated overhead for the added hours of nurse time required for nurse triage and visits. We increased the number of support staff members and associated overhead to account for the increased number of patients managed per FTE physician per year, as shown in Appendix Exhibit 3. We included an additional medical assistant to help with panel management and closing care gaps between patient encounters.

FROM TRADITIONAL FEE-FOR-SERVICE TO CAPITATED PAYMENTS We compared net surplus per FTE physician per year before and after the shift to team- and non-visit-based care under a range of capitation levels—varying from 0 percent (traditional FFS) to 100 percent (fully capitated). We set the capitation payment fee to 110 percent of the previous year’s total payment under traditional FFS, following procedures of the Centers for Medicare and Medicaid Services (CMS) that private insurers adopt.

We simulated the capitated patients as no longer producing visit-based FFS payments but instead producing a risk-adjusted per member per month payment. Risk adjustment was performed using CMS’s Hierarchical Condition Categories (HCC) model, which estimates medical expenditures based on age, sex, and diagnoses. To obtain the per member per month capitation payment, we multiplied each capitated patient’s HCC risk score by the previous year’s average monthly primary care payment for his or her age, sex, and insurance group and added the additional 10 percent. The per member per month payment was adjusted for inflation to 2016 US dollars.

THRESHOLD POINT ANALYSIS We expected that a shift from visit-based to team- and non-visit-based services would produce losses in net surplus under traditional FFS payment, because of lost in-person visit revenue and the higher expenses required to deliver team-based care. Conversely, we anticipated gains in net surplus from the shift under capitated payment, because caring for additional patients would produce more per member per month payments. We sought to find two thresholds: the capitation level above which a shift from visit-based to team- and non-visit-based services produced gains in net surplus among 95 percent of simulated practices, and the capitation level below which the shift produced losses in net surplus among 95 percent of simulated practices (details of this analysis are provided in Appendix Exhibit 6).

We conducted multiple sensitivity analyses, including one that included a shared savings bonus, which are described in the Appendix. All analyses were conducted in R, version 3.2.3.

LIMITATIONS Our study had several limitations. First, as with any simulation analysis, our model required us to make certain assumptions. We assumed that capitated payment fees to practices would be risk-adjusted using the formulas commonly employed by CMS, although these do not account for social risk factors that...
might predict primary care services use.\textsuperscript{26–28} Furthermore, we assumed that the utilization and staffing needs of newly empaneled patients would be similar to those of existing patients. Yet new patients could be more expensive. If so, our estimates of minimum capitation thresholds would be conservative.

Second, we included the cost of additional support staff members and overhead associated with new patient enrollment using currently observed staffing ratios per patient and additional care coordination costs. Yet current staffing levels without the supplemental support might be inadequate to care for substantially larger panel sizes. Again, if that were the case, our minimum capitation thresholds would be conservative.

Third, we assumed that only a subset of visits—those involving no laboratory tests (other than point-of-care testing), imaging, or medication prescriptions—could be effectively triaged to nurse in-person visits or physician telephone or e-mail visits, and that practices could triage patients. An even larger subset of visits involving medical changes (for example, short-term prescriptions of cough medication) could likely be triaged if effective systems were in place. At the same time, we acknowledge the possibility that visits without tests or imaging might have required more time and cognitive thought, rather than less.

\textbf{Study Results}

\textbf{STATUS QUO UTILIZATION, REVENUE, AND COSTS}

Under traditional fee-for-service, each FTE internal medicine physician in our model typically provided 3,776 visits per year for 1,684 unique patients (Exhibit 1), grossing an average of $530,181 in annual visit-based FFS revenue (Exhibit 2). Medical services costs totaled $451,893 per FTE physician—including physician and support staff salaries, benefits, and additional overhead costs—resulting in a net annual surplus of $78,288 per FTE physician.

\textbf{FROM VISIT-BASED TO POPULATION-BASED CARE}

Under traditional fee-for-service, shifting to team- and non-visit-based care in our model replaced 20.0 percent of primary care visits with alternative visit types, with 10.9 percent of all annual physician visits defined as low-complexity chronic care visits and 9.1 percent defined as low-complexity acute care visits (Appendix Exhibit 7).\textsuperscript{18} The appointment slots freed up by replacing low-complexity visits with alternative visits increased the number of unique patients seen annually per physician by about 20 percent, from 1,684 to 2,017—based on typical patient utilization rates per year and after we accounted for physician telephone or e-mail time for low-complexity acute care patients not seen through nurse visits.

Under traditional FFS payment, costs from replaced in-person visits were not fully offset by new revenue earned from filling the freed-up encounter slots because of the additional expenses required for nursing and support staff members. Thus, annual gross revenues declined slightly, to about $528,877, and annual costs increased to an average of $492,987 per physician (Exhibit 2). Annual net surplus declined by $42,398 per physician.

\textbf{FROM TRADITIONAL FEE-FOR-SERVICE TO CAPITATED PAYMENTS}

In contrast, shifting to team- and non-visit-based care in our model increased net surplus as the proportion of patients reimbursed under capitation increased: Practices enrolled a higher number of unique patients under team- and non-visit-based care, receiving more per member per month payments and facing fewer opportunity costs for deferring in-person visits. After the shift to team- and non-visit-based care, the annual net surplus per physician increased from $35,890 under traditional fee-for-
service to $120,654 at 50 percent capitation and $205,418 at 100 percent capitation (Exhibit 2).

**Threshold Point Analysis** We found that above 63 percent capitation, 95 percent of simulated practices would gain revenue by shifting to team- and non-visit-based care (Exhibit 3). Conversely, below 23 percent capitation, 95 percent of simulated practices would lose revenue by making that shift.

**Sensitivity Analyses** In sensitivity analyses, these thresholds changed when we incorporated a shared savings bonus similar to those provided by ACOs. If practices received a bonus of 0.6 percent of their total medical expenditures for capitated patients (50 percent of the savings rate observed in pilot ACO studies), net surplus per physician per year increased by an additional $59,823 at full capitation—even when we assumed that the shift in care did not otherwise affect utilization. With this shared savings bonus, 95 percent of simulated practices would gain revenue by shifting to team- and non-visit-based care above 56 percent capitation. Results of additional sensitivity analyses are reported in the Appendix.

**Discussion**

As new payment models encourage primary care practices to shift to team- and non-visit-based care, our study suggests that relatively high levels of capitation might be required for such changes to be financially sustainable for those practices. We found that the costs of lost in-person visit revenue would be large for practices making that shift under traditional FFS payment. These costs cannot be offset by higher patient enrollment in this case, given the time and staffing costs of team- and non-visit-based care services. However, as more payment moves toward capitation, especially when shared savings bonuses based on total medical expenditures are incorporated, as in Medicare’s ACO programs, the shift becomes more financially viable.

Our findings are relevant to the new Comprehensive Primary Care Plus (CPC+) initiative, a multipayer model sponsored by CMS that aims to support primary care practices in delivering patient-centered population-based care. The goal is for the initiative to gradually shift five thousand practices across the United States to largely capitated payment as of January 2017. Our finding that reimbursement for more than 63 percent of patients should be capitated is similar to one of the two capitation rates offered in the CPC+ initiative, in which practices are to be given the option of 40 percent or 65 percent capitation. Including a shared savings bonus, as in the CPC+ initiative, could make the shift to team- and non-visit-based care sustainable for practices at lower levels of capitation. How much shared savings is actually achieved and converted to bonuses is therefore critical to the ini-

### Exhibit 2

Mean annual revenues, costs, and net surplus per FTE physician before and after a shift to team- and non-visit-based care, by payment strategy

<table>
<thead>
<tr>
<th>Metric</th>
<th>Traditional FFS</th>
<th>Capitation 50%</th>
<th>Capitation 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before shift</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue</td>
<td>$530,181</td>
<td>$556,690</td>
<td>$583,199</td>
</tr>
<tr>
<td>Costs</td>
<td>451,193</td>
<td>451,193</td>
<td>451,193</td>
</tr>
<tr>
<td>Net surplus</td>
<td>78,288</td>
<td>104,797</td>
<td>131,306</td>
</tr>
<tr>
<td><strong>After shift</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue</td>
<td>$528,877</td>
<td>$613,641</td>
<td>$698,405</td>
</tr>
<tr>
<td>Costs</td>
<td>492,987</td>
<td>492,987</td>
<td>492,987</td>
</tr>
<tr>
<td>Net surplus</td>
<td>35,890</td>
<td>120,654</td>
<td>205,418</td>
</tr>
</tbody>
</table>

*Source: Authors’ calculations. Notes:* The capitation payment fee was set at 110 percent of the previous year’s total fee-for-service (FFS) payment, as explained in the text. Changes in net surplus per full-time-equivalent (FTE) physician per year (that is, the difference between revenue and expenditures at each practice, after accounting for physician salary) due to the shift were $42,398 for traditional FFS, $15,857 if 50 percent of patients had capitated payment, and $74,112 if 100 percent of patients had capitated payment. Confidence intervals are available from the authors upon request.

### Exhibit 3

Net surplus per FTE physician per year after shifting to team- and non-visit-based care, by percentage of patients with capitated payment

*Source: Authors’ calculations. Notes:* Net surplus per full-time-equivalent (FTE) physician per year is defined in the Notes to Exhibit 2. The minimum capitation level is the level above which 95 percent of practices would gain revenue by shifting to a team- and non-visit-based primary care delivery strategy. Appendix Exhibit 6 contains a conceptual illustration of the analysis used to determine this level (see Note 18 in text). CI is confidence interval.
Primary care demonstration programs. In previous work, we found that they could explain the limited impact of early patient-centered medical home demonstration programs. In previous work, we modeled non-face-to-face billing codes that could be used to reimburse practices as they transitioned from FFS payment to capitated payment. The use of these codes may be necessary to support practices as they make that transition. Importantly, our analysis was limited to estimating utilization, costs, and revenues: We did not estimate changes in the quality of care. Other important factors for practices—such as physician burnout or satisfaction, self-efficacy for both clinicians and patients, impact on workflow, local payer mix, and unique patient populations—are also not easily evaluated within a modeling framework. Furthermore, our model assumed that any given clinician would be at least equally content to care for a more complex patient, compared to a less complex one. Yet family physicians have an additional professional interest in caring for children as well as adults, and thus the substitution of less complex for more complex patients might not be straightforward for family practices. Additionally, new staff required for population care may require practices to attain higher levels of staffing than are widely prevalent or modeled here. Finally, our model included the HCC risk-adjustment approach used by Medicare and other payers. While common, this approach may be imperfectly related to primary care needs, which are driven in part by coexisting mental illness and by social and economic factors.

Conclusion

Our results highlight the need to understand at what point providers will receive sufficient incentives through capitated payments to switch from a visit-based to a team- and non-visit-based approach. Though our model estimated thresholds for making that shift based on net surplus, practices deciding whether to make the shift will consider a broader range of factors—including patient safety and outcomes, physician work-life balance, patient convenience, workflow, and the difficulties of changing practice models under fluctuating payment systems. Additionally, the percentage of capitation received may need to be accompanied by having multiple private payers paying a consistent capitated payment level for primary care. Hence, coordinating payer activity around a shared model might be critical to accelerating transformation. In any case, our findings suggest that high levels of capitated payment might be necessary to ensure that providing team- and non-visit-based care is financially sustainable for primary care practices.

NOTES

professionals/systems/primary-care/tpc-synthesis-report.pdf
18 To access the Appendix, click on the Appendix link in the box to the right of the article online.
what-is-the-current-state-of-the-art-and-how-can-it-be-improved