Structure, Process, and Outcome in Health System Improvement

Barbara Starfield, MD, MPH

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Revolutions in Medicine, 1900s

Ascendence of single disease and chronic illness focus

Diagnostic challenges/more technology

Single cause (? gene) – magic bullet

All fostered an INDIVIDUAL ORIENTATION in health services.
Revolutions in Medicine, 2000s

Multiple interacting influences on illness/health
Disparities in health (inequity)
Illness as morbidity burden, not as disease
Risk factors as diseases
Health as an impossibility (a healthy person is someone without enough tests)

All require a POPULATION ORIENTATION.
This slide shows the well-known direct relationship between the density of health professionals and one aspect of the health of populations: health professional supply. As this slide shows, the relationship holds only on average, and there is considerable variation, with some countries having many health workers but still relatively high child mortality under age 5. There is even one country with few health workers that has a child mortality the same as the United States and Cuba. Clearly, it is not the number of health professionals that influences child mortality; rather, it must be how those health professionals are organized and what they do that is the influence.

This chart shows the relationship between the wealth of 177 countries and their child survival to age 5. The size of the circle represents the population of the country. Child survival to age 5 improves with increasing gross domestic product (GDP) per capita. However, at any given level of GDP per capita, there are large variations in child survival. This indicates that countries differ in important ways in their approaches to maximizing the health of their people. Other evidence shows that one of these ways concerns their policy towards organizing and developing equitable health systems.

This graph shows the well-known relationship between country wealth (as expressed by GDP per capita) and life expectancy. Although not previously stressed, it shows considerable variation in life expectancy at any given GDP. For example, Poland and South Africa have approximately similar wealth but life expectancy is, on average, 7-8 years greater in Poland. Variability is noted all along the curve, even at its asymptotic end, as some countries at the wealthy end of the curve experience lower life expectancy than less wealthy countries. These include, particularly, Switzerland and the US. Other wealthy countries fall below the curve; these include Germany, Taiwan, and Singapore. Thus, wealth alone does not assure health. The graph also shows a new phenomenon: an apparent decline in life expectancy above a certain level of country wealth. Some very wealthy countries (US, Switzerland) are recently experiencing lower life expectancy than some less wealthy countries, and some others (Germany, Singapore, Taiwan) are below the curve. That is, they have lower life expectancy than expected despite their wealth. These five countries are all countries whose health systems are more specialty oriented than primary care oriented, suggesting the likelihood that there is excessive and unnecessary specialty and technology use leading to inappropriate care and perhaps even an increasing rate of adverse effects from excessive intervention.

Are there differences in structure, process, and outcomes that can explain variability in health even across areas with similar wealth and resources?
Increasing recognition that there are systematic differences in health across different population subgroups, i.e., inequity in health, has led to an expanded view of influences on health. In this view, health is viewed as both an average of individuals in the population and the way in which health is distributed in the population. In populations, community and policy contexts have a major role in influencing more proximal influences on health in communities and on individuals in communities.

These societal influences operate differently in the various subgroups of the population. It is these factors, rather than those at the community and individual level, that primarily influence distribution of health within the population rather than average of levels of health such as those that are commonly in use in health statistics.

Political contexts determine the nature of policies, which, in turn, influence the characteristics of communities: environmental; levels of income and their distribution, e.g., income inequality; power and status relationships; behavioral and cultural characteristics; and health system characteristics. Because they are all influenced by the political context, they potentiate or interact with each other and more directly (through unknown individual characteristics and exposures) influence both health levels as well as distributions of health in individuals, both of which also are affected by demographic characteristics and historical health disadvantage i.e., the tendency of good or poor health to persist for long periods of time in defined geographic areas.\(^1\)

\(^1\)continued on IH 6891 bn
There are only a handful but increasing number of studies concerning the influences of such characteristics on various health needs.²

A focus on influences on the health of populations does not assume a particular pattern of risks among individuals in that population. In this diagram, the individual risk factors are less salient than community and policy characteristics in a political context. Conventionally the province of public health, interventions at these levels have emphasized the extent to which societal factors can be modified to prevent the occurrence of ill health. Thus, prevention is a major thrust of public health efforts. Less common is consideration of the extent to which characteristics of these levels contribute to worsening of health where it has already been compromised.

In the most recent 20 years, the salience of such activities has become more visible as, for example, the role of health policy in facilitating or interfering with the practices of pharmaceutical companies in marketing retroviral medications for HIV/AIDS. In this sense, the “determinants of disease” and their progression are societal (rather than social), and they operate primarily to alter rates of discomfort, disability, and death rather than occurrence (incidence) of ill health.

The other important characteristic of a focus on populations is that it explicitly requires consideration of distributions in the population, i.e., equity in health, as well as average levels of ill health.

A framework based on structure, process, and outcome is helpful in describing and measuring the components of health services systems.

This figure specifies the important components of health services systems according to their type (structure, process, and outcome in the terminology of Donabedian (1966). In the diagram, structural components of health services systems are designated as Capacity and include the characteristics that enable medical practices to provide services. The process components are designated as Performance and include the categories of action engaged in by practitioners as well as the actions of patients and populations that enable them to receive services that are recommended. All characteristics of health systems and their interactions with communities and civil society should be represented by this diagram. (The diagram applies to ambulatory care as well as to care in institutions; hospitalization is represented as a management strategy under the control of providers.) Costs can be superimposed on each of the components of the system.

Primary care is a major component of health services systems.
Primary Health Care and Primary Care

Primary health care is a system-wide approach to designing health services based on primary care.

Primary care is the representation, on the clinical level, of primary health care.
The framework of structure, process, and outcome is useful in defining primary care so that it can be measured and evaluated.
Primary care has four main functions: first contact (the place where care is first sought for a new or newly recurring health problem or health need); longitudinality (person-focused care over time); comprehensiveness (providing for all common health needs without referral); and coordination (integrating all aspects of care when people have to go elsewhere for uncommon or unusually serious health conditions). Each of these four essential functions can be described and assessed by using several of the elements of health systems, as described in this chart.

| First Contact          | • Accessibility  |
|                       | • Use by people for each new problem |
| Longitudinal          | • Relationship between a facility and its population  |
|                       | • Use by people over time regardless of the type of problem; person-focused character of provider/patient relationship |
| Comprehensive         | • Broad range of services  |
|                       | • Recognition of situations where services are needed  |
| Coordination          | • Mechanism for achieving continuity  |
|                       | • Recognition of problems that require follow-up  |
This diagram shows how just seven elements are used to describe and measure the four essential functions of primary care. Each function entails the achievement of a particular structural element that the practitioner or practice must have in place in order for there to be appropriate performance. Three aspects of performance are important to the achievement of the function. For two of the functions (comprehensiveness and coordination), that element is the recognition of patients’ problems. For a service to be comprehensive, the totality of a patient's health problems must be recognized in order for appropriate actions to be taken. For coordination, the practitioner or facility needs to recognize which problems require integration into the totality of care provided to the patient in order to achieve effective and safe care.
In addition to the elements important for primary care, this diagram highlights other features that are important to primary health care. That is, they concern elements of health systems that are necessary for designing practices for primary care: personnel, facilities and management, financing, and governance. Decisions about the number and distribution of personnel and facilities are critical in achieving equity in the distribution of resources for primary care. Financing considerations are important in controlling financial access to care, including low or no copayments for primary care services. Little is known about the specific ways in which governance particularly facilitates the achievement of primary care characteristics, but it clearly is important as studies have shown that the political characteristics of governments are related to health levels in different countries.

The diagram also highlights the elements of “outcome” that are appropriate for evaluating the contributions of health services interventions. They range from changes in life expectancy to changes in activity or disability, symptoms resulting from health services interventions, disease rates and severity, achievement of life goals, satisfaction with one’s health, and resilience and vulnerability to influence on illness.

These data, from a national data source in the US show that spending is much lower when episodes of care begin with a visit to a primary care physician. This is even more the case when the episode is one that concerns an illness, where the differences between a first visit to primary care versus to a specialist are very marked (more than double in the case of first visits to specialists).
Scores of studies have documented benefits from long-term patient-provider relationships. This chart shows that the benefits are greater and more consistently found when that relationship is with a particular person rather than simply with a particular place for receiving care. Outcomes that are less person-focused, for example routine immunizations, are as likely to be achieved when the particular regular source of care is a place, but those features that depend on the knowledge that grows out of an interpersonal relationship are much better achieved when the regular source of care is a person.

In evaluating the benefits of a regular source of care, it is methodologically better to ascertain the relationship before the outcomes (benefits) are measured. Otherwise, better reports of personal relationships might be attributable to better outcomes rather than the other way around. (Some early studies of satisfaction with the regular source of care were prey to this reverse relationship.)

Criteria for Comprehensiveness

In US studies: universal provision of extensive and uniform benefits for children, the elderly, women, and other adults; routine OB care; mental health needs addressed; minor surgery; generic preventive care.

In European studies: treatment and follow-up of diseases (e.g., hypothyroidism, acute CVA, ulcerative colitis, work-related stress, n=17); technical procedures (e.g., wart removal, IUD insertion; removal of corneal rusty spot; joint injections); taking cervical smears; group health education; family planning and contraception.

Sources:
Coordination

Coordination requires transfer of information (a structural element) and the recognition of that information in the ongoing care of a patient (a process element).

Modes of transfer are multiple: conventional medical records, patient-held records; smart cards; electronic medical records; multidisciplinary teams with specified complementary, supplementary, and substitutive functions of each team member.

These different types have not been compared with regard to effectiveness and efficiency, but developing countries (in particular) are exploring the potential of community workers in assuming explicit responsibility for a variety of primary care tasks in conjunction with personnel in health centers where they exist.

Sources:
There are structural, process, and outcome features that characterize primary HEALTH care, that is, primary care at the policy level.

The critical structural features are equitable distribution of resources (Personnel and Facilities); government control or regulation of financing and low or no copayments for primary care services (Financing); and Definition of the Eligible Population. A remaining question is the extent of importance of mechanisms of Governance, which have been poorly studied.
During the 1990s, two successive international comparisons involved rating different countries on the strength of primary care within the country. Ratings of primary health care were obtained by rating 6 (and 9 in the later study) characteristics of policy in each country: efforts to distribute resources according to where they were most needed; maintaining low or no cost-sharing; financial access controlled or regulated by government; the type of primary care practitioner (family physician or a mixture of types including also general internists and general pediatricians); and the presence of patient lists by primary care practices. In the second study, the following were added: low or no copayments for primary care; strength of academic departments of family medicine; the presence of patient lists by primary care practices; and 24-hour availability of primary care practices. Extent of achievement of the clinical features of first contact care, person-focused care over time, comprehensiveness (breadth) of services, coordination of care, family centeredness, and community orientation were also rated. Each characteristic was rated on a scale of 0 to 2, then all scores were averaged to obtain a systems score, a practice score and a combined overall primary care score. Eleven, and then 13 industrialized countries were compared; this comparison led to three groups of countries: those with low scores, those with intermediate scores, and those with high scores. These three groupings were unchanged over the decade between the two studies.

An international comparison of industrialized nations found a statistically significant relationship between per capita health care expenditures and the extent to which the health system was oriented around strong primary care policies and practices*. The stronger the primary care, the lower the total health care expenditures. This was the case even when the United States, with its high expenditures and poor primary care infrastructure, was removed from the analysis.

When countries were separately ranked by the strength of health policies (such as efforts to distribute health resources equitably, low or no copayments, and publicly accountable health services financing) and by the quality of primary care practice (first-contact access, person-focused care over time, comprehensiveness, and coordination), there was a very strong relationship such that countries with better health policies had better primary care practices. Strong primary care practice apparently requires strong national policy support.

The primary care score has two parts: the first reflects the strength of primary health care (that is, policies oriented towards primary care), and the second reflects the practice of primary care at the clinical level. In this chart, the countries are ranked by each of their two sub-scores. The country with the best sub-score is ranked #1, and the one with the worst sub-score is ranked #13. The better the policies (systems rankings), the better the practices, indicating the importance of governmental policy to good practice.

Primary health care oriented countries

- Have more equitable resource distributions
- Have health insurance or services that are provided by the government
- Have little or no private health insurance
- Have no or low co-payments for health services
- Are rated as better by their populations
- Have primary care that includes a wider range of services and is family oriented
- Have better health at lower costs

Sources:
Key system factors in achieving primary health care in both developing and industrialized countries are:

- Universal financial coverage, under governmental control or regulation
- Efforts to distribute resources equitably (according to degree of need)
- No or low co-payments
- Comprehensiveness of services

Both international comparisons and within-country studies provide the basis for specifying 6 key factors in achieving an effective health system (Starfield and Shi 2002; Gilson et al 2007). There are some countries in the world that approach the achievement of these policies; they also have the best health in the world, as measured by conventional and widely accepted health statistics, including mortality and illness rates as well as indicators related to death and age at death.

Sources:
Studies in other developing and middle income countries also show benefit from primary care reform.

- In Bolivia, reform in deprived areas lowered under-5 mortality rates compared with comparison areas.
- In Costa Rica, primary care reforms in the 1990s decreased infant mortality and increased life expectancy to rates comparable to those in industrialized countries.
- In Mexico, improvements in primary care practices reduced child mortality in socially deprived areas.

Sources:
Many other studies done WITHIN countries, both industrialized and developing, show that areas with better primary care have better health outcomes, including total mortality rates, heart disease mortality rates, and infant mortality, and earlier detection of cancers such as colorectal cancer, breast cancer, uterine/cervical cancer, and melanoma. The opposite is the case for higher specialist supply, which is associated with worse outcomes.

Sources:
What We Already Know

A primary care oriented system is important for

- Improving health (improving effectiveness)
- Keeping costs manageable (improving efficiency)
The preceding empirical demonstrations of the influence of a primary care orientation show that it is associated with greater effectiveness of health services. Does primary care also improve equity in health?
Equity in health is the absence of systematic and potentially remediable differences in one or more aspects of health across population groups defined geographically, demographically, or socially.

This definition was developed by the International Society for Equity in Health at its first meeting in Havana Cuba in June of the year 2000 - thus greeting the new millennium with a definition of equity in health which, for the first time, made it possible to assess the state of equity in any area in a standard way. Previous definitions took recourse in terms such as “fairness”, which do not lend themselves to standardized measurement and, by being explicit about systematic differences across population subgroups, made it clear that equity was distinguished from equality by differences across population subgroups rather than between individuals in a population.
In the United States, an increase of 1 primary care doctor is associated with 1.44 fewer deaths per 10,000 population.

The association of primary care with decreased mortality is greater in the African-American population than in the white population.

As the effect of increasing primary care health professionals is greater in more deprived populations (in this case, the African American population in the US), it can be said that primary care is equity-producing.

During the 1990s, policy in Thailand led to the development of at least one primary care health center in each rural village. During this time period, insurance for medical services was progressively expanded to cover the entire population by the early 2000s. A very active Rural Doctors Society was a major advocate of this expansion. During this period, under-5 mortality was lowered by a much greater percentage in more deprived populations than in less deprived ones: 44% in the poorest quintile and 13% in the richest percentile - with a progressively greater reduction in successive percentiles of wealth. Both relative and absolute differences in under-5 mortality were reduced.

In 7 African countries

- The highest 1/5 of the population receives well over twice as much financial benefit from overall government health spending (30% vs 12%).
- For primary care, the poor/rich benefit ratio is much lower (23% vs 15%).

“From an equity perspective, the move toward primary care represents a clear step in the right direction.”

Sources:

In this chart, countries on the left are paired with countries on the right that spend a much lower proportion of government expenditures on health for the poor than for the rich. Each pair has approximately the same gross domestic product (GDP) per capita. The number of children per 1000 who survive to age 5 is much greater in the countries on the left; countries that provide a greater percentage of resources to the poor compared with the rich have between 25 and 150 more children who survive than their paired country.

Sources: analyses from data in:

<table>
<thead>
<tr>
<th>High child survival</th>
<th>Low child survival</th>
<th>Additional children lost per 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sri Lanka 1.1</td>
<td>Ivory Coast 0.3</td>
<td>150</td>
</tr>
<tr>
<td>Malaysia 2.6</td>
<td>Brazil 0.4</td>
<td>45</td>
</tr>
<tr>
<td>Costa Rica 2.1</td>
<td>South Africa 0.9</td>
<td>55</td>
</tr>
<tr>
<td>Jamaica 3.3</td>
<td>Ecuador 0.2</td>
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<tr>
<td>Nicaragua 1.0</td>
<td>India 0.3</td>
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</tr>
<tr>
<td>Egypt 0.6</td>
<td>Ivory Coast 0.3</td>
<td>100</td>
</tr>
</tbody>
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*Ration of one or more signify a greater share of government expenditures to poorest segment of population.
This slide shows the four main policy characteristics related to effectiveness and equity of primary health care services: distribution of resources according to extent and type of health needs, progressivity of financing, degree of cost sharing, and breadth of services provided in primary care. Scores range from zero (0), where the policy characteristic is absent, to a score of 1, where the characteristic is present but poorly developed, to a score of 2, where the characteristic is well developed. Belgium, France, Germany, and the US have weak primary health care systems; Denmark, Finland, The Netherlands, Spain, and the UK have strong primary healthcare; and Australia, Canada, Japan, and Sweden are in-between. With few exceptions, countries with equity-focused health policy are countries with strong primary care; countries with weak policy characteristics have weak primary care health systems.

Sources:


Primary Care and Health: Evidence-Based Summary

- Countries with strong primary care
  - have lower overall costs
  - generally have healthier populations
- Within countries
  - areas with higher primary care physician availability (but NOT specialist availability) have healthier populations
  - more primary care physician availability reduces the adverse effects of social inequality

The positive impact on health of primary care resources is most notable in geographic areas that are socially inequitable. Thus, primary care reduces health disparities resulting from social inequity.

Conclusions

Both international comparisons and studies within countries document the beneficial impact of primary care on effectiveness (health outcomes), on efficiency (lower costs), and on equity of health outcomes (reducing disparities across population subgroups).

Health policy should be directed toward strengthening the primary care orientation of health systems.
For outcomes, the imperative is to replace the primary focus on DISEASE with a focus on ILLNESS, substituting a multi-domain conceptualization for a disease-by-disease accounting of health statistics.
Diseases

- are professional constructs
- can be and are artificially created to suit special interests; the sum of deaths attributed to diseases exceeds the number of deaths
- do not exist in isolation from other diseases and are, therefore, not an independent representation of illness
- are but one manifestation of ill health

Sources:
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