GLOBAL PERSPECTIVE

Telehealth at the Crossroads

James N. Gardner & James H. Barron

Health care is a global market of staggering size, endowed with stunning growth prospects. Consider the magnitude and potential for expansion of the U.S. health-care industry alone: Currently generating $1 trillion in yearly revenues, this sector is projected to grow 8% annually, reaching $2.2 trillion by 2005. At that point, health care will consume an astonishing 17.9% of U.S. GDP.

And that's just the beginning. As ongoing demographic, social, and technological trends gather momentum in the second and third decades of the 21st century, the health-care industry will continue to eat its way through the remainder of the U.S. gross domestic product.

Then, there's the international market. The same demographic and technological factors driving the expansion of the U.S. health-care market are at work in other OECD economies, often operating with even greater intensity. As health care becomes increasingly open to cross-border competition, foreign health-care venues will be exposed to the same winds of change that are sweeping through the U.S. market, creating enormous opportunities for savvy exporters and indigenous entrepreneurs.

When one thinks of the industries likely to benefit from the explosive growth of the health-care sector that looms ahead, the usual suspects come to mind: HMOs, large hospital chains like Columbia/HCA, physician practice management companies, pharmaceutical and medical device manufacturers, as well as nursing homes and assisted living chains. Yet, it is not entirely clear that these traditional denizens of the health-care world will be the primary economic beneficiaries of this dramatic phenomenon.

Why do we say this? Because while the trends driving the expansion of the health-care industry are inexorable, the emerging structure of the leviathan is far from clear. Vast tectonic shifts are rearranging the health-care landscape:

- Ongoing consolidations in the hospital, managed care, and pharmaceutical sectors.
- The disaggregation of formerly integrated functions like pharmaceutical benefit management, home care, nurse triage service, and radiological service.
- The onslaught of capitation in all its confusing permutations.
- The intensifying involvement of politicians in the rapidly-evolving managed care policy environment.
- Perhaps most significant, the emergence of what Larry Feinberg of Oracle Partners called "post managed care"—a new health-care paradigm characterized by increasing individual responsibility for self-care, as well as proactive patient involvement in diagnosis, treatment, and disease management.

Overarching all of these shifts is a portentous megatrend: the health-care industry is fast becoming an *information* business. Competitive advantage in this industry is becoming inextricably linked to the capacity to acquire, manipulate, brand, and deploy pertinent information nimbly, aggressively, and pervasively.

As opportunities to use and deploy strategic information emerge throughout the health-care industry, a series of profound value migrations will inevitably ensue. Those entities which control the shape and

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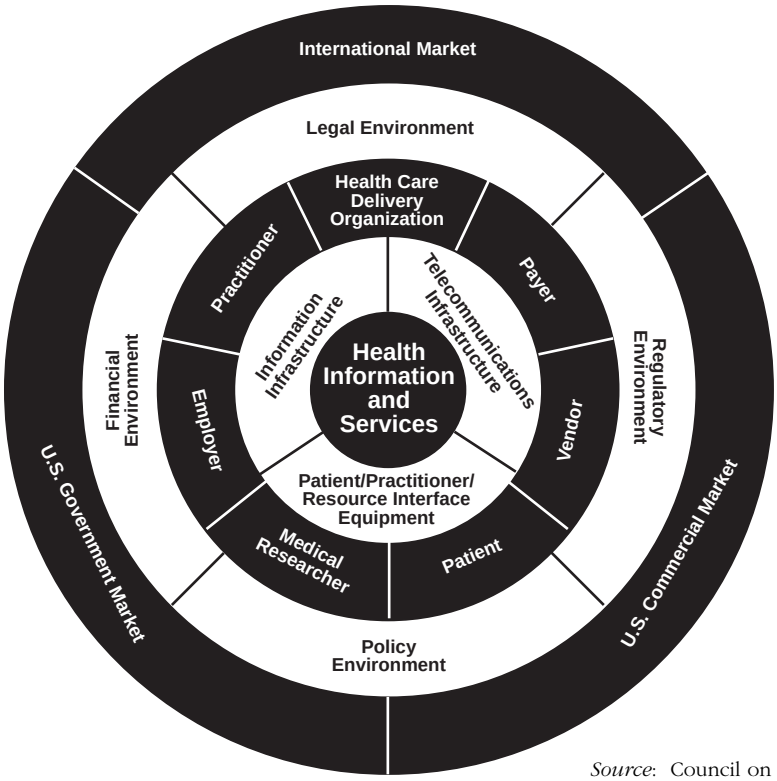
flow of *information*—through branding, standards-setting, preferential patient and payer access, political clout, and consumer loyalty—will be optimally positioned in the brave new world of 21st century health care.

It is our hypothesis that telecommunications and information companies—cable MSOs, RBOCs, long distance carriers, DBS competitors, software companies, information systems integrators, and content providers—have a unique opportunity to peer over the horizon of chaotic change now roiling the health-care industry. The opportunity exists in the ability to formulate a vision of an integrated health information system vastly different from the system with which we are familiar today. It is our further contention that the gravitational "pull" likely to be exerted by the *realistic* prospect of such an integrated health information system might well turn out to be the elusive "killer app" of home-based interactive broadband communications. This industrial-strength driver could propel the next wave of change in the ongoing evolution of what Microsoft co-founder Paul Allen calls the "Wired World." Needless-to-say, great sums of money hang in the balance. As they say inside the Beltway about the health-care economy, "A trillion here and a trillion there, and pretty soon you're talking about real money!"

The key word in the preceding paragraph is "realistic." In order for the vision of a fully-integrated health information system to be realized, a myriad of governmental and private-sector barriers must be cleared away. In a recent comprehensive report entitled *Highway to Health: Transforming U.S. Health Care in the Information Age*[1] [hereafter *Highway to Health*], the prestigious Council on Competitiveness identified the

Figure 1 is a conceptual picture of a telehealth system made possible as the NII and the health-care market converge. It illustrates the components necessary to ensure that health-related information and services are available anywhere, anytime.

Figure 1
Components of the Telehealth System



Source: Council on Competitiveness

major roadblocks impeding the rollout of a national health information infrastructure and assessed the potential benefits that would result from their removal (see Figure 1). In the remaining pages of this article, we will outline the specific barriers identified by the Council and analyze the proposed reforms.

The Four Sectors of the Telehealth Market Space

The Council's report defines telehealth as "the provision of remotely located health information or services."[2] Within this broad market space, four principal sectors are identified:

(1) Remote care.
(2) Personal health information and management.
(3) Integration of health information systems.
(4) Health care research and education.[3]

While related, these four sectors possess distinct characteristics and confront different challenges.

Remote Care

Providing access to health care for traditionally underserved populations is one of the great challenges and opportunities for telehealth.

Taxonomy

The *Highway to Health* report defines "remote care" as health care at a distance, regardless of the distance between the health-care practitioner and patient. This covers:

(1) Links between rural and urban markets.
(2) Connections to private homes.
(3) Ties to markets immune to certain economic and regulatory considerations (i.e., governments, correctional facilities, and international locations).

Remote care telemedicine consultations typically involve one of three scenarios: physician-to-physician, non-physician practitioner-to-medical practitioner, and patient-to-medical practitioner. The technology linking the participants can range from POTS (plain old telephone service) to two-way, full-motion, high-definition, high-bandwidth video. Consultations and home monitoring of patients with episodic illnesses and chronic diseases is one of the most promising areas of remote care.

Market Potential

Because telemedicine is in its early stages, precise data on the size of the telemedicine market today are slim. The Koop Institute estimates market size at $20 billion, but does not distinguish between funding for services, equipment, and infrastructure. Nonetheless, even without widely accepted commercial data, there is a perceived need and growing number of adopters and vendors. Restructuring the nation's health-care industry to respond to the twin needs of providers to lower costs and to expand market share to increase profitability will "force serious consideration" of commercial telemedicine.

The Koop Institute estimates the telemedicine market size at $20 billion, but does not distinguish between funding for services, equipment, and infrastructure.

Telemedicine offers opportunities to lower fixed costs by using health-care practitioners more efficiently. Home care visits and telemedicine links to the home are considerably less expensive than hospital inpatient and nursing home alternatives. Telemedicine can also help health-care delivery organizations maintain and expand market share by increasing referrals and permitting them to engage in distance learning opportunities. The international market represents the largest potential opportunity. The domestic potential is also great, if key barriers to entry and growth are overcome.

Barriers

Reimbursement for services rendered and funding for telemedicine projects are critical to telemedicine realizing its market potential. (Other specialties must become more like radiology, which is the most established of telemedicine disciplines, and whose practitioners receive Health Care

Transatlantic Telemedicine Summit

Highway to Health describes international markets as the most promising for telemedicine, with domestic niche markets not subject to traditional regulation and economic considerations also rich with opportunities. These and other critical issues are the focus of the **Transatlantic Telemedicine Summit** scheduled for **Boston** on **May 20-22, 1997**.

"The time is ripe, not for just another conference, but for a summit of transatlantic leaders, from both the private and public sectors, to identify the critical issues facing the development of telemedicine and to make recommendations for action," said Jay Sanders, M.D., president of the American Telemedicine Association and summit co-chairman. "The Transatlantic Telemedicine Summit will bring together the international leaders in telemedicine and related fields to respond to common concerns and help create an action agenda to speed deployment of cost-effective health-care for all people."

The need for timely, high-quality, affordable health care makes telemedicine a high priority topic for policy makers, health-care practitioners, and technology providers on both sides of the Atlantic. Recently, professional telemedicine interests in North America and Europe have begun to organize themselves into professional associations. Telemedicine-related businesses have been eagerly exploring markets abroad, and policy makers have been re-examining regulatory frameworks. The summit provides an opportunity for leaders, many of whom have never met, to identify common concerns, exchange experiences, recommend solutions, and help create an action agenda for better and more cost-effective health care.

The Atlantic Rim Network (ARN) was asked to convene the Transatlantic Telemedicine Summit to provide a forum where the leaders in these organizations, and other corporations, could candidly assess regulatory, economic, technical, and clinical obstacles confronted in the international development of telehealth products and services.

While, ultimately telemedicine must be developed as part of a global health-care system, much of the work to date has been nationally oriented. Opportunities to speed learning curves through the exchange of experiences internationally and benchmarking best practices have frequently been missed.

The Atlantic Rim region has been described as "the keystone test bed for global telemedicine." A growing list of regional, national, and international organizations are supporting the summit, which is being planned from both sides of the Atlantic with the help of an International Advisory Board and Business Leadership Council.

ARN, a Boston-based non-profit international organization dedicated to generating transatlantic collaboration through practical programs and projects, was formed out of the First International Congress on the Atlantic Rim in 1994. Telemedicine was made one of its five priority areas at its 1995 meeting in Halifax. Since then, ARN members have organized and participated in telemedicine-related activities ranging from international teleconferences to demonstration projects. ARN has frequently partnered with the Department of Defense's Medical Defense Performance Review, charged under Vice President Gore's "Reinventing Government" initiative with making health-care technologies available for defense and civilian applications.

ARN organized the transatlantic roundtable to address issues raised in a remote international telecardiology demonstration in Monaco in 1995. At the 100th Boston Marathon, the ARN arranged to have voice recognition equipment—used in Bosnia to identify the location of land mines—adapted to provide health-care assistance to non-English-speaking runners.

Some of the world's most respected authorities in telemedicine will participate in the Summit. In addition to Dr. Sanders, Jean-Pierre Thierry, M.D., vice president of the French Telemedicine Association, is serving as co-chair. Dr. Joseph Kvedar, head of Massachusetts General Hospital's Telemedicine Center, and Professor James McGee, director of Oxford University's Telepathology Centre, are chairing the clinical part of the program. Other participants include Michael Richonnier, head of the European Commission's Directorate General XIII for Telecommunications and Telematics, as well as federal regulators and health-care officials from the United States, Canada, Europe, Africa, Latin America, and the Caribbean. Panels will include discussion of cost-effective sustainable telemedicine practices, including consultations, data transfer, and distance learning. Transatlantic collaborations will be demonstrated and initiated. Economic and legal obstacles will be addressed, as well as strategies for deploying telemedicine to Southern Hemisphere communities and other underserved areas.

Leading clinical specialists will describe problems faced in the development of user-driven clinical protocols, and the importance of common standards and interoperable technologies. Vendors of products and services and system integrators, including telecommunications companies, will then offer solutions to described problems and needs. Other sessions will address distance learning and transfer of medical records as well as disease monitoring, reporting, and control, including advances in emergency medical care. Telemedicine and travel issues, from both the air-to-land and ship-to-shore perspectives, will be featured along with the growing area of home health care. The best practices of telemedicine in military and correctional institutions will also be evaluated.

For information concerning the May 20-22, 1997 summit, contact the Atlantic Rim Network, World Trade Center Boston, Suite 402, Boston, Masschusetts, USA. Telephone: (617) 439-5393 or (617) 423-7770. Fax: (617) 969-6640. E-mail: 73613.2436@compuserve.com.

Financing Administration [HCFA] reimbursement.) Other barriers to be surmounted include:

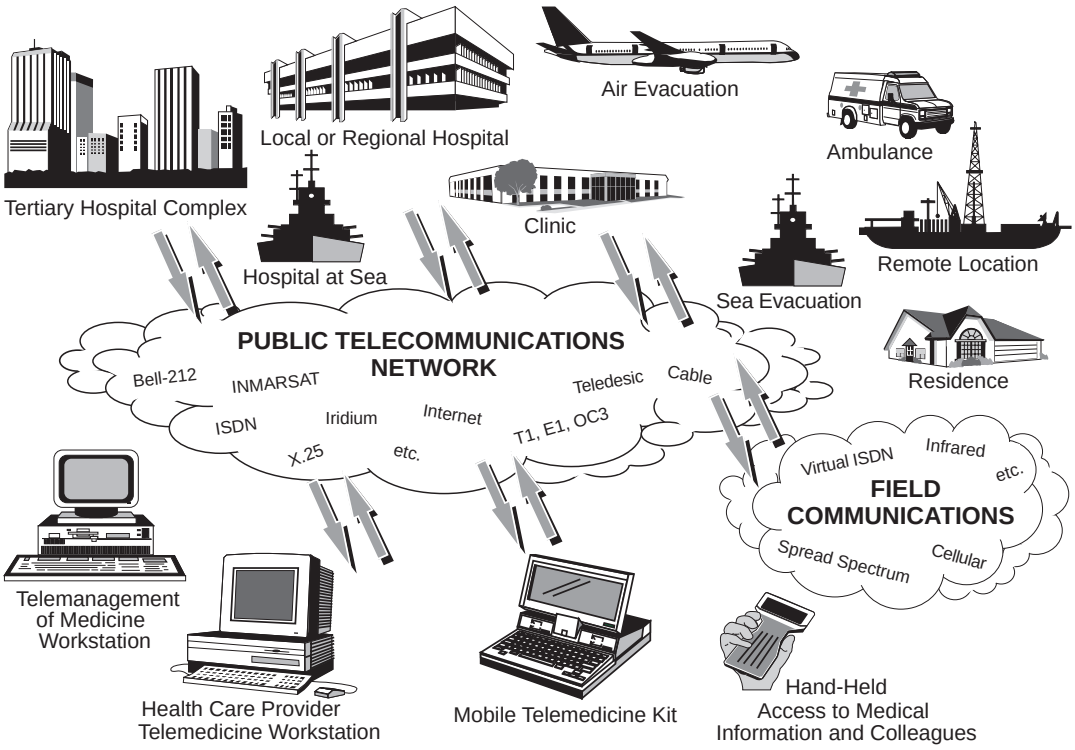
- Lack of widespread physician/practitioner familiarity and acceptance of telemedicine technologies and uncertain patient reactions to the perceived quality and efficacy of remote care.
- Legal and regulatory issues, such as interstate licensing, credentialing, uncertain malpractice exposure, patient confidentiality, and privacy issues.
- Cost of telecommunications infrastructure, issues of standards, and FDA guidelines for telemedicine equipment.

Recommendations

The Council's recommendations to speed the deployment of cost-effective, high-quality telemedicine include proposals that:

- HCFA should base its reimbursement policies on data collected from telemedicine projects where reimbursement is provided, so cost benefit data will be realistic.
- Specialty medical societies should develop evaluation platforms, and limits should be set on when software and telecommunications infrastructure are subject to FDA regulations.
- States should pass uniform special license legislation, permitting practice across state lines.
- Legal liability issues should be clarified.
- Medical schools should provide telemedicine training, and manufacturers should accelerate technology to facilitate desktop consultations.

Figure 2
A Spectrum of Needs Met by A Spectrum of Equipment



Source: Evans, et al.[4]

To achieve its promise, telemedicine must link the patient and the proximate healthcare giver to the expert—the consultant. This requires that telemedicine be globally interoperable, just as the telephone has achieved such interoperability to maximize utility and, in turn, to maximize resultant markets.

The Council on Competitiveness

The Council on Competitiveness is a non-partisan, non-profit forum of CEOs drawn from the business, labor, and university communities. The Council's broad objective is to foster the enhancement of American competitiveness in the global economy with the objective of raising the living standards of all Americans. The *Highway to Health* report is the culmination of an in-depth Health Care Information Infrastructure Project undertaken by the Council to assess the implications of the national information infrastructure for the health-care industry.

Personal Health Information and Management

Highway to Health makes a significant finding of fact with regard to the rapidly burgeoning consumer health information market, then identifies a series of barriers restricting an individual's access to such information. It concludes with two policy recommendations aimed at improving the functioning of this market.

Finding of Fact

The report finds, unsurprisingly, that "[t]here is a growing public appetite for personal health information, and the NII is facilitating access to it."[5] This trend is being driven by a confluence of several factors:

> The public is being asked to play a more responsible role in the health-care decision-making process, from evaluating and selecting health plans and providers, to participating in disease management programs, to adopting preventive habits to stay healthier longer. Individuals are actively seeking comparative information to assist them in assessing the options during their decision making. At the same time, the rapid development and deployment of NII-related tools and technologies are making information much easier to disseminate and access. Commercial on-line services are packaging vast amounts of health-related information in response to demands from customers. Health-care practitioners and delivery organizations, as well as payers, are beginning to use the Internet as a vehicle to provide information tailored to their patients, plan members, and customers. As public access to and comfort with the NII increases, so will its use as a tool to package and deliver important health-care information. And because this information increasingly will include patient-level medical record data, the need for policies on privacy and confidentiality will grow.[6]

The report fleshes in this general conclusion by describing two categories of consumer health information (CHI) into which this market sector is segmented—" 'wellness' or 'prevention' information to assist people in staying healthier longer and 'disease management' information to assist them in better managing their own illnesses or those of loved ones"[7]—and then analyzes the characteristics and drivers of the CHI market as well as its future potential.

Determining that "health information represents one of the largest single information markets in the United States,"[8] *Highway to Health* identifies and analyzes seven distinct media through which such information is conveyed to the public: newsletters, magazines, videos, cable/broadcast television, CD-ROMs, information kiosks, and on-line services.

Barriers

The report identifies six barriers limiting the availability and usefulness of consumer health information:

- Uncertainty regarding consumers' willingness to use consumer health information.
- Discomfort on the part of both practitioners and patients resulting from changes in the patient/practitioner relationship.
- Uncertainty regarding the accuracy and authenticity of health-related information.
- Lack of easy access to understandable health information.
- Uncertainty regarding liability for disseminating health-related information.
- Cost of electronic publishing.[9]

Recommendations

Highway to Health offers two recommendations aimed at improving the quality and practical availability of consumer health information:

- A proposal that "major medical associations and professional societies as well as health-care delivery organizations should establish guidelines for themselves and their members for screening and authenti-

cating health-related information before it is publicly disseminated."
- A proposal that vendors, health-care delivery organizations, and payers develop health and wellness information products and services with the full diversity of their served populations in mind.[10]

Integration of Health Information Systems

No element of the health-care information equation is more daunting than the systems integration challenge. As the *Highway to Health* report indicates, this systems integration must take place at three different levels: intra-organizational, enterprise-wide, and inter-enterprise. It must respect nettlesome patient privacy issues, while addressing the overlapping needs of a variety of stakeholders: patients, practitioners, health-care delivery organizations, employers, and payers. To make matters more challenging, the task of integration must take place in a political atmosphere that discourages a visible governmental role in shaping health-care industrial policy.

The Council's report dissects the elements of this challenge, analyzes the factors hindering market adoption of integrated systems, projects the staggering market potential of the health-care information

A Daunting Task

The foreword, quoted below, to *Highway to Health* gives a sense of the daunting nature of the task of creating a fully-integrated health information infrastructure:

The Council report analyzes the impact of the NII [national information infrastructure] on the health care market and uncovers the potential it offers to increase access to higher quality, more cost-effective, patient-centered care for every citizen. The title, *Highway to Health: Transforming U. S. Health Care in the Information Age*, suggests that health care will somehow be different in this new era of abundant information. It also signals that the NII, the nation's information and communications "highway," can play a vital role in addressing the changes underway.

Widespread use of the NII can help ensure that health-related information and services are available anywhere at anytime. Advanced computing and communications capabilities will permit distant health care providers to "see" patients, whether they are in their homes, in another city, in another state, or perhaps in another country. Practitioners will be able to access patient information wherever it may be located. Researchers will be able to share appropriate data in order to more effectively assess outcomes and ultimately develop more beneficial treatments to keep the population healthy. And a healthy population, if achieved at a reasonable cost, is the foundation of national competitiveness. The NII also offers the potential to export our medical expertise to other populations that do not have adequate health-care services, at the same time contributing to economic growth here at home.

However, exploiting the power of the NII is a complex task. It is not simply a matter of "hooking up" all the participants. Major gaps and incompatibilities in existing health-care information systems make the creation of an effective "HII" (health information infrastructure) impossible without collaborative action by many stakeholders, both customers and suppliers of HII components. A myriad of policy and regulatory issues are frustrating the delivery of innovative technologies and applications. This report clearly articulates many of these "roadblocks" and proposes a number of specific actions that the public and private sectors can take to move beyond them.

technology industry, and offers six recommendations aimed at eliminating the barriers to deployment of a fully-integrated national health information system.

Characteristics of the Market

As *Highway to Health* points out, "between 20 percent and 30 percent of our national health care expenditures"—which now total $1 trillion and are projected to reach $2.2 trillion by 2005—"are associated with informational paperwork for the hundreds of millions of transactions that take place every month."[11] Despite the enormity of this administrative cost, the health-care industry has historically underinvested in advanced information technology in comparison with other information-intensive industries like banking and airline transportation.

Part of the explanation for the historical pattern lies in the fragmented character of the health-care industry where "[t]raditional health-care information systems investments typically extended only to the procurement of the hardware, software, and administrative components within a specific department of a hospital, such as radiology or finance."[12] Another element of the explanation is the lack of strong and direct consumer demand for system integration analogous to that which stimulated the adoption of common standards in ATM banking, VISA credit card transactions, and airline reservations systems. A third factor impeding systems integration is that health-care competitors have traditionally viewed *access* to patient information as a crucial source of competitive advantage. An open informational system would dissipate this source of advantage and would instead reward superior *use and manipulation* of information. Finally, difficult patient privacy issues have impeded the development of an open health information system.

A third factor impeding systems integration is that health-care competitors have traditionally viewed *access* to patient information as a crucial source of competitive advantage.

Despite these barriers, a number of promising health information integration efforts are underway. Initiatives identified in *Highway to Health* include:

- *MinnesotaCare*—A state-enacted legislative package aimed at encouraging the development of integrated service networks by granting antitrust exemptions to providers and purchasers that form business alliances.
- *Ohio Corporation for Health Information*—A public/private partnership which is building a patient information network linking hospitals and medical centers.
- The *U. S. Department of Defense Composite Health Care System* (CHCS) which supports military health-care worldwide.

Market Potential

The market potential for health information systems integration products and services is generally acknowledged to be exceptional. A widely cited study by Alex Brown & Sons estimated that "the health-care information technology industry will more than double in size by the end of the century, from about $9 billion a year to $20 billion."[13]

Driving these expenditures is the allure of offsetting cost reductions, estimated to range from $45 billion to $100 billion on an industry-wide basis. The Council predicts that even more dramatic savings may be in the offing as a network-centric national health information system begins to emerge:

> Prospective savings may be greater, and initial investments may decrease over time as more applications and data reside in the networks rather than in each stakeholder location. Networked computing may hold the key to reducing investment barriers by spreading the cost of development and maintenance across communities of users. Individual hospitals, plans, and practitioners could avoid the cost of upgrading or replacing existing systems. This would require a shift in today's competitive model, where competition is based on access to information and not how it is creatively used.[14]

Highway to Health concludes that three basic issues must be addressed if this market potential is to be realized:

- Patient privacy and confidentiality concerns.
- The need for uniform information content and network standards.
- The need to quantify cost benefits of health information system expenditures.

Barriers

Barriers to deployment of an open national health information infrastructure identified in *Highway to Health* include:

- Privacy, confidentiality, and security concerns.
- Lack of uniform standards for administrative and clinical data.
- The need for better tools to quantify the cost benefit of information system expenditures by the health-care industry.
- Health-care practitioner resistance to system integration and concomitant loss of professional autonomy.
- Failure of senior health-care managers to perceive the value of information system integration.
- Lack of clear, comprehensive guidelines for protection of personal medical information.

Recommendations

Highway to Health offers six key recommendations to accelerate the deployment of an integrated national health information infrastructure:

- A private sector-driven standards-setting initiative aimed at developing uniform standards in electronic health-care transactions, data content, and format.
- State legislation to permit smaller purchasers of health-care goods and services to pool their buying power and help drive the integration process.
- A requirement imposed by the largest private sector purchasers that all providers comply with ANSI standards for claims and encounter information and eligibility requirements.

The Health Information Business: Wall Street's View

The acid test of any new technology, product, or service is Wall Street's valuation of it. How is Wall Street likely to assess the market potential of the health-care information applications analyzed in *Highway to Health*? Here's the short answer from one prominent health-care financial analyst, Michael D. Samols, Vice President of the San Francisco-based investment banking firm of Robertson, Stephens & Company:

> We believe growth and value creation in the health-care industry should be driven in sequential order by three integrally-bound sectors: HMOs, Physician Practice Management, and Information Systems and Services. In our view, the smallest of these sectors—information—offers the greatest upside potential in terms of profitability and earnings growth over the next decade.
>
> The shifting of financial risk to providers is driving demand for information systems that enable collection and management of clinical data.
>
> Under the new paradigm of patient-centered, cost-based health-care delivery, the industry is at the very early stage of a new technology cycle. We estimate the market for new applications will grow to [a range of] $6 billion to $7 billion from $1.2 billion over the next five years. We believe that the most rapid growth will occur in resource management systems, clinical information management systems, including electronic medical records, and interactive networks. (From Michael Samols, *The Information Imperative: Managing Care Means Managing Information* published by Robertson, Stephens & Company.)

- Federal legislation to protect personally identifiable health information from unauthorized disclosure and to ensure appropriate individual patient access to such information.
- Adequate encryption of all electronically transmitted, personally identifiable health information.
- Development of widely accepted cost-benefit models for use by the health-care industry in making major health information system investments.

Health Care Research and Education

As the NII moves toward an integrated system of networked health-care applications linked to desktop computers, health-care researchers and educators have an opportunity to be involved in and enhance both the day-to-day delivery of health care as well as continuing medical education.

There is an emerging market for NII-based tools to support medical research and education. The first category of applications involves enhancing the quality and relevance of outcomes research. The second category involves enhancing real-time decision support through decision-making software. A third category of applications encompasses enhancements to networked communications tools such as the Internet. The market for networked medical education, especially educational offerings which utilize multimedia approaches, is also promising.

Barriers

Highway to Health cites six barriers to overcome before the promise can be realized:

- Lack of FDA regulations concerning stand-alone medical decision support software.
- Reluctance of practitioners to change their practice patterns.
- Absence of standards in terminology and data format.
- Lack of guidelines regarding privacy and the use of patient records for research.
- Competition for and hoarding of information.
- Liability associated with inaccurate databases and inferences.

Recommendations

Highway to Health makes four recommendations to eliminate these barriers:

- FDA should not regulate stand-alone decision support software except when it both introduces substantial risk to patients and is to become a commercial product.
- Legal and legislative initiatives should be adapted to clarify liability and malpractice issues in stand-alone medical decision-support systems.
- Health informatics should be included in medical school and continuing medical education programs.
- Research and innovation on user interface hardware and software should be stimulated.

Conclusion

The gargantuan U.S. health-care industry is virtually an economy unto itself. Like an OECD nation, its revenues are measured in trillions, not billions. Moreover, the health-care economy is growing with dramatic speed, while simultaneously undergoing the turmoil of truly revolutionary change.

As we observed at the beginning of this article, health care is becoming increasingly an *information* business. For this reason, the changes currently reshaping the health-care landscape will inevitably impact the telecommunications and information industries. A careful reading of the *Highway to Health* report issued by the Council on Competitiveness and summarized in this article is, we believe, an essential prerequisite for competitive success in this enormous and fast-evolving sector. ntq

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[1] The report is available electronically at the following address: http://nii.nist.gov/coc.html. Click on the Publications category and, at the description for *Highway to Health: Transforming U.S. Health Care in the Information Age*, click on the link that takes you directly to the full report. The report can also be ordered from the Council on Competitiveness at a cost of US $25.00 plus $3.50 shipping and handling (domestic) and $6.50 (overseas). To order, send a check or money order to: Council on Competitiveness, Publications Office, 1401 H Street, NW, Suite 650, Washington, DC 20005. Phone: 202-682-4292. Fax: 202-682-5150. E-mail: pubs@compete.org.
[2] Council on Competitiveness, *Highway to Health: Transforming U.S. Health Care in the Information Age* [hereafter cited as *Highway to Health*] (March 1996), p. 3.
[3] *Highway to Health*, p. iii.
[4] John A. Evans, Frank Davidson (JD, DHL), Jay Sanders (MD), and Lt. Gen. Thomas G. McInerney (USAF, retired), "Evolution of a Global Military and Civilian Telemedicine Network for the 21st Century: Status, Critical Success Factors, and Future Directions." Presented at the International Conference, *Macro-Engineering in the 21st Century*, sponsored by the Masschusetts Institute of Technology (October 24-27, 1996), p. 12.
[5] *Ibid.,* p. vi.
[6] *Ibid.*
[7] *Ibid.,* p. 29.
[8] *Ibid.*, p. 31.
[9] *Ibid.*, p. 38.
[10] *Ibid.*, p. 39.
[11] *Ibid.*, p. 41.
[12] *Ibid.*, p. 42.
[13] *Ibid.*, p. 47.
[14] *Ibid.*, p. 49.

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