To limit the role of geographic variation, we analyzed charges within counties. While Fresno County had the smallest range of charges, the lowest and highest charges still differed by a remarkable $46 204.

Finally, when considering the explanatory power of the covariates, we found that 67.8% of the variation in charges could be predicted by patient-level and hospital-level factors. The remaining 32.2% of the variation was unexplained.

Comment. Our first result of the median charge for treating "uncomplicated" appendicitis of $33 611 would certainly startle many patients. Given estimates that 60% of bankruptcies in the United States involve catastrophic medical expenses,[7] these data should alarm those making decisions about our society's ability to obtain medical care without financial catastrophe.

A patient with severe abdominal pain is in a poor position to determine whether his or her physician is ordering the appropriate blood work, imaging, or surgical procedure. Price shopping is improbable, if not impossible, because the services are complex, urgently needed, and no definitive diagnosis has yet been made.[8] In our study, even if patients did have the luxury of time and clinical knowledge to "shop around," we found that California hospitals charge patients inconsistently for what should be similar services as defined by our relatively strict definition of uncomplicated appendicitis.

In order to consider health care a good that abides by traditional market theory, both consumers and producers should have a reasonable sense of how much the good costs. Yet health care providers are often unaware of what their recommendations cost.[9] Consumers (ie, patients) with adequate insurance are shielded from charges, while the underinsured or uninsured see staggeringly high numbers without understanding what the charges mean, let alone if they are appropriate. Our findings suggest that there are inherent limitations of market theory within the health care system, and much work remains to be done to allow consumers to fulfill the role of a true consumer in the health care marketplace.

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1. Herzlinger RE, Parsa-Parsi R. Consumer-driven health care: lessons from Switzerland. *JAMA*. 2004;292(10):1213-1220.
2. Pacific Business Group on Health. Hospital costs in California: wide variations in charges raise questions on pricing policies. San Francisco, CA: Pacific Business Group on Health. http://www.pbgh.org/news-and-publications/pbgh-articles-a-publications. Accessed January 2011.
3. California Office Statewide Health Planning and Development (OSHPD). 2009 Patient Discharge Data: Public Data Set. http://www.oshpd.ca.gov/HID/Products/PatDischargeData/PublicDataSet/index.html. Accessed February 2011.
4. Crandall M, Shapiro MB, Worley M, West MA. Acute uncomplicated appendicitis: case time of day influences hospital length of stay. *Surg Infect (Larchmt)*. 2009;10(1):65-69.
5. Horattas MC, Guyton DP, Wu D. A reappraisal of appendicitis in the elderly. *Am J Surg*. 1990;160(3):291-293.
6. Finkler SA. The distinction between cost and charges. *Ann Intern Med*. 1982;96(1):102-109.
7. Shih A, Davis K, Schoenbaum S, Gauthier A, Nuzum R, McCarthy D. Organizing the U.S. Health Care Delivery System for High Performance. *The Commonwealth Fund*. http://www.commonwealthfund.org/Publications/Fund-Reports/2008/Aug/Organizing-the-U-S--Health-Care-Delivery-System-for-High-Performance.aspx. Accessed January 2011.
8. Ginsburg PB. Shopping for price in medical care. *Health Aff (Millwood)*. 2007;26(2):w208-w216.
9. Allan GM, Lexchin J, Wiebe N. Physician awareness of drug cost: a systematic review. *PLoS Med*. 2007;4(9):1486-1496.

Health Care Reform

Effect of Physician Payment Disclosure Laws on Prescribing

With the enactment of the Physician Payments Sunshine Provision of the Affordable Care Act, pharmaceutical manufacturers are now required to disclose certain payments made to physicians—for example, payments for consulting, honoraria, gifts, or travel.[1] This law is based on the premise that transparency in these transactions is of public importance and that disclosure acts as a deterrent against quid pro quo exchanges; physicians may be reluctant to accept large payments if these payments are publicly known and perceived as compensation for prescribing certain therapies.[2,3]

To predict deterrence effects of the federal sunshine law, we studied the experience of 2 states, Maine and West Virginia, that previously implemented sunshine laws. We examined the effect of these laws on the prescribing of HMG-CoA [(3-hydroxy-3-methylglutaryl)–Coenzyme A] reductase inhibitors (statins) and selective serotonin reuptake inhibitors (SSRIs), 2 therapeutic classes in which marketing plays an important role because the therapies within each class are pharmacologically and clinically highly sub-

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Table. Effect of Disclosure Laws on Brand Prescribing and Expenditures[a]

Type of Effect	Maine		West Virginia	
	Compared With New Hampshire	Compared With Rhode Island	Compared With Kentucky	Compared With Delaware
On percentage of claims that are for brands				
Statins	−0.81 (−1.22 to −0.39)[b]	−5.29 (−5.45 to −5.13)[c]	0.26 (−12.82 to 13.34)	−2.62 (−4.74 to −0.49)[b]
SSRIs	3.73 (3.20 to 4.25)[c]	−0.72 (−1.18 to −0.26)[b]	1.09 (−4.13 to 6.31)	−0.53 (−0.77 to −0.28)[b]
On out-of-pocket prescription costs ($ per 30-d supply)				
Statins	0.77 (−1.94 to 3.48)	0.77 (−3.03 to 4.58)	−2.64 (−9.41 to 4.16)	−2.12 (−8.50 to 4.27)
SSRIs	0.02 (−0.51 to 0.55)	−0.69 (−1.88 to 0.51)	−1.78 (−5.72 to 2.15)	−3.01 (−14.52 to 8.49)
On out-of-pocket costs + insurer payments ($ per 30-d supply)				
Statins	−2.08 (−7.19 to 3.02)	−6.33 (−13.87 to 1.21)	3.06 (−23.39 to 29.52)	−0.11 (−13.83 to 13.61)
SSRIs	0.08 (−0.05 to 0.22)	−2.74 (−4.46 to −1.03)[b]	0.73 (−18.23 to 19.69)	−0.99 (−14.44 to 12.45)

Abbreviation: SSRI, selective serotonin reuptake inhibitors.

[a] Numbers in parentheses indicate the 95% CI. All regressions include dummy variables for exclusivity expiration of brand drugs, dummy variables for seasonality of state claims, state fixed effects, and year fixed effects. Standard errors are clustered by state. There were 156 observations in each set of comparisons.

[b] $P < .05$.

[c] $P < .01$.

stitutable. We hypothesized that, to the degree that physicians were influenced by industry payments to overprescribe branded therapies—and disclosure deterred physicians from accepting these payments—disclosure laws would lead physicians to decrease prescribing of branded statins and SSRIs.

Methods. To estimate the effect of the disclosure laws, we used a differences-in-differences or interrupted time-series with control approach, comparing prescribing in states that enacted these laws with states that did not.[4,5] We compared the experience of Maine, which enacted its disclosure law in May 2004, with that of New Hampshire and Rhode Island, demographically similar states that did not enact these laws. We also compared the experience of West Virginia, which enacted its disclosure law in March 2004, with that of Kentucky and Delaware. In our analysis, we looked at the change in prescribing in the disclosure state, before and after the disclosure law, and compared it with the change in prescribing in comparison states over the same period. A difference in prescribing in the disclosure state relative to comparison states would potentially reflect the impact of the disclosure law.

We obtained information about state sunshine laws from the legal databases Westlaw and LexisNexis (I. Gorlach and G. Pham-Kanter, unpublished data, 2012). We used prescription drug claims from the Thomson Reuters Marketscan Claims and Encounters Database, one of the largest collections of claims of employer-insured individuals, for the period July 2003 to March 2009. We used state demographic information (eg, population, percentage of high school graduates, per capita personal income) from the US Census Bureau's 2002 American Community Survey[6] to identify comparison states. In our analysis, we included, as controls, indicators of whether a brand had patent/market exclusivity, obtained from the US Food and Drug Administration (FDA) Orange book.

Results. In Maine, the effect of the disclosure law on the use of branded statins was small (**Table**). Depending on the control state, the law was associated with a 0.8 percentage point reduction (New Hampshire) to a 5.3 percentage point reduction (Rhode Island) in the percentage of statin prescriptions that were for branded therapies. Thus, whereas the percentage of branded statins declined by 45.3% in the nondisclosure state of Rhode Island during this period, the decline in branded prescriptions in the disclosure state of Maine was 50.6% (45.3% + 5.3%). Overall, there were negligible to small effects of the disclosure laws in Maine and West Virginia for both statins and SSRIs.

In the Table, we also report the net effect of the disclosure law on out-of-pocket prescription costs for patients and on total prescription expenditures, including insurer payments. The changes we observed in switching from branded therapies to generics did not translate into statistically significant decreases in out-of-pocket prescription costs or overall prescription expenditures.

Comment. One reason we observed minimal switching from brands may be that the reporting that is required does not capture much of the marketing and promotional efforts that can influence physicians. Another reason may be that the reporting categories were too aggregated to distinguish between legitimate and questionable payments. Finally, although these payments were disclosed to state agencies, payment information was not disseminated to the public in an accessible way.

Our analysis has several limitations. First, there may have been other changes happening at the same time as the disclosure laws that could have led to similar net effects, although we are not aware of any such changes. Second, our results are based on whether the comparison states are good comparisons. Although we matched on demographic characteristics, control states may differ from disclosure states in nondemographic attributes that affect prescribing be-

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havior. Third, the use of branded therapies may be proportionately greater in our sample of individuals, who are privately insured, than in the general population. Finally, our outcome measures may not be sufficiently sensitive to detect benefits of the disclosure laws.

Overall, our results suggest that the Physician Payments Sunshine Provision in the federal health care law may have a limited effect on prescribing and on expenditures.

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1. Pub L No. 111-148, 124 Stat 199.
2. Ross JS, Lackner JE, Lurie P, Gross CP, Wolfe S, Krumholz HM. Pharmaceutical company payments to physicians: early experiences with disclosure laws in Vermont and Minnesota. *JAMA*. 2007;297(11):1216-1223.
3. Rosenthal E. I disclose . . . nothing. http://www.nytimes.com/2012/01/22/sunday-review/hard-truths-about-disclosure.html. Accessed January 22, 2012.
4. Shadish WR, Cook TD, Campbell DT. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference.* 2nd ed. Belmont, CA: Wadsworth; 2002.
5. Cameron AC, Trivedi PK. *Microeconometrics: Methods and Applications*. New York, NY: Cambridge University Press; 2005.
6. http://www.census.gov/acs/www/. US Census Bureau Web site. Accessed November 30, 2011.

Characteristics of "Complex" Patients With Type 2 Diabetes Mellitus According to Their Primary Care Physicians

Despite recent trends toward improved risk factor control, most patients with type 2 diabetes mellitus still do not achieve all evidence-based management goals,[1] suggesting that new approaches are needed to further improve the quality of diabetes care. Patient complexity is a concept that is defined to describe the multiple factors that contribute to the challenges associated with clinical care.[2] Because primary care physicians (PCPs) have a unique perspective on type 2 diabetes management, we hypothesized that greater insight into PCP-defined complexity among patients with type 2 diabetes could help inform strategies for improving diabetes primary care.

Methods. We conducted a cross-sectional analysis of PCP-defined patient complexity by asking 40 PCPs from the Massachusetts General Primary Care Practice-Based Research Network, Boston, to review randomly generated lists of 120 of their own patients and to designate which of these patients "in their view" they considered complex.[3] Among the patients with type 2 diabetes, we examined the relative impact of diabetes-related vs other more general medical conditions on PCP-defined complexity. For each comorbid diagnosis that was significantly associated with complexity in univariate analysis, we constructed a separate logistic regression model and reported the relative odds of PCP-defined complexity after adjusting for age, sex, glycemic control, and patient clustering by PCP. The study was approved by the institutional review board of Massachusetts General Hospital, Boston.

Results. The PCPs reviewed 327 patients with type 2 diabetes (mean [SD] number of patients per PCP, 8.4 [5.1]; range, 2-25 patients per PCP) and designated 68.2% of these patients as complex. The PCP-defined complex patients with diabetes were 3 years older and more often female than noncomplex patients with diabetes but had similar race/

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