Lessons from the Trenches:
Implementation of an Automated Patient Safety System

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St. Joseph Health System
CRG Medical, Inc.

Society for Health Systems/ASQ Healthcare Division Conference
February 27, 2010 in Atlanta Georgia
<table>
<thead>
<tr>
<th>History of Incident Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1970</strong> Institute of Medicine (IOM) was created as an additional component of the National Academy of Sciences</td>
</tr>
<tr>
<td><strong>1976</strong> Dr. Don Mills conducted one of the first studies on patient safety</td>
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<tr>
<td>• Reviewed over 20,000 medical charts</td>
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<tr>
<td>• Found that 1 out of 20 patients was harmed by treatment</td>
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</tbody>
</table>
Crossing the Quality Chasm: A New Health System for the 21st Century

- "Care is based on continuous healing relationships"
- "Care is customized according to patient needs and values"
- "The patient is the source of control"
- "Decision making is evidence-based"
- "Safety is a system property"
- "Needs are anticipated"
- "Transparency is necessary"
- "Knowledge is shared and information flows freely"
- "Waste is continuously decreased"
- "Cooperation among clinicians is a priority"
National Quality Forum

- Est. in 1998 by President’s Advisory Commission on Consumer Protection and Quality
- Provides guidelines for
  - Quality care for patients
  - Protection for workers and consumers
  - Classified 27 events which outline criteria for adverse event reporting
**National Patient Safety Quality Improvement Act**

- Public Law 109-41 was est. in 2005
- Intended to improve patient safety through use of voluntary and confidential adverse event reporting
- Created Patient Safety Organizations which aid in
  - Gathering and analyzing general patient safety and adverse event information
Importance of Reporting Systems

- Allows Communication among providers concerning potentially harmful events
- Provides info. which gives providers opportunity to learn from past mistakes
- Can be used to establish protocols that prevent events from reoccurring

The urgency of improved patient safety and healthcare quality can be facilitated through the use of comprehensive web based reporting systems.
Factors Impeding the Successful Use of Reporting Systems

- Fear of punitive repercussions
- Misunderstanding the nature of adverse events reporting
- “Blame and shame” culture
Investigating Incident Reporting

Doctors engaging in adverse events reporting

- Reporting to colleagues vs. superiors
- Reporting to superiors if event was caused by violation of protocol
Barriers of Incident Reporting

- Lack of knowledge pertaining to events appropriate for reporting
- Fear of blame
- Confusing reporting processes
- Infrequent feedback concerning outcomes of report
National Patient Safety Agency of England

Investigated relationship between hospital culture and error reporting of 148 hospitals

- Perceived positive culture
- Safer hospitals
- Increased event reporting & patient safety
Web Based Reporting Systems

Web based systems increase adverse events reporting

Study used educational tools to inform employees of the purpose behind reporting, the importance of it, and the operational fundamentals of the electronic system.
Researchers in Japan found similar results after implementing a system that was:

- Voluntary
- Non punitive
- Web based

Nurses monthly reporting increased from 45 to 177. Knowledge from these increased reports lead to improvements in:

- Drug searching methods for computer prescriptions
- Elimination of “look alike” drugs
- Operation of syringe pumps
- Error detecting systems for blood transfusions
St. Joseph Health System

A Quest for Excellence
St. Joseph Health System

- Est. in 1936, SJHS of Bryan includes
  - St. Joseph Regional Health Center
  - St. Joseph Rehabilitation Center
  - Two long-term care facilities
  - Three critical access hospitals
  - Eight rural health clinics
  - A managed care division
  - St. Joseph Foundation
  - Property company

- SJHS serves an extended 7-county area of Brazos Valley
- Sponsored by the Sisters of Saint Francis of Sylvania, Ohio
SJHS Journey to Excellence

- Malcolm Baldrige National Quality Award
- Management framework supporting performance excellence
  - Ever improving value and healthcare quality to patients and stakeholders supporting organizational sustainability
  - Improved organizational effectiveness and capabilities
  - Organizational and personal learning
- Core values and concepts-learning
- Award criteria
  - Manage organizational knowledge
    - Collection and transfer of workforce knowledge
    - Rapid identification, sharing, and implementation of best practices
- Key terms
  - Knowledge assets
Texas Award for Performance Excellence

- Received the TAPE in 2007
- Effective knowledge transfer mechanism from top down, but not bottom up, not between facilities
- Paper based event reporting system adversely affecting patient safety communication
- Collaborated with CRG Medical to employ electronic event recording and analyzing system
St. Joseph Health System

- Focuses on patient safety and improved health care by learning from
  - adverse events that harm patients
  - events with no harm
  - near misses
- Analysis begins with all stakeholders at the point of service
- Addresses health care workers concerns regarding openness and transparency in health care delivery
CRG Medical

CRG Medical approach follows the Toyota Production concept of Kaizen or “continual improvement”
CRG Medical Concept

- Building institutional knowledge gained from the knowledge workers who are the experts on their process

- Knowledge Workers own the processes and know best how to implement them

- Knowledge workers can identify
  - Process weaknesses
  - Potential failures
  - “Work-arounds”
CRG Medical’s KBCore

KBCore is a Patient Safety Knowledge Building platform

- Caregivers can communicate issues of concern in real time
- Condition or event is analyzed at point of delivery of care by the caregiver
- Caregivers provide solutions or recommendations for improvement
CRG Medical’s solutions allow you to improve quality and reduce risk in a systematic process.
Encourage management and caregivers to not only record harmful events but also near misses and events without harm.
Going Paperless

- Reporting systems do not prevent errors only people do
- However, an online paperless process trumps paper for several reasons:
  - Replaces paper with electronic notification
  - Allows immediate routing to management
  - Provides rapid sharing of knowledge
Going Paperless

- Involves front line worker
- Pulls tacit knowledge from the front line into explicit knowledge
- Provides caregiver analysis of problems at the point of care
- Provides an easy way for front line workers to submit ideas to fix identified problems
- System does more than document facts and narrative- a Mini - RCA
Essential Elements

- Requires commitment from the top (a given but must be said)

- Requires one person who owns the project

- Enterprise rollout plan: main hospital, clinics, CAH, long term care facilities (requires additional material for state reporting)
Reflects Culture

- SJHS basic culture & tenets were incorporated into the project: trust and transparency
- As a matter of principle:
  - There is no limiting of access to data entry
  - There is no limiting of access to individual case reports
  - All managers can run reports on any event type, follow-up comments, or unit
- As one Director noted, this was a massive change from the hard copy system.
Flexibility in Development

- Requires a "core" set of fields and values but the ability to customize/modify is critical
  - SJHS modified the order of the STEPS
  - SJHS modified the organization of the contributing factors
  - SJHS customized the module by adding the interventions already in place for falls and PU
  - SJHS customized the module by adding a specific type of follow up report
  - All modifications had to be tested and a pilot for problem identification.
Required Effort

Due to other enterprise wide projects, a massive training program was not possible. Therefore a unit by unit "just in time" training was initiated.

- Requires ongoing maintenance of user data base
- Requires one person who has an enterprise wide view to route, track, and monitor trends.
- Requires whoever looks at all events, looks for completeness, accuracy, and review of follow-up
Outcomes - Success is not 100%!

SIX MONTHS INTO IMPLEMENTATION

• Main hospital, three CAH, all clinics on board

• System being customized for LTC reporting requirements

• Staff are using the system despite follow-up from administration

• Managers do not always document their follow-up

• Not all areas are as compliant as others
Outcomes – any surprises?

- We did expect to learn what is happening in the organization and to obtain the direct care giver perspective on the “why and how”
- Suggestions from front line workers
## Going Paperless - Outcomes

**How is it working?**

<table>
<thead>
<tr>
<th>Events ratio tends to be 40+% falls and 40+% medication variances</th>
<th>SJRHC's has 43% falls and 57% other (separate medication system).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing Factors: many times the &quot;CF&quot; is &quot;patient&quot;</td>
<td>SJ's indicates 35% &quot;patient&quot; with communication, environment, equipment, documentation.</td>
</tr>
<tr>
<td>Intervening Factors - we hope for the following: equipment, protocol, team and family</td>
<td>SJ's has 50% in these selections</td>
</tr>
</tbody>
</table>
Outcomes Information From the Frontline

• Reasons for events can be shared across event types and units
• Contributing Factors provide a “mini RCA”
• Intervening factors provide data on what was done to stop an event from worsening
• Category Specific Intervening Factors (falls and PU) provide data on what prevention mechanism did not work in these cases
Outcomes

Benefits for Managers

- Managers have instant access to their own data
- Fall data was ratio by unit. Now Nursing has content re: falls
- Get more than "just the facts“, get the reporters assessment of the reasons-contributing factors.
Login
Entering Events in KBCore

**Main Menu**

<table>
<thead>
<tr>
<th>Events</th>
<th>Reports</th>
<th>Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events</td>
<td>Reports</td>
<td>Administration</td>
</tr>
<tr>
<td>New</td>
<td>Users</td>
<td>Users</td>
</tr>
<tr>
<td>Search</td>
<td>Ratio Data</td>
<td>Ratio Data</td>
</tr>
<tr>
<td>Modify</td>
<td>Export</td>
<td>Export</td>
</tr>
<tr>
<td>Remove</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Who/What was involved?

Event Related To
Last Name
First Name
Medical Record #
Claim #
Age
Date Birth (format: month/day/year)
Gender
Contact Information if not a patient
Name of Attending Physician

2. If patient related, select unit or area
- Patient Unit

3. Select Clinical Service
- Clinical Services
Describe the event

4. Where did the Event Occur?
   - Event Unit

5. Date of occurrence
   - (format: month/day/year)

6. Time of occurrence
    -

7. Location of occurrence
    -

8. What level/case type status is the event?
   -

9. What actual injury occurred?
   - Injuries
Case type

- Category by “Case type”: what type of events are reported?
  - with harm?
  - without harm?
  - near miss?
- Case type allows comparisons between near misses and other event types
- Measuring Case type is a proxy for the culture of reporting
Describe the event

4. Where did the Event Occur?
   - Event Unit

5. Date of occurrence
   - [Format: month/day/year]

6. Time of occurrence
   - [Hour/Minute]

7. Location of occurrence
   - [Field]

8. What level/case type status is the event?
   - [Dropdown]
     - Claim (for admin only)
     - Event to RCA (for admin only)
     - Hazardous condition
     - Incident with harm
     - Incident with no harm
     - Lawsuit (for admin only)
     - Near miss
     - Unknown

9. What actual injury occurred?
   - Injuries

[Step 2 of 8]
10. **Description of the event**

(You may enter up to 4000 characters.)

11. **What was done to reduce possible harm for this event?**

(You may enter up to 4000 characters.)

12. **How could this have been prevented in future?**

(You may enter up to 4000 characters.)
13. What is the category of Event? Select only One Category. More than one Sub-Category may be selected

- Categories
  - Behavioral
  - Blood/Blood product
  - Concern-employee or patient/family
  - Confidentiality/HIPAA complaint
  - Decubitis
  - Documentation
  - Equipment
  - Falls
  - Infection
  - Medication/IV
    - Miscellaneous
  - Nutrition
  - Other
  - Physical environment
  - Safety
  - Security
  - Treatment/Surgery/Procedure
14. What were the factors that contributed to this event?
   - Contributing Factors

15. What were the intervening factors in use or used during this event?
   - Intervening Factors

16. Category Specific Contributing factors
   - Contributing Factors Cat Sp

17. Category Specific Intervening factors
   - Intervening Factors Cat Sp
18. What were the affected body parts?
   - Body Parts
     - Selected: Ear-left

19. Did any of the outcomes occur?
   - Outcomes

20. Severity
   - Death
   - Emotional only
   - Legal only
   - Major permanent
   - Major temporary
   - Minor permanent
   - Minor temporary
   - No injury
   - Not Applicable
   - Other
   - Pending Classification
   - Unknown
Follow-up action

21. What internal contacts were notified?

- Notifications
  - Administration
  - Clinical Engineering
  - Consult service
  - Family Notified
  - Maintenance
  - None
  - Nursing Dept/ House Supervisor
  - Other dept
  - Peer Review Committee
  - Pharmacy
  - Physician
  - Police
  - Quality
  - Risk Management
  - Unknown

Name of the Physician Notified

22. What follow-up actions were taken?

- Follow up
24. Reporter Information

Last Name

First Name
Recording in KBCore

- **Standard reports** with defining criteria allows the staff person to start doing reports without creating their own.
- **Using the criteria** provides a broad range of reports, both bar and run charts, from the same template.
- Reports are **web-based**, that is, do not require download to Excel or Access.
- Exports all data elements to Excel.
### Generating Report(s)

Select the report(s) to be generated:

<table>
<thead>
<tr>
<th>Report Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category By Age</td>
<td></td>
</tr>
<tr>
<td>Category By Case type</td>
<td></td>
</tr>
<tr>
<td>Category By Clinical Service</td>
<td></td>
</tr>
<tr>
<td>Category By Contributing Factors</td>
<td></td>
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<tr>
<td>Category By Gender</td>
<td></td>
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<tr>
<td>Category By Severity</td>
<td></td>
</tr>
<tr>
<td>Category By Specific Contributing Factors</td>
<td></td>
</tr>
<tr>
<td>Category Ratio data</td>
<td></td>
</tr>
<tr>
<td>Category by Event Unit</td>
<td></td>
</tr>
<tr>
<td>Category by Injuries</td>
<td></td>
</tr>
<tr>
<td>Category by Intervening Factors</td>
<td></td>
</tr>
<tr>
<td>Category by Patient Unit</td>
<td></td>
</tr>
<tr>
<td>Category by Specific Intervening Factors</td>
<td></td>
</tr>
<tr>
<td>Count of Events By Category</td>
<td></td>
</tr>
<tr>
<td>Count of Events by Fiscal Quarter</td>
<td></td>
</tr>
<tr>
<td>Count of Events by Time of Day</td>
<td></td>
</tr>
<tr>
<td>Follow up To Do Tracking Report</td>
<td></td>
</tr>
<tr>
<td>Follow up Tracking Report</td>
<td></td>
</tr>
<tr>
<td>Injury by Severity</td>
<td></td>
</tr>
<tr>
<td>Single Case</td>
<td></td>
</tr>
<tr>
<td>Unit/Clinic Manager Morning Report by Event Unit</td>
<td></td>
</tr>
<tr>
<td>Unit/Clinic Manager Morning Report by Patient Unit</td>
<td></td>
</tr>
</tbody>
</table>

Available: 22 reports
Looking at Data - Standard Data capture

- Count by Quarter: All category types - a trend report - how many and what categories?
- Count by Category: All category types - how many of each event type
- Category by Unit: department and unit/area
- Category by Clinical Service for physicians
- Severity
  - Category by Severity
  - Category by Injury Type
  - Injury by Severity
Drilldown Capability

- Category by Unit Drilldown to different administrative levels
- Category by Contributing Factor- looking at detail of one CF across all categories
- Looking at detail of one category but drilling down into detail of CF's
- Lowest level:
  - drilldown by unit, category subtypes x factor subtypes (ex, fall subtypes x CF subtypes)
Use of Case-type for Measuring Culture

- Case-type allows comparison of events that have not harmed patients to events that have harmed patients
- Provides an early warning system
- Measuring ratio of near misses to events that reach a patient provides a proxy measure of culture
- Comparing RCA contributing factor to current event contributing factors indicates status of performance improvement efforts
Learning more about Events and Near Misses

- Contributing Factors - what started the event
  - Learn what CF are the same or different between categories of events/areas/units/demographics of patients
  - Compare and contrast without doing a specific study
  - What are the differences between misses and hits?
- Intervening Factors - what stopped the event from becoming worse
  - What Interventions relate to which categories
  - What Interventions relate to which Contributing Factors
Going paperless - What did we learn?
Simple charts lead to further review

Staff report more events without harm than with harm (positive culture)

Note: Event to RCA Compares past to present
Going paperless- What did we learn?
Contributing Factors from the Frontline

“Common Cause” may be identified across event types

Staff spend time on their selections, and are willing to check Management and Organizational factors
Going paperless - What did we learn?
Prevention mechanism in place prior to fall

Customized for the facilities’ Safecare
Fall prevention program

Mini RCA without chart review

Note: these mechanisms worked for patients who did not fall
Going paperless- What did we learn?
Fall specific Contributing Factors= Mini RCA

For each type of fall, what are the Contributing factors?

Mini RCA without chart review
How to Create Charts from the Data Collected in KBCore

1. **Export Raw Data from KBCore into Excel**
   - Use Excel Pivot Tables to refine data.
   - Use the QI Macros for Excel to create charts.

### Individual Staff Factors by Reason

<table>
<thead>
<tr>
<th>Reason</th>
<th>Individual (staff) factors</th>
<th>Decisions</th>
<th>Rules based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decisions</td>
<td>Individual (staff) factors</td>
<td>Decisions</td>
<td>Rules based</td>
</tr>
<tr>
<td>Distraction</td>
<td>Individual (staff) factors</td>
<td>Decisions</td>
<td>Rules based</td>
</tr>
<tr>
<td>Ability based</td>
<td>Individual (staff) factors</td>
<td>Decisions</td>
<td>Rules based</td>
</tr>
</tbody>
</table>

### Chart Examples

- Bar chart showing percentage of events by reason.
- Line chart showing trends over time.
- Pie chart showing distribution of reasons for events.

### Data Example

<table>
<thead>
<tr>
<th>Event ID</th>
<th>Patient</th>
<th>Child1</th>
<th>Child2</th>
<th>Child3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<td>4</td>
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<tr>
<td>5</td>
<td></td>
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</tr>
</tbody>
</table>
Improvement Story: Contributing Factors

Contributing Factors by Reason

- Individual (staff) factors: 17 (30.4%)
- Patient factors: 9 (16.0%)
- Environment: 7 (12.0%)
- Management systems: 6 (10.0%)
- Equipment/technology: 4 (7.0%)
- Organizational: 4 (7.0%)
- Policies and procedures: 4 (7.0%)
- Other: 1 (2.0%)
- Team factors: None (0.0%)
Improvement Story: Individual Factor Pareto

Individual Staff Factors by Reason

- Decisions: 5, 29.4%
- Knowledge based: 4, 24.4%
- Communication between patient/caregiver: 3, 17.6%
- Skill based: 2, 12.3%
- Ability based: 1, 6.2%
- Distraction: 1, 6.2%
- Physical ability: 1, 6.2%

Bar graph showing the distribution of events by reason, with Decisions being the most frequent (29.4%) and Physical ability being the least frequent (6.2%).
References


Institute of Medicine (2001). Crossing the Quality Chasm: A New Health System for the 21st Century


Whitson ,T., Garten , B., & Lewis ,Jon.(2009). Indiana medical error reporting system. Indiana State Department of Health

www.IOM.edu
http://www.hcqualitycommission.gov/
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