

Practice-Based Research Networks

Their Current Level of Validity, Generalizability, and Potential for Wider Application

P RIMARY CARE, and particularly family practice, is widely seen as a vital part of the solution to the ills of the current health care system.^{1,2} Ideally, decisions about practice and policy should be based on data that characterize the nature of the practitioners, their patients, and the problems and treatments that constitute primary care practice.³ However, because of the concentration of researchers in tertiary care medical centers and the focus of family physicians and other generalists on patient care rather than research, these data have been largely missing.

PRACTICE-BASED NETWORKS ARE CRITICAL TO THE FUTURE OF PRIMARY CARE

Primary care research networks are increasingly seen as important for the future of primary care.^{4,5} Research from such networks will allow policy makers and practitioners to address primary care issues from the perspective of data rather than mere belief. A growing number of local, regional, statewide, national, and international networks^{4,6} are active (Paul A. Nutting, MD, PhD, written communication to directors of practice-based research networks, April 9, 1993). In general, these networks incorporate the perspectives and insights of practicing primary care physicians into research carried out on relatively unselected populations. Networks have different strengths and weaknesses that influence the validity and generalizability of their research. In general, geographically contiguous networks allow more intensive data collection techniques, interventions, and communication at a lower cost than the more dispersed networks. Specific networks may also be configured to provide access to special populations of physicians or patients or to answer particular research questions.

Among national primary care research networks, the Ambulatory Sentinel Practice Network Inc (ASPEN) is among the best established and most respected. Unique aspects of ASPEN include its egalitarian governance structure, wide geographic distribution of practices, and requirement that all participating practices keep an age and sex registry of active patients.^{7,8} The ASPEN network has already made important contributions to the understanding of prob-

lems commonly seen in family practice.⁹⁻¹³ Current ASPEN research is funded by a number of sources and uses increasingly sophisticated research designs.

GENERALIZABILITY OF RESEARCH FROM ASPEN

One of the main reasons for developing ASPEN was to conduct research that is relevant and generalizable to patient care by practicing primary care physicians. It is intuitively obvious to practicing physicians that well-designed research carried out in the practices of primary care physicians will be more generalizable to most primary care settings than research conducted in referral settings or teaching practices. The article by Green et al¹⁴ asks the question, "How representative of typical practice are practice-based research networks?" The issue of generalizability of findings from ASPEN to the population of patients seen by family and general practitioners in the United States is critically important for practitioners who are frequently in a position of having to assess the dubious

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relevance of studies done in tertiary care settings. The issue of generalizability has not been widely addressed with empirical data for most research endeavors and particularly for practice-based research. The main reason that the representativeness of study populations is not frequently assessed is a practical one. If it were easy to study nonrespondents and others not included in a study sample, they would have been included in the sample to begin with. Obtaining access to nonrespondents or a measure that truly represents the population from which the study sample came is usually difficult and frequently impossible.

Therefore, it was fortunate and ingenious that Green et al¹⁴ were able to use data from the National Ambulatory Medical Care Survey (NAMCS),¹⁵ which includes a random sample of family and general practitioners, to assess the representativeness of the patients seen by ASPEN practitioners. These authors compared descriptions of patient encounters by ASPEN practitioners who used a modification of the

NAMCS self-report methodology with descriptions by NAMCS physicians, 72% of whom participated in the survey.¹³ Thus, it is among the most representative samples of data on patient visits to family and general practitioners available. The fact that racial minorities are underrepresented in both the NAMCS and ASPN may relate both to selection factors in physician recruitment and to limited access to care for disadvantaged minorities.

Green et al¹⁴ provide us with descriptive details about the ambulatory patient encounters of ASPN practitioners. This description confirms other research that shows that primary care practitioners provide continuity of care, manage a wide variety of problems, hospitalize one patient for every 200 office visits, and obtain consultation for about one of every 20 office visits.

The data show substantial similarity between NAMCS and ASPN practitioners in patient characteristics, time spent with patients, reasons for visits, diagnoses, diagnostic tests, therapy, and patient disposition. The ASPN practitioners tended to see a larger percentage of white patients and more patients covered by a health maintenance organization or private health insurance. They also tended to have more visits for preventive care and fewer for symptomatic complaints, particularly respiratory and musculoskeletal problems. Depression and anxiety were diagnosed more frequently by ASPN practitioners. Some of these differences in the rank order of diagnoses are likely attributable to slight differences in patient populations as well as practitioner characteristics and practice styles.

The ASPN practitioners are volunteers who have been selected on the basis of their interest and willingness to follow rigorous but minimally disruptive protocols to study important problems in primary care. Family physician members of ASPN tend to be younger, more likely to be board certified (and therefore residency trained), and more likely to practice in rural areas than physician members of the American Academy of Family Physicians (Kansas City, Mo).⁷ These characteristics may account for many of the small differences noted between office visits to ASPN vs NAMCS practitioners. In addition, the statistical treatment of related categories of responses as independent variables may have tended to identify minimal differences as statistically significant, in spite of the use of the Bonferroni correction.

Do these minor differences mean that data from ASPN are not generalizable to the "typical practice" of primary care providers? The answer depends on what one considers to be the typical primary care practice. Primary care practitioners include those trained in allopathic, osteopathic, and allied health professional schools and those in various specialties of postgraduate training. Providers may be solo practitioners or work in clinic settings or large-group or health maintenance organization practices. Primary care practices include rural, urban, and suburban settings that serve a wide array of patients and communities that may differ in demographics, occupations, and economics. Generalist training and approaches are applicable and adaptable to a wide variety of populations and settings. As a result, primary care practitioners find themselves

in widely divergent situations as they try to "take care of the folks." (I first heard this apt description of what family physicians do in an oral communication from Bruce Bagley, MD, Latham, NY, 1979.) What is meant by "take care" and "the folks" may vary with the setting. The diversity within primary care is much greater than the differences between ASPN and the NAMCS.

Starfield¹⁶ estimates that "about half of the research on primary care is conducted in hospital outpatient departments, with patient populations composed largely of inner-city populations in major cities." The fact that the ASPN sample overrepresents rural practitioners should not necessarily be seen as a disadvantage in generalizability. Rather, research conducted in ASPN and other practice-based networks represents a population and a perspective that has been largely ignored in most medical research to date. Although research conducted in ASPN is more likely to be generalizable to most primary care practices than research carried out in non-primary care practice settings, practitioners will have to assess the relevance and transportability of the findings of a particular study to their own setting. No study population is perfectly generalizable.

Reasonable people may disagree about the degree to which findings can be applied to populations that differ from the population in a study. Green et al¹⁴ have given us information that will help us decide on the generalizability of future ASPN studies to the patients in our own settings.

VALIDITY VS GENERALIZABILITY

A more important concern about the representativeness of any research study sample is whether the manner in which the study subjects were selected could affect the validity of study findings. Selection biases can operate in at least two important ways. First, studies can reach errant conclusions if the study subjects do not contain the appropriate spectrum of the disease under study. For example, studies of women who present to specialty practices because of spontaneous abortion show a high percentage of complications,¹⁷ thus leading to recommendations that all women be treated with dilation and curettage.¹⁸ However, the population characteristics and referral nature of the practices on which these recommendations are based select for women at high risk for complications. An ASPN study showed that primary care practitioners successfully treat the spectrum of patients who present to primary care practices without surgical intervention in most cases.¹⁹ Thus, the spectrum of patients seen not only affects the generalizability of the findings, but it can affect their validity.

Second, selection bias can also occur in studies that attempt to ascertain a causal association between two factors. If the manner in which subjects are selected is associated with both factors under study, the measure of association may be biased. The ASPN researchers have paid particular attention to minimizing selection and measurement biases²⁰ in their studies to date and have appropriately limited their study questions²¹ to those for which

high-quality data can be gathered by busy geographically dispersed practitioners. Selection bias is a potential concern if eligible patients are systematically excluded based on characteristics that are associated with the factors under study. To the extent that unbiased patient recruitment strategies that are easy to employ within a busy practice setting are followed in ASPN studies, selection bias is unlikely to be a problem in studies on patients.

However, since the ASPN sample of physicians is a volunteer sample, it is likely to be systematically different from other groups of physicians. Indeed, the most common reason for joining ASPN, even among those who eventually discontinued participation, was the "opportunity to participate with others interested in research."²² The characteristics that make ASPN participants excellent candidates to carry out practice-based research also mean that they are different from the average practitioner. Thus, studies of physician behavior are likely to be biased toward higher standards of care than studies of a truly representative sample of physicians. The extent to which this difference is a problem depends on the research question. Since ASPN studies have focused on patient populations rather than the physician as the unit of analysis, this potential selection is not an important factor in any completed or ongoing ASPN study. Additional studies that characterize ASPN physicians as well as their patients would assist readers of ASPN studies in assessing both their generalizability and the possibility of selection biases.

CONCLUSION

Research in practice-based networks is critical to the future of primary care and is badly needed to guide both practice and health-policy decisions. Judgments about generalizability must always be made on the basis of the particular study and the population to which the findings are to be applied. However, ambulatory visits to ASPN practitioners are sufficiently representative of most primary care practices to provide useful information about patients seen in primary care. Attention to the details of patient selection in individual studies will be the most important determinant of selection bias in ASPN studies. The ASPN has particular strengths in terms of providing a wide spectrum of primary care patient visits for study and in terms of being able to provide a denominator for incidence and prevalence studies. The geographic dispersion of the ASPN practitioners and the need to minimize practice disruption limit the intensity of data collection methods that can be used. These characteristics have been taken into account and should continue to be considered in the choice of research questions and study designs in ASPN. There is a need for the complementary development of other networks that are configured to allow more intensive data collection techniques. Robustness and generalizability of practice-based research findings will be aided by the development of other networks that have different

characteristics, including different types of practitioners, varied patient populations, and different geographic bases. Research in ASPN and the development of other practice-based research networks should be supported.

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