

# Think Globally, Act Locally: The National Health Information Infrastructure

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## Overview

- Why do we need more information technology (IT) in health care?
- Emerging national consensus – IT is part of the solution
- The National Health Information Infrastructure – definitions, motivations, activities
- What are the barriers and why are we not there?



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## Why do we need more IT in health care?

- Quality
- Safety
- Cost
- Inaccessible information



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## Quality – errors of omission

- There are many studies to choose from...
- McGlynn, 2003
  - Sample of nearly 7,000 adults in 12 US metro areas assessed for 30 conditions
  - On average, only 54.9% of care was consistent with known quality
- NCQA, 2007 – gaps in quality annually result in
  - 35,000-70,000 avoidable deaths
  - \$2.7-3.7 billion in avoidable medical costs
  - 45 million sick days
- Zingmond, 2007 – assessment of Medicare and Medicaid claims for 100,000 Californians
  - 35% of indicated interventions in diabetes, heart disease, and other conditions not provided



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## Safety – errors of commission

- The IOM “Errors” report: As many as 98,000 Americans die each year due to medical errors, mostly medication errors (Kohn, 2000)
  - Some have argued that the numbers are too high or too low, but none argue with the concept
- Lost in the discussion: Most errors are the result of faulty systems; the solution is not in making people smarter or punishing them, but building better “systems” to track and prevent errors (Berwick, 2003)
- “Medicine used to be simple, ineffective, and relatively safe. Now it is complex, effective, and potentially dangerous.” (Chantler, 1999)



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## Cost

- Health care costs continue to rise and outpace inflation (Kaiser Family Foundation, 2007)
- US spends more per capita on health care but gets less in terms of “products” (OECD, 2006; Angrisano, 2007) and “outcomes” (Banks, 2006; Lasser, 2006)



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## Inaccessible information

- Primary care physicians report information missing in 13.6% of clinical visits, which is available but outside system in 52% of instances and could adversely effect patients 44% of time (Smith, 2005)
- As many as 20% of all tests and 1 in 7 hospital admissions may be result of inadequate access to information (David Brailer, unpublished data)

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## According to IOM (2001), attributes of quality health care

- Safe
- Effective
- Patient-centered
- Timely
- Efficient
- Equitable



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## Emerging national consensus – it starts at the top

- President George W. Bush
  - State of the Union – mentioned every year 2004-2008
    - January, 2004 – “Computerizing health records [can] reduce costs, improve care, and lower the risk of medical mistakes.”
    - January, 2007 – “We need to reduce costs and medical errors with better information technology.”
  - Goal of electronic health records (EHRs) for all Americans by 2014
    - <http://www.whitehouse.gov/news/releases/2005/01/20050127-2.html>
- Strange bedfellows
  - Patrick Kennedy and New Gingrich (NY Times, 2004)
  - Bill Frist and Hilary Clinton (Wash Post, 2004)

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## Perhaps even more amazing, there is action

- Office of the National Coordinator for Health Information Technology (ONC)
  - <http://www.hhs.gov/healthit/>
  - Established in 2004, formalized into law in 2005
  - Initially headed by first “health IT czar,” Dr. David Brailer, now headed by Dr. Robert Kolodner
  - First actions were
    - Release of 10-year strategic framework to build a national health information infrastructure (Brailer, 2004)
    - Awarding of contracts for prototype networks, certification of EHRs, standards harmonization, and assessment of impact of state privacy laws

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## Action (cont.)

- American Health Information Community (AHIC, <http://www.hhs.gov/healthit/ahic.html>)
  - Established by Mike Leavitt, Secretary of HHS to promote increased adoption of health IT
  - Included 17 commissioners from government, industry, health care system
  - Transitioning to private non-profit organization
- Agency for Healthcare Research & Quality (AHRQ, [www.ahrq.gov](http://www.ahrq.gov))
  - Funding research and policy development
- And others, e.g., National Library of Medicine (NLM, [www.nlm.nih.gov](http://www.nlm.nih.gov)) and other institutes of the National Institutes of Health and National Committee for Vital & Health Statistics (NCVHS, [www.ncvhs.hhs.gov](http://www.ncvhs.hhs.gov))

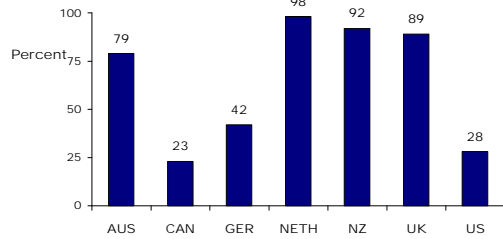
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## It is not limited to the United States

- United Kingdom – NHS Connecting for Health
  - <http://www.informatics.nhs.uk/>
  - Most ambitious in world: spending \$18 billion on developing nationwide electronic health records for all citizens (Chantler, 2006; Brennan, 2007)
- Australia HealthConnect
  - <http://www.healthconnect.gov.au/>
- Canada Health Infoway (Alvarez, 2007)
  - <http://www.infoway-inforoute.ca/>

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## In many ways, US is a laggard



Primary care physician use of EHR in 7 countries (Taylor, 2007)

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## Part of the solution: the Electronic Health Record (EHR)

- Increasing evidence documenting the benefits of the EHR with clinical decision support (Chaudhry, 2006), especially in areas of
  - Increased adherence to guideline-based care
  - Enhanced surveillance and monitoring
  - Decreased medication errors
- Well-designed systems do not take more physician time (Overhage, 2001)
- Overall return on investment (ROI) in inpatient (Schmitt, 2002) and outpatient (Wang, 2003) settings

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## But there are caveats

- “Unintended consequences” (Ash, 2004)
  - Computerized physician order entry (CPOE) can cause error and harm (Koppel, 2005; Han, 2005)
  - Most health care settings experience a variety of problems related to new work, workflow, communication, and other problems (Ash, 2007)
- Documented benefits limited to a small number of institutions – 25% from 4 institutions (Chaudhry, 2006)
- Health care IT is a “journey, not a destination,” i.e., we cannot think of it as a one-time undertaking (McDonald, 2004)

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## We also must go beyond the EHR of a single organization

- Patients are “mobile” in many ways
  - May get their care in more than one “business”
  - May develop medical problems away from local physician’s office or hospital
- Also greater need in public health sphere with growing threats of emerging diseases and bioterrorism

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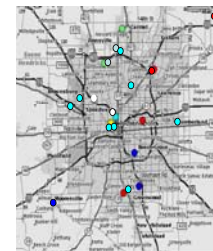
## Beyond the EHR: health information exchange (HIE)

- “Anytime, anywhere access to clinical information for the care of patients” – William Yasnoff, MD, PhD
- “Data following the patient” – Carolyn Clancy, MD, Director, AHRQ
- Requires that information seamlessly flow across business boundaries
  - Challenges are not only technical, but also financial, legal, etc. (Rosenfeld, 2006)
- But there are other successful examples of information exchange, such as ATM cards, wireless networks, etc.

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## Example of HIE: Indiana Health Information Exchange

- (McDonald, 2005)
- [www.ihie.org](http://www.ihie.org)
- Access to clinical information in real time by
  - Most hospital emergency departments
  - Many hospital-based clinicians
  - 85 primary care providers in 20 locations
  - Homeless care network
  - Public school clinics
  - County Health Department
  - Indiana State Health Department



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## “Results” of other HIE efforts have been mixed

- Other successful efforts
  - Inland Northwest Health System (INHS, www.inhs.org), Spokane, WA
  - Massachusetts eHealth Collaborative (www.maehc.org) (Halamka, 2005)
- Less so
  - Santa Barbara County Care Data Exchange – combination of technical, leadership, and funding problems (Miller, 2007; Brailer, 2007)
  - NE Pennsylvania (Robinson, 2007)
  - Oregon (Korn, 2007; Moody, 2007; Conn, 2007)

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## National Health Information Infrastructure (NHII)

- “The set of technologies, standards, applications, systems, values, and laws that support all facets of individual health, health care, and public health” (Detmer, 2003)
- Anytime, anywhere access to clinical information with appropriate authorization and authentication
- Information as a “utility,” not locked in silos
- Health systems must compete on other things besides IT

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## The National Health Information Network (NHIN)

- The NHIN is the computer network that will link all aspects of health information with appropriate privacy and security
- The cost is substantial – \$156 billion (Kaushal, 2005) – but there should be return on investment (Walker, 2005)
- For political reasons, US approach likely to proceed bottom-up

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## How do we get to the NHIN?

- Health care is mostly local or regional but patients cross business boundaries within those localities
- Brailer (2004) advocated formation of Regional Health Information Organizations (RHIOs)
  - Government not viewed as primary funder, but could lead in other ways
    - Standardized practices and regulations
    - Funding demonstration projects
    - Providing incentives, e.g., via Medicare

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## Why are we not there? What are the barriers? (Hersh, 2004)

### Health Care Information Technology Progress and Barriers

William Hersh, MD  
In the 3 to 5 years since the 1996 Health Information Technology Act, we have seen significant progress in the development of health information technology. However, we have also seen significant barriers to widespread adoption of these technologies. This report discusses the progress and barriers to widespread adoption of health information technology.

- Cost
- Technical challenges
- Interoperability
- Privacy and confidentiality
- Workforce

See also p 2255.  
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## Cost barriers

- Even though there is overall ROI, benefit does not accrue to those who pay, especially in small practices (CITL, 2003)
  - Practices only see 11% of ROI – most goes to insurance companies and laboratories
  - But they are usually asked to pay the cost of EHRs
- More recent data, however, suggests physicians do achieve positive ROI around 2.5 years after initial investment, although range is wide (Miller, 2005)

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## Technical challenges

- While underlying technology (e.g., networks, relational database systems) is well-established, other technical issues remain, such as
  - Implementing systems, especially in office settings (Hartley, 2005; Amatayakul, 2005)
  - Matching systems to workflow – best systems add time in some areas but make it up in others (Overhage, 2001)

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## Need for standards to achieve interoperability

- Clinical data is trapped in “silos,” not easily moved from one system to another (Brailer, 2005)
- Growing push for attention to “secondary use of clinical data,” which can align benefits for quality assessment, clinical research, public health surveillance, etc. (Safran, 2007)
- To achieve this, need standards for data elements, terminology, messaging, etc.
- Why are we not there? Lack of incentives, such as
  - Vendors ambivalent
  - Clinicians do not prioritize documentation
  - Genuine scientific disagreement over best approaches

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## Concerns about privacy and confidentiality

- (Gostin, 2002; Kluge, 2003)
- VERY real, but
  - Security technologies are well-known and proven effective
  - Paper-based records are at least as insecure as EHRs and probably more so
  - Human curiosity will trump even best methods, so we need to consider benefits versus risks

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## Workforce

- Probably the most important aspect of a successful enterprise health IT implementation is people, especially “special people” (Ash, 2003)
- The job is too important to be left to pure IT professionals – clinicians must provide leadership and be actively involved
- Workforce report from AHIMA and AMIA documents need (AHIMA-AMIA, 2006)
  - Safran (2005) has advocated we need at least one physician and one nurse in each of the 6,000 US hospitals knowledgeable in informatics
  - Hersh (2008) has found we will need 40,000 more IT workers to implement IT at level of known benefit

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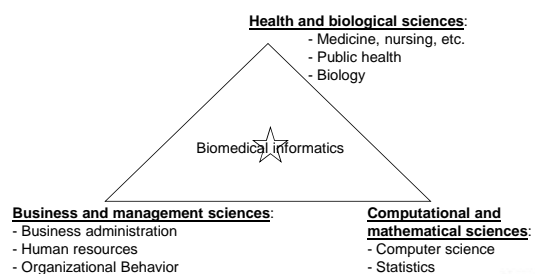
## Why do we need a competent workforce? A case study

- Han (2005) performed retrospective analysis of computerized physician order entry (CPOE) at Children’s Hospital of Pittsburgh
  - Mortality rate increased from 2.8% to 6.6%
- Increased mortality not seen at other academic centers (Del Baccaro, 2006; Jacobs, 2006)
- Implementation was flawed; adverse outcome may have been avoided with known “best practices” in informatics (Phibbs, 2005; Sittig, 2006)
  - Orders could not be entered before patient arrival
  - Non-use of order sets
  - Centralization of pharmacy
  - Inadequate wireless network

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## What competencies are needed by the informatics workforce?



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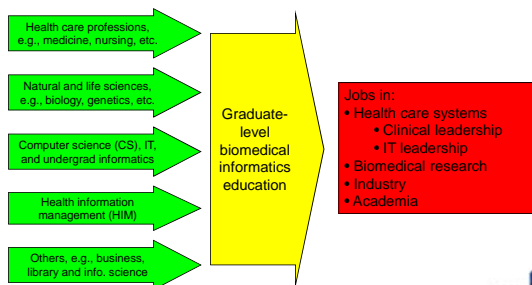
## Biomedical informatics is one of ten “ahead of the curve” careers

Careers that are “relatively new, already viable, and promise further growth...” (Nemko, 2007)



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## There are many career pathways



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## How do we develop the workforce?

- AMIA 10x10 program (Hersh, 2007)
  - Aims to train 10,000 clinicians in medical informatics by 2010 – nearly 400 trained by end of 2007
  - First offering in partnership with OHSU
  - <http://www.amia.org/10x10/>
  - Has inspired political leadership, e.g., the 10,000 Trained by 2010 Act of Congressman David Wu (D-OR)
- Other educational programs in biomedical informatics and related disciplines
  - <http://www.amia.org/informatics/acad&training/>
- Need to develop informatics discipline and profession (Hersh, 2006; Hersh, 2008)



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## Other actions to facilitate adoption

- Certification of EHRs to reduce risk of investment
  - Certification Commission for HIT (CCHIT) – [www.cchit.org](http://www.cchit.org)
- Harmonization of standards
  - Health Information Technology Standards Panel (HITSP) – <http://www.ansi.org/hitsp/>
- Quality assessment, including pay for performance (P4P)
  - Accountability in health care – public reporting and/or tying some reimbursement to quality measures
  - Only possible with use of HIT
  - Initial results mixed (Glickman, 2007; Fung, 2008)
- Other ideas discussed
  - Grants, subsidies, or low-interest loans – though need “skin in the game”

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## How to proceed? (Dust off some political slogans?)

- Think globally, act locally
  - Adhere to standards
  - Implement based on what is known to work elsewhere
  - Partner with local providers, payors, purchasers, patients, etc. to achieve consensus on value and plan
  - Build a skilled informatics workforce and then deploy it most effectively
- Maybe “it takes a village” to raise an EHR?

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