Evidence-based Management: From Theory to Practice in Health Care

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OVER THE LAST DECADE, THERE HAS BEEN A significant shift in the way that health care professionals use evidence from scientific research in their clinical practice. The concept of evidence-based health care (Sackett and Rosenberg 1995) has become part of the language of clinicians, managers, policymakers, and researchers in health services throughout the world. Though the notion of evidence-based health care is far from new (Cochrane 1972) and the extent of its uptake in clinical practice is uneven, the diffusion and adoption of the ideas associated with evidence-based health care during the 1990s provide a remarkable testament to their power and their relevance to the current problems and challenges of health care systems in many countries (Davies and Nutley 1999). Moreover, the concept has begun to spread to fields outside health care, with the establishment of initiatives for evidence-based practice in social care, criminal justice, and education (Davies, Nutley, and Smith 1999; Boruch, Petrosino, and Chalmers 1999), and interest in its methodologies in many other scientific fields (Petticrew 2001).

However, the leaders and managers of health care organizations, while often doing much to encourage clinicians to adopt an evidence-based approach to clinical practice, have been slow to apply the ideas to their own

managerial practice (Hewison 1997). The rise of evidence-based clinical practice was prompted in part by the existence of unexplained wide variations in clinical practice patterns, by the poor uptake of therapies of known effectiveness, and by the persistent use of technologies that were known to be ineffective. These problems are found equally in managerial practice in health care organizations, and in the way that decisions about how to organize, structure, deliver, or finance health services are made, yet what might be called evidence-based management has made slow progress (Kovner, Elton, and Billings 2000).

This article describes the main principles of evidence-based health care, documents its increasing acceptance, and explores the reasons for its popularity. It discusses the applicability of the ideas of evidence-based practice to health care management, and presents a comparison of the culture, research base, and decision-making processes in the two domains, which helps to explain the slow progress of evidence-based management to date. The work of the Center for Health Management Research is described and used to explore the practicalities of evidence-based managerial practice. The article concludes by outlining an agenda for action to promote the development of evidence-based management in health care. While the article focuses on clinical and managerial decision making, we believe much of its content is equally relevant to policymakers and the way that health policy decisions are made.

The Rise of Evidence-based Health Care

For many years, there has been plenty of evidence that a gap existed between research and clinical practice. In major clinical areas, such as the treatment of myocardial infarction, it has long been acknowledged that the findings of research studies into what is effective often do not translate into actual practice (Antman, Lau, Kupelnick, et al. 1992; Ketley and Woods 1993). There is no doubt that many patients receive suboptimal care as a result, and some of them suffer serious, avoidable harm to their health. In an influential report, the Institute of Medicine (1999) described three categories of problems relating to this research-practice gap: the *overuse* of some health care interventions, particularly in circumstances where they are not very effective; the *underuse* of other health care interventions that are known to be effective but are not applied appropriately; and the *misuse* of health care interventions, especially

TABLE 1

The Research-Practice Gap: Examples of Overuse, Underuse, and Misuse
Drawn from Reviews by the NHS Centre for Reviews and Dissemination

Overuse	• Prophylactic extractions of asymptomatic impacted third molars (wisdom teeth) • Screening for prostate cancer • Composite and other new materials used for dental fillings in place of traditional amalgam • Atypical antipsychotic drug treatments for schizophrenia
Underuse	• Drug treatment of essential hypertension in older people • Smoking cessation through nicotine replacement therapy • Compression therapy for venous leg ulcers • Cardiac rehabilitation for people with heart disease
Misuse	• Pressure-relieving equipment in the prevention of pressure sores • Interventions to diagnose and treat gynecological cancers • Selection of hip prostheses in hip replacement surgery • Some preschool hearing, speech, language, and vision screening tests

Source: Drawn from *Effective Health Care Bulletins* issued by the NHS Centre for Reviews and Dissemination, and available from its Web site at http://www.york.ac.uk/inst/crd/.

when the evidence of effectiveness is unclear or ambiguous and leads to wide variations in their use. Examples of each are not difficult to find, as table 1, based on the work of the British National Health Service (NHS) Centre for Reviews and Dissemination, demonstrates.

Evidence-based health care is, at its simplest, the idea that the care that health professionals provide should be based as closely as possible on evidence from well-conducted research into the effectiveness of health care interventions, thereby minimizing the problems of underuse, overuse, and misuse outlined above. However, this is easier said than done because of the volume of research evidence that exists, the speed with which new evidence is produced, the complexity of large health care organizations, and the many practical difficulties of changing clinical practice (Halladay and Bero 2000). It requires major reform of the whole process of knowledge management in health care systems, which affects individual clinicians, health care organizations, researchers and their institutions, the users of health services, and the health system as a whole. The scale and ambition of the paradigm shift required is illustrated in table 2.

During the 1990s, the ideas of evidence-based health care moved into the mainstream of health policy. They influenced the thinking of

TABLE 2
The Paradigm Shift of Evidence-based Health Care

	From	To
Research strategy	No national leadership of health care research; funding fragmented across many research funders, with poor communication and coordination	Growing strategic leadership at a national level; coordination of research activity and funders, resulting in a more coherent overall research agenda
Research direction	Researcher-led; tied to academic agendas; little coordination	Needs-led; tied to health service priorities; focused on major service areas/needs; well coordinated
Research quality	Much ad hoc, piecemeal, small-scale, poor-quality research; sometimes repetitive; not well managed or reviewed	Coherent research programs made up of well planned, larger research projects of high quality
Research methods	Inflexibility about methods, with frequent mismatches between research questions and methods used	More appropriate use of research methods, from experimental methods to qualitative approaches, depending on the research questions
Research outputs	Publication in peer-reviewed academic journals seen as researchers' primary goal	Changes in clinical practice seen as primary aim of research, with publication as one step toward that goal
Dissemination of research findings	Journals, textbooks, expert opinions, and narrative reviews	Online databases, summaries of evidence, clinical guidelines, secondary journals, systematic reviews
Mode of access to research findings	"Pull" access, reliant on clinicians seeking information by accessing libraries, journals, databases, etc	"Push" access, with relevant research findings delivered to clinicians proactively, as close to the relevant point of care as possible
Practitioner understanding of research findings	Focused on reports of individual research studies	Focused on meta-analyses and systematic reviews of relevant, appraised research

TABLE 2 *continued*

	From	To
Practitioner attitudes to research	Uninformed, suspicious of methods and motives, lacking skills in research appraisal and interpretation	Informed, accustomed to using and participating in research, skilled in appraising and applying research to own clinical practice
Major influences on clinical practice	Personal clinical experience, precedent, tradition, expert opinion	Clinical epidemiology, empirical evidence, research
Responsibility for implementing research findings	Left to individual clinical professionals and clinical teams, with little corporate interest or involvement in decision making	Seen as a key organizational function, supported by investments in information resources, etc., with corporate involvement and oversight alongside clinical team in decision making

policymakers, funders, health care providers, and many clinical professionals, and their concepts and terminology became widely used. It may be rash to claim that any health care system has been transformed by the ideas of evidence-based health care, but it is notable that many of the transitions outlined in table 2 have begun to take place in the United Kingdom and, to a lesser extent, in the United States. For example, the British NHS has reformed its approach to commissioning health care research by establishing—for the first time in its history—a national research and development strategy, nationally funded standing research programs in key areas, and a national research register to track all currently funded health care research projects (Black 1997; Swales 1998). Many developed countries have established national health technology assessment programs to review and advise on the adoption of new health care interventions (Perry, Gardner, and Thamer 1997). In the United States, governmental investment in health services research has increased rapidly in recent years, and a national database of health services research projects has been created (Adelman, Chester, and Slack 2000).

Important advances have been also been made in the management and dissemination of research findings. The international Cochrane Collaboration has made significant progress toward its ambitious objective of creating and maintaining systematic reviews of the effectiveness of health

care interventions across a wide range of clinical areas, and toward establishing a register of all randomized controlled trials (Chalmers, Sackett, and Silagy 1997). A number of journals of secondary publication have been established that search a wide range of published primary journals and provide a carefully appraised, structured summary of new research for clinical practitioners (Davidoff, Haynes, Sackett, et al. 1995). At the national level, the NHS Centre for Reviews and Dissemination has established a database of reviews of the effectiveness of health care interventions in the United Kingdom, and has produced and published an influential series of effectiveness bulletins on key conditions, technologies, and procedures (Sheldon and Chalmers 1994). In the United States, the Agency for Healthcare Research and Quality has established a series of evidence-based practice centers to produce and disseminate evidence reports and technology assessments (Graham 1998) and sponsored the development of a national clearinghouse for clinical guidelines (Isham 1999).

Clinical effectiveness and evidence-based practice have been consistent core themes in health policy in the United Kingdom for almost a decade, and have received considerable resource investments. The current U.K. government has emphasized a rational, planned approach to the appraisal and adoption of new health technologies, the development of national frameworks for defining how services should be delivered, the creation of new, clinically focused performance measures, and the elimination of unjustified variations in clinical practice—all of which owe much to the ideas and impetus of earlier work on evidence-based health care (Department of Health 1997; 1998).

Evidence-based health care can trace its roots back many years in the long history of medicine, but its recent rise seems not to have yet had much effect on everyday clinical practice. The evidence is hard to come by, and somewhat equivocal. There are studies in the United Kingdom that suggest it has changed the tenor and content of local decision making and has helped to bring about important changes in practice (Walshe and Ham 1997; Dopson, Locock, Chambers, et al. 2001). A number of trends suggest that evidence-based clinical practice is making progress, such as the uptake of new sources of evidence (e.g., the Cochrane Library), the number of clinical guidelines being produced and disseminated (Isham 1999), the spread of training in techniques such as critical appraisal (Taylor, Reeves, Ewings, et al. 2000), and the rapid growth in the number of books and journal papers about evidence-based practice. On the last
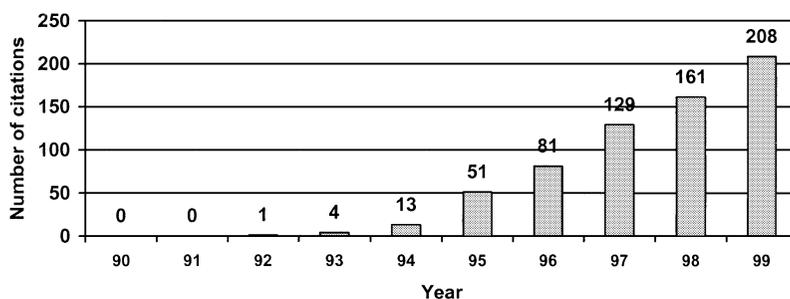
F I G . 1. Number of citations in Medline/Healthstar database with the term "evidence-based" in main title, analyzed by year of publication.

of these, figure 1 shows a crude bibliographic indicator of the spread of evidence- based health care: the first paper ever to use the term "evidence-based" in its title appeared in 1992, whereas there were 208 such papers in 1999. However, Medline citations do not treat patients—clinicians do—and it seems that there is still a gap between the idealized, ambitious aims of evidence-based health care and the realities of practice for most patients and practitioners.

Some analysts have raised concerns about the principles and practice of evidence-based health care (Harrison 1998; Tonelli 1998; Ferlie, Wood, and Fitzgerald 1999; Naylor 1995). While the central tenet—that clinical practice should be based on the best available research evidence—is uncontroversial, its implementation has attracted some criticisms. One is that evidence-based practice will stifle innovation and slow medical progress by reducing the scope for variations in clinical practice, making it more difficult to try out new ideas. Some critics argue that the imposition of evidence-based guidelines devalues and subverts the individual clinical professional's expertise and ignores differences in patients' expectations and valuations of different treatment options. Others challenge the apparent focus on quantitative experimental research methods in evidence-based health care and assert the value of other research traditions. The practical challenges of providing evidence on effectiveness to clinicians in a timely and usable form are considerable. Critics often point out that the research base is insufficient in many areas of clinical practice because existing research is of poor quality or does not address the relevant research questions, or there is little or no research available.

The rapid and widespread diffusion of the ideas of evidence-based health care is, in itself, a striking example of the process of innovation

(Gladwell 2000; Rogers 1995). Given that the concepts were articulated at least two decades earlier (Cochrane 1972), it is interesting to speculate why they only began to gain ground in the early 1990s. It seems that the growing awareness of the size and impact of variations in clinical practice, the increasing pace and costs of medical innovation, and the rising costs of health care in many countries all played some part in bringing the ideas to the attention of policymakers. For clinicians, the difficulty of staying up-to-date with the literature in their own areas, and their awareness of unacceptably wide variations in clinical practice were both important. Recent advances in information technology, bibliographic systems, and secondary research methods (e.g., the science of systematic reviews and meta-analysis) have also made the development of evidence-based health care practically possible (Chalmers and Altman 1995).

The ideas of evidence-based practice were well received in health care, and are being extended into nonhealth sectors. Policymakers, researchers, and practitioners in education, social work, criminal justice, and other areas face similar dilemmas over the costs and effectiveness of the services they provide, and have begun to address them using the same language and methods of evidence-based practice. While the research traditions in these other areas are often very different, they share the same need for a better link between research, policy, and practice (Boruch, Petrosino, and Chalmers 1999). These developments parallel the growing interest in many other sectors in knowledge management and the relationships between organizational culture, the way organizations use knowledge, and organizational performance (Blackler 1995; De Long and Fahey 2000).

In health care, clinical professionals have begun to use the ideas of evidence-based health care to challenge the way that decisions about the management of health care organizations and the delivery of health care are made (Hewison 1997), and to question the basis for health policy initiatives (Florin 1996; Macintyre, Chalmers, Horton, et al. 2001) or to urge policymakers to make better use of evidence (Lohr, Eleazeer, and Mauskopf 1998). They argue that if clinicians are expected to justify the decisions they make, or to show that the interventions they use or the services they provide are effective, so should managers and policymakers. Why should managerial and policy innovations not be subjected to the same evidentiary standards and tests as clinical innovations? Though the idea has an intuitive appeal, other analysts caution that the scope for evidence-based practice in health policy and management may be limited because of their different culture, context, and content (Klein 2000; Stewart 1998).

Evidence-based Management:
A Slower Start

There is plenty of evidence that a research practice gap also exists in health care policy and management (Lomas 1997), and that the problems of overuse, underuse, and misuse that were described earlier in the clinical context can also be seen in the way that health care organizations are managed and health services are delivered. These instances have received far less attention and been less well documented than some of their clinical equivalents, however (see table 3). Though quantitative data are hard to come by, there is little doubt that these problems represent very significant costs to health care organizations, or that they have a real impact on the quality of care and on patient outcomes.

At first sight, overuse seems to be the predominant problem in health care management. Managerial practice has often been criticized for being influenced by fads and fashions that are adopted overenthusiastically, implemented inadequately, then discarded prematurely in favor of the latest trend (Abrahamson 1996; Walston and Bogue 1999; Staw and Epstein 2000). However, it is also true that some promising managerial innovations are very slow to spread, and underuse can be observed (Christensen, Bohmer, and Kenagy 2000). More significantly, in almost every area of managerial practice, we find massive variations between individual health care managers and health care organizations that cannot easily be explained, which probably indicate that substantial misuse exists.

Nevertheless, evidence-based management seems to have made little or no progress in health care so far, at least in comparison with its clinical cousin. While a few academics and practicing managers have written about it in largely positive terms (Hewison 1997; Stewart 1998; Homa 1998; Axelsson 1998; Kovner, Elton, and Billings 2000), governments, policymakers, and managers themselves have shown a conspicuous lack of interest. Although there are some encouraging developments—such as the Cochrane Collaboration's effective practice and organization of care groups (Halladay and Bero 2000), the U.K. government's new health service delivery and organizational research program (Fulop, Allen, Clarke, et al. 2001), the recently established Canadian Health Services Research Foundation (Lomas 2000), and a new initiative to promote evidence-based management by the Association for University Programs in Health Administration—we are still a long way from seeing managers make proper use of evidence in their decision making.

TABLE 3
Examples of the Research-Practice Gap in Health Care Management

Overuse	• The usage of organizational mergers as a response to problems of service quality, capacity or financial viability in health care organizations (Blumenthal and Edwards 2000; Arndt, Bigelow, and Dorman 1999)
	• The measurement of patient satisfaction using poorly conceptualized, poorly designed instruments, which produce data that often are not used (Sitzia and Wood 1997; van Campen, Sixma, Friele, et al. 1995)
Underuse	• The replacement of physicians with other health professionals in providing many routine health services, especially in primary care and accident and emergency department settings (Richardson, Maynard, Cullum, et al. 1998; Richards, Carley, Jenkins-Clarke, et al. 2000)
	• The concentration of workload for particular procedures at institutions that handle substantial volumes of those procedures and have better patient outcomes (Dudley, Johansen, Brand, et al. 2000; Luft, Bunker, and Enthoven 1979)
Misuse/variation	• The use of community-based treatment ("hospital at home" schemes and the like) as an alternative to hospital inpatient care (Shepperd and Iliffe 1998)
	• The involvement of clinicians in the management of health care provider organizations, and the structuring of clinical management arrangements (Succi and Alexander 1999; Guthrie 1999)
	• The adoption and implementation of total quality management or continuous quality improvement initiatives (Shortell, Bennett, and Byck 1998; Blumenthal and Kilo 1998)

Comparing the Use of Evidence in Health Care Management and in Clinical Practice

The culture, research base, and decision-making processes of clinical practice and of health care management are different in many ways (see, e.g., Mintzberg 1973; Freidson 1980; 1986; 1994; Bazerman 1998; Drucker 1998; and Schein 1988). This section highlights some of the differences, mainly by comparing the worlds of doctors and health care

managers, which may help explain why evidence-based practice has been slow to progress in health care management. Of course, there are also many similarities between the clinical and managerial worlds, and neither is as homogeneous or as straightforward as this kind of comparative analysis may suggest. However, this simplified and generalized comparison may be useful in understanding whether and how the ideas of evidence-based practice might be transferred from the clinical domain to the managerial domain (see table 4).

Culture

The clinical culture is highly professionalized, with a formal body of knowledge that is shared by all members of the profession and acts as a frame of reference for intraprofessional dialogue and debate. Entry to the profession is controlled—limited to people who share that formal knowledge and have undergone specific training. This helps produce a disciplinary coherence in knowledge, attitudes, and beliefs, which fits well with the structured and directed approach to knowledge that is found in evidence-based practice. In contrast, health care managers are a highly diverse group drawn from different professional and disciplinary backgrounds, and they often lack even a shared language or terminology with which to describe and discuss what they do. Many (though not all) have some qualification in management or health care administration, but there is no specified formal body of knowledge, training, or registration *required* to become a health care manager, and many clinicians take on health care management roles with little or no formal management training at all. Personal experience and self-generated knowledge play a much larger part in determining how managers approach their jobs, and there is much less reliance on a shared body of formal knowledge in decision making. It is not surprising, therefore, that managers may be less willing and less able to understand, accept, and use research findings in their practice, both as a group and as individuals.

The clinical culture values scientific knowledge and research. Through their training, clinical professionals are imbued with the primacy of the scientific method as a way of knowing, and with a profound respect for the research process and its outputs. Many clinicians receive some research-methods training as part of their professional development, and have some ongoing involvement in research. The structure of the profession bestows high status on those who engage in research or pursue an

TABLE 4
A Comparison of Clinical Practice and Health Care Management

	Clinical practice	Health care management
Culture	• Highly professionalized, with a strong formal body of knowledge and control of entry to the profession, resulting in coherence of knowledge, attitudes, and beliefs • High value placed on scientific knowledge and research, with many researchers who are also practitioners (and vice versa)	• Much less professionalized, with much less formal body of knowledge, no control of entry, and great diversity among practitioners • Personal experience and self-generated knowledge highly valued; intensely pragmatic • Less understanding of research; some suspicion of value and of motives of researchers • Divide between researchers and practitioners, with little interchange between the two worlds
Research and evidence	• Strong biomedical, empirical paradigm, with focus on experimental methods and quantitative data • Belief in generalizability and objectivity of research findings • Well-organized and -indexed literature, concentrated in certain journals with clear boundaries; amenable to systematic review and synthesis	• Weak social sciences paradigm, with more use of qualitative methods and less empiricism • Tendency to see research findings as more subjective, contingent, and less generalizable • Poorly organized and indexed research literature, spread across journals and other literature sources (including gray literature), with unclear boundaries; heterogeneous and not easy to review systematically or synthesize
Decision making	• Many clinical decisions taken every day, mostly by individual clinicians with few constraints on their decision	• Fewer, larger decisions taken, usually by or in groups, often requiring negotiation or compromise, with many organizational constraints

TABLE 4 *continued*

	Clinical practice	Health care management
Decision making (*cont.*)	• Decisions often homogeneous, involving the application of a general body of knowledge to specific circumstances • Long tradition of using decision support systems (handbooks, guidelines, etc.) • Results of decisions often relatively clear, and some immediate feedback	• Decisions are heterogeneous, and less based on applying a general body of knowledge to specific circumstances • No tradition of using any form of decision support • Results of decision and causal relationship between decision and subsequent events often difficult to determine

academic career. Clinicians often have a twin career track in research and clinical practice, and the structure of clinical academic departments and academic health care facilities is predicated on the idea that individuals will practice, teach, and research. In contrast, the managerial culture is intensely pragmatic, and values the application of ideas in practice more than it does the search for knowledge about those ideas. Managers lack an adequate understanding of the research process, often have no research training, rarely have any ongoing involvement in research, and are sometimes actively suspicious of the motives and values of research and researchers. Health care managers and researchers in health care management are not one community but two. Very few successful managers are also successful researchers, and it is rare for individual careers to span both worlds. We know of no posts in health care organizations in which senior managers practice, teach, and do research in the way that is routine for many senior clinicians. In general, practicing managers are much better rewarded than management researchers, at least in financial terms. As a result, there is a research-practice gap, not just in managerial practice, but between managers and researchers themselves.

The clinical and managerial cultures are profoundly different in many respects, and while some aspects of the clinical culture seem inherently supportive of the ideas of evidence-based practice, some traits of the managerial culture are neutral, at best, and positively antagonistic to such ideas, at worst. Gaining greater acceptance of the need for evidence-based managerial practice requires either some substantial changes in the managerial culture or the adaptation of the ideas of

evidence-based practice so that they are more congruent with the existing values and beliefs of managers.

Research and Evidence

Not only do clinicians generally have a greater respect for research and the scientific method than managers do, they also have a different understanding of what research is. Clinicians and managers come from very different research traditions that might be very broadly characterized as the biomedical sciences versus the social sciences, and this affects the way they engage with and use research.

The clinicians' biomedical background emphasizes the use of experimental methods (with the randomized controlled trial seen as the "gold standard" of research methodologies), quantitative data, and empiricism. These research methods—and the processes of meta-analysis and systematic review that are then used to synthesize research findings—are well suited to the explicit, empirical paradigm of evidence-based health care. In contrast, managers may come from an academic discipline in which observational methods are used, qualitative research is more accepted and may even be the norm, and there is perhaps a greater focus on theoretical development than on empirical theory testing. Synthesizing, generalizing, and transferring research findings from one setting to another are contested concepts, and the methodological challenges are much greater (Popay, Rogers, and Williams 1998).

This difference may make clinicians more positivist in their outlook, ready to believe that there is an objectively determinable "right answer" to research questions, and so more willing to adhere to the findings from research. In comparison, managers may, quite rightly, view the results of research as more subjective, and contingent on the context for the research and on the characteristics of the researchers themselves. Faced with research findings, especially those that contradict their own experience or ways of doing things, managers may be less willing to change their own views.

The evidence base for most clinical professions is both well-defined and relatively well organized. Because clear professional boundaries have been established, there will generally be a readily identifiable set of journals and other media through which research findings are disseminated. Those dissemination channels are almost all within the health care

research and practice community, and are often controlled by the professions themselves. Good bibliographic services (e.g., Medline) index the research literature and make searching for relevant research relatively easy. While the volume of research evidence and the rate at which it is published may present problems, the clinical literature is well organized and indexed. The boundaries of research relevant to health care management, on the other hand, are much more difficult to set. There are some journals specific to this area, but much relevant research is published in clinical or general management journals, or in a wide range of books, reports, and other outputs. While some specialist bibliographic services exist (e.g., Healthstar), their coverage is less comprehensive, so searching for relevant research can be laborious. The so-called gray literature (e.g., unpublished research reports) is much more important, but is often not indexed anywhere. This means that the processes of secondary research synthesis and meta-analysis, which have been so fundamental to the growth of evidence-based clinical practice, are much more difficult to apply to the managerial literature. Overall, managers may be acting quite rationally when, faced with such a limited and disjointed research literature, they place more faith in their personal experience and beliefs.

Clinical and managerial ideas about the generalizability or transferability of research findings from one setting to another are also often different. In biomedical research there is often, rightly or wrongly, a presumption of high generalizability, based on belief in the universality of the scientific method. Research on a particular clinical topic may have taken place in different countries, with different populations and health care systems, but the results can often still be combined or used together. In contrast, the actual or perceived transferability of managerial research findings is rather lower. The research methods used, the importance of local organizational context and culture, and the structural differences between health organizations and health systems all make research transfer more problematic. For example, whereas research undertaken in a Californian hospital on the clinical management of end-stage kidney disease may easily be used by British clinicians, it is much less straightforward to take the findings of a U.S. study of the leadership styles of hospital chief executives and to make them relevant to chief executives in British hospitals.

Overall, the tightly defined, well-organized, highly quantitative, and relatively generalizable research base for many clinical professions provides a strong and secure foundation for evidence-based practice and lends

itself to a systematic process of review and synthesis and to the production of guidelines and protocols. In contrast, the loosely defined, methodologically heterogeneous, widely distributed, and hard-to-generalize research base for health care management is much more difficult to use in the same way. There are real methodological and conceptual problems involved in framing research questions, searching the literature, appraising studies, and synthesizing or combining their results, which make the development of evidence-based management more challenging.

How Decisions Are Made

Managers and clinicians make very different sorts of decisions, and make them in different ways, so it is not surprising that the way they use (or could use) evidence in their decision making differs, too.

Clinicians make many decisions each day about the treatment of individual patients, and it is these decisions that have been the focus of the evidence-based practice movement. The time scale for each decision may be very short—a matter of minutes or less—and they therefore need systems to help them collect and assimilate the relevant clinical information and reach the right diagnostic or therapeutic decision quickly. They often use decision support systems of one sort or another, whether they are handbooks, reference guides, textbooks, clinical guidelines, or more sophisticated computer-based tools. These systems are useful because many clinical decisions are basically similar (involving the application of the same body of knowledge to different patients with the same condition). The nature of clinical decision making both promotes and limits the development of evidence-based practice. On the one hand, clinicians need and are used to working with decision support aids (even if they don't call them that), so it should be possible to promote evidence-based practice by improving or replacing some of those existing systems. On the other hand, because of the short time scale of decision making and the sheer volume of decisions, evidence has to be delivered as close to the point of care as possible, and be very easy to access, understand, and use. The practical and logistical challenges of evidence-based clinical practice are considerable.

In comparison, managers make rather fewer but larger decisions, and the time scale for those decisions is usually longer. Major managerial decisions may take weeks, months, or even years to be made and implemented, and it can be difficult even to discern or describe the

decision-making process or to pin down when a decision is actually made. Managerial decisions are more heterogeneous, in the sense that they do not usually involve the application of the same body of knowledge to a series of similar but different circumstances, so guidelines or decision support aids are seldom used in decision making. In any case, intuition often plays a part in decisions that would defy any rule-based, procedural analysis. In some ways, the different time scale and size of managerial decisions should make it easier to find and use research evidence in decision making, but the lack of what might be termed an explicit decision process and decision support infrastructure can make promoting evidence-based management practice more difficult.

Although their decisions may be constrained by resource availability, or by other restrictions imposed by health care organizations, clinicians generally have considerable clinical freedom and they make most of their decisions individually. They may seek the advice of colleagues, and some decisions may be made in group settings, such as medical rounds, nursing team meetings, or case conferences. However, the great majority of decisions are made by clinicians as individuals, in a relatively unconstrained context. For managers, decision making is much more of a team or group activity. Managers make most of their decisions in concert with others—through formal committees or informal groups—and securing the support of others for a decision is often a key part of the process, involving negotiation and consensus building both before and after the decision is made. Managerial decisions are also often significantly constrained by organizational or wider system requirements, such as resource availability, pressures in the health care marketplace, organizational policies and procedures, and stakeholders' views and interests. These factors may act as limitations, or may even directly conflict with research findings. Because of the constrained, contested, and political nature of many managerial decisions, it may be difficult for managers to apply research evidence even when it is available.

Finally, the results of clinical decision making are often—though far from always—apparent in the subsequent progress of the patient concerned, so there is an immediate feedback to the decision-making clinician about the effects of the decision. In contrast, the results of many managerial decisions are more difficult to discern, both because the time scale for their effects is longer and because there are many potential sources of confounding or bias that make connecting the decision and its effects more difficult. In this sense, the results of clinical decisions may

be much more visible (both to the decision maker and to others) than the results of managerial decisions.

Overall, the clinical and managerial decision-making processes are very different. The technical challenges of delivering relevant evidence to clinicians to support their decision making may be great, but the ideas of evidence-based practice fit well with the nature of those decisions and the way they are made. For managers, the technical challenges of delivering the evidence are probably rather less, but the way that decisions are made means that there are few existing traditions, systems, or processes that can be used to bring evidence to bear.

Applying the Ideas of Evidence-based Practice in Health Care Management

Having outlined the many differences between clinical practice and health care management, it is important to explore whether and to what extent the principles of evidence-based practice can be applied in the managerial domain. To this end, we now discuss the experience of the Center for Health Management Research (CHMR), which was founded in 1992 by a consortium of health care organizations and academic centers (and of which one of the authors, Thomas Rundall, is co-director). CHMR provides a forum in which managers, clinicians, and researchers collaborate to set research questions; review existing research literature and undertake new research, if need be; appraise research findings; and present the results and recommendations to those who need to use them in decision making. It is an example of what Kovner and colleagues (2000) have termed an "evidence-based management co-operative." The goals of the Center are:

- To develop a research agenda in collaboration with corporate members;
- To undertake research, development, and evaluation projects on behalf of the corporate members;
- To disseminate to the members the findings of health services research;
- To identify and disseminate to the members successful innovations and management practices from other health care organizations; and

TABLE 5
Membership of the Centre for Health Management Research

Health care organization members	Academic members
• Ascension Health–St. Louis, MO	• Arizona State University
• Banner Health Arizona–Phoenix, AZ	• Northwestern University
• Exempla Health Care–Denver, CO	• Ohio State University
• Catholic Health Initiatives– Denver, CO	• San Diego State University
• Fairview Hospital and Health care Services- Minneapolis, MN	• University of California at Berkeley
• Sharp Health Care–San Diego, CA	• University of California at Los Angeles
• Summa Health System–Akron, OH	• University of Colorado at Denver
• Sutter Health–Sacramento, CA	• University of Michigan
• Trinity Health–Farmington Hills, MI	• University of Missouri
• Virginia Mason Medical Center– Seattle, WA	• University of North Carolina
• Veterans Administration Upper Midwest Regional Network	• University of Pennsylvania
• Washington Hospital and Health System–Fremont, CA	• University of Southern California
	• University of Toronto
	• University of Washington
	• Virginia Commonwealth University/Medical College of Virginia

- To identify and disseminate to the members relevant research findings of successful innovations and management practices from other industries.

CHMR is sponsored by the National Science Foundation under its Industry/University Collaborative Research Centers program. The Center is also supported by member health systems (corporate members), which provide financial resources, collaborate with the Center's leadership on setting research priorities, and provide researchers with opportunities to collect data at their various health service facilities (see table 5). Participation in the Center enables the corporate members to develop and implement a research agenda focused on their defined areas of interest and need. Since they serve as the primary sites in the Center's research (though fieldwork takes place in other organizations as well), members have the opportunity to develop, test, and evaluate innovations, new technologies, and management practices, and to benefit from the

early transfer and replication of new knowledge. The results of CHMR studies are generally made available to a wider audience through published reports, journal papers, and other means, and studies are designed and reported with the transferability of research findings in mind. By design, the corporate members of the Center are integrated delivery systems, and the overriding theme of the Center's research projects and commissioned papers has been the strategies, structures, processes, and performance of integrating health care systems.

CHMR has undertaken a wide range of research projects aimed at contributing to evidence-based managerial decision making in its member health systems. These projects cover such issues as the evaluation of physician-organization arrangements; physician-system alignment; the impact of system integration on supplier contracting; and the organizational and clinical factors influencing the use of clinical practice guidelines. These projects have informed the corporate members about key issues that they have identified to be of both current and long-term interest and importance. For example, the recently completed project on physician-system alignment was designed to identify strategies, tactics, and approaches for aligning physicians and medical groups with organized delivery systems to improve the value of health care services for patients and communities. In this project, areas of inquiry included governance and management of medical groups; care management practices; physician compensation, productivity, and incentives; accountability mechanisms; and physician commitment and identification with systems. Using multiple surveys and in-depth site visits, the researchers focused on documenting underlying processes and on identifying the best practices and key lessons associated with more effective relationships between organizations and physicians (Shortell, Alexander, Budetti, et al. 2001).

Other activities of the Center include commissioning papers to review and synthesize research findings on selected topics; initiating roundtable discussions on management issues with representatives of corporate members; and holding dissemination conferences, where corporate members receive written and oral research reports from academic researchers. The findings from CHMR's research projects and commissioned papers are used both by the member institutions and by other health care organizations. Much of the research is designed to help integrated delivery systems understand how the adoption or development of management strategies—such as electronic medical records, physician-hospital

organizations, and supply chain management—will better position the organization in a competitive environment. However, attention is also paid to the implementation and evaluation of such managerial innovations, thereby providing operational guidance to system leaders and managers.

The experience of CHMR suggests that it is possible to bring health care managers and health care organizations together with researchers to develop and pursue a shared research agenda and, in the process, to address some of the characteristics of the managerial domain in the areas of culture, research and evidence, and decision making that were summarized in table 4. Some of the lessons learned from the work of CHMR are outlined below.

Building an Evidence-based Culture

First and foremost, the organization must cultivate a culture of "learning through research." Without it, efforts to deliver useful research evidence to managers are likely to end in frustration. Research evidence is more likely to be used in organizations that have a culture that supports and encourages innovation, experimentation, data collection and analysis, and the development of critical appraisal skills among managers. In such organizations—and we believe there are very few of them—managers routinely review the findings of relevant research studies and research syntheses before making important decisions.

Getting the Evidence

The complex, heterogeneous, and unstructured nature of the research literature has already been noted, but the organization can take a number of steps to try to provide the evidence needed by managerial decision makers when they need it. First, it must take great care to specify the research question to ensure that the results are action-oriented. Research questions that focus on specific management questions are more likely to produce results that will lead to managerial action than vague or overly broad research questions. For this reason, the input of managers is essential in formulating research questions. Ideally, managers should work collaboratively with academic researchers to formulate the research questions, taking care to avoid specifying questions in highly abstract terms. Although theoretical arguments are often useful in developing

greater understanding of managerial problems, it is more likely that the results will be used if the research is conceptualized around answering a practical question that managers need to understand.

Second, the questions selected must be important to the organization. Certain operational questions (e.g., will basing part of the compensation of a hospital's primary care physicians on their productivity significantly reduce waiting times for patient appointments?) are suitable for an evidence-based approach to decision making. But strategic questions (e.g., will the hospital's purchase of primary care practices produce a net financial gain over the next 10 years?) are especially appropriate because the importance of the questions to the viability of the organization increases the likelihood that the research will be used in decision making.

Changing the Way that Decisions Are Made

It is unrealistic to expect managerial decision-making processes to be redesigned around research priorities or processes. Rather, research systems and their products need to be designed to fit into the way that the health care organization makes decisions. First, when research questions are chosen, there should be a match between when the research results will be available and when management must make a decision. Obviously, if circumstances dictate that management must make a decision before the research is completed, the research will not be used. Thought must be given to determining what is the likely time frame for decision-making on a given issue, what levels of precision and thoroughness in the research are required, and how long the research will take to complete.

Second, the results of research must be succinctly summarized and transmitted to managers in easy-to-use formats. The demands on the time of health care managers have never been greater, and they are unlikely to read lengthy research reports or make the effort to distill the major findings of a report from the interesting but less robust results. Managers *will* use an action-oriented abstract of the research. Such an abstract should report the research question, the setting for the research, the method used to collect primary data, the method used to compile and review existing research on the topic, the type of data analysis performed, the main results, the author's conclusions with respect to the research question, and the implications for managerial decision making. While certain caveats may be included, those who are writing the report and

abstract must keep in mind that managers must make decisions based on the best available evidence. Calling for additional research before making a decision may be appropriate under some circumstances, but usually a research brief should state the implication for pending decisions based on the existing research evidence.

Third, a huge effort needs to be made to communicate the research results broadly and deeply throughout the organization, embedding them in "the way things are done." Research results will only be used if the relevant decision makers know of and understand them at the time the decision is made. Multiple, redundant systems are necessary to insure that research results are disseminated throughout an organization. These include using a liaison to carry the research results generated by the Center back to the organization; providing research briefs or abstracts that can be easily distributed via mail and/or e-mail to organizational decision makers; using a Web site to provide an accessible, consolidated resource for evidence-based decision making; and publishing the research projects in respected professional and academic journals.

The Future Development
of Evidence-based Management
in Health Care

There is certainly considerable scope for making better use of research evidence when deciding how to organize, structure, deliver, or finance health services. Managers and policymakers are on shaky ground if they argue that the principles of evidence-based health care—which they have advocated so enthusiastically for clinical practice—do not apply to them. However, managerial and clinical practice are very different, and so the implementation of evidence-based practice in health care management is unlikely simply to follow the established clinical model, which in any case is not as straightforward to apply as it might first appear (Nutley and Davies 2000). Government agencies, health care organizations, research funders, academic centers involved in teaching and researching health policy and management, and the professional associations for health care managers all have some part to play in this transition toward more evidence-based managerial practice.

If evidence is to play a greater part in managers' decision making, it will be necessary to change managers' attitudes toward research evidence

and the research process. We need to make managers more aware of research, more interested in undertaking or participating in research, and better equipped to understand and act on the results of research. This kind of cultural and attitudinal change is unlikely to happen quickly, but it is not difficult to identify a number of actions that would help to promote it, some of which are already under way in some places (Lomas 2000). For example, health care organizations could provide training for managers in research methods, critical appraisal, and accessing the research literature. They could provide resources and support to enable managers to undertake or participate in research within their own organizations. They could also offer more opportunities for managers to obtain postgraduate degrees, and promote such study through their personnel policies and career structures. Academic centers could provide more health management and policy programs, and could increase the focus on research and evidence-based practice in existing programs. Together, academic centers and health care organizations could use joint or visiting appointments, temporary transfers, fellowships, and other mechanisms to build greater long-term managerial involvement in research, and to bring health management researchers into more direct involvement in health care management. They could collaborate in setting up organizations like CHMR to promote the development of evidence-based practice. These measures would all start to reduce the unhealthy divide that currently exists between the research and practitioner communities in health care management, and to create a culture that would be more supportive of evidence-based practice.

However, the implementation of evidence-based management practice is also likely to need government-led or systemwide changes to—and increased investment in—the research and dissemination infrastructure. These steps can help ensure that a coherent needs-related program of health care management research is undertaken and that the results are then managed and disseminated in ways that maximize their uptake. For example, research funding organizations could develop more rigorous practitioner-focused approaches to assessing research need, and could collaborate more closely in planning the research they commission. They could move funding toward more secondary research projects, aimed at synthesizing existing research knowledge, and invest more in disseminating their findings. Whether through the existing dissemination infrastructure (such as journals and new entities like the Cochrane Collaboration) or through new channels of communication, the results of all this research need to be presented in simple, clear, accessible,

and widely available evidence reports. Academic and practitioner health management journals could collaborate to present research findings in a format that managers find accessible and through journals that managers actually read. Health care organizations could invest more in their local knowledge management systems for managers, with better library access, more information resources, and more professional support for managerial decision making.

These changes would not only create a cadre of health care managers who are more able and willing to use evidence in their own decision making, and so contribute to an improvement in the quality of health care management. They would also enable managers to be better equipped to deal with the complexities of clinical practice, and support the wider development of evidence-based health care. In the long term, it is surely in the interests of all stakeholders in the health care system to have better, more evidence-based processes for making managerial decisions and developing health care policy.

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