

## References

- 1) "Contribution of Primary Care to Health Systems and Health", [Barbara Starfield](#), [Leiyu Shi](#), and [James Macinko](#), *Milbank Q.* Sep 2005; 83(3): 457–502.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2690145/>

### ABSTRACT:

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.

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- 2) "Medicare Spending, The Physician Workforce, And Beneficiaries' Quality of Care", Katherine Baicker and Amitabh Chandra, *Health Affairs.* 2004;W4:184–97

<http://content.healthaffairs.org/content/early/2004/04/07/hlthaff.w4.184.full.pdf>

### ABSTRACT:

The quality of care received by Medicare beneficiaries varies across areas. We find that states with higher Medicare spending have lower-quality care. This negative relationship may be driven by the use of intensive, costly care that crowds out the use of more effective care. One mechanism for this trade-off may be the mix of the provider workforce: States with more general practitioners use more effective care and have lower spending, while those with more specialists have higher costs and lower quality. Improving the quality of beneficiaries' care could be accomplished with more effective.

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- 3) "Primary Care and Receipt of Preventive Services". Bindman AB, Grumbach K, Osmond D, Vranizan K, Stewart AL. *Journal of General Internal Medicine.* 1996;11:269–76.

<http://www.ncbi.nlm.nih.gov/pubmed/8725975>

### CONCLUSION:

A regular source of care is the single most important factor associated with the receipt of preventive services, but optimal primary care from a regular place increases the likelihood that women will receive preventive care.

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- 4) "Hospitalizations of Children and Access to Primary Care: A Cross-National Comparison". Casanova C, Starfield B. *International Journal of Health Services.* 1995;25:283–94.

<http://www.ncbi.nlm.nih.gov/pubmed/7622319>

### ABSTRACT:

In the United States, hospital admissions for conditions sensitive to primary care are related to socioeconomic characteristics. The authors compare the prevalence of

avoidable hospital admissions and their relationship to socio-economic and primary care characteristics in Spain and the United States. A case-control analysis of the relationship between avoidable hospitalizations and socioeconomic characteristics (illiteracy, unemployment, income) and primary care characteristics (type of physician and facilities for primary care) of children's area of residence was conducted in Spain. Bivariate statistical tests and conditional logistic regression were used to test the strength of the association among the variables, and to calculate the probability of being admitted to hospital for treatment of an ambulatory care sensitive (ACS) condition. Neither socioeconomic nor primary care characteristics affected this probability, and the rate of admission for ACS conditions was lower in Spain than in the United States. The provision of universal financial access to care and the availability of a consistent and accountable primary care provider are associated with lower hospitalization rates for conditions that are preventable with good primary care.

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5) "Is General Practice Effective? A Systematic Literature Review. *Scandinavian Journal of Primary Health Care*". Engstrom S, Foldevi M, Borgquist L. 2001;19:131-44  
<http://www.ncbi.nlm.nih.gov/pubmed/11482415>

**RESULTS:**

Primary care contributed to improved public health, as expressed through different health parameters, and a lower utilization of medical care leading to lower costs. Physicians working in primary care, in comparison with other specialists, took care of many diseases without loss of quality and often at lower cost. The organization of primary care was important in respect of reimbursement by capitation, more group practices, higher personal continuity, and having generalists as primary care physicians.

**CONCLUSIONS:**

To compare the effectiveness of primary care and specialist care is a complex task and there are limitations in all studies. However, we have found evidence that increased accessibility to physicians working in primary care contributes to better health and lower total costs in the health care system. It is also clear that studies with evaluation of how to most effectively organize primary care are far too few. There is an extensive need for future research in this area, a suitable task for collaborative research between the Nordic countries.

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6) "The Contribution of Primary Care Systems to Health Outcomes within Organization for Economic Cooperation and Development (OECD) Countries, 1970-1998" Macinko J, Starfield B, Shi L., *Health Services Research*. 2003;38:831-65  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1360919/>

The strength of a country's primary care system was negatively associated with (a) all-cause mortality, (b) all-cause premature mortality, and (c) cause-specific premature mortality from asthma and bronchitis, emphysema and pneumonia, cardiovascular disease, and heart disease ( $p < 0.05$  in fixed effects, multivariate regression analyses). This relationship was significant, albeit reduced in magnitude, even while controlling for macro-level (GDP per capita, total physicians per one thousand population, percent of elderly) and micro-level (average number of ambulatory care visits, per capita income, alcohol and tobacco consumption) determinants of population health.

**Conclusions:**

(1) Strong primary care system and practice characteristics such as geographic regulation, longitudinality, coordination, and community orientation were associated with improved population health. (2) Despite health reform efforts, few OECD countries have improved essential features of their primary care systems as assessed by the scale used here. (3) The proposed scale can also be used to monitor health reform efforts intended to improve primary care.

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7) "Medicare costs in urban areas and the supply of primary care physicians." Mark DH, Gottlieb MS, Zellner BB, Chetty VK, Midtling JE. Journal of Family Practice. 1996;43:33-9.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2690145/#b118>

**RESULTS:**

The average Medicare Part B reimbursement per enrollee was \$1283. After adjusting for local price differences and county characteristics, a greater supply of family physicians and general internists was significantly associated with lower Medicare Part B reimbursements. The reduction in reimbursements between counties in the highest quintile of family physician supply and the lowest quintile was \$261 per enrollee. In contrast, a greater supply of general practitioners and non-primary care physicians was associated with higher reimbursements per enrollee.

**CONCLUSIONS:**

These results add to the evidence that an increased supply of primary care physicians is associated with lower health care costs. If this association is causal, it supports the theory that increasing the number of primary care physicians may lower health care costs.

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8) "Primary Care Physicians and Avoidable Hospitalizations". Parchman ML, Culler SD. Journal of Family Practice. 1994;39:123-8

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2690145/#b118>

**CONCLUSIONS:**

The availability of FPs/GPs is related to lower rates of hospitalization for certain conditions. Family physicians may provide more effective first-contact access to health care than is provided by either general internists or pediatricians in Pennsylvania. Future studies should address whether care by family physicians is more cost-effective as a result of this reduction in avoidable hospitalizations.

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9) "Preventable Hospitalizations in Primary Care Shortage Areas. An Analysis of Vulnerable Medicare Beneficiaries. Archives of Family Medicine" Parchman ML, Culler SD.. 1999;8:487-91.

<http://www.ncbi.nlm.nih.gov/pubmed/10575386>

**RESULTS:**

Medicare beneficiaries in fair or poor health were 1.82 times more likely to experience a preventable hospitalization if they resided in a primary care shortage area (95% confidence interval, 1.18-2.81). After controlling for educational level, income, and supplemental insurance, Medicare beneficiaries in fair or poor health were 1.70 times more likely to experience a preventable hospitalization if they resided in a primary care shortage area (95% confidence interval, 1.09-2.65).

CONCLUSIONS:

Medicare beneficiaries 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. Provision of Medicare coverage alone may not be enough to prevent poor ambulatory health care outcomes such as preventable hospitalizations. Improving health care outcomes for vulnerable elderly patients may require structural changes to the primary care ambulatory delivery system in the United States, especially in designated shortage areas.

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10) "Inequality in America: The Contribution of Health Centers in Reducing and Eliminating Disparities in Access to Care. Medical Care Research and Review." Politzer RM, Yoon J, Shi L, Hughes RG, Regan J, Gaston MH. 2001;58:234-48.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2690145/#b118>

ABSTRACT:

Reducing and eliminating health status disparities by providing access to appropriate health care is a goal of the nation's health care delivery system. This article reviews the literature that demonstrates a relationship between access to appropriate health care and reductions in health status disparities. Using comprehensive site-level data, patient surveys, and medical record reviews, the authors present an evaluation of the ability of health centers to provide such access. Access to a regular and usual source of care alone can mitigate health status disparities. The safety net health center network has reduced racial/ethnic, income, and insurance status disparities in access to primary care and important preventive screening procedures. In addition, the network has reduced low birth weight disparities for African American infants. Evidence suggests that health centers are successful in reducing and eliminating health access disparities by establishing themselves as their patients' usual and regular source of care. This relationship portends well for reducing and eliminating health status disparities.

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11) "Continuity of Care: Is It Cost Effective?" Raddish M, Horn SD, Sharkey PD. American Journal of Managed Care. 1999;5:727-34

<http://www.ncbi.nlm.nih.gov/pubmed/10538452>

RESULTS:

There were 12,997 patients followed for more than 99,000 outpatient visits, 1000 hospitalizations, and more than 240,000 prescriptions. Increasing the number of primary or specialty care providers a patient encountered during the study generally was associated with increased utilization and costs when HMO and patient characteristics were controlled. The number of specialty care providers also increased as the number of primary care providers increased. The incremental increase in pharmacy costs per patient per year with each additional provider ranged between \$19 in subjects with otitis media to \$58 in subjects with hypertension.

CONCLUSIONS:

Continuity of care was associated with a reduction in resource utilization and costs. As healthcare delivery systems are designed, care continuity should be promoted.

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12) "Burnt Out Primary Care Docs Are Voting With Their Feet" By Roni Caryn Rabin April 1, 2014  
<http://kaiserhealthnews.org/news/doctor-burnout/>

There are no hard national data on physician burnout. But nearly half of more than 7,200 doctors responding to a survey published in 2012 by the Mayo Clinic reported at least one symptom of burnout that indicated a loss of enthusiasm about medicine or cynicism about it. That's up from 10 years ago, when one quarter of doctors reported burnout symptoms in another survey.

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13) "Policy Relevant Determinants of Health: An International Perspective" Starfield, B., Shi, L. , Health Policy 2002 June, 60(3) :201-18.  
<http://www.ncbi.nlm.nih.gov/pubmed/11965331>

ABSTRACT:

**BACKGROUND:** International comparisons can provide clues to understanding some of the important policy-related determinants of health, including those related to the provision of health care services. An earlier study indicated that the strength of the primary care infrastructure of a health services system might be related to overall costs of health services. The purpose of the current research was to determine the robustness of the findings in the light of the passage of 5-10 years, the addition of two more countries, and the findings of other research on the possible importance of other determinants of country health levels.

**METHODS:** Thirteen industrialized countries, all with populations of at least 5 million, were characterized by the relative strength of their primary care infrastructure, the degree of national income inequality, and a major manifestation of a behavioral determinant of health that is amenable to policy intervention (smoking), using international data sets and national informants. Health system and primary care practice characteristics were judged according to pre-set criteria. Major indicators of health were used as dependent variables, as were health care costs.

**FINDINGS:** The stronger the primary care, the lower the costs. Countries with very weak primary care infrastructures have poorer performance on major aspects of health. Although countries that are intermediate in the strength of their primary care generally have levels of health at least as good as those with high levels of primary care, this is not the case in early life, when the impact of strong primary care is greatest. A subset of characteristics (equitable distribution of resources, publicly accountable universal financial coverage, low cost sharing, comprehensive services, and family-oriented services) distinguishes countries with overall good health from those with poor health at all ages. Neither income inequality nor smoking status accurately identified those countries with either consistently high or consistently poor performance on the health indicators.

**INTERPRETATION:** A certain level of health care expenditures may be required to achieve overall good health levels, even in the presence of strong primary care infrastructures. Very low costs may interfere with achievement of good health, particularly at older ages, although very high levels of costs may signal excessive and potentially health-compromising care. Five policy-relevant characteristics appear to be related to better population health levels. There is no consistent relationship between income inequality, smoking, and health levels as measured by various indicators of health in different age groups.

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14) "Value for money in the health sector: the contribution of primary health care." Mills A, Drummond M. *Health policy and planning*, 1987, 2 (2):107-128.

<http://heapol.oxfordjournals.org/content/2/2/107.abstract>

**ABSTRACT:**

Since the Alma-Ata Declaration in 1978, primary health care (PHC) has been seen in most countries as a vital part of any strategy to improve the health of the population. Economic evaluations of PHC delivery and PHC activities are therefore needed to assist in decision-making on resource use in the health sector. A report was prepared on such economic evaluations in the Commonwealth and this paper summarizes those findings which relate to developing Commonwealth countries. After a brief explanation of the main methods of economic evaluation, existing evaluations, classified according to the eight essential elements of PHC, are reviewed. The literature review throws up a number of methodological issues of which policy-makers need to be aware when interpreting evaluations. These are pointed out before moving on to a consideration of what lessons the literature may hold about the value and affordability of PHC and the most efficient ways of delivering PHC activities. The final section suggests that, although economic evaluation techniques have an important role to play in decision-making, they have not so far been used to best advantage. A number of ways in which health ministries could increase the usefulness of the evaluations they commission are considered.

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15) "The Relationship Between Income Inequality, Primary Care and Mortality in the United States, 1980-1995". , Shi, L , Macinko,J, Starfield, B ; *Journal of the American Board of Family Practice*, 2003: Vol. 16(5): 412-22.

[http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-primary-care-policy-center/Publications\\_PDFs/2003%20JABFP.pdf](http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-primary-care-policy-center/Publications_PDFs/2003%20JABFP.pdf)

**RESULTS:**

In weighted multivariate regressions, both contemporaneous and time-lagged income inequality measures (Gini coefficient, Robin Hood Index) were significantly associated with all-cause mortality ( $P < .05$  for both measures for all time periods).

Contemporaneous and time-lagged primary care physician-to-population ratios were significantly associated with lower all-cause mortality ( $P < .05$  for all 4 time periods), whereas specialty care measures were associated with higher mortality ( $P < .05$  for all time periods, except 1990, where  $P < .1$ ). Among primary care subspecialties, only family medicine was consistently associated with lower mortality ( $P < .01$  for all time periods).

**CONCLUSIONS:**

Enhancing primary care, particularly family medicine, even in states with high levels of income inequality, could lead to lower all-cause mortality in those states.

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16) "Associations of physician supplies with breast cancer stage at diagnosis and survival in Ontario, 1988 to 2006". Gorey KM, Luginaah IN, Holowaty EJ, Fung KY, Hamm C: *Cancer*; 2009 Aug 1;115(15):3563-70

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2909270/>

ABSTRACT:

The risk of living in primary care physician-undersupplied areas increased significantly between 1991 and 2001 (10%-30%), and such physician supply losses were associated with reduced cancer care protection, including less prevalent early diagnoses (odds ratio [OR], 1.60; 95% confidence interval [95% CI], 1.00-2.58) and lower 5-year survival rates (OR, 1.62; 95% CI, 1.03-2.55).

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17) "Is primary care effective? Quantifying the health benefits of primary care physician supply in the United States." Macinko J, Starfield B, Shi L.; *Int J Health Serv.* 2007;37(1):111-26.

<http://www.ncbi.nlm.nih.gov/pubmed/17436988>

ABSTRACT:

This analysis addresses the question, Would increasing the number of primary care physicians improve health outcomes in the United States? A search of the PubMed database for articles containing "primary care physician supply" or "primary care supply" in the title, published between 1985 and 2005, identified 17 studies, and 10 met all inclusion criteria. Results were reanalyzed to assess primary care effect size and the predicted effect on health outcomes of a one-unit increase in primary care physicians per 10,000 population. Primary care physician supply was associated with improved health outcomes, including all-cause, cancer, heart disease, stroke, and infant mortality; low birth weight; life expectancy; and self-rated health. This relationship held regardless of the year (1980-1995) or level of analysis (state, county, metropolitan statistical area (MSA), and non-MSA levels). Pooled results for all-cause mortality suggest that an increase of one primary care physician per 10,000 population was associated with an average mortality reduction of 5.3 percent, or 49 per 100,000 per year.

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18) "Primary Care, Social Inequalities, and All-Cause, Heart Disease, and Cancer Mortality in US Counties, 1990" Shi L, Macinko J, Starfield B, Politzer R, Wulu J, Xu J. *Am J Public Health.* 2005 April; 95(4): 674-680.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1449240/>

RESULTS:

Counties with higher availability of primary care resources experienced between 2% and 3% lower mortality than counties with less primary care. Counties with high income inequality experienced between 11% and 13% higher mortality than counties with less inequality.

CONCLUSIONS:

Primary care resources may partially moderate the effects of income inequality on health outcomes at the county level.

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19) "The Contribution of Primary Care Systems to Health Outcomes within Organization for Economic Cooperation and Development (OECD) Countries, 1970-1998", Macinko J, Starfield B, Shi L., *Health Serv Res.* 2003;38:831-865.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1360919/>

PRINCIPAL FINDINGS:

The strength of a country's primary care system was negatively associated with (a) all-cause mortality, (b) all-cause premature mortality, and (c) cause-specific premature

mortality from asthma and bronchitis, emphysema and pneumonia, cardiovascular disease, and heart disease ( $p < 0.05$  in fixed effects, multivariate regression analyses). This relationship was significant, albeit reduced in magnitude, even while controlling for macro-level (GDP per capita, total physicians per one thousand population, percent of elderly) and micro-level (average number of ambulatory care visits, per capita income, alcohol and tobacco consumption) determinants of population health.

**CONCLUSIONS:**

(1) Strong primary care system and practice characteristics such as geographic regulation, longitudinality, coordination, and community orientation were associated with improved population health. (2) Despite health reform efforts, few OECD countries have improved essential features of their primary care systems as assessed by the scale used here. (3) The proposed scale can also be used to monitor health reform efforts intended to improve primary care.

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20) "Does continuity of care matter in a universally insured population?" Menec VH, Sirski M, Attawar D., *Health Serv Res.* 2005;40:389–400.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1361147/>

**PRINCIPAL FINDINGS:**

Continuity of care was related to better preventive health care and reduced ED use. A consistent socioeconomic gradient also emerged. For instance, the odds of having a mammogram was double for individuals living in the wealthiest neighborhoods, relative to those in the poorest neighborhoods (adjusted odds ratio=2.31, 99 percent CI 2.13–2.50).

**CONCLUSIONS:**

Having a long-term relationship with a single physician makes a difference even in a universal health care system. Moreover, socioeconomic disparities remain, suggesting the need to target specifically individuals from lower socioeconomic strata for preventive health care.

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21) "Primary Care supply and Colorectal Cancer" Roetzheim RG<sup>1</sup>, Gonzalez EC, Ramirez A, Campbell R, van Durme DJ, *Journal of Family Practice*, 2001 Dec 50(12):1038-9.

<http://www.ncbi.nlm.nih.gov/pubmed/11742602>

Increasing primary care physician supply was negatively correlated with both colorectal cancer (CC) incidence (CC = -0.46;  $P < .0001$ ) and mortality rates (CC = -0.29;  $P = .02$ ). In linear regression that controlled for other county characteristics, each 1% increase in the proportion of county physicians who were in primary care specialties was associated with a corresponding reduction in colorectal cancer incidence of 0.25 cases per 100,000 ( $P < .0001$ ) and a reduction in colorectal cancer mortality of 0.08 cases per 100,000 ( $P = .0008$ ).

**CONCLUSIONS:**

Incidence and mortality of colorectal cancer decreased in Florida counties that had an increased supply of primary care physicians. This suggests that a balanced work force may achieve better health outcomes.

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22) "The Political Economy Of U.S." The singular lack of balance between primary and specialty care has serious consequences for health care in the United States. Lewis G. Sandy, Thomas Bodenheimer, L. Gregory Pawlson, and Barbara Starfield. s. [Health Affairs 28, no. 4 (2009): 1136–1144; 10.1377

<http://content.healthaffairs.org/content/28/4/1136.full.pdf+html>

ABSTRACT:

Compelling evidence suggests that the United States lags behind other developed nations in the health of its population and the performance of its health care system, partly as a result of a decades-long decline in primary care. This paper outlines the political, economic, policy, and institutional factors behind this decline. A large-scale, multifaceted effort—a new Charter for Primary Care—is required to overcome these forces. There are grounds for optimism for the success of this effort, which is essential to achieving health outcomes and health system performance comparable to those of other industrialized nation.

23) "THE IMPACT OF PRIMARY CARE" SHLL, Scientifica, Volume 2012 (2012), Article ID 432892, 22 pages  
<http://www.hindawi.com/journals/scientifica/2012/432892/>

ABSTRACT:

Primary care serves as the cornerstone in a strong healthcare system. However, it has long been overlooked in the United States (USA), and an imbalance between specialty and primary care exists. The objective of this focused review paper is to identify research evidence on the value of primary care both in the USA and internationally, focusing on the importance of effective primary care services in delivering quality healthcare, improving health outcomes, and reducing disparities. Literature searches were performed in PubMed as well as "snowballing" based on the bibliographies of the retrieved articles. The areas reviewed included primary care definitions, primary care measurement, primary care practice, primary care and health, primary care and quality, primary care and cost, primary care and equity, primary care and health centers, and primary care and healthcare reform. In both developed and developing countries, primary care has been demonstrated to be associated with enhanced access to healthcare services, better health outcomes, and a decrease in hospitalization and use of emergency department visits. Primary care can also help counteract the negative impact of poor economic conditions on health.