qSOFA: where are we now?

Christopher W. Seymour, MD MSc
Assistant Professor of Critical Care Medicine & Emergency Medicine
University of Pittsburgh School of Medicine
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• Member, Surviving Sepsis Campaign, ATS representative
Caveats

• I helped coordinate the analyses for Sepsis3 & qSOFA

• Like it or not, the name is his fault

• We will not cover all the validation studies reported or those in process
Agenda

• Review concepts behind qSOFA - parsimony
• Touch on original data in Sepsis-3
• Discuss post-release controversies
• Where are we headed?
Why do we need qSOFA?

Sensible definitions
Organ dysfunction
SOFA score

Apply changing definitions to clinical practice guidelines
Why do we need qSOFA?

Definition describes organ dysfunction, life threatening using the SOFA score

Change in 2 or more points
A math problem

• SOFA score is a bit complicated
  • 6 organ systems
  • 9 physiologic variables
  • Total 24 points

• How to increase by 2 points in different systems?

\[
\begin{bmatrix}
6 \\
2 \\
\end{bmatrix}
\text{6 ways in 6!} = \frac{6!}{2!} = 25
\]
Conceptually, might we want a different (not better) tool?

- Low cost
- Quick
- Reliable
- Repeatable
- Acceptable validity

Angus et al., Crit Care Med, 2016
What we did..

Seymour et al., JAMA, 2016
We did not develop a complex, screening test.
What did we find..

- Altered mentation
- Elevated respiratory rate
- Systolic hypotension

quick Sepsis-related Organ Failure Assessment score

Seymour et al., JAMA, 2016
What did we find..
What did we find..

Outside the ICU encounters
N = 66,522
AUROC in-hospital mortality

SIRS

SOFA

LODS

qSOFAsimilar to complex scores outside the ICU

Seymour et al., JAMA, 2016
Next steps for qSOFA

- External validation by Sepsis-3 investigators

<table>
<thead>
<tr>
<th>Data Set and Infection Type</th>
<th>No. of Patients With Suspected Infection</th>
<th>AUROC (95% CI) Baseline Model</th>
<th>AUROC (95% CI) Baseline Model + qSOFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPNC (all suspected infections)</td>
<td>321,380</td>
<td>0.67 (0.67-0.67)</td>
<td>0.78 (0.78-0.78)</td>
</tr>
<tr>
<td>ICU patients</td>
<td>7031</td>
<td>0.64 (0.62-0.66)</td>
<td>0.72 (0.70-0.73)</td>
</tr>
<tr>
<td>Non-ICU patients</td>
<td>314,349</td>
<td>0.68 (0.67-0.68)</td>
<td>0.78 (0.78-0.79)</td>
</tr>
<tr>
<td>VA (all suspected infections)(^a)</td>
<td>377,325</td>
<td>0.73 (0.73-0.74)</td>
<td>0.78 (0.78-0.79)</td>
</tr>
<tr>
<td>ALERTS (hospital-acquired infections)</td>
<td>1,186</td>
<td>0.55 (0.51-0.60)</td>
<td>0.73 (0.69-0.77)</td>
</tr>
<tr>
<td>KCEMS (community-acquired infections)</td>
<td>6,508</td>
<td>0.59 (0.57-0.62)</td>
<td>0.71 (0.69-0.73)</td>
</tr>
</tbody>
</table>

- External validation by others
  - Already >100 citations
  - Multiple reports with varying designs and results

Seymour et al., JAMA, 2016
Next steps for qSOFA

- Repeated measurement of qSOFA
- 6 hour epochs after suspected infection
- Max qSOFA points per epoch
- >30,000 encounters
  12 hospitals, UPMC

Kievlan, unpublished
Next steps

- Group mixture modeling of qSOFA trajectories
Next steps

• qSOFA validation in low middle income countries

SAILORS study

HIV, Meliodosis, VHF, Malaria, Dengue, Pneumonia

10 countries
18 hospitals
>8000 encounters
Wrap up

• qSOFA is not a screening tool but a **clinical prompt** for sepsis among patients already thought to be infected

• Though validated in 1 million encounters, more complex models may be statistically “better”

• Innovative new research is coming
  • Repeated qSOFA over time
  • SAILORS study in LMICs
Questions