

What Does It Cost Physician Practices To Interact With Health Insurance Plans?

A new way of looking at administrative costs—one key point of comparison in debating public and private health reform approaches.

by **Lawrence P. Casalino, Sean Nicholson, David N. Gans, Terry Hammons, Dante Morra, Theodore Karrison, and Wendy Levinson**

ABSTRACT: Physicians have long expressed dissatisfaction with the time they and their staffs spend interacting with health plans. However, little information exists about the extent of these interactions. We conducted a national survey on this subject of physicians and practice administrators. Physicians reported spending three hours weekly interacting with plans; nursing and clerical staff spent much larger amounts of time. When time is converted to dollars, we estimate that the national time cost to practices of interactions with plans is at least \$23 billion to \$31 billion each year. [*Health Affairs* 28, no. 4 (2009): w533–w543 (published online 14 May 2009; 10.1377/hlthaff.28.4.w533)]

ADMINISTRATIVE COSTS ARE HIGH IN U.S. HEALTH CARE, although there is disagreement over their causes and the benefits that may be provided by the activities that generate them.¹ Costs incurred by physicians' offices are an important contributor to overall administrative costs; interactions with health insurance plans appear to be responsible for a large proportion of physicians' administrative costs.² However, little information exists about the costs to physician practices of interactions with health plans.

We present results from a national survey of physicians and medical group administrators inquiring about time spent interacting with health plans, specifically looking at prior authorization requirements, pharmaceutical formularies, claims, credentialing, contracting, and data on quality. In addition to generating a na-

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tional estimate of the time—and the dollar value of the time—spent on these interactions, the survey data provide the first national information available on costs by the type of interaction and by the size and specialty type of physician practice.

Study Data And Methods

■ **Survey sample.** Beginning with the 2006 American Medical Association (AMA) Physician Masterfile, our sample excluded physicians employed by the federal government, academic medical centers, or health maintenance organizations (HMOs) and physicians likely to spend most of their time in hospitals (such as emergency department physicians) or to have many self-pay patients (such as plastic surgeons). We then randomly selected 750 physicians from those identified by the Masterfile as working in solo or two-physician practices, and 560 physicians from those working in practices of three or more, for a total of 1,310 physicians. Selection was stratified by specialty type—primary care (including family physicians, general internists, and general pediatricians), medical specialists, and surgical specialists—for a total of 730 primary care physicians and 580 specialists.

From the Medical Group Management Association (MGMA) Universe national file of 39,944 medical groups (the file includes information on both MGMA members and nonmembers), we selected the administrators for 629 groups, stratified by specialty.³

■ **Survey instrument.** We designed three survey instruments.⁴ The “physician survey” inquired about time spent on specific categories of interaction by the physician and by nursing staff working directly with that physician: registered nurses (RNs), medical assistants (MAs), or licensed practical nurses (LPNs). The “administrator survey” inquired about time spent by nursing and clerical staff providing practicewide functions; it was sent to administrators sampled from the MGMA group-practice database. Because physicians in solo and two-physician practices typically act as administrators, we developed a combined “physician-administrator survey,” which was sent to 375 physicians randomly selected from the sample of 750 physicians in one-to-two-physician practices; the other 375 physicians in practices of this size received the physician survey. Survey questions asked about the minutes per typical day spent on each type of interaction.⁵

Surveys were designed based on review of previous research and on twenty-seven interviews conducted with physicians, practice administrators, and health plan executives. The surveys were then pilot-tested on fifteen physicians and administrators from different U.S. regions and were revised. Surveys were mailed in late July 2006 and again to nonrespondents in September and November.⁶

■ **Statistical analysis.** We categorized each physician and each administrator as belonging to one of nine size/specialty practice categories.⁷ We then calculated the mean time spent per day, week, and year for each type of interaction by physicians and the time spent per physician in the practice by each type of staff.⁸ We did so by adding the mean hours spent per physician calculated from the physician survey to

the mean hours spent per physician calculated from the administrator survey. We converted time spent to dollars per year for physicians and for each type of staff, using external data on annual compensation, including benefits, and annual time worked.⁹ We conducted z-tests of differences between pairs of weighted means.¹⁰

Although we trimmed extreme outliers, the mean values in our data were increased by respondents who reported spending large amounts of time interacting with health plans. For the most important estimates, we therefore present median as well as mean values.

The surveys and cover letter repeatedly and explicitly asked respondents to report time spent interacting with health plans; however, we were concerned that they would not be able to separate time spent on billing/claims interactions with health plans from billing/claims interactions with Medicare and Medicaid. Therefore, to be conservative, we reduced the claims/billing time estimates presented by 38.4 percent—the percentage of gross charges attributable to these payers—from the data reported.¹¹ This adjustment was not made for other types of interactions, because they are rare or nonexistent for traditional Medicare and Medicaid (prior authorization, contracting), likely to involve small amounts of time (quality data), or require physicians to interact with private health plans (in Medicare Part D and Medicare and Medicaid managed care programs).

The study was approved by institutional review boards at Cornell, the University of Chicago, and the University of Toronto.

Study Results

Of the 1,939 physicians and administrators in the sample, 142 were ineligible because they were no longer practicing, were in an excluded category, or were no longer at their practice address. Of the remaining 1,797 people, 895 returned completed surveys, for a raw response rate of 49.8 percent. The adjusted response rate was 57.5 percent; this rate was 60.1 percent for physicians, 51.5 percent for physician-administrators, and 56.6 percent for administrators.¹²

On average, physicians reported spending forty-three minutes per workday—equivalent to three hours per week and nearly three weeks per year—on interactions with health plans (Exhibit 1). The median values were 28 minutes per day and 1.9 hours per week. Primary care physicians spent significantly more time (mean = 3.5 hours weekly) than medical specialists (2.6 hours) or surgical specialists (2.1 hours).

Of RN/MA/LPN time, 3.8 hours was spent per physician per day interacting with health plans (19.1 hours per physician per week). Note that this is not necessarily time spent by one person, but rather time spent per physician by all nursing staff in the practice. Median values were 1.8 hours per physician per day and 9.1 hours per week (median values not shown). Clerical staff spent 7.2 hours per physician per day—for a total of 35.9 hours per week. Median values were 5.9 hours per physician per day and 29.8 hours per week. Staff time did not vary systemati-

EXHIBIT 1
Mean Hours Per Physician Per Week Or Per Year For All Types Of Interactions, By Practice Specialty, Type Of Staff, And Practice Size, 2006

	Hours per week				p value		
	1-2 MDs	3-9 MDs	10+ MDs	Weighted mean	PCP vs. medical specialist	Medical vs. surgical specialist	PCP vs. surgical specialist
Physicians							
PCPs	4.3	3.3	2.8	3.5	0.007	0.18	<0.001
Medical specialists	3.0	2.7	2.3	2.6			
Surgical specialists	1.9	2.3	2.1	2.1			
Nursing staff^a							
Primary care	14.1	22.0	22.5	19.5	0.95	0.44	0.40
Medical specialty	11.6	25.4	21.7	19.7			
Surgical specialty	11.7	23.1	17.9	17.5			
Clerical staff							
Primary care	45.4	31.3	25.7	34.4	0.57	0.94	0.26
Medical specialty	39.6	46.5	28.8	37.7			
Surgical specialty	40.1	41.8	27.5	38.2			
Senior administrators							
Primary care	4.2	1.7	0.5	2.2	0.86	0.40	0.31
Medical specialty	3.9	2.5	0.8	2.3			
Surgical specialty	3.0	1.0	1.0	1.8			
Hours per year							
Lawyer/accountant^b							
Primary care	5.9	1.0	6.1	4.1	0.28	0.23	0.29
Medical specialty	3.0	5.3	48.4	20.6			
Surgical specialty	0.7	1.8	5.3	2.1			
All practices							
	Hours per week				1-2 vs. 3-9 MDs	3-9 vs. 10+ MDs	1-2 vs. 10+ MDs
Physicians	3.5 (0.19)	2.95 (0.26)	2.6 (0.29)	3.0 (0.14)	0.11	0.36	0.012
Nursing staff	13.0 (0.65)	22.9 (1.86)	21.55 (3.00)	19.1 (1.12)	<0.001	0.70	0.005
Clerical staff	43.0 (2.35)	36.5 (2.88)	26.8 (3.53)	35.9 (1.68)	0.080	0.034	<0.001
Senior administrators	3.8 (0.46)	1.7 (0.26)	0.7 (0.12)	2.1 (0.19)	<0.001	<0.001	<0.001
Hours per year							
Lawyer/accountant ^b	4.0 (2.3)	2.0 (0.7)	17.5 (11.2)	7.2 (3.3)	0.41	0.16	0.24

SOURCE: Authors' calculations based on responses to the survey administered.

NOTES: Standard errors of the mean (in parentheses) are available for all values in this exhibit; see Supplemental Exhibit 1, online at <http://content.healthaffairs.org/cgi/content/full/hlthaff.28.4.w533/DC2>. PCP is primary care physician.

^a Includes registered nurses, medical assistants, and licensed practical nurses.

^b Includes consultants.

cally by specialty.

The average physician in a solo or two-person practice spent 3.5 hours weekly interacting with health plans (4.3 hours for primary care physicians, data not shown)—significantly more than for physicians in practices with ten or more phy-

sicians (2.6 hours; Exhibit 1). Time spent by clerical staff and by administrators per physician was also significantly higher in smaller practices, but nursing staff time per physician was significantly lower in the smallest practices, primarily because of less time spent on authorizations (data not shown).

On average, physicians spent more time dealing with formularies than on any other interaction (Exhibit 2).¹³ Primary care physicians spent significantly more time (1.7 hours weekly) than medical specialists (1.2 hours; $p = 0.003$) or surgeons (0.7 hours; $p < 0.0001$). Nursing staff spent 13.1 hours per physician per week on authorizations—far more than any other type of staff and far more than nurses

EXHIBIT 2
Mean Hours Per Physician Per Week Spent On Interactions With Health Plans, By Type Of Interaction, Specialty Of Practice, And Type Of Staff, 2006

	Authorization	Formulary	Claims/ billing	Credentialing	Contracting	Quality data
Physicians						
PCPs	1.1	1.7	0.5	0.04	0.05	0.06
Medical specialists	0.8	1.2	0.5	0.08	0.04	0.01
Surgical specialists	0.7	0.7	0.7	0.08	0.06	0.01
Nursing staff^a						
Primary care	13.1	3.8	2.1	0.01	0.00	0.02
Medical specialty	13.2	4.0	2.6	0.03	0.00	0.01
Surgical specialty	12.9	2.4	2.8	0.03	0.00	0.00
Clerical staff						
Primary care	5.6	0.00	27.1	2.1	0.00	0.17
Medical specialty	5.6	0.00	29.8	1.9	0.00	0.02
Surgical specialty	8.5	0.00	28.7	1.9	0.00	0.15
Senior administrators						
Primary care	0.00	0.00	2.4	0.01	0.13	0.08
Medical specialty	0.00	0.00	2.2	0.01	0.12	0.03
Surgical specialty	0.00	0.00	1.7	0.01	0.16	0.08
Lawyer/accountant^b						
Primary care	0.00	0.00	0.00	0.00	0.08	0.00
Medical specialty	0.00	0.00	0.00	0.00	0.42	0.00
Surgical specialty	0.00	0.00	0.00	0.00	0.04	0.00
All practices						
Physicians	1.0 (0.06)	1.3 (0.07)	0.6 (0.06)	0.06 (0.01)	0.05 (0.01)	0.04 (0.01)
Nursing staff	13.1 (0.99)	3.6 (0.17)	2.3 (0.18)	0.02 (0.01)	0.00	0.01 (0.01)
Clerical staff	6.3 (0.81)	0.00	28.0 (1.2)	2.03 (0.21)	0.00	0.14 (0.03)
Senior administrators	0.00	0.00	2.2 (0.22)	0.01 (0.00)	0.13 (0.01)	0.07 (0.02)
Lawyer/accountant	0.00	0.00	0.00	0.00	0.15 (0.07)	0.00

SOURCE: Authors' calculations based on responses to the survey administered.

NOTES: Standard errors of the mean (in parentheses) are available for all values in this exhibit; see Supplemental Exhibit 2, online at <http://content.healthaffairs.org/cgi/content/full/hlthaff.28.4.w533/DC2>. PCP is primary care physician.

^aIncludes registered nurses, medical assistants, and licensed practical nurses.

^bIncludes consultants.

spent on any other type of interaction. Little time was spent submitting data on quality or reviewing quality data provided by health plans (Exhibit 2).

When time is converted to dollars, practices spent an average of \$68,274 per physician per year interacting with health plans (Exhibit 3). The median value was \$51,043. Although per physician costs are lower in practices of ten or more physicians, there was not a statistically significant difference in costs by practice size. Primary care practices spent \$64,859 annually per physician—nearly one-

EXHIBIT 3
Mean Dollar Value Of Hours Spent Per Physician Per Year For All Types Of Interactions, By Practice Specialty And Size, 2006

	1-2 MDs	3-9 MDs	10+ MDs	Weighted mean
Total per practice				
Primary care	\$72,675	\$63,611	\$57,480	\$64,859
Medical specialty	70,788	87,566	78,553	78,913
Surgical specialty	61,187	76,429	59,866	66,954
Physician time				
PCPs	16,864	12,858	11,118	13,691
Medical specialists	23,083	20,850	18,014	20,497
Surgical specialists	15,197	18,091	16,814	16,669
Nursing staff time^a				
Primary care	16,079	25,142	25,618	22,254
Medical specialist	13,279	29,000	24,731	22,449
Surgical specialist	13,328	26,391	20,426	19,935
Clerical staff time				
Primary care	31,666	21,833	17,918	23,980
Medical specialist	27,595	32,411	20,038	26,279
Surgical specialist	27,977	29,118	19,180	26,650
Senior administrative time				
Primary care	6,299	3,474	991	3,697
Medical specialist	5,939	3,705	1,254	3,496
Surgical specialist	4,466	2,298	1,865	3,082
Lawyer/accountant time^b				
Primary care	1,767	304	1,835	1,237
Medical specialist	892	1,600	14,515	6,192
Surgical specialist	219	531	1,582	618
All practices				
MD	17,817 (1,024)	15,670 (1,380)	13,798 (1,593)	15,767 (769)
Nursing staff	14,897 (745)	26,225 (2,121)	24,314 (3,402)	21,796 (1,279)
Clerical staff	30,014 (1,639)	25,632 (2,004)	18,636 (2,461)	25,040 (1,168)
Senior administrative	5,829 (694)	3,269 (405)	1,235 (196)	3,522 (287)
Lawyer/accountant ^b	1,249 (694)	626 (194)	4,455 (3,351)	2,149 (999)
Total per practice cost	69,805 (2,954)	71,422 (4,860)	62,438 (7,262)	68,274 (2,934)

SOURCE: Authors' analysis based on survey responses and on data from the U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment and Wages, May 2006; American Medical Association, *Physician Socioeconomic Statistics*, 2003 ed. (for physician work weeks); Medical Group Management Association 2007 Cost Survey; and Sullivan Cotter, *2006 Physician Compensation and Productivity Survey Report*.

NOTES: Standard errors (in parentheses) are available for all values in this exhibit; see Supplemental Exhibit 3, online at <http://content.healthaffairs.org/cgi/content/full/hlthaff.28.4.w533/DC2>. PCP is primary care physician.

^a Includes registered nurses, medical assistants, and licensed practical nurses.

^b Includes consultants.

third of the income plus benefits of the average primary care physician (median spending for a primary care practice: \$47,707). Practices comprising primarily medical specialists and surgeons spent \$78,913 and \$66,954 per physician, respectively. In comparing the amounts spent across specialties, one should keep in mind that the hourly compensation for specialists is much higher than that for primary care physicians.

The total cost of practices' interactions with health plans cannot be precisely estimated using our data, because not all physician categories were included in the sample. An approximate calculation can be made by multiplying the number of physicians in U.S. office-based practice by the \$68,274 per physician annual cost we found. The AMA lists 560,118 U.S. physicians in office-based practice in 2006, but this figure likely is approximately 19 percent higher than the actual number.¹⁴ Reducing the AMA number of physicians by 19 percent results in an estimate of 453,696 office-based physicians; multiplying this number by \$68,274 results in an estimate of \$31.0 billion as the total annual cost to physician practices of interacting with health plans (\$23.2 billion if the median per physician value is used). This estimate does not include costs for interaction-related equipment, supplies, telephone, fax, or office space or for time spent by nurse practitioners (NPs) and physician assistants (PAs) interacting with health plans.

Surveys asked respondents to state, on a five-point scale ranging from "decreased a lot" to "increased a lot," the extent to which they believed their practice's costs of interacting with health plans had changed over the prior two years. Forty-one percent of respondents stated that costs had increased a lot; 36.4 percent, that they had somewhat increased (Exhibit 4).

EXHIBIT 4
Perceptions Of Change In The Cost To Physician Practices Of Interacting With Health Plans, 2006

	During the past two years, the costs of dealing with health plans have										Mean score
	Decreased a lot		Somewhat decreased		Not changed much		Somewhat increased		Increased a lot		
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Physicians	7	1.1	19	3.0	92	14.4	228	35.6	294	45.9	4.2
Administrators	6	2.8	15	6.9	52	23.9	84	38.5	61	28.0	3.8
Total	13	1.5	34	4.0	144	16.8	312	36.4	355	41.4	4.1
Aggregated total	47 ^a	5.5 ^a			144	16.8	667 ^b	77.7 ^b			

SOURCE: Authors' analysis based on responses to the survey.

NOTE: Standard errors for all values are available in Supplemental Exhibit 4, online at <http://content.healthaffairs.org/cgi/content/full/hlthaff.28.4.w533/DC2>.

^aApplies to "Decreased a lot" and "Somewhat decreased."

^bApplies to "Somewhat increased" and "Increased a lot."

Discussion And Policy Implications

Health plans claim to have taken steps to reduce the administrative burden they place on physicians; our data suggest that physicians continue to be discontented with this burden.¹⁵ The average physician reports spending nearly three weeks per year on these interactions (nearly two weeks if the median value is used); twenty-three weeks per physician per year are spent by nursing staff, and forty-four weeks, by clerical staff. A small fraction of this time—two hours per year by the average physician, and little more by their staff—is devoted to providing quality data to health plans or to reviewing quality data generated by plans about the physicians' practice. Primary care physicians, especially those in small practices, spend larger amounts of time interacting with health plans than physicians in other specialties.

■ **Comparison with prior research.** Three previous studies provided estimates of physicians' administrative costs, but the first was conducted in 1995, the second relied heavily on the 1995 study and does not separate overall administrative costs from the costs of dealing with health plans, and the third relied heavily on a small sample of California practices.¹⁶ Our survey is recent; it is the first national survey to ask directly about time spent by nonphysician staff interacting with health plans and the first to provide data by type of interaction, type of staff, specialty, and practice size.

The two prior studies that provide information on the time spent by physicians on interactions with health plans found results similar to our estimate of 3.0 hours per week. The 1995 survey found that physicians spent 3.0 hours a week on "insurance-related matters" comparable to those included in our study.¹⁷ Data from the small California-based study suggest that physicians spend 3.1 hours per week on these matters.¹⁸

A study conducted by Julie Sakowski and colleagues focused intensively on one very large multispecialty medical group and estimated that physicians spent thirty-five minutes per day (compared to our mean estimate of forty-three minutes and median estimate of twenty-eight minutes) on a set of activities similar to those included in our study.¹⁹ As in our study, physicians spent the most time dealing with formularies, and the next most time on authorizations.

■ **Study limitations.** Our study has several limitations. First, although the physicians categories surveyed represent two-thirds of all physicians engaged in U.S. patient care, we did not include all categories of physicians. If physicians not included have lower-than-average costs of interacting with health plans, our per physician estimate will be too high. On the other hand, our total estimated cost may be too low: it did not include costs for the approximately 66,000 U.S. physicians classified as hospital staff, for the 97,000 U.S. residents and fellows, or for the staff working with these 163,000 physicians. Our estimate also did not include costs for health plan interaction-related equipment, supplies, telephone, fax, office space, or time spent by

NPs and PAs.

Second, our response rate was 58 percent. Recent work suggests that significant nonresponse bias is unlikely in physician surveys with response rates in this range.²⁰ However, physicians and administrators who were more concerned with time spent interacting with health plans might have been more likely than others to respond to our survey. We cannot rule out this possibility, but we found no evidence for nonresponse bias in the check we were able to perform.²¹

Third, our estimates are based on respondents' reports, not on direct observation. These reports varied considerably (in general, the standard deviations were approximately as large as the means); this could reflect inaccurate or exaggerated responses or true variation among physicians, whose practices have very different degrees of exposure to managed care. Some reassurance about the accuracy of the estimates may be gained from the fact that four different studies (including ours), using different methodologies, found quite similar estimates of the time spent by physicians; additionally, the patterns of responses across practices sizes, specialty types, and types of interaction are generally consistent. In the absence of a national time and motion study, which would be costly to conduct, respondents' reports are the best source of data available.

Fourth, our estimates include time spent by practices interacting with health plans in plans' role as payers for individuals, employers, and the Medicare and Medicaid programs (which use health plans to administer managed care and formulary programs). They are not intended to include time spent dealing directly with Medicare or Medicaid (nearly all such time would be spent on billing) or general administrative time spent on overall physician practice operations.

Our estimated mean \$31 billion cost to physician practices of time spent on interactions with health plans is equal to 6.9 percent of all U.S. expenditures for physician and clinical services.²² It is six times the amount the federal government has spent annually on the Children's Health Insurance Program (CHIP).²³ The median cost estimated—\$23.2 billion—is smaller but still substantial.

■ **Administrative spending produces benefits as well as costs.** Nevertheless, although it is easy to portray administrative costs as “waste,” it is important to emphasize that these costs can never be zero and that the interactions that generate these costs may produce benefits as well.²⁴ Prior authorization and formulary requirements, for example, may reduce costs and improve the quality of care to the extent that they reduce inappropriate provision of services and promote the use of appropriate procedures and medications.²⁵ Although it is expensive for physicians to deal with multiple health plans, each with its own requirements for authorizations, formularies, billing, and so on, it can be argued that having multiple plans generates the benefits that can flow from competition, including innovation and increased patient choice.²⁶

It would be useful for further research to explore innovations in the policies and administrative procedures of health plans and physician offices that could reduce

the costs of physician-plan interactions without also reducing benefits therefrom.²⁷ Some efforts to achieve this goal are being made, with discussion occurring in such forums as the Healthcare Administrative Simplification Coalition. Created in 2006, the coalition includes, among other organizations, two large national health plans, the Centers for Medicare and Medicaid Services, Microsoft, the MGMA, the AMA, the American College of Physicians, the American College of Surgeons, and the American Academy of Family Physicians.

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NOTES

1. H.J. Aaron, "The Costs of Health Care Administration in the United States and Canada—Questionable Answers to a Questionable Question," *New England Journal of Medicine* 349, no. 8 (2003): 801–803; P.M. Danzon, "Hidden Overhead Costs: Is Canada's System Really Less Expensive?" *Health Affairs* 11, no. 1 (1992): 21–43; A.K. Gauthier et al., "Administrative Costs in the U.S. Health Care System: The Problem or the Solution?" *Inquiry* 29, no. 3 (1992): 308–320; U.E. Reinhardt, P.S. Hussey, and G.F. Anderson, "U.S. Health Care Spending in an International Context," *Health Affairs* 23, no. 3 (2004): 10–25; K.E. Thorpe, "Inside the Black Box of Administrative Costs," *Health Affairs* 11, no. 2 (1992): 41–55; and S. Woolhandler, T. Campbell, and D.U. Himmelstein, "Costs of Health Care Administration in the United States and Canada," *New England Journal of Medicine* 349, no. 8 (2003): 768–775.
2. J.G. Kahn et al., "The Cost of Health Insurance Administration in California: Estimates for Insurers, Physicians, and Hospitals," *Health Affairs* 24, no. 6 (2005):1629–1639; and Woolhandler et al., "Costs of Health Care Administration."
3. D. Gans et al., "Medical Groups' Adoption of Electronic Health Records and Information Systems," *Health Affairs* 24, no. 3 (2005): 1323–1333.
4. The survey instruments are available in the online supplement at <http://content.healthaffairs.org/cgi/content/full/hlthaff.28.4.w533/DC2>.
5. When appropriate—for example, for credentialing—the questions asked about hours per year rather than minutes per day.
6. Each mailing included a five-dollar bill, as well as a cover letter from the authors and one or more neutrally worded endorsement letters from the American Academy of Family Physicians, the American Academy of Pediatrics, the American College of Physicians, or the American College of Surgeons (the letter[s] sent depended on the specialty of the physician or practice).
7. See Supplemental Exhibit 5, online as in Note 4.
8. Based on 47.1 physician work weeks per year and 52.8 hours worked per week. See American Medical Association, *Physician Socioeconomic Statistics*, 2003 ed. (Chicago: AMA Press, 2003). We assumed that non-physician staff work eight hours a day, five days a week, forty-nine weeks a year.
9. Sources used were the U.S. Department of Labor, Bureau of Labor Statistics, *Occupational Employment and Wages* (May 2006); AMA, *Physician Socioeconomic Statistics*, 2003 ed.; the Medical Group Management Association's 2007 Cost Survey; and Sullivan Cotter, *2006 Physician Compensation and Productivity Survey Report* (New York: Sullivan Cotter, 2006).
10. When comparing time spent by specialty type or practice size, we applied a Bonferroni adjustment and considered differences to be statistically significant if the *p* value was less than 0.0167 (two-tailed, adjusting for the three pairwise comparisons). Standard errors for within-stratum means (for example, general

internists in one-to-two-physician practices) were first derived. Weighted means across strata were then calculated to adjust for differences in rates of sampling and nonresponse. Standard errors of these estimates incorporated the population weights, as well as correlation between multiple responses from the same practice in the case of physician-administrator surveys.

11. The 38.4 percent figure is from the Medical Group Management Association MGMA's 2007 Cost Survey.
12. Adjusted response rates were calculated by dividing the number of completed, eligible surveys by the estimated number of eligible potential respondents in the sample, as recommended by current guidelines. See American Association for Public Opinion Research, "Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys" (Lenexa, Kan.: AAPOR, 2006). This adjustment is particularly important when samples are drawn, as ours were, from databases known to include large numbers of people likely to be misclassified or no longer reachable. See G.L. Freed et al., "Counting Physicians: Inconsistencies in a Commonly Used Source for Workforce Analysis," *Academic Medicine* 81, no. 9 (2006): 847–852; E. Hing and C.W. Burt, *Characteristics of Office-Based Physicians and Their Practices: United States, 2003–04*, Vital and Health Statistics Series 13, no. 164, January 2007, http://www.cdc.gov/nchs/data/series/sr_13/sr13_164.pdf (accessed 4 May 2009); and P.R. Kletke, "Physician Workforce Data: When the Best Is Not Good Enough," *Health Services Research* 39, no. 5 (2004): 1251–1255.
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