The purpose of the health care system must be
- to continuously reduce the impact & burden
  - of illness, injury & disability
- and to improve the health and function of the people of the United States
Information Management
Problems

- Information overload
- Delay in relay of information
- Necessary information not available
- Available information not accessible
- Accessible information not usefully organized
Clinical Informatics Capabilities

- Increase consistency
- Reduce redundancy
- Automate surveillance
- Facilitate education & awareness
- Enhance collaboration
Information & Evolution of Informatics in Health
Information Society

• Evolution
  – From Agricultural focus
    • to industrial production of goods
  – From Industrial society
    • to mass production of information
  – From Information society
    • to integrated communication of information
  – From a Communication society
    • to use of information for knowledge-based discovery & decision making
  – Knowledge society
Information Society

• Consequences
  – Explosions of information
    • Challenge is selection - not supply
  – Source of power is “know how”
    • Knowledge based worker
    • Most jobs require working with information
  – Increased pace of change
    • Collapse of information float
    • Information spends less time in the channel between sender & receiver
  – Increased need for technology
    • Brings order to the chaos of information pollution
Information Explosion

• Impact on Society
  – Increased electronic communication and interaction
  – Transformation of work environments.
  – New options for education, commerce, play & healthcare
  – Continued search for physical contact & relationships
Information Explosion

• Impact on Healthcare
  – Healthcare delivery requires information about
    • Science of care
      – >30K references added each month to MEDLINE database
      – Need access and IT skills to search databases
    • Patient
      – Electronic records for cradle to grave data
      – Access across encounters anytime / anyplace
    • Provider
      – Access to experts virtually
      – Credentialing & performance monitoring
    • Outcome
      – On line access to guidelines
    • Process & system of care delivery
      – Virtual home visits
Information Explosion

• Impact on Patient / Consumer Health
  – Active informed participant
  – Increased use of IT
    • Email providers
    • Access medical records
    • Create personal health records
    • Search internet for health information
    • Access on line patient education
    • Engage in virtual support groups
Information Explosion

• Impact on Patient / Consumer Health

  – Expect providers
    • to translate information
    • to evaluate and advise on information resources
    • to be skilled in using information technology
Structure of Information

• **Data**
  – syntactic
  – uninterpreted elements, raw material
  – no context
  – examples: 180, temperature 104F

• **Information**
  – semantic
  – collection of data, organized, processed & displayed into a structure with interpretation
  – examples: 180/120, patient has a fever & hypertension

• **Knowledge**
  – Pragmatic
  – Synthesized information with formalized relation between data and information.
  – Used in decision making
  – Examples: treat with antipyretic & antihypertensive drug
Structure of Information

Data → Information → Knowledge
Informatics

• Integration of
  – computer science
  – cognitive science
  – information science
  – healthcare science
    • Nursing Informatics - nursing science
    • Medical Informatics – medical science
Informatics

- Identify, collect, process & manage
- Data - Information - Knowledge
  - Symbolic representation of a disciple
- Methods & technology of information handling
- Not the content or context of information
Evolution of Informatics

• 1980s  Automation
• 1990s  Info-mation
• 2000   Communication & Integration
• 2010  Knowledge Creation
Evolution of Informatics

- data cemetery → knowledge repository
- data entry → data extraction
- documentation → decision support
- text → vocabularies/taxonomies
Evolution of Informatics

- information silos → integrated networks
- technology for convenience → safety & outcomes
- disciplinary → interdisciplinary
- provider resource → consumer resource
Informatics Challenge

• Information is power
  – Healthcare information has the power to promote health and wellness.
  – All providers are affected in all aspect of care by processing healthcare information

• Competent providers exploit the technology
  – Ignorant providers become its victims
Informatics Challenge

• Balance use of technology with faith in human judgment
  – Wisdom & insight
    • come from quiet reflection
  – Morality, integrity, compassion & caring
    • Come from the spirit of our humanity
National Directions in Health Informatics
Surgeon General ‘s Priorities for Health

• Prevention
• Public Health Preparedness
• Eliminating Health Disparities

(Health Literacy as the currency for the priorities)
Public Health Challenges  21st Century
IOM Report, 2003  *Who Will Keep the Public Healthy*

- **Globalization**
  - Increase trade, travel, economic growth
  - Diffusion of technology

- **Advances in Science & Technology**
  - Increased communication & distribution of health information
  - Concerns over misinformation & privacy & security

- **Demographic Transformations**
  - Aging population with chronic conditions
  - Increased racial and ethnic diversity
President’s Vision: Harness HIT to Transform US Healthcare

- Office of the National Coordinator for Health Information Technology (ONC)
- Established in response to Executive Order 13335, April 27, 2004
- Widespread adoption of interoperable Electronic Health Records within 10 years
Decade of Health Information Technology: Office of the National Coordinator (ONC)

- **Goals**
  - Inform Clinical Practice
    - Encourage EHR adoption and diffusion
  - Interconnect Clinicians
    - Consumers move seamlessly across POC & providers
    - National health information network
  - Personalize Care
    - Informed choice
    - Personal health records & tele-health
  - Improve Population Health
    - Timely reporting
National Directions in Health Information Technology

- **Technology Industry**
  - HIT Adoption Initiative
  - Standards Harmonization
  - Compliance certification for Electronic Health Records
  - National Health Information Infrastructure
  - Privacy & Security Solutions
National Directions in Health Information Technology

• **Health Care Industry**
  – American Health Information Community
  – Breakthroughs
    • Bio surveillance
    • Consumer Empowerment
    • Chronic Care
    • Electronic Health Record
Health Information Technology Deployment Coordination

Health Care Industry

Breakthroughs

Biosurveillance
Consumer Empowerment
Chronic Care
Electronic Health Records

Coordination of Policies, Resources, and Priorities
Office of the National Coordinator - Health IT Policy Council
- Federal Health Arch.
The Community - Workgroups

Standards Harmonization
Compliance Certification
NHIN
Privacy / Security
Health IT Adoption

Technology Industry
Infrastructure

Industry Transformation

Consumer Value
Quality Health Care Service

IOM Report

- Safety
- Effectiveness
- Patient / family-centeredness
- Timeliness
- Efficiency
- Equity
- No death
- No pain
- No helplessness
- No wait
- No waste
- For anyone
IOM Report: *To Error is Human*

- “It may be part of human nature to error, but it is also part of human nature to create solutions, find better alternatives and meet the challenges ahead.”

1999 IOM