Mortality Index:
Understanding the intersection of population health and healthcare delivery

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Disclosure

I have no relevant financial relationships to disclose or conflicts of interest to resolve.
Objectives

I. Hospital mortality: Why do we care?

II. How is mortality index (observed/expected) calculated?

III. Mortality review: Factors that impact observed and expected mortality

IV. UTMB’s journey to improve performance in mortality
Hospital Mortality: Why do we care?
And where do we start?
Why do we care?

• Allows us to understand patterns in disease processes, communities, and access to healthcare
• Allows us to evaluate and compare the quality of healthcare provided
Flip The Big Question

Looking at the patient at the time they arrived at the hospital, what were their chances of being discharged alive?
Suitcase of Woe

In addition to the presenting medical condition, must consider what a patient brings with them to the hospitalization.
Risks of treatment

- In some cases, the immediate risks associated with the proposed treatment plan are greater than the risk of not treating.
  - Ex. Pt w/ h/o severe HTN, CAD, end-stage systolic heart failure, and ESRD, presenting with acute MI, new coronary blockage

Is the risk associated with PCI in this patient necessary and acceptable?
How is the Mortality Index (O/E) Calculated?
The term “mortality rate” in health care refers to the number of people that died from their illness or injury at the hospital.

We measure our performance using a mortality index (observed/expected).

The mortality rate does not compare “apples to apples” because it assumes all patients are the same—however, we know that the types of patients and the severity of their illnesses are different.

Our goal: Decrease observed deaths and appropriately document the severity of illness of our patients to improve our expected mortality.
Observed Mortality Rate

**Observed Mortality** is the % of patients that died during a given time period. It is calculated by dividing the number of actual deaths in the group of patients by the total number of patients.

\[
\text{Number of Deaths}^* \\
\text{Observed Mortality rate} = \frac{\text{Number of Deaths}^*}{\text{Total number of Discharges}}
\]

*Only hospice deaths are excluded*
O:E Ratio (Mortality Index)

**Expected Mortality** = % of patients that were expected to die during a given time period.

\[
O:E = \frac{\text{Observed Mortality}}{\text{Expected Mortality}}
\]

- **Mortality index** compares the observed to expected mortality rates.
  - A score of **less than 1** means that more patients survived than were predicted to. A score of **more than 1** means that more patients passed away than were predicted to. So, a lower the score is better.
Factors that impact observed and expected mortality
Severity of illness

Quality of care

Random error

Outcome
# Major Factors Contributing to Mortality

<table>
<thead>
<tr>
<th>Major Factors</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delays</td>
<td>Delays in recognition, response and definite treatment</td>
</tr>
<tr>
<td>Care of critically ill</td>
<td>Practice variation, high census, overcrowding in ED</td>
</tr>
<tr>
<td>Healthcare-associated infections</td>
<td>CLABSI, VAP, CAUTI</td>
</tr>
<tr>
<td>Post-operative complications</td>
<td>Prevention, recognition and rescue</td>
</tr>
<tr>
<td>Medical errors</td>
<td>Knowledge based, technical and omissions</td>
</tr>
<tr>
<td>Communication and teamwork</td>
<td>Handoffs, escalation and dysfunctional group</td>
</tr>
<tr>
<td>System and community</td>
<td>End of life, transfer</td>
</tr>
</tbody>
</table>

Behal et al. Academic Medicine 2009
What improves observed mortality?

- Evidence-based practice
- System and process of care
- Human factors
- Escalation of concerns about deteriorating patients
- Expertise input
- Appropriate use of palliative/hospice services
Prevailing theories for high mortality rate

“Our patients are sicker”
“We get lot of transfers”
“These are all DNR cases”
“The data is wrong”
“Coders do a poor job”
“Most of these deaths are expected”
“We can’t improve mortality”
## Observed Mortality Rate

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Discharges</th>
<th>No. of Deaths</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>12,122</td>
<td>314</td>
<td>2.59</td>
</tr>
<tr>
<td>2016</td>
<td>13,226</td>
<td>358</td>
<td>2.69</td>
</tr>
</tbody>
</table>
Expected Mortality

- Based on logistic regression model (c-statistics - 0.83)
- Updated yearly
Risk Factors in Sepsis Mortality Model

- Age
- Transfer site (OSH acute, SNF, LTACH)
- Basic (severe sepsis, shock, MV on admit day)
- Acute/Sub-acute disease (coma, respiratory failure, shock, arrhythmia, AKI, electrolyte disorder, liver necrosis, coagulopathy)
- Chronic disease (pulmonary heart disease, heart failure, arrhythmia, CKD, CLD)
- Malignancy (lung, liver, AML, Mets)
- Other (malnutrition, subendocardial AMI, cardiac arrest)

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.485</td>
</tr>
<tr>
<td>Transfer site (OSH acute, SNF, LTACH)</td>
<td>0.413</td>
</tr>
<tr>
<td>Basic (severe sepsis, shock, MV on admit day)</td>
<td>0.394</td>
</tr>
<tr>
<td>Acute/Sub-acute disease (coma, respiratory failure, shock, arrhythmia, AKI, electrolyte disorder, liver necrosis, coagulopathy)</td>
<td>0.814</td>
</tr>
<tr>
<td>Chronic disease (pulmonary heart disease, heart failure, arrhythmia, CKD, CLD)</td>
<td>0.787</td>
</tr>
<tr>
<td>Malignancy (lung, liver, AML, Mets)</td>
<td>0.277</td>
</tr>
<tr>
<td>Other (malnutrition, subendocardial AMI, cardiac arrest)</td>
<td>0.392</td>
</tr>
</tbody>
</table>
Example Calculation

\[ \sum_{i=0}^{n} \beta_i x_i = \beta_{1,5} \text{ Male 65-70} \quad \text{(YES)} \quad 0.506 \times 1 \\
+ \quad \beta_{2,5} \text{ Severe Sepsis} \quad \text{(YES)} \quad 0.814 \times 1 \\
+ \quad \beta_{3,5} \text{ Shock} \quad \text{(YES)} \quad 0.738 \times 1 \\
+ \quad \beta_{4,5} \text{ Mech Vent} \quad \text{(NO)} \quad 1.015 \times 0 \\
+ \quad \beta_{5,5} \text{ AKI} \quad \text{(YES)} \quad 0.099 \times 1 \\
+ \quad \beta_{6,5} \text{ Electrolyte Abnl} \quad \text{(YES)} \quad 0.277 \times 1 \\
+ \quad \beta_{7,5} \text{ Arrhythmia} \quad \text{(YES)} \quad 0.171 \times 1 \\
+ \quad \beta_{8,5} \text{ CHF} \quad \text{(YES)} \quad 0.103 \times 1 \\

\[ \sum_{i=0}^{n} \beta_i x_i = 2.71 \quad \Rightarrow \quad E = \frac{e^{\gamma_0 + \sum \beta_i x_i}}{1 + e^{\gamma_0 + \sum \beta_i x_i}} = \frac{e^{4.664 + 2.71}}{1 + e^{4.664 + 2.71}} = 0.12 \]
UTMB’s journey to improve performance in mortality
In 2016, UT System Chancellor William McRaven outlined “quantum leaps” in the plan to provide Texas the very best in higher education, research, and health care.

* Every UT system campus to aim to achieve top 20 ranking in the Vizient Quality & Accountability Study by FY 2018
Quality & Accountability Study - 2016

<table>
<thead>
<tr>
<th>Star Rating</th>
<th>Overall Rank</th>
<th>Overall Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>★★★</td>
<td>76</td>
<td>57.42%</td>
</tr>
</tbody>
</table>

**Domain Performance**

- **Mortality (25%)** (documentation)
- **Efficiency (10%)** (adjusted length of stay, resources, cost, etc.)
- **Safety (25%)** (preventable patient safety events, such as infections, hemorrhage, pressure ulcers, and falls)
- **Patient Centeredness (15%)** (patient satisfaction)
- **Equity (5%)** (same care for all patients)
- **Effectiveness (20%)** (how well we deliver care/outcomes, readmissions)

**Overall Score** 57.42%

94th out of 102
## Mortality by Service Line

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality - Cardiology</td>
<td>1.35 (4)</td>
<td>0.98 (4)</td>
<td>0.74 (5)</td>
<td></td>
</tr>
<tr>
<td>Mortality - CT Surgery</td>
<td>1.73 (3)</td>
<td>2.12 (3)</td>
<td>1.95 (3)</td>
<td></td>
</tr>
<tr>
<td>Mortality - Gastroenterology</td>
<td>0.97 (4)</td>
<td>0.74 (5)</td>
<td>0.50 (5)</td>
<td></td>
</tr>
<tr>
<td>Mortality - Medicine General</td>
<td>1.08 (4)</td>
<td>1.23 (3)</td>
<td>1.20 (3)</td>
<td></td>
</tr>
<tr>
<td>Mortality - Neurology</td>
<td>1.44 (2)</td>
<td>1.04 (4)</td>
<td>0.88 (3)</td>
<td></td>
</tr>
<tr>
<td>Mortality - Neurosurgery</td>
<td>1.35 (4)</td>
<td>1.32 (4)</td>
<td>1.17 (4)</td>
<td></td>
</tr>
<tr>
<td>Mortality - Surgery General</td>
<td>0.83 (6)</td>
<td>0.96 (5)</td>
<td>0.86 (4)</td>
<td></td>
</tr>
<tr>
<td>Mortality - Ortho/Spine</td>
<td>1.33 (4)</td>
<td>1.18 (4)</td>
<td>0.46 (5)</td>
<td></td>
</tr>
<tr>
<td>Mortality - Oncology</td>
<td>0.77 (5)</td>
<td>0.96 (5)</td>
<td>0.87 (4)</td>
<td></td>
</tr>
<tr>
<td>Mortality - Vascular Surgery</td>
<td>1.93 (3)</td>
<td>0.76 (5)</td>
<td>1.62 (2)</td>
<td></td>
</tr>
<tr>
<td>Mortality - Non Core Service</td>
<td>1.50 (3)</td>
<td>0.85 (5)</td>
<td>1.35 (2)</td>
<td></td>
</tr>
</tbody>
</table>
*CDI – Clinical Data Information
Mortality Review: Goals

– To review all observed mortalities generated through an Epic report within 48 hours of event
– To identify areas for improvement
– Implement Best practices to “Be the Best”
– To achieve integrity in documentation on mortalities
Quality: Mortality Review Classification

- **A** – an acceptable, predictable or unavoidable death without opportunity to improve the inevitable outcome.

- **B** – an acceptable, predictable or unavoidable death with opportunity to improve the inevitable outcome.

- **C** – an unacceptable, unanticipated death that reflects failure to recognize, failure to plan or failure to communicate.
# Level 1 Mortality Review

<table>
<thead>
<tr>
<th>ID:</th>
<th>Name:</th>
<th>Age:</th>
<th>MRN:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date of Admission:</th>
<th>Admitted From:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date of Death:</th>
<th>D/C Unit:</th>
<th>D/C Service:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Admit Dx:</th>
<th>Admit Code Status:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>D/C Dx:</th>
<th>Was pt transferred to a higher level of care? (at any point during admission):</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Dx of Sepsis?</th>
<th>□ Y</th>
<th>□ N</th>
</tr>
</thead>
</table>

Brief Synopsis of Case/Findings:

Category of Death: □ Expected w/o opportunity (A) □ Expected w/ opportunity (B) □ Unexpected (C)

Opportunities for Improvement:

- □ Appropriateness of transfer or admission
- □ Failure of treatment at outside facility
- □ Delay or error in diagnosis
- □ Delay or error in treatment
- □ Delay or issue with consultation
- □ Deterioration/death within 48 hrs of admission (appropriate level of care)
- □ Healthcare Associated Infection/Patient Safety Indicator
- □ Timely discussion of goals of therapy
- □ Inpatient hospice candidate
- □ Communication
- □ Other: ____________________________

Disposition of case:

- □ No further review necessary
- □ Refer to Peer Review
  - Dept/Division: ____________________________
  - Practitioner: ____________________________
  - Referral for: ____________________________
- □ Referral to other committee/dept
  - Specify: ____________________________
Mortality - Reviews
Category = ALL

Number of Deaths

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Deaths</td>
<td>37</td>
<td>31</td>
<td>28</td>
<td>32</td>
<td>28</td>
<td>20</td>
<td>17</td>
<td>31</td>
<td>21</td>
</tr>
</tbody>
</table>
Mortality Category  D/C Date: Apr 1 2016 To Dec 31 2016

Category

A  136
B  74
C  32
x  2
b  1

Category:
A - Expected mortality without opportunity for improvement
B - Expected mortality with an opportunity for improvement
C - Unexpected mortality
a, b, c - lower case indicates these cases are in the initial phase of review
x - Case still needs to be reviewed
Mortality - Unexpected (Category C)
Category = ALL

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Deaths</td>
<td>4</td>
<td>3</td>
<td>8</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
Vizient mortality risk models

- Clinical database comprised of large cohort of similar institutions
- DRG-based
- Logistic regression
- Revised annually

### AMC Hospital: Risk Modeling Summary for CDB 2018 Outcome = Mortality

<table>
<thead>
<tr>
<th>Model Group</th>
<th># 18 - (Age=18) Nervous system neoplasms w MCC (MSDRG 54), Nervous system neoplasms w/o MCC (MSDRG 55)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Diagnostics</td>
<td>Calculation: Chi-sq = 42.463, Validation: Chi-sq = 44.058, F = 1.037, p = 0.4778, Final: Max VIF = 1.505, Hosmer-Lemeshow = 68.820, p &lt; 0.001, df = 9, C = 0.840 Mean Observed = 0.0442, Mean Expected = 0.0442</td>
</tr>
</tbody>
</table>

### Model Results (Significant Predictors)

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Beta</th>
<th>OR</th>
<th>LCL</th>
<th>UCL</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-4.707</td>
<td>1.000</td>
<td>3.503</td>
<td>10.223</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Shock</td>
<td>1.818</td>
<td>2.176</td>
<td>1.755</td>
<td>2.622</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Liver Failure</td>
<td>1.704</td>
<td>5.498</td>
<td>3.357</td>
<td>9.003</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Vent on Admission Day</td>
<td>1.635</td>
<td>5.132</td>
<td>3.071</td>
<td>8.651</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Non-Invasive Mechanical Ventilation on Admission Day</td>
<td>1.487</td>
<td>2.357</td>
<td>1.983</td>
<td>5.764</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Coma</td>
<td>1.250</td>
<td>4.031</td>
<td>2.657</td>
<td>5.227</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Palliative Care</td>
<td>1.104</td>
<td>3.015</td>
<td>2.117</td>
<td>3.571</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Hydrocephalus</td>
<td>0.777</td>
<td>2.137</td>
<td>1.749</td>
<td>2.602</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Admit Source = Transf From Skilled Nursing/Long Term Care</td>
<td>0.665</td>
<td>3.606</td>
<td>1.971</td>
<td>9.692</td>
<td>0.0003</td>
</tr>
<tr>
<td>Metastatic Cancer</td>
<td>0.664</td>
<td>1.591</td>
<td>1.005</td>
<td>2.496</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Encephalopathy</td>
<td>0.492</td>
<td>1.632</td>
<td>1.013</td>
<td>2.176</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Aspiration Pneumonitis</td>
<td>0.640</td>
<td>1.096</td>
<td>1.717</td>
<td>2.722</td>
<td>0.0008</td>
</tr>
<tr>
<td>Thrombocytopenia Including Purpura, HIT, &amp; Other Platelet Disorders</td>
<td>0.626</td>
<td>1.360</td>
<td>1.325</td>
<td>2.204</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Pulmonary Disorder</td>
<td>0.455</td>
<td>2.727</td>
<td>1.429</td>
<td>3.227</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Malignancy</td>
<td>0.341</td>
<td>1.400</td>
<td>1.800</td>
<td>1.800</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Fluid &amp; Electrolyte Disorders</td>
<td>0.516</td>
<td>1.578</td>
<td>1.400</td>
<td>1.928</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Calcium Disorder</td>
<td>0.564</td>
<td>1.586</td>
<td>1.223</td>
<td>2.225</td>
<td>0.0008</td>
</tr>
<tr>
<td>Respiratory Failure</td>
<td>0.470</td>
<td>1.632</td>
<td>1.242</td>
<td>2.052</td>
<td>0.0003</td>
</tr>
<tr>
<td>Cardiac Arrhythmia</td>
<td>0.354</td>
<td>1.411</td>
<td>1.139</td>
<td>1.612</td>
<td>0.0006</td>
</tr>
<tr>
<td>Death</td>
<td>0.226</td>
<td>1.234</td>
<td>1.035</td>
<td>1.491</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Low Socioeconomic Stat, Prim Payer = Medicaid</td>
<td>0.215</td>
<td>1.240</td>
<td>1.053</td>
<td>1.460</td>
<td>0.0100</td>
</tr>
</tbody>
</table>
## CDI: Mortality review

### AMC Hospitals: Risk Modeling Summary for CDB 2018

**Outcome:** Mortality

<table>
<thead>
<tr>
<th>Model Group:</th>
<th>75</th>
<th>Select model group from drop-down list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculation:</td>
<td>Chi-Sq = 6.379</td>
<td>Validation: Chi-Sq = 11.016</td>
</tr>
<tr>
<td>Final: Max VIF = 1.470</td>
<td>Hosmer-Lemeshow = 8.505</td>
<td>p = 0.484</td>
</tr>
<tr>
<td>Mean Observed = 0.088</td>
<td>Mean Expected = 0.088</td>
<td></td>
</tr>
</tbody>
</table>

**Cases:** 7,259

**Model Method:** Logistic Regression

*Indicate which coding variables are present for each individual patient by placing a 1 for present and 0 for absent within the 'Value' column.*

### Expected Mortality

<table>
<thead>
<tr>
<th>Expected Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Expected Mortality</td>
</tr>
<tr>
<td>Expected Mortality for this patient</td>
</tr>
<tr>
<td>Expected Mortality relative to model group</td>
</tr>
</tbody>
</table>

### Computation for Expected Mortality

| Mean Expected | 0.088 |
| Sum of Coefficients | 1.067 |
| Numerator | 0.098 |
| Denominator | 1.058 |

**Explanatory Variables**

- Intercept
- ECMO on Admission Day
- Metastatic Cancer
- STEMI
- Vent on Admission Day
- Severe Omi Conditions
- Other Pulmonary Conditions
- Chronic Kidney Disease
- Aortic Root Replacement
- Female, Age >= 75
- Shock
- Female, 65 <= Age < 75
- Cardiac Assist Device on Admission Day
- Chronic Liver Disease
- Open Pulmonary or Tricuspid Valve Repair
- AMI Non-STEMI
- Male, Age >= 75
- CABG
- Acute Renal Failure
- Fluid & Electrolyte Disorders
- Admit Source = Trans From Acute
- Cardiac Device/Implant in Place, Previous Encounter
CDI: Mortality Review

• Clinical documentation specialist performs a retrospective review within 48 hours of patient’s death, using mortality risk model
• Clinical documentation specialist places flag on chart in EMR which places a bill hold until 2nd level mortality review complete
CDI: Mortality Review

• 2\textsuperscript{nd} level review performed by CDI Manager or Lead CDI specialist
  – DRG reconciliation
  – Mortality risk model verification
  – Identify any coding/sequencing errors
  – Identify any remaining query opportunities

• Flag/bill hold released after feedback given to CDI/Coding
CDI MORTALITY REVIEW
CDI Working DRG/RCO Final DRG 917 Poisoning & Toxic effects of drugs w/ MCC, RW 1.4020

Agree with DRG 917 and Principal dx T40994A Poisoning by other psychodysleptics (hallucinogens), undetermined, initial encounter

Notes to RCO:

- Disagree with procedure date 3/31 for 5A12012 Performance of cardiac output, single, manual: See code documentation note which lists date of cardiac arrest as 4/1/2018 at 12:06. If left as 3/31, the risk model variable for CPR on admit day will be incorrectly captured, thereby falsely elevating the risk of mortality.

Notes to CDI:

- Disagree with code R402342 Coma scale, best motor response, flexion withdrawal, at arrival to ED: Pt’s motor score was 3 at arrival to ED, which actually should be coded to R402332 Coma scale, best motor response, abnormal, at arrival to ED. The code description "flexion withdrawal" actually refers to a GCS subscore of 4.

Vizient mortality risk model variables coded: Vent on admission day, CPR on admit day, Vasopressor infusion on admission day, Coma, Acute renal failure, Fluid & electrolyte disorder

Estimated risk of mortality = 37.2%
Mean expected risk for model group (313) = 3.1%
O/E = 11.969

Estimated risk of mortality without CPR on admit day variable = 8.7%
Potential O/E = 2.789

Final recommendations: Procedure date change as above. No additional documentation/query opportunities identified.
What would it take to achieve top 20 performance in mortality?

<table>
<thead>
<tr>
<th>No. of Deaths/discharges</th>
<th>Observed mortality %</th>
</tr>
</thead>
<tbody>
<tr>
<td>358/13,226</td>
<td>2.69</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Observed mortality rate</th>
<th>No. of Deaths to Be the Best</th>
<th>Net changes needed to Be the Best</th>
<th>No. of Discharges</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0%</td>
<td>264</td>
<td>94 less Deaths</td>
<td>17,788 (+4,562)</td>
</tr>
</tbody>
</table>
Decrease observed mortality to ~2%

- Convert patients who are expected to die to Hospice (5-7 per month); this would result in 60-84 less observed deaths per year
- Rescue 20-30 patients per year with early intervention and improve process of care
- Improve efficiency by increasing the number of discharges
What determines the expected mortality?

Model

Documentation  ICD-10  MS-DRG

Observed/Expected (O/E)

Performance
Implications of Documentation

Diagnosis-related Group (DRG) determines the amount of reimbursement that will be paid for the care provided

- **Complication / Comorbidity (CC)** usually results in increased hospital resource use
- **Major Complication / Comorbidity (MCC)** usually results in increased hospital resource utilization; reflects the highest level of severity

Case Mix takes into consideration the diversity, clinical complexity and resources needed to care for our total hospital patient population
Documentation challenges

• Provider documentation is often minimal on dying patients compared to those expected to survive hospitalization
• Providers may be reluctant to document diagnosis they are not “treating” or that they assume are “integral” to the dying process
• Providers may think it’s “obvious” that a patient is high risk for expiring
Secondary diagnoses

• Crucial to patient profiling
  – Affect length of stay
  – Affect likelihood of expiring
  – Justify resources used
• Do not need to be “treated” if patient is comfort care only
  – Still reportable if the condition requires monitoring or consumptive care by nursing and ancillary staff
Common secondary diagnoses in dying patients

- Acute renal failure
- Acute respiratory failure
- Apnea
- Brain herniation, cerebral edema and compression in patients with neurologic diagnosis and no excludes notes for reporting
- Cheyne-Stokes respirations
- Coma/comatose in patients with GCS <9 prior to any comfort care sedation
- Encephalopathy for patients with AMS with GCS greater than 9 and less than 12 or with EEG showing diffuse slowing, bicortical dysfunction
- Shock liver
DRG 871
Combined (n=40)

Ave E  0.256
Ave E' 0.448
E' / E  1.75
What Mortality Review Revealed...

Remember, a score of **less than 1** means that more patients survived than were predicted to. A score of **more than 1** means that more patients passed away than were predicted to. So, a lower the score is better.

<table>
<thead>
<tr>
<th>Documented</th>
<th>Reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave $\Sigma$ Risk Factors</td>
<td>Ave $\Sigma$ Risk Factors</td>
</tr>
<tr>
<td>O</td>
<td>2.2</td>
</tr>
<tr>
<td>E</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>0.14</td>
</tr>
<tr>
<td>O/E</td>
<td>1.5</td>
</tr>
</tbody>
</table>
“Why can’t coders get it right?”

- Coders cannot code for something that is not in the documentation.
- Additionally, coders can’t assign an ICD-10 code for:
  - “Coffee ground emesis” unless GI bleed is spelled out.
  - Creatinine 2.4 as acute renal failure.
  - RML infiltrate as RML pneumonia.

Only 5 - 20% of expected mortality is explained by documentation and coding.

78-y.o. WM from NH with CHF, COPD & AFib

Dr. A’s Documentation:
- “SOB, Low O2 sats, tachypneic, On BiPAP”
- “ABG abnormal”
- “Sacral wound”
- “Hypotension, gtt’s started”

• Expected Mortality Rate: 1.7%

Dr. B’s Documentation:
- “Acute hypoxic Respiratory Failure”
- “Respiratory Acidosis”
- “Decubitus ulcer, Stage 3-POA”
- “Cardiogenic Shock”

• Expected Mortality Rate: 36.3%
** Documentation Improvement Tips**

<table>
<thead>
<tr>
<th>REMEMBER: BE SPECIFIC!</th>
<th>NON-SPECIFIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF – Acute, Acute on Chronic, Chronic Systolic, Diastolic, Combined</td>
<td>CHF HFpEF</td>
</tr>
<tr>
<td>Resp Failure -Acute, Acute on Chronic Hypoxic, Hypercapnic, Mixed</td>
<td>Respiratory insufficiency</td>
</tr>
<tr>
<td>Acute MI – NSTEMI, STEMI</td>
<td>Troponinemia</td>
</tr>
<tr>
<td>Acute renal failure secondary to ***</td>
<td>Renal insufficiency, AKI</td>
</tr>
<tr>
<td>Encephalopathy</td>
<td>Altered mental status</td>
</tr>
<tr>
<td>Coagulopathy</td>
<td>Elevated INR/PT/PTT</td>
</tr>
<tr>
<td>Liver Failure – Acute, Subacute, Chronic, Shock Liver</td>
<td>Transaminitis, Elevated LFTs</td>
</tr>
<tr>
<td>Sepsis/Severe sepsis secondary to UTI</td>
<td>Urosepsis</td>
</tr>
<tr>
<td>Hyper-/Hyponatremia</td>
<td>↑Na+, ↓Na+</td>
</tr>
<tr>
<td>Malnutrition – Mild, Moderate, Severe</td>
<td>Hypoalbuminemia, Malnourished</td>
</tr>
<tr>
<td>Pressure ulcer stage *** present on admission</td>
<td>Ulcer</td>
</tr>
<tr>
<td>Pneumonia secondary to ***</td>
<td>Pneumonia</td>
</tr>
<tr>
<td>Chronic respiratory failure</td>
<td>On home oxygen</td>
</tr>
<tr>
<td>Atherosclerosis of extremities</td>
<td>PAD, PVD</td>
</tr>
<tr>
<td>Acute blood loss anemia</td>
<td>Anemia</td>
</tr>
</tbody>
</table>

** No use of symbols **

*** Please use linking statements (see example): Patient with acute hypoxic respiratory failure, acute renal failure secondary to ATN, and metabolic encephalopathy in the setting of severe sepsis from community-acquired pneumonia secondary to Strep pneumoniae.***
No use of symbols

Symbols and numbers do not translate into a diagnosis!

- Na 124 = nothing
- U/A + = nothing
- Hgb ↓ = nothing
- Albumin 1.5 = nothing
- Troponins ↑ = nothing
- Symbols = nothing
Case Mix takes into consideration the diversity, clinical complexity and resources needed to care for our total hospital patient population.
Non-specific / Inadequate Documentation (Dx)

- 73 yo F found down in vomit, admitted with CVA and sepsis 2/2 aspiration pneumonia.

Physical Exam: “Neuro / Psych – GCS 3”

A/P: “AMS”

Dx: Missed Coma (weight 0.799)
Non-specific / Inadequate Dx

- 61 yo M with CHF, alcohol abuse admitted with septic shock vs cardiogenic shock

**Labs:**
- AST 1060
- ALT 220
- INR 4.5

**A/P:**
- “Elevated LFTs”
- “Elevated INR”

**Dx:**
- Missed Liver Failure (weight 0.878)
- Missed Coagulopathy (weight 0.456)

Also Missed:
- Electrolyte Abnl (Na 133) (weight 0.277)
- CLD (hepatic steatosis on RUQ US, EtOH abuse) (weight 0.778)
Non-specific / Inadequate Dx

- 68 yo M with CHF, CKD 4-5 admitted with cardiogenic vs septic shock, complete AVB

Labs <24 hrs:
- AST 753, ALT 429 (→ 3k)
- INR 4.0 (→ 13)

A/P:
- “Shock Liver”
- “Elevated INR”

Dx:
- Captured Liver Failure
- Missed Coagulopathy (weight 0.456)

Also Missed:
- Arrhythmia (“Bradycardia, AVB”; likely Coding Error) (weight 0.171)
Congestive Heart Failure {acuity:300070236} {type:300070237}
MI, acute - {specificity:300070232}
Acute stroke , {specificity:300070234}, {infarction:12297}
Shock, {type:300070240}
Acute Pulmonary Embolism
COPD {with:300070245}
Respiratory failure, {type:300070247}
Pneumonia, {type:300070248}, due to ***
Acute renal failure due to ***, {type:300070252}
Chronic Kidney Disease - {specificity:300070223}
Sepsis secondary to organism:*** and site: ***, with associated {specify organ:300070279}
HIV Disease
Acute GI Bleed due to ***
Diabetic Ketoacidosis
Encephalopathy {specificity:300070235}
Pressure Ulcer, Stage ***
None
***
A peek at our progress...
2018 Vizient Quality & Accountability Study

Star Rating: 4 Stars
Overall Rank: 4th
Overall Score: 69.43%

Domain Performance:
- Efficiency: 13/99, 6.83% of 10%
- Safety: 22/107, 14.51% of 25%
- Equity: 1/99, 5.00% of 5%
- Patient Centeredness: 20/99, 10.88% of 15%
- Effectiveness: 15/99, 12.24% of 20%

Score Range:
- 01 – 10
- 11 – 20
- 21 – 30
- 31 – 40
- 41 – 50
- 51 – 60
- 61 – 70
- 71 – 80
- 81 – 90
- 91 – 99
Don’t fix what’s not broken!

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<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Rank</td>
<td>76</td>
<td>9</td>
<td>4</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Mortality</td>
<td>94</td>
<td>55</td>
<td>5</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>Safety</td>
<td>23</td>
<td>7</td>
<td>22</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>47</td>
<td>14</td>
<td>15</td>
<td>30</td>
<td>38</td>
</tr>
<tr>
<td>Patient Centeredness</td>
<td>21</td>
<td>12</td>
<td>20</td>
<td>27</td>
<td>32*</td>
</tr>
<tr>
<td>Efficiency</td>
<td>98</td>
<td>27</td>
<td>13</td>
<td>47</td>
<td>38</td>
</tr>
</tbody>
</table>
Summary

• Use appropriate documentation verbiage
• Document whether present on admission
• Give a diagnosis, not a symbol or a symptom
• Add linking statement
• Appropriately assign palliative/hospice care
• Employ evidence based practice
• Escalation to faculty/expert when necessary
• Use your tools