Leveraging Technology for Nursing Handoffs

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Northwestern Memorial Hospital
This project was approved by the Institutional Review Board of Northwestern University.

The authors declare that they have no vested interest in any product or company referenced in this presentation.
Agenda

• Introduction to Northwestern Memorial Hospital
• Background
• Pre-implementation Findings
• Electronic SBAR Design and Implementation
• Post-pilot Findings
• Conclusions
Northwestern Memorial Hospital

• Mission: “Academic Medical Center Where the Patient Comes First”

• Strategic Goals: Best Patient Experience, Best People, Exceptional Financial Performance

• Primary Teaching Affiliate of Northwestern University’s Feinberg School of Medicine (>500 Residents / 125 Fellows)

• RNs 1000
State of the Art Facilities

- $580 Million Redevelopment Project
- 3 Million square feet covering one city block
- High Tech – “Most Wired”
- Level I trauma networks and Level III neonatal intensive care unit
  - 9000+ deliveries

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Beds</td>
<td>744</td>
</tr>
<tr>
<td>Total Admissions</td>
<td>43,312</td>
</tr>
<tr>
<td>Total Outpatient Visits</td>
<td>438,979</td>
</tr>
<tr>
<td>Total Outpatient Clinics</td>
<td>13</td>
</tr>
<tr>
<td>ED Visits</td>
<td>73,881</td>
</tr>
<tr>
<td>Average Daily Census</td>
<td>596</td>
</tr>
</tbody>
</table>
NMH Medical Record:
96% of the Inpatient Health Record is Electronic

*Medical Record:*
- **NMH Medical Record:** 96% of the Inpatient Health Record is Electronic.
- **Chart:** A bar chart showing the percentage of electronic inpatient health records across different months and specialties.
- **Specialties:** Medicine, Surgery, OB/GYN, Psych.

*Legend:*
- Medicine
- Surgery
- OB/GYN
- Psych

*Percentages:*
- April 2003: 17.8%
- June 2003: 35.3%
- March 2004: 47.4%
- August 2004: 61.8%
- November 2004: 67.0%
- March 2005: 79.9%
- May 2005: 82.3%
- August 2005: 84.7%
- October 2005: 90.9%
- December 2005: 92.6%
- July 2008: 95.7%
Implementation of the EHR

**Clinical Decision Support**

**ANCILLARY NURSING**
- All Results On-Line
- Bedside Nursing Documentation
- Electronic Medication Administration Record
- Ancillary & Procedural Documentation
- Pharmacy System
- Lab Order Entry
- Surgery

**PHYSICIAN FOUNDATION TECHNOLOGY**
- IT Data Warehouse
- Data Warehouse
- Ambulatory/ Clinic Rollout
- CPOE with basic Decision Support (order sets, allergies)
- Physician Documentation
- Select Focused Alerts/drug interactions & dose alerts

**ANCILLARY**
- Radiology System

**IT**
- Foundation Technology

**2001 2002 2003 2004 2005 2006 2007/2008**

- Passing grade Leapfrog CPOE
Background
Maximizing the Quality, Safety, and Efficiency of Handoffs

- Handoffs present a known threat to patient safety
- Transfer of accurate information is fundamental to provision of safe and effective care
- Higher levels of nursing time per patient-day are associated with better patient outcomes*

Elements of an Effective Handoff

- Face-to-face verbal report with written / paper summary
- Availability of current, up-to-date information
- Information given in predictable order
- Limited interruptions
- Unambiguous transfer of responsibility

Identified Handoff Failures

• Content omissions / missing information
• Lack of current information
• Failure-prone processes
  – Double handoffs
  – Not face-to-face
  – Illegible notes

Nursing Efficiency

• Little attention to date on nursing change-of-shift report practices, but . . .

• Time and motion study: nursing documentation accounted for 27 per cent of total shift time*

• Maryland Nursing Workforce Commission survey: nurses estimate that they spend 25 to 50 percent of time on documentation**

• 63 percent reported that they often or very often were kept from spending as much time with patients as needed**


**Maryland Nursing Workforce Commission. (2007). Challenges and Opportunities in Documentation of the Nursing Care of Patients.
Physician Sign-out Reports

• Preliminary advances in electronic sign-out sheets from medicine

• UWCores system at the University of Washington

• Adaptation at NMH
# Physician Sign Out

## Northwestern Memorial Hospital

**Physician Signout**

**Service List:**

**LOCATION:** Feinberg 16 E

### Admit Date

- **DOB:** 
- **MRN:**
- **ATN. MULCAHY, MARY F.**
- **PCP. MULCAHY, MARY F.** [ph: 707-0894]

### Allergies

- **No Known Allergies**

### Scheduled

- Dexamethasone Tab 4 mg PO Daily (8 AM)
- Dicoumes Sodium Gluconate Tab 2 Tab PO BID
- Lactose Oral Soln 30 mL PO Daily

### Code Status

- **Patient does NOT have active DNR order**
- **CBC/Chem (most recent within 30 days)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>137</td>
<td>102</td>
<td>18</td>
</tr>
<tr>
<td>4.0</td>
<td>28</td>
<td>0.7</td>
</tr>
<tr>
<td>91</td>
<td>9.0</td>
<td>30.5</td>
</tr>
<tr>
<td>306</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Vital Signs (last 3 within 24 hours)

- **Date/Time:**
  - 06/12 14:00
  - 06/12 07:04
  - 06/11 22:49

- **Temp:**
  - 96.3
  - 97.5
  - 97.8

- **BP:**
  - 96/49
  - 95/57
  - 97.8

- **Pulse:**
  - 87
  - 77
  - 24 Hr Tmax

- **RR:**
  - 20
  - 20

- **SaO2:**
  - 93
  - 96

- **FiO2:**
  - 0

### Additional Labs

- **Date/Time:**
  - 06/03 19:41
  - 06/03 19:41
  - 06/03 19:41
  - 06/04 03:46

- **Type:**
  - INR
  - FTT
  - CA
  - PHOS

- **Val:**
  - 3.1 H
  - 56.6 H
  - 8.9
  - 4.3

### Written Notes

- Admit Weight: 61 kg
- Current Weight: 58 kg
- 06/11 07:11
- 06/03 22:05

---

**Printed:** 06/12/07 16:21

**Run By:** NISmith

**Script:** LP_PM_PHYSICIAN_ROUNDS
Key Factors for Consideration

• Failures in communication between healthcare personnel have been clearly implicated as a threat to patient safety
• Reporting tools are fundamental to an effective framework for clinician communication
• Tools must reflect key patient information, be legible, relevant, accurate, and up to date

Leveraging existing electronic clinical information can streamline and simplify workflow processes and generate intended results.
Pre-Implementation Findings
Baseline Nursing Handoff Practices at NMH

• Nursing shift report involved transcription of information from the electronic medical record to paper

• Unit-created paper forms in SBAR format in place, but use varied

• Broad identification of a need for an electronic standardized report form
To obtain nurses’ perceptions of the quality, safety, and efficiency of change of shift reporting

- Administered online in September 2007
- 198 of 1000 RNs responded (19.8%)
- Wide range of clinical units from all shifts
Time to Prepare Report on Each Patient

- 37% respond in <5 minutes
- 45% respond in 5 - 15 minutes
- 13% respond in 15 - 30 minutes
- 7% respond in 30 minutes or more, varying according to shift
Total Time to Prepare Report for All Patients

- <5 Minutes: 10%
- 5 - 15 Minutes: 29%
- 15 - 30 Minutes: 32%
- 30 - 60 Minutes: 16%
- >60 Minutes: 8%
- Varies according to shift: 6%
20% rate their own reports as excellent, but only 7% rate the reports they receive as excellent!
Can you think of a time that something bad happened or almost happened because you did not receive a complete or accurate report?

- Medication/procedure given late or not done
  - Repeat electrolyte levels not done after administering potassium
- Medication/procedure not documented
  - The previous RN had not charted a particular medication, so could not determine if it had been administered
  - Patient was supposed to receive coumadin but order not signed off
- Information missing from report
  - DNR status, DVT information, previous fall, patient confusion, patient isolation, complicated surgery (close observation required), vital signs

30% responded “yes”
What is the most challenging thing about current report practices?

• Completing report
  — Being concise
  — Lack of time to prepare report and give handoff
  — Including relevant information only

• Receiving report
  — Inaccurate and missing information
  — Reading handwriting

• SBAR form
  — Not being able to use PowerChart to download information

• Lack of consistency
  — Discrepancies between report sheet and orders
Do you have suggestions for improving the report process?

• Computerize the form
  – Have a computer-generated sheet on PowerChart that populates with necessary information that does not need to be written out each day (e.g., patient demographics, history, allergies), with space to type in additional information and that can be updated throughout shift for next shift

• Completing the SBAR form and handoff
  – Be specific and concise during handoff
  – Standardize reporting process and form across the hospital
Electronic SBAR Design and Implementation
Multiple Levers Create a Powerful Platform for EHR Adoption

Leadership & Organization

Deployment Strategy

Design

Optimization

Adoption and Innovation
Leadership & Organization

• Nursing leadership initiative to standardized change-of-shift report, 2006
  – Improvement initiative using the SBAR template (Situation, Background, Assessment, Recommendation)

• CNE charged nursing informatics committee to create electronically generated SBAR form

• Convened workgroup – June 2007
  – RN representatives from all inpatient care areas, Information Technology, patient safety, and informatics
  – Charged group with design, development, and implementation of electronic SBAR
Overview

- **Linkage to BPE/BP/Finance:** Best People and Best Patient Experience
- **Problem Statement:** Nursing report shift to shift currently includes transcription of information from PowerChart to paper which is time consuming and risk prone due to the potential for transcription errors and incomplete information. As well, there is lack of standardization nurse to nurse and unit to unit for report information transfer.
- **Goal/Benefit:** Improved accuracy of information used for nursing report by developing an electronic report that pulls electronically recorded information into a template that can be printed. Identification of core patient information (based on specialty) for patient status, care delivery, and recommendations will facilitate standardization of the report process.
- **Scope:** Develop electronic SBARs for the following specialties: OB/Gyne, Neonatal Intensive Care Unit, ICUs, Med/Surg, and Psychiatry
- **System Capabilities/Deliverables:** Development of a report that pulls specified patient information from the medical record, allows the addition of free text content either electronically or written, and can be printed and used for nurse to nurse report.
- **Resources Required:** IT, Nursing Technology & Informatics Committee, identified task force members from across nursing specialties, quality/clinical informatics, patient safety

**Key Metric(s):** baseline

- **Report times:** Preparation 5-15 mins/ patient
- **Quality of report:** Nurse recollects time that something bad happened or almost happened because of not receiving complete or accurate report - 31% yes
- **% Units using electronic SBAR for report:** 0%

**Milestones:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Date (mo/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Report design</td>
<td>July 07 - February 08</td>
</tr>
<tr>
<td>#2 Baseline metric measurement</td>
<td>September 07</td>
</tr>
<tr>
<td>#3 Pilot implementation 12E Feinberg</td>
<td>March 8, 2008</td>
</tr>
<tr>
<td>#4 Med-Surg Roll out – tbd</td>
<td></td>
</tr>
<tr>
<td>#5 Other specialty report development and roll out - tbd</td>
<td></td>
</tr>
</tbody>
</table>

**Sponsor:** Julie Garrett  
**Project/Process Owner:** K. Leonard/C. Cabansag  
**Improvement Leader:** S. Kitt
Design

• **Review of standard inpatient SBAR content**
  - Collected all specialty versions of paper SBAR
  - Found variability in content
  - Variability in format (3 per page vs. one)
  - Trialed MD sign-out as a potential solution
Design

• **Design decisions**
  - SBAR format in landscape orientation
  - Agreement to “pull in” as much of desired EMR content as possible
  - Identified minimal standard information (not sub-specialty based)
  - Allow free text capability (either electronically or on paper)
  - Accommodate need for paper version workflow
  - 3 patients/page
  - MD sign-out not sufficient

• **Mock-up**
# Paper Nursing Report Tool: SBAR Format

<table>
<thead>
<tr>
<th><strong>S</strong> (Situation)</th>
<th><strong>B</strong> (Background)</th>
<th><strong>A</strong> (Activity/Assess Care)</th>
<th><strong>R</strong> (Required Activities for Next Shift)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient: ___</td>
<td>Activity (circle):</td>
<td>Medication Update (include TPN/Split):</td>
<td>Scheduled: ___</td>
</tr>
<tr>
<td>Room No. ___</td>
<td>Ad Lib ___________</td>
<td>Medication</td>
<td>Need to be scheduled: ___</td>
</tr>
<tr>
<td>Age: ___ Gender: ___</td>
<td>Rest _____________</td>
<td></td>
<td>Need to be scheduled: ___</td>
</tr>
<tr>
<td>Date of Admission: ___</td>
<td>Up with assist __</td>
<td><strong>B</strong> (Background)</td>
<td>Discharge Planning Issues/Outstanding Patient Education Requirements: ___</td>
</tr>
<tr>
<td>Admitting Diagnosis: ___</td>
<td>Turn q ____</td>
<td><strong>A</strong> (Activity/Assess Care)</td>
<td>Other Treatment/Plans/Patient Issues: ___</td>
</tr>
<tr>
<td>History: ___</td>
<td>Non-weight bearing</td>
<td><strong>A</strong> (Activity/Assess Care)</td>
<td>Other Treatment/Plans/Patient Issues: ___</td>
</tr>
<tr>
<td><strong>Psychosocial:</strong></td>
<td>Intubated: No Yes</td>
<td><strong>A</strong> (Activity/Assess Care)</td>
<td><strong>R</strong> (Required Activities for Next Shift)</td>
</tr>
</tbody>
</table>
Design Build

• Iterative (to say the least)
  – Once “wish list” defined, feasibility determined
  – 3 patients per page (not feasible)
  – Landscape orientation for printing (not feasible)
  – Change in design based on results of coding (pending orders)

• Coding done in Cerner Command Language (CCL) for script
• Discern Visual Developer for formatting
• Data pulled from person table, results, orders and form documentation
Cerner Technology

- Cerner “Report Launched From PowerChart” functionality used
  - Add row to code set 16529 with script name, pc report as CDF meaning and visit as Description.
  - Set preferences at position level in Pref Maint to display report in chart.
  - Cycle servers 52, 54, 79 and 81 (or as appropriate for your site).
<table>
<thead>
<tr>
<th>Situación</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Paciente, Nombre</td>
</tr>
<tr>
<td>Número: 1111111111</td>
</tr>
<tr>
<td>Servicio: Cirugía General</td>
</tr>
<tr>
<td>Médico de Atención: Liebovitz, David</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Alergias: Sin Alergias</td>
</tr>
<tr>
<td>Riesgo del Paciente: Cae: Riguroso</td>
</tr>
<tr>
<td>Consultas: IR Consultation* 03/28/08 / Consulta de Nutrition Support Team</td>
</tr>
<tr>
<td>Problemas: MRSA/VRE ... (más..)</td>
</tr>
</tbody>
</table>
### Nursing SBAR

**Background**

**Reason for Hospitalization:** 3/6 GSW x 16 to chest/abd/head and to OR for ICP monitor placement.

**Past Medical History:** asthma, bronchitis, drug abuse

**Activity:**
- Up to chair
- I & O 8 Hour Shift Total (mL) Intake: 1000
- Output: 576
  - Urine: 575
  - NG Tube: 0
  - Others: 1
- R. DL PICC change 4/7, Foley cath and diaphragm in place

**Diet Order:**
- 4/2/2008 15:17: Tube Feedings - Intermittent
- 3/12/2008 10:39: NPO

**24 Hrs T Max:** 99.8

**Vital Signs:** Q 4Hrs
- Temp F: 150°/99
- BP: 105
- RR: 18
- SaO2: 100
- PrO2: 40
- Pain: 0

**Disoriented to:**
- PRN medications administered in the last 8 hrs
  - Pentazocine hydrochloride 04/03/2008 for tube

**Additional Labs:**
- CBC/Chem within 24 hours: LAST CHEM: 06/03 04:00
- 3/4/2008 Magnesium 2.6
- 3/16

**Last Medication Reconciliation done:** (date/time) and by:
## Nursing SBAR (Assessment & Recommendations)

### Assessment & Recommendation (Goals)

**Patient Assessment / IV Site / Wound Documentation Freetext:**
- Vitals Q4 hrs

**Active Restraint Order:** 04/03/2008 09:35

**Pain Documentation Freetext**
- Lt Shoulder, Chest, Rt forearm with 4+4

**Pending Labs & Procedures Freetext:**

**Radiology** IR Consultation* 03/28/2008 09:35 – Ordered

**Discharge Planning/Patient Education Issues Freetext**
- Case Management Note: Discharge Recommendations: Transfer to Acute Inpatient Rehab
Deployment & Optimization

• Finalized version piloted on one unit (Telemetry & Surgical Oncology)
• Training with job aide document
• Coaching support at change of shift
• Workflow process: 12 East, General Surgery (Pilot Unit)
  – Off going shift creates or updates existing form
  – Each patient SBAR is printed individually and organized in preparation for the next shift
  – Oncoming shift reviews the SBAR and utilizes during walking rounds
  – *Per nurse preference, the electronic updates are done throughout the shift or at the end of the shift.
Deployment & Optimization

• 4 month pilot (tweaks occurring along the way)
• Overall were very satisfied with tool, but…..
• Outstanding issues identified
  — Not easy to read
  — Fields weren’t static making it difficult to find information for each patient
• Decision to re-code to address above issues
• Final version just being finalized for implementation (July 08)

Don’t let perfection get in the way of progress, BUT, if fundamental issues exist, they must be fixed, despite timeline constraints!!
Post-Pilot Findings
Post Implementation Nursing Report Survey

To obtain nurses’ perceptions of the quality, safety, and efficiency of change of shift reporting

- Administered online in July 2008
- 18 of 40 RNs responded (45%)
- 32 from unit participated in pre-implementation survey
How long do you spend preparing report on each patient?

100% of report preparation takes 15 minutes or less
How long do you spend preparing report in total?

Largest shift to the 5-15 minute timeframe

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Pre-eSBAR</th>
<th>Post-eSBAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 5 minutes</td>
<td>0%</td>
<td>6%</td>
</tr>
<tr>
<td>5 - 15 minutes</td>
<td>28%</td>
<td>47%</td>
</tr>
<tr>
<td>15 - 30 minutes</td>
<td>52%</td>
<td>41%</td>
</tr>
<tr>
<td>30 - 60 minutes</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td>More than 60 minutes</td>
<td>14%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Do you feel your reports are...?

Slight improvement in perception of report quality

% of Responses

Unsatisfactory | Fair | Good | Excellent
---|---|---|---
0% | 14% | 69% | 17%
0% | 6% | 76% | 6%

Pre-eSBAR: %
Post-eSBAR: %
How would you rate the quality of the report you receive?

“Excellent” ratings increased 8-fold
Can you think of a time that something bad happened or almost happened because you did not receive a complete or accurate report?

6.9% responded “yes”

- My patient had a blood sugar of 35 in early am, it didn’t pull up on the SBAR and was not reported to me.

- Previous nurse didn’t update report sheet

- Patient had no IV access and RN didn’t explain situation, the patient really needed IV access
What is the most challenging thing about current report practices?

• Ensuring important patient information highlighted orally for receiving nurse
• Chemstick orders don’t show up
• Getting accustomed to the form
• Time to develop SBAR for new patients
• Waiting to print report until current days lab results are posted
Do you have suggestions for improving the report process?

• Bigger sections for free texting
• Awkward to read, not easy to locate information *(this will be fixed with the changes to be implemented)*.
• Nope, I love it!
Conclusions

• Electronic report format is the way to go

• Design that is incorporated into workflow is essential

• Stakeholder lead in design is imperative

• Can be used for situations beyond scope of charter
  – Downtime communication - print along with MARS
  – Patient transfers

• Future implementation and evaluation will be used to continue the improvement process