Lessons Learned on the CPOE Journey

How one community hospital is preparing to implement CPOE

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Roadmap to CPOE
Agenda

- Information about CareTech Solutions
- Background on Blanchard Valley Health System.
- Current HIT portfolio
- Plans for CPOE implementation
- CPOE Readiness Assessment
- Rationale for process mapping
- Approach to process mapping
- Outcomes from process mapping
Information about CareTech Solutions

An information technology and web products and services provider for hospitals and health systems

- We create value for clients through customized solutions that contribute to improving patient care while lowering healthcare costs.
- From implementing emerging technologies to supporting day-to-day operations, CareTech offers clients expert services across the entire patient data lifecycle.

“We Do Whatever IT Takes”

CareTech Solutions, Inc.
Best in KLAS – Extensive IT Outsourcing
KLAS® 2008 Top 20 Report
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This presentation is not about CareTech Solutions or an attempt to sell our products or services.

This presentation is about how Blanchard Valley Hospital prepared to implement CPOE by using process mapping.
Background on Blanchard Valley Health System

Two hospitals and over 35 other facilities in Northwest Ohio

- Blanchard Valley Hospital in Findlay Ohio (142 bed)
- Bluffton Hospital in Bluffton Ohio (25 bed)
- 2200 employees, 170 physicians
- Over 10,000 inpatient admissions annually
- Recognition for quality care
  - Designated a Blue Distinction Center for Cardiac Care
  - Lab is the third in the nation to meet ISO 15189 stds.
  - Healthgrades 2009 Joint Replacement Excellence
By July 2008 had implemented the following:

<table>
<thead>
<tr>
<th>Bar Code Medication Administration</th>
<th>Electronic Forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralized Pharmacy Dispensing Robot</td>
<td>PACs and C-PACs</td>
</tr>
<tr>
<td>Single-Dose packaging</td>
<td>ED Clinical system</td>
</tr>
<tr>
<td>Automated medication dispensing cabinets on all inpatient units</td>
<td>Integration of all clinical results into the EMR.</td>
</tr>
<tr>
<td>Scanning of Pharmacy orders</td>
<td>Document Imaging of Medical Records</td>
</tr>
<tr>
<td>Nursing documentation</td>
<td>Physician Desktop with results and electronic signature</td>
</tr>
</tbody>
</table>
### Information Systems Environment

#### EMR & Clinical Functions

<table>
<thead>
<tr>
<th>ADT/Registration</th>
<th>EMPI</th>
<th>Order Entry</th>
<th>Dietary</th>
<th>Electronic Signature</th>
<th>Medical Records Encoder</th>
<th>Medical Records Abstracting</th>
<th>Radiology PACS</th>
<th>Cardiology Cath Lab</th>
<th>Transcription</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiology Information System</td>
<td>Drug Formulary</td>
<td>Anatomic Pathology</td>
<td>Dictation</td>
<td>OB Fetal Monitoring</td>
<td>Inpatient / Outpatient Pharmacy</td>
<td>Lab Blood Bank</td>
<td>EKG</td>
<td>Laboratory Information System</td>
<td>Cardiology Information System</td>
</tr>
<tr>
<td>Nursing Document</td>
<td>Results Reporting</td>
<td>Medical Record Chart Tracking</td>
<td>Clinical References</td>
<td>Sleep Center</td>
<td>Patient Scheduling</td>
<td>Discharge Planning</td>
<td>Decision Support</td>
<td>Physician Office Base EMR</td>
<td>CPOE</td>
</tr>
<tr>
<td>Operating Room</td>
<td>Home Health / Hospice</td>
<td>Emergency Room</td>
<td>Clinical Documentation / Charting</td>
<td>Alerts &amp; Reminders</td>
<td>Long Term Care Clinical</td>
<td></td>
<td></td>
<td></td>
<td>Medication Dispensing</td>
</tr>
<tr>
<td>Physician Portal</td>
<td>Clinical Document Management</td>
<td>Rehab Services</td>
<td></td>
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</tr>
</tbody>
</table>

#### Business & Administrative Applications

<table>
<thead>
<tr>
<th>Accounts Payable</th>
<th>General Ledger</th>
<th>Billing</th>
<th>Payroll</th>
<th>Accounts Rec.</th>
<th>Patient Accounting</th>
<th>Time &amp; Attendance</th>
<th>Budget</th>
<th>Employee Education</th>
<th>Email</th>
<th>Help Desk Tracking</th>
<th>Executive Information Dashboard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Term Care</td>
<td>Material Mgt / Purchasing</td>
<td>Physician Practice Mgt (financials)</td>
<td>Electronic Remit</td>
<td>Human Resrcs.</td>
<td>Occupational Medicine</td>
<td>Contract Mgt</td>
<td>Nurse Scheduling</td>
<td>Security</td>
<td>Insurance Eligibility</td>
<td>Electronic forms</td>
<td>Data Warehouse</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>BVHA Web Site</td>
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</tbody>
</table>

#### Quality Assurance

<table>
<thead>
<tr>
<th>Risk Mgt</th>
<th>Physician Credentialing</th>
<th>Employee Health</th>
<th>Case Mgt</th>
<th>Utilization Review</th>
<th>Infection Control</th>
<th>Social Work</th>
</tr>
</thead>
</table>

#### Administrative & Financial Document Management

<table>
<thead>
<tr>
<th>Physician Champion</th>
<th>Nursing Champion</th>
<th>Education Department</th>
<th>IS Portfolio Planning</th>
<th>IS Strategic Plan</th>
<th>Process Analysis</th>
<th>Business Process Re-Engineering</th>
<th>IS Standards</th>
<th>Change Mgt</th>
</tr>
</thead>
</table>

#### Process and Staffing

|----------------|-------------------------|--------------------|-----------------------|------------------|-----------------------|------------------|-------------------|---------------------|------------------|

#### Infrastructure Components

<table>
<thead>
<tr>
<th>RFID</th>
<th>Unified Threat Mgt (security)</th>
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## IT Capital / Project Status By Year

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010 - 2011</th>
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<tbody>
<tr>
<td></td>
<td>$504,000</td>
<td>$1,717,291</td>
<td>$2,000,800</td>
<td>$2,000,000</td>
<td>TBD</td>
</tr>
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</table>

### Projects

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010 - 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

- **Blue – Completed**
- **Green In Process**
- **Black – Future or Deferred**

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Plans for CPOE implementation

- 2007: CPOE Readiness Assessment
  - Recommendation: Understand the Current Process
- Fall of 2008: process mapped all order-related processes
- Planned to begin the CPOE project in 2009
  - Delayed to 2010 due to economy and focus on ambulatory EMR
    (Possibly 2011 due to EMR vendor resource availability)
  - Silver Lining – Time to prepare for CPOE & physician documentation
There are many **Risks and Barriers** to successfully implementing CPOE.

Process mapping addresses these Risks:

- Challenge of **changing & standardizing all order-related processes**
- Risk of **unplanned detrimental workflow changes**
Rationale for process mapping

Joint Commission's Sentinel Event Alert (#42) on…

Safely implementing health information and converging technologies

13 recommendations
to help prevent patient harm from technology implementation
Joint Commission's Sentinel Alert (#42)

The first recommendation:

Examine workflow processes and procedures for risks and inefficiencies and resolve these issues prior to any technology implementation.
Rationale for process mapping

- Don’t lose what you have gained with respect to:
  - order management
  - clinical outcomes
  - patient safety
  - patient satisfaction
  - revenue optimization and cost control

- Yet often our processes are not well documented and are fully understood by no one
- This makes change **Risky**
Approach to process mapping

- Project took about 3 ½ months
- Started in October, 2008
- Finished in January 2009
- We did inpatient only and did only the main hospital
- We plan to return for the smaller hospital
Approach to process mapping

We developed process maps for:

- Every patient care unit (9)
- Every ancillary department (9)
- Typical physician process flow (order related activities)
- Direct admit orders
- ED admit orders
- Discharge orders
- Consult orders
- Order Set development
## Approach to process mapping

### Deliverables / outcomes included:
- Process flow charts (typically 2-10 pages per dept / unit)
- Documented / prioritized issues and problems
- Documented processes that work fine now but will need to change before CPOE
- Discussed with department staff the likely impacts CPOE will have on current processes (Raised awareness)
- Documented concerns and requests raised with the implementation of CPOE
Approach to process mapping

Project Sponsor – CMO

Project Steering Committee – CMO, CNO, COO, CIO, CPOE Coordinator, Hospital Process Engineer, Consulting Process Engineer (Chair)

Participants in process mapping exercises

CPOE Coordinator
Hospital Process Engineer
Consulting Process Engineer
Department head and 2-4 department staff
IT analyst most involved with the department
Approach to process mapping

Kicked off the project with a strong statement from the executive leadership.

- Described the process mapping initiative
- Why process mapping is important to CPOE
- Described benefits and risks of CPOE
- Introduced the process engineer
- Identified departments and processes involved
- Requested full support
## Approach to process mapping

| Pre-Visit 1 | Develop department-specific questionnaires  
Distribute questionnaires, schedule meetings, receive back & evaluate questionnaires |
|------------|----------------------------------------------------------------------------------|
| Visit 1    | Meet onsite to review the questionnaires with the dept. SME.  
Diagram the process.  
Identify process issues/problems. |
| Post Visit 1 | Develop preliminary documentation of OE / OM processes – diagrams and list of issues / problems. |
| Visit 2    | Shadow people in the department (GEMBA)  
Review preliminary documentation and issues from shadowing.  
Identify needed changes. |
| Post Visit 2 | Develop final documentation |
| Visit 3    | Drop off and review final documentation. |
| Monthly    | Steering committee meeting |
Please give a high-level description of the work that you and your Nursing Unit do with inpatient orders? (The BIG picture)

List the roles or job titles that work on the order entry / order management process on your nursing unit and describe generally what each role does:

Please list in sequence the steps you take to process the order. Include any decisions you make and alternatives you consider. Please list these steps in detail.
Questionnaires – Example of Nurse Unit

When you process orders for this ancillary department are there phone calls that you need to make or other contacts you need to make? Y / N
Please list who you contact, how you contact them and why.

Please list and attach examples of any forms you fill out.

Please list and attach examples of computer screens you use to enter or look up information.

If this order is to be fulfilled by a nurse on the unit, please describe how the order is communicated to the nurse.
If an order requires a specimen to be collected on the unit how does the scheduling of the collection occur?

Please describe how changes to orders (edits) & cancellations of orders are processed.

Please indicate the final step that you take to complete your work with the order.

Please identify points in the order management process where errors, delays, communication breakdowns, repetition or rework commonly occur.
**Issue/Problem**

- Any Hepacer based on PTT
  - Consistently documented in flow sheet but need to enter order & not consistent - pharmacy need this.
- Special procedures during code
- Not getting print out of Sticker from LAB
- Forms fast is difficult for nursing to use
- Scheduling Radiology procedures may be left waiting
Annotations in Bold indicate details that will change with CPOE.

In addition to process steps (workflow) Suppliers, Inputs, Outputs and Customers are documented. (SIPOC)

Pharmacy Process Diagrams

3.1.1 – Pharmacy Inpatient Orders – Detail Level (P1)

| Process Orders | 
| --- | --- |
| Pharmacy | 
| 1. Pharmacist receives order in scanning system (95%) | 
| 2. Pharmacist processes next order | 
| 3. Pharmacist receives order via tech pickup (2%) | 
| 

Pharmacist begins entering order into CIS, uses function key to transfer PI from scanning system

- Allergies always needed. Wt. needed for Ped's and some other med orders.
- Something is missing approx. 6-7 times daily.

&emsp;5. Evaluate therapeutic substitutions

- Substitutions Protocols approved by P&T Ctr.

6. Change needed to order?

10. Write clarification of order

13. Scan written order

Physician can see clarification order in paper chart

15. Written clarification order goes on chart

17. Request to nurse to enter missing allergies and/or weight in CIS

Customers
1. Patient
2. Physician

Inputs
1. Physician order – Scanned
2. Physician order – Paper
3. Physician order – Verbal

Outputs
1. Labels for Medication dose
2. Med order w/Worklist (Process Med screen in CIS Status Board)
3. Medication delivered.
CPOE increases pharmacist productivity by moving forward to the physician – clinical decision support such as allergies and drug-drug interactions.

Pharmacy Process Diagrams

Sample Hospital

3.1.1 – Pharmacy Inpatient Orders – Detail Level (P2)

Dispense Meds

Most frequently used meds dispensed by robot. Others p/c'd by tech. TPNs made by tech.

31 Labels are applied to Meds by tech

32 Pharmacist verifies meds and labels not dispensed by robot

33 Medication is dispensed

34 Medications delivered to unit

Floor Stock is delivered 2x daily M-F & 1x on Sat & Sun. Cart Fill is delivered 1x daily starting @ midnight. IV delivered 3x daily. Stat / Non-Pres Stock delivered hourly or more frequently. Couriers deliver to site 2. TPN & non-floor stock weekend & after hours orders.

Suppliers
1. Nurse (LPN, RN, Case Manage)
2. Unit Secretary
3. Pharmacy Tech
4. Pharmacist
5. Physician

Inputs
1. Physician order—Scanned
2. Physician order—Paper
3. Physician order—Verbal

Outputs
1. Labels for Medication dose
2. Med order worklist (Process Med screen in CIS status board)
3. Medication delivered.

Customers
1. Patient
2. Physician

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One need is for automated messaging from the system for consult orders and for certain other orders such as stats and respiratory therapy orders.

Nursing - CCU Process Diagrams

Nursing processes are complex, non-standardized (many opportunities for improvement) and will require many changes for CPOE.

1. Receive Order
2. Write Verbal Order
3. On Physician’s order sheet. Write “TO” for telephone order or “VO” for verbal order. Physician signs w Date & Time on paper within 48 hours.
4. Notify RX to enter order. May be an Acudose pull, but want to avoid override. Or may be, for example, a drip that needs to be prepared quickly.
5. Many Labs are Stat. Time & Urgent in CCU.

Sample Hospital

1. Look up who is on call
2. Call/Anxiety Dept.
3. Call/Order rx consult

1. Physician is to make this call if emergent or after hrs and weekends. All general surgeons are called immediately

Many detailed procedures. See Ancillary Diagrams for all. Here are some: 1) Non-blood Lab orders requiring “nurse collect” are not entered until specimen is collected and tubed or transported. 2) Orders requiring diet prep: Secretary / Nurse enters an NPO order in Meditech. 3) Lab add-ons: Secretary / Nurse calls lab to see if prep specimen can be used. Enter as add-on; 4) If UltraSound call first to check on prep to enter the right service date. Also call first if portable. 5) for EP studies, Arteriograms and special procedures don’t enter in CIS, just call. 6) Echoes: must call for shades. 7) Cardiologic stress requires 2 calls – Nuc Med & Cardiology. 8) Some Meds are administered by RT and require an order for them.

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## Identification of Problems and Issues

### Sample Hospital: Issues List from Order Entry / Order Management Process Mapping Exercise

<table>
<thead>
<tr>
<th>No.</th>
<th>Issue / Problem</th>
<th>Identifying Department</th>
<th>Date Identified</th>
<th>Affected CPOE?</th>
<th>Y / N</th>
<th>Effort</th>
<th>Benefit</th>
<th>Financial Benefit</th>
<th>Priority (By Category)</th>
<th>Source</th>
<th>Status</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>81</td>
<td>The process of creating standard orders sets is centered in the forms committee. With the increased focus that will be placed on the development of standard order sets due to implementation of CPOE and Zynex best practice order sets this process should be reviewed and consideration given to forming a new committee or other organizational structure dedicated to the management of standard order sets. It will be necessary to deal with not only the initial creation of order sets but periodic review &amp; processing of change requests. Management of these order sets will be a new work effort for the hospital.</td>
<td>Standard Order Sets (Forms Cmte)</td>
<td>11/20/08</td>
<td>Y</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>10</td>
<td>Important to CPOE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>There are many opportunities for process improvement or re-engineering of the nursing processes. There are many manual steps with checks and double checks that are indicative of an error prone inefficient process. (Jeff’s comment). One opportunity is an electronic Kardex. This would be a report, printing out needed info and leaving room for notes. This has been piloted on 4th floor.</td>
<td>Nursing - ICU</td>
<td>11/5/08</td>
<td>Y</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>9</td>
<td>Initial Meetings are taking place regarding some kardex-like reports. Reduction of errors and re-work would improve care. improve patient and physician satisfaction, reduce LOS, improve productivity of nursing and secretaries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Missing allergies and weight. 6-7 times daily. Missing allergies are most often ED patients. Weight is missing more often than allergies. Physicians and pharmacists need this information to place medication orders.</td>
<td>Pharmacy</td>
<td>11/5/08</td>
<td>Y</td>
<td>M</td>
<td>H</td>
<td>M</td>
<td>9</td>
<td>Allergies are just text in ED system. Allergies, home meds and vital signs need to be discrete data that can interface to CIS as discrete data. This is important for CPOE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Duplicate of 40. Vital signs, allergies, home meds are not in the CIS when he looks for them (on admission). He obtains this information from the patient and family and is satisfied with that process. This does mean repetition for the patient.</td>
<td>Physicians</td>
<td>10/7/08</td>
<td>Y</td>
<td>M</td>
<td>H</td>
<td>M</td>
<td>9</td>
<td>Duplicate of 40.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>109</td>
<td>CPOE would benefit from having an automated paging capability from CIS. There are situations where an order is followed by a phone call or a page. Some of these could be automated. RT orders are the prime example. Other possible benefits of this would be pages to physicians when there is a panic value or a consult order.</td>
<td>Process mapping team</td>
<td>12/17/09</td>
<td>Y</td>
<td>M</td>
<td>H</td>
<td>M</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Make Cytology / Histology and other Pathology orderable via CIS, replacing the paper requisition.</td>
<td>Lab</td>
<td>11/3/08</td>
<td>Y</td>
<td>M</td>
<td>H</td>
<td>L</td>
<td>8</td>
<td>In progress</td>
<td>Save money on Forms, needed for CPOE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Outcomes from process mapping

The findings were presented to the BVHS Information Technology Oversight Committee.

The CIO took responsibility to manage the resolution of the identified issues and problems.

The CPOE project team will use the deliverables when they configure the CPOE system and design a new process.
Outcomes from process mapping

Approximately 90 unique issues and problems were identified.

These were classified and prioritized.

22 of the issues need to be resolved before implementing CPOE.

23 will be fixed or improved by CPOE.
Many inconsistent practices in placing orders.

- Phone calls by the unit secretary to the ancillary secretary before entering the order.
- Pathology, Histology & Cytology orders were still paper.
- Nursing orders written on a kardex
All IT-related issues that can be improved without CPOE have been assigned to IT analysts.

About 10 issues were not IT-related and have been handed off to the appropriate BVHS manager.

Many small issues have been resolved:

- Lack of a backup dietary printer.
- RT Med orders that did not involve treatment were not consistently communicated to the RT for administration. First doses were delayed. Fixed with a report to RT of such orders.
- Consult orders did not always specify a reason
- Orders not printing to the right place
23 issues have been designated as part of a Clinical System Optimization Project

- Nursing Kardex reports
- Nursing Orders
- Dietary orders
- Many improvements to clinical documentation such as nursing and RT assessments
Major focus – Nursing Orders

Nursing interventions are not being ordered or managed in clinical system.

- Includes nursing activities and treatments
- Developed naming conventions to support searching
- Developing screens, notifications, paging
Outcomes from process mapping

The override feature on the med dispensing cabinets was being overused. This by-passes pharmacy review of med orders. Now require a valid reason for the override.

Working on Medication Reconciliation improvements

Order sets:

• Have purchased evidence-based order sets.
• Plan to implement prior to CPOE.
• A policy & procedure for order set development, change management and periodic review has been proposed to the clinical council and the CPOE team.
Outcomes from process mapping

More timely collection of allergies and weight have been facilitated by screens earlier in the admission process.

The current process for managing lab add on order involves a phone call from the unit secretary to the lab secretary. This needs to change for CPOE.

TBD
Outcomes from process mapping

Summary – The value of process mapping in preparation for CPOE

• Gained a common understanding of all order related processes. Documented the processes.
• Identified existing processes that are not standardized or optimized. Improvement opportunities.
• Identified processes that need to change for CPOE
• Identified problems that will be resolved by CPOE
• Provided education regarding CPOE
• Foundation for better system implementation
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Questions