

What Physicians Need in CDS

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Let me tell you a story.....

Advancing Clinical Decision Support
A Clinician's Perspective

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LITTLE
RED
RIDING
HOOD

Sepsis Wolf

- 10th most common cause of death in US
- Leading cause of death in ICU
- 18 billion dollars/year
- Sepsis is the body's response to infection
 - Severe sepsis: multiple organ dysfunction
 - Septic shock: hypotension
 - Septicemia: bloodstream infection
- Estimated 800,000 cases of severe sepsis per year in the US
- Rate increasing by 1.5% per year – estimated additional 1 million cases by 2020
- Mortality 30-40%

The obedient child laid her down by the side
Of her Grandmother dear (as she thought);
But all at once, "Granny!" Red Riding Hood
cried,
"What very long arms you have got!"
He answered, "The better to hug you, my child."
"But, Granny, what very large ears!"

"The better to hear you;" the voice was still
But the poor little girl had her fears. [mild,
"Grandmother, you seem to have very large
"The better to see you, I trow." [eyes!"
"What great teeth you have got!" and the
wicked Wolf cries,
"The better to eat you up now!"



Sepsis/Wolf Recognition

- What big eyes you have
- What big ears you have
- What sharp teeth you have
- What long nails you have
- WBC count
- Fever
- Tachycardia
- Respiratory rate elevation

Evaluation for Severe Sepsis Screening Tool

Instructions: Use this optional tool to screen patients for severe sepsis in the emergency department, on the wards, or in the ICU.

1. Is the patient's history suggestive of a new infection?

- | | | |
|---|---|---|
| <input type="checkbox"/> Pneumonia, empyema | <input type="checkbox"/> Bone/joint infection | <input type="checkbox"/> Implantable device infection |
| <input type="checkbox"/> Urinary tract infection | <input type="checkbox"/> Wound infection | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Acute abdominal infection | <input type="checkbox"/> Bloodstream catheter infection | |
| <input type="checkbox"/> Meningitis | <input type="checkbox"/> Endocarditis | |
| <input type="checkbox"/> Skin/soft tissue infection | | |

___ Yes ___ No

2. Are any two of following signs & symptoms of infection both present and new to the patient? **Note:** laboratory values may have been obtained for inpatients but may not be available for outpatients.

- | | | |
|--|---|--|
| <input type="checkbox"/> Hyperthermia > 38.3 °C (101.0 °F) | <input type="checkbox"/> Tachypnea > 20 bpm | <input type="checkbox"/> Leukopenia (WBC count < 4000 μ L ⁻¹) |
| <input type="checkbox"/> Hypothermia < 36 °C (96.8 °F) | <input type="checkbox"/> Acutely altered mental status | <input type="checkbox"/> Hyperglycemia (plasma glucose > 120 mg/dL) in the absence of diabetes |
| <input type="checkbox"/> Tachycardia > 90 bpm | <input type="checkbox"/> Leukocytosis (WBC count > 12,000 μ L ⁻¹) | |

___ Yes ___ No

If the answer is yes to both either question 1 and 2, *suspicion of infection* is present:

✓ Obtain: lactic acid, blood cultures, CBC with differential, basic chemistry labs, bilirubin.

Cloud Technology

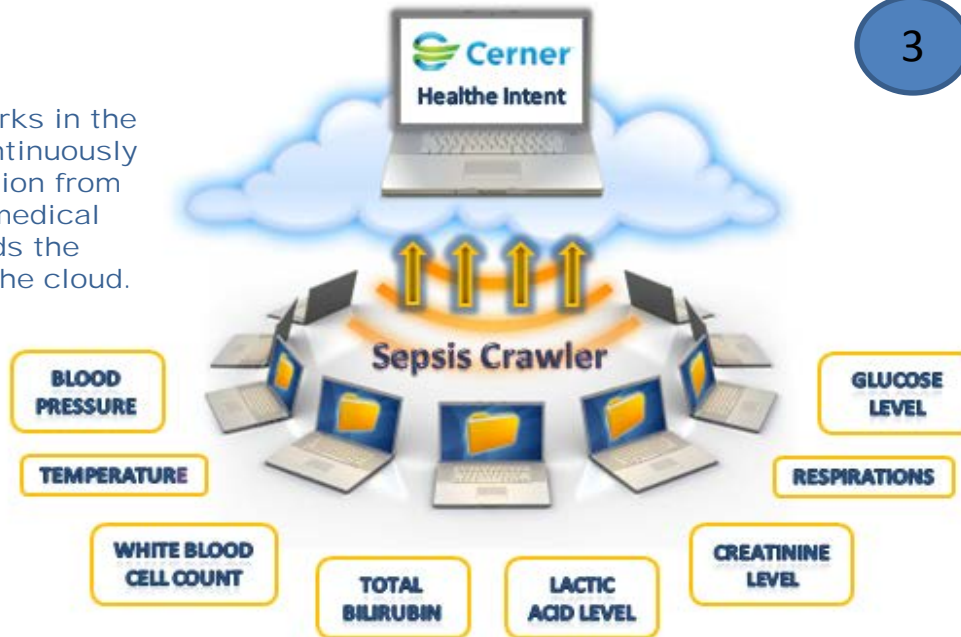
Sepsis Cloud

2

Data is extracted in "real-time" by the Sepsis Crawler. The Sepsis Agent then analyzes the data for potential triggers of Sepsis.

1

The crawler works in the background continuously pulling information from the electronic medical record and sends the information to the cloud.



3

When the Sepsis Agent finds a risk for Sepsis, communication alerts are sent to clinicians.



SIRS
ALERT

SEVERE SEPSIS
ALERT

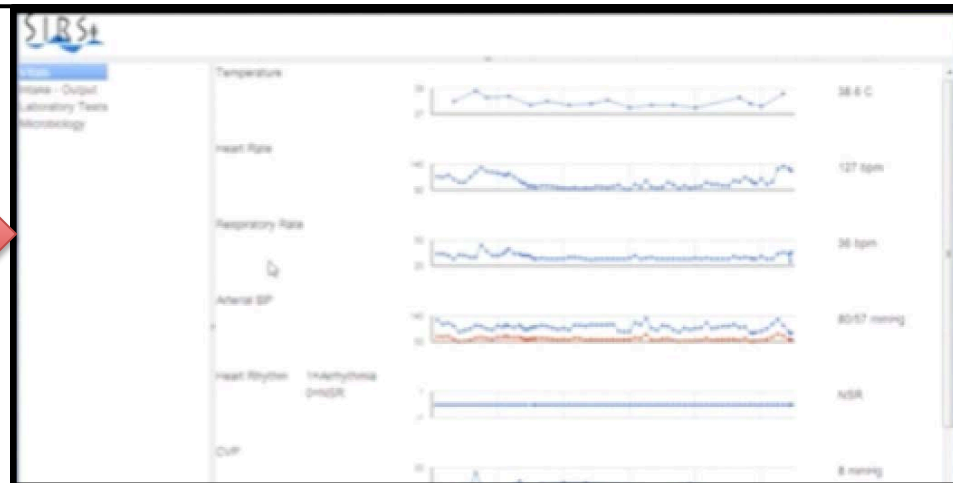
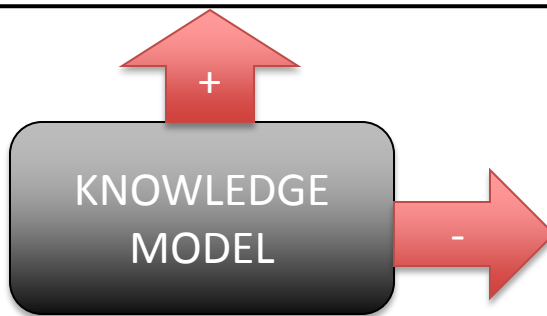
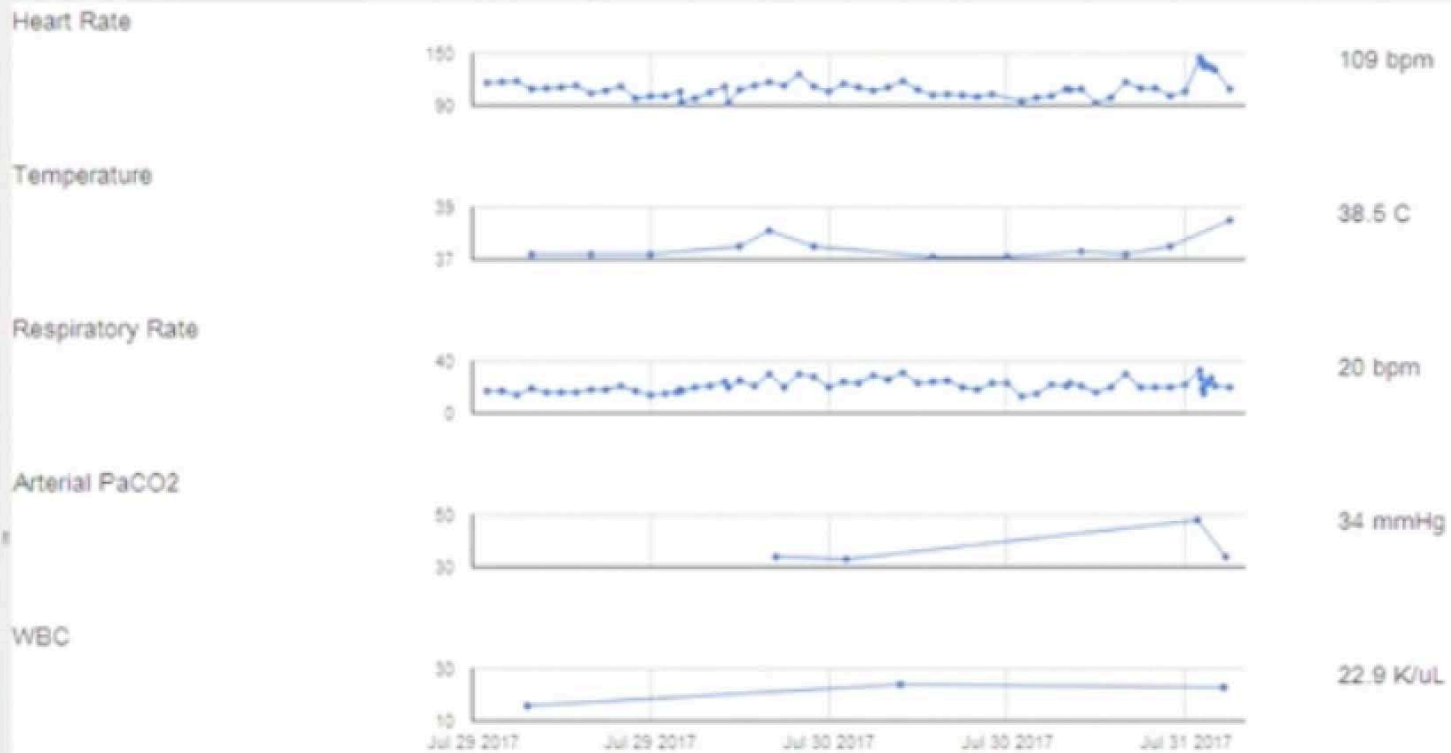


Think of the crawler as a physician on constant rounds, continuously analyzing clinical parameters (The Cloud) and adding them up to determine if SIRS/Sepsis is possibly present (The Alerts).

You tell me a story.....



- infection
- SIRS**
- Renal System
- Respiratory System
- Central Nervous System
- Hepatic System
- Cardiovascular System



SIRS

WBC

Infect

9.5

K/uL

Sho

2012-02-03 10:14:00 +0000



Orga

Respiratory Rate

0

BPM

2012-02-04 21:50:00 +0000

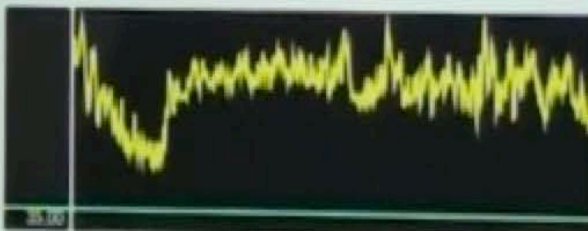


Heart Rate

35

BPM

2012-02-04 22:02:00 +0000

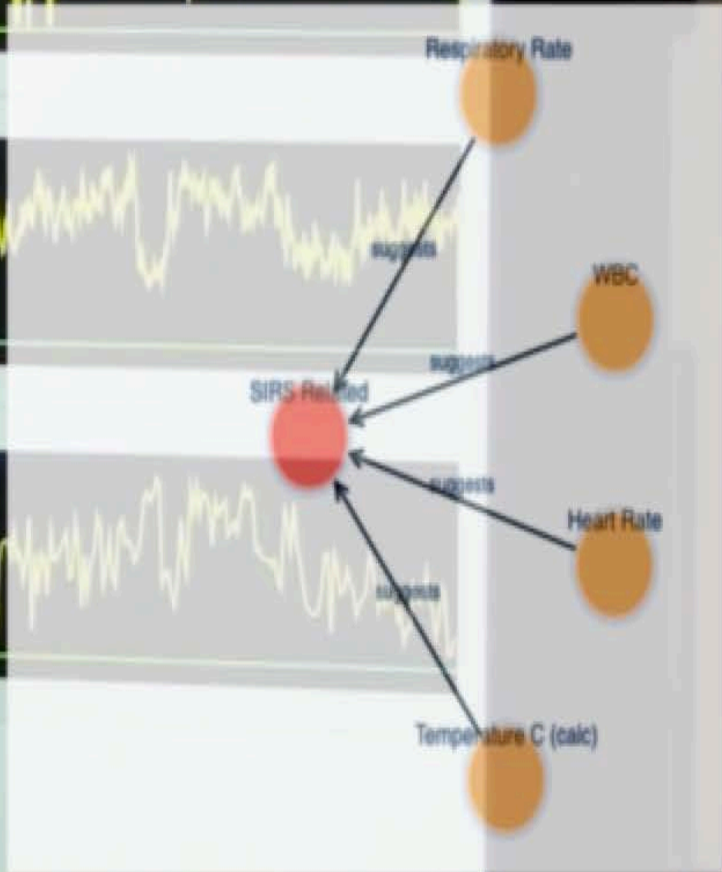


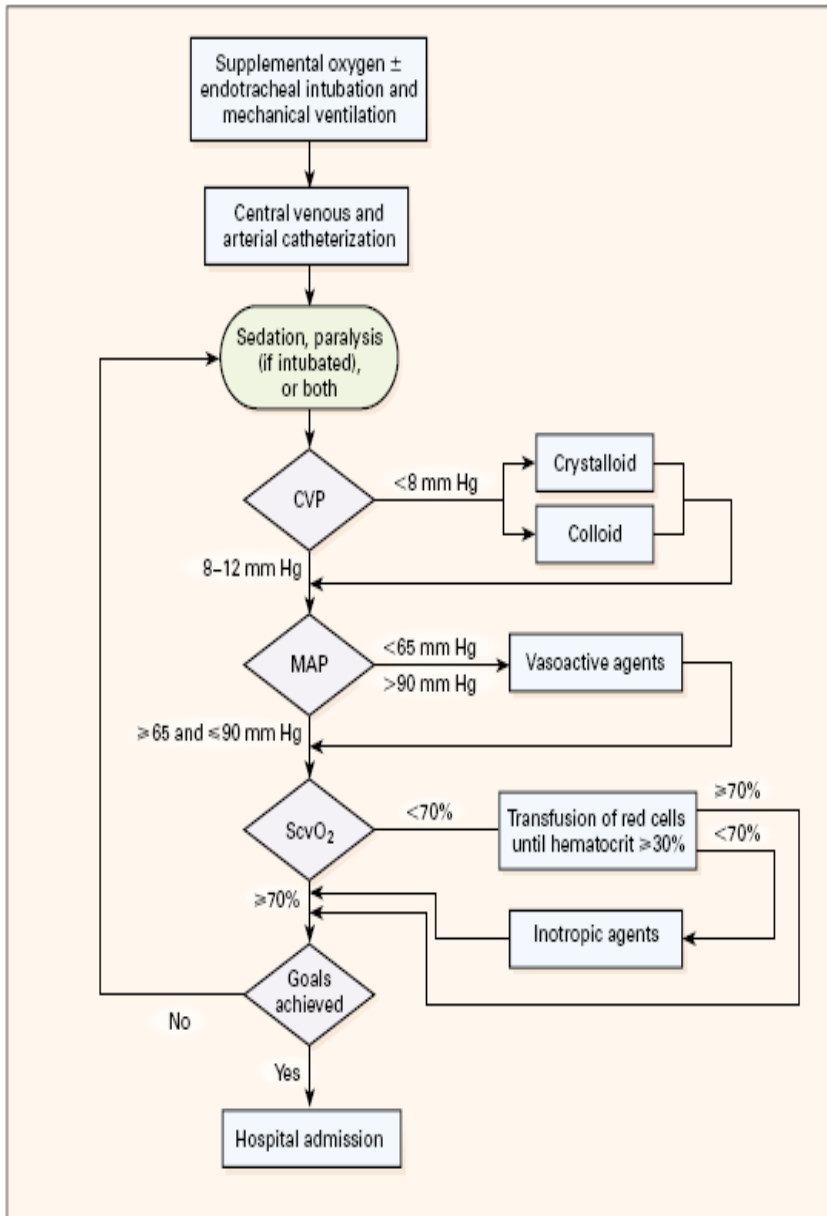
Temperature C (calc)

35.556

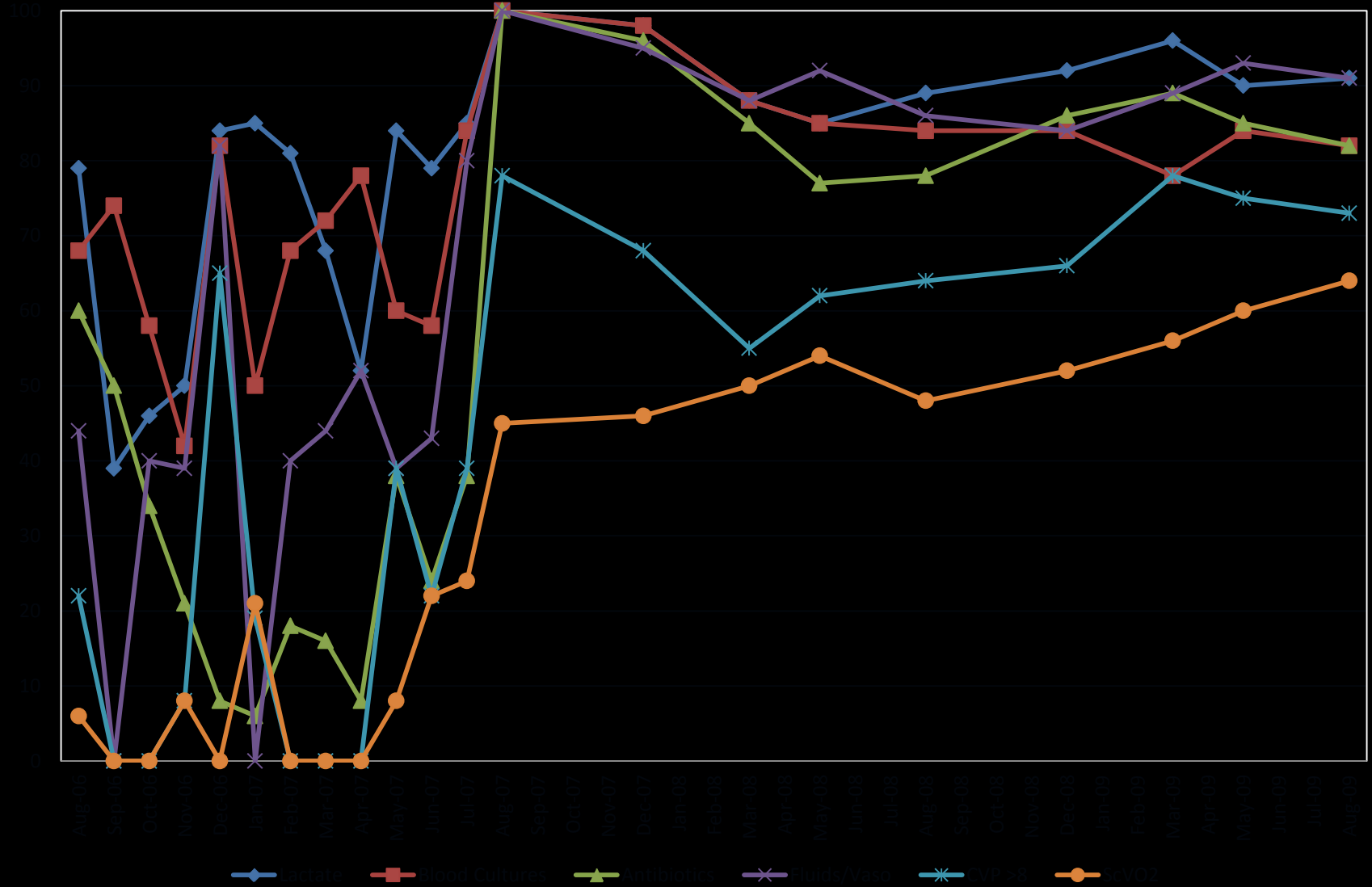
Deg. C

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Compliance with Bundle Elements





Command Central Clinical Decision Support

- Time to Detection
- Time to Initiation
 - Antibiotics
 - Fluids
 - Vasopressors
- Time to Organ Stabilization
 - Lactic Acid normalization
 - Urine output targets
 - Organ dysfunction resolution
- Time to de-escalation



Clinical Decision Support

Future State



- Preventions Systems
- Early Detection Systems
- Early Intervention Systems
- Organ response Systems
- De-escalation Systems

- Save Grandma 