How Is a Shortage of Primary Care Physicians Affecting the Quality and Cost of Medical Care?

A Comprehensive Evidence Review

A White Paper of the
American College of Physicians

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For questions about the content of this White Paper, please contact ACP, Division of Governmental Affairs and Public Policy, Suite 700, 25 Massachusetts Avenue NW, Washington, DC 20001-7401; telephone 202-261-4500. To order copies of this Position Paper, contact ACP Customer Service at 800-523-1546, extension 2600, or 215-351-2600.

Introduction

In January 2006, the American College of Physicians warned that primary care, the backbone of the nation's health care system, was on the verge of collapse (1). ACP noted that very few young physicians were going into primary care and many of those already in practice were leaving, at a time when the demand for primary care services would be expected to increase due to an aging population with more chronic disease. In that paper, and in several other position papers published over the subsequent 2.5 years, ACP proposed a number of policies to halt and reverse the decline in the numbers of physicians choosing primary care careers. (2,3,4) ACP's recommendations include: creating pathways to eliminate student debt for physicians choosing primary care careers; reforming dysfunctional payment policies to increase payments to primary care physicians linked to accountability for improved outcomes; and designing, implementing and evaluating new models of primary care, such as the Patient Centered Medical Home.

Since then, and notwithstanding a heightened interest and concern expressed by many physicians, policymakers and other stakeholders about the future of primary care, *the United States has yet to implement comprehensive strategies to recognize, support, and enhance primary care to the degree necessary to reverse a worsening primary care shortage*. With each passing year, the gap between the need for primary care, and the numbers of physicians in primary care specialties and practices, will continue to grow. A shortage of primary care physicians will have huge, adverse implications for access, quality, and cost of care in the United States.

The hallmarks of primary care medicine--first contact care, continuity of care, comprehensive care, and coordinated care--are going to be increasingly necessary in taking care of an aging population with growing incidence of chronic disease, and have proven to achieve improved outcomes and cost savings. Without primary care, the health care system will become increasingly fragmented and inefficient, leading to poorer quality care at higher costs.

With health care reform taking a central role in the 2008 presidential and congressional elections, it is imperative that that the new president and Congress make a commitment to implementing federal policies to facilitate a sufficient supply of primary care physicians. Otherwise, policies designed to expand access to insurance coverage, although essential, will *not* by themselves achieve the intended result of assuring that all Americans have access to high-quality, affordable care. Moreover, the cost of providing coverage to more than 46 million uninsured Americans will be much higher--and the outcomes of care much poorer--if expansion of coverage is accomplished without also concurrently expanding the primary care workforce.

ACP believes that policymakers are more likely to take the steps necessary to assure a sufficient primary care workforce if they are aware of the research on the importance of primary care to a high-performing health care system. To this end, this white paper provides an overview of current trends in the primary care physician workforce, the importance and value of primary care, and the growing demand for primary care services in the United States.

Twenty years of research, reviewed in this paper, documents the value of primary care. An annotated bibliography based on a literature review documents the evidence to support the critical importance of primary care in providing patients with better outcomes at lower cost, and the urgency of the need to prevent shortages of primary care physicians. It demonstrates that primary care physicians deliver high-quality care, reduce mortality, provide continuity of care, and reduce health care costs. Results of international comparisons are also provided. Overall, the evidence described in this paper support the following findings:

- Absent changes in policies to make primary care more attractive and rewarding to new physicians and to sustain those already in practice, the supply of primary care physicians will fall behind increased patient demand, resulting in a shortfall of tens of thousand of primary care physicians over the next decade.
- The availability of primary care is positively and consistently associated with improved outcomes, reduced mortality, lower utilization of health care resources, and lower overall costs of care.
- Consequently, a shortage of primary care physicians will result in poorer health outcomes and more premature and preventable deaths for millions of Americans, and overall higher costs of care.

In addition to this white paper, ACP is developing a new policy paper to provide a comprehensive set of recommendations to assure that the supply of primary care physicians is sufficient to meet current and future needs. Later in 2009, ACP will release a position paper that will make recommendations on how primary care itself needs to change to meet the needs of an aging population with more chronic diseases[1].

Although the focus of these papers is on the importance of primary care physicians, ACP recognizes and respects the roles of other health professionals and clinicians, including independent nurse practitioners and physicians assistants, in meeting the United States' primary care needs in a collaborative and team-based manner that recognizes each profession's contributions to patient care. ACP is currently engaged in discussions with the nursing profession on the development of policies that support and recognize the contributions of both nurses and primary care physicians. ACP had previously endorsed legislation enacted by Congress to address the nursing profession shortage.

Summary of Evidence

Summary of the Evidence That Demand for Primary Care Will Exceed Supply

The current method of health care delivery in the United States, which emphasizes episodic treatment for acute care through private health insurance and governmental programs, is not optimally meeting the health care needs of patients with chronic diseases. Primary care physicians are at the forefront of managing chronic diseases, providing comprehensive care and coordinated long-term care, and the demand for such care is growing. Primary care physicians also focus on primary prevention--avoiding the chronic diseases that then require costly management.

> The U.S. population is expected to increase by 18%, to 349 million, between 2005 and 2025. Within the next decade, the baby boomers will begin to be eligible for Medicare. By the year 2030, one fifth of Americans will be above the age of 65, with an increasing proportion above age 85. The population age 85 and over will increase 50% from 2000 to 2010. (5)
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> This rapid growth in population and increased proportion of elderly people is expected to raise the number of ambulatory care visits by 29% by 2025. The increased child population is estimated to increase patient visits by 13%. (6)
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> The number of patients with chronic diseases, those who benefit most from the coordination of care and continuity of care that primary care physicians provide, is also increasing. 45% of the U.S. population has a chronic medical condition and about half of these, 60 million people, have multiple chronic conditions. (5) For the Medicare program, 83% of beneficiaries have one or more chronic conditions and 23% have five or more chronic conditions. (7) It is important to note that the 23% of beneficiaries with five or more chronic conditions account for two-thirds of all Medicare spending.
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> By 2015, an estimated 150 million Americans will have at least one chronic condition. (5) Among nonelderly adults, the number who report having one or more of seven major chronic conditions has increased from 28% in 1997 to 31% (or 58 million) in 2006. (8)

While the demand for primary care is increasing, there has been a dramatic decline in the number of graduating medical students entering primary care. (9-11)

> Factors affecting the supply of primary care physicians include excessive administrative hassles, high patient loads, and declining revenue coupled with the increased cost of providing care. As a result, many primary care physicians are choosing to retire early. (10) These factors, along with increased medical school tuition rates, high levels of indebtedness, and excessive workloads, have dissuaded many medical students from pursuing careers in general internal medicine and family practice. (12)

From 1997 to 2005, the number of US medical graduates entering family medicine residencies dropped by 50%. (12) In 2007, only 23% of third-year internal medicine residents, planned to practice general internal medicine compared to 54% in 1998. Among first-year internal medicine residents, only 14% indicated that they planned to pursue careers in general medicine. (13) Even more disheartening, a 2007 study of fourth-year medical students' career decision making revealed that only 2% of students intended to pursue careers in general internal medicine. (14)

An increasing proportion of new primary care physicians are women, who tend to work fewer hours, further reducing the effective workforce. By 2025, half of all primary care physicians will be female. (6)

Approximately 21% of physicians who were board-certified in the early 1990s have left internal medicine, compared with a 5% departure rate for internal medicine subspecialists. (11)

A 2008 study predicted that the U.S. will experience a shortage of 35,000–44,000 adult primary care physicians by 2025. The study also predicted that population growth and aging will increase family physicians' and general internists' workloads by 29% between 2005 and 2025. Further, greater use of nurse practitioners and physicians assistants and increased primary care by specialists are not expected to make enough of an impact on this shortfall. (6)

Summary of the Evidence on the Value of Care Provided by Primary Care Physicians

Evidence from the available medical and scientific literature suggests that:

When compared with other developed countries, the United States ranked lowest in its primary care functions and lowest in health care outcomes, yet highest in health care spending. (15-17)

Primary care has the potential to reduce costs while still maintaining quality. (18-22)

States with higher ratios of primary care physicians to population have better health outcomes, including decreased mortality from cancer, heart disease, or stroke. (23, 24)

Individuals living in states with a higher ratio of primary care physicians to population are more likely to report good health than those living in states with a lower ratio. (25)

The supply of primary care physicians is also associated with an increase in life span. (26, 27) An increase of just one primary care physician is associated with 1.44 fewer premature deaths per 10,000 persons. (28)

Primary care physicians have been shown to deliver care similar in quality to that of specialists for certain conditions, such as diabetes and hypertension, often while using fewer resources, (14, 29, 30) although specialists often are the best qualified to provide care within their areas of training and expertise for patients with more advanced and complex clinical conditions. Cooperation between specialists and primary care physicians is of utmost importance in ensuring optimal care of patients. Specialty care is more effective when the patient also has an ongoing relationship with a primary care physician. Primary care physicians are adept at ensuring that patients get the right care, including care from specialists. (31)

Primary care physicians have also been shown to provide better preventive care than specialists, reflecting their ability to better manage the whole health of patients. (32-34)

The preventive care that primary care physicians provide can help to reduce hospitalization rates. (35-39) In 2000, an estimated 5 million admissions to U.S. hospitals, with a resulting cost of more than $26.5 billion, may have been preventable with high-quality primary and preventive care treatment. Assuming an average cost of $5,300 per hospital admission, a 5% decrease in the rate of potentially avoidable hospitalizations alone could reduce inpatient costs by more than $1.3 billion. (18)

Hospital admission rates for five of 16 ambulatory care-sensitive conditions "for which good outpatient care can potentially prevent the need for hospitalization, or for which early intervention can prevent complications or more severe disease," increased between 1994 and 2003, suggesting worsening ambulatory care access or quality for those conditions.(40, 41) Studies of certain ambulatory care-sensitive conditions have shown that hospitalization rates and expenditures are higher in areas with fewer primary care physicians and limited access to primary care. (35)

An increase of 1 primary care physician per 10,000 population in a state was associated with a rise in that state's quality rank by more than 10 places and a reduction in overall spending by $684 per Medicare beneficiary. (42) By comparison, an increase of 1 specialist per 10,000 population was estimated to result in a drop in overall quality rank of nearly 9 places and increase overall spending by $526 per Medicare beneficiary.

The following annotated literature review provides a more detailed and comprehensive description of the evidence on the impact of primary care on quality and cost.

Annotated Literature Review

To characterize the relationship between primary care physicians and health care quality and costs, research published within the last 20 years was reviewed. This paper summarizes the evidence relating primary care physicians to individual and community health care outcomes.

An initial search of major medical and scientific databases for published articles resulted in more than 1000 documents. The search was conducted utilizing a computerized search of PubMed, scanning the bibliographies of articles, and reviewing reports from major health care surveys. The compiled research was ultimately narrowed down to approximately 100 documents. Evidence from the available medical and scientific literature suggests that:

Primary Care Physicians Reduce Mortality Rates

A US state-level study conducted by Farmer et al examined the empirical relationship between the prevalence of poverty and the mortality experience of different age groups within the population. The study revealed that the higher the ratio of primary care physicians to population, the better the outcomes as measured by age-specific mortality rates. (43)

EXHIBIT 2
Relationship Between Primary Care And Specialist Physician Ratios And Mortality: Regression Coefficients, Standard Errors, And Statistical Significance, 1996–2000

Mortality measure (per 100,000)	Primary care				Specialist			
	Unadjusted		Adjusted[a]		Unadjusted		Adjusted[a]	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
All-cause	−0.0353****	0.0029	−0.0086**	0.0035	0.0264****	0.0068	−0.0031	0.0051
Heart	−0.0171****	0.0011	−0.0117****	0.0005	0.0031	0.0017	−0.004**	0.0016
Cancer	−0.0039****	0.0006	−0.0006	0.0005	0.0053****	0.0007	−0.0003	0.0007

SOURCE: National Center for Health Workforce Analysis. *2002 Area Resource File* (Rockville, Md.: National Center for Health Workforce Analysis, 2002).

NOTES: Numbers are regression coefficients derived from Proc-Mixed analysis. The results are interpreted as in an ordinary regression: A one-unit change in the coefficient is associated with a one-unit change in the outcome. Negative values indicate an association with lower mortality; positive values indicate an association with higher mortality.

[a]All values for regression coefficients adjusted for per capita income, percent high school education, percent unemployment, percent elderly, percent African American, percent below the federal poverty level, and percent in a metropolitan statistical area (MSA) or non-MSA. SE is standard error. Tests of significance were based on z-statistics.

**$p < .05$ ****$p < .001$

In an analysis of mortality data from 1996-2000 for 3,075 U.S. counties (99.9% of all U.S. counties), Starfield et al found that the greater the supply of primary care physicians, the lower the total and heart disease mortality rates. These data, from 35 separate studies, remained statistically significant even after socioeconomic and demographic characteristics were controlled for. Upon analyzing the types of geographic areas and mortality, the authors concluded that the higher the primary care ratio, the lower the mortality for 28 of the 35 studies reviewed, with statistical significance reached in 20 of them. Further, when socioeconomic characteristics were added to the analyses the ratio of primary care to population remained significantly associated with lower total, heart disease, and cancer mortality. In contrast, the ratio of specialist to population was generally associated with higher mortality in 25 of the 35 studies. (44)

The addition of one primary care physician per 10,000 population in the U.S. resulted in 3.5 fewer people dying each year.

Shi et al conducted a US state-level analysis to evaluate the associations among income inequality, primary care, specialty care, smoking, and health indicators When state-level economic and demographic characteristics were controlled for, the authors concluded that an increase of one primary care physician per 10,000 population was associated with a 6% decrease in all-cause mortality and an approximately 3% decrease in infant, low-birthweight, and stroke mortality. The authors also estimated that an increase of 1 primary care doctor per 10,000 persons would result in a reduction of 34.6 deaths per 100,000 population. (38)

Macinko et al analyzed articles on primary care physician supply published between 1985 and 2005. The authors reanalyzed the results to assess primary care effect size and the predicted effect on health outcomes of a one-unit increase in primary care physicians per 10,000 population and determined that pooled results for all-cause mortality demonstrated that an increase of one primary care physician per 10,000 population was associated with an average mortality reduction of 5.3%, or 49 per 100,000 per year. (45)

In a study using US state-level data from 1985 to 1995, Shi et al examined the relationship of primary care resources and income inequality with all-cause mortality within the entire population, and in black and white populations. After controlling for socioeconomic and demographic characteristics and modeling contemporaneous and time-lagged covariates, the authors found that in all models, primary care was associated with lower mortality. In fact, an increase of one primary care doctor per 10,000 population was associated with a reduction of 14.4 deaths per 100,000. In addition, the magnitude of primary care coefficients was higher for black mortality than for white mortality. (46)

Shi examined the relationship between the availability of primary care and specialty care and certain life chance indicators such as mortality rates and life expectancy using the multiple regression procedure. After controlling for sociodemographic measures such as percentages of education, urban, minority, pollution and lifestyle factors such as seatbelt use, obesity, and smoking, the author associated lower primary care physician supply and higher specialist-to-population ratios with higher overall age-adjusted mortality, mortality from cancer, mortality from heart disease, neonatal mortality, life span, and low-birth-weight ratios. (23)

Shi studied the empirical relationship between the availability of health services resources (i.e., primary care, specialty care, hospital beds) and certain life chances indicators as measured by overall and disease-specific mortality rates, and life expectancy. The author found that there was a significant direct association between primary care and favorable mortality outcomes, though the same does not hold true for variables such as hospital beds or physician specialists. (24)

In a U.S. state-level study conducted by Vogel and Ackermann, the authors concluded that while specialist physician supply has no correlation with a wide range of health outcomes, the supply of primary care physicians was associated with an increase in life span and with reduced low birthweight rates. (26)

Shi et al conducted a longitudinal analysis using 11 years of state-level data from 1985 to 1996 to examine whether primary care reduces the impact of income inequality on stroke mortality. After adjusting for income inequality, educational level, unemployment, race, and percentage of urban residents, the authors concluded that the supply of primary care was significantly associated with reduced stroke mortality. The authors also found that primary care practically eliminated the impact of income inequality on stroke mortality. (47)

In another longitudinal analysis of US state-level data from 1985 to 1995, Shi et al studied the extent to which primary care physician supply (office based primary care physicians per 10,000 population) moderated the association between social inequalities and infant mortality and low birthweight. After adjusting for state level education, unemployment, racial/ethnic composition, income inequality, and urban/rural differences, the authors found that primary care physician supply was associated with reduced low birthweight. These findings remained valid even after 1-, 3- and 5-year lag periods. The authors also found that primary care physician supply was associated with reduced infant mortality. (48)

In a cross-sectional analysis of county-level data stratified by urban compared with nonurban areas in 1990, Shi et al examined the association between primary care and income inequality on all-cause, heart disease and cancer mortality at the county level and whether it differed in urban and nonurban areas. The authors found that all-cause mortality, heart disease mortality, and cancer mortality were lower in areas where the supply of primary care physicians was greater. Nonurban counties with a greater number of primary care physicians had 2% lower all-cause mortality, 4% lower heart disease mortality, and 3% lower cancer mortality than nonurban counties with a smaller number of primary care physicians. (49)

Using data from Florida's population-based tumor registry, Campbell et al determined cervical cancer incidence and mortality rates for each of Florida's 67 counties over the 3-year period of 1993-1995. The study examined the relationship between physician supply and cervical cancer incidence and mortality rates, adjusting for other county-level characteristics such as education, income, urban/nonurban, white/nonwhite, and percentage of women who were married. The authors found that each increase in the supply of family physicians of one physician/10,000 persons was associated with a corresponding drop in the incidence rate of 1.5 cases/100,000 persons and a corresponding drop in mortality rate of .65 cases/100,000 persons. Cervical cancer mortality rates were also inversely associated with the supply of general internists. (50)

Roetzheim et al conducted a study measuring age-adjusted colorectal cancer incidence and mortality rates for Florida's 67 counties during the period 1993 to 1995 to determine if increasing primary care physician supply was associated with lower incidence and mortality rates for colorectal cancer. Using data from the state tumor registry and the American Medical Association physician masterfile, the authors concluded that increasing primary care physician supply was inversely correlated with both colorectal cancer (CC) incidence (CC = -0.46; P <.0001) and mortality rates (CC = -0.29; P =.02), that is, more primary care physicians are associated with fewer incidences of cancer and a reduction in avoidable deaths. After adjusting for county characteristics, the authors found that a 1% increase in the proportion of physicians who were in primary care specialties was associated with a corresponding reduction in colorectal cancer incidence of 0.25 cases per 100,000 (P < .0001) and a reduction in colorectal cancer mortality of 0.08 cases per 100,000 (P =.0008). (51)

Using 1990 data from 3081 U.S. counties, Shi et al conducted a cross-sectional analysis to test the association between the availability of primary care, income inequality, and several categories of mortality in U.S. counties. The authors found that counties with higher availability of primary care resources experienced between 2% and 3% lower mortality than counties with less primary care. (52)

Perrin et al studied pediatric hospitalizations in three U.S. communities during 1988 through 1990. The authors examined the relationship between a child's usual source of primary care and involvement of that source before and during hospitalization. They found that rates of hospital admissions were lower in communities where primary care physicians were more involved in caring for children both before and during hospitalization. (53)

Primary Care Physicians Are Essential to Optimal Preventive Care

Turner et al surveyed general internists, obstetrician-gynecologists, and cardiologists in a large metropolitan area to determine how their characteristics affected their performance and beliefs about breast cancer screening. The authors found that cardiology and pulmonary specialists were less informed about breast cancer screening guidelines than general internists. In addition, general internists were more likely to screen their patients for breast cancer. Consistent with the studies above, this suggests that patients who use a specialist as their usual source of care may not reliably receive indicated preventive services. (32)

Each 10th Percentile increase in primary care physician supply = 4% increase in odds of early-stage breast cancer diagnosis.

Ferrante et al studied 11,740 incident cases of breast cancer occurring in Florida in 1994 using data from the state cancer registry to determine the effects of physician supply on the odds of late-stage diagnosis. Measures of physician supply were obtained from the 1994 AMA Physician Masterfile. The authors found that each 10th percentile increase in primary care physician supply resulted in a 4% increase in the odds of early-stage breast cancer diagnosis. (54)

Lewis et al surveyed 1,349 internists who were members and fellows of the American College of Physicians to determine their counseling practices in the areas of smoking, exercise, and alcohol and seat belt use. The authors found that generalists were more likely than specialists to counsel at least one counseling session to all patients who were at risk and to be more persistent in counseling. (33)

O'Malley and Forrest conducted cross-sectional and decomposition analyses on a nationally representative sample of 18,013 noninstitutionalized Medicare beneficiaries who responded to the Medicare Current Beneficiary Survey (MCBS) in 2000 to 2002 to assess immunization disparities in the elderly population. The authors found that immunization rates were below recommended levels for all Medicare beneficiaries. However, beneficiaries with a primary care generalist as their usual physician had higher odds of immunization than those with a specialist as their usual physician. In addition, a higher number of primary care physicians per elderly resident was associated with higher rates of immunization at the county level. (34)

In another analysis of Medicare Current Beneficiary Survey (MCBS) data, O'Malley et al evaluated disparities in colorectal cancer (CRC) screening rates

for 9,985 Medicare Parts A and B beneficiaries with a usual physician. The authors found that having a primary care generalist (vs another specialist) as one's usual physician was associated with higher odds of screening after controlling for other factors. (55)

Morales et al conducted surveys of 1,915 men enrolled in 2 Medicare+Choice health plans. One of these surveys required enrollees to select a primary care provider to examine the effect of demographic and socioeconomic factors on use of preventive services. Preventive services evaluated included prostate-specific antigen testing, colorectal cancer screening (CRC), and influenza vaccination. The authors found that men in the plan that required beneficiaries to choose a primary care generalist as a usual health care provider had no socioeconomic differentials in use of CRC screening, whereas men in the plan not requiring a primary care physician had persistent socioeconomic differentials in screening use. (56)

O'Malley et al conducted a telephone survey of 1,205 low-income women over age 40 in Washington, D.C. to examine the effects of primary care, health insurance, and HMO participation on adherence to regular breast, cervical, and colorectal cancer screening. The authors found that continuity with a single primary care practitioner and higher patient satisfaction with the relationship with primary care practitioners were associated with higher adherence to the screening tests, even after controlling for other factors. Coordination of care also was associated with screening adherence for women age 65 and over. (57)

Bindman et al surveyed 3,846 English-speaking and Spanish-speaking women between the ages of 18 and 64 in urban California to examine whether health insurance, a regular place of care, and optimal primary care were independently associated with receiving preventive care services. The authors found that having a regular primary care source was the major determinant of receiving preventive care, including blood pressure screening, clinical breast exams, mammograms, and Pap smears. The authors concluded that primary care from a consistent locale increased the likelihood that women will receive preventive care. (58)

In a study on tuberculosis prevention activity in DeKalb County, Georgia, Braun and Wiesner surveyed the use of tuberculin skin testing among 198 primary care physicians, 95 surgeons, 215 medical and pediatric specialists, and 41 obstetricians-gynecologists. Primary care physicians were significantly more likely to report ordering at least one skin test in the previous year than the other physician groups. (59)

Rosenblatt et al studied ambulatory care data in Part B of the Washington State Medicare Claims Database in 1994 and 1995 to evaluate the extent to which specialists incorporate elements of primary care in their clinical work. The authors found that while a considerable proportion of patients only sought care from specialists, most specialists did not assume the principal care responsibility for their patients. Patients who received the majority of care from generalists were more likely to have received influenza immunization (55.4%) compared to those who received the majority of their care from medical specialists (47.7% immunization) or surgical specialists (39.6% immunization). (60)

Flocke et al conducted a cross-sectional study using a sample of 2,889 patients in Ohio who visited 138 primary care physicians. Four primary care attributes were measured, including patient preference for their regular physician, interpersonal communication, physician's accumulated knowledge of the patient, and coordination of care. After controlling for patients' age, race, health and insurance, the authors found that each of the measured primary care attributes was significantly associated with patients' being up to date on screening, immunization, and health habit counseling services. (61)

Primary Care Reduces Unnecessary Hospitalization and Emergency Room Admissions

Gill and Mainous analyzed data on 13,495 continuously enrolled fee-for-service Medicaid patients aged 0 to 64 years who had made at least 3 ambulatory physician visits using paid claims to the Delaware Medicaid program during a 2-year period from 1993 to 1995. Continuity with a single provider during year 1 of the study was computed for each participant to examine the association between provider continuity and future hospitalization in a Medicaid population. The authors concluded that patients with better provider continuity for 1 year had significantly lower rates of hospitalization in the subsequent year. (62) In further analysis of these data, the authors found that high continuity with a site but low continuity with a provider was found to be similar to having low continuity with an individual clinician. (63)

Living in a primary care shortage area represents an independent risk factor for a preventable hospitalization.

In a survey of Medicare beneficiaries from the 1991 Medicare Current Beneficiary Survey, Parchman and Culler examined whether Medicare beneficiaries in fair or poor health were increased risk for a preventable hospitalization if they resided in primary care health professional shortage areas. The authors found that Medicare beneficiaries in fair or poor health were 1.82 times more likely to experience a preventable hospitalization if they resided in a primary care shortage area. The authors found that living in a primary care shortage area was an independent risk factor for a preventable hospitalization, even after controlling for other factors such as income, age, and race. (64)

Laditka et al studied the relationship between physician supply and hospitalization for ambulatory care sensitive conditions (ACSH) in 642 urban counties and 306 rural counties in 20 states. The authors found that across most of the urban counties studied, the supply of primary care physicians was negatively associated with ACSH. (65)

Mauskopf et al used data from the New York State Medicaid HIV/AIDS Research Data Base on patients diagnosed with AIDS from 1983 to 1990 to examine the use of the emergency department during the 6-month period after AIDS diagnosis. Patients without a regular provider were more likely to visit the emergency room than those who had a primary care physician or used AIDS specialty clinics or primary care clinics. Among those with a regular provider of care, the authors found that patients with a primary care physician or primary care clinic as their usual source of care were less likely to use emergency department services than patients whose regular provider was an AIDS specialty clinic. (36)

In a study on the effects of health maintenance organization (HMO) penetration on preventable hospitalizations, Zhan et al examined data on preventable hospitalizations due to 14 ambulatory care sensitive conditions for 932 urban counties in 22 states. The authors found that a 10% increase in HMO penetration was associated with a 3.8% decrease in preventable hospitalizations and that fewer primary care physicians per capita was significantly associated with more preventable hospitalizations. (38)

Rosenblatt et al studied emergency department use by Medicare patients older than 65 years in Washington State during 1994 using data from the Health Care Financing Administration's National Claims History File. The authors found that patients with principal-care physicians, 63.8% of whom

were generalists, were much less likely to use the emergency department for every category of disease severity: 184.6 visits per 1,000 patient-years vs 456.9 visits per 1,000 patient-years. The 58.4% of patients with a principal-care physician made only 36.2% of all the emergency department visits. (39)

Parchman and Culler studied statewide hospital discharge data for general acute care hospitals in Pennsylvania to determine the relationship between the availability of primary care physicians and the rate of avoidable hospitalizations. The authors found that as the number of family physicians/general practice physicians in each health service area increased, the avoidable hospital condition rate decreased. This relationship remained significant even after controlling for the effect of per capita income. (35)

Primary Care Physicians Improve Quality and Outcomes

In a cross-sectional survey of 12,707 adult patients in California, Grumbach et al examined the extent to which patients value the role of their primary care physicians as first-contact care providers and coordinators of referrals. The authors found that 94% of patients valued the role of a primary care physician as a source of first-contact care and 89% valued their role as coordinator of referrals. In addition, 75% to 91% of patients surveyed indicated that they preferred to seek care initially from their primary care physicians rather than specialists depending on the specific medical problem. (66)

Using data from the Robert Wood Johnson Foundation-sponsored 1996-1997 Community Tracking Study (CTS) Household Survey and state indicators of income inequality and primary care, Shi et al examined the extent to which good primary care experience diminishes the adverse association of income inequality with self-reported health. The authors found that enhanced accessibility and continuity to primary care was associated with better self-reported general and mental health. Good primary care experience was also able to reduce the adverse association of income inequality with general health. It was especially beneficial in areas with highest income inequality. (67)

Shi and Starfield used data from the 1996 CTS Household Survey from 60 nationally representative U.S. communities to examine whether income inequality and primary care predict individual morbidity as measured by self-rated health status. The authors found that individuals living in states with a higher ratio of primary care physician to population were more likely to report good health than those living in states with a lower ratio. (25)

Mahajan et al tracked 310 consecutive patients scheduled for open-access esophagogastroduodenoscopy (EGD) and colonoscopy by nongastroenterologist physicians over a 9-month period to examine whether nongastroenterologist physicians scheduled patients for appropriate indications. The American Society for Gastrointestinal Endoscopy guidelines were used as the standard for comparison. The authors found that family practitioners and general internists did a better job of scheduling patients for appropriate indications for EGD and colonoscopy than did internal medicine subspecialists and surgeons: 97.0% vs 81.3% for EGD and 84.9% vs 66.7% for colonoscopy respectively. (31)

Shea et al studied the characteristics of the medical care received by patients in order to identify risk factors for severe, uncontrolled hypertension. Data were obtained by interviewing patients at two New York City hospitals from 1989 through 1991 using a case-control study design. After adjusting for age, sex, race or ethnic background, education, smoking status, alcohol-related problems, use of illicit drugs during the previous year, and lack of health insurance, severe, uncontrolled hypertension was found to be more common among

patients who had no primary care physician. In fact, the authors found that those admitted for uncontrolled hypertension were four times more likely to lack a primary care physician than their sample overall. (68)

Schreiber et al studied the differences between general internists and cardiologists in their approaches to treating patients with unstable angina in a community hospital. Patterns of use of established pharmacotherapies for unstable angina, diagnostic testing and clinical outcomes were compared. The authors found that general internists were less likely than cardiologists to use aspirin, heparin, and -blockers in their initial treatment of patients with chest pain. General internists had a tendency to use exercise tests more often for risk stratification and diagnosis while cardiologists performed coronary revascularization procedures 2 to 4 times as often. Yet the authors found no significant differences in the incidence of myocardial infarction or in mortality between the 2 groups. (30)

Weingarten et al evaluated data from 5,112 hospital admissions for community-acquired pneumonia, acute myocardial infarction, congestive heart failure, or upper gastrointestinal hemorrhage at 6 hospitals in the greater Cleveland, Ohio, area to compare the quality of care provided by subspecialists practicing outside of their specialty, general internists, and subspecialists practicing within their specialty. Using the severity-adjusted mortality rate and the severity-adjusted length of stay indices of quality of care, the authors found that patients cared for by subspecialists practicing outside of their subspecialty had longer lengths of stay; prolongations of stay were observed for patients with congestive heart failure (16% longer), upper gastrointestinal hemorrhage (15% longer), and community-acquired pneumonia (18% longer) than patients cared for by general internists.

Safran et al conducted a cross-sectional study of adults employed by the Commonwealth of Massachusetts in order to evaluate the characteristics of primary care that link it to important health outcomes. The authors examined the relationship between specific elements of primary care (accessibility, continuity, comprehensiveness, integration, clinical interaction, and trust) and adherence to physician's advice, patient satisfaction, and improved health status. The authors found that adherence rates were 2.6 times higher among patients who rated their physicians' comprehensive scores in the 95th percentile compared with the 5th percentile (44.0% adherence vs 16.8% adherence, $P < .001$). In addition, the likelihood of complete satisfaction was 87.5% for those with 95th percentile trust scores compared with 0.4% for patients with 5th percentile trust scores ($P < .001$). (69)

Greenfield et al studied patients sampled from health maintenance organizations, large multispecialty groups, and solo or single-specialty group practices in three cities to compare the outcomes of patients with hypertension and non-insulin-dependent diabetes mellitus (NIDDM) who were cared for in different systems of care and by generalist and subspecialist physicians. After 2 years, patients of endocrinologists and cardiologists were more likely to receive antihypertensive therapy, with no significant difference in the number of office visits, change in systolic blood pressure, change in diastolic blood pressure, or change in functional status. There was no difference in the adjusted mortality rates by physician specialty after 7 years. The authors found that there were also no significant differences between those cared for by internists, family practitioners, or endocrinologists in terms of receiving insulin therapy, frequency of blood sugar monitoring, frequency of foot examinations, or number of office visits in patients with NIDDM. For patients with NIDDM, change in physical function and adjusted mortality rates were not found to be different according to the specialty of the treating physician. (29)

O'Malley et al studied visits to community health centers, which emphasize primary care, between 1994 and 2001. The authors found that U.S. populations served by community health centers are healthier than populations with comparable levels of social deprivation receiving care in other types of physicians' offices or clinics. (70)

Regan et al used data from the 1999 Uniform Data System to compare rural health center patients with people in the general rural population for indicators of access to preventive services and health outcomes. Selected health status indicators, preventive services utilization, and health outcomes were also obtained from a survey of health center patients, and the results were compared with the National Health Interview Survey and National Vital Statistics. The study revealed that, despite having higher prevalence of traditional access barriers than the general rural population, rural health center patients were significantly more likely to receive certain preventive services and also to experience lower rates of low birthweight, particularly for African-American infants. (71)

Primary Care Physicians Provide Continuity in Health Care

Forrest and Starfield used data from the 1987 National Medical Expenditure Survey to examine the effects of access on use of primary care physicians as sources of first contact care and as sources of continuity for all ambulatory visits. The study revealed that generalists provided more first-contact care than specialists acting as primary care physicians, largely because of fewer access barriers (0.97 vs 1.31 access barriers, $P < .01$). (72)

Sox et al studied 1,952 nonretired, nonMedicare patients aged 18 to 64 years who presented with one of six chief complaints to five academic hospital emergency departments in Boston and Cambridge, Mass, during a 1-month study period in 1995. The authors evaluated access to care using three measures: delay in seeking care for the current complaint, no physician visit in the previous year, and no emergency department visit in the previous year. After controlling for clinical and socioeconomic characteristics, the study found that having a relationship with a regular physician was a stronger predictor of increased access to all health care than insurance status. (73)

Using data from the Robert Wood Johnson Foundation sponsored 1996-1997 CTS Household Survey and state indicators of income inequality and primary care, Shi et al compared the self-assessed health of those who received better primary care (as assessed by the health delivery characteristics of primary care) with those who reported less adequate primary care. The authors found that those who reported better primary care had 5% less reported poor health and 6% less reported depression. Upon examining those who reported the best primary care experiences, the authors found 8% less reported poor health and 10% less reported depression than those who reported receiving less adequate primary care. (67)

Saultz and Lochner conducted a meta-analysis of 40 studies addressing the relationship between interpersonal continuity and the outcomes and cost of health care. Of the 81 care outcomes that were tracked, 41 were significantly improved by continuity. Of the 41 cost variables associated with interpersonal continuity tracked, expenditures were significantly less for 35. The authors concluded that it was likely that a significant association existed between interpersonal continuity and improved preventive care and reduced hospitalization. (74)

Higashi et al reviewed measurements of the quality of medical care received in three cohorts of 7,680 community-dwelling adult patients in the Community Quality Index study, the Assessing Care of Vulnerable Elders study, and the Veterans Health Administration project, to evaluate the relationship between

the quality of care and the number of medical conditions a patient has. The authors found that patients with multiple medical problems actually get more preventive care and concluded that this is due to more frequent visits. For patients who received only generalist care, the relationship between the quality score and the number of conditions was found to remain positive. The data revealed that generalists can provide equivalent care to patients with complex conditions and to those with less complex conditions. (75)

In a large-scale, multisite, longitudinal evaluation of healthcare utilization in a managed care environment, Raddish et al examined the association between the degree of healthcare provider continuity and healthcare utilization and costs. 12,997 patients with arthritis, asthma, epigastric pain/peptic ulcer disease, hypertension, and otitis media were followed for more than 99,000 outpatient visits, 1,000 hospitalizations, and more than 240,000 prescriptions. The authors found that continuity of care was associated with a reduction in resource utilization and costs. (76)

O'Malley and Forrest analyzed 1988 Child Health Supplement to the National Health Interview Survey data to assess how continuity of care influenced receipt of preventive care and overall levels of ambulatory care among children and adolescents in community health clinics (CHCs). The authors found that receipt of preventive services in community health centers was greater for those who identified the community health clinic as their regular source of both preventive and illness care. Continuity of care was associated with an almost two-fold increase in the odds of receiving age-appropriate preventive care. (77)

Ryan et al surveyed 2 middle schools and 2 high schools in rural areas of a mid-Atlantic state to examine factors associated with the use of different types of ambulatory health services in a rural adolescent population. The authors found a greater use of emergency services when adolescents did not have a consistent provider for both preventive and illness care. Having a different source of care for preventive and illness care was estimated to double the likelihood that adolescents had used emergency services. In addition, those who reported greater satisfaction with their health were more likely to have received preventive care. (78)

Another study of the adolescent population and the role of continuity of care by Bartman et al used data from the 1987 National Medical Expenditure Survey. The authors found that inequities in accessing ambulatory care were more strongly associated with lack of a usual source of care than socioeconomic factors. (79)

Christakis et al used Washington State Medicaid claims data for 1997 to measure the impact of continuity of care, quality and utilization of services for children with type 1 diabetes mellitus who were covered by Medicaid. The authors found that children with high continuity of care were less likely to have diabetic ketoacidosis (DKA) as outpatients and children with medium or high continuity of care were less likely to be hospitalized for DKA. The authors concluded that low continuity of primary care is an independent risk factor for DKA. (80)

In a multicenter randomized, controlled trial at nine Veterans Affairs Medical Centers, Weinberger et al randomized veterans with a chronic disease who did not have an established relationship with a primary care physician to either intense post-discharge follow-up by a nurse and primary care physician or "usual care". The authors found that rehospitalization rates were higher in the group that received intensive primary care than controls six months after discharge, indicating that short-term relationships with physicians result in poorer outcomes. While the primary care intervention did not affect the quality of life of the patients who received it, they were substantially more satisfied than the controls with their care at both one month and six months. (81)

Primary Care Physicians Reduce Overall Healthcare Costs and Utilization

In U.S. Standard Metropolitan Statistical Areas*: An increase of one PCP/10,000 (approximately a 15% increase) would decrease.

Inpatient admissions	5.5%
Outpatient visits	5.0%
ER visits	10.9%
Surgeries	7.2%

Source: Kravet SJ, Shore AD, Miller R, Green GB, Kolodner K, Wright SM. Health care utilization and the proportion of primary care physicians. Am J Med 2008;121:142-8.

Kravet et al studied data on healthcare utilization over the 1990s to examine the impact of primary care physicians on health care utilization. The study examined healthcare utilization in 1990, 1995, and 1999 using the Area Resource File, a U.S. database compiling demographic and resource information. The authors found that increased proportions of primary care physicians across all U.S. counties was associated with significantly fewer hospital admissions, emergency department (ED) visits, and total surgeries. After controlling for patient and community factors, the association between primary care proportion and reduced utilization still remained significant. (82)

For population of 775,000, an increase from 35% to 40% primary care physicians could:

- ☐ **Reduce inpatient admissions** by ~2500/year
  - ■ At approximately $9000/admission = $23M
- ☐ **Reduce ED utilization** by 15,000 visits/year
- ☐ **Reduce surgery** by about 2500 cases/year

Source: Kravet SJ, Shore AD, Miller R, Green GB, Kolodner K, Wright SM. Health care utilization and the proportion of primary care physicians. Am J Med 2008;121:142-8.

Kronman et al used a national random sample of 78,356 Medicare beneficiaries aged 66 and over who died in 2001 to measure hospital utilization during the final 6 months of life and the number of primary care physician visits in the 12 preceding months. The authors measured hospital days, costs, in-hospital death, and presence of two types of preventable hospital admissions (congestive heart failure and chronic obstructive pulmonary disease) during the final 6 months of life. According to the authors, medical treatments for the 6 % of Medicare beneficiaries who die each year comprise almost 30% of Medicare expenditures. Thirty-eight percent of adults did not have any primary care visits during their final six months of life, 22% had one to two primary care visits, 19% had three to five visits, 10% had six to eight visits, and 11% had nine or more visits. More primary care visits in the preceding year were associated with fewer hospital days at end of life and lower costs. In 2001, nine primary care visits cost Medicare $3,000; 9 days in the hospital cost Medicare $11,000. More primary care visits also resulted in less in-hospital death and fewer preventable hospitalizations for those with congestive heart failure and chronic obstructive pulmonary disease. (19)

Weiss and Blustein used a nationally representative sample of Americans 65 and older who participated in the Medicare Current Beneficiary Survey in 1991 and had a usual source of care to examine the impact of continuity of care on the processes and costs of medical care. The authors found that relationships of longer duration between patients and their physicians were associated with lower costs. Compared with patients with a relationship of 1 year or less, patients with relationships of 10 years or more incurred $316.78 less in Part B Medicare costs, after adjustment for key demographic and health characteristics. Increased continuity in care was also associated with higher influenza immunization and lower hospitalization rates. (20)

Carey et al studied the differences in outcomes of costs of care in management of acute low back pain among primary care physicians, chiropractors, and orthopedic surgeons in North Carolina. The authors found the times to functional recovery, return to work, and complete recovery from low back pain were similar among patients seen by the various provider types. However, costs were lowest for the care provided by primary care physicians. (22)

Shekelle et al analyzed data from the RAND Health Insurance Experiment to compare the costs of an episode of back pain treated by different provider types, including chiropractors, general practitioners, and orthopedists. Visits were grouped into episodes using decision rules and clinical judgment. The primary provider was defined as the provider who delivered most of the care. The authors found that orthopedists had the highest mean total cost per episode, and general practitioners the lowest. Orthopedic surgeons had significantly higher mean total cost per episode of back pain care than general practitioners ($531 vs $281). (83)

Ozcan et al studied physician-level data from Virginia Medicaid claim files for 1993 to compare resource utilization between primary care physicians and specialists in the treatment of sinusitis in Virginia's Medicaid patients. The authors found that otolaryngologists were more costly than generalists in treating sinusitis yet there were no apparent differences in technical efficiency between the two. (84)

In a 1-year retrospective cohort study, Parekh et al examined the effects of internal medicine specialty and physician experience on inpatient resource utilization and clinical outcomes at the University of Michigan Hospitals. The authors reviewed data from 2,617 admissions to the general medicine service from July 2001 to June 2002 and found that the patients of general internists had shorter lengths of stay and lower costs than those of endocrinologists and

rheumatologists. Specifically, adjusted mean lengths of stay were significantly greater for rheumatologists (0.56 days greater; P =.002) and endocrinologists (0.38 days greater; P =.03) than general internists, and total costs were lower for general internists than for endocrinologists ($1100 lower; P =.01) and rheumatologists ($431 lower; P =.07). (85)

Fisher et al studied the health implications of regional differences in Medicare using data from the Medicare Current Beneficiary Survey (1992-1995). Upon examining patients' exposure to different levels of spending for those hospitalized between 1993 and 1995 for hip fracture (n = 614,503), colorectal cancer (n = 195,429), or acute myocardial infarction (n = 159,393), the authors found that the higher the ratio of specialists per population, the higher the surgery rates, performance of procedures, and expenditures. They also noted that the higher the level of spending in geographic areas, the more people see specialists rather than primary care physicians; and that quality and outcomes of care, for both illnesses and preventive care, were no better in higher-spending areas The authors concluded that neither quality of care nor access to care appeared to be better for Medicare enrollees in higher-spending regions for both illnesses and preventive care. (86)

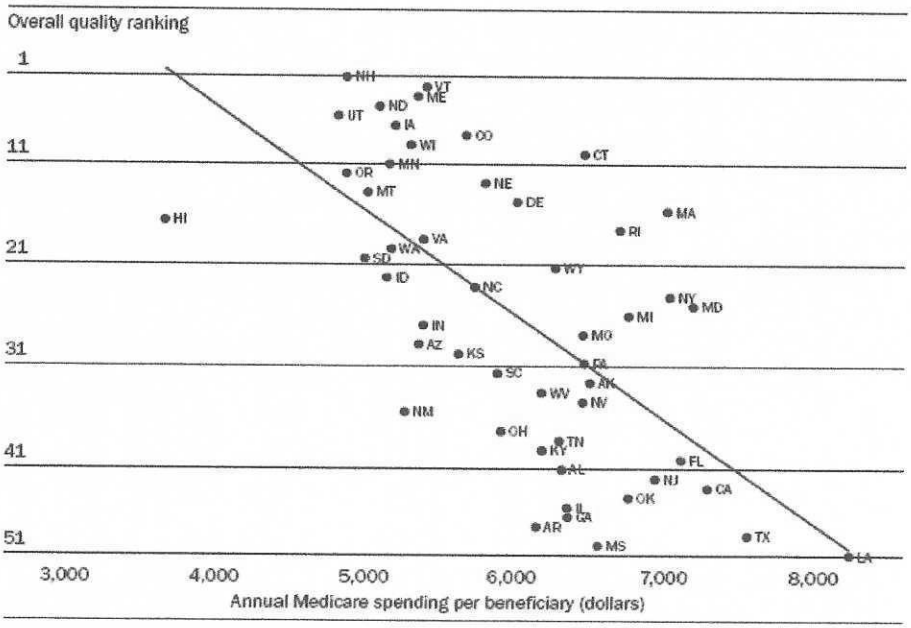
Mark et al used data from all U.S. metropolitan counties to examine the association between primary care physician supply and geographic location with respect to variation in Medicare Supplementary Medical Insurance (Part B) reimbursement. After adjusting for variables such as local price differences and county characteristics, the authors found that a greater supply of family physicians and general internists was significantly associated with lower Medicare Part B expenditures. (87)

Franks and Fiscella used data from the 1987 National Medical Expenditure Survey to examine the total annual health care expenditures and 5-year mortality experience of respondents who reported using a primary care physician than those who used a specialist as their personal physician. After adjustment for demographics, health insurance status, reported diagnoses, health perceptions, and smoking status, respondents reporting using a primary care physician had 33% lower annual adjusted health care expenditures and 19% lower adjusted mortality than those using a specialist. (88)

Welch et al used Medicare claims data for 1989 to examine geographic variations in expenditures for physicians' services use for beneficiaries living in the 317 U.S. urban areas. The authors found that areas with higher ratios of primary care physicians to U.S. elderly population had lower total health care costs than did other areas. (89)

Greenfield et al studied patients sampled from health maintenance organizations, large multispecialty groups, and solo or single-specialty group practices in three cities to compare the outcomes of patients with hypertension and NIDDM who were cared for in different systems of care and by generalist and subspecialist physicians. The authors found that primary care physicians were able to deliver care similar in quality to that of specialists while using fewer resources. (29)

EXHIBIT 1
Relationship Between Quality And Medicare Spending, As Expressed By Overall Quality Ranking, 2000–2001



SOURCES: Medicare claims data; and S.F. Jencks et al., "Change in the Quality of Care Delivered to Medicare Beneficiaries, 1998–1999 to 2000–2001," *Journal of the American Medical Association* 289, no. 3 (2003): 305–312.
NOTE: For quality ranking, smaller values equal higher quality.

Baicker and Chandra studied the relationship between the provision of high-quality care for Medicare beneficiaries and Medicare spending at the state level. The study used states' overall rankings on 22 indicators of the quality of care as measured by the Medicare Quality Improvement Organization (QIO) program for Medicare fee-for-service beneficiaries during 2000-2001. Higher spending was associated with greater use of hospital resources but was not associated with higher patient satisfaction. The authors found that Medicare spending is less for states with more primary care physicians and that these states have more effective, higher-quality care. In fact, increasing the number of primary care physicians in a state by 1 per 10,000 population was associated with a rise in that state's quality rank of more than 10 places and a reduction in overall spending of $684 per Medicare beneficiary. In contrast, the authors found that the supply of specialists was associated with increased spending and lower-quality care. An increase of 1 specialist per 10,000 population was estimated to result in a drop in overall quality rank of nearly 9 places and an increase in overall spending of $526 per Medicare beneficiary. (42)

Forrest and Starfield used ambulatory claims data from the 1987 National Medical Expenditure Survey to examine the effect of first-contact care with primary care clinicians on ambulatory health care expenditures. The authors analyzed 20,282 episodes of care for 24 preventive care and acute illness conditions and found that for 23 of the 24 health problems studied, first-contact care with a primary care physician was associated with reductions in expenditures. The study associated first-contact care with reductions in ambulatory episode-of-care expenditures of over 50%. (90)

Rubenstein et al surveyed veterans who visited Veterans Affairs Medical Center in Sepulveda, California, to evaluate the impact of a recent reorganization emphasizing primary and ambulatory care. The authors found that the institution's reorganization toward primary and ambulatory care resulted in enhanced continuity of care, higher rates of preventive services, fewer hospitalizations, and lower death rates. (91)

Studies in Other Countries Confirm Primary Care's Benefits

Reduced Hospital Admissions and ED Visits

Gulliford conducted an ecological analysis of 99 health authorities in England in 1999 that evaluated whether population health was associated with general practitioner (GP) supply in England. Health outcomes included standardized mortality ratios, infant mortality rate (per 1,000), hospital admissions with acute and chronic conditions (per 100,000), and teenage conception rates (per 1,000). The author found that the higher the ratio of general practitioners, the lower the rate of all-cause mortality at 15 to 64 years of age. In fact, the standardized mortality ratio for all-cause mortality at 15-64 years decreased by about 6% with each additional general practitioner per 10,000 population. Hospital admission rates for both acute and chronic conditions were also found to have decreased with each additional general practitioner per 10,000 population. (92)

Burge et al conducted a retrospective, population-based study of patients who died of cancer and who had made at least three visits to a family physician during their last 6 months of life between 1992 to 1997 to evaluate the relationship between total emergency department (ED) visits and family physician continuity of care in Canada. The authors found that greater family physician continuity of care for cancer patients during the end-of-life was associated with decreased ED utilization. (93)

Menec et al studied data on all individuals who had at least one physician contact in 1998 or 1999 in a midwestern Canadian city to examine the relationship between continuity of care and preventive health care and emergency department (ED) use in a universal health care system. The authors found that having a long-term relationship with a single primary care physician resulted in better preventive care and fewer ED visits despite free access to health care services for all individuals. (37)

Casanova et al conducted a cross-sectional survey of 504 children hospitalized in a District General Hospital in Valencia, Spain, to identify sociodemographic and primary care factors associated with pediatric hospitalization for ambulatory care–sensitive conditions. The authors gathered data on sociodemographic disparities, the type of physician providing primary care, and ambulatory care use prior to hospitalization. The Spanish health system's primary care orientation was determined to reduce hospitalization rates for certain conditions despite socioeconomic disparities. (94)

In a review of medical records of patients admitted to medical wards of a nonteaching acute care hospital in Catanzaro Italy, Rizza et al confirmed the crucial role that primary care physicians play in reducing unnecessary hospitalizations. The authors quantified the proportion of avoidable hospital admissions for ambulatory care–sensitive conditions to assess the relationship between primary care access characteristics and preventable hospitalizations. Of the 31.5% of the hospitalizations in the sample that were judged to be preventable, 40% were for congestive heart failure, 23.2% for chronic obstructive pulmonary disease, 13.5% for angina without procedure, 8.4% for hypertension, and 7.1% for bacterial pneumonia. They found that poor access to primary health care increased the likelihood of hospitalization for ambulatory care–sensitive conditions, after controlling for most of the other factors that may affect hospital admission, such as sociodemographics and propensity to seek care. (95)

Reduced Mortality Rates

In another study of health authorities in England, Gulliford et al examined data for the supply and structure of primary medical services. Dependent variables included standardized mortality ratios (SMR), standardized hospital admission rates, and pregnancy in teenagers younger than 18 years. The authors found that the ratio of general practitioners to population was significantly associated with decreased all-cause mortality, acute myocardial infarction mortality, avoidable mortality, acute hospital admissions, and teenage pregnancies. After controlling for socioeconomic deprivation and for partnership size, the authors found that the structural characteristics of primary care practices may have had a greater impact on health outcomes than just the presence of primary care physicians. (96)

McAlister et al used data on 24,232 adults newly diagnosed with diabetes mellitus between 1991 and 2001 in a publicly funded health care system with universal access to study the effects of specialty care on patients with chronic conditions treated in the ambulatory care setting. Over 5 years of follow-up, the authors found that all-cause mortality was higher in specialty care patients (13.1%) than patients cared for solely by primary care doctors (11.7%). (97)

Jarman et al studied data on in-hospital mortality over a 4-year period in England, to determine which factors best explain variation in standardized hospital death ratios. The authors reviewed eight million discharges from NHS hospitals when the primary diagnosis was one of the diagnoses accounting for 80% of inpatient deaths. The study revealed that in hospital death rates fell significantly in association with increased numbers of general practitioners in the communities outside the hospitals and that this supply is more closely related with lower in-hospital death rates than is the total number of physicians per 100 beds. (98)

Gravelle et al linked data from 49,541 individuals from the Health Survey for England database with data from 351 English local authorities to examine the impact of family physicians supply on individual health. A 10% increase in family physician supply was associated with a 6% increased probability of reporting good health. This association remained significant even after allowing for endogeneity. (99)

Benefits of Continuity of Care

Hjortdahl and Laerum surveyed 3918 Norwegian primary care patients to evaluate the influence of continuity of care on patient satisfaction. Continuity of care was recorded as the duration and intensity of the present patient-doctor relationship and as patients' perception of whether their current doctor was their personal doctor. The authors found that patients consulting a physician they regarded as their personal doctor were seven times more likely (95% CI 4.9 to 9.9) to rate the consultation as satisfactory compared with consultations where no such relationships existed. (100)

In a multipractice survey of consecutive adult patients consulting general practitioners in Norway, Gulbrandsen et al evaluated general practitioners' knowledge of a range of psychosocial problems among their patients. The authors measured doctors' knowledge of nine predefined psychosocial problems in patients and found that previous knowledge of a patient, reflecting continuity of care, increased the chances of a doctor recognizing psychosocial problems. (101)

De Maeseneer et al studied patient utilization patterns in the Belgian health care system over a 2-year period to assess whether provider continuity with a family physician was related to lower health care costs. The authors found that patients who were visiting the same family physician had a lower total cost for medical care. The study also revealed that provider continuity was one of the most significant variables related to total health care cost. (102)

U.S. Primary Care Weak in International Comparisons

In a 2004 survey of primary care experiences among adults in Australia, Canada, New Zealand, the United Kingdom, and the United States, Schoen et al examined recent experiences with access to care, emergency care, coordination, continuity, and doctor-patient interactions. The authors found that the U.S. primary care system ranked either last or significantly lower than the leaders on almost all dimensions of patient-centered care, including access, coordination, and physician-patient experiences. These findings stand in stark contrast to U.S. spending rates that outstrip those of the rest of the world. The survey also revealed that nearly 1 in 10 adults in the United States reported having no usual person or place and nearly one in five reported not having a usual doctor. People in the United States were also found to experience more adverse effects and more errors. (103)

The U.S. primary care system ranked either last or significantly lower than leading industrialized nations on access, coordination, and physician-patient experiences.

In a 1991 study by Starfield, 10 Western industrialized nations were compared on the extent of their primary health service, their population's score on 12 health indicators, and the satisfaction of their populations in relation to overall costs of the systems. The author found that there was general concordance for primary care, the health indicators, and the satisfaction-expense ratio in 9 of the 10 countries. The United States ranked low on all three measures. (15)

Americans spend less time with a primary care physician than patients in countries with better health outcomes.

Bindman et al reviewed 79,790 office visits in Australia, 10,064 in New Zealand, and 25,838 in the U.S. in a comparison of three comparable cross sectional surveys performed in 2001-2002. The authors found that while primary care visits were longer in the U.S. than in New Zealand and Australia, the per capita annual exposure to primary care physicians in the U.S. (29.7 minutes) was about half that of New Zealand (55.5 minutes) and about a third that of Australia (83.4 minutes) because of higher rates of primary care visits in these countries. The authors note that the provision of prevention services recommended by the U.S. Prevention Services Task Force requires an estimated average of 37 minutes per patient a year for children and 40 minutes per patient for adults. (104)

Starfield and Shi compared the association of primary care with health outcomes in 13 industrialized countries. The authors found that primary care–oriented countries showed better health outcomes even after income inequality, smoking rates, post-neonatal mortality, and low birthweight were controlled for. The authors also found that countries with weak primary care did not perform as well on most major aspects of health, including mental health including years of potential life lost due to suicide. Another finding was that the stronger primary care, the lower the costs. (16)

Macinko et al analyzed the contribution of primary care in 18 wealthy Organization for Economic Cooperation and Development (OECD) countries over three decades. The authors found that the stronger the country's primary care orientation was, the lower the rates were for all-cause mortality, all-cause premature mortality, and cause-specific premature mortality from asthma and

bronchitis, emphysema and pneumonia, cardiovascular disease, and heart disease. Even after controlling for system and population characteristics, this relationship was significant. The analyses estimated that increasing a country's primary care score by 5 points on a 20-point scale could reduce premature deaths from asthma and bronchitis by up to 6.5%. The same increase in a country's primary care score could impact premature mortality from heart disease by up to 15%. The authors concluded that strong primary care system and practice characteristics, such as geographic regulation, longitudinality, coordination, and community orientation, were associated with improved population health. (105)

A 2005 Commonwealth Fund report based on two surveys of patients ranked patients' ratings of various dimensions of their health care, according to the Institute of Medicine's framework for quality. The first survey was conducted in 2004 among a nationally representative sample of adults in Australia, Canada, New Zealand, the United Kingdom, and the United States. The second survey in 2005 was conducted among a sample of adults with health problems in the same five countries and Germany. Of 51 indicators of quality of care, the United States ranked first on only 6 indicators, including effectiveness of care, but was last or tied for last on 27 (106).

Conclusion

The evidence for the value of primary care is clear: better quality of life, more productive longevity, and lower costs as a result of reduced hospitalization improved prevention and better coordination of chronic disease care. The nation must take immediate steps to address the issues that threaten primary care's survival. ACP calls on the federal government, large employers and other purchasers, health plans, and the medical profession itself to take immediate action to create a comprehensive national health care workforce policy with a focus on primary care (2); adopt a patient-centered physician guided model of health care delivery to provide Americans with optimal care (3); and restructure payment policies to support the value of care provided by primary care physicians (4). The consequences of failing to act will be higher costs, greater inefficiency, lower quality, more uninsured persons, and growing patient and physician dissatisfaction. Averting the collapse of primary care is the best cure for an ailing health care system.

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