Dawning of a New Epoch in Harm Measurement

From Paleolithic Hunter Gathers to Holocene Farmers

Jack Jordan
Henry Ford Health System
(This presenter has nothing to disclose)
Objectives

• Implement strategies to leverage new EMRs to make action on harm visible and actionable within 48 hours or less
• Share a cutting-edge method for comprehensive, near real-time harm measurement
• Engage you in a journey to re-invent harm measurement
Goal of HARM 2.0

• Comprehensive tracking of harm by Oct 2015 with data within 48 hours of triggering documentation with no human intervention.

• Harm may include iatrogenic vulnerability as well as harm requiring additional treatment
Real Goal of Program

• Give tools for insight and action to front line staff and middle management.
• Make gaps in care visible and actionable
• Make not testing changes seem very uncomfortable.
What is Comprehensive?

- **Medication**
  - Hypoglycemia
  - Anticoagulation issues (INR > 5)
  - Narcan
  - Diuretics causing adverse effects
  - Allergic Reaction not POA
  - C-diff toxin positive
  - Delirium
  - GI Bleed not POA

- **Environment**
  - Pressure Ulcer
  - Falls
  - Patient Trauma

- **Other**
  - DVT
  - Acute Renal Failure
  - Blue Alert

- **Procedural Complications**
  - Pneumothorax
  - Puncture/Laceration
  - Unexpected blood use post Procedure
  - Aspiration Pneumonia
  - Other Procedural complications

- **Infections**
  - SSI
  - CAUTI
  - CLABSI
  - Pneumonia
    - VAE
    - Other Pneumonia Not POA

- **Perinatal**
  - Ideal Delivery
Meaningful Use and Available Data

**Traditional**
- ICD9 Dx
- ICD9 PX
- Cpt4 (maybe)
- Limited Labs/cultures
- LOS
- Charges
- ADT locations
- Individual Charge master items

**EMR Era**
- All Traditional
- Problem lists (maybe)
- Orders
- Medication Administration
- Vital Signs (limited)
- Flow sheet data
- Equipment feeds (maybe)
What is Special about HFHS

- Problem based charting
- Long History of Quality Improvement
- Open Data Environment
  - Data Reporting & Analytics are not part of IT
- New EMR with all hospitals on the same build
Problems in Paradise

• Definitions are far more complicated
• Audiences are different for data with new distribution channels
• Choices for where to find data
  – Comorbid Edema (from Flow Sheet?, problem list? Past ICD9 code, Medications?)
What Have We Learned So Far?

• Timely delivery changes the intervention from the ground up
  – Related opportunities appear in the process
  – Some traditional measures not useful

• Predictive Analytics are not as valuable as actionable analytics

• Weakness in the data usually uncover other interesting opportunities in Patient Care
What We are Learning

• Measurement becomes tightly coupled to the care-giving

• Design of the documentation is profoundly linked to data possibilities
Delivery and Follow up

Traditional
• Monthly reports to leadership
• Detail lists for deep dives
• Teams built around project and data from team out to staff

EMR Advanced
• Detail to front-line
• Roll up with analysis to leadership
• Detail can be both for team and front line real time
### Pressure Ulcer Detailed Investigation on Hospital Acquired Pressure Ulcers

**Date of Review:**

**MRN:**

**Room #:**

**Hospital Admit Date:**

**Unit Admit Date:**

**Date PU 1st documented:**

**Pt had a PU on admission:**

**Admitting diagnosis:**

**Unit discovered:**

**Unit acquired:**

**2 person assessment?**

**Comorbidities:**
- Diabetes
- HTN
- ARF
- Dementia
- Steroids
- A HF
- Radiation
- Vasopressors
- PO2 < 50%
- Nutrient
- Other

**Site of Ulcer:**
- Stage at first
- Stage today
- Comments

**Device Related**

**Site of Ulcer:**
- Stage at first
- Stage today
- Comments

**What is the device?**

**If ET, what held it in place?**

**Was patient off floor for >2 consecutive hours in 3 days prior to PU?**

**Date/time off unit/comment**

**Day of PU**

**PU-1**

**PU-2**

**PU-3**

**Total Braden**

**Sensory**

**Moisture**

**Activity**

**Mobility**

**Nutrition**

**Prevention Protocol Initiated?**

**Nutritional Consult?**

**NPO for ___ hours (total)**

**Nutritional supplements ordered?**

**Nutritional supplements documented?**

**Bed in Use:**

**Type of Surface Used:**

**Nutritional Intake:**

**Diaper**

**Turning:**

**Wedge used for turn?**

**Heel Ulcer:**

**Mobility:**

**Conclusion:**

**Other:**
Example VTE Harm:

- Problem list (Added during stay)
  - low resolution, non-Deep Vein, “at risk for vs real”, POA reliability
- Treatment received (Heparin drip, etc)
  - Logic to weed out a-fib, etc. used for Drip
- Imaging results (CT, Venous Doppler and duplex) → Order but No results available in Clarity
- Heart problems (Problem list ICD9 codes 410.xx and 427.xx)
- Billing data (ICD9 code) Not used in logic
- Lab results N/A
VTE is Really Complicated

• No single variable is good enough
• Treatment overlaps with other problems
• Numerous patients with Heparin or Lovenox and no legitimate problem on problem list
Real-Time Method: Review

• Identification within 48 hours of documentation
• Real time identification through the artifacts of care
  – Problems list
  – Ordering a treatment/medication
  – Lab value
• Accuracy and reliability
• Insight into the variation of practice
• Organic system allows faster response to change
DVT/PE Harm: Logic

Other factors affecting all:
- Total encounters: 32,695
- Total number of VTE harm based on Logic: 263
VTE: Chart Reviews

- 427 Chart Reviews were done
- Comparison:

<table>
<thead>
<tr>
<th></th>
<th>Real Time Logic</th>
<th>Modified AHRQ</th>
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<tbody>
<tr>
<td>Sensitivity</td>
<td>84%</td>
<td>37.5%</td>
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<tr>
<td>Specificity</td>
<td>97%</td>
<td>99.0%</td>
</tr>
<tr>
<td>PPV</td>
<td>69%</td>
<td>75%</td>
</tr>
<tr>
<td>NPV</td>
<td>99%</td>
<td>95%</td>
</tr>
</tbody>
</table>

- We are finding a little bit more, but wait!

- Improvement in documentation can significantly improve accuracy
VTE Harm: Actual vs. Modified PSI#12 vs. Logic
VTE Harm/1000 patient days: HFHS Total

VTE Harm/1000 patient days: Compare Proposed Logic vs. Billing
HFHS Total

[Graph showing comparison between logic and billing for VTE harm over time]
Other Lessons and Data

• Failures in the measurement of DVT are tightly connected to practice issues
  – Building reports on use of Doppler & CT scans per found DVT (resident project)
  – Continued treatment of superficial vein clots needs feedback loop
    (reached out to program director for resident education)

• Timelines don’t match
  – Date of discharge vs Date of problem in hospital

• Built estimate of Padua score from existing documentation
Blood and Bleeding

• Teasing out unexpected drop in Hgb or blood use
• Linking bleeding with anticoagulants (INR> 5)
• Attempting to integrate tracking of bleeding with good management of blood products.
Questions, Thoughts

• What excites you about this work?
Contact Info

• Jack Jordan
jjordan1@hfhs.org
313-874-4988

• S. Mani Marashi
smarash1@hfhs.org
313-808-8424
LinkedIn