Building a Bridge Between Peri-OP and Inpatient Clinical Information Systems

All presenters have indicated they have no relevant financial relationships to disclose in regard to the content of this presentation.
Memorial Sloan-Kettering Cancer Center

Academic medical center focusing on cancer treatment and research, located in NYC and Tri-state region

- Est. 1884 – The world's oldest and largest private cancer center
- 470 Inpatient Beds
- 536,000 Outpatient Visits
- 19,000 Surgical Cases
- 11,400 Employees
- 2,000 Nursing Staff
Contents

- Objectives
- Project Initiation
- Current Process and Gap Analysis
- Building a Bridge between the Systems and its Considerations
- Implementation
- Outcomes
- Lessons Learned
Objectives

• Understand how information technology facilitates nursing workflows and practices through multidisciplinary team approach.

• Understand a strategic plan to develop interoperability data flow between multi-vendor information systems (perioperative and inpatient).

• Describe benefits of utilizing information systems for meaningful use as well as the technical and practical challenges throughout the implementation process.

Project Initiation: Short-Stay

- A short-stay postoperative program for surgical patients to be safely discharged within 23-hours
- Goal: To establish an efficient surgical patient workflow with improved clinical outcomes

Project team members:
- Operating Room and PACU Admin (MDs & RNs)
- Inpatient and Ambulatory Nurses
- Nursing Informatics team
- Information Technology (IT)
  - Periop team
  - Clinical Information System team (Orders team, ClinDoc team)
  - Interface team
  - Admitting

Proposed Plan:
- To build a systematic solution to identify criteria-based patient lists
- To establish efficient documentation processes reflecting patient and project outcomes
Identified Issues

- **Data Analysis Process:**
  - Paper documentation of initial post operative/procedure note (IP)
  - Illegibility
  - Resource & Time (manual)
  - Lack of Standardization

- **IS infrastructure:** A ‘Best of Breed’ method
  - eGATE: MSK interface engine to send critical information among multi systems (Allergy, Health Issues, Infection Control...)

- **Efficiency:** Redundant process on the paper form

- **Reliability:** Potential transcription errors
Interface Engine (eGate)

- Interface Engine
- ADT
- Patient Portal
- Clinical Information Systems (CIS)
  - CPOE
  - eMAR
  - ClinDoc
- Wall of Knowledge
- Peri-OP System
  - Scheduling
  - Peri-OP
  - Anesthesia
- Cardiology
- Pathology
- Medication (Pyxis)
- Pharmacy
- Materials Management
- Radiology (PACS)
- Laboratory
- IDB
- EMR
- eSIG

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Can we Build a Bridge and How?

Peri-OP Island

Inpatient Island
Building Interoperability

- Phase I (Feb. 2008 – Mar. 2009) – MDs OP Note
  **Unidirectional data exchange** auto-populates surgical information documented in the peri-OP system.

- Phase II (Dec. 2010 – Apr. 2011) – Short Stay Nsg Note

- Surgical information
- Intra OP & Anesthesia data

- Communication Protocol: TCP/IP
- Custom tables
- Specific clinical documents
- Configuration to populate data on the notes

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System Requirements

- It requires extracting **unique identifiers** to establish a 1:1 relationship between the Peri-OP and the CIS interface.
- To understand the **data structure** in each system.
- To understand the **clinical workflows** to trigger HL7 messages.
- To troubleshoot any unexpected technical interface errors prior to building an optimal data exchange structure.
- This mandates not only meticulous **design and testing** effort but also an **ongoing reconciliation process** between the two systems.
Procedure date, Procedures, and Primary Surgeon will pull in automatically from the PeriOp system. These fields can be modified or added to if necessary.
Nursing Documentation Design in CIS

- Standardized framework for nursing documentation
  - Surgical Information
  - Pain Assessment
  - Review of System – Respiratory, Neurological, Cardiovascular, Gastrointestinal, Musculoskeletal, Skin Assessment, Drain & IV
- Laboratory Result: Results pull into the note from last 24 hrs.
- I & O
- Fall Risk Assessment
- Learning Needs
- Patient Education
- Discharge Information
- Nursing Intervention
**Mandatory fields**

- **Significant** field - The document will be saved as **incomplete** until the field is valued; The RN can save the document with missing significant fields, but must **modify** the document and value these fields to save the document as complete.

- **Mandatory** field - The document cannot be saved until the field is valued.

```
Respiration
- Incentive spirometer: [ ] Yes [ ] No
- Level (ml): __________
- Head of bed elevated 30 degrees: [ ] Yes [ ] N/A
- Humidified air: [ ] Yes
- Respiratory assessment: [ ] WNL (Bilateral breath sounds clear; No Cough; No SOB) [ ] Abnormal...
- Breath sounds/Left:
  - [ ] Absent
  - [ ] Absent due to pneumonectomy
  - [ ] Coarse
  - [ ] Crackles
  - [ ] Diminished
  - [ ] Rhonchi
  - [ ] Stidor
  - [ ] Wheeze
- Breath sounds/Right:
```
Follow Up Nursing Documentation

- Discharge Criteria with Nursing Intervention

<table>
<thead>
<tr>
<th>Nursing Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Meets Discharge</td>
</tr>
<tr>
<td>Criteria</td>
</tr>
<tr>
<td>Yes...</td>
</tr>
<tr>
<td>No...</td>
</tr>
<tr>
<td>Nursing Interventions</td>
</tr>
<tr>
<td>Increase oral fluids</td>
</tr>
<tr>
<td>Increase ambulation</td>
</tr>
<tr>
<td>Supplement electrolytes</td>
</tr>
<tr>
<td>Reinforced self-care measures</td>
</tr>
<tr>
<td>Continue pulmonary toileting</td>
</tr>
<tr>
<td>Repeat labs pending</td>
</tr>
<tr>
<td>LIP made aware...</td>
</tr>
<tr>
<td>Drain to be removed at a later time</td>
</tr>
<tr>
<td>Requires continued hospitalization...</td>
</tr>
<tr>
<td>Transfer to Inpatient Unit</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

- Drop-Off Rate: Patient’s status converted to inpatient admission
Discharge Delay Reasons

- Care partner is available for discharge
- Patient/Care partner concerns about going home
- Patient agrees with discharge time
**Project Timeline**

- **Design (Dec. 2010)**
- **Implementation**
  - Pilot in one unit (Apr. 4th 2011)
    - *Urology, GYN*
- **Design modification**
- **Expand to other services and units (Aug. 2011)**
  - 3 overflow units
  - HNS

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Data Analysis

- The IDB (Institutional Data Base) is MSKCC's data warehouse.
- The IDB is updated daily with clinical, financial, operational and research data.
- ClinDoc Data is updated daily to the IDB.
- **DAVInCI (Data Analysis and Visualization of Integrated Cancer Information) Report**: a web-based application that empowers researchers, clinicians and operational staff to independently run queries to answer their data questions.
DAVINCI is a web-based application that empowers researchers, clinicians and operational staff to independently run queries to answer their data questions. DAVInCI users can access PHI (Protected Health Information) or a completely de-identified version of institutional data based on their level of authorization. In addition, mechanisms are available that allow clinicians and researchers associated with active protocols to access PHI information for only those patients accrued to their protocols.

Data currently available in DAVInCI includes demographics, ICD-9 and ICD-0 diagnosis, full pathology reports, ICD-9 and CPT procedures, hospital admissions, census, outpatient visits, dispensed medications, lab results, protocols and a tissue availability indicator.

Features of DAVInCI include the following:

- Structured reports - prewritten parameterized reports that prompt users to enter variables specific to their needs.
- Adhoc reports - enables users to write their own queries given the data elements available to them.
- Metadata - descriptions of data elements including their source and how far back the data is available.
- Free text searches of Pathology reports.
Create a report which will provide statistics related to the electronic documentation of short stay patients by nursing.

From (report start date)
To (report end date)
Summary Data for Short Stay Patients as Identified by Nursing Documentation

<table>
<thead>
<tr>
<th>Service of Visit Associated with Form</th>
<th>Service Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast - Surgery</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Cardiology</td>
<td>8</td>
<td>1%</td>
</tr>
<tr>
<td>Gynecology</td>
<td>333</td>
<td>25%</td>
</tr>
<tr>
<td>Head &amp; Neck</td>
<td>602</td>
<td>43%</td>
</tr>
<tr>
<td>Head &amp; Neck/Kidnoma/Leukemia</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Urology</td>
<td>401</td>
<td>30%</td>
</tr>
</tbody>
</table>

Count of short stay documents by service of visit provider associated with form

<table>
<thead>
<tr>
<th>Discharge Delay Category</th>
<th>Reasons for Discharge Delay</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not identified delay reason (OTHER)</td>
<td>234</td>
<td>69%</td>
</tr>
<tr>
<td>Pt does not meet DCC criteria</td>
<td>71</td>
<td>21%</td>
</tr>
<tr>
<td>Care partner not available</td>
<td>28</td>
<td>8%</td>
</tr>
<tr>
<td>Pt concerned about leaving</td>
<td>5</td>
<td>1%</td>
</tr>
<tr>
<td>Care partner not available and concerned about leaving</td>
<td>2</td>
<td>1%</td>
</tr>
</tbody>
</table>
Results & Outcomes

- Total 4,883 ClinDoc postop notes were created for 1,360 short-stay patients in Urology (35.1%), GYN (25.3%), Head and Neck (39.2%) Services (Apr. 2011 to May 2012).
- Required admission to the inpatient unit (N=45, 3.3%)
- Discharge Delay Reasons:
  - Failure to meet the discharge criteria: 21%
  - Care partners not available: 6%
  - Patient’s concerns: 2%
  - Care partners not available and Pt’s concerns: 1%
  - Disagreement on discharge time: 1%
  - Not identified reasons (Others): 69%
- Request for building PACU ClinDoc note!!
Benefits

- **Reduction of redundant work processes**
  RNs can easily retrieve patient’s surgical information without transcribing to the clinical information system

- **Efficiency**: System push-pull sets within the note

- **Completeness of Documentation**

- **Regulatory Requirement**

- **Data Analysis**
  A scheduled report was created to review effectiveness of the new post-op assessment forms.
Lessons Learned

• **Multidisciplinary team approach** is essential foundation for successful system implementation.

• **Standardized and Structured framework** throughout the system design and building processes is essential.

• **Handling incomplete documentation** was a big challenge for nursing admin and IT group because any incomplete documents didn’t go to EMR.

• **TESTING! TESTING!! TESTING!!!**
Lessons Learned

• **Lots of Data**
  - Redesign some of the ClinDoc to capture more answers
  - Decision of mandatory fields
  - Data reports answer some questions – but lead to others
  - Need to develop expertise on developing reports from the large amount of data
    - OR report
    - Anesthesia record
    - LIP post op assessment
    - Nursing post assessments
    - Return to urgent care center/readmission
Questions & Answers

Thank You