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BRIEF REPORT

The Effect of Bundled Payment on Emergency Department Use: Alternative Quality Contract Effects After Year One

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Abstract

Objectives: The objective was to identify the effect of the Alternative Quality Contract (AQC), a global payment system implemented by Blue Cross Blue Shield (BCBS) of Massachusetts in 2009, on emergency department (ED) presentations.

Methods: Blue Cross Blue Shield of Massachusetts claims from 2006 through 2009 for 332,624 enrollees whose primary care physicians (PCPs) enrolled in the AQC, and 1,296,399 whose PCPs were not enrolled in the AQC, were evaluated. A pre–post, intervention–control, propensity-scored difference-in-difference approach was used to isolate the AQC effect on ED visits. The analysis adjusted for age, sex, health status, and secular trends to compare ED use between the treatment and control groups.

Results: Overall, secular trends showed that the number of ED visits decreased slightly for both treatment and control groups. The adjusted analysis of the AQC group showed decreases from 0.131 to 0.127 visits per member/quarter, and the control group decreased from 0.157 to 0.152 visits per member/quarter. The difference-in-difference analysis showed the AQC had no statistically significant effect on total ED use compared to the control group.

Conclusions: In the first year of this AQC, we did not find evidence of change in aggregate ED use. Similar global budget programs may not alter ED use in the initial implementation period.

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As concern over health care spending grows, novel payment systems are increasingly being implemented by public and private payers to contain costs without compromising quality.[1–3] Global budgets, which reimburse provider organizations based on a prospective budget for each enrollee, are considered a strong method of controlling spending compared to shared savings systems that use a spending target, but do not place providers at financial risk. The effect of global budgets on emergency department (ED) use is not known.

Blue Cross Blue Shield (BCBS) of Massachusetts implemented the alternative quality contract (AQC), a global budget contract, in 2009. This contract is similar to pioneer accountable care organization contracts recently implemented by Medicare, which are intended to contain spending and improve quality.[4–6] The AQC is a global budget system where primary care provider groups are accountable for spending and receive bonuses for meeting quality benchmarks. BCBS initiated the AQC in its health maintenance organization (HMO) and point-of-service enrollee population. These enrollees are each required to designate a primary care physician (PCP). In 2009, seven physician organizations

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began participating in the AQC; this represented 321 primary care practices and more than 4,000 physicians. The details of the AQC have been previously published and an analysis of the first and second year reported that the AQC was effective at lowering total medical spending and improving quality.[7–9] The three primary features that distinguish the AQC from other provider contracts are the shared provider risk for overall health care spending of enrollees, performance bonuses up to 10% of the budget, and support from BCBS in quality improvement and budget management. In the first year of the AQC, the savings were achieved largely by referring patients to lower-cost providers as opposed to reductions in use. While designed to control spending, such a global budget system is not designed to hinder those with severe acute illness from seeking appropriate ED care. Instead, its purpose is to control spending by encouraging physician groups to use resources more efficiently. Nevertheless, spillover effects on ED use are possible—either with increased use due to poor primary care access or with decreased use due to improved management of ambulatory care. It is therefore imperative to evaluate the effect of such global budgets on ED utilization.

METHODS

Study Design

This was a pre–post, intervention–control, difference-in-difference approach to best evaluate the AQC effect on ED utilization. The study was reviewed by the University of Michigan institutional review board and met exempt status.

Study Setting and Population

The state of Massachusetts was the study setting; the study population was composed of BCBS enrollees of all ages. The time period evaluated was from January 2006 through December 2009 and included 1,634,514 members from 2,335,593 total HMO and point of service members. We excluded those members not continuously enrolled for at least 1 calendar year (701,079). All providers with BCBS patients were included, both those participating in the AQC and those not participating.

Study Protocol

The unit of analysis was the enrollee, and an ED visit was determined by Current Procedural Terminology (CPT) codes: 99281–99285. The dependent variable was the total number of ED visits per member per quarter. The preintervention period was from 2006 through 2008. The AQC went into effect in 2009 and this was the postintervention time period. BCBS enrollees designating PCPs in practices participating in the AQC were the intervention group. Enrollees with PCPs not assuming risk under the AQC were the control group.

To account for differences at the level of the individual between intervention and control groups, we controlled for age categories, interactions between age and sex, risk score, and secular trends. Risk scores were calculated by BCBS from current diagnoses, claims, and demographic information, similar to the diagnostic-cost group (DxCG) scoring system (Verisk Health, Eden Prairie, MN).[10] This risk score is similar to the DxCG scoring system employed by the Centers for Medicare and Medicaid Services for risk adjustment of payments to Medicare Advantage Plans. In this scoring system, claims with higher scores denote lower health status and higher expected utilization. Additionally, we included a health plan fixed effect to address differences in benefit design and clustered standard errors at the physician practice level to account for variation between group practices. Covariates included in our model were chosen carefully to account for known differences in health care use based on sex, age, and comorbidities. Time variables, as well as interaction between time and the AQC intervention, were included to control for any confounding temporal trends that may affect results.

Data Analysis

A multivariate linear model with propensity scores was analyzed at the enrollee-quarter level. The basic assumptions required for conducting linear regression were met (i.e., normality, homoscedasticity, linearity, and absence of strongly influential multicollinearity and outliers). The propensity scores used age, sex, and risk scores to balance individual traits between intervention and control groups. The model included independent indicator variables for the intervention, each quarter, the postintervention period, and interactions between each indicator and the intervention (see Data Supplement S1, available as supporting information in the online version of this paper, for further details). An interaction between the intervention and postintervention period indicators allowed us to isolate the effect of the AQC on ED use. Huber-White corrections were used to adjust standard errors for clustering of multiple observations at the level of the PCP practice.[11,12] All analyses used STATA software, version 11 (StataCorp, College Station, TX). Results are reported with two-tailed p-values, with no adjustment for multiple comparisons.

RESULTS

The individuals in the intervention (AQC) group were younger, were more likely to be male, and had more favorable (lower) risk scores compared to those in the control group. There were differences in ED use between groups prior to the AQC implementation. In the years 2006 through 2008 the adjusted average number of ED visits per enrollee per quarter for the AQC group was 0.067 and for the non-AQC group was 0.082 (Table 1).

Overall, secular trends showed ED use decreased similarly for both treatment and control groups. The adjusted analysis of the AQC group showed decreases from 0.131 to 0.127 visits per member/quarter, and for the control group, decreases from 0.157 to 0.152 visits per member/quarter. The difference-in-difference analysis showed the AQC had no effect on total ED use compared to the control group. The difference-in-difference analysis of each CPT code showed no statistically significant difference for the four most complex CPT codes, but there was a small increase in visits in the least complex 99281 visits (Table 2).

Table 1
Characteristics of the Intervention and Control Groups*

	Intervention Group (N = 380,142)		Control Group (N = 1,351,446)	
Characteristic	Before AQC (2006–2008)	After AQC (2009)	Before AQC (2006–2008)	After AQC (2009)
Age (yr)*, mean (range)	34.4 (15.8–53.0)	35.3 (16.8–53.8)	35.3 (16.9–53.7)	35.5 (16.7–54.3)
Sex (% female)	52.6	51.2	51.8	51
Health RISK SCORE† (mean)	1.08	1.16	1.11	1.16

AQC = alternative quality contract; PCP = primary care physician.
*Age is listed as the mean and 1 SD below and above the mean. The total number of patients in each group exceeds 1,634,514 because there were individuals with PCPs in each group for greater than one year between 2006 through 2008.
†The health risk score takes into account the health status of the enrollee. The score is calculated using the diagnostic-cost group (DxCG) scoring system (Verisk Health, Eden Prairie, MD). The score is derived by statistical analyses using national claims data, current-year diagnoses, and demographic information. The DxCG is similar to Medicare's Hierarchical Condition Category system, but more detailed and designed for younger persons.

Table 2
Comparison of ED Use in Aggregate and by CPT Code*

	Control (Non-AQC) Group (N = 1,296,399)		Intervention (AQC) Group (N = 332,624)		Between-group Comparison			
CPT Code	Before AQC (2006–2008)	After AQC (2009)	Before AQC (2006–2008)	After AQC (2009)	Control Pre–Post Difference	Intervention Pre–Post Difference	Difference in Difference	p-value
99281 (lowest complexity)	0.003	0.002	0.002	0.001	−0.001	−0.001	−0.000†	<0.000
99282	0.017	0.015	0.013	0.011	−0.004	−0.002	−0.001	0.082
99283	0.070	0.067	0.057	0.055	−0.003	−0.002	−0.000	0.829
99284	0.045	0.046	0.037	0.037	0.000	0.000	−0.000	0.945
99285 (highest complexity)	0.022	0.023	0.022	0.023	0.001	0.001	0.001	0.399
All ED visits	0.157	0.152	0.131	0.127	−0.005	−0.004	0.001	0.606

*All results represent ED visits per member per quarter. The AQC/intervention group represents those enrollees whose PCP participated in the AQC in 2009 and the non-AQC/control group comprised enrollees with primary care physicians who were not part of the AQC system.
†Results displayed are rounded to the thousands decimal place for ease in reporting.
AQC = alternative quality contract; CPT = Current Procedural Terminology; PCP = primary care physician.

DISCUSSION

This analysis shows that in the first year of a program bundling payments to PCPs, ED use did not change. This should be reassuring to critics of global payment systems concerned that such payment structures will prevent necessary emergency services. However, it also shows that, at least in the first year, primary care–based global budget strategies are not sufficient to divert low-acuity patients to alternative settings. In AQC years after 2009, BCBS has reported a decrease in low-acuity visits as a result of targeting this group specifically. It will be important to evaluate if rewarding PCPs based on reductions in ED visits for low-acuity problems such as medication refills or suture removal provides sufficient incentive to improve primary care clinic access.

The ED adds value to the health care system providing timely access to health care through its 24/7 model. This is invaluable for serious acute illness when the rapidity with which care is provided can improve the outcomes for individuals. For this reason, these results are promising because ED use was not rationed under the AQC payment model. Although the promise that enhanced continuity and quality incentives would decrease low-acuity ED use did not occur in the first year, it will also be important to monitor if our null finding in ED use continues in subsequent years of the AQC.

LIMITATIONS

Selection into the intervention group was nonrandom; therefore, the usual limitations of observational studies that concern the validity of the counterfactual apply. However, preintervention trends did not differ between treatment and control groups, suggesting that differences in the outcome were attributable to the intervention. One confounder may be varying exposure to the intervention, but a sensitivity analysis including only the individuals continuously enrolled for the entire evaluation time (48 months) yielded similar results, suggesting that this is unlikely.

The study population only included members enrolled in a BCBS HMO or point-of-service program, and

therefore our findings may not be generalizable to preferred-provider or indemnity plans. The analysis was performed at the visit level, not the individual level; therefore, our analysis does not account for individuals who may have had multiple visits. Also the study population was young, so the Medicare population may have different results.

Another limitation is that each AQC varied slightly by practice group. Although each was similar in its global payment model using financial incentives to achieve quality measures, this study did not evaluate the details of each contract nor changes in ED use individually. It is possible that some groups were able to reduce nonurgent ED use or that other groups saw increased ED use, while the overall AQC cohort effect was one of no significant change. In addition, our analysis covers only the first year of AQC implementation. The intervention was derived with intent to have a positive effect over the course of the 5-year contract, and therefore results may differ in subsequent years of the AQC. However, our analysis helps understand what to expect in the initial year of similar multiyear global budget systems.

Although the ED can be an expensive health care venue compared to a clinic, PCP global payment systems are not directly targeted to change ED utilization. Global budget incentives should stimulate groups to actively avoid unnecessary ED visits by improving urgent care access and care management overall. Our analyses were designed to look at overall ED use and not to discern effects on truly emergent versus nonemergent uses of the ED. CPT codes are not intended to define emergent or nonemergent use of the ED, but showed that more complex visits (99282–99285) showed no significant change, and the least complex (99281) visits showed a very small, but statistically significant increase. Additionally, critical care and observation codes were not included in our model and thus are not captured in our analysis. Critical care codes were omitted to avoid redundancy, as critical care billing can be separate from the codes analyzed for private insurers like BCBS, and any changes in observation admissions should have been identified in previously reported assessments of the AQC.

In year 1 of the AQC, while the global budget incentivizes careful resource use overall, no benchmarks specifically rewarded or penalized PCPs for enrollee use of the ED. This highlights a limitation of analyzing ED use based only on the AQC, despite our efforts to isolate its effect. As with the aggregate analysis, the effect may grow over time as the groups adapt to AQC incentives.

CONCLUSIONS

In the first year of this global budget payment model, we did not find evidence of change in aggregate ED use. Future research of similar policies will be important to assure appropriate access for patients in need of ED services. This may help to coordinate acute unscheduled care to optimize limited financial resources.

References

1. Antos J, Bertko J, Chernew M, et al. Bending the curve: effective steps to address long-term health-care spending growth. Am J Manag Care. 2009; 15:676–80.
2. Miller HD. From volume to value: better ways to pay for health care. Health Aff (Millwood). 2009; 28:1418–28.
3. American Hospital Association. Bundled Payment: An AHA Research Synthesis Report. Available at: http://www.aha.org/research/cor/bundled-payment/index.shtml. Accessed Jun 28, 2013.
4. Berwick DM. Making good on ACOs' promise–the final rule for the Medicare shared savings program. N Engl J Med. 2011; 365:1753–6.
5. Correia EW. Accountable care organizations: the proposed regulations and the prospects for success. Am J Manag Care. 2011; 17:560–8.
6. Goldsmith J. Accountable care organizations: the case for flexible partnerships between health plans and providers. Health Aff (Millwood). 2011; 30:32–40.
7. Chernew ME, Mechanic RE, Landon BE, Safran DG. Private-payer innovation in Massachusetts: the 'alternative quality contract'. Health Aff (Millwood). 2011; 30:51–61.
8. Song Z, Safran DG, Landon BE, et al. Health care spending and quality in year 1 of the alternative quality contract. N Engl J Med. 2011; 365:909–18.
9. Song Z, Safran DG, Landon BE, et al. The 'alternative quality contract', based on a global budget, lowered medical spending and improved quality. Health Aff (Millwood). 2012; 31:1885–94.
10. Pope GC, Kautter J, Ellis RP, et al. Risk adjustment of Medicare capitation payments using the CMS-HCC model. Health Care Financ Rev. 2004; 25:119–41.
11. Huber P. The behavior of maximum likelihood estimates under non-standard conditions. In: Le Cam LM, Neyman J, eds. Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability. Berkeley, CA: University of California Press, 1967:221–33.
12. White H. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica. 1980; 48:817–30.

Supporting Information

The following supporting information is available in the online version of this paper:

Data Supplement S1. Supplementary Methods Appendix.