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Best Practices & Challenges  
in Developing  
National Health Information Networks

# Presentation Outline

- Healthcare service network
- Healthcare system challenges
- National Health Information Network
- Health Metrics Network
- Challenges
- Conclusion

# Healthcare Service Network



# Healthcare System Challenges

- Equity & access
- Error rates are too high
- Quality is inconsistent
- Health outcomes not significantly measured
- Costs are escalating
- New technologies
- Demand vs. supply

# HIMSS National Survey 2007

- The most important reasons for favoring the development of a nationwide health information network are as follows:
  - 25% It will improve the quality of communications between healthcare providers
  - 20% It will improve the quality of healthcare
  - 18% It will lower healthcare costs
  - 16% It will speed the transfer of information between healthcare providers
  - 13% It will reduce medical errors
  - 5% It will reduce paperwork

# HIMSS National Survey 2007

- The most important reasons for opposing the development of a nationwide health information network are as follows:
  - 43% Privacy concerns
  - 15% The security of your healthcare data
  - 14% The role of the Government in healthcare
  - 10% Concerns that healthcare information may be used against you
  - 5% Questions about who owns the information
  - 4% It will increase the cost of healthcare
  - 2% Lack of access to a computer
  - 1% The cost of establishing and operating the network

# What is NHIN ?

- Comprehensive knowledge-based network of interoperable systems
- Capable of providing information for sound decisions about health when and where needed
- Anywhere, anytime health care information and decision support
- NOT a central database of medical records
- Includes technologies, practices, relationships, laws, standards, and applications, e.g.
  - Communication networks
  - Message & content standards
  - Computer applications
  - Confidentiality protections
- Individual provider Electronic Health Record (EHR) systems are only the building blocks, not NHIN

# NHIN Model

- **Kaushal and colleagues convened an expert panel to develop a model national health information network (NHIN) that would be attainable in five years, taking into account financial, personnel, and technical constraints.**
- **The panel agreed that such a network should include electronic viewing of test results, electronic health records (EHRs), computerized physician order entry (CPOE), electronic claims submission, electronic eligibility verification, secure online patient communication, and electronic prescription acceptance by pharmacies.**
- **The network should span physician offices, hospitals, skilled nursing facilities, home health agencies, clinical laboratories, and pharmacies.**

Source : Functional Gaps in Attaining a National Health Information Network

September 14, 2005 | Volume 7 **Authors:** Rainu Kaushal, M.D., P.H., David W. Bates, M.D., M.Sc., Eric G. Poon, M.D., M.P.H. et al.

# NHIN challenges

**Governance**

**Economic**

**Consumer**

**Standards**



**Healthcare  
Provider**

**Legislation  
regulations**

**Technical**

**Information  
Management**

# Governance –National goals

- **Regenstrief Institute Selected To Help Design Nationwide Health Information Network**
  - "Trial implementations of the Nationwide Health Information Network will bring us steps closer to a health IT system that will improve quality of care, increase efficiencies in health care, and improve disease prevention," said HHS Secretary Michael Leavitt.
  - HHS is funding this work to create a secure foundation for health information exchange that can follow Americans throughout their lives, a goal set by President Bush. By 2014, the President wants the majority of Americans to have access to secure electronic health records.

October 11, 2007
- **Canada Health Infoway**
  - "Canadians want their medical information available electronically to the clinicians who care for them. And that's starting to happen in communities across Canada. Collaboration among governments is at an all-time high and with continued funding, we are well on our way to providing every Canadian with an electronic health record by 2016."
  - Richard C. Alvarez, president and CEO, Canada Health Infoway

# Governance - Implementation

- **The National Health Service's (NHS's) National Programme for Information Technology (NPfIT) in the UK with its proposed nationwide online health record service poses serious technical challenges, especially with regard to access control and patient confidentiality. The complexity of the confidentiality requirements and their constantly evolving nature (due to changes in law, guidelines and ethical consensus) make traditional technologies such as role-based access control (RBAC) unsuitable.**

**Information governance in NHS's NPfIT: A case for policy specification .**

International Journal of Medical Informatics , Volume 76 , Issue 5 - 6 Pages 432 – 437; M . Becker; 2006 Oct 27.

- **The sociocultural challenges to implementing the NPfIT are as daunting as the technical and logistical ones. Senior NHS staff feel these have been neglected..**

**Challenges to implementing the national programme for information technology (NPfIT): a qualitative study**

BMJ 2005;331:331-336 (6 August), doi:10.1136/bmj.331.7512.331

- **A recent Audit Commission study (May 2008) reported that the National Programme is running four years late and that a single NHS electronic patient records system will not be in place anywhere until 2014,**

**Public Service Review: Health Issue 16 - Tuesday, August 12, 2008**

# Standards

- **The complexity of the standard vs the burden to implement it.**
  - The complexity of the standard vs the burden to implement it. Highly complex standards like HL7 v3 can represent almost all health information however are extremely difficult to implement, Simpler standards such as HL7 v2 will take on specific aspects of the health information system but be much easier to implement
  - Localization of international standards ;LOINC a free available protocol for representing laboratory codes has a process by which country specific values can be added for free. Can it be adapted to local data needs?
- **Licensing and cost of using the standard. Is it available under an open license where anyone can use and contribute to it for free,**
  - SNOMED a standard for clinical answer codes which must be licensed for each installation, or ICD-10, a standard for diagnostic codes which can be used under national level licenses
  - Local capacity to use the standards. Is there local expertise available in the use of the standard or will investment in foreign resources be necessary? Can the standard be used to promote local capacity building in health informatics?

# Legislation & Regulations – Privacy

- **The Hippocratic Oath introduced in the 4th century BC, indicates that privacy was a concern then, and now. Physician Hippocrates stated that, "All that may come to my knowledge in the exercise of my profession or in daily commerce with men (now people), which ought not to be spread abroad, I will keep secret and will never reveal."**
- **Are You Confident That Electronic Health Records Will Remain Private?**
  - **In 2008, 62% of U.S. adults surveyed said they were not too confident or not at all confident that electronic health records would remain confidential, down from 69% in 2005, according to a survey by the Employee Benefit Research Institute and Matthew Greenwald & Associates.**
  - **The survey also found that 12% of 2008 respondents said they were extremely or very confident that EHRs would remain confidential, compared with 10% of survey respondents in 2005.**
  - **Twenty-five percent of 2008 survey respondents said they were somewhat confident that EHRs would remain confidential, compared with 20% in 2005.**
  - **The 2008 survey is based on telephone interviews of 1,000 adults age 21 and older conducted between May 24 and June 30.**
- **Source: Employee Benefit Research Institute and Matthew Greenwald & Associates, "The 2008 Health Confidence Survey"**

# Consumer – use

- The Commonwealth Fund has released the results of its 2008 Survey of Public Views of the U.S. Health Care System, conducted by Harris Interactive. According to a telephone survey of 1,004 random U.S. adults, **80 percent of respondents believe that the healthcare system needs either fundamental change or complete rebuilding.**
- Approximately one of five adults with Internet access is able to communicate electronically with their doctors (21%) or schedule appointments online (19%).
- Of those who cannot access their medical records via the Internet, nearly half (49%) would like to do so. An even greater proportion of adults would like to be able schedule appointments online (57%) or communicate electronically with their doctors (58%).

# Consumer -Market forces

- Google Health, launched in May to much fanfare, allows users to store, organize and manage their personal health records and other information online. The concept is that the approach puts individuals in charge of their own health data and allows them to access that data when they switch providers, visit an emergency room or search for relevant health information.
- In applying that model to healthcare, Google Health, along with Microsoft Corp., which offers a competing product called HealthVault, are rapidly shaping the health information sphere. HealthVault, launched in fall 2007, is a formidable competitor, with more than 100 partners, including leaders in the health information technology field such as Kaiser Permanente.

<http://www.modernhealthcare.com/apps/pbcs.dll/article?>

# Healthcare provider –EHR Adoption

- Based on current trends, secure patient communication systems will be available in 33 to 46 percent of office practices in five years.
- Computerized physician order entry is estimated to be more prevalent than electronic health records (EHRs) in the inpatient setting.
- Only 21 percent of home health agencies and 14 percent of skilled nursing facilities are expected to have an EHR system.
- More than one-half (58%) of pharmacies will be able to accept electronic prescriptions in five years, the panel estimated.

SOURCE : R.Kaushal et al; Functional gaps in attaining a National Health Information Network;

# Healthcare provider –EHR Adoption

- **HIMSS Survey 2008**
  - **Physician order entry with clinical decision support for all orders—61 percent (55 percent in 2006)**
  - **Physician orders for medications and refills only—60 percent (57 percent in 2006)**
  - **Nursing orders for medications and refills only—58 percent (53 percent in 2006)**
  - **Reference lab connectivity for orders/results—55 percent (49 percent in 2006)**
  - **Nursing order entry with clinical decision support for all orders—54 percent (49 percent in 2006)**
  - **Imaging connectivity for diagnostic studies, results and Picture Archiving and Communication System (PACS) viewing—52 percent (40 percent in 2006)**
  - **Patient self-reporting and messaging—31 percent (three percent in 2006)**
  - **Online consultations—21 percent (12 percent in 2006)**

# Healthcare provider –Quality

- Electronic health records were used in 18% of the estimated 1.8 billion ambulatory visits) in the United States in 2003 and 2004.
- For 14 of the 17 quality indicators, there was no significant difference in performance between visits with vs without EHR use.
- Categories of these indicators included medical management of common diseases, recommended antibiotic prescribing, preventive counseling, screening tests, and avoiding potentially inappropriate medication prescribing in elderly patients.
- For 2 quality indicators, visits to medical practices using EHRs had significantly better performance: avoiding benzodiazepine use for patients with depression) and avoiding routine urinalysis during general medical examinations (94% vs 91%;).
- For 1 quality indicator, visits to practices using EHRs had significantly worse quality: statin prescribing to patients with hypercholesterolemia (33% vs 47%;).
- **Conclusion** As implemented, EHRs were not associated with better quality ambulatory care.

Source : **Electronic Health Record Use and the Quality of Ambulatory Care in the United States** ; *Arch Intern Med.* 2007;167(13):1400-1405.

# Healthcare Provider Safety

- **Diverse stakeholders—clinicians, researchers, business leaders, policy makers, and the public—have good reason to believe that the effective use of electronic health care records (EHRs) is essential to meaningful advances in health care quality and patient safety. However, several reports have documented the potential of EHRs to contribute to health care system flaws and patient harm.**
- **As organizations (including small hospitals and physician practices) with limited resources for care-process transformation, human-factors engineering, software safety, and project management begin to use EHRs, the chance of EHR-associated harm may increase.**
- **The authors propose a coordinated set of steps to advance the practice and theory of safe EHR design, implementation, and continuous improvement. These include setting EHR implementation in the context of health care process improvement, building safety into the specification and design of EHRs, safety testing and reporting, and rapid communication of EHR-related safety flaws and incidents.**

# Economic

- **To achieve an NHIN would cost \$156 billion in capital investment over 5 years and \$48 billion in annual operating costs.**
- **Approximately two-thirds of the capital costs would be required for acquiring functionalities and one-third for interoperability. Ongoing costs would be more evenly divided between functionality and interoperability.**
- **If the current trajectory continues, the health care system will spend \$24 billion on functionalities over the next 5 years or about one quarter of the cost for functionalities of a model NHIN.**
- **Limitations: Because of a lack of primary data, the authors relied on expert estimates.**
- **Conclusions: While an NHIN will be expensive, \$156 billion is equivalent to 2% of annual health care spending for 5 years. Assessments such as this one may assist policymakers in determining the level of investment that the United States should make in an NHIN.**

Source :The costs of a national health information network.

Personal Authors: Kaushal, R., Blumenthal, D., Poon, E. G., Jha, A. K., Franz, C., Middleton, B., Glaser, J., Kuperman, G., Christino, M., Fernandopulle, R., Newhouse, J. P., Bates, D. W.

Annals of Internal Medicine, 2005 (Vol. 143) (No. 3) 165-173

# Information Management

- **Develop policies to evaluate and certify that appropriate security measures are in place in the business**
- **Create legal contracts between the business and any business associates given access to individually identifiable medical information requiring the business associates to safeguard the data**
- **Develop contingency plans for response to emergencies, in a data backup plan and a disaster recovery plan**
- **Establish a system of access control that includes policies for the authorization, establishment and modification of access privileges**
- **Perform ongoing internal review of data access records in order to uncover possible security violations**
- **Supervise systems personnel responsible for systems maintenance activities**
- **Train system users in system security, including user education on virus protection, monitoring login failures, password management, and how to report discrepancies or suspicious activities**
- **Establish termination procedures for when an employee leaves the business (voluntarily or involuntarily) or whose data access privileges are revoked**

# Technical

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"I almost qualified."



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# NHIN challenges in summary ..

- The diversity of stakeholders
- Contradictory viewpoints
- A wide assortment of hardware and software
- A variety of organizational structures
- A diversity of data standards
- A range of communication models
- A wealth of policies and procedures
- Multiple business practices
- privacy and security policies and procedures in information-sharing systems
- Management of the enterprise wide information network
- Economic climate ; costs for deployment, operations and maintenance ; R&D



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