eHealth: The Foundation for Health System Transformation

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Introduction
The information age has finally arrived for the health enterprise. For many years, health care has lagged behind other sectors, such as banking, manufacturing, and retail, in the use of networked information systems to support business practices. To be sure, much work still needs to be done to achieve a comparable level of familiarity, widespread use, acceptance, and integration. But as a nation and state we now realize the increasing role information systems must play if we are to greatly improve the quality and safety of health care, increase the pace of innovation and adoption of evidence-based practices, and improve the health of individuals and our communities.

eHealth provides the foundation for this transformation.

eHealth has been defined as “...an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state of mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology.”

Embracing the eHealth theme, this issue of the Wisconsin Medical Journal is devoted to electronic health records. From the cellular and genetic level to communities and populations, this month’s contributors provide a wide-ranging snapshot of ehealth and information system applications evolving and supporting Wisconsin’s health enterprise.

Ms Swanson and her colleagues at the Medical College of Wisconsin and Froedtert Memorial Lutheran Hospital (Preimplantation Genetic Diagnosis: Technology and Clinical Applications. WMJ. 2007;106(3):145) provide an overview of the process and information needs supporting preimplantation genetic diagnosis. This is a method of testing in-vitro fertilized embryos for single gene and chromosome abnormalities prior to transfer to significantly improve the chances of having a healthy child.

Mr Wright and his co-authors (Clinical Decision Support Systems Use in Wisconsin. WMJ. 2007;106(3):126) assess the extent of clinical decision support systems currently used by Wisconsin physicians. They found that while nearly 40% indicated their facilities had these systems, a much smaller percentage of systems were computer-based, leaving room for considerable strategic growth for computerized systems in Wisconsin.

In a study sponsored by the Wisconsin eHealth Care Quality and Patient Safety Board, Dr Foldy similarly examines the current landscape of electronic health information exchange in Wisconsin (Inventory of Electronic Health Information Exchange in Wisconsin, 2006. WMJ. 2007;106(3):120). Although the end goal of universal adoption of electronic medical records is necessary, it is not sufficient to complete the eHealth picture. Health information exchange is vitally important if clinicians are to have a comprehensive understanding of the patient they are treating. Today, patients typically receive care and have relevant health information generated from multiple organizations, such as hospitals, clinics, laboratories, pharmacies, and therapists. Our mobile society requires that an individual's health information follow them to wherever they seek care. Dr. Foldy’s research underscores the distance Wisconsin will need to travel in order to achieve secure health information exchange supporting patient care everywhere.

Two papers focus on public and population health. Mr Landis and colleagues from the Wisconsin Division of Public Health describe the Secure Public Health Electronic Record Environment (SPHERE)
routine, secure, high-vol-

ume and high-speed data exchange
was unthinkable because the infra-
structure did not exist. Today, it is
commonplace, and data standards
now proliferate to insure systems in-
tegration capability.

There are essentially 4 major
users of the spectrum: clinicians/
health care professionals, research-
ers, public health, and the individual
or consumer. Unfortunately these
user groups have similarly developed
their own systems or views into the
medical informatics spectrum, again
creating islands of information and
disparate computer applications that
do not readily talk to each other.

The Nationwide Health
Information Network (NHIN) is a
national effort to bring about inte-
grated, universal eHealth adoption
within the health enterprise. The ef-
fort is being led by the Office of the
National Coordinator for Health
Information Technology (ONC) in
the US Department of Health and
Human Services (DHHS). The goal
is to unify both the informatics spec-
trum and its end users through a stan-
dards enabled interoperable system.
The development and “use of this
infrastructure will improve the qual-
ity, safety, and efficiency of health
care and the ability of consumers to
manage their health information and
health care.”

But how do we get to there?
Perhaps the most effective method
is to form stakeholder collaboratives
to answer 3 questions: How do we
do our work now (business process
analysis); how should we do our
work (business process redesign);
and how can an information system
support our work (requirements
definition)? For NHIN to realize
its goal of interoperability and the
promise of health system transfor-
mation, stakeholders from each of the
4 user groups must be engaged
whenever applications are being de-
signed for any user group. Otherwise
we run the risk of only computeriz-
ing the first step for each user group,
i.e. how we do our work now, and
perpetuating the informatics barriers
that currently exist between clinical
care, public health, research, and
person-

nel health.

A national dialog has started for
a number of critical NHIN areas.
Work groups have formed on bio-
surveillance/population health and
clinical care connections; consumer
empowerment; chronic care; elec-
tronic health records; confidentiality;
privacy and security; quality; and per-
sonalized health care. Considerable
progress has been made, but much
work must still be done to specify
business process redesign and a full
set of NHIN requirements defini-
tions for each of these areas.

eHealth: The Once and
Future Network

Medical informatics, the intersection
of medicine and information sci-
cences, supports a spectrum of health
data and is generally described by 4
domains: cellular/genetic/proteomic,
imaging, clinical, and population
health. Though the spectrum can be
seen as a continuum, the information
systems supporting these domains
have historically developed with lit-
tle regard for one other. In part due
to the nature of professional special-
ization, it is also due to technology
limitations of the past. Less than 10
years ago, routine, secure, high-vol-

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working in truly different ways, and these new opportunities are more clearly seen as we move toward the eHealth enterprise. Public health providing real time, epidemiological contextual information (situational awareness) to improve the performance of a clinical prediction model differentiating aseptic from bacterial meningitis is but 1 example.27 One could easily envision extending this process of population health informatics feedback to clinical care for a wide variety of health outcomes, making it a new objective and priority for public health surveillance systems.4 But perhaps it is research and the rapid adoption of evidence-based innovation that stand to gain the most from eHealth: “using electronic health record (EHR) databases from millions of people could rapidly advance the US evidence base for clinical care. Rapid learning could fill major knowledge gaps about health care costs, the benefits and risks of drugs and procedures, geographic variations, environmental health influences, the health of special populations, and personalized medicine.”28

**Wisconsin’s eHealth Action Plan**

Wisconsin’s eHealth Action Plan outlines steps that are underway to transform the health enterprise.6 Mindful of national developments, it employs 3 strategies for transformation: improve quality, safety, and value by establishing the eHealth technology platform to provide needed information at the point of patient care; encourage the development, alignment, and implementation of value-based purchasing policies and actions across the public and private sectors; and link Health Information Technology and Health Information Exchange plans to prevention and disease management activities. Wisconsin’s eHealth Implementation Summit was held on March 15, 2007, and it is available on-line at Wisconsin’s eHealth Web site.6

Nationally, Wisconsin is in a unique position because of groundbreaking work being done by the Wisconsin Medical Society, the Wisconsin Collaborative for Healthcare Quality, the Wisconsin Health Information Organization, the Wisconsin Health Information Exchange, and the Wisconsin Hospital Association. Our state has a significant proportion of physicians in large group practices, with most of these already using electronic health records and associated technology. There is strong commitment to quality improvement and leadership in our health care sector, including the 2 medical schools and professional associations. And Wisconsin is home to 2 of the world’s leading companies in electronic health information and many other innovative companies working on health technology. In the public sector, Wisconsin is developing a sophisticated public health information network as well as other systems that can provide assets to a statewide eHealth technology platform. Finally, extensive work on privacy and security issues has been completed under the leadership of the HIPAA Collaborative of Wisconsin, providing a venue for diverse stakeholders to uniformly address critical issues.6

eHealth has been described as a ‘race to the starting line.’ But as we have seen, Wisconsin has gone well beyond this. In the near future, Wisconsin is poised to make significant eHealth progress with the continued participation of physicians, the public and private sectors, researchers, and consumers to support and guide Wisconsin’s eHealth Care Quality and Patient Safety Board.

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**References**

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