Improving Patient Safety and Outcomes Through A Comprehensive Mortality Review Process at University of Minnesota Health

Chris Kissell, RN, BSN, MBA
Director of Clinical Quality
Craig Weinert, MD, MPH
Executive Medical Director, Adult Acute Care
Session Objectives

- Identify how a mortality review process can improve patient safety and outcomes
- Evaluate the effectiveness a mortality review model would have in your organization
- Explain why a comprehensive mortality review process should be an integral component in mortality reduction efforts
Background

Nonprofit, academic health system driven to heal, discover and educate for longer, healthier lives

- 900 Staffed Beds at University of Minnesota Medical Center with 1,600 Physicians
- 34,021 patient admissions
- 23,350 surgeries
  - 1,139 neurosurgical cases
**Respected Reputation**

- Referring physicians tend to send patients to a hospital with the best outcomes
- Mortality rates affect specialty program certification or ranking
Background: University of Minnesota Health Mortality

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Index</strong></td>
<td>1.02</td>
<td>0.95</td>
<td>0.87</td>
</tr>
<tr>
<td><strong>Deaths</strong></td>
<td>571</td>
<td>594</td>
<td>205</td>
</tr>
<tr>
<td><strong>Rate</strong></td>
<td>1.60%</td>
<td>1.75%</td>
<td>0.60%</td>
</tr>
</tbody>
</table>

**Overall Deaths**

- May-15: 54
- Jun-15: 58
- Jul-15: 39
- Aug-15: 52
- Sep-15: 52
- Oct-15: 47
- Nov-15: 51
- Dec-15: 38
- Jan-16: 52
- Feb-16: 49
- Mar-16: 63
- Apr-16: 41

**Overall by Quarter Deaths**

- Q2 13: 142
- Q3 13: 134
- Q4 13: 137
- Q1 14: 153
- Q2 14: 133
- Q3 14: 147
- Q4 14: 138
- Q1 15: 148
- Q2 15: 167
- Q3 15: 143
- Q4 15: 136
- Q1 16: 164
## Background: University of Minnesota Health Mortality

### Overall Mortality Index by Month

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality Index</td>
<td>1.04</td>
<td>1.05</td>
<td>0.76</td>
<td>1.00</td>
<td>1.16</td>
<td>1.00</td>
<td>0.99</td>
<td>0.68</td>
<td>1.01</td>
<td>0.83</td>
<td>0.99</td>
</tr>
<tr>
<td>Deaths</td>
<td>54</td>
<td>58</td>
<td>39</td>
<td>52</td>
<td>52</td>
<td>47</td>
<td>51</td>
<td>38</td>
<td>52</td>
<td>49</td>
<td>63</td>
</tr>
<tr>
<td>% Early Deaths</td>
<td>0.45%</td>
<td>0.52%</td>
<td>0.25%</td>
<td>0.35%</td>
<td>0.36%</td>
<td>0.39%</td>
<td>0.34%</td>
<td>0.32%</td>
<td>0.15%</td>
<td>0.45%</td>
<td>0.41%</td>
</tr>
</tbody>
</table>
Approach to Reducing Mortality

- Improving clinical documentation and coding
- Mortality Case review
- Rapid Response Program
  - Transfer Mortality
  - Palliative Care
  - Sepsis

Where there are opportunities to standardize process
The concepts of peer review and the venerable morbidity and mortality conference are familiar improvement approaches to health care providers. These 2 entities are typically provider or patient centric and are not typically extended within hospitals and health systems as a tool for organizational learning for care process or system failures. Out of a desire to deepen our understanding and accelerate learning about quality and safety opportunities in our hospitals, Mayo Clinic embarked on journey to analyze the stories of all patient deaths. This paper illuminates the lessons learned through the development and evolution of the Mayo Clinic Mortality Review System (Rochester, MN).

Guiding principle of Mayo Clinic Mortality Review System:
“No one should ever suffer or die as the result of process of care or system failure.”
Purposes of a Mortality Case Review Program

• Identify errors/vulnerabilities to make system and process improvements
• Educate health care providers
• Understand disease process
• Identify cases for peer review
• Manage medicolegal risk
• Demonstrate a culture of safety
Areas of focus for review

- Admission source
- Severity of illness
  - Was death expected or unexpected?
- Vital sign, lab, or imaging changes 48 hours prior to death
- Communication delays or errors
- Systems of care breakdowns
- Human error
- Protocols not followed
Create an action plan

• Utilize Root Cause Analysis (RCA) process if applicable
• Assign accountability for implementation and education
• Share findings and learnings across departments
• Monitor action plans for sustainment
Overview

Neurosurgical mortality rates: what variables affect mortality within a single institution and within a national database?

Clinical article

Ronald Hammers, M.D.¹, Susan Anzalone, B.A.¹, James Sinacore, Ph.D.², and Thomas C. Origitano, M.D., Ph.D.¹
Mortality Review: UMMC Process

- Pool of ~25 reviewers, mostly physicians with administrative experience
- Cases received the next day from Admission Discharge Transfer (ADT) data feed
- Case notification via email
  - Assign by primary specialty if possible
- Expect completion within a week
- Escalation process for delinquent cases
Mortality Review MD Completes Four Sections

• Y/N: Was death expected on admission/first 24 h?
• Assign a mortality classification
  – Death expected at any time during hospitalization and no opportunity for improvement
  – Death expected at any time during hospitalization and opportunity for improvement
  – Death unexpected and opportunity for improvement
• Brief narrative focusing on:
  – Communication, delays, complications, inappropriate transfers, failure of outpatient/hospice care to prevent terminal hospitalization
• Y/N: Recommend follow-up by Patient Safety program?
MD Mortality review is...

- Legally designated as peer review-protected
- Conducted in a way most convenient for the MD reviewer
  - University of Minnesota email
  - Server with a spreadsheet
  - Manual method
- Not a complete investigation needing interviews or timelines
  - 15-20 minutes review per case using Epic
- The MD reviewer does not have to arrange or conduct the follow-up
Mortality Review: Failure of outpatient system to prevent terminal hospitalization

- 65 y.o. with metastatic colon cancer, not receiving any more treatment, was seeing Fairview palliative care and was “considering hospice”. Was falling frequently at home, had a POLST, DNR/DNI status and had always wanted to die at home.

- Fell again at home, with brow laceration and head CT in outside ED showed epidural hematoma, enoxaparin reversal agents given. Had seizure and sent to UMMC to trauma service. Later that day became obtunded and family declined surgery or intubation. “Never wanted to be in the hospital”. Made comfort care on second hospital day and died next day.
Mortality Review: Failure to follow established severe sepsis protocol

- 77 y.o. with CKD (baseline Cr 3.5), “never wanted to be on dialysis” to ED with abdominal pain and Cr up to 5—w/u in ED focused on intra-abdominal causes but nothing was found and eventually diagnosed as pneumonia/sepsis and given Zosyn. Both ED and Hospitalist physicians ordered much less than full 30 ml/kg IVF for fear of volume overload. Blood cx positive for strep pneumoniae and Cr continued to worsen and patient decided not to dialyze so made comfort care and died three days later.
Mortality Review: Detection of a Reportable Event

67 y.o. F with hepatocellular carcinoma and chemoembolization procedures

Developed portal venous thrombosis and started on heparin

Became orthostatic and lost consciousness while ambulating with assistance and was lowered to the floor

Lactate 8 and Hgb 8 and transferred to ICU
CT showed a left rectus sheath hematoma and intra-abdominal fluid
Massive transfusion protocol and heparin stopped
Patient intubated for metabolic acidosis and AKI
Over next 48 hrs, stabilized Hgb and vent status
But then developed oliguria and was planned for CRRT
Received metoprolol for rapid atrial fibrillation prior to dialysis catheter insertion but had asystole which, after 20 minutes of CPR, could not be reversed
Mortality Review: Detection of a Reportable Event

• Corrective action plan included:
  – Case study review with staff
  – Reinforce utilization of shift change report
  – Manager audit of shift change report
  – Reinforce review of fall summary information
Where do mortality cases come from?

Aggregate Monthly Admission Source

- ER
- Physician Referral
- Hospital Transfer
- Nursing Facility
- Clinic Referral
- Normal Delivery
- Inpatient Transfer

November
December
January
February
March
April
Most mortality cases have abnormal vital signs in the two days prior to death

Monthly Aggregate Vital Sign Trends

- Systolic BP > 180 or < 90
- Heart Rate > 140 or < 40
- Respiratory Rate > 28 or < 8
- Urine Output < 50 cc over 4 hours
- Oxygen Sat < 90% despite supplementation
Mortality Review: Results

Aggregate Primary Diagnosis

- Sepsis: 53%
- Malignant Neoplasm: 21%
- Idiopathic Pulmonary Fibrosis: 5%
- GI Complications: 5%
- Acute Renal Failure: 11%
- Other: 5%
MD Mortality Review judgment

- 5%, the death was unexpected and there was likely opportunity for improvement
- 14%, the death was expected and there was likely opportunity for improvement
- 81%, the death was expected and there was no opportunity for improvement
Personnel costs

• For those that do require follow-up:
  – .5-1.0 FTE within the patient safety team over the course of 2 months for those that go to a Root Cause Analysis (RCA)
  – Time commitment from multi-disciplinary committees (sepsis, rapid response, etc.)
  – Physician time commitment for those cases that go to peer review
Challenges

• Resource intensive (reviewers/follow up)
• Departments “owning” their own reviews
• Participation
• Understanding intended benefits
Key Learnings

• Assemble the team (consider physician and non-physician reviewers)
• Create necessary follow-up infrastructure (e.g. review committee, workgroup such as sepsis, patient safety team)
• Automate the process
• Communicate the findings
• Prioritize the quality improvement opportunities
## Mortality Review vs. Mortality and Morbidity Review

<table>
<thead>
<tr>
<th></th>
<th>Mortality Review</th>
<th>Mortality and Morbidity (M &amp; M) Review</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>Systematic quality and patient safety improvement</td>
<td>Acquire new knowledge, teaching opportunity</td>
</tr>
<tr>
<td><strong>Cases</strong></td>
<td>All</td>
<td>All in some Departments; Interesting or unexpected for others</td>
</tr>
<tr>
<td><strong>Areas of Focus</strong></td>
<td>Across the organization</td>
<td>Isolated to care environments (ED) or departments (surgery)</td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td>Multiple across many departments</td>
<td>Limited to those required to review and present case</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>May result in multi-focal improvements across many care settings</td>
<td>May result in specific improvements within a specific care setting</td>
</tr>
</tbody>
</table>
Resources


University Health System Consortium Mortality Review Guidelines
Questions?

Chris Kissell, RN, BSN, MBA
ckissell11@umphysicians.umn.edu
Director, Clinical Quality

Craig Weinert, MD, MPH
weine006@umn.edu
Executive Medical Director