EHR Implementation for Meaningful Data Analysis

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After this presentation, learners should be able to

1. Deduce the effectiveness EHR implementation and the quality of data obtained.
2. Determine the ease of use and the user compliance.
3. Determine if the intent of the EHR design was fulfilled based on the ability to analyze data meaningfully.
Electronic Health Records

- Complex building process
- Enormous undertaking
- Costs in the millions of dollars
- Significant amount of time
- Overwhelming
An elephant is like a big snake.

What are you saying? It is like a sheath of leather!!

Your all wrong!! It's actually like a little furry mouse.

Actually, No! It's a tree stump!
Common Disparities in EHR

EHR Build or Education

- Statements like
  - “We used to do that on paper...”
  - “We haven’t done that since we went to our EHR”
- The use of “Select All” or templates that are not individualized
- Physician Orders are not clear and accurate

Examples

- Learning Needs Assessments
  - Typically missing in outpatient (ambulatory) areas; when paper went away, so did this documentation
- Pain Reassessments
- Time Outs
- Care Plans
- Protocols are not attached to the EHR
Common Disparities in EHR

Data Entry
- Low data scores
- Physician orders are not clear and accurate
- Statements like
  - “We can find (chart) in 3 different places”
  - “I chart that here; my peers may chart it there…”

Examples
- Critical (lab/diagnostic) value communication
- Not all of the elements are checked
- Time Outs
- Pain Reassessments
- Care Plans
- Lack of standardization
- Knowledge deficit
Common Challenges

- EHRs that inhibit interdisciplinary views or limit access
  - RNs who can’t access physician H & P
  - Dieticians who can’t access nursing notes

- Inhibits the true intent of Interdisciplinary Care Plans

- Staff who cannot navigate the EHR
  - Unable to find information
An effective EHR implementation is reflected in the quality of data obtained.
Review of Literature

- Meaningful data
  - Explore system vulnerabilities
  - Truly reflect an organization’s quality of care
  - Make evidenced based recommendations

- Electronic Health Records (EHR)
  - Health Information Technology for Economic and Clinical Health (HITECH) Act
  - Intent is to improve the flow of healthcare information
  - Improve patient care through the availability of information
Review of Literature

- Implementing a new EHR system is complex
- EHR systems are not being used to their full capacity
- Potential for EHRs
  - Create and share new knowledge
  - Innovative practice changes
  - Quality improvement and research
- Challenges for EHR
  - Standardizing processes
  - Complete and accurate records
Quality Concerns

- Complete and error free clinical data abstraction is needed for accurate & meaningful data analysis

- Research Concerns
  - EHR data is not recorded at the same level of detail as research data collection
  - Accurate data analysis is questionable due to high variable in quality

- Quality Improvement Concerns
  - Inhibits the ability to retrieve needed information to improve quality and outcomes
  - Impacts projects due to wide variation in measurement, recording, and clinical focus

- Have EHRs led to an increased amount of bad data instead of the improvement of quality data collection?
CMS Incentive Programs

- Reinforcement through reimbursement incentives
  - Affordable Care Act
  - Core Measures
  - Meaningful Use (MU)
    - Health and efficiency goals
An effective EHR implementation is reflected in ease of use and the user compliance.
Validation & Re-validation

- Determines the accuracy of meaningful data and other analytic abilities
- Validating the EHR development and deployment processes determines the usability and user interface
- Re-validation assists in determining if the intent of the design was fulfilled.
  - When the intent of the design is not fulfilled, then it is a priority to refine and re-measure its usefulness.
Standardization & Education

- Works simultaneously with the validation and re-validation process
- Standardizing and defining operation practices increases compliance and outcomes
  - Define responsibility for inputting data elements with a defined time frame
    - Within 24 hours of admission, “x” elements will be completed
    - The pre-op RN will input the reason for the OR delay during hand-off
    - The ED RN will input a reason for delayed disposition during the transition of care
- Educate staff on expectations around accurate data collection (entry) for meaningful data analysis
EHR Potential

Improvements

- Patient care
- Quality outcomes
- Data extraction
- Coding accuracy

Problems if Poorly Designed

- Unintended consequences
- Introduction of new risk
- Inhibits efficient quality improvement projects
The intent of the EHR design was fulfilled based on the ability to analyze data meaningfully.
Case Study:

Tertiary care center, with approximately 4,000 annual operating room (OR) cases wanted to perform a root cause analysis (RCA) for OR delays.

DIRECT AND INDIRECT COSTS OF OPERATING ROOM DELAYS
Background

- ORs are the most costly area to operate in a healthcare organization
- 40% of all hospital expenses are related to surgical interventions
- OR delays cost an organization as much as $20 for each delayed minute
- OR delays are a primary cause for inefficiencies
Retrospective EHR Report

- EHR reports were designed to query data; 6 months of data was requested.
- This report included the following:
  - Case Log ID, Patient Age, Patient Class, Case Class, Add On Case Y/N, Primary Procedure, Physician, Circulator, Anesthesia, Service, Location, Room ID, First Case Y/N, Surgery Date, Scheduled Start Time, Actual Start Time, Delay Length, Delay Type, Delay Reason, Delay Comments, Case Scheduled End, Actual End, Overrun Length.
- The retrospective report contained both objective (data that is time stamped or required no decision-making) and subjective data (required decision-making on the part of the recorder).
The plan was the following:

- Evaluate the queried data from the EHR and review operative delays
- Subdivide the reported 69 reasons for delay by disaggregating data and then further analyze with descriptive statistics
- Meet with an interdisciplinary team to validate the data.
- Present the final analysis to nursing leadership for the operative area
Intent Versus Reality

- EHR build included 6 delay types and 69 delay reasons
  - Resulted in 414 (6 x 69) permutations for delays
  - Additionally, with missing (unreported) data, 490 (7 x 70) permutations were possible
- Nearly 24% of the time, the subjective data was either “Other” or missing data
  - 47% of delays marked “Other” or missing could have been categorized
- Inconsistent language and classification used
  - Delay type used the word “facility” and “staff” while delay reason used the word “hospital” and “nurse”
- Lack of a standardized process for entering data which affected the ability to retrieve accurate meaningful data.
<table>
<thead>
<tr>
<th>Delay Type</th>
<th>Delay Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Additional Labs, Tests, etc.</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Block/Epidural in Holding Area</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Difficult Airway</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Lumbar subarachnoidal</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Equipment/Setup</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Extended Time to PACU/ICU</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Failed Block</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Insufficient Coverage</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-In-Access</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Late to OR-Faculty</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Late to Uni-provider</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-pre-op needed Longer to Work</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Pre-op Wait</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-Prolonged emergence from anesthetic</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia-With Another Patient</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Blood Delay</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Case Added To Room</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Emergency Case Added To Room</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Emergency Case In Room</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Financial Clearance</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Hold for ER case</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Housekeeping Delay</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Interpreter Needed</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-No Bed Available-Post-Op</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-No Bed Available-Pre-Op</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-No Unit Bed Available</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-OR Housekeeping Delay</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Pager system not working</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Pharmacy Delay</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Previous Case Cancelled</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Radiology Tech Not Available</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Recovery Room Closed</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-Transport Not Available</td>
</tr>
<tr>
<td>Facility</td>
<td>Hospital-X-Rays Not Available</td>
</tr>
<tr>
<td>Facility</td>
<td>Nurse-No Pre-op evaluation</td>
</tr>
<tr>
<td>Facility</td>
<td>Nurse-Not Available</td>
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<tr>
<td>Facility</td>
<td>Nurse-O.R. Suite Did Not Send For Patient</td>
</tr>
<tr>
<td>Facility</td>
<td>Nurse-Patient Not Ready-Day Surgery</td>
</tr>
<tr>
<td>Facility</td>
<td>Nurse-Patient Not Ready-ER</td>
</tr>
<tr>
<td>Facility</td>
<td>Nurse-Patient Not Ready-Floor/ICU</td>
</tr>
<tr>
<td>Facility</td>
<td>Nurse-Room Set up</td>
</tr>
<tr>
<td>Patient</td>
<td>Patient-Delay-Talk to Surgeon</td>
</tr>
<tr>
<td>Patient</td>
<td>Patient-Difficult Positioning</td>
</tr>
<tr>
<td>Patient</td>
<td>Patient-Late Arriving to Hospital</td>
</tr>
<tr>
<td>Patient</td>
<td>Patient-Left Area</td>
</tr>
<tr>
<td>Patient</td>
<td>Patient-Not NPO</td>
</tr>
<tr>
<td>Patient</td>
<td>Patient-Wait For Family Members/Parents</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Additional Labs, X-Rays, etc. needed</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Cancelled Case</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Change Order Of Cases</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Incomplete Of No Consent</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Incomplete Scheduled Information</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Late to OR-Faculty</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Late to OR-Resident</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Previous Case Ran Over</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Pt Not Marked</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Took Longer Than Posted</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Undated Hold</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Unscheduled Procedure Added to Case</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-with Another Patient</td>
</tr>
<tr>
<td>Physician/Surgeon</td>
<td>Surgeon-Work-up On Arrival</td>
</tr>
<tr>
<td>Uncategorized</td>
<td>Abnormal Lab Values</td>
</tr>
<tr>
<td>Uncategorized</td>
<td>Equipment-Being Used in Another Room (Comment Required)</td>
</tr>
<tr>
<td>Uncategorized</td>
<td>Equipment-Malfunction (Comment Required)</td>
</tr>
<tr>
<td>Uncategorized</td>
<td>Instrument/Implant-Not Available (Comment Required)</td>
</tr>
<tr>
<td>Other</td>
<td>Other</td>
</tr>
</tbody>
</table>
Challenges

- Too many choices
  - 6 delay types
  - 69 delay reasons

- Fields were used other than intended design
  - 5% of delay comment field was used for nursing communication other than delays
  - 97.6% of the on time cases had a delay type, 91.6% had a delay reason, 67.2% had a delay comment

- No hard-stops were used
  - 16% duplicate cases
    - Multiple delay types and reasons
  - 8.4% missing data

- Poor education and definitions
  - Delay was defined by the organization as starting the case 1 minute or more late
  - Did not encompass delay to PACU or disposition
  - Lack of accountability
Discussion

- The current process of the organization inhibits the ability to determine an accurate RCA of OR delays further impacting meaningful data analysis.

- The lack of a standardized implementation and educational process of the EHR came with the price of questionable data analysis due to highly variable in quality, meaningful data:
  - The organization was unaware as to the permutations available for OR delays.
  - Inconsistent methodology for classification.
  - Staff reported too many choices/fields when busy.
  - Staff reported a lack of understanding/knowledge deficit for data accuracy.
Massive amounts of clinical data are being captured and now it is a matter of transforming and translating the data into meaningful data that can improve practice.
References


Questions??