Where does the problem occur? The ED

Over a 14-month timeframe, we found that the majority of sepsis diagnoses occurred in the ED. The dotted outline shows the sepsis cases diagnosed over a 10 hour window: 5 hours before and after admission orders are placed ("Hour 0").

What is Sepsis Watch?

SIRS criteria - Temperature >38°C or <36°C (6 hours)
- HR >90 (6 hours)
- RR >20 (6 hours)
- WBC count >12, <4, or % bandemia >10% (24 hours)

Suspect Infection - Blood culture order (24 hours)

1 element of end organ failure - Creatinine >2.0 (24 hours)
- INR >1.5 (24 hours)
- Total bilirubin >2.0 (24 hours)
- SBP <90 or decrease in SBP by >40 (6 hours)
- Platelets <100 (24 hours)
- Lactate ≥2 (24 hours)

Define adult sepsis at Duke

- At least one value for each vital in 99% of encounters.
- Some labs rarely measured (2-4%), most measured 20-80% of the time.

Create machine learning model to predict sepsis quickly and accurately

- 42,000+ inpatient encounters analyzed at Duke Hospital over 14 months, 21.3% with a sepsis event.
- 32+ million data points incorporated: 25 million vital sign measurements, 2 million med admins, 5.2 million labs.
- 34 physiological variables (5 vitals, 29 labs).
- At least one value for each vital in 99% of encounters.
- Some labs rarely measured (2-4%), most measured 20-80% of the time.
- 35 baseline covariates (e.g. age, transfer status, comorbidities).
- 10 medication classes (antibiotics, opioids, heparins).

Why are we failing to solve the problem today? Slow, false alarms

(fake) NEWS
- Only 6.8% of patients with NEWS (National Early Warning Score) BPA had discharge diagnosis of sepsis
- BPA fired 447 times/day on 42 unique patients/day on average (up to ~100x/patient).
- 63% of BPA canceled.

The Problem: Struggle with sepsis

The Solution: Sepsis Watch

Sepsis Watch is a custom-built tool to support identification of patients at risk of sepsis in the hospital. Access Sepsis Watch App at https://sepsiswatch.dhe.duke.edu/

For more information, go to Just In Time Learning: https://intranet.dh.duke.edu/hospitals/duh/duhedcouncil/SitePages/Current%20Roll%20Outs.aspx