PERFORMANCE MEASURES & BENCHMARKS
OVERVIEW

• Since when has Taylor talked about data…?
• Performance Measures vs Benchmarks
• Sample Measures with National Benchmarks
• Where do we go from here?
SO FIRST OF ALL... THESE IDEAS ARE JEFF’S (OH AND SO IS THIS LECTURE)
JEFF’S A SMART GUY

He figured out how to:

1) Go on a Griswold style European family vacation
2) How to see some of the best parts of Europe
3) And how to attend one of the most bad-ass EM conferences in the world
JEFF’S TRIP
TAYLOR’S TRIP
BUT I’M NOT JEALOUS
BUT REALLY I’LL TRY...

JEFF
(NOT REALLY JEFF)

TAYLOR
A GREAT GUY TO HAVE IN THE OFFICE...

JEFF
(DOESN’T LIKE “HUT-HUT SHIT”)

TAYLOR
(FAILED COLLEGE ALGEBRA)

The R Project for Statistical Computing
OVERVIEW

• Since when has Taylor talked about data…?
• Performance Measures vs Benchmarks
• Sample Measures with National Benchmarks
• Where do we go from here?
WHICHWICH?

- **Performance measure** - *performance* of an individual, group, organization, system or component
  - Type of measure defined by what you look at
  - Requires collection of defined data
- **Benchmarking** - a *comparison* of these performance measures across similar other organizations looking at identical measures.
  - Allows and organization to “rank itself” amongst it’s peers
A SIMPLIFICATION

YOUR HOUSE EVERY YEAR
(PERFORMANCE MEASURE)

THE NEIGHBOR
(BENCHMARKING)
Performance Measures

- Structure
- Process
- Outcome
- Balancing
PERFORMANCE

- Structure data deals with the setting where care is performed
- Did my irrigation guy put in a good sprinkler system that works?
- Most common EMS structure measure is response time
- Are structure measures always tied to quality?

- Does faster response time mean better outcomes?
Process data is just that, dealing with a procedure or direct aspect of some action required for clinical care.

- How many times per week do I remember to water my grass?
- Most simple EMS performance measure to obtain
- Most common for QA/QI process as tied to easily measurable data point
- Most agree that these are tied directly to patient quality

- Faster door to 12-lead times decrease time to STEMI detection which decreases overall symptom to balloon time?
Outcome data evaluates changes in the patients subsequent health status

- My grass looked awesome, grew tall and was green this year.
- Can be relatively simple and defined or complex and nebulous
- Most common example is outcome data for out of hospital cardiac arrest
- Death, disability, functional status based outcomes most common

- Better neurologically intact discharge home rates in a community suggest better EMS OOHCA system performance?
BUT THERE MUST BE BALANCE
• As anyone knows, a laser focus causes a loss of perspective on other issues.
• Bringing crews out of rotation for intensive clinical training may improve a clinical problem but worsen operational response times.
• Requiring crewmembers to stay late to finish all ePCRs on overtime may fix an operational problem but cause a financial and employee relation strain.
• Focus on patient contact to EKG time reduction may improve a clinical metric but diminish operational patient satisfaction with care.

• System priorities must remain balanced.
Operations
(Sprinklers kept repaired.)

Clinical
(Remembered to water every other day.)

Financial
( Didn’t water too much to keep the bill down.)

Employee Relations
( The neighbors love my yard.)
BENCHMARKING

“To evaluate with comparison to a standard”
WHICH TYPES OF APPLES DO YOU WANT TO COMPARE?

- What information can you easily compare across EMS systems?
- Historical examples?
- Response times
  - Clinically do they matter?
  - Where and how have we proved this?
- Cardiac arrest survival
  - Benchmarking with a tiny fraction of your data?
  - What is the overall health of your population and healthcare system?
- What about measures that evidence has shown matter?
WHO DECIDES WHAT MATTERS? (AND HOW)
WHO DECIDES EFFICACY OF TREATMENT AND WHAT MEASURES TO BENCHMARK?

• Obviously CMS has an opinion…
  • Pneumonia care standards
  • Sepsis care standards

• The State has an opinion…
  • Trauma facility designation
  • Provider level licensing

• Industry has an opinion…
  • AHA standards
  • GWTG,ACTION registry

• What about for EMS?
  • What standards are better?
Evidence-Based Performance Measures for Emergency Medical Services Systems: A Model for Expanded EMS Benchmarking

A Statement Developed by the 2007 Consortium U.S. Metropolitan Municipalities’ EMS Medical Directors (Appendix)

J. Brent Myers, MD, MPH, Corey M. Slovis, MD, Marc Eckstein, MD, MPH, Jeffrey M. Goodloe, MD, S. Marshal Isaacs, MD, James R. Loflin, MD, C. Crawford Mechem, MD, Neal J. Richmond, MD, Paul E. Pepe, MD, MPH

<table>
<thead>
<tr>
<th>Clinical Area</th>
<th>Elements in Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST-Elevation Myocardial Infarction (STEMI).</td>
<td>Aspirin (ASA), if not allergic</td>
</tr>
<tr>
<td></td>
<td>12-Lead electrocardiograph (ECG) with prearrival activation of interventional cardiology team as indicated</td>
</tr>
<tr>
<td></td>
<td>Direct transport to percutaneous coronary intervention (PCI)</td>
</tr>
<tr>
<td></td>
<td>capable facility for ECG to PCI time &lt; 90 minutes</td>
</tr>
<tr>
<td>Pulmonary edema</td>
<td>Nitroglycerin (NTG) in absence of contraindications</td>
</tr>
<tr>
<td></td>
<td>Noninvasive Positive Pressure Ventilation (NIPPV) preferred as first-line therapy over endotracheal intubation</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asthma</strong></td>
<td>Administration of beta-agonist</td>
</tr>
<tr>
<td></td>
<td>Blood glucose measurement</td>
</tr>
<tr>
<td></td>
<td>Benzodiazepine for status epilepticus</td>
</tr>
<tr>
<td><strong>Seizure</strong></td>
<td>Limit non-entrapment time to &lt; 10 minutes</td>
</tr>
<tr>
<td></td>
<td>Direct transport to trauma center for those meeting criteria, particularly those over 65 (with time consistent caveats for air medical transport situations)</td>
</tr>
<tr>
<td><strong>Trauma</strong></td>
<td>Response interval &lt; 5 minutes for basic CPR and automated external defibrillators (AEDs)</td>
</tr>
<tr>
<td>Clinical Area</td>
<td>Elements</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ST-Segment Elevation</td>
<td>Aspirin 12-lead electrocardiograph (ECG), direct transport to</td>
</tr>
<tr>
<td>Myocardial Infarction (STEMI)</td>
<td>percutaneous cardiac intervention (PCI) interval from ECG to balloon &lt;</td>
</tr>
<tr>
<td></td>
<td>90 minutes&lt;sup&gt;46&lt;/sup&gt;&lt;sup&gt;,47&lt;/sup&gt;</td>
</tr>
<tr>
<td>Seizure</td>
<td>Administration of benzodiazepine for status epilepticus&lt;sup&gt;66&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pulmonary edema</td>
<td>Noninvasive positive pressure ventilation (NIPPV)&lt;sup&gt;59&lt;/sup&gt;</td>
</tr>
<tr>
<td>Trauma</td>
<td>Patients with an Injury Severity Score (ISS) &gt; 15 to trauma center&lt;sup&gt;72&lt;/sup&gt;</td>
</tr>
<tr>
<td>Trauma</td>
<td>Patients over 65 years of age with ISS &gt; 21 to trauma center&lt;sup&gt;69&lt;/sup&gt;</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>Defibrillator to the scene &lt; 5 minutes rather than &lt; 8 minutes&lt;sup&gt;15&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
About Performance Measures

The ultimate goal of EMS is to provide effective, high-quality healthcare to patients. But without performance measures, EMS providers, executives, and regulators have no way of knowing if they're achieving those goals.

As much as possible, the EMS Compass team is trying to develop measures that are relevant to prehospital providers everywhere. The performance measures are being designed to assess things that patients and communities would value whether they live in rural or urban environments or are served by fire departments or private ambulances or paid or volunteer personnel. While some measures may be more relevant to some agencies than to others, the goal of EMS Compass is to make its measures useful and usable by all EMS agencies.
<table>
<thead>
<tr>
<th>EMS Compass Bundle</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoglycemia</td>
<td>2</td>
</tr>
<tr>
<td>Medication Error</td>
<td>3</td>
</tr>
<tr>
<td>Pediatric Respiratory</td>
<td>4</td>
</tr>
<tr>
<td>Seizure</td>
<td>5</td>
</tr>
<tr>
<td>Stroke</td>
<td>6</td>
</tr>
<tr>
<td>Trauma</td>
<td>7</td>
</tr>
<tr>
<td>Trauma Pain</td>
<td>8</td>
</tr>
<tr>
<td>Vehicle Operations Safety</td>
<td>9</td>
</tr>
<tr>
<td>EMS Compass ID</td>
<td>Version</td>
</tr>
<tr>
<td>---------------</td>
<td>---------</td>
</tr>
<tr>
<td>Hypoglycemia-GL</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
WHERE’S THE DATA?

• Multiple sources as becoming available as complexity and intricacy of ePCR increases…
  
• Public sector
  • Compass data based of NEMSIS data points

• Private sector
  • Many emerging large ePCR products with global use
  • Recognizing the value of aggregation of data
CITY COUNCIL PERSON Z: “DR. MEDICAL DIRECTOR, WHAT IS THE INCIDENCE OF RABID SQUIRREL BITES IN THE HISTORIC DISTRICT OF OUR FINE CITY?...I’LL NEED THAT INFORMATION BY TOMORROW BY THE WAY.”
CITY COUNCIL PERSON Z: “DR. MEDICAL DIRECTOR, HOW DOES CARDIAC ARREST SURVIVAL IN OUR FINE CITY COMPARE TO THE REST OF TEXAS?”
DISCLOSURE

(THese GUYS ARE MY EPCR VENDOR AND I LIKE THEM!)

NOTHING ELSE TO DISCLOSE

UNFORTUNATELY BUT IF YOU HAVE A LOT OF MONEY AND WANT TO PAY ME A LOT OF MONEY TO TALK ABOUT YOUR STUFF THAT WOULD BE REALLY AWESOME!!!
WHERE DOES THE DATA COME FROM?
• 7,709,017 Emergency responses over 8 year period
• 941 consenting agencies of ESO
• ESO covers:
  • 2,000 client agencies
  • 20 million calls/year
MEASURE 1 – TIME TO 1ST DEFIB

• 18,106 patients. Average: 18.37 min, IQR: 12.0 (7.48, 22.52)
• Included:
  • All 911 cardiac arrests prior to EMS arrival w/ initial shockable rhythm
• Excluded: No valid time data (negative time to first defib or time > 120 minutes)
MEASURE 3 – BETA USE IN BAD ASTHMA

• Included:
  • All transported 911 patients
  • Primary/Secondary Impression = Asthma
  • RR > 28 or SpO2 <90%
  • ALS system
M3: Beta use in sick asthmatics

10,226 complied
12,489 patients

81.9%
MEASURE 5 – NTG & CPAP IN ACUTE DECOMPENSATED HEART FAILURE

- N: Got NTG and CPAP
- D: all transported 911 patients with:
  - Impression of CHF AND
  - Highest SBP >200 AND
  - (Highest RR >30 OR Lowest SpO2 <90%)
M5 – NTG & CPAP IN ACUTE DECOMPENSATED HEART FAILURE

2,100 complied
2,612 patients
80.4%
MEASURE 6 – HYPOGLYCEMIC PTS GETTING GLUCOSE

- N: Got some form of glucose
- D: all transported 911 patients with:
  - Lowest blood glucose < 60
M6 – HYPOGLYCEMIC PTS GETTING GLUCOSE

117,358 complied
147,238 patients

79.7%
MEASURE 7 - PEDI DYSPNEA WITH DOCUMENTED RR AND SPO2

- N: At least 1 RR and SpO2 documented
- D: all transported 911 patients with:
  - Age < 15,
  - Impression includes respiratory diagnosis
M7 - PEDI DYSPNEA WITH DOCUMENTED RR AND SPO2

37,741 complied
43,142 patients
87.5%
MEASURE 8 – PEDI ASTHMA WITH BETA-AGONIST

• N: given some type of beta-agonist
• D: all transported 911 patients with:
  • Age < 15,
  • Impression = asthma
  • ALS agency
M8 – PEDI ASTHMA W/ BETA-AGONIST

4,291 complied
6,202 patients

69.2%
MEASURE 8 – PEDI MOD/SEVERE ASTHMA WITH BETA-AGONIST

- N: given some type of beta-agonist
- D: all transported 911 patients with:
  - Age < 15,
  - Impression = asthma
  - ALS agency
M9 – PEDI MOD/SEVERE ASTHMA W/ BETA-AGONIST

627 complied
755 patients
83.0%
MEASURE 10 – PEDIATRIC WEIGHTS

• N: those with a documented weight
• D: all transported 911 patients with:
  • Age < 15
M10 – PEDI WEIGHTS

287,719 complied
524,856 patients
54.8%
MEASURE 11 – MEASURED GLUCOSE IN STATUS EPILEPTICUS

• N: those with a documented blood glucose
• D: all transported 911 patients with:
  • Impression status epilepticus OR
  • Impression of seizures AND
    • Signs/symptoms of status epilepticus
    • ALS agencies
M11 - BLOOD GLUCOSE IN STATUS EPILEPTICUS

7,679 complied
10,584 patients

72.6%
MEASURE 12 BENZOS IN STATUS EPILEPTICUS

• N: those given some type of benzodiazepine
• D: all transported 911 patients with:
  • Impression status epilepticus OR
  • Impression of seizures AND
  • Signs/symptoms of status epilepticus
  • ALS agencies
M12 - BENZO IN STATUS EPILEPTICUS

6,065 complied
10,584 patients

57.3%
MEASURE 13 – STROKE SCALE DOCUMENTED IN STROKES

• N: those with a documented stroke scale
• D: all transported 911 patients with:
  • Impression Stroke OR TIA
M13 – STROKE SCALE IN STROKES

84,437 complied
168,854 patients

50.0%
MEASURE 14 – GLUCOSE MEASURED IN STROKE

• N: those with a documented blood glucose
• D: all transported 911 patients with:
  • Impression stroke or TIA
M14 - GLUCOSE MEASURED IN STROKE

140,294 complied
168,854 patients

83.1%
NEXT STEPS?

- Pay for Performance
- Where industry is going
- Disguised as quality?
- RFPs
  - Nationally being incorporated into some contracts
  - Better than response time?
Q&A
(JAJ – JUST ASK JEFF)

- EMSWorld.com/webcasts
- ESOSolutions.com

@DrJeffJarvis
jjarvis@wilco.org

@DrRatEMTP
bellcomd3@gmail.com