Rethinking Medical Professionalism: The Role of Information Technology and Practice Innovations

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Context: Physician leaders and the public have become increasingly concerned about the erosion of medical professionalism. Changes in the organization, economics, and technology of medical care have made it difficult to maintain competence, meet patients' expectations, escape serious conflicts of interest, and distribute finite resources fairly. Information technology (IT), electronic health records (EHRs), improved models of disease management, and new ways of relating to and sharing responsibility for patients' care can contribute to both professionalism and quality of care.

Methods: The potential of IT, EHRs, and other practice facilitators for professionalism is assessed through diverse but relevant literatures, examination of relevant websites, and experience in working with medical leaders on renewing professionalism.

Findings: IT and EHRs are the basis of needed efforts to reinforce medical competence, improve relationships with patients, implement disease management programs, and, by increasing transparency and accountability, help reduce some conflicts of interest. Barriers include the misalignment of goals with payment incentives and time pressures in meeting patients' expectations and practice demands. Implementing IT and EHRs in small, dispersed medical practices is particularly challenging because of short-term financial costs, disruptions in practice caused by learning and adaptation, and the lack of confidence in needed support services. Large organized systems like the VA, Kaiser Permanente, and general practice in the United Kingdom have successfully overcome such challenges.

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Conclusions: IT and the other tools examined in this article are important adjuncts to professional capacities and aspirations. They have potential to help reverse the decline of primary care and make physicians' practices more effective and rewarding. The cooperation, collaboration, and shared responsibility of government, insurers, medical organizations, and physicians, as well as financial and technical support, are needed to implement these tools in the United States' dispersed and fragmented medical care system.

Keywords: Professionalism, information technology, physicians, disease management.

IN THIS ARTICLE I ARGUE THAT FULFILLING ESSENTIAL norms of professionalism is difficult in the modern context of practice and thus requires new adaptations. After reviewing elements of professionalism and the challenges associated with medical and organizational trends, I examine how they can be mitigated by the effective use of such facilitators as information technology (IT), improved models of chronic disease management, and new ways of relating to and sharing responsibility for patient care. I also consider the potential role of modified payment arrangements to support these patterns of care and current programs of "paying for performance" and the extent to which they might help support professionalism. Of course, many competent, thoughtful, and caring physicians continue to provide a high standard of professional care without these facilitators. I maintain, however, that doing so is increasingly untenable given the evolving realities of medical science and the organization and financing of medical care.

Elements of Professionalism

In 2002 a group of medical leaders, led by the Foundation of the Board of Internal Medicine and in cooperation with other medical and surgical societies, promulgated a charter for medical professionalism stating fundamental principles, professional responsibilities, and ethical priorities (Medical Professionalism Project 2002). This effort was prompted by concern about the erosion of trust in medicine. The charter is built on three principles: patient welfare, patient autonomy, and social justice, followed by ten professional responsibilities, including a commitment to professional competence, appropriate relationships with patients, better quality of and access to care, and a fair distribution of finite resources. These efforts continue.

Medical professionalism has been depicted in varying ways and has been said to be motivated by both beneficent and selfish intentions (Abbott 1988; Freidson 1970a, 1970b, 1994; Kessel 1958; Relman 2007b; Starr 1982). Nevertheless, some core professional and ethical expectations of physicians' behavior have broad consensus and have withstood the test of time. These expectations are for physicians to practice competently, to be respectful of patients, to not allow their self-interests to influence their treatment and decisions, and to provide treatment not influenced by judgments of a patient's worth (see Daniels 2008). These principles, though difficult to contest in the abstract, are difficult to implement in view of the major changes in financing and organizing care, in scientific knowledge and technology, and in the growth of for-profit corporate involvement in medical endeavors (Geyman 2008; Kassirer 2005; Relman 2007a, 2007b; Rodwin 1993). Indeed, corporations now exercise substantial control over health care programs and payments to physicians.

Although the preceding principles continue to form the bedrock of medical professionalism, they must be extended in light of recent changes in medical organization and care. In an earlier paper examining the impact of managed care on physicians' roles, I suggested four additional elements needed to ensure medical competence and respect for patients' autonomy: practicing in an evidence-based way that acknowledges and takes account of current medical research and understanding, taking responsibility for distributing resources prudently and fairly among those covered by the plan, developing relationships with patients that enable them to participate in their treatment and treatment choices, and advocating for patients in the context of these other elements (Mechanic 2000).

A controversial aspect of these additional elements is the argument that the physician's responsibilities in advocacy should be constrained by fair distribution and the needs of other patients in the collective plan. That is, when medical practice was largely an individual financial transaction between patient and doctor and less dependent on a shared financial pool, other professional team members, or an elaborate technology, the notion of unrestrained advocacy was easier to justify, but these conditions no longer obtain.

Norman Daniels, a philosopher and medical ethicist, refers to the "ideal advocate model" as "the view that physicians should pursue their patients' best interests through autonomous clinical decision making while adhering to the ethic of advocacy" (Daniels 2008, 234) but argues that this model is not as unrestricted as it might have been when other patients were unaffected by what physicians did with any single patient. In light of the changes in the organization of medicine, he contends, it is ethical that "whatever is done for one patient be fair in light of what is done for others similarly dependent on the cooperative scheme" (Daniels 2008, 235).

Challenges to Professionalism

The changing realities of medical practice also make it more difficult for physicians to maintain their medical competence, to meet the changing expectations of what constitutes respect for patients, to ensure a fair distribution of finite resources, and to avoid serious conflicts of interest.

Maintaining Competence

Maintaining competence means continuing to learn as medical understanding and technologies rapidly change. The enormous and changing corpus of medical research, alternative technologies, and competing treatments makes keeping abreast of them difficult not only in their magnitude but also in the need for skeptical evaluation requiring technical quantitative as well as medical skills. The number of articles on randomized clinical trials alone increased from 200 in 1975 to some 30,000 in 2005 (Halvorson 2007). Adding to this growth of information are the biases that arise from the control of information by for-profit companies, which purposely design studies to maximize their positive effects (Angell 2004; Avorn 2004) and from publications that exaggerate efficacy.

One study, for example, comparing the published literature on twelve antidepressant agents with the data from trials reported to the Food and Drug Administration (FDA), found that almost a third of the studies registered with the FDA had not been published. Even though 94 percent of the published trials appeared to be successful, only 51 percent of those filed with the FDA were, in fact, positive. The study's authors conducted a separate meta-analysis of the published and the FDA data sources and found that in the published literature the sizes of the inflated effects varied among drugs from 11 to 69 percent, with an average of 32 percent (Turner et al. 2008). Other studies have found that drug trials sponsored by pharmaceutical companies are more likely to report positive results than those funded in other ways (Angell 2004; Avorn 2004; Healy and Cattell 2003). These studies illustrate the challenges that conscientious physicians face when assessing the literature and why decision aids are needed for their understanding.

Respect for Patients

Traditionally, medical care has followed what is commonly viewed as a paternalistic model, in which physicians are seen as experts who assess the patient, diagnose the problem, and prescribe treatment. The patient's role is to cooperate in the needed assessment and adhere to the physician's treatments and recommendations. Changes in culture, treatment options, patients' educational levels, availability of medical information, and patterns of morbidity all have helped change expectations and led to alternative approaches (Roter and Hall 2006). Although paternalistic relationships between doctor and patient still may be the most common (Roter and Hall 2006), they no longer have the authority or legitimacy of earlier decades. Expectations relevant to patient autonomy, informed consent, exercise of preferences, and role in decision making have changed significantly for many patients. Physicians' responses to these new expectations have often been in name only, however, and have not greatly changed their relationships with their patients. Nonetheless, it is increasingly evident that the appropriate management of chronic disease requires more involvement and self-management by the patient and a more longitudinal perspective than is typical.

Patients vary in their knowledge, expectations, and preferences, and differ in age, social circumstances, and comorbidities as well. Physicians' respect for their patients requires responsiveness to their individuality in assessment and treatment. Most patients strongly value medical and interpersonal competence, caring, and indications that the physician is their advocate (Mechanic and Meyer 2000), though they may differ in the depth of information they require or the extent to which they care to participate in treatment decisions (Roter and Hall 2006). Some patients insist on their right to decide on their treatment when options are available, whereas others prefer that physicians make that choice in their best interests. Decision aids for patients and their involvement in treatment decisions are now being emphasized, which may help build respectful partnerships but may also risk absolving physicians from their decision-making responsibilities. Patients given more responsibility than they want are no more pleased than those given too little (Lantz et al. 2005). In short, there is no substitute for physicians' knowing their patients, how they assess their illnesses, and what their needs and preferences are.

Responsibility for Advocacy for Patients

Central to the relationship between doctor and patient is physicians' responsibility to put the needs of their patients first, to advocate for their best interests, and to not allow their self-interest or personal judgments of the patient to interfere in providing the best care possible. The physicians' charter cited earlier explicitly includes the principle of social justice and lists as a major professional responsibility that the doctor be committed "to a just distribution of finite resources" (Medical Professionalism Project 2002). This is difficult given the dynamics of doctor-patient interactions and physicians' reluctance to deny their patients' requests. In a recent national survey of physicians on behaviors relevant to the charter, 36 percent reported in response to a vignette that they would order an unwarranted MRI if the patient insisted (Campbell et al. 2007), a figure that probably understates what physicians do in real situations. Nevertheless, the social justice principle means that providing unnecessary costly services, regardless of what patients might prefer, is a failure of professional responsibility and disrespectful of other patients who are affected by resource limitations. Physicians remain divided regarding their obligations beyond their patients, and some still strongly believe that restricting the care of individual patients to serve collective interests violates their responsibility to put their patients' interests first if the added treatment could have any value, however cost ineffective it may be. A clearly unnecessary service is easy to exemplify; much more commonly, however, the physician believes that the selected treatment has some small added value, relative to alternatives, even if its costs far outweigh any likely benefit.

Such decisions can be difficult for physicians whose patients may question whether their doctors really have their best interests in mind, when weighed against those of their other patients. When asked about trust, foremost among patients' preferences is that the physician be their advocate, on their side, prepared to do whatever is needed to serve their welfare (Mechanic and Meyer 2000). In a national survey, only 39 percent of respondents believed (completely or mostly) that they could trust their doctor to put their health above costs in a comparable situation, in which the patient wanted an MRI and the doctor believed it was unwarranted (NORC 2002). Managing these situations appropriately will require decision-making supports that go beyond each physician's individual judgment.

Avoiding Conflicts of Interest

The growth of for-profit enterprises in medicine and the power and influence of large corporate sponsors and enterprises have increased the number of opportunities for physicians to work with the manufacturers of pharmaceuticals, devices, and other medical items to develop, test, and promote products. As a result, medical scientists' and physicians' ties with pharmaceutical companies, as well as other manufacturers, have raised concerns about the extent to which these commercial interests violate the objectivity of medical science and professional education and distort medical decision making. Because these companies have financial relationships with many physicians, agencies such as the Federal Food and Drug Administration and medical journals have difficulty finding expert reviewers who have no, or have no appearance of, conflicts of interest. These financial arrangements range from lucrative consultant and lecture appointments to conference travel and expenses, free dinners, and small favors that are easily rationalized as having no effect on clinical judgment (Angell 2004; Avorn 2004; Geyman 2008; Kassirer 2005; Relman 2007a, 2007b).

Arnold Relman, former editor of the prestigious *New England Journal of Medicine*, places the main cause of the loss of professionalism on market economics, which, he believes, "is not compatible with a strong, ethically based profession" (Relman 2007b, 131; 2007a). The commercial arrangements with physicians that have evolved in recent decades go well beyond the pecuniary interests physicians have always had that sometimes encouraged unnecessary or excessive care, fee splitting, and referral to diagnostic facilities and services in which they had a financial interest (Rodwin 1993).

The environment in which these elaborate commercial arrangements take place was made more permissive by the Bayh-Dole Act of 1980, which sought to transmit more quickly innovations from federally supported research and development to practice. This act promoted collaboration between universities and other nonprofit research organizations and businesses and, as Greenberg notes, "legitimized and compelled private dealings between corporate America and government financed scientists in universities" (2007, 55). Medical scientists and their universities now had greater incentives to seek patents and license them to business, with many investigators developing spin-off companies, seeking to cash in financially. The Human Genome Project, launched in 1990, and the competition it prompted (Cook-Deegan 1994; Venter 2007) made clear the large financial stakes involved and the conflicts that could ensue.

The competition in encoding the human genome and the debates about patenting genes attracted enormous media interest and ethical discussion. Many of the less dramatic but more prevalent conflicts of interest among medical scientists and physicians accelerated in an environment that appeared to normalize such arrangements, leading to expressions of concern from medical leaders (Angell 2004; Brennan et al. 2006; Kassirer 2005; Relman 2007b). As the technologies of medicine have become more sophisticated and expensive, physicians' choices about alternative devices, implants, and drugs can bring very large profits. In addition, the financial ownership or other financial arrangements with companies manufacturing these products may affect physicians' judgment and choices. At worst, such arrangements may lead to bribes and criminality, but the seemingly benign and frequent instances in which physicians more easily rationalize financial incentives are more pervasive and problematic in their effects. It is easier to believe, despite evidence to the contrary, that small favors neither distort clinical judgment nor violate patients' interests (Angell 2004; Avorn 2004).

The Importance of Time

Time pressures affect physicians' ability and willingness to adhere to many professional tasks. As medical knowledge and treatment options have grown, the boundaries of medical activities have increased as well, and as administrative and financial pressures have become more demanding, there seems to be too little time to do all that constitutes good professional practice. Recommendations for good medical practice, each one reasonable on its own terms, can be overwhelming in the aggregate.

One study, for example, found that even just following the recommendations of the U.S. Preventive Services Task Force, which are more carefully derived than many recommendations from professional societies and consumer health groups, would consume most of the time that primary care physicians spend caring for patients (Yarnall et al. 2003).

In recent decades, patients have become better educated and more interested in health issues, more influenced by medical advertising and media presentations, and more active in using medical information. Because they are bombarded with much contradictory and confusing information, patients often have many questions and concerns. Although active patients contribute positively to care, they also put stress on the communication between doctor and patient, given the time usually available (Mechanic 2003).

The average amount of time that physicians spend with their patients has actually increased in the last couple of decades in both primary and specialty care (Mechanic, McAlpine, and Rosenthal 2001), but the more detailed content of these encounters, the changing expectations of patients, and the demands of payers have left many physicians feeling that the length of the visit has been shortened. This perception is commonly reported in other countries as well, despite longer doctor-patient encounters, suggesting that the changing content of the visit itself and the influences that bear on it are the source of physicians' perceptions (Mechanic 2001). In addition to having more active patients, physicians now have many more treatments, options, and choices to consider and explain.

Even though professionalism requires the communication of expert judgment in regard to patients' overall needs and preferences, time pressures constrain the ability to do this well. Time is money, especially with insurance plans limiting the payment for each type of encounter and providing little remuneration for the communication and instructional components of medical visits. Thus, when physicians spend more time with patients, they reduce their productivity and income. Some physicians have adapted to what they describe as undesirable constraints on their practice by developing so-called concierge practices that restrict the number of patients, allowing the physician to give each patient more time and to provide other additional services, but that require that the patient pay a monthly or yearly retainer. If successful, these physicians can generate comparable income while seeing fewer patients and follow a practice style that they and their patients prefer. The difficulty is that such practices widen the inequities in the attention that patients receive, if not in the access to care itself, and challenge the norm of fairness in allocating finite resources. Not surprisingly, patients who join such practices are more affluent and less likely to be members of disadvantaged groups (Alexander, Kurlander, and Wynia 2005).

Changes in patients' expectations and behavior also contribute to time pressures. Patients commonly ask doctors about advertised drugs and treatments, and some demand them (Mechanic 2005). Direct-to-consumer advertising is not an exclusive source of information, since patients also acquire similar information from the Internet, the general media, and relatives and friends (Henry J. Kaiser Family Foundation 2000, 2001, 2002). Physicians report, however, that patients often ask about drugs and treatments they learned about from the media, which adds more time to the visit. Many physicians agree to their patients' requests if they decide it would do no harm, even if they believe it would have little value. Not uncommonly they view the requested treatment as worthwhile and, in some instances, use the occasion to provide an alternative treatment (Weissman et al. 2004). In a recent national survey of adults, 32 percent reported talking to a doctor about an advertised drug, and 44 percent of these respondents received a prescription for the drug. Fifty-four percent reported that their doctor recommended another prescription drug (USA Today, Kaiser, and Harvard 2008). But physicians get especially upset with patients who insist on treatments that the doctors feel are inappropriate, who require much time to be persuaded otherwise, who believe that the doctor is refusing the treatment in order to reduce the health plan's costs, and who imply or threaten that they will go elsewhere if their demand is not met (Abramson 2004).

The purpose of requiring prescriptions for drugs is to ensure that the doctor's expertise and judgment are used in treatment decisions that carry risks as well as benefits. Therefore, if physicians depend primarily on information from pharmaceutical marketing, or give patients whatever they demand, they are not acting professionally in this important "gatekeeping function." Physicians typically complain, however, that they do not have time to educate patients and that patients are often distrustful and demanding when refused a requested treatment.

Renewing Medical Professionalism

The challenges complicating physicians' adherence to professional norms have no easy solutions. Selecting recruits to study medicine who are motivated to behave ethically and socializing them properly are necessary but not sufficient conditions to induce the desired behavior. Indeed, the demands, pressures, and incentives of practice affect even the most ethically inclined. Exhortations to behave ethically and good models of such behavior from mentors and peers are useful, but achieving significant change requires altering practice arrangements.

Some practice innovations would contribute to professionalism, higher quality of care, and physicians' satisfaction, and they would also make primary care practice more feasible. These innovations include the implementation of information technology (IT), including electronic health records (EHRs); organized arrangements for improved and meaningful patient relationships; implementation of disease management programs; and alignment of payment incentives with professionalism and quality goals. These innovations are not independent of one another, because IT is essential to the successful implementation of other needed changes. When appropriately aligned with one another, all these facilitators provide building blocks for new ways of organizing and providing care that reinforce physicians' competence, are centered on patients and responsive to their needs and preferences, make more effective use of physicians' time and teamwork, and help physicians advocate for their patients in a broader context of fairness.

Information Technology (IT) and Electronic Health Records (EHRs)

EHRs, decision and educational aids, prompts and reminders, emailing with patients, within-practice messaging, computer order entry of prescriptions, specialized websites, and disease registries all are valuable tools that provide a platform not only to improve the quality of care but also to better meet the professional expectations described. The United Kingdom, Sweden, and Australia have widely adopted EHRs, especially in primary care (Bates 2005; Bodenheimer and Grumbach 2003), but their adoption has been very slow in the United States. Estimates of the use of IT and EHRs vary depending on definitions, but minimal expectations of comprehensive use include entry of clinical notes, computerized orders for tests, access to laboratory and imaging results, and computer order entry of prescriptions. The National Center for Health Statistics has monitored the adoption of IT in physicians' offices through the National Ambulatory Medical Care Survey (NAMCS) and has found that any use of electronic records in ambulatory care increased from 18 to 29 percent between 2001 and 2006 (Hing, Burt, and Woodwell 2007). But only 12 percent of office-based physicians made more comprehensive use of EHRs in 2006, as defined by the four elements just listed. A survey of a national sample of 6,600 physicians by the Health Systems Change Community Tracking Study (CTS) in 2004/2005 also found an increased use of IT compared with the results of an earlier survey in 2001 (Grossman and Reed 2006). But 35 percent of the responding physicians did not use IT for any of the five clinical functions studied, and their use ranged from 65 percent to obtain guidelines to 22 percent for computer order entry of prescriptions. Both the NAMCS and CTS found that practice size was a significant determinant of both any use and more comprehensive use (Grossman and Reed 2006; Hing, Burt, and Woodwell 2007).

Large health care programs are adopting comprehensive IT applications much more quickly. Kaiser Permanente, with its almost nine million members, has invested "literally billions of dollars" in building an EHR and provider support system (Halvorson 2007, 76). As Halvorson, its CEO, explains, "Computers should be a direct physician support tool. . . . Computers today have the potential to add value to care delivery in multiple ways" (Halvorson 2007, 45–46). Over many years the Veterans Administration developed the highly successful Veterans Health Information Systems and Technology Architecture (VistA), a comprehensive electronic health records system that includes an electronic patient record, computer order entry of medications, laboratory and diagnostic orders and results with visual access to X-rays and scans, alerts and reminders for health personnel, and much more (Kolodner 2005; Longman 2007; Oliver 2007). VistA has been credited for much of the dramatic quality improvements in the VA and has been adopted by large health programs both in the United States and abroad (Groen and Goldstein 2007; Longman 2007).

Much has been written about the importance of IT and EHRs and how they can contribute to the quality of health care (Halvorson 2007; Halvorson and Isham 2003; Health Affairs 2005; Millenson 1997). They can contribute to a revival of primary medical care, which more and more physicians are finding frustrating and unrewarding and which rarely provides the "medical home" and coordination of services that many view as one of its most valuable goals. Few Americans, even those who report using a primary source of care, receive the comprehensive, coordinated care deemed desirable and effective. Fragmentation and a lack of coordination leave physicians feeling rushed and frazzled, and communication with patients and within treatment teams suffers as well. IT and the EHR provide opportunities to function in a more comprehensive, coordinated, and effective manner and offer many ways of facilitating communication with patients, patient instruction, and patients' participation in their treatment.

Providing competent and high-quality care requires taking advantage of the very extensive and rapidly growing medical information programs that track, update, and responsibly integrate clinically relevant research. IT innovations facilitate cooperative efforts such as the Cochrane Collaboration (www.cochrane.org), which allows thousands of physicians to collaborate in reviews that bring together and assess controlled clinical trials and other studies from around the world. IT systems help integrate the results of these efforts into clinical practice and make them relevant to the care of individual patients through guidelines, prompts, reminders, and cautions. IT applications give physicians immediate access to information they can use in their decisions and in participatory decision-making programs for patients that help them weigh the benefits and risks of alternative treatment options. IT also facilitates teamwork and interprofessional communication and coordination, enabling the efficient sharing of important patient care information and identifying and communicating responsibility for various necessary functions regarding the patients' continuing care. IT is an indispensable tool for maintaining continuity of care and keeping the care team informed and integrated.

Barriers to the Implementation of IT. Although physicians may understand the value of EHRs, many do not plan to use them (Bates 2005). Unlike such organized systems as the VA and Kaiser-Permanente or the United Kingdom's National Health Service, which has invested heavily in enhancing general practice information systems and used IT as a platform for its ambitious pay-for-performance program (Smith and York 2004), the American care system, with its many decentralized small practices, lacks a central impetus for overcoming the barriers to implementing IT. Many enthusiastic physicians who adapted IT applications early were conversant with computer and software innovations and were drawn to its many possibilities. But with the exception of these initial groups, the barriers have been formidable, especially for physicians who are in small practices with little IT support and who feel less comfortable with IT innovations. Moreover, the start-up costs for installing EHRs in solo and small practices have been estimated at $44,000 for each full-time provider, with average yearly additional costs of $8,500 (Miller et al. 2005).

Although these investments in start-up costs and initial learning should be repaid in a few years by the improvement in productivity, physicians must overcome the initial financial risk and hassles associated with learning IT. Those who have little technical support usually feel insecure about introducing new systems that will have a pervasive influence on their practice, and they worry about managing software and other system failures (Miller et al. 2005). Outside vendors can provide such services but there is no assurance of suitability, capability, or responsiveness. This insecurity should be resolved over time as newly trained physicians carry over these skills from their medical education and outside vendors offer increasingly sophisticated and user-friendly assistance.

Small fee-for-service practices face disincentives unlike those affecting large systems that have adopted EHRs widely. Small fee-for-service practitioners that would bear the costs of IT see many of the benefits going to insurers or others (Hersh 2004). Also, email consultations, IT disease management applications, and educational services, for which many physicians receive little or no payment, may substitute for patients' visits and other reimbursable services. Some programs reimburse doctors for innovations such as email visits (www.relayhealth.com; Eads 2007), but most such visits are not reimbursed and physicians worry that taking on this additional responsibility will increase their work burden and cost them money. Adopting EHRs and IT innovations enable the reduction of clerical staff, yielding some financial advantages, but these seem small relative to those gained by the payers.

The Centers for Medicare and Medicaid Services (CMS), seeking to remove the barriers and costs associated with adopting EHRs in office-based practices, provided the VA's VistA software at a minimal cost to physicians (Kolodner 2005), adapted for broader use (VistA-Office EHR [VOE]). Although the distribution was described as "free," licensing and other requirements were estimated to cost each doctor several thousand dollars annually. The costs depend on the need for hardware upgrades, licenses, installation, customization, data-interface development, and the number of physicians that share the fixed costs. Although data are limited, a small evaluation, contracted by the CMS, estimated that the direct costs, including lost productivity during initial use, varied for physicians from $2,000 to $33,500, with the larger figure largely due to lost productivity and the cost of data-interface development. Additional indirect costs due to the need for clinicians' staff time to help with content customization and lost time in becoming accustomed to the system raised the estimated range per physician from $2,500 to $45,500 (Sujansky and Associates 2006). Some doctors make a smooth adjustment, whereas for others, the learning is more challenging and costly.

Although the release of the VistA software was enthusiastically promoted (Goetz 2007), it was clear from the outset that while this system was remarkable in many ways and could be a breakthrough in encouraging the use of EHRs (Longman 2007; Spotswood 2004), its broad implementation would be challenging. Dr. Kenneth Kiser, who ran VA medicine from 1994 to 1999 and is credited for guiding many of its impressive improvements, stated that a lot of support would be needed for success, even for sophisticated physicians (Brewin 2005). As John Deutsch, an executive of an EMR commercial vendor, observed, "The healthcare system is extremely fragmented, with thousands upon thousands of practices all practicing differently, using different billing systems, with different levels of computer proficiency, and different workflows. . . . The need for pre-and post-sale customization is a reality in every practice" (Deutsch 2007). WorldVista, a nonprofit charitable corporation seeking to extend the use of medical information technology and make it more affordable, explains that such software must be highly adaptable to local medical practice, change continuously to keep current with medical developments, and, as modifications occur, continue to protect patients' privacy (www.worldvista.org/WorldVistA).

Although there are no definitive surveys, my discussions with physicians and with EMR experts suggest that many physicians are concerned about making VistA compatible with their billing needs and with the time, costs, and uncertainties in adapting to the new system. Its adaptation has been slow and appears to be limited, and implementation support depends on commercial vendors, since providing such support is outside the CMS's mission. The small evaluation in 2006 noted earlier (Sujansky and Associates 2006) assessed the vendor support model and included ten small-practice sites and six commercial vendors. The evaluation found that in only half the sites did the physicians use the system in their clinical care and that in only three sites did they use most of the available support tools. Some of the most important tools, such as maintaining active medication lists, reviewing laboratory results, writing prescriptions, and checking drug interactions, were rarely used. The evaluators emphasized the need to customize the system to the particular clinical context: "It is questionable whether VOE can ultimately provide a low-cost EHR solution without improving the technologies or standards available to facilitate interface development" (Sujansky and Associates 2006).

In making the case for using IT to practice competently and in a way that respects patients' autonomy and choices, it is important to see it as a tool and not as a substitute for physicians' vigilance and judgment. The fragmentation of our health system will persist for many years, and patients will continue to use multiple providers. Thus, it is inevitable that EHRs and their lab results and other important information will be incomplete and sometimes wrong. Similarly, even though access to evidence-based practice guidelines is important, they are no more than aids to making treatment decisions. Such guidelines must be considered in light of patients' different needs and circumstances, and clinical decisions will continue to call for expert judgment. Responsibility will continue to rest with thoughtful, observant clinicians who understand the limitations and remain sensitive to what they see and learn from their patients. Moreover, the fact that information is compiled in an EHR does not guarantee that it will be attended to or appropriately used.

Disease Management and New Patient Partnerships

Restructuring conventional care to produce better clinical care across conditions and over time is challenging. Traditionally, such integration has been embodied in the role of the primary care physician or the primary care team, but sustaining primary care in this ideal sense has been difficult. The proper management of chronic disease depends on the careful monitoring of patients, timely information, cooperation and good communication within teams of health professionals, and patient education and involvement. High-quality, professionally appropriate care, especially for chronic disease and complex comorbidities, transcends individual relationships and depends on having in place thoughtful systems of care that focus responsibility longitudinally and make sure that necessary monitoring, follow-up, and continuing care and instruction are provided across the various settings in which patients may need care.

Typical pressures of practice and the lack of financial incentives for continuity discourage such care, especially in smaller practices without the supporting ancillary professionals that might be found in larger organized settings. Two alternative models are presently being disseminated. Ed Wagner and his colleagues advocate a chronic disease model (see www.improvingchroniccare.org) and are helping interested organizations improve the design of their delivery system, develop clinical information systems with appropriate decision supports, and work toward the improvement of patients' self-management. It is difficult to know how broadly this model has been implemented, although we have evidence that many physicians' groups have adopted at least some of the elements (Casalino 2005). A 2003 survey of physician organizations with twenty or more doctors reported that such groups used an average of five of about sixteen measured care organization processes associated with the chronic care model (Casalino et al. 2003).

Many small practices, however, seem unable to make the needed accommodations or perceive financial and other barriers. An alternative approach to chronic disease management is to have some of the necessary tasks performed by independent organizations that work through health insurance plans to manage the disease without reorganizing the medical practice itself. Many disease management companies now contract with health plans to use their administrative data to identify both individuals with serious chronic disease and other high-risk, high-cost patients and to build patient disease registries. They take responsibility for monitoring patients' status, provide self-care instructions and aids, and communicate with patients' physicians when medical interventions are needed to avoid exacerbations or emergencies (R.E. Mechanic 2002). Many large health plans now have such programs, and the Centers for Medicare and Medicaid Services have established several demonstration programs to evaluate this approach for enrollees in the Medicare program. It is understandable that many physicians may find it difficult to oversee disease management directly (Mechanic 2006), but new disease management approaches allow these functions to be performed in a variety of ways. But their success ultimately depends on the interest, cooperation, and follow-up of physicians, who through their involvement and cooperation can more effectively meet their professional obligations.

Although impressive claims have been made about how chronic disease management can improve care and achieve large savings (Halvorson 2007), its value for developing effective patient partnerships and allowing physicians to more readily involve patients in decision processes and self-management may be more persuasive. Many small studies of disease management for chronic diseases such as asthma, diabetes, congestive heart failure, depression, and multiple morbidities (Bodenheimer, Wagner, and Grumbach 2002a, 2002b) have reported good results for the quality of care and patients' involvement and, in some cases, have provided a positive economic return on investment (Goetzel et al. 2005). But despite the many claims, we know little about the cost savings of these approaches on a large scale. Effective disease management requires the disease management program and the patients' physicians to cooperate, and it depends on physicians' interest and attentiveness, reimbursement arrangements, incentives, and other practice contingencies (Mechanic 2006; Shortliffe 2005).

Fair Advocacy

We might agree in the abstract that advocacy should be fair to all participants in a plan, but its implementation poses difficulties. Organized group practices, with well-developed EHRs and more opportunities to develop a shared-practice culture, can more readily achieve this. The obstacles are especially difficult in decentralized networks but are not impossible if physicians are interlinked in a strong IT infrastructure. Norman Daniels and his psychiatric colleague James Sabin (Daniels and Sabin 2002), who has had management responsibilities at the Harvard Pilgrim Health Plan, have worked for several years to develop approaches within organizational settings to establish a process of fair allocation. They stress the importance of mechanisms to reinforce good stewardship of resources while advocating for patients' interests. Key to their model is that HMOs or other types of health plans must be accountable for the reasonableness of limit-setting decisions, and they have shown how this might be done in different circumstances (Daniels 2005, 2008; Daniels and Sabin 2002). Their approach is based on four necessary conditions: that the plan's decisions and rationales be publicly accessible, that these rationales be based on plausible evidence and reasoning, that decisions be open to challenge and revision in light of new evidence and understanding, and that mechanisms be in place to ensure that decision makers adhere to the prior conditions.

EHRs do not solve the challenge of fair advocacy, but they make possible a shared database that allows clinicians to examine their decisions relative to those of their peers, determine whether their decisions are consistent with the best evidence, and receive prompts that help consider alternatives. The aggregation of information in an EHR itself helps avoid the wasteful duplication of tests and procedures. Information relevant to the range of practice decisions provides the focus for a listserve within plans that helps arrive at consensual norms and helps reduce unjustifiable outliers in the use of resources. An important goal is to protect discretion as in organized group plans like Kaiser Permanente but to require that those who deviate have defensible rationales.

Physicians' Payments and Medical Professionalism

There is no ideal way of paying physicians, with each of the major types of payment (fee-for-service, capitation, and salary) having advantages and disadvantages. Methods for paying physicians for their services in the United States have long been contentious with physicians strongly favoring fee-for-service, which motivates their efforts but which critics believe encourages excessive and unnecessary care. Capitation, in contrast, is seen as having the opposite incentives, limiting necessary services. While some people believe that salary offers a more neutral form of payment, it is often criticized with some empirical basis as encouraging more comfortable and less energetic efforts and less responsiveness to patients. Over the years, health plans and group practices have used blended systems of remuneration that compensate for the weaknesses of each form of payment. Research on physicians' payments in different systems around the world found that physicians prefer those forms of payment to which they are accustomed if the payment levels are viewed as adequate and fair (Glaser 1970).

Federal programs and large health plans have made great efforts to devise payment arrangements that are equitable, that stay within acceptable cost limits, and that distribute payment fairly among varying specialties and medical activities. The process is politically contentious among physicians' groups, the most common complaint being that payment arrangements reward procedural medicine more than the cognitive and educational services that make up a larger part of primary care responsibilities. The large disparities in the income of primary care physicians, specialists, and procedure intensive subspecialists give substance to this claim (Mechanic 2006). Reimbursement incentives in the United States push many physicians away from primary care and from many of the patient care activities described as consistent with professionalism. More generally, there is much concern that the U.S. payment systems are not often consistent with quality or professional objectives and even provide disincentives to good practice.

The forms of payment that physicians most dislike are those that explicitly tie their personal remuneration to withholding services from their patients (Hadley and Mitchell 2002). Such capitation arrangements can include coverage of tests and procedures ordered by the physicians and penalize physicians financially when they exceed specified targets. Such financial incentives impose a direct conflict between physicians' remuneration and their professional responsibilities. Most physicians probably have the ethical training and commitment to resist withholding services that they really believe their patients need, but at the margins, strong incentives can push in unacceptable directions. Many physicians find such incentives more acceptable when they apply to a pool covering a large number of physicians and no single physician faces a large personal financial risk. In these circumstances, the incentives seem to function more as prompts toward attentiveness in the use of resources and less as a direct threat.

In recent years, a movement toward pay-for-performance (P4P) initiatives has been growing as a means of encouraging improvements in quality (Christianson et al. 2007). These P4P programs define clear and important objectives of care and provide financial incentives for meeting these goals. The underlying idea is not new, and care systems, such as in the United Kingdom, have used extra payments to general practitioners for decades to encourage the completion of necessary preventive and other objectives, such as higher rates of immunization. What is new is the effort to develop more comprehensive programs that cover important quality-of-care processes such as those monitored by the Healthcare Effectiveness Data and Information Set (HEDIS) measures and to provide incentives to encourage them.

P4P programs could be seen as facilitating professionalism if they focus on rewarding areas of practice such as establishing stronger partnerships with patients that respect their needs and preferences, improving chronic care management, and achieving patients' satisfaction with such efforts. Also, to the extent that P4P is successful in encouraging competent practice based on the best available evidence, it too contributes to professional goals. While medical education seeks to have physicians internalize the norms consistent with professionalization, the subsequent complicated web of medical arrangements and incentives, competing demands and objectives, and significant time constraints make it inevitable that important tasks will be left undone. P4P tries to make such important medical tasks more salient. In a sense, P4P seeks to accomplish objectives similar to EHRs when they provide patient care prompts and reminders, warn of drug interactions, and direct attention through disease registries to patients with particular illnesses who need special monitoring and attention. However, P4P adds the potentially powerful incentive of greater remuneration for achieving specified objectives.

Most P4P programs in the United States are small and have had only a minor impact on most physicians' incomes. The programs are diverse, and much depends on the details of their design and implementation. The existing studies and evaluations in the United States have found mixed results and no strong evidence of substantially improved quality, although much better documentation (Christianson et al. 2007). But this modest result may, in part, reflect the fragmentation of the health care system and the relatively small part that these efforts have had in overall reimbursement. A more robust example comes from the P4P system in general practice in the UK National Health Service (NHS).

In 2004, the NHS developed a P4P system to upgrade the quality of general practice care and to reward doctors who accepted extra responsibilities. The incentive system used a 1,050-point system to reward both incremental and larger improvements, including achieving standards for a variety of clinical conditions, enhancing patients' experience, and reaching other practice management and organizational goals (Smith and York 2004). In the first year, reimbursement for general practice increased 30 percent through excellent performance in meeting the targets, well beyond the government's expectations (Kmietowicz 2006). In the first year also, general practices achieved a median 96.7 percent of the available points on clinical indicators (Doran et al. 2006). Doctors were allowed to exclude some patients who were inappropriate for scoring, thus making "gaming" the incentive system possible, but Doran and colleagues report relatively few exceptions and conclude that significant gaming was uncommon (Doran et al. 2006). The scoring system has been amended to make the goals more challenging. Whatever the merits of this quality and outcomes framework, it was possible to implement it only because all general practices have electronic patient records and are electronically linked to the health authority.

Increased remuneration was obviously a strong incentive to meet quality goals in the UK case, but questions remain as to whether payment is a necessary condition for the success of quality improvement frameworks and whether it serves professionalism beyond improving the particular indicators measured. Although the NHS system is fairly elaborate, even here the indicators measured and rewarded at any time are but a small sample of all important care. Attention drawn to particular quality goals that are readily measurable may take attention away from dimensions of quality and professionalism that are not measured and redirect effort to behaviors that are more easily accomplished and most remunerative. This is analogous to teaching to the test in education. In the case of P4P, it remains unclear whether already neglected problems like chronic mental illness, substance abuse, end-of-life care, and other demanding care-giving obligations are even more neglected as doctors focus on a scoring system with easily measurable indicators. The NHS scoring system itself has been changed, with points reallocated to new and existing indicators and thresholds for receiving extra remuneration changed. New clinical areas include dementia, depression, palliative care, obesity, and learning difficulties (Leech 2006), suggesting a willingness to tackle very difficult areas of care.

We know very little about how such comprehensive incentive systems affect how doctors view their roles and professional responsibilities. Services shown to be efficacious in randomized controlled trials for carefully selected populations may not fit patients with different characteristics, patients with complicated comorbidities, or patients whose life circumstances pose special considerations (Mechanic 2006). Evidence-based thinking is a tool to be used for exercising thoughtful and informed judgment. As pay-for-performance programs progress, we need to consider how they can encourage the internalization of professional goals and not simply provide rewards for performing specific procedures.

Some physicians' concerns that paying for performance may distort the appropriate exercise of judgment and medical professionalism require attention. Existing pay-for-performance systems are relatively transparent and can be gamed in ways inconsistent with professionalism and the quality of care. These systems will not function properly if physicians avoid difficult cases, neglect complicated and uncertain areas of activity, and reallocate their time and efforts to those activities that are measured and explicitly rewarded. These are not easily resolved issues and have not received the careful attention they merit.

Some Conclusions and Implications

In an ideal world, physicians would internalize the need to advance their competence and mastery of medical knowledge, stay current and continue to learn, avoid conflicts of interest, and treat patients fairly and in nonjudgmental ways. They also would do all they reasonably could for their patients while remaining fair to others. Physicians would build strong patient partnerships that respect autonomy and help patients make good treatment choices consistent with their values and preferences. They also would work effectively with other professionals and caregivers to successfully manage complex and long-term treatments. But physicians function in less than ideal circumstances in which personal limitations, organizational arrangements, resource constraints, managerial influences, and financial incentives and pressures undermine professional ideals.

It is to the credit of the profession and medical educators that they have given these issues careful thought and concern. Undergraduate and graduate medical education and the quality of socialization they provide are important. Medical education is often criticized, but few, if any, other professions give more attention to professional obligations and ethical standards. But educators, too, are caught up in their distinctive sociocultural systems and face incentives and practical demands that make it difficult for them to adhere to their values. Sociologists have often observed the disjunction between the formal professional values espoused in medical schools and the informal processes and behaviors that undermine them (Bloom 1971, 1992). Students are readily aware of the discrepancies between the medical ideals they have been taught and the behavior of their seniors (Brainard and Brislen 2007). Moral training is thus never sufficient but needs reaffirmation and reinforcement in the social contexts in which people live and work.

Time limits significantly constrain practice. Most advocates of serious doctor-patient partnerships and patients' appropriate participation in their treatment believe that visits lasting about thirty minutes are required, which is a pattern of care that insurers are not likely to remunerate adequately. Longer encounters are economically more viable using teams, a feature of organization more possible in larger medical groups with sufficient supportive staff. Physicians' groups are studying alternative approaches that attain similar objectives without greatly extending visit time, for example, by combining personal medical visits with group visits for patients who share many problems in managing their chronic diseases (Noffsinger 1999; Weinger 2003). Although these approaches are being evaluated, it appears that these interactive groups not only provide more extensive advice from physicians, with opportunities for feedback and discussion, but also allow patients to share valuable information and give emotional support to others. Increasingly used in large group practices, it remains unclear whether a business case can be made for group visits in small, noncapitated practices (Christianson and Warrick 2003).

The value of IT for making medical decisions more transparent and accountable and facilitating peer influence has been noted. Thus, it provides modest help in managing some of the conflicts of interest that are of concern to many medical leaders. Treatment choices and referral patterns directly relate to potential conflicts of interest between what is best for the patient and what might serve the physician's economic interests. Studies found that doctors' financial interests in diagnostic facilities raised referral rates and costs (Geyman 2008; Iglehart 2005), although demonstrating that these higher rates were necessarily inappropriate has been difficult. These potential conflicts led to congressional concern and passage of the Stark legislation and regulations that prescribe extraordinarily complex rules governing these and related issues.

Doctors disagree about whether accepting gifts from drug companies are as compromising as critics contend. One well-known Harvard physician, who takes exception to many of the efforts to regulate such relationships and the relationships between physicians and researchers and corporations, put it this way:

> Doctors on the ground who treat patients and who perform basic and clinical medical research are as capable of discerning right from wrong as unconflicted critics. They are not morally inferior if they accept gifts of any kind from the companies that provide their patients with the best gifts of all—improved quantity and quality of life. . . . Most Americans base trust on competence, track record, and reliability, not on who pays whom or how much. (Stossel 2007, p. 69)

Many of the prevalent behaviors that concern critics are less direct conflicts of interest between physicians and their patients and more issues of payment to physicians for promoting particular drugs or treatments to the general public and peers. Such behaviors include the participation of physicians in drug advertisements (e.g., the recent flap over Dr. Robert

Jarvik's advertisements for Lipitor; see Saul 2008), payments to doctors by pharmaceutical companies for lectures promoting particular drugs, being listed as a "ghost author" on scientific research without full access to the data and analyses, and related practices. Such activities, especially by well-known physicians, are believed to influence not only patients but also colleagues who are too busy to keep up with the medical literature themselves. None of the practice aids discussed in this article are directly helpful in avoiding these ethical issues, although IT does provide tools that help physicians keep current with treatment alternatives and the costs of comparably effective treatments and avoid depending on marketing for such information.

Although IT is a necessary condition for achieving many of the professional aims discussed here, progress in the United States remains exceedingly slow. Large health care systems such as the VA and Kaiser Permanente have understood the advantages and have devoted the significant resources needed to put these systems in place, but doing so more generally remains difficult. Building a truly integrated clinical IT system for the country is a large and very expensive undertaking (Hillestad et al. 2005). Significant cost savings and improved quality of care are projected for the long run, but strong leadership will be needed in the public and private sectors to secure the necessary short-term resources. Financial and technical assistance will be especially needed in the many medical settings and practices that have no obvious economic incentives to make this investment, such as community health centers (Fiscella and Geiger 2006) and the many small, decentralized practices that still dominate much of the American medical scene.

In a more integrated health care system, physicians would be part of larger groups and regional networks with the financial ability to invest in appropriate IT, to acquire sophisticated technical backup, and to make efficient use of teams. But American physicians do not particularly like these types of organized medical groups that provide favorable conditions for many new innovations in quality and professionalism, so much thought is needed about building virtual systems that can successfully incorporate many of these technologies and support services. The growth of disease management companies that coordinate with those physicians' practices that lack this capacity is one such development, but it remains uncertain whether this approach is comparable in value to the physicians' practice itself taking more direct responsibility for managing chronic diseases.

In sum, maintaining medical professionalism is a continuing task for physicians that requires adapting to changes in organizational, technological, economic, and cultural influences. Maintaining competence and appropriate responsiveness to patients means participating in a subculture of continued learning and appreciation of new knowledge and new partnerships with patients in managing disease. As I have argued, the thoughtful use of information technology, disease management, and programs to help patients make choices can contribute to maintaining high professional standards under changing and challenging conditions. Payment incentives help shape behavior as well. It is important for policymakers to try and get these incentives right, consistent with ethical and high-quality care. This remains an especially difficult task with much competition for remuneration among specialties and little agreement on optimal payment incentives.

Physicians trained and motivated to practice in highly professional ways will find IT and the other tools discussed here to be important adjuncts to their professional aspirations and capacities. The government, insurers, medical organizations, and physicians will need cooperation and collaboration as well as strong financial and technical support to implement these tools. Although many needed changes in medical care are impeded by ideological differences and political gridlock, the tools discussed here, while difficult to implement, are less ideological. Their adoption is inevitable in the long run, but we should not have to wait decades. The challenge is worthy of major efforts now.

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