

# Commentary: Primary Care and Health Outcomes: A Health Services Research Challenge

*Barbara Starfield and Leiyu Shi*

The contributions of primary care to improvements in many aspects of population and individual health are well documented (Starfield, Shi, and Macinko 2005). In addition to the health benefits, there are reductions in health system costs and reductions in disparities in health across population subgroups. The findings are robust over time and across areas and health systems. International comparisons show that countries with health systems based on strong primary care have better health at lower costs. Studies within countries, including both industrialized as well as middle income and developing countries, are consistent in showing greater improvements in health consequent to legislative and administrative policy initiatives directed at strengthening primary care, including increases in the supply and use of primary care practitioners and clinical improvements in primary care practice. The special and critical features of primary care are well known and include first contact access and use of primary care facilities and practitioners; person-focused (not disease-focused) care over time; comprehensiveness of services available and provided within primary care; and coordination of services when they are needed elsewhere (Starfield, Shi, and Macinko 2005).

In this issue of *Health Services Research*, Tom Ricketts and George Holmes published the results of analyses that refined previous analyses from the United States by examining the relationship between the supply of primary care physicians and age-adjusted total, heart disease, and cancer mortality at the county and regional level. Using pooled 1996–2000 U.S. county data, the authors found that the association between primary care physician supply and mortality varies across regions. A greater supply of primary care physicians is associated with decreased mortality on the east coast and in the upper midwest, but the correlation disappears or is reversed in the west (with the exception of Washington state) and south central states. The authors suggested

that there are strong regional patterns that make national conclusions suspect. We applaud this excellent work on regional differences in primary care impact and agree that further study is needed to understand these regional differences and policy alternatives to address them.

One hypothesis might be that an excessive supply and use of specialists might attenuate the effect of primary care in particular regions. Specialists are trained to do more testing than would be necessary in generalist practice, with consequent more false positive results, adverse effects from the resulting cascade of tests, and with much higher costs. Where the supply of specialists is excessive relative to that of primary care physicians, or where a large tertiary academic medical center is a dominant provider of care, the benefits of primary care physicians may not be achieved because primary care physicians may have a lower threshold for referral to specialists. Thus, the patterns of health outcomes and costs of care are likely to differ greatly across geographic areas with different generalist/specialist ratios and with the extent of dominance of hospital clinics on care, particularly of socially disadvantaged population groups. This may explain why studies such as those of Ricketts and Holmes (2007) show that the effect of the supply of primary care and specialty physicians on health outcomes varies from one region of the country to the other, but the dynamics of the relationship between the two types of physicians has not been explored.

Ricketts and Holmes (2007) compared their analyses with those of our previous analysis using county-level data from the United States. However, there were major methodologic differences between the approaches. In our studies, the dependent variable, mortality, was not age adjusted due to the absence of age-adjusted mortality rates in the Area Resource File. Instead, to account for regional differences in age, we included a covariate, the percentage of the population 65 and older. Ricketts and Holmes (2007) computed age-adjusted mortality rates per 10,000 residents, using the Compressed Mortality Files from the National Center for Health Statistics, Centers for Disease Control and Prevention. However, they also included percentage of elderly in the same model, thus overadjusting for the effect of age.

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Address correspondence to Barbara Starfield, M.D., M.P.H., Johns Hopkins University, 624 North Broadway, Room 452, Baltimore, MD 21205. Dr. Starfield is director of the Johns Hopkins University Primary Care Policy Center, with appointments in the Departments of Health Policy and Management and Pediatrics at the Johns Hopkins University Schools of Public Health and Medicine, Baltimore, MD. Leiyu Shi, Dr.P.H., M.B.A., is co-director of Johns Hopkins Primary Care Policy Center and a faculty member in the Department of Health Policy and Management at Johns Hopkins Bloomberg School of Public Health, Baltimore, MD.

While examining the county-level data, we observed a large number of missing values for certain years for some counties. We used the “averaging” imputation method to “create” the values for these counties with missing values. In a few situations, severe outliers were also removed. Based on the methods described in Ricketts and Holmes’s (2007) paper, apparently missing values were not specially treated and outliers were not removed. These analytic differences may explain the selected discrepancies in findings between our two studies.

Other studies of the ecological association between primary care and population health have used various geographic levels, e.g., cross-nation, U.S. states, metropolitan statistical areas, and counties. Our experience with these analyses indicates that studies conducted at higher geographical units (e.g., cross-nation and U.S. states) tend to demonstrate more significant benefits of primary care than studies carried out at smaller geographical aggregations (e.g., metropolitan statistical areas and counties). We also believe it is more methodologically sound to conduct studies at higher geographical units. For example, through geographical aggregation at the state level, both numerators and denominators of the mortality and other rates are increased so that random fluctuations in these rates are less likely to confound findings. Further, using state-level aggregate data also has the advantage of attenuating the likely “crossover” effect that researchers encounter when smaller units of analysis (such as counties) are used when measuring availability of medical care and mortalities. The “crossover” effect refers to the likelihood that those who require medical care may be attracted to areas where that care is available and not necessarily where they live. Patients are less likely to travel between states than counties or cities to seek medical care. Nonetheless, there may be true differences across regions that are related to health system characteristics in different regions.

Studies of the relationship between physician supply and health outcome cannot establish cause and effect. The absence of factors that intervene between workforce supply (a structural characteristic) and outcomes (health, disparities in health, or costs) is a major constraint in explaining the ecological associations. Mere presence of primary care clinicians does not assure availability and accessibility and does not guarantee that existing primary care facilities provide a level of primary care adequate to attain the four cardinal features of first contact use, person-focused care over time, comprehensiveness of services available and provided, and coordination of care. Dartmouth researchers have demonstrated great regional and local variation in quality of care, mostly with regard to hospitalization and surgery rates but also with the

quality of hospital services (Skinner, Staiger, and Fisher 2006). The existence of similar regional variations in people's access to and use of primary care as a result of financing and/or organizational differences is highly likely, as are variations in professional practices in different regions, including hours of availability, comprehensiveness of services, referral patterns, and arrangements for coordination between hospital services and primary care practices. We know that past research, with individuals as the unit of analysis, shows strong relationships between people's primary care experiences and their reported and documented health (Starfield, Shi, and Macinko 2005, pp. 463–6). Regional variations in specialist availability and use are also likely to contribute to health outcomes, not always in positive ways (Starfield et al. 2005). The common wisdom that specialist care is always superior care, even for conditions in the province of the specialist, is contradicted by an increasing number of studies (Hartz and James 2006; Smetana et al. 2007).

Thus, health services research faces a major and important challenge. Very little research attention has been devoted to health system organization at the macro level. Despite knowledge about the importance of primary care and the development of methods to measure primary care, very few researchers have recognized the importance of the nature of the source of care to responses to care. Even though the strength of people's relationships with primary care is known to be an important influence on health outcomes, a variable reflecting this characteristic has never been part of controlled clinical trials of interventions. Most studies of primary care come from primary care academicians and practitioners, not health services researchers. It is time to recognize that primary care and specialist care have different roles in delivering health services and to understand the impact of these differences on health outcomes and costs.

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