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FROM THE FIELD

Interoperability: The Key To The Future Health Care System

Interoperability will bind together a wide network of real-time, life-critical data that not only transform but become health care.

by David J. Brailer

ABSTRACT: The United States is building a point-of-care health information system to rival the worldwide network of electronic banking. Through health care information exchange and interoperability, clinicians will have access to a longitudinal medical record. This interoperability is a fundamental requirement for the health care system to derive the societal benefits promised by the adoption of electronic medical records (EMRs). The paper by Jan Walker and colleagues highlights some of these benefits. One critical question is whether the adoption of EMRs needs to wait for interoperability standards or whether it can proceed efficiently without them.

THE OVERWHELMING majority of Americans receive their care from more than one caregiver or other provider—be it a physician group, solo physician, hospital, laboratory, pharmacy, or urgent care center, let alone work-site clinics, school clinics, or public health sites. Closed systems such as Kaiser Permanente or the Veterans Health Administration farm out a portion of their care to outside providers because of geographic coverage, specialty access, or overflow management. Even the narrow and restrictive health plan networks of the past are rarely seen anymore.

Americans can and do choose to get care from whomever they want: more than 500,000 office-based physicians, approximately 5,000 community hospitals, more than 16,000 certified nursing facilities, and many other care settings.[1] Choice of caregivers and other providers is a defining characteristic of the privately operated U.S. health care system, one that makes our health care markedly different from that of most other countries. Choice allows consumers to select caregivers or other providers based on their proximity, bedside manner, quality and capability (to the degree that consumers can observe this), cultural aptitude, or many other factors that may matter to any given consumer.

Without some means of integration, choice leads to fragmentation of the consumer's health care experience. Fragmentation, in turn, results in errors, duplication, lack of coordination, and many other problems. Integration mechanisms have been tried in the past, although none has delivered lasting benefit: These include horizontal and vertical mergers, physician roll-ups, specialty carve-outs, and specialty carve-ins. Information as a mechanism for integration has been contemplated and debated for two decades, but technical barriers have kept it out of reach until recently. Unlike integration through merged assets, in-

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formation could virtually tie together a network of providers so that fundamental operational, clinical, and financial synergies could be realized. It is no wonder, then, that Jan Walker and colleagues demonstrate that substantial value arises from interoperability and the exchange of health care information.[2]

Interoperability and health information exchange are technospeak jargon for health care information that is treated as a required element of diagnosis and therapy, albeit one that jealously guards patients' privacy and confidentiality. In a world that is interoperable and in which health information can be exchanged, a consumer's medical information can be portable and available to his or her clinicians, at least to the extent that the consumer wants it to be. Without interoperability and health information exchange, health information will remain in proprietary silos, in which the health care enterprise hopes to gain comparative advantage by imposing high costs on consumer switchover and by exercising market leverage over small-niche players such as solo physicians and community hospitals.

Interoperability and health information exchange are best understood as business concepts rather than technical concepts. The technical feat of how banks cobbled together the ATM network or point-of-service credit cards may have been interesting at some point in history, but the lasting transformation of these advances is the portability of finance and credit throughout the world and its forward migration into every setting where commerce occurs. Similarly, it is easy to be impressed, or put off, by the technical complexity of health care standards, security, architecture, and other technical advances that have made health care next on the list of industries that can become interoperable and consumer-centric. But, as with banking, what will be truly impressive is the effect that interoperability will have on the structure and functioning of the health care marketplace.

Through health care information exchange and interoperability (HIEI), for the first time, clinicians everywhere can have a longitudinal medical record with full information about each patient. Consumers will have better information about their health status since personal health records and similar access strategies can be feasible in an interoperable world. Consumers can move more easily between and among clinicians without fear of their information being lost. Payers can benefit from the economic efficiencies, fewer errors, and reduced duplication that arise from interoperability. HIEI also underlies meaningful public health reporting, bioterrorism surveillance, quality monitoring, and advances in clinical trials. In short, there is little that most people want from health care for which HIEI isn't a prerequisite.

Interoperability is a fundamental requirement of ensuring that widespread electronic medical record (EMR) adoption gives us the social and economic benefits that we want. Without interoperability, EMR adoption will further strengthen the information silos that exist in today's paper-based medical files, resulting in even greater proprietary control over health information and, with it, control over patients themselves. Public efforts to support adoption of EMRs that are not interoperable would be questionable, since stand-alone EMRs might not increase consumers' welfare. With interoperable information, there is little doubt that EMR adoption would increase consumers' welfare through increased choice, portability, and control.

We think about interoperability only in today's terms. Looking ahead, the demands that future health care technologies will make on health information exchange could be large, as could the health benefits delivered because of interoperability. Streaming real-time video interactions between physicians and patients and among physicians will be integrated into the EMR in some form and will require profound broadband capacity. Monitoring of live-feed data from the homes of the elderly or infirm will tell clinicians and family members about medication taking, ambulation, consumption, and other aspects of autonomous daily living. Implantable devices with wireless feeds will report patients' physiological status to physicians and monitoring centers and will

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report functional anomalies to the manufacturer and relevant federal agencies. And that is not to mention inputs about weight and reaction times from automobiles, ambient environmental sampling data linked to one's location by wearable global positioning system (GPS) devices, exercise data from implantable stress monitors, and sensors at one's desk for other kinds of stress. In short, the future of interoperability is to bind together a wide network of real-time, life-critical data that not only transform health care but become health care.

■ **Realizing the benefits.** Although the benefits of HIEI are large, they may be difficult to realize. First, interoperability benefits are highly dispersed across many stakeholders. Some could lose from disruption of long-standing industry practices, particularly vendors who rely on custom integration of their products for revenue and who use the lack of interoperability as a customer retention strategy. Second, the negative network externalities and first-mover disadvantage that penalize early adopters make it difficult to synchronize the behavior of the market so that interoperability can gain a foothold. Just like the fax machine, the last to install an interoperable EMR benefits from everyone else's prior investment, and the first to install bears most of the cost. Third, interoperability first movers have faced many barriers and challenges that have resulted in partial success, slow progress, and outright failure. Interoperability may be beneficial, but it is certainly not easy.

■ **Interoperability and EMR use.** A central question about interoperability is how it should proceed relative to EMR adoption. Some argue that interoperability has to precede EMR use. They believe that the ability to share information has to be designed into EMRs and that the infrastructure and industry capacity for securely networking this information has to exist up front. They view the risk of widespread adoption of stand-alone EMRs as a lost opportunity and one that may lead irreversibly to treatment of health information as a proprietary asset of delivery systems. They believe that if standards are not solidified and built into EMRs now, a generation

of investment will be wasted. Others argue that interoperability will follow from widespread EMR adoption. They believe that once health information is electronic and everyone is using EMRs, interoperability will naturally follow, since it is easier and cheaper than manual data sharing. They view up-front requirements for interoperability as too restrictive and think that standards will naturally evolve from the point-of-care information infrastructure that the United States is building. Meanwhile, the adoption of EMRs continues to grow. We need an urgent and vigorous debate that gives us clear answers to these questions.

WALKER AND colleagues have brought an essential topic about the future of health care to the forefront. Seventy-seven billion dollars in savings from interoperability and health information exchange is a good starting point. Also, this may underestimate the true benefits of interoperability. Clinicians would have the information they need at the point of care, consumers would have choice and portability, payers would save money, and researchers would have better data. If the broad market effects that interoperability enables are taken into account, the benefits would be truly impressive: I can't think of a more positive starting point for the future of our industry.

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The opinions expressed here are those of the author and not necessarily of the federal government.

NOTES

1. American Medical Association, *Physician Characteristics and Distribution in the U.S., 2004–2005 Edition* (Chicago: AMA Press, December 2004), 63, Table 3.1; American Hospital Association, "Fast Facts on U.S. Hospitals," 2003, www.hospitalconnect.com/aha/resource_center/fastfacts/fast_facts_US_hospitals.html (11 January 2005); and American Health Care Association, "Trend in Certified Nursing Facilities, Beds, and Patients," www.ahca.org/research/oscar/trend_graph_facilities_beds_patients_200406.pdf (11 January 2005).
2. J. Walker et al., "The Value of Health Care Information Exchange and Interoperability," *Health Affairs*, 19 January 2005, content.healthaffairs.org/cgi/content/abstract/hlthaff.w5.10.