

Population-Based Family Practice: The Next Challenge of Primary Care

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In its first 15 years family medicine has moved the focus of clinical care from the individual to the family unit. Assuming responsibility for the care of a denominator population is an important challenge to primary care and a potential next step for family medicine.

This paper presents a model of denominator-based practice and discusses its particular applicability to family practice. In addition to offering the potential for improving the health of its denominator population, this innovation in primary care may provide an important opportunity to lever family practice into a more favorable competitive position in the health care market.

The concern for the quality of care in the 1970s clearly has given way in the 1980s to a national concern for controlling the costs of medical care. Within the national health policy debate, only occasional reference is made to primary care. Yet primary care is a common denominator for many of the issues and offers a mechanism for balancing the requirements for the quality of care with the mandate to control escalating costs. The challenge is clear—primary care must demonstrate that it is a viable mechanism within the health care system of this country, capable of controlling unnecessary costs by focusing the rational use of appropriate biomedical technology on high-priority health care needs of the American people.

While there is no widespread agreement either on a unitary definition of primary care or on who is and is not a primary care provider, for family practice the disagreement is largely at the margins. In its 15-year history, family practice has demonstrated a clear commitment to providing primary care to individuals and family units. Alone among the medical disciplines, family practice makes no claim to subspecialty care and devotes its energies to practicing, teaching, and developing the knowledge base of primary care.

Family physicians are not, however, alone in the provision of primary care services, and other medical

disciplines rightfully claim part of the arena. Ironically, primary care may become financially more attractive to many subspecialty clinicians as the projected increase in practicing physicians results in an excess in many disciplines and, fueled by increased pressures for cost containment, leads to fierce competition for patients. In the next decade the competitive edge may belong to the practice that has captured and serves a target population, and in this regard, family practice has a distinct advantage.

A recent report from the Institute of Medicine describes a process by which a primary care practice identifies a denominator population and systematically addresses its health needs.¹⁻³ Under the rubric of community-oriented primary care, the report developed a generic model and demonstrated its applicability to a variety of practice settings. While to some the term *community-oriented primary care* is reminiscent of publicly funded programs that provide services to medically indigent communities, the report describes a generic model and analyzes its application in both the public and the private sectors. In the seven case studies describing elements of this model in diverse medical care environments, the predominance of family physicians was notable. Further, one of the case studies described a private, fee-for-service family practice and demonstrated the particular application of the concept to family medicine.

CORE CHARACTERISTICS OF POPULATION-BASED FAMILY PRACTICE

In addition to the primary care practice itself, there are

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TABLE 1. SUMMARY OF CRITERIA FOR STAGES OF DEVELOPMENT OF THE ACTIVITIES OF POPULATION-BASED FAMILY PRACTICE

Function	Stage 1	Stage 2	Stage 3	Stage 4
Defining and characterizing the community	Based on subjective impressions of the physicians or consumers	Characterized by extrapolation from secondary data sources	Enumerated and characterized by ad hoc database specific to the population	Enumerated and characterized from a current and complete database of the population
Identifying community health problems	Based on subjective impressions	Extrapolation from secondary data	Use of data sets specific to the population	Routine mechanisms identify and set priorities among a range of problems
Modifying the health care program	Based on national or organizationwide initiatives	In response to special resources that become available	Tailored to identified needs of the target population	Targeted to specific high-risk individuals and groups
Monitoring the effectiveness of program modifications	Based on subjective impressions	Extrapolation from secondary data	Use of data sets specific to the population	Specific to program objectives and differential impact among risk groups

two more components of the model, the *denominator* population and the *process* by which the denominator population is defined and characterized and its health needs identified and addressed. Primary care traditionally has been practiced by physicians who feel a deep responsibility for their active patients, and many clinicians have developed informal systems for addressing the health needs of the population of active patients. Such systems have included tickler files and postcard reminders to monitor immunizations and screening procedures, and more recently, computer systems have added greatly to the capability of monitoring the active patient population for needed and overdue health services. The denominator-based practice model extends this approach to include individuals in the denominator population who are nonusers of the practice.

It is useful to think of the denominator population as having three levels. The first is the population of active patients, defined as all individuals who have contacted the practice within the previous two years. At the next level is the practice community, which includes all members of the household to which active patients belong. Finally, there is the larger population whose health needs can be addressed, which, for example, may include a school population, the enrolled members of a health plan, participants in a work-place health program, or a geographic community.

The process that identifies and addresses the health care needs of the denominator population consists of four sets of activities. These include (1) defining and characterizing the denominator population, (2) identifying major health and health care problems, (3) adapting the array of primary care services provided, and (4) monitoring the impact of service modifications. This process is familiar to practitioners, and many family physicians have applied it to office management

problems, such as determining the best combination of office hours that will maximize access for their patients. Usually the process is subjective, although some have proceeded to gather data, first to document the extent of the problem and later to monitor the impact of altered office hours.

Many health and health care problems can be fruitfully identified and addressed within a denominator population. These problems range from an excessive incidence or prevalence of a particular disease to problems in health care, such as poor access to basic services, inadequate case finding, lack of continuity and coordination of care, and poor compliance with therapy. The types of problems that are both important and feasible to address with this process will depend on the particular population addressed and the sophistication of the methods used. The process of developing a population-based approach in a family-practice setting is summarized in Table 1.

In reality many practices may be using varying techniques to address simultaneously more than one denominator population. A two-dimensional matrix, as shown in Figure 1, characterizes the possible combinations and assists the clinician in identifying rational steps in developing the model in his practice. On one dimension are shown five stages of development, which may apply to each of the four functions listed above. The other dimension describes several possible configurations of the denominator population.

While the matrix scheme implies higher value associated with higher stages of development and higher levels of the community, the value of moving on either dimension will be specific to the individual practice. Some practices may find it both useful and feasible to identify and address a practice community, while the setting or the personal philosophy of other physicians may argue for defining the denominator population as

		Levels of the Denominator Population		
		Active Patients	Practice Community	Total Community
Stages of Development	Stage 0			
	Stage 1			
	Stage 2			
	Stage 3			
	Stage 4			

Figure 1. Relationship of the rigor of the population-based practice process and the levels of the denominator population

a social, cultural, or geographic community. Practices that focus on a denominator population made up of their active patients, however, should do so with the assurance that they are forging an important innovation in the delivery of primary care.

A similar condition holds for the process steps as well, where stage 4 may represent a high level of development for a given function, but attaining the ideal in a practical setting may not always be worth the marginal cost. For example, practices with developed data systems may find it relatively easy to apply more rigorous quantitative techniques to the process of identifying and addressing the health care needs of a denominator population, techniques that would be labor-intensive and overly expensive without a data system. In some cases the denominator population may be sufficiently similar to the population base of large area data that may be available from the local health department. In these settings, the diligent use of secondary data may yield more information than the more nonchalant use of a sophisticated—and undoubtedly more expensive—data system. Nonetheless, it is useful to keep in mind the multiple trade-offs inherent in differing levels of rigor of the process of addressing health problems and in differing configurations of the denominator population. Thus, the several combinations of sophistication of the activities and alternative denominator populations (as depicted in Figure 1) should be kept in mind during the following description of the model.

Defining and Characterizing the Denominator Population

The initial activities of the process of identifying and addressing health problems of the denominator population define and characterize the denominator population for which the practice has accepted responsibility. The information gathered in this step forms the

basis for the subsequent activities. Information is needed that describes who and where the individuals and households are who make up the population, how they live and behave in ways that influence their health, where and when they seek care for ailments, and how they perceive and finance their care. In the early phases of development, information may necessarily be based on subjective impressions of the physicians or consumers (stage 1) or extrapolated from census or other secondary data (stage 2). At the higher stages the population is characterized from a data set specific to the population. Ideally (at stages 3 and 4), the physician would be able to enumerate, or actually list, all the individuals in the population as a basis for subsequent identification and for focusing on high-risk individuals.

Identifying Health and Health Care Problems

The second set of activities identifies the major health problems of the population, characterizes their determinants and correlates, and sets priorities among them. The major requirement is that the methods used for examining the health issues be based on an appropriate denominator. For example, a chart audit that focuses on patients currently under treatment for hypertension, while useful as a quality-assessment activity, will omit important data on patients with undiagnosed hypertension within the larger active patient population. Similarly, focusing on the active patient population would be inappropriate to the study of hypertension within the still larger practice community.

Initial efforts may be based on subjective data (stage 1) or by extrapolation from large area data (stage 2), such as the epidemiologic data available from most local health departments. At the higher stages problems are identified from a database that is specific to the target population (stage 3), and ideally the process is routine and iterative in nature (stage 4).

Modifying the Health Services

As high-priority health problems are identified, adjustments are made in the array of health services offered to address the problem better. For many health problems, the physician may also become an advocate for appropriate modifications in other community or public health programs that serve the denominator population. The major requirement for full development of this function is that service modifications be based on health problems of, and targeted appropriately at, the denominator population.

At stage 1, the physician is modifying his practice patterns, but is doing so largely in response to local, national, or specialty-wide initiatives. For example, emphasizing infant immunization as a result of national data that suggests declining immunization levels would be characteristic of this stage. Stage 2 modifications are made largely in response to special resources that

become available to address a particular problem. For example, a physician with a particular interest in diabetes may join a practice and initiate expanded services for the active patients with diabetes. In both cases, the resulting program may address an important problem but will not necessarily address the problem in the manner most effective for the entire denominator population, nor will it be based on the unique characteristics of the problem in that target population. Ideally, activities at the higher stages will address an identified, high-priority health problem (stage 3) and will attempt to reach those individuals who will most benefit from the emphasized services (stage 4).

Monitoring the Impact of Service Modifications

Finally, the impact of modifications must be monitored to determine the extent to which they have addressed and resolved the original problem. In practice this final step of the process¹⁶ is often neglected or accomplished with less rigor. At any level of rigor, however, it is essential that the methods used be based on a denominator that is consistent with the definition of the target group and with the stated objectives of the service modification.

As in the previous quantitative functions, monitoring activities may be based on the subjective impressions of the physicians or consumer groups (stage 1) or on extrapolation from secondary data sources (stage 2). At stage 3, program modifications are monitored with data that are specific to the population. Usually evaluation efforts at this stage are based on simple before-and-after designs, and as such, the results are subject to the weakness of this particular approach.

Finally, at stage 4 the practice assesses program impact with methods that are specific to the program objectives. Ideally, assessment techniques are sensitive to both positive and negative impacts, ie, they not only take into account the impact on the target health problem, but also consider the impact of potential competition for resources on a variety of other problems that were not addressed. Results also should pinpoint the relative deficiency in the program as the basis for subsequent attempts to refine the modification.

IMPLICATIONS OF POPULATION-BASED FAMILY PRACTICE FOR FAMILY MEDICINE

In its relatively short history, family medicine has shifted the focus of clinical medicine from the care of the individual to the care of family units. In its leadership role, it is reasonable for family medicine to expand the scope of primary care to include a denominator population. This focus can be adopted relatively easily by addressing the health care needs of a

“practice community,” defined as all members of the households to which the active practice patients belong. This practice community represents a denominator population for whom most family physicians feel a professional responsibility. With the use of practice-based computers, most physicians could develop a modest database on all members of the practice community, including such items as age, sex, occupation, major health problems, smoking habits, exercise habits, and weight. This data set could be gathered on all household members at the time of registration of the patient, and would provide the basic data necessary to identify specific individuals potentially in need of a variety of screening, educational, and therapeutic services.

A growing body of evidence suggests that much of the burden of chronic disease can be reduced by early detection and prevented altogether by changes in personal behaviors. Family practice is ideally postured to incorporate a variety of health promotion and disease prevention services into its practice. Family physicians are also well aware, however, that the ailing patient is receptive to a limited body of new information related to his presenting problem but is not overly receptive to health education on a separate topic. Consequently, health promotion services are usually reserved for follow-up visits or during periodic physical examinations, and thus occur only during visits scheduled for another purpose.

The cause of health promotion and disease prevention in the primary care setting will be enhanced by the practice that assumes responsibility for a denominator population. With the database described above, the family physician can identify specific individuals at risk or with adverse risk profiles to preventable illness. With simple analysis of the database and some outreach effort, the family physician can offer services to the at-risk subset of his population. For example, a conditional retrieval of the database, listing all individuals over the age of 65 years or individuals with cardiovascular or chronic pulmonary disease, would identify a subset of the denominator population potentially at increased risk for complications of influenza. For this subset, the physician could compose a letter outlining the epidemiologic patterns of influenza and the relative protection afforded by annual immunization. The letter could further indicate that the immunization is available from the practice or could be requested from the patient's usual source of physician care. Similarly, this database could be used further to identify subsets of the denominator population who would benefit from specific services related to cancer screening (eg, Papanicolaou smear, mammography, rectal examination, or flexible sigmoidoscopy), needed immunizations (eg, DPT and polio series in children), or health-promoting behaviors, (eg, smoking cessation, weight reduction, or appropriate exercise patterns).

While some physicians would be hesitant to give the

impression of "advertising" their services, this problem could be offset by an appropriate expression of concern for the health of all members of the family. Families who indicate a desire not to be approached in this way could easily be tagged in the database and not included in subsequent efforts.

DISCUSSION

Although it is useful for the model to describe discrete stages of development for each function, there is likely to be a great deal of overlap in actual practice. Attention to the physical and social environment of patients is a hallmark of the primary care physician, and thus it would be unusual for a major health problem to be totally unsuspected until revealed by a systematic study. More commonly, the clinician will suspect a problem in the denominator population, may even be able to describe it based on subjective practice impressions, and may resort to a quantitative process to document the problem and gain information needed to modify the practice and subsequently to monitor effectiveness.

Three of the four functions described are quantitative and require the use of data and quantitative techniques to collect and analyze them. While the activities at stages 1 and 2 do not require the use of new data, the requirements for a database at the higher stages present a problem for most physicians who have neither the time nor the skills to develop and analyze a database. The data needed to manage a population-based practice, however, may be more available than is readily apparent. For the active patient population, the individual patient records in the aggregate make up a clinically rich database. While difficult to analyze manually, the increasing use of computer technology in medical practice will make practice-based data more accessible for analysis by the busy clinician. At the level of the practice community, a focused database can be constructed from a minimal data set collected on each member of the household at the time a new patient enters the practice. When computerized, this type of database, while modest in content, can be a powerful tool for addressing problems of high priority in the practice community, as demonstrated by the Crow Hill Family Medicine Center.²

Finally, the stages of development described above are somewhat arbitrary and based on a relatively small number of actual case studies. Further experience in family practice settings will serve to refine the stages and to define the specific tools and techniques necessary to address systematically health problems in a primary care denominator population.

The advent of microprocessor applications to office practice will offer new opportunities to automate a number of the activities required to address health problems of the target population. By linking current database management and word-processing software,

the physician can compose health education material and target it to relevant at-risk individuals in the practice community, avoiding much of the labor-intensive cost associated with preparing personalized correspondence.

In many practice settings it may not be feasible to address the health problems of the entire community. In urban areas, the community is often complex, transient, and composed of multiple social and ethnic neighborhoods. Often, suburban communities share none of the usual attributes of a community, other than geographic proximity, and continue to seek health care from sources determined in part by location of employment, schools, and shopping patterns. However, the practice that identifies and addresses its practice community can extend care beyond its active patients to a larger population of potential patients in any setting.

There is a pressing need to develop the knowledge base of primary care—that system of theory and fact upon which primary care as a scientific discipline will eventually rest. A portion of the knowledge base will derive from research in the actual practice settings of primary care. In the United Kingdom there is a rich tradition of practice-based research that is only beginning in the United States. The seminal work of practice networks, such as the Ambulatory Sentinel Practice Network (ASPN),⁴ the Dartmouth COOP Primary Care Research Network,⁵ and the Family Practice Network of the Medical College of Virginia,⁶ is beginning to contribute to an understanding of the content of primary care and the natural history of primary care problems. Much remains to be done, however, in describing and analyzing the distribution of care and the patterns of care-seeking behavior in a primary care population, the referral patterns and methods for achieving coordination of care, and the distribution of functionality or dysfunctionality within a primary care population. The family practice that identifies and collects data on a denominator population is in an ideal position to engage in and contribute to the kind of population-based research so necessary to building the knowledge base for primary care.

The activities inherent in identifying and addressing the health services requirements of a denominator population will be associated with certain marginal costs—those incurred above and beyond the baseline costs of operating the practice. Similarly, the process will lead to a marginal benefit in terms of health status of the denominator population and, in a fee-for-service practice, an increment in the revenue generated by the practice itself. The magnitude of these costs, benefits, and revenues are largely unknown. The Institute of Medicine study found very little evidence to suggest the marginal cost and benefit, and virtually no data on the process itself. Whether the costs of the activities themselves will be offset by an increase in service demand and revenue generated remains an unanswered, but testable, hypothesis.

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