Workflow Redesign in Support of the Use of Information Technology within Healthcare
Conflict of Interest Disclosure

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- Cecilia A. Backman, MBA, RHIA, CPHQ
- Kelly Sager
- Adrish Sannyasi, MBA, PMP, CPHIMS

Have no real or apparent conflicts of interest to report.
Presenters & Moderators

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  Associate Director, HIM, Parkland Health & Hospital Services
• Kelly Sager  
  Marketing Manager, eHealth Solutions, GE Healthcare
• Adrish Sannyasi, MBA, PMP, CPHIMS  
  Manager, Deloitte Consulting
Organizational Panel

- To be determined
Objectives

• To inform the audience of a recently published HIMSS toolkit on workflow redesign

• To provide an overview of ten organizational case studies featured in the toolkit, focusing on four aspects:
  - People
  - Process
  - Technology
  - Achieving Excellence

• To provide the audience with an opportunity to interact with a panel made up of individuals who were interviewed for this publication
Toolkit Content
Why Workflow Redesign?

- Improve quality
- Reduce costs
  - Eliminate waste
  - Focus on value (patient, provider, staff, organization)
  - Reduce cycle time
  - Reduce variation
- Improve process
  - Bad paper process = bad electronic process
Why Workflow Redesign?

- Obtain “quick wins”
- Reduce time spent on design
- Promote clinical staff involvement
- Ease electronic medical record (EMR) adoption
- Support EMR sustainability
Workflow Design Concepts

• Think healthcare delivery as a “system” with a large number of components
• Focus efforts on reducing non-value added activities
• Reduce backlogs or wait times & consider parallel execution
Workflow Design Concepts

• Focus on total value stream improvements, not on localized improvements
• Use industry standards such as Unified Modeling Language (UML) & Business Process Modeling Notations (BPMN) to map workflow

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Five Step Design Guidelines

Step 1: Current State: Review existing process

Step 2: Future State: What and why?

Step 3: Future State: How?

Step 4: Future State: Who?

Step 5: Maintain: Implement, measure, improve

LEAN PDQA LEAN Six Sigma TQM CQI
Workflow Design Tools

- Visio flowcharting
- UML & BPMN modeling software
- Business Process Management suite
Lucile Packard Children’s Hospital at Stanford  
Palo Alto, CA

<table>
<thead>
<tr>
<th>Facility</th>
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<tbody>
<tr>
<td>• 280 active beds &amp; several highly active clinics, located on Stanford University campus</td>
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<tr>
<td>• Ranked in the top ten pediatric hospitals - 2008 U.S. News and World Report</td>
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<table>
<thead>
<tr>
<th>Goal</th>
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<tbody>
<tr>
<td>• Implement computerized provider order entry (CPOE) &amp; clinical documentation</td>
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<table>
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<tr>
<th>Process</th>
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<tr>
<td>• Brought in expert on change management for lectures &amp; group sessions</td>
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<tr>
<td>• Demonstrated leadership commitment through active participation</td>
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<tr>
<td>• Emphasized quality improvement, safety benefits &amp; clinical care efficiencies</td>
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<tr>
<td>• Clearly communicated benefits on a regular basis</td>
</tr>
<tr>
<td>• Conducted training sessions lead by peers (e.g. a physician taught physicians)</td>
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<td>• Surveyed users to gather feedback</td>
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<thead>
<tr>
<th>Outcomes</th>
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<tbody>
<tr>
<td>• Highly successful implementation - CPOE used for 97% of orders in first month</td>
</tr>
<tr>
<td>• Widespread agreement that no one wanted to return to life before CPOE</td>
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Medical University of South Carolina  
Charleston, SC

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<tr>
<th>Facility</th>
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<th>Process</th>
<th>Outcomes</th>
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</table>
| • 709 licensed beds and 776,000 ambulatory care visits a year  
• 705 affiliated physicians, 545 residents, and 11 hospitalists on staff | • Implement a large-scale core clinical information system | • Included executive sponsors and project leaders from the clinical areas  
• Created five nursing informatics specialist positions to liaise with clinical staff  
• Implemented governance structure including key senior clinical & administrative leaders  
• Formed implementation oversight committees reporting to project steering committee  
• Offered incentives such as pizza lunches & ice cream socials to reward contributors  
• Identified four physicians & allocated 25% of their time to serve in an advisory capacity | • Successfully ensured adoption of clinical information system including CPOE and clinical documentation by leveraging provider participation during implementation |
Process
Fox Chase Cancer Center
Philadelphia, PA

Facility
• 100 bed cancer center focused on patient care, cancer research & cancer prevention
• Ranked as one of the top cancer center hospitals by U.S. News and World Report

Goal
• Automate coding workflow using an application which maintains a workflow engine

Process
• Workflow analysis using flowcharts of each area to support remote coding
  • Revealed strengths, weaknesses & areas of opportunity
  • Designed rules and work lists best suited for each coding area
  • Tested, made change based on testing, implemented, and monitored

Outcomes
• Created a paperless environment
• Improved coder productivity
• Reduced unbilled outpatient accounts by $11M in two months
• Increased management’s ability to adjust work distribution based on chart volumes
Loma Linda University Medical Center  
Loma Linda, CA

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<tbody>
<tr>
<td>• 900 bed university medical center focused on adult, children and behavioral medicine</td>
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<tr>
<td>• International leader in infant heart transplantation and proton cancer treatment</td>
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<tr>
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<tr>
<td>• Implement inpatient clinical documentation and e-MAR and an ambulatory EMR</td>
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<tr>
<td>• Inventoried existing hard copy documentation</td>
</tr>
<tr>
<td>• Utilized multi-disciplinary team for electronic forms design</td>
</tr>
<tr>
<td>• End-to-end process flows for current and future states with education on future state</td>
</tr>
<tr>
<td>• Rolled out new design unit by unit in the hospital and clinic by clinic in the ambulatory setting</td>
</tr>
<tr>
<td>• Championed a go-live theme with designated super users to foster adoption</td>
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<tbody>
<tr>
<td>• Online clinical documentation in the acute environment including medication documentation</td>
</tr>
<tr>
<td>• Implementation of an ambulatory EMR which is ongoing at this time</td>
</tr>
</tbody>
</table>
## Facility
- 478 bed adult & 154 bed children’s medical centers; ambulatory & specialized centers
- Recognized as a Top 100 Hospital organization

## Goal
- Deploy a fully-integrated clinical solution

## Process
- Focused first on clinical transformation – created clinical transformation team
- Engaged consulting firm on first implementation project to train on transformation techniques and provide knowledge transfer
- Held senior executive meetings weekly to review project, budget & to mitigate issues
- Required deep involvement of key stakeholders (physicians & other clinicians)
- Provided financial remuneration to physicians who were heavily involved in the project
- Instituted a formal change management process

## Outcomes
- Projects remained on time and within budget
- Achieved buy in from executives and key stakeholders due to their involvement
# Seattle Children’s Hospital
Seattle, WA

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<tr>
<td>• 250 bed children’s hospital affiliated with the University of Washington</td>
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<tr>
<td>• Top children’s hospital for 17 consecutive years – U.S. News and World Report</td>
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<tr>
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<tbody>
<tr>
<td>• Replace obsolete system using continuous performance improvement (CPI) principles</td>
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<tbody>
<tr>
<td>• Instituted a CPI management system 10 years ago based on Toyota Production System to transform healthcare</td>
</tr>
<tr>
<td>• Goal has been to remove waste and create value for patients and their families</td>
</tr>
<tr>
<td>• Focused on the revenue cycle system implementation by:</td>
</tr>
<tr>
<td>• Involving people that do the work</td>
</tr>
<tr>
<td>• Standardizing process and tools</td>
</tr>
<tr>
<td>• Developing error-proof processes</td>
</tr>
<tr>
<td>• Maintaining customer focus</td>
</tr>
<tr>
<td>• Always asking why?</td>
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<table>
<thead>
<tr>
<th>Outcomes</th>
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<tbody>
<tr>
<td>• Technology no longer seen as the “answer”, but as an enabler to sound work processes</td>
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</tbody>
</table>
### Facility
- 550 bed and 24 bassinet tertiary and quaternary hospital
- Holds magnet status for nursing from the American Nurses Credentialing Center

### Goal
- Implement an electronic health record (EHR) system

### Process
- Developed a project philosophy that was centered on the patient and branded the project O2 which stood for “Optimal Outcomes”
- Involved key executives in product selection & implementation
- Appointed a chief medical information officer & established a core physician workgroup
- Developed an advanced clinical information systems team to work with the information technology (IT) department on design and to flowchart current/future states
- Designed and built the system in parallel
- Instituted an early change management process
- Engaged an external consultant to moderate the process

### Outcomes
- Phased, ongoing approach for implementation of the EHR
Technology
<table>
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<tbody>
<tr>
<td>310 bed community hospital; draws patients from a 100 mile radius and</td>
<td>serves northeast Missouri, western Illinois &amp; southeast Iowa;</td>
</tr>
<tr>
<td>serves largest health system in area</td>
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<table>
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<tr>
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<tbody>
<tr>
<td>Implement an EMR system</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Utilize wireless infrastructure; Citrix provides remote access from</td>
<td>Home &amp; office</td>
</tr>
<tr>
<td>Hardware includes desktops, laptops, tablets, carts &amp; touch pens/</td>
<td>screens</td>
</tr>
<tr>
<td>Utilize 18 servers structured in clusters which have fail over ability;</td>
<td>servers set in an active/passive cluster</td>
</tr>
<tr>
<td>Server monitoring handled through alerts &amp; received by a technical</td>
<td></td>
</tr>
<tr>
<td>Development &amp; testing is done internally with vendor support &amp; end</td>
<td></td>
</tr>
<tr>
<td>Four environments maintained – testing, training, development &amp;</td>
<td></td>
</tr>
<tr>
<td>Maintain a project management office; use Lean Six Sigma process</td>
<td></td>
</tr>
<tr>
<td>Interdisciplinary clinical design team used for system design,</td>
<td></td>
</tr>
<tr>
<td>approval of system optimizations</td>
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Blessing Hospital
Quincy, IL

Technology

• Implemented structured downtime procedures & processes
• Clinicians can only access patients assigned to their floors and work stations
• Physicians can only see patient data on patients in which they are providing care
• Over-ride function available for consultants
• Utilize break the glass, as needed, to access patient chart for care purposes
• Remote access must be reapplied for annually; special procedures in place for physician office staff & students
• Higher level of security maintained for psychiatric records
• Compliance department performs routine audits to assure appropriate access

Benefits

• ED orders placed electronically 100% of the time
• ED triage time reduced 60%
• Pharmacy turn-around time reduced 24%
• Performance related calls down 75%
• Order modification decreased from 5.8% to 0.6%
• No documentation issues during last Joint Commission survey – first time in 20 years
Denver Health
Denver, CO

Facility

• 500 bed teaching hospital which serves as the safety net hospital for the State of Colorado – Motto is “to provide level one care for all”
• Awarded the 2009 University Health System Consortium Rising Star in Safety & Quality award

Goal

• Improve quality & enhance patient & organizational value; Utilize the EHR as a goal enabler

Technology

• Robust Cisco infrastructure network; one gigabyte backbone; fully-distributed
• SONET ring (10 megabyte) is used to support the ambulatory health centers
• Utilize two data centers, fully provisioned with redundant power & redundant cooling
• Servers are standardized on Dell as the base hardware – heavily virtualized operation
• Run geographically tolerant storage database; fully-replicated across data centers to assure 99.9% availability
• Zero client PC environment is maintained with Citrix as the back end
• Access gained with smart cards to thin clients; two factor authentication required
• Hardware is standardized to ease maintenance & control costs
Denver Health
Denver, CO

Technology

- Monitoring systems are used that send alerts to support staff for infrastructure issues
- Development is done internally with some outside consultants used
- Nurses and physicians are heavily involved in system design and testing
- LEAN concepts from the Toyota Production System have been adopted for system development, testing & implementation of systems
  - Vertical value stream assessments & rapid improvement events are utilized to identify current, ideal & future states
  - Use iterative cycles of design-develop-test for rapid development of applications
    - eliminated development rework
- Training includes hands-on, web-based & at-the-elbow training
- IT partners with vendors to provide enhanced products & services on aggressive timelines
- Utilize dedicated project managers & proven project management methodologies
- Projects are supported by the hospital Board & Chief Executive Officer
- Project governance includes key stakeholders & vendor partners
- Merged IT & health information management departments
- Learned through experience to focus on workflow and then technology
- Use objective measures to demonstrate the value of technology investments
Benefits

- Using LEAN, have reduced development time by up to 50% and implementation costs by 30%
- CPOE has provided an 83% reduction in turn-around time for medication orders
- Demonstrated medication risk avoidance of approximately 300 doses/month
- Reduction 400,000 pharmacy call-backs to clarify orders
- Order legibility has improved 100%
- At level five on the HIMSS EMR analytic model. Once physician documentation is implemented, Denver Health will move to level seven
MCGHealth, Inc.
Augusta, GA

**Facility**
- 478 bed adult & 154 bed children’s medical centers; ambulatory & specialized centers
- Recognized as a Top 100 Hospital organization

**Goal**
- Deploy integrated clinical solutions across the enterprise

**Technology**
- Robust infrastructure with clustered servers and high availability fail-over capabilities
- Building a disaster recovery system for continuity and sharing information with partners
- Public and private wireless networks available throughout the enterprise
- Physicians use handhelds and blackberry devices in addition to laptops
- Utilize bedside workstations and computers on wheels
- Utilize single sign on for clinical applications – testing smart cards & biometrics
- Onsite desktop support at the hospital – data center is offsite
- Systems are monitored 24 x 7; on call system to resolve issues
- Shared project management between a project manager, IT lead & operational project lead
- Most application development done internally – consultants used for go live events
MCGHealth, Inc.
Augusta, GA

Technology

- Use an interdisciplinary clinical transformation team responsible for workflow redesign, system design & testing
- Use “super docs” for testing of physician functionality & for training other physicians
- Clinical application team is small, lean & productive; projects completed on time & under budget
- End user support provided by an RN-staffed clinical response team on a 24 x 7 basis
- Physician executive team reviews and approves system enhancements
- Downtime procedures are required of each hospital department
- Interdisciplinary downtime group meets monthly to plan for scheduled downtime
- Web-based applications have been developed to support registration, order entry & medication administration during downtime; for ambulatory care similar applications exist for the problem list, allergy list & medication records
- Serve as a developing partner of the East Georgia Healthcare Cooperative which will allow for an exchange of patient data with a neighboring county

Benefits

- Quantifiable benefits not obtained
Achieving Excellence
Eastern Maine Medical Center
Bangor, ME

**Facility**
- 2008 Nicholas E. Davies award winner for organizational excellence
- 411 bed tertiary care center – hub referral hospital for 21 hospitals
- Participates in the Maine HealthInfoNet project

**Goal**
- Clinical transformation (patient safety & quality) – technology served as an enabler
- Have all providers treat a patient using a single, shared electronic system
- Design, build & maintain an EHR

**People**
- Developed defined structure, accountable to hospital Board & health system’s governance committee
- Provided hospital & medical staff leadership support
- Established project management office
- Developed an EHR roadmap guided by the HIMSS EMR analytic model
- Involved day-to-day staff & physicians in decisions
Eastern Maine Medical Center
Bangor, ME

**Process**
- Assigned project managers for each project
- Followed Project Management Institute (PMI) practices when managing projects
- Used LEAN methodology for process redesign
- Established patient first care coordinator positions
- Introduced a formal change management program
- Required that all users demonstrate EHR competency before system use

**Technology**
- Required information technology transparency – encouraged input from end users & conveyed the status of all submitted tickets via an online system
- Allowed end users to select their own hardware devices
- Continues to use dashboards to provide real-time data on cost & quality to physicians
- Continues to devote sufficient time to planning for the future & to the analysis of completed projects to establish best practices
Eastern Maine Medical Center
Bangor, ME

Outcomes

• Nicholas E. Davies Award for Organizational Excellence
• Decreased medication errors
• Improved overall efficiency
• Reduced the cost of providing care
• At level four on the HIMSS EMR analytic model at the time of the Davies award.

Eastern Maine Medical Center plans to be at level seven in 2011
Lessons Learned

- Assuming selection of a certified product, organizational culture and effort rather than product is a better predictor of success.

- Workflow processes must be re-engineered, including clinic policies and procedures, job descriptions, and scheduling and billing workflows.

- Involve stakeholders from the beginning. Physician involvement is key to success.

- Develop a plan to manage change and provide governance to ensure rapid decision making.

- Demonstrate the support of senior leadership, communicate frequently and build consensus.

- Train end users by hospital staff members who understand the culture and workflows.
Accessing HIMSS Workflow Toolkit

• HIMSS members can obtain the workflow toolkit by accessing the HIMSS website and clicking on Topics & Tools > Electronic Health Record > EHR Adoption
Panel Discussion

Thank You for Your Attention & Participation