Anticipating and Addressing Unintended Consequences of Health Information Technology (HIT) and Policy

September 9-10, 2009

Reston VA
Welcome and Opening Remarks

- David W. Bates, MD, MSc
  Chair, AMIA Board of Directors
- Edward H. Shortliffe, MD, PhD
  AMIA CEO and President
American Medical Informatics Association

The professional home of biomedical and health informatics
AMIA’s Domains

- Applied clinical informatics (including health care and personal health management)
- Clinical research informatics (including clinical trials, clinical research and those methods used in translational bioinformatics)
- Public health/population informatics
- Translational bioinformatics (the research itself)
President Obama’s First Weekly Address
Saturday, January 24th, 2009

“To lower health care cost, cut medical errors, and improve care, we’ll computerize the nation’s health records in five years, saving billions of dollars in health care costs and countless lives.”
Stimulus Package—HITECH

• Includes ~$36 billion in spending on Medicare and Medicaid incentives for the “meaningful use” of certified EHRs

• Office of the National Coordinator (ONC) for HIT gets more status and budget ($2 billion)

• $1.1 billion to study comparative effectiveness
AMIA’s Previous Health Policy Meetings

- **Toward a National Framework for the Secondary Use of Health Data**

- **Advancing the Framework: Use of Health Data - A report of a working conference of the American Medical Informatics Association**

- **A Strategy and Framework for the Future Evidence Continuum**
  (publication pending)
2009 AMIA Health Policy Meeting
Steering Committee

- Joan Ash (OHSU)
- David Bates (AMIA BOD Chair; Partners)
- Meryl Bloomrosen (AMIA)
- Trevor Cohen (UT)
- Richard Dykstra (OHSU)
- Nancy Lorenzi (Vanderbilt), co-chair
- Julie McGowan (Indiana)
- Vimla Patel (ASU)
- Josh Peterson (Vanderbilt)
- Vojtech Huser (Marshfield Clinic)
- Adam Wright (Brigham and Women’s)
- David Pieczkiewicz (Marshfield Clinic)
- Trent Rosenbloom (Vanderbilt)
- Justin Starren (Marshfield Clinic), co-chair
- Ted Shortliffe (AMIA President and CEO)
- Freda Temple (AMIA)
AMIA Wishes to Recognize and Thank Our Generous Sponsors and Supporters
Government Leadership Present

- AHRQ
- CDC
- CMS
- DoD
- HRSA
- IHS
- NCRR
- NHLBI
- NIH
- NLM
- NRC
- ONC
- VHA
Framing the 2009 Meeting

• Nancy M. Lorenzi, PhD, MS, MA
  - Steering Committee Co-chair
  - Professor of Biomedical Informatics, Vanderbilt University School of Medicine and Clinical Professor of Nursing at the Vanderbilt University School of Nursing

• Justin Starren, MD, PhD, FACMI
  - Steering Committee Co-chair
  - Director, Biomedical Informatics Research Center, Marshfield Clinic Research Foundation
UNINTENDED CONSEQUENCES

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Meeting Goals and Objectives

- Explore and outline approaches to anticipating, recognizing/identifying, and addressing potential unintended consequences of HIT.
- Explore and outline potential unintended consequences of HIT policy and legislative efforts (including payment mechanisms).
- Identify potential future issues we might face especially those due to the convergence of HIT, clinical technologies and devices and communications capabilities.
- Identify areas for further study or research.
- Help develop materials that synthesize the conference outcomes to inform policymakers about the issues related to unintended consequences of HIT design, development, implementation, adoption and use.
Anticipated Outcomes / Work Products

- A summary report with recommendations
- A proposed taxonomy of unintended consequences
- A proposed model/schema depicting unintended consequences
- A short range action/research plan (2-3 years) that could be pursued by the participants and other stakeholders in order to address the issues.
- One or more manuscripts for submission to JAMIA and/or elsewhere
- Publication(s) to help inform the growing number of HIT users
  - Translation of selected informatics research into lay language
    - A Roadmap to Successful HIT Design, Development and Implementation
    - Best Practices for HIT Design, Development and Implementation
  - Case Studies
The Concept of Unintended Consequences

• Merton’s “Unanticipated Consequences of Purposive Social Action“

• Five possible causes of unanticipated consequences:
  - *Ignorance* (It is impossible to anticipate everything, thereby leading to incomplete analysis)
  - *Error* (Incorrect analysis of the problem or following habits that worked in the past but may not apply to the current situation)
  - *Immediate interest*, which may override long-term interests
  - *Basic values* may require or prohibit certain actions even if the long-term result might be unfavorable (these long-term consequences may eventually cause changes in basic values)
  - *Self-defeating prophecy* (Fear of some consequence drives people to find solutions before the problem occurs, thus the non-occurrence of the problem is unanticipated)


Growing Interest in Unintended Consequences

Articles Indexed in PubMed

keywords: 'unintended consequence(s)' OR 'unanticipated consequence(s)'

as of September 4, 2009
The best laid schemes o' Mice an' Men,
Gang aft agley,

- Robert Burns, *To a Mouse*, 1785
“[Everyone is] led by an invisible hand to promote an end which was no part of his intention.”

-Adam Smith, *Wealth of Nations*, 1776
“Quite often, good things have hurtful consequences”

- Aristotle, 384-322 B.C.
Working Definition

• Unintended Consequences (UC) are outcomes of actions that are not originally intended in a particular situation. In a clinical domain, they can often be equated with side-effects or adverse events.
Describing Consequences

• Unintended Consequences are difficult to categorize
• Often the result of an unseen or poorly understood complex system
Describing Consequences

- Desirability
- Anticipatability
- Direct vs. Indirect
- Type of input
- Type of consequence
- Stakeholders affected
- Magnitude of impact
Desirability

- Is the outcome positive, negative or mixed (good for some, bad for others)
Anticipatability

• Can such events be anticipated?
Direct vs. Indirect

- Does the input cause the consequence directly or is there a chain of events?
Describing Consequences

Bringing it Together

Consequences of:

- Anticipated
  - Direct
  - Indirect
- Unanticipated
  - Direct
  - Indirect

Desirable

- Goals

Undesirable

- Trade-offs
- “Classic” Negative Unintended Consequences

Intended Consequences

Unintended Consequences
Describing Consequences

Consequences of: CPOE

Anticipated
- Direct
  - More Accurate Prescribing
- Indirect
  - Improved JCAHO Compliance

Unanticipated
- Direct
  - Use error checker as recommender system
  - Alerts become learning tool
- Indirect
  - Change in Organizational Power Structure
  - New Types of Errors
  - Alert fatigue

Desirable

Undesirable
- Ordering takes more time
- Some Physicians Leave

Intended Consequences

Unintended Consequences
Describing Consequences

Input

• What factors start the chain of events?

- Technology
- Human and Cognitive
- Organizational
- Fiscal
- Policy and Regulation

Something happens
Describing Consequences

Type of Consequence

• What kind of consequence?

![Diagram showing types of consequences: Cognitive, Care Process, Organizational, Social / Legal, Fiscal, Technology.]

Something happens
Describing Consequences

Stakeholders

• Who is affected

Something happens

- Patient
- Provider
- Organization
- Vendor
- Payor
- Government
Describing Consequences

Magnitude

• How large is the effect?
• Probably the most common error.
Describing Consequences

Magnitude
Describing Consequences

**INPUTS**
- Technology
- Human and Cognitive
- Organizational
- Fiscal
- Policy and Regulation

**HIT**

**CONSEQUENCES**
- Type of Consequence
  - Care Process
  - Cognitive
  - Organizational
  - Social / Legal
  - Fiscal
  - Technology
- Stakeholder (Those Affected)
  - Patient
  - Provider
  - Organization
  - Vendor
  - Payer
  - Government

**AMIA**
Overarching Questions

• What do we know about unintended consequences relative to HIT design, development, implementation, adoption and use?
• What do we still need to learn?
• To what extent are unintended consequences generalizeable across practice types or settings?
• What about adverse consequences (such as medical errors? errors that cause/result in patient harm?)
• To what extent do stakeholders’ needs/wants/viewpoints factor into these discussions?
More Overarching Questions

Anticipating
• To what extent can we anticipate unintended consequences?
• Who is responsible for anticipating unintended consequences?
• To what extent can we identify, describe, and categorize unintended consequences?
• To what extent are unintended consequences undesirable? desirable?
• To what extent are there benefits or efficiencies of unintended consequences?
• To what extent can we prevent unintended consequences?

Addressing
• What are possible approaches to mitigate/leverage unintended consequences
• What are potential approaches to track, detect, study, and measure unintended consequences?
• What can we learn from other industries/times?
Meeting Agenda

• Day One
  - Setting the Stage
  - Small Group Discussions: Anticipating and Addressing UCs

• Day Two
  - Large Group Discussions
  - Recommendations, Action Plans and Next Steps

• Plenary Session Speakers
  - David Blumenthal, ONC
  - Aneesh Chopra, EOP
  - Rodeina Davis, Blood Center of Wisconsin
  - Nancy Leveson, MIT
Meeting Format

- Interactive & Open Discussions
- General & Plenary Sessions
- Facilitated Small Group Breakouts
  - Select topics (s) beyond your traditional “comfort zone”
  - Encourage high degree of participant interactivity
  - AMIA Steering Committee members as recorder/reporter to keep notes of discussions and ideas
  - Leave about 15 minutes at the end to allow the recorder to organize his/her thoughts
  - Report outs to the larger group
Small Group Breakouts

• **Technological**: Software Engineering and HIT Design and Implementation

• **Cognitive**: Human and Cognitive Factors

• **Organizational**: Organizational Readiness, People and Processes Related to Adoption and Use of HIT

• **Financial**: Financing of and Incentives for Implementing, Adopting and Using HIT

• **Regulatory**: Federal Regulation versus Voluntary Compliance (CMS, CCHIT, JCAHO, FDA)
AMIA’s Vision: *Home for AMIAblesbl Informaticians*

- Through informatics, transform health & health care for individuals & populations
  - *Care that is Equitable, Efficient, Effective, Patient-centered, Timely, Safe*

- Transform informatics from a serious avocation to a formally recognized health profession
Upcoming AMIA Meetings

AMIA CMIO Bootcamp
Scottsdale, AZ
October 7-10, 2009

AMIA 2009 Annual Symposium
San Francisco, CA
November 14-18, 2009

3rd Annual Summit on Translational Bioinformatics
San Francisco, CA
March 10-12, 2010

1st Annual Summit on Clinical Research Informatics
San Francisco, CA
March 12-13, 2010

AMIA Spring Congress
Phoenix, AZ
May 25-27, 2010
AMIA 10x10 Program
Partners and Academic Forum Members

Map Key
- Forthcoming 10x10 course
- 10x10 Partner Institution
- Academic Forum Member
Thank YOU!

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