A CPOE Primer for Hospital Executives

Dan Morgenstern, MD, MBA
Principal
Computer Sciences Corporation
Agenda

Introduction

What is CPOE?
How Does CPOE Work?
Physician Orders in CPOE
What Physician Work does a CPOE Project Entail?
Benefits of CPOE
Success Factors for CPOE
Comments and Discussion
Who am I?

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Simple Country Doctor

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Who am I?

- **Dan Morgenstern, MD, MBA**
  - MD, Albert Einstein College of Medicine
  - 25 years of practice:
    - Private solo as well as group
    - Academic – US, Israel
    - Cardiac, thoracic, vascular, trauma and general surgery, wound care
  - “Recipient” of a failed Hospital Clinical Information System Installation - *twice*
  - MBA, Auburn University-Montgomery AI
    - Major course of study: Information Systems
  - Left practice in 2003 – result of the malpractice crisis
  - Health Care Consulting since September, 2003
    - Clinical Transformation
    - Workflow Process Analysis and Redesign
    - Clinical Master Plan Development
    - Medical and Clinical Staff Education
    - Clinical Issues Resolution, Implementation Support (go-live)
    - Vendor Selection Assistance
    - Clinical Content Development
    - Physician/Clinician Adoption
Who are you?

- Name
- Institution
- Role in your institution’s CPOE project
- Your goals for this session
- Do you know who your physician champion is?
- Do they know of their status as champion?
- What resources do they have – and do you think those resources are adequate?
Where are you vis a vis others?

**EMR Adoption Model**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Cumulative Capabilities</th>
<th>2007 Final</th>
<th>2008 Final</th>
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</thead>
<tbody>
<tr>
<td>Stage 7</td>
<td>Medical record fully electronic; HCO able to contribute CCD as byproduct of EMR; Data warehousing in use</td>
<td>0.0%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Stage 6</td>
<td>Physician documentation (structured templates), full CDSS (variance &amp; compliance), full R-PACS</td>
<td>0.3%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Stage 5</td>
<td>Closed loop medication administration</td>
<td>1.9%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Stage 4</td>
<td>CPOE, CDSS (clinical protocols)</td>
<td>2.2%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology</td>
<td>25.1%</td>
<td>35.7%</td>
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<tr>
<td>Stage 2</td>
<td>Clinical Data Repository, Controlled Medical Vocabulary, Clinical Decision Support, may have Document Imaging</td>
<td>37.2%</td>
<td>31.4%</td>
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<tr>
<td>Stage 1</td>
<td>Ancillaries – Lab, Rad, Pharmacy – All Installed</td>
<td>14.0%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Stage 0</td>
<td>All Three Ancillaries Not Installed</td>
<td>19.3%</td>
<td>15.6%</td>
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<tr>
<td></td>
<td><strong>Total Hospitals</strong></td>
<td>n = 5073</td>
<td>n = 5166</td>
</tr>
</tbody>
</table>

http://www.himssanalytics.org/stagesGraph.html
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What is CPOE?

- Computer-based Provider Order Entry - CPOE - is the portion of a clinical information system that enables a patient’s care provider to enter an order for a medication, clinical laboratory or radiology test, or procedure directly into the computer.

- The system then transmits the order to the appropriate department, or individuals, so it can be carried out.

- The most advanced implementations of such systems also provide real-time clinical decision support such as dosage and alternative medication suggestions, duplicate therapy warnings, and drug-drug and drug-allergy interaction checking


What is CPOE?

- A more detailed examination of the definition – and its consequences
  - “The portion of a clinical information system” (CIS)
    - Is only part of the overall CIS
      » Does not include physician documentation – or nursing documentation
    - Does not in and of itself
      » Centralize needed care information for physicians
      » Improve upon the fragmented data environment in which clinical care is delivered
  - Is not the solution to all that ails your institution and its medical staff – and should not be “sold” in such a manner
What is CPOE?

• A more detailed examination of the definition – and its consequences
  – “That enables a patient’s care provider to enter an order for a medication, clinical laboratory or radiology test, or procedure directly into the computer”

• The Good News:
  – “Transcribing” of MD orders by nurses, clerks, unit secretaries ends
  – Errors of handwriting, dosage, drug name, administration route virtually disappear

• The Bad News:
  – Physicians enter most - but not all – the orders
  – All the necessary information for a complete order is entered by the physician

• This is News?
  – Financial consequences of lost charges are erased
What is CPOE?

- A more detailed examination of the definition – and its consequences
  - “The system then transmits the order to the appropriate department, or individuals, so it can be carried out”

- More Good News:
  - Direct and instantaneous transmission to the correct place, without intermediary of fax, runner, “carbon copy,” phone call, paging, etc.
  - Automatic and relentless “audit trail” which precludes
    » Lost orders
    » “I wasn’t aware”
    » “The fax never came through”
    » Questions of delay and time
  - Automatic notification of all who need to know about an order
What is CPOE?

• Note the final tally of news from a doctor’s perspective:
  – They don’t bother me with phone calls, pages etc.
  – The orders are no longer lost
    • Others are finally doing their job
  – More work for me
    • I enter almost all the orders
    • I enter all the information
    • It takes more of my time
  – More work for me as a physician in exchange for
    • Not being bothered
    • Others doing what they were supposed to in the first place
What is CPOE?

- The final tally of news from a doctor’s perspective

- Hardly an easy sell…
• CPOE Implementations represent a sea-change for the institutions that undertake them
  – Traditional order writing
    • Distribution of responsibility and “turf” (physician, nurse, clerk, etc.)
    • Profusion of forms and formats (medications, labs, radiological exams and others)
    • Diffuse data-input structure (progress notes, problem list, medication list, lab results, x-rays, all manner of ****grams, etc.)
  » All potentially housed in different venues and formats
What is CPOE?

• CPOE Implementations represent a sea-change for the institutions that undertake them
  – Migration from paper-driven, data source-fragmented and “task-diffuse” environment to an electronic, information-centralized, and task-focused one
  • Affects all patient-care processes — no matter how indirect or supportive
  • Edifice of clinical workflow, built over practitioners’ years and even decades of experience and training, is significantly changed
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Success Factors for CPOE

Comments and Discussion
How Does CPOE Work?

- CPOE Harnesses the Power of the Enterprise Computer Database to
  - Present all relevant information (re patient and institution) to the ordering physician — *if all the appropriate applications have already been implemented*
    - Lab
    - Pharmacy
    - Radiology
  - Facilitate the entry of all information relevant to the order at the point and time of order
    - Dose, route, schedule, type, time, priority, justification, etc.
  - Notify all relevant users of the order
    - Pharmacy, lab, radiology, nursing, dietary, etc.
How Does CPOE Work?

• CPOE Harnesses the Power of the Enterprise Computer Database to
  – Offer real time, instantaneous error checking through Clinical Decision Support
    • Lab/drug interaction, drug allergy interaction, drug contraindication, dosage calculations, protocols, etc.
  – Modify all database entries affected by the order
    • Pharmacy, global inventory, PIXIS, billing, coding, admissions, other nursing units, lab, radiology, etc.

• Note that CPOE touches every department, service, office and individual involved in any aspect of patient care or its support
  – That means that every process in your hospital is affected
    • Some changed – minimally or drastically
    • Some eliminated
    • All need to be thoroughly understood and mapped
How Does CPOE Work?

Health Management Technology; February 2003; p.24
Features of CPOE

• Incorporates
  – Safety alerts (allergies/drug-drug interactions)
  – *Real-time* clinical decision support
    • Error checking
    • Latest clinical information availability
  – Formulary compliance
  – Weight-based dosing calculations

• Requires order sets for standardization and ease of use
  – Easier said than done

• Requires standardization of vocabulary
  – Easier said than done
Features of CPOE

- Is - or needs to be - customizable by physician (subject to local policy decisions)
- Captures charges at point of ordering
- Bypasses nurse or clerk ordering
- Eliminates nurse and pharmacy calls to physicians
- Has the potential to leave nurses “out of the loop”

Requires workflow redesign in all clinical and business areas
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What Really Constitutes an Order?

- **Example: Chest X-Ray (hypothetical paper system)**
  - Physician input:
    - CXR written on order sheet
    - May specify portable versus departmental.
  - Nurse input:
    - Positional mode (supine, upright, etc.)
    - Transport mode (stretcher, chair)
    - Monitor mode (yes or no)
    - Oxygen therapy mode (yes, no, mask, prongs etc.)
    - Diagnostic information (what is this for?)
  - Unit Secretary input:
    - Enter order into computer
    - Coordinate scheduling (other lab, imaging tests)
• In the totality of time and effort required to successfully complete a Chest X-Ray order, the time and effort expenditure of the physician is the *smallest* component.

<table>
<thead>
<tr>
<th>Physician's component</th>
<th>Nurse’s component</th>
<th>Unit secretary’s component</th>
</tr>
</thead>
<tbody>
<tr>
<td>CXR written on order sheet</td>
<td>Positional mode (supine, upright, etc.)</td>
<td>Enter order into computer</td>
</tr>
<tr>
<td>May specify portable versus departmental</td>
<td>Transport mode (stretcher, chair)</td>
<td>Coordinate scheduling (other lab, imaging tests)</td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Diagnostic information (what is this for?)</td>
<td></td>
</tr>
</tbody>
</table>
However, since the time of hieroglyphics and clay tablets, physicians have equated “order time” with “their time”

This has definite and direct consequences in the implementation of CPOE:
- Additional MD time required in CPOE will be measured by docs against the MD component time, not the true, complete order time
- Transfer of “nurse’s and clerk’s components” to the physician is seen as “making me a unit secretary”
  - Not cost effective
  - Not time efficient
  - Not terribly rewarding or appropriate
  - Not a warm fuzzy
What is the CPOE Grand Bargain

• If
  – Physician time and effort expenditure in a CPOE CXR order are now measured against the total time and effort expenditure in a paper system CXR order and not just the CXR quickly written on the order sheet

• And If
  In CPOE, some nursing and clerk order tasks are transferred to the physician by definition

• Then
  – CPOE must give the physician something more than just additional work and lost time. It must offer increased safety and efficiency through Order Sets and Clinical Decision Support

• Else
  – Forget about widespread physician adoption
What is the CPOE Grand Bargain

• Physicians need to be educated as to the true time needed to “write an order”
  – MD writing time
  – Delay in chart availability
  – Phone calls and pages to clarify written orders
  – Nurse time
  – Clerk/secretary time

• Project teams (execs, IT, etc) need to understand physician worldview and workflow

• Both need to ensure that resources and time are available to make the “carrots” (i.e. physician and patient benefits) happen
  – Order sets
  – Clinical decision support
  – Excellent and thoughtful design and implementation
What Sort of a Bargain is This?

• Physicians expend more time, effort to do what they “already do”

• Hospitals reap
  – Increased efficiency
  – Increased safety
  – Increased reimbursement
  – Decreased costs
  – Improved throughput

• This is a fundamental misalignment of incentives
  – Must be recognized by hospital administrations
  – Must be addressed and dealt with vis a vis doctors
  – Increases the imperative of doing CPOE right
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What are Order Sets?

• What is an order set?
  
  *An Order Set is “any collection of orders that are entered into the patient record in a single step.”*

• Classification of order sets
  
  • “Complete” versus “pick and choose from a list”
  
  • Departmental versus personal

A UTILIZATION STUDY OF ORDER SETS AT PROVIDENCE PORTLAND MEDICAL CENTER

May 2004  J. Miller Batson, MD
What are Order Sets?

- **Order sets**
  - Need not only encompass long lists of orders
  - May be built for any repeatable and repeated group of orders, no matter how short the list
  - Are designed to enhance standardization, completeness and efficiency
  - Provide the “volume discount” in order entry
    - Assume 4 clicks to enter an individual order
    - An order set of 12 orders may be entered in as little as 10 clicks
    - Savings of dozens of clicks
    - Clicks are time, time is efficiency
    - Efficiency increased physician adoption greater accrual of benefits from CPOE
How Many Order Sets are Enough?

• **Ceteris paribus**
  – You can never be too rich or too thin
  – You can never have too many order sets

• **What does this mean?**
  – The more order sets (especially at go-live) the better
  – It is unwise to trim project time and cost by building order sets only for
    • The top 10 DRG’s
    • The top 10 procedures
    • The top 10 admitters
    • The top…. anything

• **Every properly designed order set**
  – Saves physician time
  – Increases physician efficiency
  – Increases physician buy-in and adoption
  – Increases patient safety
• **Types of Order sets:**
  – Departmental/Institutional
    • Standard across the department/house
    • Perceived by administration as a step towards institutional/system standardization
    • Perceived by most physicians as an attempt to decrease autonomy
  – Personal
    • Compiled and maintained by a single physician or group
    • Maximizes the owners’ efficiency
    • Perceived by administration as a step away from institutional/system standardization
    • Perceived by most physicians as the logical way to practice (“what works well for me and my patients”)

• Each has advantages and disadvantages
Order Sets – Personal vs Departmental or Institutional

• **Departmental or Institutional:**
  - Usually product of group consensus and “peer review”
  - Reflect departmental as well as recognized/reviewed best practices
  - Designed for maximum inclusivity and standardization, not necessarily efficiency
  - Maintained by department or specifically tasked committee - faster, more up-to-date inclusion of updates/advances
  - Eliminates multiple sets for same procedure, disease process, clinical process

• **Personal:**
  - Completely customized to suit the physician and his/her manner of practice
  - Reflect personal as well as (sometimes) recognized best practices
  - Designed for maximum speed and efficiency of the “owner”
  - Maintained by owner – updates and advances at the discretion of the individual practitioner
  - Multiple sets (by different physicians) for the same procedure, disease process, clinical process
Policy considerations
- Standardization versus personal preference
- Inclusivity versus efficiency
- Value of greater completeness versus increased order time and unused functionality
- Maintenance: assigned task versus personal

Neither ensures increased physician adoption
- Data and studies on both sides of the issue

Decision should be physician - and not software or administration - driven
Advantages of Order Sets

- CPOE resulted in
  - Physicians taking 25 seconds longer to enter orders (albeit with significantly reduced duplicative and administrative task time)
  - *Use of order sets resulted in 37% decrease in ordering time.*

Controlled Trial of CPOE:
Effects on Physicians’ Time
Utilization in Ambulatory Internal Medicine Practices
JAMIA 2001;8:367-371
Bottom Line on Order Sets

• Order sets do not usually come with the vendor package
  – Exception: Siemens and Invision

• Order sets are not simple or quick to build

• The “pre-printed” orders that doctors may already have are a good starting point

• There are commercial products (tools) that can assist in this process, even if there are no order sets presently in your hospital
  – Zynx
  – Thompson Reuters
  – Provation
  – OSOS

• However it is done, it should and must be done
  – Time and $ well spent
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What are Physician Alerts?

• Physician alerts are part of an electronic cross-referencing system known as clinical decision support

• Constitute a large benefit to physicians if properly constructed and deployed

• Can and should be
  – Built and customized at your institution
  – Based on common, clinically-accepted best medical practices that reflect wisdom and practice patterns of
    • Outstanding authorities
    • Your medical staff
  – Turned on or off, fine tuned, as per the practice patterns and wishes of your medical staff
Decision support creates algorithms that cross-reference orders in general and drugs in particular for:

- Allergies
- Lab findings
- Drug interactions
- Correct dosing
- Contraindications
- Best practices

Alerts result from a variance vis a vis the algorithm:

- Wrong dose
- Drug incompatibility
- Patient allergy
- Laboratory value contra-indication
- Duplication of agent
- Agent of questionable value
• **Your** physicians need to be in control
  – Decision support algorithms can be created by the institution itself
  – Levels at which alerts “fire” are set by institution:
    • Avoid alert overload, arbitrary thresholds set by outside entities
    • Avoid patterns and “electronic interference” at odds with local practice norms
  – Override policies are set by the institution
  – Override option and responsibility rest with the ordering physician
    • The “system” does not practice medicine, doctors do
    • Clinical evaluation and decision-making rest with the clinician - within the boundaries that **your medical staff has defined**
• **Obvious that getting this right requires**
  – Considerable work and input from physicians, pharmacists, nurses, etc.
  – Time and resources
  – Skill and patience during and after implementation

• **Tendency is toward:**
  – “Not enough time, money, people, skills, energy… to do it now”
  – “Get the CPOE system in this year”
  – “We’ll do CDS next year”

• **Remember this?**
  – *CPOE must give the physician something more than just additional work and lost time. It must offer increased safety and efficiency through Order Sets and Clinical Decision Support*
  – Else

  • **Forget about widespread physician adoption**
Clinical Decision Support and Alerts

• **Do it now (i.e. when you do CPOE)**
  – Your physicians should decide when and how much to phase in

• **Well worth the time and money spent**
  – Consider it an “insurance policy” for physician adoption
  – Demonstrates your dedication to patient safety in a most concrete and visible manner
  – Will actually make your hospital a better place for patient care and your doctors better practitioners
  – Efficiency increased physician adoption greater accrual of benefits from CPOE
• Order sets combined with Clinical Decision Support constitute the carrots that will bring physicians to the CPOE salad
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Physician Roles in CPOE (partial list)

• Act as Physician Champion/Sponsor
• Serve on Physician Advisory Committee
• Serve as Super-User
• Develop physician training materials and requirements
• Serve as Physician Trainer
• Act as Subject Matter Experts (SME’s)
• Perform system validation and testing
• Participate in various workgroups
  – Standing committees
  – Ad hoc work groups
Communicate
- Act as a liaison between physician community and Executive/Project Team
- Help craft communication plan
- Interact with physician audiences in collaboration with executive champions

Educate
- Present/sponsor educational sessions for medical staff
- Monitor physician training
- Share lessons learned – site visits, colleagues, etc.
Representative Physician Champion Tasks

• **Advocate**
  – Represent the interests of the physician community
  – Present positive image of system and benefits to colleagues
  – Direct project-related physician activities
    • Engagement
    • Adoption
    • Adaptation to change

• **Coordinate**
  – Chair Physician Advisory Committee (PAC)
  – Act as or appoint liaison to P&T committee, other quality improvement groups
  – Monitor physician utilization statistics
  – Identify and address areas of resistance
  – Act as coach to physicians and PAC
• **Physician Advisory Committee**
  – Highest ranking clinical committee
  – Reports to executives
  – Serves as final arbiter of all clinical conflicts related to project that cannot be resolved by other mechanisms
  – Has direct liaison to highest ranking IT and operational committees
  – *Owns* the CPOE project on behalf of the medical staff
  – Is reflective and representative of the medical staff
    • Balance of specialties, practice types and patterns, computer literacy etc
PAC Tasks (partial list)

• Make medical staff policy recommendations and decisions
• Communicate to the medical staff
• Oversee the development, validation, approval and maintenance of project clinical content
• Oversee, decide and implement project clinical policy issues
• Map or sign-off on physician workflow analysis
• Review and sign-off on future state
• Serve as liaison with other project work groups
• Delegate and coordinate tasks to physician subgroups
• Direct physician engagement and adoption of change
• Support Physician Champion
• Make medical staff policy recommendations and decisions concerning
  – System design
  – Implementation approach
  – Work-arounds if necessary
  – Definition of - and sign-off on - physician requirements
  – End-user device strategy
  – Question of “mandatory” usage
  – User certification
  – Security/Privacy/Access
  – Definition of Legal Medical Record
  – Electronic Signature
  – Common Medical Vocabulary
  – Chart Completion

• In general, represent all physician interests in the project
Oversee the development, validation, approval and maintenance of project clinical content

- Order sets
- Documentation tools
- Flow-sheets
- Best practices library
- Problem lists
- Clinical Decision Support
- Monitor facility physician utilization statistics
• Oversee, decide and implement project clinical policy issues
  – Clinical rules
  – Decision regarding “mandatory” usage
  – User certification
  – Security/Privacy/Access
  – Definition of Legal Medical Record
  – Electronic Signature
  – Common Medical Vocabulary
  – Chart Completion
  – Usage and handling of
    • Verbal and telephone orders
    • Co-signatures
PAC Tasks

• Map or sign-off on physician workflow analysis
  – Conduct workflow interviews
  – Validate workflows with direct process observation
  – Validate workflows with process owners
  – Diagram workflows in Visio or other standard tool
  – Assemble workflows into care continuum format
  – Identify and categorize workflow defects

• Review and sign-off on future state
  – Participate in future state design sessions
  – Analyze current state defects for future state repair or elimination
  – Validate all future state scenarios for clinical
    • Relevance
    • Applicability
  • Efficiency
  • Quality
• Serve as liaison with other project work groups
  – Coordinate with quality improvement and other committees or groups such as Pharmacy and Therapeutics Committee
  – IT and operational groups
  – Clinician (nursing) groups
  – Other working groups, official and ad hoc
  – All clinical project work groups, official and un-official should have physician representation
• Representation at all but the most technical groups also desirable
PAC Tasks

• Delegate and coordinate tasks to physician subgroups
  – Assist with pilots and rollout of system at facility
  – Monitor physician training at facility

• Direct physician engagement and adoption of change
  – Act as coaches to physician super-users
  – Become physician super-users
  – Identify and address areas of resistance
  – Act as change agents and represent the interest of the physician community as respected leaders
The Physician as Super User

• Develop expertise as physician super-users
  – Need is for many, not just a few
  – Do not need to be geeks
  – Attend vendor supplied super-user classes
  – Disseminate knowledge gained to physician community
  – Perform final clinical validation of system design
    • Workflow
    • Screen look and feel
  – Act as physician go-live support
The Physician as Trainer

• Develop physician training requirements, tools and materials, timetables
  – Clinical scenarios for training
    • Generic as well as specialty-oriented
    • Can also be used for system testing
  – Training materials for physicians
    • Clinically appropriate
    • Generationally appropriate
    • Venue appropriate
      » Classroom materials
      » Tutorial materials
      » Online materials
The Physician as Trainer

• Develop physician training requirements, tools and materials, timetables
  – Physician expectations and requirements
    • What do we really need to know to be competent users of the system?
  – Certification materials
    • Quizzes, tests, requirements
  – “Train the trainers” in physician-appropriate methods, needs, requirements
Act as Subject Matter experts (SME’s)

- Attributes
  - Knowledgeable in area of medical practice
  - Clinically up to date
- Clinical content development
  - Orders
  - Flow charts
  - Other content
- Workflow analysis and validation
- Screen design and layout
- Problem and “bug” prioritization
  - Testing phase
  - Go-live phase
The Physician as System Tester

- **System validation and testing**
  - Test the system design before putting into “production”
  - Validate design assumptions
  - Ensure that future state design really supports clinical workflow
  - Look for bugs
  - Look for missing pieces
  - Look for poor design that impedes rather than enhances physician workflow
  - Try to break it
  - Also represents “practice” for go-live planning
    - Similar stratification of defects/bugs will take place
    - Clinical relevance categorization
    - Go-live command center clinical prioritization for repair
Other Physician Roles

• Physician workgroups charged with a variety of EMR and CPOE tasks
  – Develop content
  – Map or sign-off on physician workflow analysis
  – Office of project communication
  – Develop go-live plan

• Report to the Physician Advisory Committee or other standing committees
  – P&T
  – Departmental committees

• May be ad hoc for the CPOE project
  – Various SME subgroups
    • Specialty order sets
    • “Flow-sheet workgroup”
  – Task specific subgroups
Physicians in CPOE

• If it seems that physicians are “everywhere, everywhere” in CPOE projects
  – They are
  – They should be

• If physicians are not “everywhere” the CPOE project stands a good chance of failure

• This represents a significant amount of work – in addition to their day jobs of providing clinical care to patients (the product that hospitals produce)
<table>
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<tr>
<th>ID</th>
<th>Task Name</th>
<th>Hours</th>
<th>Start</th>
<th>Finish</th>
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<td>5/31/05</td>
<td>8/3/07</td>
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<td>6/1/05</td>
<td>3/1/06</td>
<td>C</td>
</tr>
<tr>
<td>6</td>
<td>Physician Interviews</td>
<td>768 hrs</td>
<td>7/11/05</td>
<td>9/7/05</td>
<td>C</td>
</tr>
<tr>
<td>12</td>
<td>Vendor Demonstrations - &quot;Day in the Life&quot;</td>
<td>1,096 hrs</td>
<td>7/4/05</td>
<td>11/30/05</td>
<td>C</td>
</tr>
<tr>
<td>21</td>
<td>Order Set Development - Phase I (already in existence)</td>
<td>7,256 hrs</td>
<td>7/28/05</td>
<td>9/29/06</td>
<td>C</td>
</tr>
<tr>
<td>33</td>
<td>Sub-Order Sets / Browse pointers</td>
<td>2,615.92 hrs</td>
<td>4/5/06</td>
<td>10/25/06</td>
<td>P</td>
</tr>
<tr>
<td>38</td>
<td>Order Form Review - Phase I</td>
<td>4,040 hrs</td>
<td>1/4/06</td>
<td>6/15/06</td>
<td>*</td>
</tr>
<tr>
<td>98</td>
<td>Lists &amp; Reports Development</td>
<td>480 hrs</td>
<td>3/1/06</td>
<td>5/19/06</td>
<td></td>
</tr>
<tr>
<td>101</td>
<td>List Browse Configuration</td>
<td>0 hrs</td>
<td>4/10/06</td>
<td>7/25/06</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>Device Selection &amp; Pilot</td>
<td>1,680 hrs</td>
<td>11/7/05</td>
<td>6/26/06</td>
<td>P</td>
</tr>
<tr>
<td>107</td>
<td>Nursing Documentation Phase I</td>
<td>624 hrs</td>
<td>5/3/06</td>
<td>6/27/06</td>
<td>P</td>
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<tr>
<td>111</td>
<td>Order Set Development - Phase II (New and Paper)</td>
<td>14,936 hrs</td>
<td>11/21/05</td>
<td>8/3/07</td>
<td>C</td>
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<tr>
<td>119</td>
<td>Policy &amp; Procedure Review</td>
<td>1,424 hrs</td>
<td>4/17/06</td>
<td>12/20/06</td>
<td>P</td>
</tr>
<tr>
<td>125</td>
<td>Vendor Rules and Alerts - Phase II</td>
<td>2,576 hrs</td>
<td>5/1/06</td>
<td>5/29/07</td>
<td>P</td>
</tr>
<tr>
<td>143</td>
<td>Technical Infrastructure - Phase II</td>
<td>1,960 hrs</td>
<td>7/4/05</td>
<td>6/9/06</td>
<td>I</td>
</tr>
<tr>
<td>153</td>
<td>Physician Communication Management - Based on Phases of Project</td>
<td>480 hrs</td>
<td>11/7/05</td>
<td>1/27/06</td>
<td>C</td>
</tr>
<tr>
<td>160</td>
<td>Physician Advisory Group Meetings</td>
<td>4,904 hrs</td>
<td>5/31/05</td>
<td>12/7/06</td>
<td>C</td>
</tr>
</tbody>
</table>
How Much Work is This?

• A little arithmetic
  – 53,295 hours = 26.64 years (@ 2000 hours per year)
  – Assume 10 people on PAC (a reasonable number)
    • 2.66 years of work per person (assuming full time)
  – Assume ½ of all work delegated to other physicians
    • SME’s
    • Trainers
    • Super Users
    • Others
    • Still have 1.3 years of work (assuming full time)
• The work needs to get done
  – Your physicians do it
  – Some one else does it
  – You get what you pay for
How to Accomplish This?

• **Your physicians do it**
  - Two philosophies:
    • Have a limited number of doctors (10-15) do all the work
    • Spread as much of the work out among a larger number of doctors *e.g.*
      » 10 on the PAC
      » 10 SME’s
      » 10 super users

• **Some one else does it**
  - Vendor
    • Has a different agenda from yours and that of your physicians
  - Consultant
    • Double edged sword
      » Experience and insight from other institutions
      » Does not *a priori* know your institution
• **Recommendations**
  – Decide which roles will be filled internally
    • Talent, skills on hand
    • Willingness and ability to acquire skills
    • Long-term, permanent roles
  – Decide which roles will be filled externally
    • Temporary, “one-time” roles
    • Niche skills
    • Skills unlikely to be acquired within project timeframe
    • Skills benefitting from experience in other institutions
    • Certain “make or break” skills or tasks
Recommendations
– Choose consultants carefully
  • Staff augmentation “body shop” skills
    » Younger, less experience
    » Little grey hair
  • Experiential, strategic skills
    » Older, more experienced
    » Little hair – or lots of grey hair
    » Look for actual clinical experience
      - not simply “consulting careerism”
    » Fewer numbers
    » Higher cost
– Guard against
  • Bait and Switch
  • Revolving door

How to Accomplish This?

Larger numbers
Lower cost
REMEMBER!

You get what you pay for

I’m at yur survis
to make thingz betr
Your physicians need to be compensated for their time

• **Options include:**
  – Hourly compensation
  – Flat compensation (1/2 FTE, 1 FTE, etc)
  – Productivity adjustments
    • “Owned” or employed physicians
    • Contracted physicians

Compensation will not completely replace income

Compensation indicates administrative recognition of the value of physician time and effort
Agenda

Introduction
What is CPOE?
How Does CPOE Work?
Physician Orders in CPOE
What Physician Work does a CPOE Project Entail?
Benefits of CPOE
Success Factors for CPOE
Comments and Discussion
Benefits of CPOE

• **Improvement in clinical cycle time:**
  – Medication delivery: 65% reduction
  – Radiology procedure completion: 45% reduction
  – Laboratory results reporting: 25% reduction

• **Improvement in length of stay:**
  – 0.9 days reduction in LOS
  – 13% reduction in hospital charges

• **Improvement in formulary compliance:**
  – Use of CPOE rules increased use of the recommended histamine 2 blocker from 15.6% to 81.3%

From a literature review in
Computer Physician Order Entry: Benefits, Costs and Issues
Gilad Kuperman, MD, PhD, and Richard Gibson, MD, PhD.
Annals of Internal Medicine 2003; 139: 31-39
Benefits of CPOE

• Improvement in adoption of evidence-based best practices:
  – % of eligible patients receiving pneumococcal vaccination increased from 8% to 36% with CPOE reminder.

• Reduction in errors:
  – Beth Israel reduced errors by 55% from 10.7 to 4.9 per 1000 patient days.
  – Subsequent study showed 88% reduction in serious errors.
  – LDS Hospital showed 70% decrease in A.D.E’s with CPOE.

From a literature review in
Computer Physician Order Entry: Benefits, Costs and Issues
Gilad Kuperman, MD, PhD, and Richard Gibson, MD, PhD.
Annals of Internal Medicine 2003; 139: 31-39
Benefits of CPOE

• These benefits accrue to
  – Patients
  – Physicians
  – Entire hospital staff
  – Institution as a whole
  – You as executives
  – The community at large

• Upside benefits are huge
  – Improved quality of care
  – Decreased risk of all manner of adverse events
  – Improved throughput
  – Decreased cost of care
  – Improved patient, employee and physician satisfaction
In America, you get what you pay for

- Invest appropriately in this project
  - Time
  - Energy
  - Resources of all types
  - Competence
  - Money
• Pre-requisites to obtain such benefits
  – Well-designed CPOE system that meshes with physician workflow and does not bend that workflow to the “needs of the system”
  – Adequate cast of supporting applications
    • Pharmacy
    • eMar
    • Lab
    • Clinical Documentation (nursing)
  – Adequate infrastructure
    • Wireless
    • Sufficient number of access points
      » Desktops
      » Laptops
      » Tablet PC’s
  – Plethora of order sets
  – CDS
Benefits of CPOE

• The benefits of CPOE are a direct function of the clinical adequacy of design

• Absent detailed, comprehensive and sustained involvement and leadership from physicians, such adequacy will not exist and the benefits will be non-existent
Benefits of CPOE

• How to obtain such involvement and input
  – Recognize that CPOE is a clinical project, not an IT one
  – Physician Champion, the sponsor of the project, owns the project on behalf of the medical staff
  – Provide adequate authority and resources to the champion and his/her designees
    • Compensation – time and/or money
    • Infrastructure
    • Information
      » Acts as project ambassador to medical staff
      » Bridges divide between medical staff and project/executive team
      » Needs impeccable and unassailably accurate information
      » Needs access to project/executive leadership
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CPOE Success Factors

• Fast, customizable systems
• Dedication on the part of the hospital of a great deal of time, training, and ongoing support for the systems
• Hospital willingness to make changes once the system is in place
• The ability to group orders into sets
• Clinical pathways made available to the staff at the time of order entry
• Ability to enter orders remotely

Journal of the American Medical Informatics Association, Feb. 2003
What do These Success Factors Mean for Physicians?

- Fast, customizable systems.
- Dedication on hospital’s part to a great deal of time, training and ongoing support for the systems.
- Hospital willingness to make changes once the system is in place.
- The ability to group orders into sets.
- Clinical pathways made available to the staff at the time of order entry.
- Ability to enter orders remotely.

- Doctors put the time and effort in to customizing.
- Doctors take the time to get trained.
- Doctors communicate desired changes to hospital.
- Doctors compose their order sets.
- Doctors use the power of decision support to deliver the best to their patients.
- Doctors enter orders remotely (office, home).
• **Overall efficiency:**
  – Will decrease initially as new technology and workflow processes are assimilated.
  – Will return to baseline thereafter with real possibility of increase above pre CPOE level
  
  • as technology, speed, organizational attributes and *practitioner buy-in* are leveraged.
  – No Pain, no Gain
Areas of Greatest Physician Impact

- There will be some physicians who will remain here

  Consider “work-around” for those who are
  - Highly productive
  - High admitters/volumes of procedures
  - “Respected elders” who hold sway with others
Critical Considerations

- Medical staff computer literacy
- Workflow redesign
- Development of departmental-level order sets
- Design of alerts
- Development of pilot criteria
- Organizing governance structure
- Leadership stamina
Critical Considerations

- Leadership stamina
  - This means you guys
  - Show the importance of this project - all the time
  - Leadership team all sing off the same page
  - Communicate with your doctors
    - Talk to them
    - Listen to them
  - Show that their time and effort is of value
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Remember This?

• Name

• Institution

• Role in your institution’s CPOE project

• Your goals for this session

• Do you know who your physician champion is?

• Do they know of their status as champion?

• What resources do they have – and do you think those resources are adequate?
Discussion