

Computerized Physician Order Entry: A Patient Safety Tool

Masspro
July 19, 2007



Objectives

- Talk about the National Health Information Infrastructure initiative
- Briefly speak on the current state of healthcare delivery in the US today with respect to fragmentation
- Review the federal government's stake and role in the push for health information technology
- Discuss computerized physician order entry and its role in patient safety



Resources

- Agency for Healthcare Research and Quality (AHRQ)
- AHRQ's National Resource Center for Health Information Technology
- Centers for Medicare & Medicaid Services
- Dartmouth Atlas Project
- Hospital Interventions QIO Support Center
- MedQIC
- National Committee on Vital and Health Statistics
- Oklahoma Foundation for Medical Quality
- Qualis Health
- US Department of Health and Human Services



References

1. Birkmeyer JD, Dimick JB. Leapfrog safety standards: potential benefits of universal adoption. The Leapfrog Group,. Washington, DC 2004
2. Bates DW, Leape, LL, Cullen DJ, Laird N, et al. Effect of computerized physician order entry and a team intervention on prevention of serious medication errors. *JAMA* 1998;280:1311-1316 and Bates DW, Spell N, Cullen DJ, et al. The Costs of Adverse Drug Events in Hospitalized Patients. *JAMA*; 1997;227(4):307-311
3. Bates DW, Teich JM Lee J., Seger D, Kuperman GJ, Ma'Luf N, Boyle D, Leape L. The impact of computerized physician order entry on medication errors.
4. Leap,LL Bates, DW et al. Systems analysis of adverse drug events. *JAMA* 1995;274:35-43
5. Kelly, WN. Potential risks and prevention, Part 2: Drug Induced Permanent Disabilities. *American Journal of Health System Pharmacies* 2001; 58:1325-1329
6. Kuperman GJ, Gibson RF. Computer Physician Order Entry: Benefits, Costs, and Issues. *Ann Intern Med* 2003;139:31-39



National Health Information Infrastructure

The National Health Information Infrastructure (NHII):

- An initiative to improve the effectiveness, efficiency, and overall quality of health and healthcare in the US
- Envisions a comprehensive network of interoperable systems of clinical, public health, and personal health information that would improve decision making by making health information available when and where it is needed
- Includes technologies, standards, applications, systems, values, and laws



National Health Information Infrastructure

The National Health Information Infrastructure (NHII):

- Improve patient safety (e.g., alert for drug allergies)
- Improve healthcare quality (e.g., availability of complete medical information at the point of care)
- Improve public health (e.g., early detection of infectious disease outbreaks across the country)
- Better inform and empower healthcare consumers regarding their own personal health information
- Better understand healthcare costs



National Health Information Infrastructure

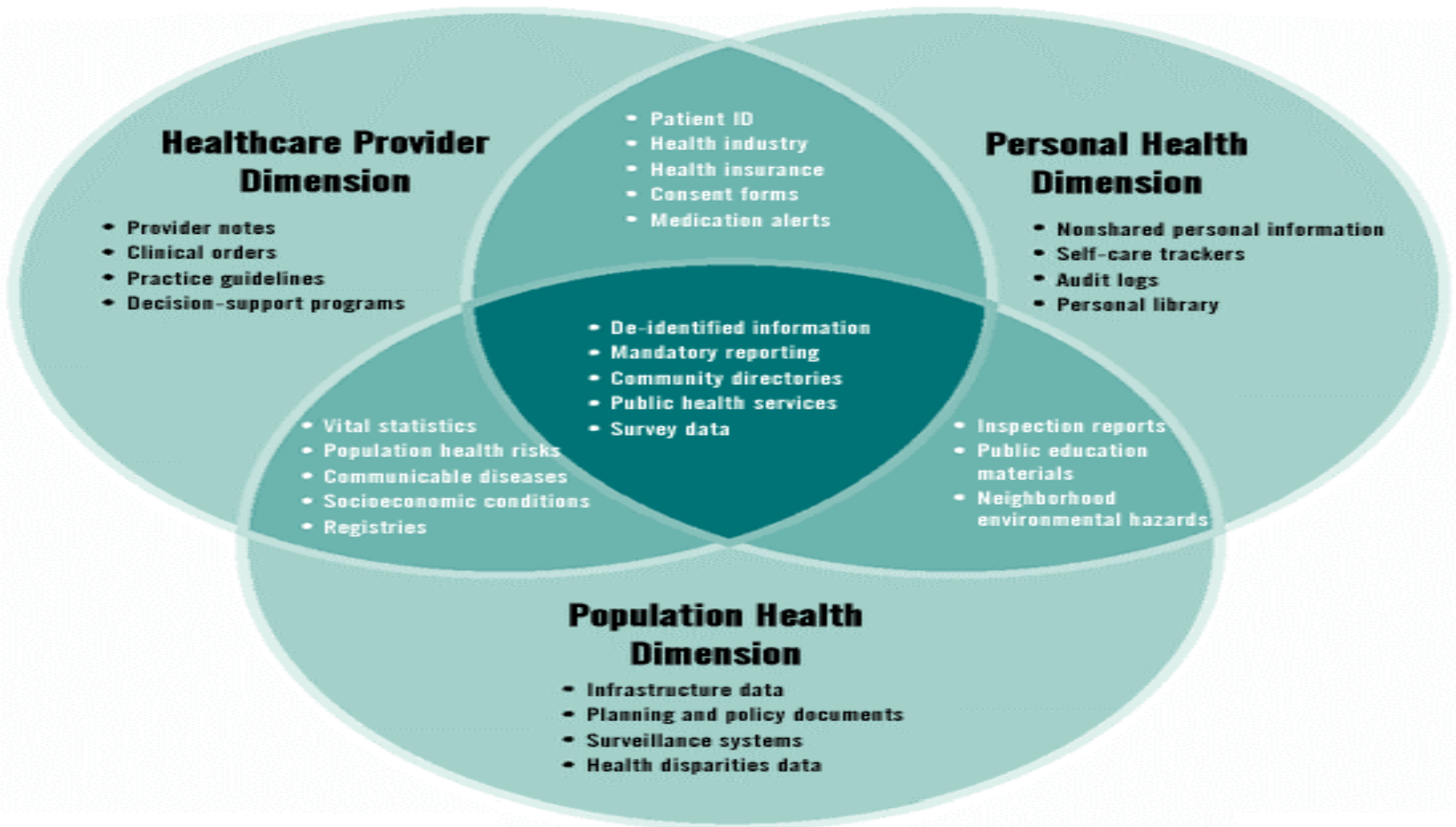
The National Health Information Infrastructure (NHII):

- Personal health – Includes a personal health record that is created and controlled by the individual or family
- Health care delivery – Includes information such as provider notes, clinical orders, decision-support programs, digital-prescribing programs, and practice guidelines
- Public health – Enables sharing of information to improve the clinical management of populations of patients, such as vital statistics, population health risks, and public registries



National Health Information Infrastructure

Examples of content for the three dimensions and their overlap



Current State

Healthcare delivery is fragmented:

- ◆ Multiple providers and services
 - › More than 360,000 care delivery sites in the US
 - › Increased provider specialization
- ◆ Data is stored in many ways and many locations
 - › On paper
 - › Within computerized systems protected by firewalls
- ◆ What is communicated is often incomplete, inaccurate, or unclear
 - › Poor documentation/out of date/illegible



Current Outcomes

Fragmentation leads to miscommunications and errors:

- ◆ Sub-optimal patient safety
 - › More than 1 million serious medication errors occur every year in hospitals in the United States ¹
 - › 20% are life threatening; many are preventable ^{2,3}
- ◆ Increased utilization and cost of care
 - › Duplicate testing
- ◆ Inappropriate or unnecessary care
 - › Overuse and under use
 - › 30% of children receive excessive abx for otitis/
50% of elderly patients don't get a pneumovax



US Government as a Stakeholder

Together, the following agencies cover 25% of all Americans with health insurance and spend 40% of US health care dollars

- ◆ Department of Health and Human Services
(Medicare, Medicaid, and SCHIP)
- ◆ Department of Defense
- ◆ Veterans Affairs Department
- ◆ Indian Health Service
- ◆ Federal Employees Health Benefit Program



CMS Response

8th Statement of Work (SOW)

- Measure and report performance
- Improve clinical performance
- Redesign care processes
- Adopt health information technology and use it effectively
- Transform organizational culture



CMS Response

Health information technology (HIT) is a complex set of technologies, policies, standards and user sets used to improve healthcare. HIT allows comprehensive management of medical information and its secure exchange between healthcare consumers and providers

- ◆ Telehealth
- ◆ Barcode-enabled point-of-care (BPOC)
- ◆ Computerized physician order entry (CPOE)



CMS Response

Telehealth is the use of electronic information and telecommunications technologies to provide long-distance clinical healthcare and patient and professional health-related education

- ◆ Teleradiology
- ◆ Telepathology
- ◆ Remote diagnostics
- ◆ Video conferencing



CMS Response

Bar code enabled point-of-care is the use of technology to prevent errors related to human factors:

- ◆ Verifies the dispensing authority of the caregiver and the patient's identity
- ◆ Matches the patient with his/her medication profile in the pharmacy information system
- ◆ Checks the rules engine for any alerts or reminders
- ◆ Electronically records the action (eMAR)
- ◆ Stores data for later aggregate analysis



CMS Response

Computerized physician order entry is a computer application that supports the electronic entry by physicians of patient orders for diagnostic and treatment services such as medications, laboratory, and other tests.

- ◆ Compares new orders against standards for dosing
- ◆ Checks for allergies or interactions with other drugs
- ◆ Flags potential problems:
 - › Contraindicated medications or routes
 - › Duplicate orders



Computerized Physician Order Entry

Additional functionality:

- ◆ Clinical decision support
 - › Research results and evidence-based guidelines
 - › Clinical knowledge – differential diagnoses, etc...
- ◆ Documentation
 - › Macros/templates for rapid documentation
 - › Automatic clinical pathways
- ◆ Communications
 - › Communicates with remote sites
- ◆ Prevention and patient education
 - › Preventive services order sets
 - › Patient handouts and pamphlets

Computerized Physician Order Entry

Patient safety:

- ◆ Potential to reduce medication errors
 - › Largest single cause of medical errors in hospitals ⁴
 - › In a meta-analysis of adverse drug events, 84% were classified as preventable (higher than usual drug dosage) ⁵
- ◆ Shown to reduce costs through avoided adverse events, reduced utilization, and shorter LOS
- ◆ Reduces variation in care by encouraging recommended care practices
 - › Incorporates order sets/EBM/best practices

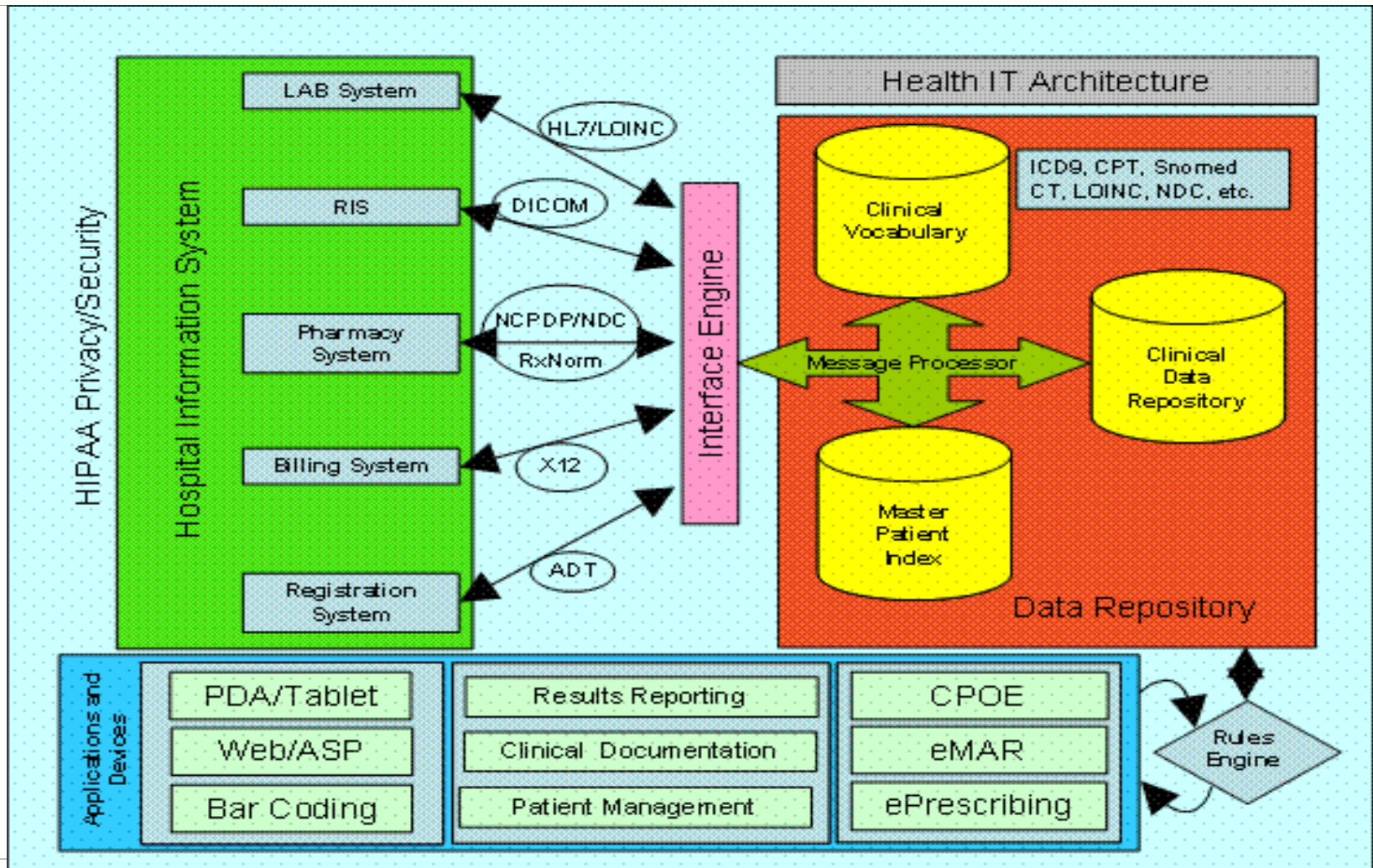
Health Information Technology

Framework for Health Information Technology (HIT)

- ◆ Application level
 - › Orders and rules
- ◆ Communication level
 - › Messaging and coding standards
- ◆ Process level
 - › Health information exchange
- ◆ Device level
 - › User interface with system/hardware



Health Information Technology



Computerized Physician Order Entry

From a Hospital's Perspective

- ◆ Positives
 - › Safer patient environment
 - › Reduces risk
 - › Improves reliability
 - › Increases efficiency
- ◆ Negatives
 - › Initial capital costs
 - › Requires cultural change
 - › Time requirements
 - › Opportunity costs



Computerized Physician Order Entry

From a Physician's Perspective

- ◆ Positives
 - › Risk reduction
 - › Decision support
 - › Care management support
 - › Fewer calls for clarification
- ◆ Negatives
 - › Something new to learn
 - › Slower (at first)
 - › Requires practice to change



Computerized Physician Order Entry

Stages of CPOE Adoption

- Assessment
- Planning
- Selection
- Implementation
- Evaluation



Computerized Physician Order Entry

Toolkits Available on MedQIC

- Implementing CPOE Technology
- CPOE Quick Reference Guide
- CPOE Readiness Assessment
- The Business Case for CPOE
- CPOE Vendor Information



Computerized Physician Order Entry

- Top priority for the hospital with a patient safety focus
- Physicians “own it”, not Information Services
- Recognized as 90% work process change, 10% software
- Multidisciplinary teams involved in process
- Use is preferred, encouraged, monitored, mentored, but not initially mandated
- Strong physician leadership involvement
- Careful analysis of how current processes work and how they will change



Computerized Physician Order Entry

- Inclusion of updated physician order sets for complex conditions and specialty care, and alerts and reminders to prevent ordering errors
- Thorough training for medical and hospital staff
- Integrated system rollout
- Easy entry and access to the program
 - ◆ Including off-site physician access and compatibility with office systems and PDAs
- Help Desk available 24/7
- Establish metric for evidence of improvement



Computerized Physician Order Entry

- Installation is hard and mainly technical
- Implementation is really hard and mostly organizational
- Transformation (lasting change) is incredibly hard and purely human



Contact Information

Masspro Hospital Team

Ed Donahue

781-419-2799

edonahue@maqio.sdps

Jim Liljestrاند

781-419-2785

jliljestrاند@maqio.sdps.org

Beth McConville

781-419-2887

emcconville@maqio.sdps.org

