

Primary Care Physicians and Specialists as Personal Physicians

Health Care Expenditures and Mortality Experience

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BACKGROUND. The advent of managed care has resulted in considerable debate regarding the relative effects of specialist and primary care on patient outcomes and costs. Studies on these subjects have been limited to a disease-focused orientation rather than a patient-focused orientation inherent in primary care management. We examined whether persons using a primary care physician have lower expenditures and mortality than those using a specialist as their personal physician.

METHODS. Using data on a nationally representative sample of 13,270 adult respondents to the 1987 National Medical Expenditure Survey reporting as their personal physician either a primary care physician (general practitioner, family physician, internist, or obstetrician-gynecologist) or a specialist, we examined total annual health care expenditures and 5-year mortality experience.

RESULTS. Respondents with a primary care physician, rather than a specialist, as a personal physician were more likely to be women, white, live in rural areas, report fewer medical diagnoses and higher health perceptions and have lower annual health care expenditures (mean: \$2029 vs \$3100) and lower mortality (hazard ratio = 0.76, 95% confidence interval [CI], 0.64 - 0.90). After adjustment for demographics, health insurance status, reported diagnoses, health perceptions, and smoking status, respondents reporting using a primary care physician compared with those using a specialist had 33% lower annual adjusted health care expenditures and lower adjusted mortality (hazard ratio = 0.81; 95% CI, 0.66 - 0.98).

CONCLUSIONS. These findings provide evidence for the cost-effective role of primary care physicians in the health care system. More research is needed on how to optimally integrate primary and specialty care.

KEY WORDS. Primary care physicians; specialists; costs; mortality. (*J Fam Pract* 1998; 47:105-109)

Managed health care has emphasized the role of primary care physicians while restricting direct patient access to specialists.¹ Concerns that this trend has gone too far have been prompted, in part, by research suggesting that the outcomes of care provided by specialists are superior to those provided by primary care physicians.²

Jollis et al³ found that patients with myocardial infarction admitted by cardiologists had a 12% lower 1-year mortality than those admitted by primary care physicians. Specialist care, as opposed to primary care management, has also yielded superior outcomes according to studies on asthma,⁴ dermatological conditions,⁵ HIV,⁶ and rheumatoid arthritis.^{7,8} Other studies comparing specialist care with that of primary care physicians have yielded conflicting results,^{9,10} and the Medical Outcomes Study (MOS) found no significant differences in outcomes between care delivered by primary care physicians and specialists in two chronic diseases.¹¹ In contrast to the findings of

Jollis et al, Ayanian and colleagues¹⁰ found no differences in the outcomes of acute myocardial infarction care provided by cardiologists and generalists. Furthermore, the process of care for patients of generalists who had cardiologic consultation was similar to that of patients of cardiologists¹⁰; thus, studies need to account for the process of care that includes consultation.

As noted by Starfield,¹² most studies comparing care by specialists with that of primary care physicians have focused on the management of specific diagnosed diseases. This approach is limited for two related reasons. First, patients do not present to primary care physicians with disease-specific concerns, but with sundry complaints. By confining an analysis to patients for whom a diagnosis has already been made, outcomes are missed for patients who present with a similar problem but who have had a different diagnosis or none. While it is possible that cardiologists may manage cardiac ischemia more efficiently than primary care physicians, the converse may be true for chest or abdominal pain.

Second, an important dimension of high-quality primary care is the coordination of care, often involving referral and consultation with specialists at appropriate intervals in the episode of care. To simply compare primary care physicians and specialists regardless of where patients are in that episode of care ignores the vital role

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of coordination in primary care.

Implicit in disease-focused studies comparing specialists and primary care physicians is the notion that primary care provides no added value to the delivery of care compared with self-referral to a specialist. Some research, however, suggests that self-referral may increase the risk of adverse outcomes in patients.¹³ Others have hypothesized that primary care physicians add value to the delivery of care by matching patients' needs and preferences with the judicious use of medical services across the entire spectrum of presenting problems, including specialist referral or consultation at appropriate points in the episode of care.¹⁴ Population-based ecological studies suggest that the availability of primary care, but not specialty care, is associated with improved outcomes.¹⁵⁻¹⁸ Ecological studies are limited, however, by their inability to control for confounding at the individual level and by their susceptibility to the ecological fallacy.

To address the limitations of both the disease-based and ecological studies, we conducted an analysis of the National Medical Expenditure Survey and the 5-year mortality experience of survey respondents. We hypothesized that having a primary care physician as a personal physician as opposed to a specialist would be associated with lower health care expenditures and improved survival after adjusting for confounding, including case-mix and illness severity.

METHODS

SAMPLE AND DATA SOURCES

Data were derived from the Household Survey component of the National Medical Expenditure Survey (NMES).¹⁹ This component of NMES consisted of a year-long panel survey of approximately 35,000 individuals in 14,000 households representative of the civilian, non-institutionalized US population. The survey used a stratified multistage area probability design with oversampling of minorities, poor persons, disabled persons, and the elderly. Four interviews were completed during 1987 to collect information regarding medical care, health expenditures, and health insurance. After the first interview, respondents were asked to complete a self-administered questionnaire that included items on subjective health status, a checklist of medical conditions, and health care access. This analysis includes respondents 25 years and older who reported using one or more physicians as a usual source of care. Five-year mortality data, derived from the National Death Index,²⁰ were obtained from the public-use file released by the Agency for Health Care Policy and Research.²¹ The National Death Index is a computer file of all deaths in the United States since 1979 and is maintained by the National Center for Health Statistics.²⁰ The National Death Index has been found to be an accurate means of ascertaining deaths by means of personal identifiers.²²⁻²⁶ Complete

data on all study variables were available on 13,270 (95.9% of those eligible) respondents.

MEASURES

Demographic Data. Study data included age at the time of last interview, sex, race (white/nonwhite), educational level (completed high school or not), income (percent of poverty level: <100; 100-124; 125-199; 200-400; or >400), insurance status (any Medicaid, Medicare, or private insurance during the year), location (rural, or other), and region (Northeast, Midwest, South, or West).

Personal Physician Specialty Type. Subjects who identified a personal physician for themselves were asked to identify the specialty types of these physicians. Respondents were considered to have a personal physician if they reported having a particular physician that they usually saw when they were sick or needed advice about their health. For this study, personal physician specialty type was classified as either (1) primary care physician (general practitioner, family physician, internist, or obstetrician-gynecologist) or (2) specialist. Subjects who reported they did not have one specific personal physician because they "saw different doctors" were included with the specialist group.

Case-Mix/Disease Severity. Respondents were asked whether a physician had ever told them they had any of the following conditions: stroke, cancer, heart attack, gallbladder disease, hypertension, arteriosclerosis, rheumatism, emphysema, arthritis, diabetes, or heart disease. Subjective health status was measured using items that make up the health perceptions subscale of the MOS short-form general health survey (SF-20), a reliable and valid measure.²⁶ The MOS general health survey is a useful measure of the effects and severity of chronic disease; the subscales exhibit distinct profiles with each of several diseases.²⁷ For example, hypertension was associated with a decrement of 3.5 in the health perceptions scale (scored from 0 to 100), compared with a decrement of 13 for persons with chronic lung disease.²⁷ The health perceptions subscale exhibited excellent internal reliability in the NMES and included five questions (Cronbach's alpha = .90).

Total Health Care Expenditures. The NMES recorded medical expenditure data for 1987. Detailed, verified information about each medical expenditure was obtained. Total health care expenditures by individuals in the study sample were examined.

ANALYSES

Because of the complex survey design of NMES, analyses were conducted with the statistical package SUDAAN.²⁸ SUDAAN uses the method of Taylor series linearization to

TABLE 1

Relation Between Care Status and Other Respondent Characteristics

Characteristic	Care Status	
	Specialty Care (n=1624)	Primary Care (n=12,213)
Age, mean years	49.2 (0.5)	49.7 (0.2)*
Sex, % female	50.9 (1.2)	57.0 (0.3)
Race, % white	81.3 (1.5)	84.9 (0.9)
Education, % ≥ 12 years	76.1 (1.4)	74.8 (0.7)*
Income, % of poverty level		
<100	10.7 (0.9)	8.1 (0.5)*
100-124	4.1 (0.6)	4.1 (0.3)
125-199	12.0 (1.0)	12.3 (0.5)
200-400	33.5 (1.6)	34.8 (0.6)
>400	39.3 (1.8)	40.8 (0.9)
Insurance status		
Medicaid	8.6 (0.8)	6.5 (0.4)
Medicare	24.7 (1.4)	23.7 (0.6)*
Private	81.7 (1.4)	86.3 (0.5)
Rural, %	20.1 (2.3)	28.3 (1.4)
Region, %		
Northeast	23.3 (1.7)	19.9 (1.0)*
Midwest	23.0 (1.8)	27.4 (1.0)
South	35.0 (2.2)	34.5 (0.9)
West	18.8 (1.5)	18.2 (0.9)
Smoking status, % yes	26.7 (1.5)	26.0 (0.6)*
Health perceptions, mean	63.6 (0.9)	67.5 (0.4)
Disease history, % reporting		
Stroke	3.6 (0.5)	2.9 (0.1)*
Cancer	9.5 (0.7)	6.3 (0.2)
Heart attack	8.4 (0.7)	5.3 (0.2)
Gallbladder disease	8.2 (0.8)	7.9 (0.3)*
Hypertension	29.6 (1.3)	31.5 (0.5)*
Arteriosclerosis	7.6 (0.8)	5.4 (0.2)
Rheumatism	7.4 (0.6)	6.4 (0.3)*
Emphysema	4.3 (0.5)	3.5 (0.2)*
Arthritis	27.7 (1.3)	28.7 (0.6)*
Diabetes	7.0 (0.7)	7.5 (0.3)*
Heart disease	13.2 (0.9)	9.0 (0.3)
Expenditures, mean, in dollars	3100 (177)	2029 (65)
Dead, %	8.1 (0.7)	6.2 (0.2)

Note: Numbers in parentheses are standard deviation. Except where noted by asterisk, all differences between specialty care and primary care are statistically significant.

produce appropriate standard errors in surveys involving cluster sampling; weights provided on the public-use tapes were also used to adjust for oversampling and nonresponse bias. The results reported provide national estimates of frequency distributions and means.

The relationship between total health care expenditures and personal physician type was examined, using ordinary linear regression to adjust for potential confounding variables. Because the distribution of expenditures is so skewed, the analysis was conducted using the logarithm of total expenditures for those persons who had at least one physician visit during the year. The method of Duan et al²⁰ was used to retransform the logarithm-based parameter estimates into dollars. The relation between personal physician type and subsequent survival was examined using a Cox proportional hazard survival analysis to adjust for potential confounding variables. The proportionality assumptions of the model were tested and found valid.

RESULTS

Of the 13,837 eligible respondents, 12,213 (88%) reported a primary care physician as their personal physician. The relation between each of the respondent characteristics and personal physician type is shown in Table 1. Persons with a primary care physician as a personal physician were more likely to be women, white, and live in rural areas; less likely to have Medicaid and more likely to have private insurance; more likely to have higher health perceptions; and less likely to report being told by a physician that they had cancer, a heart attack, arteriosclerosis, or heart disease.

Respondents with a personal physician who was a primary care physician generated lower mean total expenditures (\$2029 vs \$3100). Regression analysis adjusting for other variables showed that respondents with a primary care physician as a personal physician generated lower logarithmic total expenditures (parameter estimate = -0.283, standard error = 0.043, model R^2 = 20.1%) than those using a specialist. This translates into adjusted total expenditures that are 33% (95% CI, 0.22 - 0.44) lower.

By the end of the 5-year follow-up period, 6.4% of respondents had died. Respondents with a personal physician who was a primary care physician rather than a specialist were less likely to die during follow-up (6.2% vs 8.1%), a hazard ratio of 0.76 (95% CI, 0.64 - 0.90). After adjusting for all other variables, including socio-demographics, health insurance, smoking status, health perceptions, and clinical conditions (Table 2), the hazard ratio was reduced to 0.81 (95% CI, 0.66 - 0.98). Excluding the health perceptions and condition variables produced a hazard ratio of 0.73 (95% CI, 0.60 - 0.88). An analysis that excluded persons identifying obstetrician-gynecologists as their primary care physician or reporting that

they "saw different doctors" produced similar results, hazard ratio = 0.78 (95% CI, 0.63 - 0.98).

DISCUSSION

The findings of this study support the notion that primary care adds value to the health care system, that having a personal physician who is a primary care physician is associated with lower expenditures and reduced mortality. These results are congruent with other population-based studies, suggesting that primary care compared with spe-

TABLE 2

Adjusted Survival Hazard Ratios for Examined Risk Factors

Risk Factor	Hazard Ratio	(95% CI)
Primary care status	0.81	(0.66 - 0.98)
Age, years	1.07	(1.06 - 1.08)
Sex, female	0.64	(0.55 - 0.73)
Race, white	1.04	(0.87 - 1.24)
Education, ≥ 12 years	0.92	(0.77 - 1.08)
Income, % of poverty level		
<100	0.94	(0.72 - 1.25)
100-124	0.99	(0.73 - 1.36)
125-199	1.14	(0.94 - 1.41)
200-400	1.08	(0.92 - 1.29)
>400	1.00	(1.00 - 1.00)
Insurance status		
Medicaid	1.12	(0.90 - 1.40)
Medicare	1.33	(1.06 - 1.67)
Private	0.91	(0.76 - 1.09)
Smoking status, smoker	1.96	(1.68 - 2.26)
Health perceptions, 10 points	1.14	(1.10 - 1.16)
Disease history		
Stroke	1.36	(1.09 - 1.69)
Cancer	1.40	(1.17 - 1.67)
Heart attack	1.14	(0.92 - 1.40)
Gallbladder disease	0.81	(0.64 - 1.01)
Hypertension	1.21	(1.04 - 1.41)
Arteriosclerosis	0.93	(0.79 - 1.10)
Rheumatism	1.14	(0.99 - 1.32)
Emphysema	1.38	(1.15 - 1.66)
Arthritis	0.86	(0.75 - 0.99)
Diabetes	1.46	(1.25 - 1.70)
Heart disease	1.16	(0.97 - 1.39)

Note: Also adjusted for rural or urban location, and region. For categorical variables, the hazard ratio indicates increased mortality hazard associated with the presence of risk factor; for continuous variables the hazard ratio indicates the increased mortality hazard associated with a unit change in the value of the variable (years for age, and a 10-point decline for the health perception scale).

cialty care is associated with lower expenditures⁵⁰ and improved outcomes.¹⁶⁻¹⁸ The validity of these findings is strengthened by the use of a nationally representative sample, a population-based approach, adjustment for case-mix and disease severity, and use of mortality as an outcome.

Some disease-based studies have suggested that specialist care is superior to primary care,³⁸ though more costly.³ The contrasting results of population-based and disease-based studies are explainable because population-based studies consider the potential benefit of the gatekeeping function of primary care physicians,¹⁴ while disease-based studies do not. In this gatekeeping function, primary care physicians seek to match patients' needs and preferences with the judicious use of medical services across the entire spectrum of presenting problems, including specialist referral or consultation at appropriate points in the episode of care. As studies have documented the relationship between physician experience and improved patient outcomes,³¹⁻³³ it is plausible

that for specific diseases, of sufficient severity, specialists outperform primary care physicians because of their greater experience with those diseases. It is also plausible that primary care physicians, because of their greater gatekeeping experience, outperform patients who self-refer to specialists and specialists who refer to other specialists in the management of the full spectrum of problems and in decisions regarding appropriate referral. We believe that compared with specialists, the greater experience that primary care physicians have with comprehensiveness and coordination of care results in lower costs and improved mortality.

Interpretation of these findings must be tempered by the study limitations. First, it is possible that control for illness severity and case-mix was not adequate. Differences in case-mix between physician groups were based on self-report, using a series of common chronic disease diagnoses, and differences in disease severity were based on self-report of health perceptions. Although patients reporting use of specialists as their personal physician reported more chronic disease diagnoses, use of a self-report morbidity measure may have introduced a bias that significantly underestimates differences in patient morbidity between the two physician groups. Some evidence, however, points to the validity of self-reports of morbidity.³⁴ A health perceptions scale was used to adjust for disease severity. Some studies have also validated this subjective approach, compared with more objective measures of severity.^{35,36} These measures were powerful predictors of mortality in our study, supporting their validity as case-mix and severity measures. Respondents reporting using a specialist as their personal physician also reported lower health perceptions, suggesting that they were, on average, sicker. Adjustment for both medical conditions and health perceptions resulted in a modest change (0.73 to 0.81) in the mortality effect of the specialty group. This modest change in the effect size suggests that additional unmeasured confounding by severity of illness would be unlikely to completely eliminate or reverse observed differences between physician groups. Although it is commonly assumed that patients cared for by specialists are sicker than those cared for by primary care physicians, this is not the case with self-referred patients.^{13,37}

Respondents may have erroneously reported the specialty of their personal physician, resulting in misclassification bias. It is more likely, however, that respondents mistakenly identified their personal physician as a primary care physician (according to the definition used in this study) when their physician was in fact a specialist, than the converse. This misclassification bias is likely to reduce true differences between the groups.

Unmeasured confounding can never be definitively excluded in an observational study. Factors associated with choice of personal physician are also likely to be related to the outcomes measured in this study. For example, attitude toward health care affects both the choice of

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primary care physician type and health care utilization.³⁵ Other limitations include possible incomplete ascertainment of vital status, and inadequate adjustment for insurance status and availability of physicians of different specialties.

Despite these limitations, we believe these results suggest that having a primary care physician is associated with improved outcomes and reduced costs. With the growing prevalence of managed care, primary care physicians are likely to play an increasing role in the delivery of health care in the United States. However, given the improved outcomes for specific diseases obtained by specialists in some studies, compared with outcomes with primary care physicians, more research is needed to determine how to optimally integrate the delivery of primary and specialty care.¹⁰

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