Contribution of Primary Care to Health Systems and Health

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Evidence of the health-promoting influence of primary care has been accumulating ever since researchers have been able to distinguish primary care from other aspects of the health services delivery system. This evidence shows that primary care helps prevent illness and death, regardless of whether the care is characterized by supply of primary care physicians, a relationship with a source of primary care, or the receipt of important features of primary care. The evidence also shows that primary care (in contrast to specialty care) is associated with a more equitable distribution of health in populations, a finding that holds in both cross-national and within-national studies. The means by which primary care improves health have been identified, thus suggesting ways to improve overall health and reduce differences in health across major population subgroups.

Key Words: Primary care, health outcomes, population health.

THE TERM *PRIMARY CARE* IS THOUGHT TO DATE BACK TO ABOUT 1920, when the Dawson Report was released in the United Kingdom. That report, an official "white paper," mentioned "primary health care centres," intended to become the hub of regionalized services in that country. Although primary care came to be the cornerstone of the health services system in the United Kingdom as well as in many other countries, no comparable focus developed in the United States. Indeed, the formation of one after another specialty board

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in the early decades of the 20th century signaled the increasing specialization of the U.S. physician workforce (Stevens 1971). The GI Bill of Rights, which supported the further training of physicians returning from service in World War II, helped increase the specialization of many who had been general practitioners (generalists) before the war. At that time, general practitioners were physicians who lacked additional training after graduation from medical school, apart from a short clinical internship.

Concerned that the survival of generalist physicians would be threatened by the disproportionate increase in the supply of specialists in the United States—to the detriment of generalist practice—family physicians, working with international colleagues, established standards for credentialing the new "specialty" of family practice. Thus, in the 1960s and 1970s, longer postgraduate training became part of generalist physicians' preparation for practice. This recognition of a "specialty" of primary care, which, in the United States, covered general internal medicine as well as general pediatrics, resulted in two reports from the Institute of Medicine (IOM) (Donaldson et al. 1996; IOM 1978). These reports defined primary care as "the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community." This definition is consistent with at least two international reports (WONCA 1991; World Health Organization 1978) and has been used to measure the four main features of primary care services: first-contact access for each new need; long-term person- (not disease) focused care; comprehensive care for most health needs; and coordinated care when it must be sought elsewhere. Primary care is assessed as "good" according to how well these four features are fulfilled. For some purposes, an orientation toward family and community is included as well (Starfield 1998).

Despite the greater recognition of the importance of primary care to health services systems (World Health Organization 1978, 2003), professionals have recently called for increasing even further the supply of specialist physicians in the United States (Cooper et al. 2002). Compared with other industrialized nations, the United States already has a surplus of specialists, but not of primary care physicians. On the basis of the studies reviewed in this article, we believe that health of the U.S. population will improve if this maldistribution is corrected. Specifically, a greater emphasis on primary care can be expected to lower the costs

of care, improve health through access to more appropriate services, and reduce the inequities in the population's health.

We first review the evidence concerning the relationship between primary care and health, using three different measures of primary care. The effect of health policy on primary care and health can also be determined by between-country comparisons, which we summarize next. We then consider the impact of primary care in reducing disparities in health across population groups. After a section on cost considerations, we discuss why primary care would be expected to have a beneficial effect on health. We then look at the analyses' limitations and discuss the likely nature of primary care in the future in accordance with the policy implications of this evidence.

Reviewing the Evidence

We used research on the effects of primary care on health from studies of the supply of primary care physicians, studies of people who identified a primary care physician as their regular source of care, and studies linking the receipt of high-quality primary care services with health status. These three lines of evidence represent a progressively stronger demonstration that primary care improves health by showing, first, that health is better in areas with more primary care physicians; second, that people who receive care from primary care physicians are healthier; and, third, that the characteristics of primary care are associated with better health. We used three systematic literature reviews of primary care (Atun 2004; Engstrom, Foldevi, and Borgquist 2001; Health Council of the Netherlands 2004), supplemented by our own compilation of articles in major national and international general medical journals. We concentrated on publications written in English and mainly on studies from the United States (which accounted for most of them).We did, however, include studies from other countries if they addressed primary care, as measured by at least one of the three types of studies. A study's inclusion or exclusion did not depend on its findings. Rather, the only criterion for inclusion was a clear conceptualization of primary care, systematic data collection and analysis, and comparison populations. Several studies in the systematic literature reviews, although uniformly favorable to primary care, did not meet these criteria and therefore were excluded.

Primary Care and Health

Health Outcomes and the Supply of Primary Care Physicians

As a group, these studies covered a variety of health outcomes: total and cause-specific mortality, low birth weight, and self-reported health. They examined the relationship between the supply of primary care physicians and health at different levels of geographic aggregation (state, county, metropolitan, and nonmetropolitan regions); controlled for various population characteristics (such as income, education, and racial distribution); and used several different analytic approaches (standard regressions, path analyses) in individual years (cross-sectional) as well as over time (longitudinal).

The number of primary care physicians per 10,000 population is the measure of "supply." Primary care physicians include family and general practitioners, general internists, and general pediatricians. These three types of physicians constitute the primary care physician workforce and have been shown to provide the highest levels of primary care characteristics in their practices (Weiner and Starfield 1983).

Studies in the early 1990s (Shi 1992, 1994) showed that those U.S. states with higher ratios of primary care physicians to population had better health outcomes, including lower rates of all causes of mortality: mortality from heart disease, cancer, or stroke; infant mortality; low birth weight; and poor self-reported health, even after controlling for sociodemographic measures (percentages of elderly, urban, and minority; education; income; unemployment; pollution) and lifestyle factors (seatbelt use, obesity, and smoking). Vogel and Ackerman (1998) subsequently showed that the supply of primary care physicians was associated with an increase in life span and with reduced low birth-weight rates.

Other studies added sophistication to these early studies by examining the relationship between primary care and health after considering other potentially confounding characteristics. One of these confounders was income inequality, or the extent to which income is concentrated in certain social groups rather than being equitably distributed. In 1999, Shi and colleagues reported that both primary care and income inequality had a strong and significant influence on life expectancy, total mortality, stroke mortality, and postneonatal mortality at the state level. They also found smoking rates to be related to these outcomes, but the effect

of the primary care physician supply persisted after they controlled for smoking (Shi et al. 1999). A later study confirmed these findings, this time using self-assessed health as the health outcome (Shi and Starfield 2000). These relationships remained significant after controlling for age, sex, race/ethnicity, education, paid work (employment and type of employment), hourly wage, family income, health insurance, physical health (SF-12), and smoking.

Additional studies examined the influence of the supply of primary care physicians at the state level while also taking into account the supply of specialist physicians. These analyses found, in the same year as well as in time-lagged (between 1985 and 1995) analyses, that the supply of primary care physicians was significantly associated with lower all-cause mortality, whereas a greater supply of specialty physicians was associated with higher mortality. When the supply of primary care physicians was disaggregated into family physicians, general internists, and pediatricians, only the supply of family physicians showed a significant relationship to lower mortality (Shi et al. 2003a).

Mortality attributed to cerebrovascular stroke also was found to be influenced by the supply of primary care physicians. Using 11 years of state-level data and adjusting for income inequality, educational level, unemployment, racial/ethnic composition, and percentage of urban residents, the supply of primary care physicians remained significantly associated with reduced mortality and even wiped out the adverse effect of income inequality (Shi et al. 2003b).

Consistent with these findings for total and cause-specific mortality, the reduction in low birth weight at the state level was significantly associated with the supply of primary care physicians in the concurrent year as well as after one-, three-, and five-year lag periods (Shi et al. 2004). A greater supply of primary care physicians was associated with lower infant mortality as well and persisted after controlling for various socioeconomic characteristics and income inequality.

County-level analyses confirmed the positive influence of an adequate supply of primary care physicians by showing that all-cause mortality, heart disease mortality, and cancer mortality were lower where the supply of primary care physicians was greater. When urban areas (counties including a city with at least 50,000 people) and nonurban areas were examined separately (Shi et al. 2005b), nonurban counties with a greater number of primary care physicians experienced 2 percent lower all-cause mortality, 4 percent lower heart disease mortality, and 3 percent lower

cancer mortality than did nonurban counties with a smaller number of primary care physicians. In urban areas, however, the relationship appeared more complex, possibly resulting from the lesser degree of income inequality and the greater racial differences in urban areas. A study of premature mortality (mortality before age 75) in U.S. metropolitan, urban, and rural areas found inconsistent relationships to the supply of primary care physicians, possibly owing to a statistical instability in the way in which the supply of physicians was categorized, which was inappropriate for areas with great variability in both the supply and the population size (Mansfield et al. 1999).

Analyses conducted in counties in the state of Florida used cervical cancer mortality as the health outcome. Controlling for a variety of county-level characteristics (percentage of whites, low educational level, median household income, percentage of married females, and urban/nonurban), each one per 10,000 population increase in the supply of family physicians was associated with a decrease in mortality of 0.65 per 100,000 population. That is, a one-third increase in the supply of family physicians was associated with a 20 percent lower mortality rate from cervical cancer. The positive effect of primary care was also found in the significant relationship between reduced mortality and the supply of general internists, but not the supply of obstetrician-gynecologists (Campbell et al. 2003).

The relationship between primary care physician supply and better health is not limited to studies in the United States. In England, the standardized mortality ratio for all-cause mortality at 15 to 64 years of age is lower in areas with a greater supply of general practitioners. (In England, pediatricians and internists are not considered, and do not function as, primary care physicians.) Each additional general practitioner per 10,000 population (a 15 to 20 percent increase) is associated with about a 6 percent decrease in mortality (Gulliford 2002). A later study (Gulliford et al. 2004) found that the ratio of general practitioners to population was significantly associated with lower all-cause mortality, acute myocardial infarction mortality, avoidable mortality, acute hospital admissions (both chronic and acute), and teenage pregnancies, but the statistical significance disappeared after controlling for socioeconomic deprivation and for partnership size, which the authors interpreted as suggesting that the structural characteristics of primary care practices may have had a greater impact on health outcomes than did the mere presence of primary care physicians.

The supply of general practitioners also has high salience for in-hospital mortality; that is, it is more closely associated with lower in-hospital standardized mortality than is the total number of physicians per 100 hospital beds (Jarman et al. 1999).

In summary, the studies consistently show a relationship between more or better primary care and most of the health outcomes studied. Primary care was associated with improved health outcomes, regardless of the year (1980–1995), after variable lag periods between the assessment of primary care and of health outcomes, level of analysis (state, county, or local area), or type of outcome as measured by all-cause mortality, heart disease mortality, stroke mortality, infant mortality, low birth weight, life expectancy, and self-rated health. All but a few studies found this effect for cancer mortality. The magnitude of improvement associated with an increase of one primary care physician per 10,000 population (a 12.6 percent increase over the current average supply) averaged 5.3 percent. The results of these studies suggest that as many as 127,617 deaths per year in the United States could be averted through such an increase in the number of primary care physicians (Macinko, Starfield, and Shi 2005).

Patients' Relationship to Primary Care Facilities and Providers

Because a greater number of primary care physicians does not necessarily mean that all people in the area have greater access to or receipt of primary care services, analyses considering people's relationships to or experiences with a primary care practitioner are helpful to determining the association between primary care and health outcome. Thus the second line of evidence for the positive impact of primary care on health comes from comparing the health of people who do or do not have a primary care physician as their regular source of care.

A nationally representative survey showed that adult U.S. respondents who reported having a primary care physician rather than a specialist as their regular source of care had lower subsequent five-year mortality rates after controlling for initial differences in health status, demographic characteristics, health insurance status, health perceptions, reported diagnoses, and smoking status (Franks and Fiscella 1998). That is, people who identify a primary care physician as their usual source of

care are healthier, regardless of their initial health or various demographic characteristics.

U.S. populations served by community health centers, which are required to emphasize primary care as a condition for federal funding, are healthier than populations with comparable levels of social deprivation receiving care in other types of physicians' offices or clinics (O'Malley et al. 2005). People receiving care in community health centers receive more of the indicated preventive services than does the general population (Agency for Healthcare Research and Quality 2004). A comparison of rural patients receiving care in these community health centers with patients receiving care in other types of facilities showed that despite being sicker, they are significantly more likely to have received a Pap smear in the previous three years and to have been vaccinated against pneumococcal infection and less likely to have low-birth-weight babies (Regan et al. 2003).

In some health systems, both in the United States and abroad, people normally go to their primary care physician before seeking care elsewhere (such as from another type of physician). Spain passed a law in the mid-1980s that strengthened primary care by reorganizing services to better achieve the main features of primary care, which led to the establishment of a national program of primary health care centers. The impact of this reform on health was evaluated after ten years by examining mortality rates for some major causes of death (Villalbi et al. 1999). Death rates associated with hypertension and stroke fell most in those areas in which the reform was first implemented. There even were fewer deaths from lung cancer in those areas with primary care reform than in other areas. Health outcomes that would not be expected to be influenced by primary care, for example, perinatal mortality, did not differ across the areas.

Outcomes of care after surgery in Canada also were shown to be better when care was sought from a primary care physician who then referred children to specialists for recurrent tonsillitis or otitis media, compared with self-referral to a specialist (Roos 1979). The referred children had fewer postoperative complications, fewer respiratory episodes following surgery, and fewer episodes of otitis media after surgery, thus implying that specialist interventions were more appropriate when patients were referred from primary care.

Finally, we note that Cuba and Costa Rica, which reformed their health systems to provide people with a source of primary care, now have much lower infant mortality rates than do other countries in Latin America. In

Cuba, infant mortality rates now are on a par with those in the United States (PAHO 2005; Riveron Corteguera 2000; Waitzkin et al. 1997).

The findings from studies of the impact of actually receiving care from a primary care source consistently show benefits for a variety of health and health-related outcomes.

How Well the Characteristics of Primary Care Are Achieved

As we noted earlier, until recently primary care could be assessed only by determining the type of physician who provided it: family physicians, general internists, and general pediatricians in the United States; and family physicians or general practitioners in most other industrialized countries. The intensive examination of criteria for the designation of "primary care" in the most recent half century encouraged the development of tools to assess the adequacy of those health delivery characteristics that together define the practice of primary care. This development then enabled us to examine the extent to which the receipt of better primary care is associated with better health.

Using these new methods, several studies have demonstrated a positive association between the adequacy of the features of primary care and the provision of preventive services. A cross-sectional study using a representative sample of 2,889 patients in Ohio evaluated the aforementioned four attributes of primary care for their relationship to the delivery of preventive services. After controlling for the patients' age, race, health, and insurance in the hierarchical linear regression model (HLM), each of the measured primary care attributes was significantly associated with patients' being up to date on screening, immunization, and health habit–counseling services (Flocke, Stange, and Zyzanski 1998). According to another study, adolescents with the same regular source of care for preventive and illness care (one indication that the source is focused on providing primary care) were much more likely to receive the indicated preventive care and less likely to seek care in emergency rooms (Ryan et al. 2001).

The positive impact of primary care also was shown by comparing 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. Among those who reported better

primary care, more than 5 percent fewer people reported poor health and 6 percent fewer reported depression than did people experiencing less adequate primary care. Considering only those who reported the *best* primary care experiences, 8 percent fewer reported poor health, and more than 10 percent fewer reported feeling depressed, compared with those who received less adequate primary care (Shi et al. 2002).

Studies in two different areas of Brazil confirmed the relationship between the adequacy of primary care delivery characteristics and self-reported health. In a study in Petropolis, Macinko, Almeida, and Sa (2005) showed that patients who had better primary care experiences were more likely to report better health, even after adjusting for other salient characteristics such as their age, whether or not they had a chronic illness or a recent illness, household wealth, educational level, and the type of facility in which they received their care. Using parents' reports of their children's primary care, Erno Harzheim and colleagues confirmed these findings in a study conducted in Porto Alegre (Harzheim 2005, personal communication).

International Comparisons

International comparisons extended our examination of the impact of primary care according to the achievement of its characteristics. Studies of the characteristics of different health systems were particularly useful because they enabled us to assess the impact of various policy characteristics on the practice and outcomes of primary care. Three studies, one using data from the mid-1980s and two from a decade later, demonstrated not only that countries with stronger primary care generally had a healthier population but also that certain aspects of policy were important to establishing strong primary care practice.

The first study examined the association of primary care with health outcomes through an international comparison conducted in 11 industrialized countries (Starfield 1991, 1994). Each country's primary care was rated according to the four main characteristics of primary care practice: first-contact care, person-focused care over time, comprehensive care, and coordinated care, as well as family orientation and community orientation. Policy characteristics were the attempts to distribute health services resources equitably (according to the extent of health needs in different areas of the country); universal or near-universal financial coverage

guaranteed by a publicly accountable body (government or government-regulated insurance carriers); low or no copayments for health services; percentage of physicians who were not primary care physicians; and professional earnings of primary care physicians relative to those of other specialists. (Operational definitions of these indicators and the method of scoring them are described in Starfield 1998.) The first important finding is that the score for the practice characteristics was highly correlated with the score for the policy characteristics. That is, the adequate delivery of primary care services was associated with supportive governmental policies. The second finding is that those countries with low primary care scores as a group had poorer health outcomes, most notably for indicators in early childhood, particularly low birth weight and postneonatal mortality.

A more recent comparison, with 13 countries and an expanded set of indicators of both primary care policy characteristics and health outcomes, also showed better health outcomes for the primary care–oriented countries even after controlling for income inequality and smoking rates, most significantly for postneonatal mortality ($r = .74$, $p < .001$) and rates of low birth weight ($r = .38$, $p < .001$). Countries with weak primary care also performed less well on most major aspects of health, including mental health, such as years of potential life lost because of suicide (Starfield and Shi 2002). The positive impact of primary care orientation on low birth-weight rates may reflect a beneficial effect of primary care on mothers' health *before* pregnancy (Davey Smith and Lynch 2004; Starfield and Shi 2002). The characteristics of primary care practice present in countries with high primary care scores and absent in countries with low primary care scores were the degree of comprehensiveness of primary care (i.e., the extent to which primary care practitioners provided a broader range of services rather than making referrals to specialists for those services) and a family orientation (the degree to which services were provided to all family members by the same practitioner). The most consistent policy characteristics were the government's attempts to distribute resources equitably, universal financial coverage that was either under the aegis of the government or regulated by the government, and low or no patient cost sharing for primary care services (Starfield and Shi 2002). The latter two were studied and confirmed by Or (2001).

The positive contributions of primary care to health also were found in a much more extensive time-series analysis of 18 industrialized

countries, including the United States (Macinko, Starfield, and Shi 2003). The stronger the country's primary care orientation (as measured by the same scoring system as in the earlier international comparison) was, the lower the rates were of all-cause mortality, all-cause premature mortality, and cause-specific premature mortality from asthma and bronchitis, emphysema and pneumonia, cardiovascular disease, and heart disease. This relationship held even after controlling for various system characteristics (GDP per capita, total physicians per 1,000 population, percentage of elderly people) and population characteristics, including the average number of ambulatory care visits, per capita income, alcohol consumption, and tobacco consumption. The analyses estimated that increasing a country's primary care score by five points (on a 20-point scale) would be expected to reduce premature deaths from asthma and bronchitis by as much as 6.5 percent and that the reduction in premature mortality for heart disease could be as high as 15 percent.

Data from this study were analyzed as well to ascertain the robustness of primary care scores over time. The average primary care score increased by nearly one point from the 1970s to the 1990s. Countries that performed well in the 1970s remained high performers in each succeeding decade. When countries were divided into high and low performers (above or below the mean for each decade), no country crossed the threshold from low to high or from high to low, but the score of some countries changed. One country's score fell over time; Germany lowered access to ambulatory care services by imposing higher copayments, thus lowering its overall primary care score (OECD 2001). In general, policy changes over time paralleled improvements in primary care practice. For example, in the late 1980s and early 1990s, Spain strengthened its primary care by moving to a tax-based financing system, improving its geographic allocation of funds, and increasing the supply of family physicians as well as developing primary health care centers that improved integration, family orientation, coordination of care, and health promotion services (Larizgoitia and Starfield 1997). The United States' score rose slightly over time, almost entirely resulting from the greater participation of Americans in health maintenance organizations (HMOs), which tend, on average, to use a higher percentage of primary care practitioners (Weiner 2004) and have (at least among the not-for-profit HMOs) a tradition of community involvement (Stevens and Shi 2003).

Primary Care and Disparities in Health Outcomes

Both the World Health Organization and many countries (including the United States) have recognized the existence of marked disparities (inequities) in health across population subgroups and have identified reductions (and, for the United States, even elimination) of these as a priority (Sachs and McArthur 2005; U.S. Department of Health and Human Services 2000). In reviewing the impact of primary care on reductions in disparities in health, we looked at studies of physician supply, studies of the association with a primary care physician, and studies of the receipt of services that fulfilled the criteria for primary care delivery.

Higher ratios of primary care physicians to population are associated with relatively greater effects on various aspects of health in more socially deprived areas (as measured by high levels of income inequality). Areas with abundant primary care resources and high income inequality have a 17 percent *lower* postneonatal mortality rate (compared with the population mean), whereas the postneonatal mortality rate in areas of high income inequality and few primary care resources was 7 percent *higher*. For stroke mortality, the comparable figures were 2 percent *lower* mortality where the primary care resources were abundant and 1 percent *higher* where the primary care resources were scarce (calculated from data in Shi et al. 1999). These findings are even more striking in the case of self-reported health. Income inequality and primary care were significantly associated with self-rated health, but the supply of primary care physicians significantly reduced the effects of income inequality on self-reported health status (Shi and Starfield 2000). People in high-income-inequality areas were 33 percent more likely to report fair or poor health if the primary care resources were few (calculated from data in Shi and Starfield 2000).

As in state-level analyses, the adverse impact of income inequality on all-cause mortality, heart disease mortality, and cancer mortality was considerably diminished where the number of primary care physicians in county-level analyses was high (Shi et al. 2005a).

The supply of primary care physicians in the U.S. states has a larger positive impact on low birth weight and infant mortality in areas with high social inequality than it does in areas with less social inequality (Shi et al. 2004).

Eleven years of state-level data found the supply of primary care physicians to be significantly related to lower all-cause mortality rates in both African American and white populations, after controlling for income inequality and socioeconomic characteristics (metropolitan area, percentage of unemployed, and educational levels). In these state-level analyses, the supply of primary care physicians had a greater positive impact on mortality among African Americans than among whites. The inclusions of both the supply of primary care physicians and sociodemographic characteristics eliminated the negative impact of income inequality. The association between a greater supply of primary care physicians and lower total mortality was found to be four times greater in the African American population than in the white majority population, indicating a reduction in racial disparities in mortality in the U.S. states (Shi et al. 2005c). But when exploring further the relationship between the supply of primary care physicians and health outcomes in African American and white populations in metropolitan areas of the United States, both the supply of primary care and income inequality were significantly associated with total mortality rates in the white population, whereas only income inequality maintained its significant relationships in African American populations (Shi and Starfield 2001). The authors interpreted this finding as suggesting that in many urban areas, a great supply of primary care physicians does not ensure certain population subgroups' access to primary care; they may receive their care in places such as hospital clinics and emergency rooms, which do not emphasize primary care.

The equity-related effect of having a good primary care source also was found in the study that examined the degree of primary care–oriented services that people received. Good primary care experiences were associated with reductions in the adverse effects of income inequality on health, with fewer differences in self-rated health between higher and lower income-inequality areas where primary care experiences were stronger (Shi et al. 2002). Although similar in the direction of effect, the relationship to "feeling depressed" was not statistically significant.

In county-level analyses that stratified urban areas by race, the supply of primary care physicians had a strong and significant influence on white mortality in both low- and high-income-inequality areas, but only a weak association with African American mortality in low-income-inequality areas and no significant association in high-income-inequality areas (Shi et al. 2005b).

Thus, the U.S. studies showed that an adequate supply of primary care physicians reduced disparities in health across racial and socioeconomic groups. Multivariate analyses controlling for individual, community, and state-level characteristics provided strong evidence for the association of primary care with fewer disparities in several aspects of health.

These conclusions are buttressed by a study comparing the type of place where care is received. Disparities in low-birth-weight percentages between the majority white and African American infants are fewer in infants of mothers receiving care in primary care–oriented community health centers, compared with the population as a whole. In both white and African American populations in both urban and rural areas in the United States, the rates of low birth weight were lower, in both absolute numbers and ratios of rates, where the source of care was a community health center (Politzer et al. 2001).

A study of civil servants in the United Kingdom, where access to primary care physicians is universal, found that socioeconomic differences in coronary heart disease mortality were *not* a result of differences in cardiac care (Britton et al. 2004). Another exploration of the effect of primary care found that blacks in London did not have greater rates of diabetes-related lower-extremity amputation than whites did (Leggetter et al. 2002), whereas blacks in the United States had rates two to three times higher than that in the white population. In the United Kingdom, the rates were lower in black men than in the white population, a difference wholly accounted for by lower rates of smoking, neuropathy, and peripheral vascular disease. The findings persisted even after controlling for socioeconomic differences, thus confirming other findings (van Doorslaer, Koolman, and Jones 2004) that a health system oriented toward primary care services (such as in the United Kingdom) reduced the disparities in health care so prominent in the United States (Agency for Healthcare Research and Quality 2004).

Primary care programs aimed at improving health in deprived populations in less developed countries succeeded in narrowing the gaps in health between socially deprived and more socially advantaged populations. A matched case-control study in Mexico (Reyes et al. 1997) found that some aspects of primary care delivery had an important independent effect on reducing the odds of children dying in socially deprived areas. These processes included adequate referral mechanisms, continuity of care (being seen by the same provider at each visit), and being attended

in a public facility designed to provide primary care. A study in Bolivia (Perry et al. 1998) found that a community-based approach to planning primary health care services in socially deprived areas lowered the mortality of children under age five compared with adjacent similar areas or the country as a whole.

The Costa Rican primary care reforms, which were instituted first in the most socially deprived areas, illustrate the importance of primary care in reducing health disparities. These reforms included transferring the responsibility for providing health care from the Ministry of Health to the Costa Rican Social Security Fund (CCSS), expanding the number of primary care facilities—particularly in underserved areas—and reorganizing primary care into "integrated primary care teams" or EBAIS (equipos básicos de atención integral en salud), which consist of teams of health professionals assigned to a geographic region covering about 1,000 households (Rosero-Bixby 2004b). By 1985, Costa Rica's life expectancy reached 74 years, and infant mortality rates fell from 60 per 1,000 live births in 1970 to 19 per 1,000 live births, levels comparable to those in more developed countries. The improvements in primary health care were estimated to have reduced infant mortality by between 40 percent and 75 percent, depending on the particular study (Haines and Avery 1982; Klijzing and Taylor 1982; Rosero-Bixby 1986). For every five additional years after primary health care (PHC) reform, child mortality fell by 13 percent, and adult mortality fell by 4 percent. The study's quasi-experimental nature provided evidence of the power of PHC policies and provision of services to improve health, above and beyond improvements in social and economic indicators (which the longitudinal analyses controlled for) (Rosero-Bixby 2004a).

Studies in other developing countries show the considerable potential of primary care to reduce the large disparities associated with socioeconomic deprivation. In seven African countries, the wealthiest 20 percent of the population receives well over three times as much financial benefit from overall government spending as does the poorest 20 percent of the population (40 percent versus 12 percent). For primary care services, the ratio of rich to poor in the distribution of government expenditures was notably lower (23 percent to the top group versus 15 percent to the lowest group) (Castro-Leal et al. 2000), leading one international expert to conclude that "from an equity perspective, the move toward primary care represents a clear step in the right direction" (Gwatkin 2001,720). An analysis of preventable deaths in children concluded that

in the 42 countries accounting for 90 percent of child deaths worldwide, 63 percent could have been prevented by the full implementation of primary care. The primary care interventions included integrated care addressing the very common problems of diarrhea, pneumonia, measles, malaria, HIV/AIDS, preterm delivery, neonatal tetanus, and neonatal sepsis (Jones et al. 2003).

Except in metropolitan areas, where a greater supply of primary care physicians alone may not be associated with reductions in disparities between African Americans and whites, the findings of fewer disparities by primary care were consistent across all types of studies and were particularly marked in studies examining the actual receipt of primary care services.

Costs of Care

In addition to its relationship to better health outcomes, the supply of primary care physicians was associated with lower total costs of health services. Areas with higher ratios of primary care physicians to population had much lower total health care costs than did other areas, possibly partly because of better preventive care and lower hospitalization rates. This was demonstrated to be the case for the total U.S. adult population (Franks and Fiscella 1998), as well as among U.S. elderly living in metropolitan areas (Mark et al. 1996; Welch et al. 1993). Baicker and Chandra's (2004) analysis showed a linear decrease in Medicare spending along with an increase in the supply of primary care physicians, as well as better quality of care (as measured by 24 indicators concerning the treatment of six common medical conditions). In contrast, the supply of specialists was associated with more spending and poorer care.

Care for illnesses common in the population, for example, community-acquired pneumonia, was more expensive if provided by specialists than if provided by generalists, with no difference in outcomes (Rosser 1996; Whittle et al. 1998).

Consistent with the findings within countries, international comparisons of primary care showed that those countries with weaker primary care had significantly higher costs ($r = .61, p < .001$) (Starfield and Shi 2002).

Rationale for the Benefits of Primary Care for Health

Six mechanisms, alone and in combination, may account for the beneficial impact of primary care on population health. They are (1) greater access to needed services, (2) better quality of care, (3) a greater focus on prevention, (4) early management of health problems, (5) the cumulative effect of the main primary care delivery characteristics, and (6) the role of primary care in reducing unnecessary and potentially harmful specialist care.

1. *Primary care increases access to health services for relatively deprived population groups*. Primary care, as the point of first contact with health services, facilitates entry to the rest of the health system. With the exception of the United States, most industrialized countries have achieved universal and equitable access to primary health services, some of them directly provided and others through the assurance of financial coverage for visits (van Doorslaer, Koolman, and Jones 2004). In the United States, however, socially deprived population subgroups are more likely than more advantaged people to lack a regular source of care. The evidence is striking with regard to family income, for which there are marked gradients in having a regular source of care, hovering around 80 percent for the poor and near-poor to nearly 90 percent for those in the middle income range, approaching 95 percent for those with high incomes, and increasing over time from 1999 to 2001 for mainly those with high incomes (Agency for Healthcare Research and Quality 2004).

   The principal benefit of health insurance in the United States is facilitating access to primary care (Lillie-Blanton and Hoffman 2005; Starfield and Shi 2004). Socially deprived population groups that do not have health insurance are less likely to have a source of primary care and thus have less access to the entire health system. Over the past several decades, attempts to improve access have been mainly the expansion of eligibility for reimbursement by public funds through Medicare, Medicaid, and related programs like the State Child Health Insurance Program. Some, but not all, of these efforts have been accompanied by incentives or

even mandated enrollment with a regular source of care, and disparities in identification with a regular source of care have been reduced. However, differences in the receipt of good primary care services persist (Seid, Stevens, and Varni 2003; Shi 1999; Stevens and Shi 2002; Taira et al. 1997). Shi's national study of adults (1999) demonstrated not only differences in the likelihood of having a regular source but also (and more marked) differences in the type of that regular source, with minorities more likely to report a place rather than a person as their regular source of care; to have a specialist (other than a primary care physician) if they reported a physician as their source of care; and to experience longer delays in obtaining needed services after controlling for having a regular source of care. The same was found for children (Newacheck, Hughes, and Stoddard 1996). Other studies show that minority children are more likely to use an emergency room as their source of care (Weitzman, Byrd, and Auinger 1999). After controlling for having a regular source of care, there were few if any differences in reporting difficulty in obtaining needed services.

Analyses reported by Weinick and Krauss (2000) and Lieu, Newacheck, and McManus (1993) confirmed the finding of fewer or no difficulties in access to care when the source is a primary care source. Once they do have access to adequate primary care services, deprived minority groups often report better experiences with their care than the majority white population does, particularly when the studies were conducted in organized health care settings that, by design, eliminated many of the access barriers to primary care services (Morales et al. 2001; Murray-Garcia et al. 2000; Taira et al. 1997).

In sum, one of the main functions of a primary care source is reducing or eliminating difficulty with access to needed health services.

2. *The contribution of primary care to the quality of clinical care*. Studies designed by specialists to compare the quality of care of specialty and generalist practices often find that specialists are better at adhering to guidelines. For example, adhering to guidelines for asthma management was better in practices of specialists dealing with asthma (Bartter and Pratter 1996), and gastroenterologists used antibiotic therapy for *helicobacter pylori* earlier than

generalists did (unless the generalists were in a group practice with gastroenterologists) (Hirth, Fendrick, and Chernew 1996). Most studies comparing generalists and specialists concluded that the condition-specific quality of care provided by specialists was better when the condition was in the specialist's area of special interest, using indicators of quality of care such as the performance of disease-specific preventive procedures, the performance of indicated laboratory tests for monitoring disease status, and the prescription of relevant medications (Harrold, Field, and Gurwitz 1999).

The findings concerning the superior quality of care by specialists were not, however, confirmed by other studies. In demonstrating the effectiveness of primary care for diabetes, general practitioner (GP) diabetic clinics in the United Kingdom were found to do as well as hospital specialists in monitoring for diabetic complications (Parnell, Zalin, and Clarke 1993). In addition, in systems in which the GPs were given additional educational support and had an organized system for recall, GPs' care of diabetic patients was better than that of specialists in hospitals. In such situations, patients of GPs had lower mortality rates and better glycemic control than did patients treated by specialists (Griffin and Kinmonth 1998). Rates of complications, readmission to the hospital, and length of convalescence were the same after early discharge from the hospital after minor surgery, regardless of whether the care was provided by the hospital's outpatient department or general practitioners (Kaag, Wijkel, and de Jong 1996). Moreover, the few studies planned and executed by generalists (Donohoe 1998; Grumbach et al. 1999) concluded that the quality of care was the same or that primary care was better. These differences suggest differences in the conceptualization of appropriate "outcomes" by the two types of physicians, with specialists more concerned with specific disease-related measures and adherence to guidelines for these diseases and primary care physicians more targeted to multiple aspects of health, that is, "generic" health. Assessing generic outcomes, or quality of care *other* than for the particular conditions under study, is important because comorbidity is common and causes more visits to both generalists and specialists than do most specific conditions (Starfield et al. 2003; Starfield et al. 2005a). If the interest is in patients' health

(rather than disease processes or outcomes) as the proper focus of health services, primary care provides superior care, especially for conditions commonly seen in primary care, by focusing not primarily on the condition but on the condition in the context of the patient's other health problems or concerns.

In short, primary care physicians do at least as well as specialists in caring for specific common diseases, and they do better overall when the measures of quality are generic. For less common conditions, the care provided by primary care physicians with appropriate backup from specialists may be the best; for rare conditions, appropriate specialist care is undoubtedly important, as primary care physicians would not see such conditions frequently enough to maintain competence in managing them.

3. *The impact of primary care on prevention*. The evidence strongly shows that it is in primary care that preventive interventions are best when they are not related to any one disease or organ system. Examples of these "generic" (i.e., not limited to a particular disease or type of disease) measures are breast-feeding, not smoking, using seat belts, using smoke detectors, being physically active, and eating a healthy diet. Those U.S. states with higher ratios of primary care physicians to population have lower smoking rates, less obesity, and higher seatbelt use than do states with lower ratios of primary care physicians to population (Shi 1994; Shi and Starfield 2000). Good primary care, as determined by peoples' ratings of its main characteristics, is positively associated with smoking cessation and influenza immunization, as shown in an ongoing 60-community study in the United States (Saver 2002). The likelihood of disadvantaged children's making any preventive visits is much greater when their source of care is a good primary care practitioner (Gadomski, Jenkins, and Nichols 1998).

   To the extent that many preventive activities stress the early detection of specific diseases (secondary prevention), the quality of primary care (compared with specialty care) would not necessarily be expected to be better. However, the evidence suggests otherwise for common conditions that are in the purview of primary care. A greater supply of family physicians (although not necessarily internists) is associated with an earlier detection of breast cancer, colon cancer, cervical cancer, and melanoma (Campbell et al. 2003; Ferrante et al. 2000; Roetzheim et al. 1999, 2000). Ferrante and

colleagues (2000) found that each tenth-percentile increase in the supply of primary care physicians was associated with a statistically significant 4 percent increase in the odds of a diagnosis in an early (rather than late) stage. Most mammograms (87 percent) are ordered by primary care physicians (Schappert 1994); moreover, a physician's advice to have mammograms enhances their receipt (Breen and Kessler 1994; Campbell et al. 2003; Fox, Siu, and Stein 1994; NCI Breast Cancer Screening Consortium 1990; Roetzheim et al. 1999, 2000). Another study of differences between primary care physicians and specialists caring for patients with hypertension, non-insulin-dependent diabetes, recent myocardial infarction, or depression showed that the only preventive care procedures better performed by specialists were checks for foot ulcers and infection status in endocrinologists' diabetic patients (Greenfield et al. 1992). Moreover, approaches to prevention in primary care practice were more generic and resulted in more improvement in patients' health status than was the case in specialty-oriented practices (Bertakis et al. 1998). When the data were from the general community rather than from practices, having a good primary care source was the major determinant of receiving even disease-focused preventive care, consisting of blood pressure screening, clinical breast exams, mammograms, and Pap smears (Bindman et al. 1996).

4. *The impact of primary care on the early management of health problems.* Another indication of the benefit of primary care is its demonstrated impact on managing health problems before they are serious enough to require hospitalization or emergency services. Several studies support this conclusion.

   Shea and colleagues (1992) examined the relationship between having a primary care physician as the source of care and hospitalization for reasons that should be preventable by good primary care. Men with hypertension who were admitted to the hospital from the emergency room in a large metropolitan area were divided into two groups. One group was composed of those who were admitted for a preventable complication of hypertension; the other group was admitted for a condition unrelated to hypertension. The study found that those admitted for the preventable complication were four times more likely to lack a primary care provider than were those admitted for a condition unrelated to

hypertension, even after considering other factors such as absence of health insurance, level of compliance with antihypertensive regimens, and alcohol or drug use–related problems, thus indicating that those men with a primary care provider were relatively better protected against hospitalization for a preventable complication of a common medical problem.

In the United Kingdom, each 15 to 20 percent increase in GP supply per 10,000 population was significantly associated with a decrease in hospital admission rates of about 14 per 100,000 for acute illnesses and about 11 per 100,000 for chronic illnesses, even after controlling for the degree of social deprivation in the area in which people live, their social class, ethnicity, and limiting long-term illness (Gulliford 2002).

In the United States, rates of hospitalization for conditions that should be preventable by exposure to good primary care (ambulatory care–sensitive conditions, or ACSC) are strongly associated with socioeconomic deprivation, at least in part because socially disadvantaged populations are less likely to have a good source of primary care (Agency for Healthcare Research and Quality 2004; Hansell 1991; Stevens and Shi 2002). In contrast, in Spain, the rates of hospitalization for these conditions were *not* associated with socioeconomic characteristics, indicating that the Spanish health system's primary care orientation reduced the hospitalization rates for these conditions despite social disadvantage (Casanova, Colomer, and Starfield 1996; Casanova and Starfield 1995).

In a large multispecialty comparison of hospitalization rates, Greenfield and colleagues found that the rates of hospitalization were 100 percent higher when, compared with family physicians, the ongoing care was provided by cardiologists and 50 percent higher when it was provided by endocrinologists (Greenfield et al. 1992).

The literature is consistent in showing that lower rates of hospitalization for ACSC are strongly associated with the receipt of primary care. Geographic areas with more family and general practitioners have lower hospitalization rates for these types of conditions, including diabetes mellitus, hypertension, and pneumonia (Parchman and Culler 1994). Children receiving their care from a primary care source that fulfills the criteria for its main

characteristics have lower hospitalization rates for these conditions as well as lower hospitalization rates overall. These findings are associated with the greater receipt of preventive care from primary care providers (Gadomski, Jenkins, and Nichols 1998). Rates of hospital admissions of children are lower in those U.S. communities in which primary care physicians are more involved in caring for children both before and during hospitalization (Perrin et al. 1996). Adolescents with the same regular source of care for preventive and illness care are less likely to seek care in emergency rooms (Ryan et al. 2001). An analysis of national Medicare data showed that the elderly in the United States who are in fair or poor health are more likely to experience a potentially preventable hospitalization if they live in a county designated as a primary care shortage area (Parchman and Culler 1999).

Only two studies failed to find a positive impact for the supply of primary care physicians and hospitalizations for conditions sensitive to primary care management. Each of the studies was conducted in only one state, New York or North Carolina (Ricketts et al. 2001; Schreiber and Zielinski 1997). In both studies, socioeconomic characteristics were more salient, and so it is possible that in some places, the availability of more primary care physicians did not necessarily mean that deprived populations had access to them. A later study in one of those states (New York) showed that the ratio of primary care physicians to population was one of the more salient factors associated with lower levels of hospitalizations for ACSC (Friedman and Basu 2001).

5. *The accumulated contribution of primary care characteristics to more appropriate care.* As noted in regard to quality of care, the beneficial effects of primary care on mortality and morbidity can be attributed, at least in part, to the focus of primary care on the person rather than on the management of particular diseases. Care focuses on the person when practitioners attend to overall aspects of the patient's health rather than to the care of his or her specific diseases; it focuses on achieving better outcomes for health in all its aspects rather than on the procedures directed at improving the processes or outcomes of care for particular conditions. Other aspects of health services delivery that are characteristic of primary care also have been associated with better health outcomes. Although an extensive review of the positive contribution of each

of these characteristics is outside the scope of this review (which concerns primary care as an entity within health service systems) and has been covered elsewhere (Starfield 1998), a brief summary of these contributions explains why primary care as a whole might have positive effects.

We noted earlier that an important element of primary care is its role as the first contact for patients when a problem develops. In a seminal article entitled "Gatekeeping Revisited—Protecting Patients from Overtreatment," Franks, Clancy, and Nutting (1992) made the case for seeing a primary care physician before seeking care from another type of physician. Having a relationship with a primary care practitioner who can serve as an initial point of contact is strongly and statistically significantly associated with less use of specialists and emergency rooms (Hurley, Freund, and Taylor 1989; Martin et al. 1989). *Continuity* of care, which implies that individuals use their primary source of care over time for most of their health care needs, is associated with greater satisfaction, better compliance, and lower hospitalization and emergency room use (Freeman and Hjortdahl 1997; Mainous and Gill 1998; Rosenblatt et al. 2000; Weiss and Blustein 1996). Previous knowledge of a patient, which reflects good continuity of care, increases the doctor's odds of recognizing psychosocial problems influencing the patient's health (Gulbrandsen, Hjortdahl, and Fugelli 1997). Both continuity and first-contact attributes of primary care ensure greater efficiency of services in the time saved in the consultation, less use of laboratory tests, and fewer health care expenditures (Forrest and Starfield 1996, 1998; Hjortdahl and Borchgrevink 1991; Raddish, Horn, and Sharkey 1999; Roos, Carriere, and Friesen 1998). Very short-term relationships with physicians are associated with poor outcomes. For example, veterans with a chronic disease who did not have a previous relationship with a primary care physician were randomized to receive an intervention of increased follow-up by a newly assigned nurse and a primary care physician after they were discharged from the hospital. Rehospitalization rates six months later were higher in this intervention group (Weinberger, Oddone, and Henderson 1996), thus indicating that relationships over time are an important component of primary care. (The study did not assess rehospitalization rates for veterans who already had a primary care provider,

and it may be that the assignment of such a provider to people without an existing relationship led to the discovery of new conditions not previously recognized and requiring hospitalization.) At least two years of a relationship (and as many as five) are generally required for patients and practitioners to get to know each other well enough to provide optimal person-focused care (Starfield 1998, 175). A freely chosen primary care practitioner provides better assurance of a good relationship than does assigning a practitioner (Starfield 1998, 151). The evidence is strong regarding the benefits of an ongoing relationship with a particular provider rather than with a particular place or no place at all. People with no source of primary care are more likely to be hospitalized, to delay seeking needed and timely preventive care, to receive care in emergency departments, and to have higher subsequent mortality and higher health care costs, and they are less likely to see a physician in the presence of symptoms. People with just a place (such as a particular hospital clinic) are somewhat better off than those without a regular source of care, in that they are more likely to keep their appointments, have fewer hospitalizations and lower costs, and receive generally better preventive care. In addition, people who report a particular doctor as their regular source of care receive more appropriate preventive care, are more likely to have their problems recognized, have fewer diagnostic tests and fewer prescriptions, have fewer hospitalizations and visits to emergency departments, and are more likely to have more accurate diagnoses and lower costs of care than are either people having a particular place or people having no place at all as their regular source of care (Starfield 1998, chap. 8).

The benefits of the other two main attributes of good primary care (comprehensiveness and coordination) are less well documented, but the existing evidence was summarized by Starfield (1998, chaps. 10 and 11).

6. *The role of primary care in reducing unnecessary or inappropriate specialty care*. Nearly all studies of specialist services concluded that there is either no effect or an adverse effect on major health outcomes from increasing the supply of specialists in the United States, which already has a much greater supply of such physicians than do other industrialized countries (Starfield et al. 2005b). This

evidence addresses a wide variety of population health outcomes, including all-cause (total) mortality; heart and cerebrovascular disease mortality; cancer mortality; postneonatal, neonatal, and total infant mortality; and low birth weight; as well as the early detection of various cancers, including cervical cancer, colorectal cancers, breast cancer, and melanoma (the evidence was reviewed by Starfield et al. 2005b). The evidence is also consistent that first contact with a primary care physician (before seeking care from a specialist) is associated with more appropriate, more effective, and less costly care (Starfield 1998, chap. 7).

Other countries, most notably the United Kingdom and the Netherlands, have led the way with primary care innovations to reduce the inappropriate use of specialist services. These include making better use of information systems and video communications as well as consulting with specialists in primary care settings.

The adverse effects of seeking care directly from nonprimary care specialists have a strong theoretical basis. Since these specialists are trained in the hospital, the patients seen by specialists are not representative of the way in which patients present symptoms in community settings, because the latter have a much lower prior probability of serious illness requiring the services of a specialist. The properties of diagnostic tests (sensitivity, specificity, predictive power of a positive test) are much different in populations with a high prevalence of serious illness than they are in community settings and thus much different in specialty care than in primary care settings. The result is that specialists practicing in the community overestimate the likelihood of illness in the patients they see, with the consequently inappropriate use of diagnostic and therapeutic modalities, both of which raise the likelihood of adverse effects (Franks, Clancy, and Nutting 1992; Hashem, Chi, and Friedman 2003; Sox 1996). Compared with other Anglophone countries, people in the United States experience more adverse effects and medical errors (Schoen et al. 2004). This, combined with evidence concerning the adverse effects of greater supplies of specialists and estimates of the likelihood of adverse effects of medical care, may at least partly explain the United States' low ranking on health status relative to that of similarly industrialized countries.

Potential Limitations of Interpretations of Effectiveness of Primary Care

Despite the consistency of the findings from various types of studies, areas, and populations and the theoretical rationale for benefit of primary care on population health, it is possible that the results may be overinterpreted. Those countries and areas in which primary care is strongest (however measured) may be areas in which other social interventions (such as income supports and welfare policies that influence health) also are strongest. So far, the effort to identify the social policies that have a great influence on health has not been successful (Graham and Kelly 2004).

Moreover, the mere presence of primary care physicians may not reflect the availability of primary care services to certain population groups. At least two of the reviewed analyses in urban counties showed that the supply of primary care physicians is less closely related to the health of urban African Americans than it is for urban whites or for African Americans in rural areas. This is likely due to the poorer distribution of primary care physicians in more deprived urban areas, with the consequently greater need to seek care in such places as hospital outpatient units and emergency rooms. Supporting this hypothesis are two lines of evidence. First, African Americans are more likely than whites to report having their regular source of care in a facility (such as a hospital) and to report a specialist as their regular source of care (Shi 1999). That is, primary care physicians in urban areas tend to locate in more socially advantaged areas (Weiner et al. 1982). As a result, hospital clinics with predominantly hospital-based physicians not trained to provide the important features of primary care become the "default" regular source of care. Second, even in the presence of adequate primary care resources, African Americans may be less likely than other racial and ethnic groups to use primary care when other resources (such as hospital clinics) are available; this has been demonstrated to be the case for the medical care of inner-city infants (Hoffmann, Broyles, and Tyson 1997). State-level analyses are not as susceptible to this type of possible error because primary care is more evenly distributed than is specialty care (Shi and Starfield 2001).

If the supply of primary care physicians is less closely associated with health outcomes in urban African Americans than in whites because of difficulties in access to them, the demonstrated association between supply and health outcomes may actually underestimate the potential impact

of primary care services, particularly for deprived populations. Moreover, the studies that use alternative measures of primary care, including relationships with a primary care physician and studies considering the adequacy of primary care health services delivery characteristics, all confirm the conclusion that care meeting the criteria for primary care is associated with the better health of those populations receiving it, with a greater impact in more deprived populations.

Primary Care in the Future

What issues remain to be addressed in primary care to improve its contribution to the health of populations and equity in distribution of health? A pervasive U.S. focus on "access" to health services rather than on the type of health services has detracted from the need to ensure that services are provided in the most appropriate places. The existing national data health interview surveys combine various safety net providers into one group so that people receiving their care from hospital outpatient clinics are not distinguishable from those receiving care from primary care–oriented clinics. Combining primary care–focused community health centers with hospital emergency and outpatient departments as "safety net providers" masks the high positive contributions to the health of the former with the lesser primary care focus of the latter. Apart from the Community Health Center program of the federal Health Resources and Services Administration and the commitment of certain not-for-profit health care organizations to strong primary care (Weiner 2004), little or nothing has been done to ensure that other "regular sources of care" fulfill the criteria for good primary care. In most other industrialized countries, primary care physicians are clearly distinguished from other physicians, and where people receive care is easily identified as primary care or specialty care. Greater appreciation that it is primary care that plays a major role in ensuring access to appropriate health services should provide the rationale for better distinguishing primary care from specialty care in data on the use of health services in the United States.

At the very least, primary care must be recognized as a distinct aspect of a health services system. There now are well-validated methods (e.g., see Shi, Starfield, and Xu 2001; Starfield et al. 1998) to assess both the presence and the characteristics of primary care, and all sources of data on use of health services should include at least a few of these

measures. Understanding people's primary care experiences (rather than or in addition to their satisfaction), including the extent to which they receive the range of services appropriate to their needs and have the care they receive elsewhere coordinated and integrated, are important to evaluating the adequacy of health services.

In contrast to the situation in primary care, for which intensive conceptual and methodologic study over the past several decades has clarified its most important aspects, professional specialty groups in the United States have made little if any attempt to define the practice of "specialism" or the circumstances that should lead to seeking care from specialists. Referrals to specialists apparently have three functions: short-term consultation for diagnosis or management, referral for long-term management of specific illnesses, and recurrent consultation for periodic management. A study of referrals from 80 office-based family practices showed that by far the most referrals for common conditions (over 50 percent of all referrals to most types of specialists) were expected to be for a short term (less than 12 months) and that for more than 50 percent, they were for consultation only (no direct intervention) (Starfield et al. 2002). Very little is known, however, about the relative frequency of these functions from the viewpoint of specialty practice. One report (Hewlett et al. 2005) indicated that about 75 percent of visits to a pulmonary specialty clinic were just for "checkups," even though the patients' primary care physicians, once they had access to the specialists' reports, could just as easily perform this function and report the findings to the specialists. Such an approach to reducing the number of visits to specialists could lower the demand for a greater supply of specialists; it at least deserves to be tested. There is an urgent need for information about the indications for specialty care and about the impact on outcomes of excessive use of specialists.

Major challenges to primary care practice concern (1) recognizing and managing comorbidity, (2) preventing the adverse effects of medical interventions, (3) maintaining a high quality of the important characteristics of primary care practice, and (4) improving equity in health services and in the health of populations (Starfield 2001).

1. Historically, principles of delivery of medical care have been based on preventing and managing specific diseases. In the current climate of evidence-based medicine, guidelines for the management of diseases are proliferating and increasingly used. The

development of guidelines is generally based on evidence from the literature that certain modes of management achieve better outcomes than others do. The "gold standard" for evidence is the randomized controlled clinical trial, which generally excludes, as a requirement for participation in the trial, individuals with comorbid conditions. Comorbidity (the simultaneous presence of apparently unrelated conditions) is common in the population and is not randomly distributed. Although comorbidity becomes more common with age, it is in the young that comorbidity occurs much more frequently than expected by the chance occurrence of two or more conditions (van den Akker et al. 1998). (That is, the frequency of illness is much greater in the old than in the young, so there is much greater likelihood that two unrelated illnesses will be found together. In the young, illness is much less common, so that it is statistically much less likely that two or more will be found together, although in fact this is the case.) Data systems should be developed that provide a much better basis for examining the distribution and nature of comorbidity in primary care; ascertainment of the impact of baseline risks on comorbidity; likelihood of responsiveness to treatment in the presence of comorbidity; and susceptibility to adverse effects of medical interventions. Moreover, the applicability to primary care of guidelines developed from randomized controlled clinical trials may be more limited than is generally thought, even apart from the issue of comorbidity (Kravitz, Duan, and Braslow 2004; Rothwell 2005), particularly when considering the issue of disease-specific versus overall clinical end points (Fleming 2005).

2. Primary care practitioners are in the best position to detect the occurrence of potentially adverse effects of medical interventions, particularly those stemming from drug reactions and interactions. In systems of care oriented to primary care (including some HMOs in the United States), the primary care practitioner is, by far, the most commonly seen physician, for patients with *all* degrees of comorbidity and for both single common conditions and comorbid conditions. Only when individual conditions are uncommon are specialists the type of physician most frequently seen, and only for that condition (*not* for comorbid conditions) (Starfield et al. 2003; Starfield et al. 2005a). Thus, primary care physicians are more likely to see the adverse events that result from their own

care as well as the care of others whom the patient may see. The challenge for primary care is to establish systems to code unexpected symptoms or signs and to create information systems that could serve as early warnings of the occurrence of adverse events in persons previously subjected to particular types of interventions. It is possible that the International Classification of Primary Care (ICPC) (Lamberts, Wood, and Hofmans-Okkes 1993), which provides a straightforward classification of problems encountered in primary care while maintaining comparability with the better known International Classification of Diseases (originally developed to code causes of death), could serve as the basis for recording and classifying these symptoms and signs in the United States, as it is already being used in several other countries.

3. Improvement in clinical quality and in performance with respect to the main features of primary care practice is a challenge for primary care practice. Although each of these features is known to confer benefits on health, the remaining issues require consideration.
   - To what extent can teams of practitioners provide first-contact care without interfering with the benefits of continuing interpersonal relationships between particular practitioners and patients?
   - Ongoing person-focused care means that care should be focused on the person rather than on the disease. Can teams of practitioners fulfill this function?
   - Comprehensiveness means that all problems in the population should be cared for in primary care (with short-term referral as needed), except those that are too unusual (generally a frequency of less than one or two per thousand in the population served) for the primary care practitioner or team to treat competently. How can data systems provide the information needed to decide when problems are best met in primary care, when they can be best dealt with in primary care with appropriate specialty backup, and when patients need to be seen by a specialist?
   - Coordination of care means that the primary care practice must integrate all aspects of care when patients must be seen elsewhere. Because 13 to 20 percent (depending on various assumptions) of an average practice population requires a referral each year, this burden is considerable. Very few health systems, even

those that rate high on primary care, achieve high coordination of care, at least as measured by transfer of information from primary care physicians to specialists and vice versa. Systems to facilitate coordinating efforts are urgently needed. Lessons might be gleaned from the experiences of some health systems. For example, and despite the design limitations (Talbot-Smith et al. 2004) of the study comparing the Kaiser-Permanente health care plan in the United States with the National Health Service in the United Kingdom (Feachem, Sekhri, and White 2002), the lower hospitalization rates and lower resource use in the United States may well be a result of a system specifically designed to enhance coordination between primary care physicians and specialists.

4. The achievement of equity in health services and health is an imperative everywhere. Primary care is inherently a more equitable level of care than other levels of care. It is less costly (hence sparing resources that could be devoted to providing better services to more disadvantaged populations), and through its key features, it narrows disparities in health between more and less socially deprived population groups. The extent to which primary care in fact does result in more equity depends on the availability of information about the needs in the various areas in which primary care practices are located. Better information systems, at both the area and practice levels, would enhance the already-strong benefits of primary care to the health of individuals, population subgroups, and populations (National Committee for Vital and Health Statistics 2001).

The Relevance of Policy

The relatively poor performance of the United States on major health indicators, despite per capita health care expenditures that are much higher than those of any other country, is a pressing concern for policymakers, the business community (which has, historically, paid for much of the health insurance in the country), and, ultimately, taxpayers. Efforts to improve the system to achieve better health at lower cost are rapidly becoming imperative. Primary care offers an effective and efficient approach to achieve that goal. Evidence of the benefits of a health

system with a strong primary care base is abundant and consistent. These benefits are not limited to one or only a few aspects of health but, rather, extend to the major causes of death and disorders as well as to reducing disparities in health across major population subgroups, including racial and ethnic minorities as well as socially deprived adults and children.

Federally qualified community health centers (CHCs) currently serve more than 3,600 urban and rural communities, which are typically low-income inner-city or resource-poor rural communities. But they serve only one-quarter of all people living below the poverty level, one in seven people living under 200 percent of poverty level, and one of eight uninsured Americans (Proser, Shin, and Hawkins 2005). Expansion of the CHC network well beyond the current supply is one appropriate strategy.

Other policy strategies would strengthen primary care on a broader level (Starfield and Simpson 1993). These include (but are not limited to) changes in the method of reimbursing primary care physicians and, particularly, better reimbursement rates for primary care services for both common conditions and for the important primary care delivery characteristics. Establishing a more rational basis for referrals and improving the coordination between primary care and specialist physicians would make primary care practice more challenging and intellectually rewarding. States could encourage a better distribution of physicians (both primary care and specialists) by tailoring their licensing policies to health needs in different areas or by providing financial incentives for practicing in underserved areas, as is done in some other countries. Incentives for training primary care practitioners could be improved by reorienting federal support for graduate medical education toward training primary care physicians. Similarly, loan forgiveness for primary care practitioners could be expanded. Reducing the amount of paperwork needed to file claims and encouraging the creation of electronic medical records would greatly reduce the tedium of record keeping in practice and, at the same time, make time to improve the self-monitoring of the quality of care. Bonus payments for team practice could enhance the comprehensiveness of primary care. Special recognition of best primary care practices could enhance public recognition of the importance of primary care and its characteristics. Finally, offering more funds for research on primary care, including the support of collaborative practice-based networks (Lanier 2005; Wasserman, Slora, and Bocian 2003), would help meet the intellectual challenges of expanding our knowledge base for the practice of both primary care and specialty care.

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