

Smart Technology, Stunted Policy: Developing Health Information Networks

Computer health information networks can help lower the “cost of quality.” Yet debates rage over the privacy, proprietary control, and power of such data.

by Paul Starr

PROLOGUE: As the information revolution takes off, the health care sector remains startlingly behind the times. There is no Microsoft market giant in the world of health information technology to move the industry toward standardization and cost efficiency. And government policymakers hold mixed views about regulating data collection and information systems. Some government decisionmakers, such as former Agency for Health Care Policy and Research chief Cliff Gaus, argue that we have but a couple-year window to get health care information policy up to speed, before falling so hopelessly behind that research on quality of care outcomes is seriously compromised. Others are concerned about protecting the public’s privacy and fear raising the spectre of “Big Brother.” In this paper Paul Starr details the evolution of health information policy and practice and offers his prognosis for the future.

Starr is professor of sociology at Princeton University and author of *The Social Transformation of American Medicine*. He served in the Clinton White House as a key staff member of the president’s health care reform task force. He is also coeditor and cofounder of *The American Prospect*, a magazine about American politics and society, public policy, and ideas from a liberal point of view. An information-nik himself, Starr recently launched the Electronic Policy Network, a new network of policy and advocacy organizations on the World Wide Web. He is currently working on a book on the information revolution—a subject on which he has published articles for twenty years.

ABSTRACT: Ideally, computer networks should help raise the quality of health care, reduce its cost, and enable consumers and providers to make smarter decisions. But government and the private sector have failed to resolve such critical problems as the protection of medical privacy and production of reliable comparative data on plans and providers. While individual enterprises are building information networks, community networks serving public purposes have lagged. An information revolution in health care is in the making, but the hope that it will allow consumers and providers to make smarter choices is still far from being realized.

CONGRESS AND PRESIDENT Bill Clinton provided a quiet boost to computer networks in health care when they agreed in August 1996 on provisions for “administrative simplification” in the Health Insurance Portability and Accountability Act, widely known as the Kassebaum-Kennedy bill. The provisions, which set deadlines for the adoption of technical standards for health data communication, hardly seem controversial. But more rapid development of information networks will bring into sharp relief unresolved questions about the privacy and security of personal medical information, the ownership and control of health data and networks, and power and accountability in health care.

The immediate impetus for federal action was expected savings in administrative costs from converting insurance claims and other transactions from paper to electronic communication.¹ Supporters also anticipate that computer networks will facilitate the production of comparative data about health plans and providers, which will help consumers and other purchasers to make informed choices and thereby spur improved quality and lower cost. Computer networks can reduce the “cost of quality” by providing inexpensive capture of data, identifying problems in practice patterns, automating reminders to clinicians, diffusing knowledge about improved practice, and enabling consumers to obtain up-to-date information about their particular condition. And, telemedicine may be much more than an adjunct to medical care: Jerome Kassirer, editor of *The New England Journal of Medicine*, writes of on-line services as the “next transformation” in health care.²

But, as in so many other areas, conservatives and liberals disagree about the role of government. Conservatives generally expect the private sector to provide new services, including data for consumers, while liberals tend to believe that more governmental action is necessary. Indeed, some conservatives see computer networks as a way of minimizing government intervention, whereas some liberals see networks as a means of advancing comprehensive health care reform. Private-sector sponsors of health information networks also differ in their objectives. Some networks have been aimed chiefly at

making transactions and management of individual organizations more efficient, while others have sought in addition to generate communitywide data on the performance of providers to enable purchasers and the public to hold them accountable. The networks that are oriented to community-level data on the quality of care, however, have been slow to take hold.

The distinctive character of modern information technology, Shoshana Zuboff argues, is that it can be used not only to automate activities but also, in her phrase, to “informate” them—that is, to generate a stream of information for intelligent decision making.³ In January 1995, shortly after becoming Speaker of the House, Newt Gingrich told a conference how computer networks could help people make better-informed health decisions: “[Y]ou should be able to access easily the database that says, ‘Here are the doctors in the area; here’s what they charge; here’s what their outcomes are like’ before you walk in.”⁴ But Speaker Gingrich did not explain how he would overcome the institutional barriers that have made it impossible to obtain such comparative data.

Health information networks have long faced formidable barriers because of their complexity and cost, their perceived threat to privacy, and deep-seated professional and institutional resistance. Now, however, the new federally mandated standards and the broader development of electronic commerce and the Internet are reducing the cost and increasing the benefits of networking in health care. And, with the rise of managed care and giant health care companies, large organizations capable of overcoming the resistance of individual health care providers are building their own networks. Yet even as network development accelerates, there has been no resolution of privacy concerns or any assurance that consumers will get the information they need to make smarter choices.

Where Health Care Technology Lags

Health care has lagged behind in computer networking compared with such industries as financial services and air travel and such sectors as defense and higher education. To be sure, health care communications are more difficult to computerize than, say, credit card authorizations; the data are more voluminous and less standardized. But the health sector has lagged in adopting common data dictionaries and standards for electronic data interchange (EDI); physicians, hospitals, and insurers have been slow even to use e-mail and other network services that do not require structured data.

The slow progress of health information networks does not stem primarily from a failure to invest in computing but rather from the kind of investment that health care organizations have made. Unlike

other institutions such as universities where there was a strong commitment to open architectures (that is, technical specifications that rely on published standards), most health care organizations have purchased proprietary systems that could not communicate with those of other vendors. Even departments within the same hospital or clinic often have acquired incompatible systems, creating "islands" of information that lead not only to redundant data entry but also to duplicate tests and procedures, thereby negating potential efficiencies from computerization. Substantial sunk investments in such legacy systems often have made it costly for organizations to adapt to common standards. In addition, many physicians have worried that advanced information networks might facilitate controls on their work, and many hospitals and health plans have been wary of community networks for fear of losing proprietary control of their own data.

■ **Information networks' evolution.** Pioneering work in building health information networks dates from the 1960s when the National Library of Medicine began putting its enormous bibliographic resources on-line, researchers at academic health centers began experimenting with telemedicine, and a few organizations such as the Harvard Community Health Plan began creating internal networks for patient information.⁵ The National Committee on Vital and Health Statistics and other groups began developing health data standards.⁶ But for decades there was little electronic communication among organizations.

Several exceptions to this pattern emerged during the 1970s and 1980s. The communication loop among pharmaceutical manufacturers, wholesalers, retail stores, and payers was one of the earliest to be computerized. By the mid-1980s, 90 percent of pharmaceutical manufacturers and 96 percent of drug wholesalers were using EDI to do business with each other. Then drugstores also began to connect to payers to determine patient eligibility, coverage, and copayments for prescriptions. By the early 1990s, 95 percent of drugstores were computerized and submitting electronic claims for more than half of prescriptions covered by insurance.⁷

Another computerized communication loop developed between hospitals and their suppliers. In the mid-1970s American Hospital Supply introduced a proprietary electronic order-entry system, known as ASAP, which enabled hospitals using its dedicated terminals to cut delivery times and errors and improve management of inventory. As ASAP gave American Hospital Supply a competitive edge, other suppliers established their own systems.⁸

A third electronic link developed between providers, particularly hospitals, and the fiscal intermediaries processing Medicare claims.

By 1985 Medicare received about two-thirds of Part A claims and one-third of Part B claims electronically—typically via private clearinghouses and other services that converted the output of hospital information systems and physicians' practice management systems into a form that met Medicare standards.⁹

Although the larger private insurers adopted Medicare's standards, electronic claims did not quickly lead to more general use of electronic networks. Other administrative transactions, such as enrollment and coordination of benefits, were slow to be converted. Managed care led to more inquiries about coverage, typically via telephone, as well as demands for more documentation, often in the form of paper attachments. In 1990 and 1991, with health care cost inflation in double digits, critics attacked high administrative costs as the most rapidly growing component of health care costs and argued that a single-payer plan or other reforms could sharply reduce them. Thus health information systems became an issue in reform.

Information Networks And Health Care Reform

Virtually all of the major health care reform proposals between 1991 and 1994 sought to promote health information networks. The Bush administration especially highlighted their potential. In 1991 Secretary of Health and Human Services (HHS) Louis Sullivan convened three working groups on reducing administrative costs, and in July 1992 one of these, the Workgroup for Electronic Data Interchange (WEDI), proposed an industry-led push to develop standards for EDI along with federal legislation to ensure the confidentiality of medical records.¹⁰ In the proposed Medical and Health Insurance Information Reform Act of 1992, the Bush administration asked Congress to give the secretary of HHS authority to mandate formats for electronic data, based on the recommendations of recognized private standard-setting organizations.¹¹

The Bush proposal also would have required the states to establish "comparative value information" programs to disseminate information about the average prices of health services, the value of each insurance plan, and (within four years) quality and outcomes data on plans and hospitals. The federal government would have provided grants for such programs and supported experimentation with model systems. Thus a Republican president first proposed the principle that direct governmental provision of information about competing plans and providers could make health care markets more efficient. For Bush, information was reform.

The information provisions of the 1993 Clinton health plan were chiefly designed to support managed competition. Clinton also called for public programs to provide consumers with data on com-

peting plans and providers, but he gave more authority to the federal government (specifically the proposed National Health Board) to define the quality measures and other information that plans and providers would report to regional data centers. To achieve some of the efficiencies of a single-payer plan, the board could prescribe a standard form for such administrative transactions as enrollment and claims or encounters.¹² “Administrative simplification” in the Clinton plan was more than computerization; it also referred to provisions intended to reduce the amount of information needing to be communicated. Universal coverage, standard benefit packages, and a standard health security card, for example, would have greatly reduced inquiries about who and what was covered.

However, other provisions of the plan, such as the new system of quality assessment, would have raised the demand for information—hence the appeal of electronic networks, which offered a low-cost means of data collection and analysis. Thus the plan’s long-term vision called for an electronic information system that gathered data at the point of care as a by-product of normal services.¹³

But unlike Bush, Clinton never highlighted computer networks as a prominent feature of reform, partly for fear of arousing popular anxieties about privacy. While the plan included general principles for confidentiality, critics were dissatisfied that the National Health Board would not have to adopt full confidentiality protections until 1997. Privacy advocates objected to the requirement of unique identifiers (like a Social Security number) for patients and providers that might allow medical records to be linked to other information systems. The plan “could become an instrument of Big Brother,” warned an article in *Scientific American*.¹⁴

Although hardly the primary focus of controversy, all of the information-related proposals were defeated along with comprehensive reform in 1994, leaving communication standards, quality assessment, and confidentiality rules to the states and the private sector. In some states, these efforts were already well under way.

Competing Models (I): CHMIS And The States

Of the state and private-sector networking efforts in the early 1990s, the most ambitious followed a model called the “community health management information system” (CHMIS), which aimed to create not only a data network but also a data repository that could routinely be used to measure the cost and quality of care by competing providers in a community. The originator and chief financial sponsor of the CHMIS initiative was the Hartford Foundation of New York, which traces its endowment to the A&P grocery fortune. Under the Hartford model, the organization establishing a CHMIS

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in an area would represent all local stakeholders, public and private, purchasers as well as providers. Statistical data extracted from the digital flow would be publicly available, and experts on privacy would provide guidance on how to protect the confidentiality and security of individually identifiable records.

When Hartford began making CHMIS grants in 1991, no one had yet built a network linking all of the parties in health care, much less a community-level quality assessment system. Thus the initiative was high risk. Three key factors influenced the outcome: (1) national and state-level shifts in the political environment; (2) centrifugal forces leading health care organizations to invest in building independent networks rather than a single community network; and (3) changes in both health care and electronic communications that contradicted the assumptions of the initial Hartford model.¹⁵

Hartford directly financed seven CHMIS initiatives: five state-wide projects in Minnesota, Iowa, Ohio, Vermont, and Washington State, each with a nonprofit grantee that had both purchaser and provider representation; a sixth in New York based in the state's department of health, though actually consisting of unrelated local projects; and a seventh in Memphis, Tennessee, that was regional in scope and initially was run by a business coalition.

■ **Links with state health care reform.** Several of these initiatives gained momentum from state health care reform. In 1992 Iowa mandated compliance with a statewide CHMIS. That same year the Vermont legislature seemed close to enacting comprehensive reform and authorized the state to “establish and maintain a unified health care data base.” In 1993 Minnesota established a public/private partnership, the Minnesota Health Data Institute, which was authorized to create a CHMIS; the Hartford grantee became the institute. And in 1993 the state of Washington restructured its health insurance market in legislation that called for a statewide health information system, including a mandate for providers and insurers to comply with CHMIS.

However, initiatives that rose with reform could also fall with it. If Congress had voted for either Bush's comparative value programs or Clinton's regional data centers, the CHMIS projects would likely have played a pioneering national role. But when reform collapsed, so did the momentum to build an information infrastructure for a new system. Washington State's reforms proved bitterly divisive;

after Republicans took control of the Washington legislature the following year, they reversed nearly the entire 1993 act, eliminating the information system and the CHMIS mandate. In Vermont, the debate over health care reform ended in deadlock and mistrust in 1994, contributing to the demise of Vermont's CHMIS project.

Minnesota, which initially had the most successful CHMIS, was also the state that best preserved goodwill in health care reform. While national initiatives collapsed, Minnesota passed not just one but a series of health care reform measures under a Republican governor and a Democratic legislature. The 1993 legislation established (and partially financed) the Minnesota Health Data Institute as a partnership between the commissioner of health and a twenty-member board representing key stakeholder groups. The same law also called for standard electronic transactions, unique patient identifiers, and privacy protections. Subsequent legislation expanded the institute's activities and extended the provisions for privacy. Minnesota's health care industry also had a head start on health information networks and EDI. Still, the CHMIS effort might have stalled if competitors had pursued separate objectives. In 1995 the major health plans and provider organizations settled major technical issues and committed funds to build a network, called MedNet, which is now transmitting claims, eligibility, and enrollment transactions.

■ **Failure in Vermont and Memphis.** The difficulties of securing cooperation are illustrated by two CHMIS projects that ended in complete failure. Vermont's small size had made it seem a promising bet, and Hartford's grantee, the Vermont Health Care Information Consortium (VHIC), initially was able to bring together the key stakeholders around ambitious objectives, including a central data repository for lifetime medical records. The VHIC "served as catalyst"—but mostly for other organizations to act on their own.¹⁶ For example, Vermont's largest medical center, Fletcher Allen, faced a competitive challenge from Dartmouth's tertiary care center, which was seeking to build a network embracing nine hospitals in eastern Vermont. Unwilling to wait for the VHIC, Fletcher Allen decided to build its own information network. Similarly, the state's Blue Cross plan, faced with a competitive challenge from managed care, decided to create its own claims network in part by giving away its software to physicians.

In Memphis, the original grantee, the Memphis Business Group on Health, sought to build a CHMIS around the city's two principal hospital systems, Baptist and Methodist, which together control more than half of the market. The Business Group had a long-standing business relationship with Baptist but not with Methodist, nor

did it include many other elements of the community, such as public officials. A Methodist representative was later added, and the grant was moved to a new nonprofit entity, but the effort lacked a broad community base. It collapsed when Baptist unilaterally decided to contract for network services with IMS Medacom, one of two finalists in the selection process for a vendor to build the CHMIS. Local physicians reportedly were nervous about the collection of data on their practices. One participant summed up the reaction of local health care providers: "If somebody is going to have my business-sensitive data, I stand to lose."¹⁷

■ **Other difficulties.** Even where the CHMIS projects avoided or survived such opposition, they ran into financial obstacles for want of strong backing. Although the Iowa CHMIS initiative at first made progress on networking, it had to put off building a data repository because of cost. In Ohio, independent community networks developed across the state, denying potential revenue to the CHMIS project and forcing it repeatedly to postpone implementation.

These difficulties arose because of faulty premises in the original CHMIS model, which had assumed that fee-for-service medical care would persist and that providers and insurers would join a CHMIS for the efficient transmission of claims. But providers and payers did not have to agree to share information in a community data utility to get the benefit of electronic transactions; clearinghouses and other vendors offered other options. And with the rise of managed care, the sponsors of a CHMIS could no longer assume a centralized model in which there was one network and one data repository. With many networks developing independently, a CHMIS would have to be a network of networks, and most data would have to be decentralized. By 1994 the CHMIS projects were shifting to a "network-of-networks" model, but the new approach could no longer count on transaction charges to finance the community system. Instead, it would require contributions from participating networks; but the organizations developing their own networks often had other priorities. Thus many of the CHMIS projects were unable to develop a convincing business plan that showed how they could survive after the Hartford grants expired.

Strongly influenced by precedents in banking, the Hartford model had assumed that it was necessary to build a separate network for health care transactions rather than make use of the existing network of networks—the Internet—and readily available encryption technology. While the CHMIS projects were struggling, the technologies for the Internet and the World Wide Web were opening up simpler and less expensive solutions to the problems the CHMIS projects were trying to solve. Moreover, instead of trying to

get all of the “stakeholders” to agree, Internet-based approaches allowed individuals and groups to develop innovative ideas without the need for consensus.

The CHMIS model, in contrast, did not facilitate independent contributions or incremental steps that would provide short-term evidence of progress and build confidence among clinicians and the public. The idea of bringing together all of the stakeholders in a community to build one great health network was bold. But it required so much cooperation in such a large undertaking that it seemed to many people in health care to be less practical than more narrowly conceived network-building efforts. By 1996 the surviving Hartford grantees were shifting to more incremental projects, often based on Internet technology and focused on such concerns as security and such specific projects as provider directories, master person indexes (to point to individual records), and immunization registries. Nearly all have stopped using the term “CHMIS” to describe their mission. Richard Rubin, president of the Foundation for Health Care Quality, which runs the Washington State initiative, says, “Getting away from trying to build a huge, costly proprietary pipe and moving toward content and enabling applications has resurrected what was a moribund community health information movement. For the first time, I think we are riding the wave, instead of swimming against it.”¹⁸

Competing Models (II): Enterprise Networks And CHINs

While reformers were trying to create health information networks as a community resource, individual firms were building networks for their own purposes. As hospitals, health plans, and health networks have added new delivery sites, they have invested in computer networks to improve coordination of services, reduce costs, control liability, and provide more accurate and timely information. These “enterprise information networks” or “corporate intranets” have received by far the most capital; whereas Hartford spent about \$16 million on its CHMIS projects, some individual corporations have invested more than \$1 billion on their networks.

Enterprise information networks shade into community networks because health care systems typically have business relationships with many organizations and practitioners beyond the facilities they own. This relatively open structure sets up a characteristic tension. A hospital or health plan may want its affiliates to connect via a “proprietary umbilical cord.” Just as American Hospital Supply long captured business from hospitals that used its proprietary order-entry system, so some hospitals have hoped to use an exclu-

sive electronic link to practitioners to capture the flow of patients they control. But the practitioners, who may deal with several hospitals and plans, typically do not want to use a different proprietary information system for each one. Thus they have an interest in the use of EDI standards and a single network that enables them to communicate with all relevant parties.

In one response to that need, providers, information system vendors, payers, and others have joined together to create community health information networks (CHINs). Like a CHMIS, a CHIN is a means for health care organizations under different ownership to communicate electronically. Unlike a CHMIS, a CHIN does not necessarily have any commitment to make public community-level health data. In 1993 the Aurora Health System and Ameritech started what is generally regarded as the first functioning CHIN, the Wisconsin Health Information Network, linking together sixteen hospitals (representing nearly 40 percent of the beds in the Milwaukee area), eight clinics, three nursing homes, seven insurers, four billing services, and more than 1,300 physicians. Besides transmitting claims and other administrative data, the system enables physicians connecting by modem to check on the status of patients at local hospitals and obtain laboratory results.¹⁹

Utah also has a functioning CHIN, the Utah Health Information Network (UHIN), a public/private partnership that includes the state's department of health, all of the state's hospitals, more than 85 percent of physicians, 80 percent of other practitioners, and all but one of the major payers—an especially impressive accomplishment, since Utah did not mandate participation.²⁰ The largest CHIN is in California, run by the Health Data Information Corporation, a non-profit group composed of more than forty members covering more than half of insured Californians. Since 1995 the California CHIN has been transmitting claims and on-line eligibility, encounters, and remittance advice among 5,000 physician offices, 200 hospitals, and thirteen payers.²¹

■ **The community participation factor.** Even though CHINs do not necessarily have the CHMIS commitment to communitywide participation, they have been subject to similar frustrations. As several early CHIN projects have run into trouble, skeptical observers suggested it was “quixotic” to expect competing organizations to cooperate in building community networks.²² One notable failure occurred in Chicago, where a hospital association, the Chicago Metropolitan Healthcare Council, and the Illinois Medical Society began developing a CHIN in 1994, got bogged down, and eventually withdrew their support.²³ The term “CHIN” has now gone out of fashion in much of the industry. In the view of skeptics, networking

projects that involve “community-wide participation,” “protracted planning,” and “closed computer systems” have given way to networks that are “limited to business partners,” “proprietary,” “quick to develop,” “narrowly focused,” and based on “open” systems.²⁴ Taking a more positive view of CHINs, Alan Dowling argues that they have a clear role if they provide such services as ensuring confidentiality for individually identifiable information and aggregating data to support policy and epidemiological analyses.²⁵

Nonetheless, the pattern is clear. The more a health information network has required community participation and information sharing, the less rapidly it has developed. Of the three types—enterprise information networks, CHINs, and CHMISes—the enterprise networks have developed furthest, the CHMISes the least.

■ **Prognosis.** This pattern does not mean that networking will stop at enterprise boundaries. In health care, the boundaries of organizations are ambiguous and constantly changing; providers affiliate with multiple partners, and even those affiliated with different plans need to communicate. In hospital supplies, the proliferation of order-entry systems created pressure for a shift to standards that would allow hospitals to use one system with all suppliers. Such pressure led Baxter, which had merged with American Hospital Supply, to abandon ASAP for EDI in 1996. Long-term developments will likely favor EDI throughout health care.

In other industries, as Thomas Malone and his colleagues at the Massachusetts Institute of Technology (MIT) have argued, single-channel electronic exchange relationships typically have evolved into electronic markets. Travel reservation systems are a familiar example. American Airlines first offered its Sabre system to travel agents exclusively for its own reservations, but when United Airlines created a reservation system open to all carriers, American was forced to open up Sabre. At first, each airline created what Malone calls a “biased” electronic market, displaying its own flights preferentially. The reservation systems were obliged to present options more fairly in a subsequent third stage—an unbiased but still specialized reservations market. The fourth and final stage of network development, only now emerging on the World Wide Web, is a general, open electronic market.²⁶ But even in such an environment, rival “market makers” may compete with one another, each offering different strategies for buyers and sellers by providing different search engines, software applets (that is, dedicated programs that are usable on the network), and other services.

The same logic that favors open electronic markets is likely to assert itself in health care. Hospitals or other organizations that create single-channel pathways will face challenges from rivals of-

fering wider connections (including services based on the Internet), and unless the former enjoys monopolistic control, the broader networks will prevail. Moreover, as the history of computers and networks shows, open architectures reduce the barriers to entry for new competitors in information products and services and thereby accelerate the trend toward commoditization and lower costs. But there is a limit to this process: No institutional or market force guarantees that any intermediary will represent broader community interests and compile data that enable consumers, employers, and other purchasers to make smarter health care decisions. The development of those capacities ultimately depends on public policy.

Computer Networks And Public Policy

National policy has yet to resolve two of the most fundamental questions about computerized health information: how to keep private what ought to be private, and how to make public what ought to be public. We have resolved, however, to accelerate the growth of computer networks. The effect of mandating common standards is to reduce the cost of connectivity by obviating the need to write special software for communication. Under the Kassebaum-Kennedy legislation, the HHS secretary has eighteen months to adopt standards for key administrative transactions as well as a system of unique identifiers; health care organizations will then have two years to comply. The law did not, however, set any deadlines for standards for clinical information—an omission that may slow telemedicine and other clinical applications.

In the same session, Congress also was unable to act on legislation sponsored by Sen. Robert Bennett (R-UT) to protect the privacy of medical records, which civil liberties advocates opposed as too weak. The Kassebaum-Kennedy bill, however, does require the HHS secretary to submit to Congress “detailed recommendations” on standards for privacy within a year, and if Congress fails to act in another two years, the secretary will have broad authority to promulgate privacy regulations (although Congress can change any deadline it sets for itself). The law also made “wrongful disclosure of individually identifiable health information” a federal crime. Several states also have passed new legislation updating medical privacy protections for the information age.

Concerns about privacy, however, have become a major impediment to developing the kind of comparative value information envisioned by virtually all of the health care reform plans of the early 1990s. At the state level, reformers have backed away from proposing public data repositories for research and policy (with files stripped of names) partly out of fear of provoking populist and

libertarian opposition. Some advocates of civil liberties contend that patients have a right to control any use of their medical records and that medical organizations should be required to secure consent each time they seek to use individual records for any purpose, including statistical analysis. These requirements would severely limit health care research. Such sentiment is probably not strong enough to produce legislation limiting databases maintained by individual firms, but it could stop the development of data repositories for community health information, even though such public repositories would be subject to more strict regulation. Thus the effect of information populism and libertarianism may be to keep in proprietary hands precisely the kind of data that ought to be publicly available.

THE RECENT EVOLUTION of health information networks has steadily narrowed the focus from broad public purposes to limited commercial ones. In the early 1990s, health care reform sought to create a systematic basis for consumers to compare the value of alternative plans, but when Congress finally acted in 1996, it approved neither Bush's comparative value programs nor Clinton's more ambitious efforts to assess quality. The CHMIS efforts sought to achieve the same ends primarily on a voluntary basis at the state and local levels, yet these efforts have also been blocked. Thus far, community health information and quality assurance have been left entirely to voluntary action. Representative Gingrich is right that Americans "should be able to access easily the database" that can tell them how much health care providers charge and how well they perform. But if public policy simply defers to the marketplace, there will be no institution with the capacity to produce such information reliably. We need to get back to the original impetus in both the Bush and Clinton plans: At a minimum, government ought to ensure that consumers and other purchasers have the information to evaluate the cost and quality of care of competing plans and providers. Smart technology is here, smart networks are coming to health care, but smart health policy seems to be a long way off.

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NOTES

1. Savings estimates ranged from 0.5 percent to 3.6 percent of national health expenditures. See U.S. Congress, Office of Technology Assessment, *Bringing Health Care Online: The Role of Information Technologies* (Washington: U.S. Government Printing Office, September 1995), 104-108.
2. J. Kassirer, "The Next Transformation in the Delivery of Health Care," *The New England Journal of Medicine* (5 January 1995): 52-54. See also, Council on Competitiveness, *Highway to Health: Transforming U.S. Health Care in the Information Age*

- (Washington: Council on Competitiveness, March 1996).
3. S. Zuboff, *In the Age of the Smart Machine: The Future of Work and Power* (New York: Basic Books, 1988).
 4. N. Gingrich, unedited transcript of remarks, conference on "Democracy in Virtual America," Progress and Freedom Foundation, Washington, D.C., 10 January 1995.
 5. B. Kaplan, "Computers in Medicine, 1950-1980: The Relationship between History and Policy," dissertation, University of Chicago, December 1984.
 6. For more on the information revolution and vital statistics, see P. Starr and S. Starr, "Reinventing Vital Statistics: The Impact of Changes in Information Technology, Welfare Policy, and Health Care," *Public Health Reports* (September/October 1995): 534-544.
 7. OTA, *Bringing Health Care Online*, 94-95.
 8. *Ibid.*, 93-94.
 9. *Ibid.*, 87-90.
 10. Workgroup for Electronic Data Interchange, "Report to Secretary of U.S. Department of Health and Human Services," July 1992.
 11. *Medical and Health Insurance Information Reform Act of 1992*, 102d Cong., 2d sess.; and L. Sullivan, "Remarks," Health Information System Conference, Washington, D.C., 16 June 1992.
 12. *Health Security Act*, 103d Cong., 1st sess., Title V.
 13. See (White House Health Task Force) Workgroups 10 and 19, Information Systems and Administrative Simplification, Tollgate V, 3 April 1993; and draft plan, 7 September 1993.
 14. G. Stix, "Dr. Big Brother," *Scientific American* (February 1994): 108-111.
 15. Analysis is based on interviews at all seven of the CHMIS projects and related organizations in the same states, conducted in 1994 and 1995 for the Hartford Foundation, plus follow-up telephone interviews in 1995 and 1996.
 16. John Frymoyer, dean, University of Vermont College of Medicine and Fletcher Allen Medical Center, interview, 29 March 1995.
 17. Harold Petersen, assistant director, Computing and Telecommunications, University of Tennessee, interview, 12 July 1995.
 18. Richard Rubin, personal communication, 7 November 1996.
 19. J. Ziegler, "Health Care's Search for an Information Injection," *Business and Health* (April 1996): 33.
 20. Bart Killian, executive director, Utah Health Information Network, interview, 26 August 1996; and D. Wise, "Big Savings from Tackling the Basics: Coalition Report," *Business and Health* (August 1995): 53.
 21. Ann Geyer, president, Health Data Information Corp., interview, 21 August 1996.
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 26. T. Malone, J. Yates, and R. Benjamin, "Electronic Markets and Electronic Hierarchies," *Communications of the ACM* (June 1987): 484-497.

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