The informatics of health care reform*

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Health care in the United States has entered a period of economic upheaval. Episodic, fee-for-service care financed by indemnity insurance is being replaced by managed care financed by fixed-price, capitated health plans. The resulting focus on reducing costs, especially in areas where there is competition fueled by oversupply of health services providers and facilities, poses new threats to the livelihood of medical libraries and medical librarians but also offers new opportunities. Internet services, consumer health education, and health services research will grow in importance, and organizational mergers will provide librarians with opportunities to assume new roles within their organizations.

INTRODUCTION

I am extremely pleased and honored to give this year’s Leiter Lecture. Joseph Leiter and I were both division directors at the National Library of Medicine (NLM), though his tenure ended before mine began. Both of us had the opportunity to contribute to the mission of the NLM, and to view that institution and the entire field of medical librarianship with great respect and admiration. To serve others is surely the highest and most rewarding calling, and medical librarians serve others in a way which is particularly important in this age of information. During its sesquicentennial celebration in 1986, NLM published a poster which said “Knowledge is the Majesty of Life,” and medical knowledge is truly the majesty of the professions which seek to reduce human suffering and improve the quality of life. As facilitators of access to medical information, librarians do far more good than they know.

When I was director of the Lister Hill Center at NLM, I was privileged to oversee what is arguably the largest single medical informatics research and development group in the world. I had the opportunity to contribute to a number of new and interesting developments: the information systems support for the Human Genome Project, the Visible Human Project, the High Performance Computing and Communications Program, and provocative prototype systems such as the System for Automated Interlibrary Loan (SAIL); Diagnostic Radiology images via the Internet; and DocView, the Internet system for communicating document images. As the director of the NLM “Toy Shop,” I learned a lot about computing and communications technologies but relatively little about the topic of this lecture. Only recently have I become a student of economics and health care policy, though I predict that many if not all of you will find yourselves becoming students of this area as you react to the changing environment of health care in this country and around the world.

So you should take the information I will discuss here in the spirit of a student essay on the subject rather than a professorial treatise. I still have much to learn in this area; indeed, I believe we all have much to learn, because collectively, we in American health care are writing the textbook of the new health care economics as we go, with a pace of change that is somewhere between breathtaking and provably reckless.

In mid-1994, the current administration’s health care reform initiative was bruised but still alive in the Congress, and every major health care organization in this country was doing its planning using the assumption of legislated reform. But the defeat of that plan has pushed health care reform down on the priority list of the Congress; indeed, the ambitiousness of the plan was an important cause of voter discontent and of the Democratic party losses of the election just past [1]. The Republican majority now in Congress for the first time in forty years owes some part of its electoral success to public fears about sweeping, government-mandated health care reform, and, not surprisingly, in the recent Republican “Con-

tract with America,” there is no item which addresses medical issues exclusively.

Does this mean health care reform is not happening? Quite to the contrary—what we are seeing in America is a tidal wave of unlegislated health care reform, and, depending on where you live and work, this wave is either breaking over your head as we speak, is visible on the horizon, or is out there somewhere but due to arrive in the next several years.

THE NEED FOR HEALTH CARE REFORM

The premises underlying what has been called the “fee-for-service/indemnity” or the “find it, fix it” model of health care are sensible enough. When you have a health problem, just as when your car develops a problem, you seek out a service provider who acts on your behalf to bring to bear whatever diagnostic measures and technologies are needed to determine what is wrong with you and then prescribes a therapy intended to eliminate or minimize the illness. Because medical care for serious illnesses can be quite expensive and we cannot predict who among us will become seriously ill, insurance companies offer the service of pooling our collective risk and resources and indemnify us against high medical care costs which could easily overwhelm one’s personal finances.

What’s wrong with this model? An economist would tell you that it has an implicit conflict of interest, for it encourages your doctor to prescribe more health care interventions rather than fewer, as providing you more health care services also increases his or her financial compensation as well as increasing your sense of value received. To the extent that insurers buffer the direct economic effects of medical decisions made on your behalf, neither you nor your doctor may know how many dollars have been spent for a given diagnosis or therapy.

The national effects of the absence of checks and balances in this model have become an economic crisis whose terms are no doubt well known to you from the recent presidential initiative: Health care spending consumes 14% of gross domestic product (GDP), up from 9.1% in 1980, and is projected to reach 19% by the turn of the century. If all of us were average workers, we would be earning $1,000.00 more a year if health insurance costs had not risen faster than wages for the past fifteen years [2]. Federally funded health care entitlements such as Medicare are relentlessly consuming the domestic discretionary budget of the government in spite of improving economic indicators. And among the industrialized nations of the world, there is precious little evidence that we are healthier for the money we spend than nations such as Japan, France, and Germany, where national expenditures are 9% or less of GDP.

The second problem with the traditional model is that it endorses the autonomy of the independent practitioner and presumes that each independent practitioner is equipped to make sound judgments about a broad range of medical conditions and diagnostic problems and that each practitioner is fully equipped to recognize personal limitations of expertise and seek appropriate outside consultation. It is a model largely devoid of a notion of demonstrated best practices based on real-world outcomes; though the results of prospective, well-controlled clinical trials may be available for a given medical condition, those trials are often done on subjects without confounding medical conditions, and those results may or may not be known by a given practitioner.

As Larry Weed, the father of the problem-oriented medical record, has stated it, instead of creating clinical road maps and teaching doctors to be intelligent map readers, we have tried to train every doctor to be a cartographer. The predictable result has been a remarkable heterogeneity of personal road maps, known in econometric terms as “practice variation.” The French recognized this long ago, with the saying “A thousand doctors, a thousand opinions.” This variation might be harmless were it not for the fact that in some common medical conditions such as low-back pain, the therapeutic options range from bed rest at home to hospitalization and expensive, invasive procedures such as laminectomy. Rates of hospitalization for low-back pain have been shown to vary by more than 300% in demographically similar populations [3].

The next problem with the traditional model is that oversupply leads to overutilization. Where there are more physicians and more hospital beds than needed, billing for physician services and hospital admissions rises more or less independent of the prevalence of medical conditions in the community. In communities where there is a rather dramatic oversupply, there is a rather dramatic overutilization [4]. So the inescapable truth is that we cannot as a nation afford to allow the old model to continue to proliferate.

MANAGED CARE AND CAPITATION

The proposed legislative solution to this conundrum was embodied at the federal level in the Clinton Administration’s Health Security Act of 1993. It built upon more than twenty years’ experience with what has been called the managed-care/capitation model of health services delivery. In this model, purchasers of health care pool their resources to purchase a set of guaranteed health care and preventive services based on a fixed-price contract with a health care provider; that is, a certain number of dollars paid per member per month to the health services provider,
whether or not subscribers actually use those services. Health care organizations which bid on these contracts have a strong incentive to become more efficient and to cut unnecessary costs, for every procedure not done and every hospital bed not filled is potential profit when income is fixed.

In order for health care organizations to have confidence that their costs will not be higher than expected, they exercise a number of management controls not found in the simple fee-for-service model, such as reserving the right of administrative review for all referrals and expensive procedures requested by their participating physicians or passing the capitalization through to the providers, who thereby participate in the risk that overutilization will decrease profits. Most if not all of these plans use a Health Maintenance Organization (HMO) model, where primary-care providers are the gatekeepers who must initiate any requests for specialty services.

The economic effects of the managed-care model are quite striking in geographic areas where there is high penetration of managed care, such as Minneapolis–St. Paul, Seattle, and the urban areas of California. While the consumer price index rose about 3% in 1994, and health care costs nationwide once again increased faster than inflation, in the West, health plan premiums fell for the first time in fifteen years, with sequential decreases of 4% and 2.5% in 1994 and 1995 for Kaiser Northern California; a 0.4% decrease in health-coverage costs for the California state retirement system, CALPERS, representing several hundred thousand “covered lives”; and a remarkable 10% decrease from 1993 for the Bay Area Business Group, an alliance of companies who pooled their health dollars to form a buyer’s cooperative [5].

How could health care organizations afford to lower their prices? First, by reducing elective hospital admissions and shifting care to outpatient settings wherever possible. Where the 1993 national average for Medicare hospital days was 2,835 per 1,000 beneficiaries, the average for California HMOs was less than half at 1,343, and newer managed-care systems posted utilization in 1994 as low as 700 days per 1,000 Medicare beneficiaries. In the commercial health insurance market, representing a younger age mix than Medicare, the national average for hospital utilization is 495 days per 1,000 subscribers per year. California HMOs average 254 days, and the newer plans have posted utilization as low as 133, with no leveling off in sight [6].

This demonstrated performance has some interesting implications. Hospital occupancy rates in 1992 nationwide averaged about 66%, with about 5% of the population covered by managed health care plans. If in that same year, 50% of us had enrolled in managed-care plans, the hospital occupancy rate would have been 43% nationwide, and, if the entire population had been covered, we would have needed only one of every five hospital beds already built and staffed in the United States. In such a case, according to the American Hospital Association, there would be nearly 690,000 empty hospital beds nationwide [7].

At the same time, the primary-care gatekeeper strategy of managed-care plans has reduced utilization of and need for medical specialists. An analysis of the number of currently practicing physicians in the United States and the extrapolation of specialist numbers currently employed in managed-care systems suggests that if a managed-care model were widely deployed throughout the United States, we would have a surplus of nearly 230,000 specialist physicians, with some specialties such as psychiatry having as much as 74% more practitioners than needed [8].

The specter of oversupply extends to primary-care practice as well. Part of this is due to the creation of new models of health care delivery, which rely more upon allied health professions, nurse practitioners, and physicians’ assistants than upon physicians. It has been noted with a certain gallows humor that the new physician’s office has everything but doctors.

Where the current standard for primary-care physicians nationwide is about 1 per 1,200 population, and HMOs average about 1 primary-care physician per 1,700 population, newer models reduce physicians to as low as 1 per 5,000 population, where a single physician may supervise ten to thirty office staff who are the actual point-of-contact caregivers [9].

The failed government health care reform was built upon these principles of managed care. The Health Security Act would have provided incentives for health care consumers to join together to form large buyers’ cooperatives called “alliances,” with the economic clout to secure favorable capitated health coverage for thousands of covered lives. State governments would create at least one of the alliances in their state, to provide the public good of health coverage for everyone and to spread the risk of providing health services among the largest possible population. Health services providers would be certified to meet national quality standards and would be monitored to prevent unfair practices such as dropping poor-risk beneficiaries and other forms of cost shifting; service providers would be graded on their quality of service and those grades made public [10].

But currently, there is no legislated reform. Instead, there is a growing market-driven reform, which began in Minneapolis and the West Coast and is cascading east and south, especially in metropolitan areas where there is oversupply of physicians and hospitals. When the drive to cut costs is the sole force which drives the restructuring of an industry—any industry—there is risk of devaluing notions such as “public good” and “equal opportunity” and perhaps...
even "quality of service." So the "dark side" of managed care has afflicted us in various forms.

THE DARK SIDE OF MANAGED CARE

It is obvious that the best economic position for a health care provider to be in under capitated systems is not to have to deliver any service at all, and my own doctor describes capitation as a system designed to prevent you from getting the care you thought you bought, often through the siege tactic of delaying approval for services requested by a primary-care physician until those services are irrelevant to the medical outcome. The frustration that subscribers to such plans feel when they actually get sick and need health care makes them very much inclined to return to a fee-for-service indemnity model, and if they quit their managed health plan when they get a serious illness, the health plan is delighted to see them go; the last thing a capitated health plan needs is another person who isn’t healthy anymore.

There has been much lip service given to the idea that health care providers will compete on the basis of quality—the proven outcomes that their services are cost effective. But a health insurance broker, at a recent gathering of our faculty in San Diego, asserted that the real world is currently being guided by the philosophy of "buy price, assume quality, and sue if there is a difference." In this marketplace, health premium differences of as little as $8.00 per month appear to cause subscribers to abandon a health plan with which they are currently satisfied.

So the cloud that is hanging over many health care organizations in metropolitan areas is a simple statement of market economics: as long as there is excess capacity of facilities and providers, there will be price-based competition which will drive down costs and drive down health services revenues until supply and demand come into balance again. To save administrative costs, there will be continuing incentives to merge facilities. And as our medical schools and physician-training programs continue to churn out newly minted and certified providers and these younger physicians who are carrying large amounts of indebtedness for their education are willing to work for a fraction of the compensation commanded by their senior colleagues, there will be inevitable downward pressure on physician pay rates. This will have an eventual domino effect on lower-paid providers such as nurses and physicians’ assistants as well. Simply stated, the absence of federal rules to prevent predatorial business practices has spawned an era of unmanaged competition to provide managed care.

Who among us in the health care field will this new economics affect most? Anyone associated with health care organizations in metropolitan areas which have an oversupply of facilities and personnel, a description which is estimated to include about 70% of the U.S. population. Who will it affect least? Those 30% of us who might have thought ourselves disadvantaged to live in rural areas or wherever there exists a natural monopoly in local or regional health services due to an insufficient population base to sustain economic competition among providers. For someone employed in the health care industry, there is now an additional incentive beyond clean air and wide-open spaces to live and work in a sparsely populated area.

EFFECTS ON MEDICAL LIBRARIES AND LIBRARIANS

Unfortunately, it is not difficult to predict the near-term effects on medical libraries and medical librarians. Hospital libraries will feel the pressure of hospitalwide cost cutting, as administrators attempt to improve the organizations’ chances of survival through drastic savings in a very short period of time. The physical collection will become an endangered species, as online searching and fee-for-service interlibrary loan replace the browsable local copies of periodicals. More than one administrator will ask, "Why do we need a library at all?" and the librarian may be put in the impossible position of having to cost-justify the importance of the information provided to health professionals on the basis of individual health outcomes. For some, the "cash cow" of document delivery on a charge-back or fee-for-service basis may be the only economic shelter from the storms of cutbacks and personnel reductions.

But this is not all bad news, for there are some compelling professional opportunities that exist now to surf the wave of health care reform rather than be drowned by it.

OPPORTUNITIES

The first and most obvious is to take a leadership role in one’s organization for getting the users of library services access to the Internet. The Internet has grown from a largely academic research network to a cause célèbre of international and interpersonal communications. The Internet is truly the defining information structure of the global village. We are in the interesting position now that there is a tremendous amount of public dialog and press coverage about the Internet, yet relatively few health care institutions have made organizational commitments to provide connectivity to the Net. At the same time, though there has been endless tabloid-style lament about hackers and pornography and other social ills carried by the Internet, the fact is that major public and private institutions in this country are quietly crafting
and making available a growing array of truly useful information services, such as organizational directories, electronic versions of print publications, and forms-based searching of important databases.

In San Diego, we have created a publicly accessible World Wide Web home page for the University of California–San Diego (UCSD) Healthcare Network.† We include on this server health information for the lay public as well as a set of library and information services for our affiliated community physicians, some of which require a user ID and password and some of which are professional information which is openly available on the Internet. We explicitly recognize in this model that a curious public will explore the information services crafted for health care professionals and endorse the effect that such education may have in stimulating discussions among patients and their physicians. Future enhancements scheduled for this home page include a directory of active clinical trials at UCSD, searchable in lay language, and a secure encrypted interface to our clinical information system for look-up of patient laboratory test results.

The Web is clearly the Internet's first "killer app," and so I would suggest that a natural extension of the medical librarian's role of helping to provide access to information is to help one's clients to get themselves connected to the Internet and able to use Web and e-mail software. In order to be a pathfinder and consultant, obviously you need to get out and surf the Net yourself, to discover the growing mass of medically useful information sources, and to learn a few general search methods for asking just about any question and discovering what might exist on the Internet which has relevant information.

The second opportunity, which follows from the first, is to create your own specialized information sources on the Internet. The largely unspoken secret of the Web is that it is easier to create and maintain the HyperText Markup Language, which causes these elegant multimedia pages to be accessible nearly anywhere on the planet, than it is to learn to use most word-processor and spreadsheet programs. There are public-domain Web-server programs which run on Macintoshes and PCs, requiring only that your server have a unique IP address. Thus, for many medical librarians, establishing one's personal or organizational presence in the electronic global village will cost nothing more than the time, interest, and initiative to learn some simple computer skills that are less complicated than many things most librarians already know how to do with a computer. Pick a project: a description of your library's services; an online version of some pamphlet you created; an organizational directory; or a library home page, which may be a set of links to useful medical information sources you have found elsewhere on the Internet. It doesn't have to be a big project; the important thing is simply to do it. It will open your eyes about the remarkable power and future possibilities of the global Internet.

Another activity which is growing as a result of market-oriented health care reform is providing health information for the public. Whether you create new consumer health information resources for your local area or promote access to existing information for the lay public, this educational activity enhances the market visibility of a health care institution, raises the level of discourse between consumers and providers, and is attractive to health-systems administrators even in a time of fiscal austerity for its potential to generate new business. Vincent DeVita, M.D., as director of the National Cancer Institute, stated the premise succinctly as we were designing the Physicians' Data Query system more than ten years ago: "We need to educate doctors and their patients about the best choices available for cancer treatment" [11]. It is a theme which will grow steadily in our information-rich society and provides both an immediate and long-term opportunity for medical librarians.

Notwithstanding the fact that it appears cost, not quality, is driving the realignments in the health care industry, it is clear that sooner or later there will be a sustained focus on proving quality through the measurement of health outcomes. A medical librarian who becomes the local expert on sources of information for health services research will be an extremely valuable member of the health care team, as nearly all health care organizations will use continuous quality improvement methods to define particular service or problem areas, create process and outcome variables, institute workplace changes, and monitor the effect of the new methods or procedures. They will do this not because of any organizational affection for this way of doing business but because the Joint Commission on Accreditation of Healthcare Organizations requires a quality improvement program for accreditation, and access to health services research information is an important component of these activities.

The problems of practice variation will be gradually reined in via increased use of clinical-practice guidelines, clinical pathways, and similar evidence-based algorithms for clinical management. National-level guidelines will form a backdrop for this activity and will exist at a level of detail which is necessary but not sufficient for local health care organizations to make specific resource utilization decisions. So, like the quality improvement activities, look for the creation of local provider committees which take national guidelines and make locally specific versions of them to guide capitated care. The medical librarian

† Available online at http://health.ucsd.edu/
will be a valuable member of the local guidelines-development teams.

And, last but not least, recognize that mergers may bring cost cutting and decreases in administrative services, but the same mergers nearly always create opportunities for new internal information services for the combined operation. Things not previously the province of the medical library will appear, perhaps quite unexpectedly, such as medical libraries which have inherited patient-education activities previously done by the nursing service, or served as facilitators for patient support groups, or been catalytic for any group activity which is communication and information intensive in the medical center.

*Medical informatics* has been defined as the art and science of organizing knowledge of human health and disease and making it accessible and useful for problem solving. But is this not also a definition of medical librarianship? So it should not be surprising that the informatics of health care reform will provide amidst sometimes-convulsive change a set of remarkable opportunities for personal and professional growth. To paraphrase Dickens, the wave of managed care and capitated health care will make for the best of times and the worst of times. A surfing analogy comes to mind. If you elect to resist change as long as possible, you and your library may or may not be one of the survivors when the wave hits your neighborhood. Resourceful librarians, however, will have already gotten their information technology “longboards” out, will have practiced a bit, and will be riding that wave to new heights. Cowabunga!

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**REFERENCES**

9. Ibid., 35.
11. DeVita VT, Jr. Personal communication.

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