USING ALGORITHMS TO DIAGNOSE DISEASE

Focus: Sepsis Watch

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SPOT SEPSIS

STOP SEPSIS

Act fast. Save lives.

MICHIGAN MEDICINE
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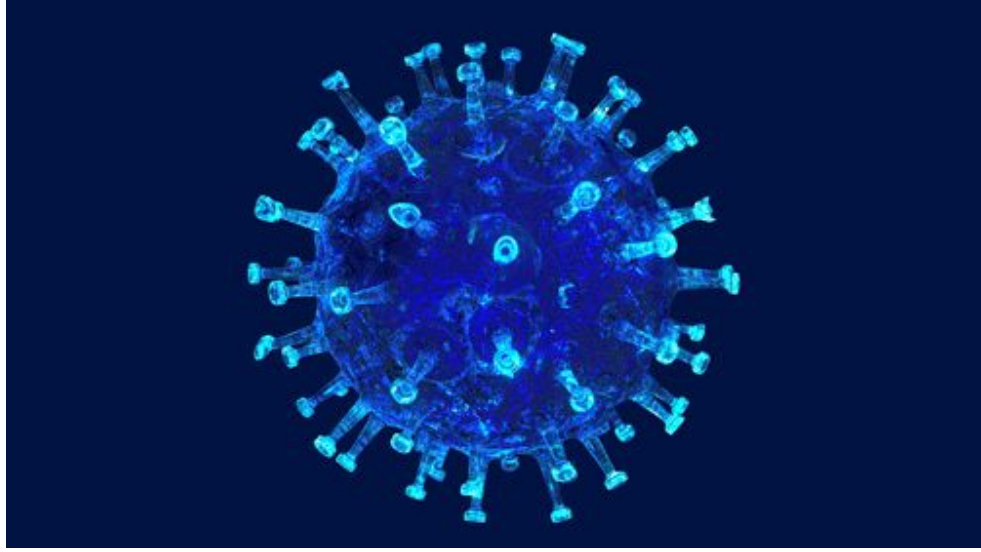
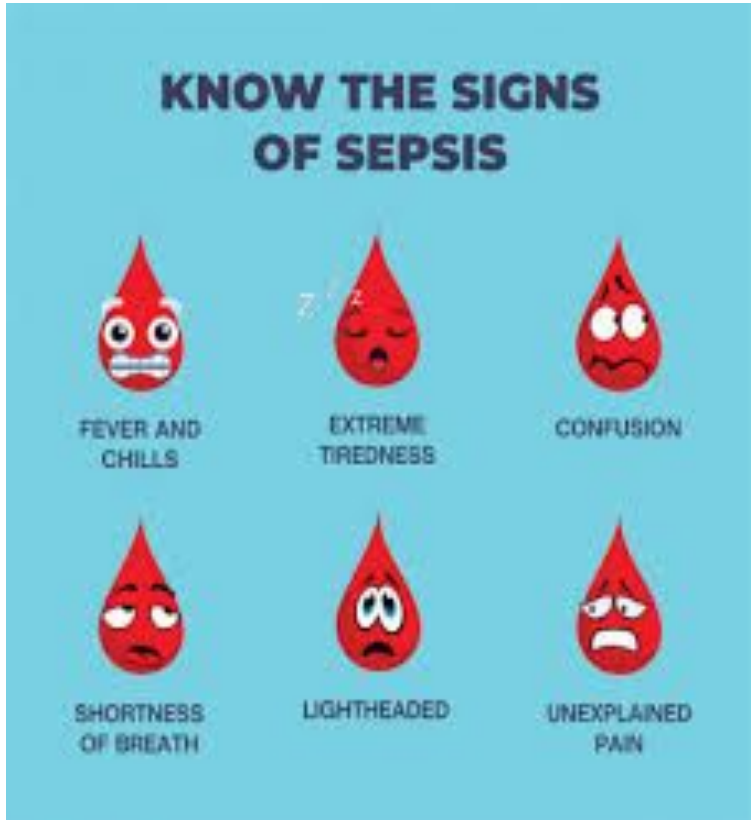
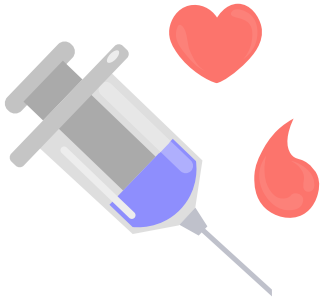


What is sepsis?





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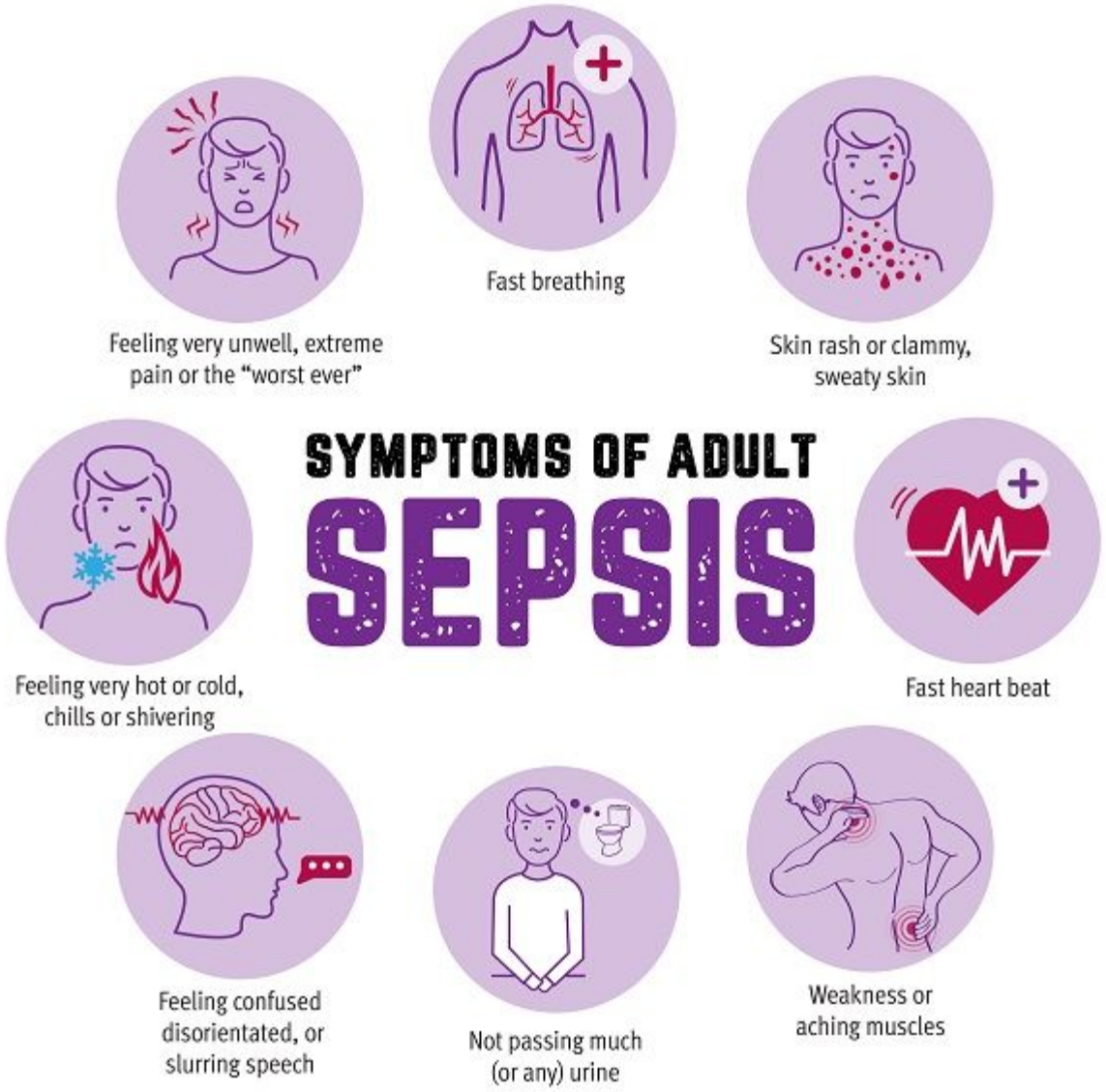
SEPSIS

- Sepsis is an extreme overreaction to an infection and is an life-threatening emergency that can cause organ failure or death

- It usually starts as a lesser infection such as a urinary tract infection or gastrointestinal infection



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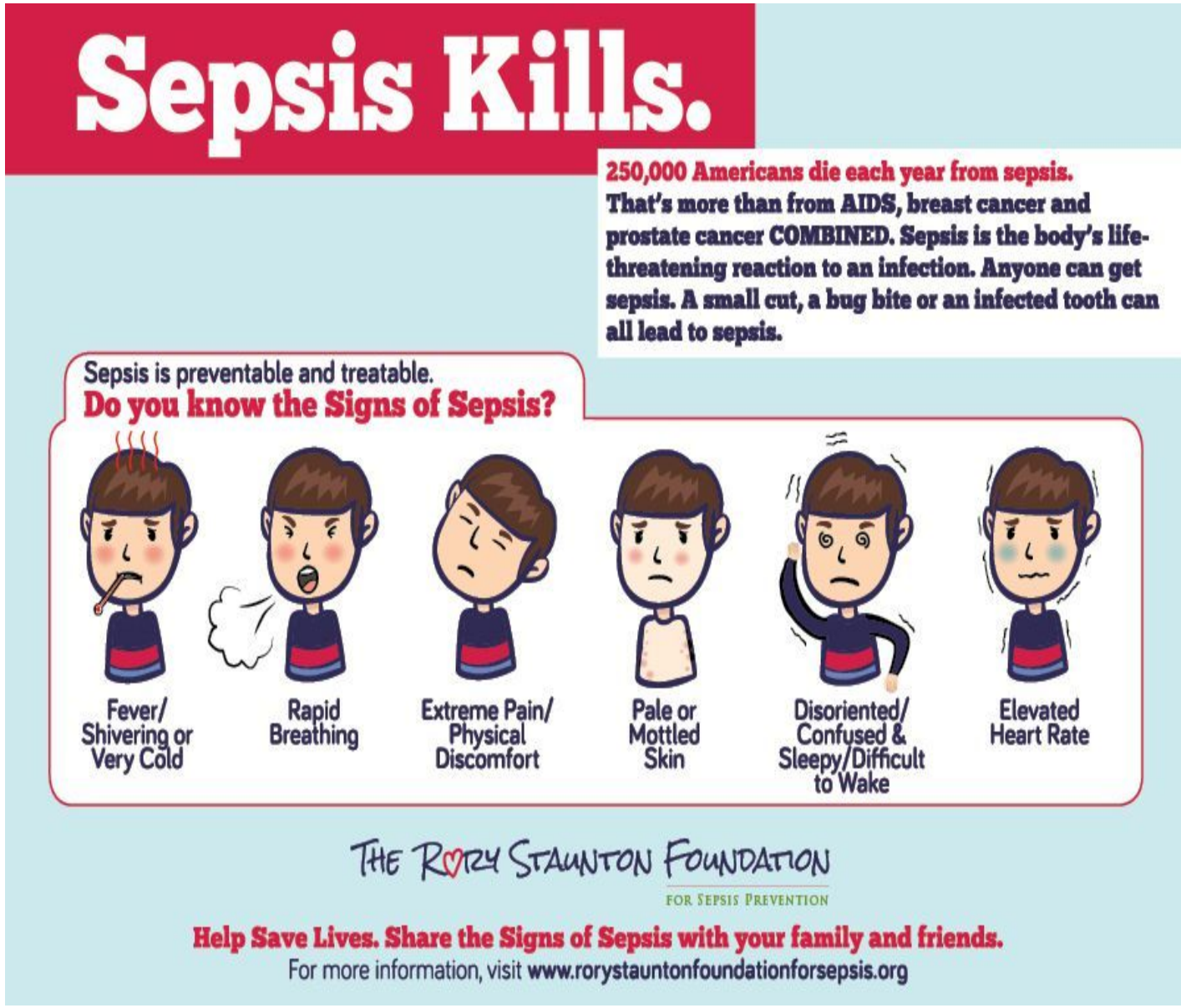
SEPSIS

- 1 out of 3 of <u>all deaths</u> in hospitals includes a point where the patient had sepsis
- 1.7 million people develop sepsis every year in the U.S.
    - 270K of those people will die



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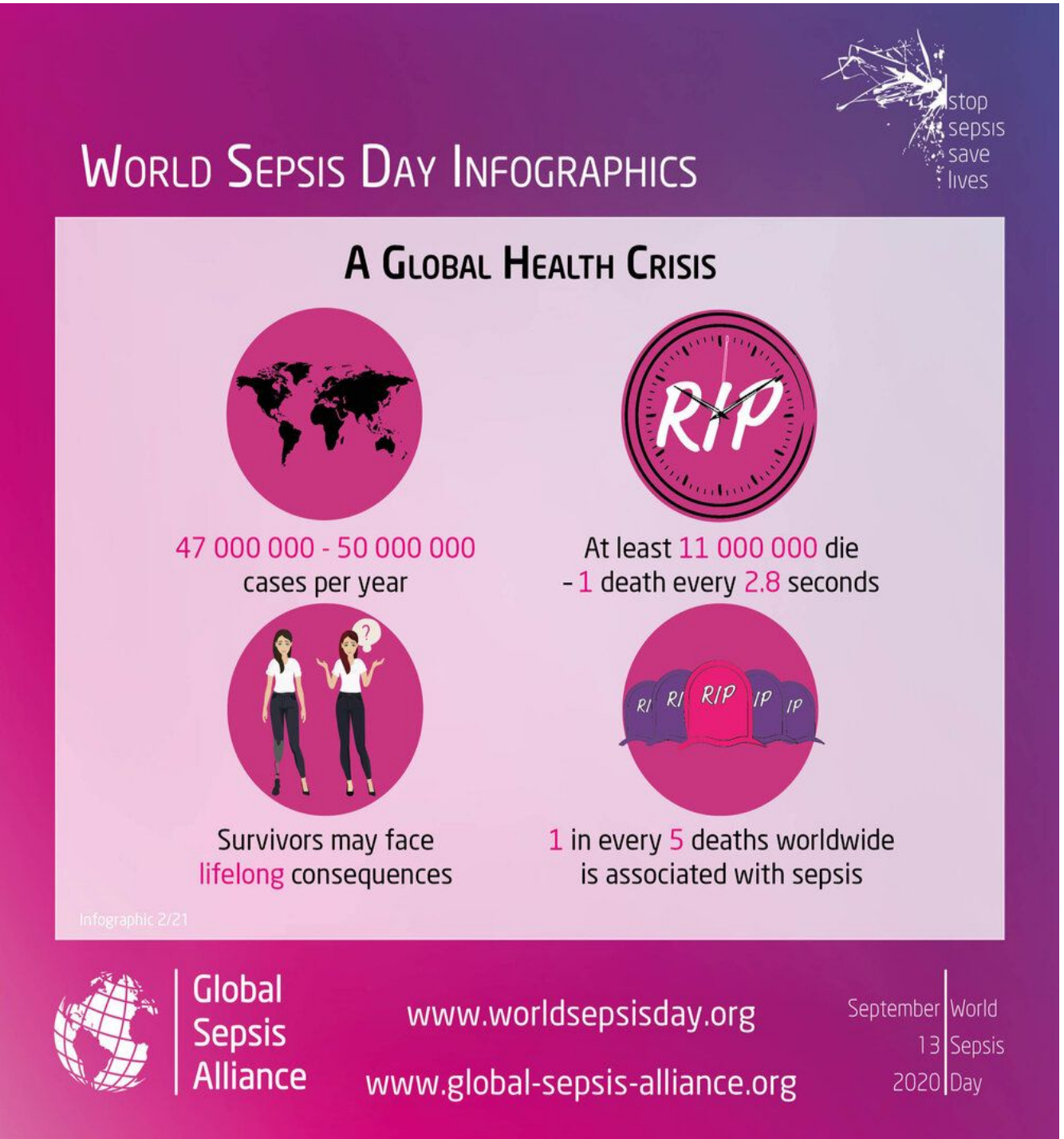
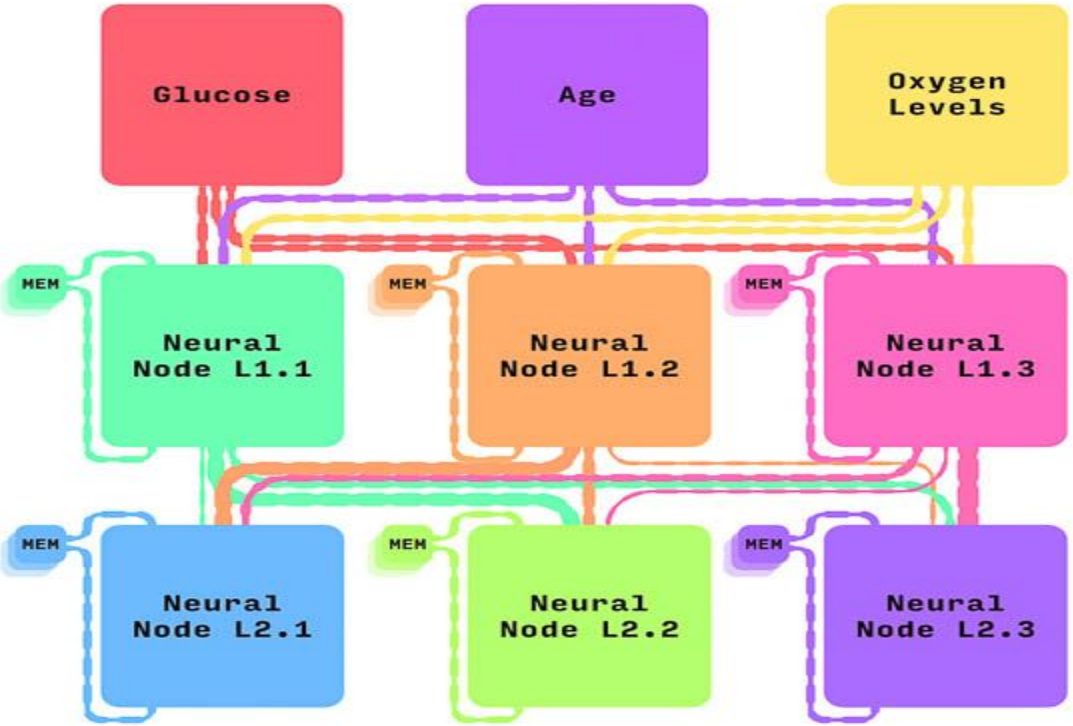
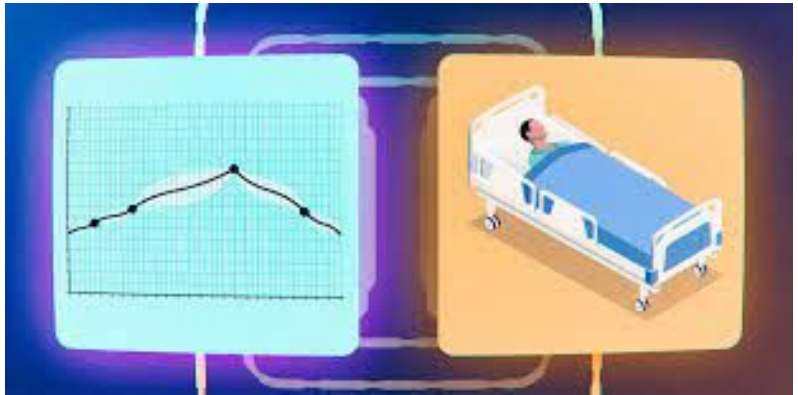


Often hard to diagnose

- There are symptoms that can appear to be other issues
- There are many factors that go into determining if someone is septic
- If it is not caught early and treated, there is a <u>high likelihood that a person will die</u>



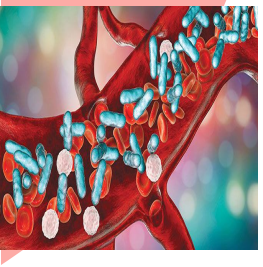


Algorithms better at predicting than humans

- Duke University is at the forefront of developing Artificial intelligence systems that integrate neural networks with data from thousands of patients

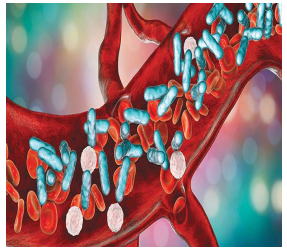
- These systems have decreased death due to sepsis by 20%

Factors the algorithm considers



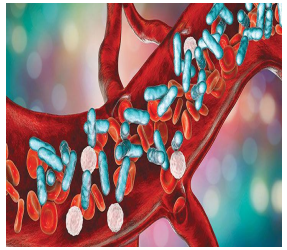
Temperature

>100.4 F



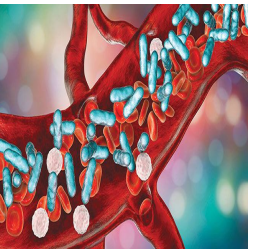
Heart Rate

> 90 bpm



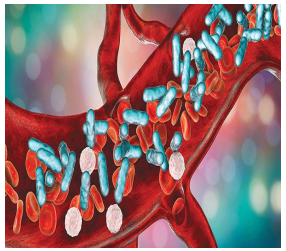
Respiratory Rate

< 32 mmHg



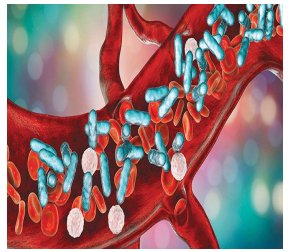
White Blood Cells

> 12,000/mm³, < 4,000/mm³



Suspected Infection

Suspected or present source of infection



Organ Failure

Evidence of ≥ 2 organs failing

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AI and TRAINING

- The AI is trained by scientists with large datasets of thousands of individuals
- After this training period, the algorithm can adapt with new information without human intervention
- However, doctors are able to use this information as a tool to determine how to proceed. The AI is not the end all be all of how to proceed with individual patients

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PROS OF SYSTEM

- Uses patient data from thousands of patients to pinpoint where doctors can intervene
- Has reduced mortality due to sepsis
- Ultimately, it is the doctor's decision whether to intervene on a warning of sepsis

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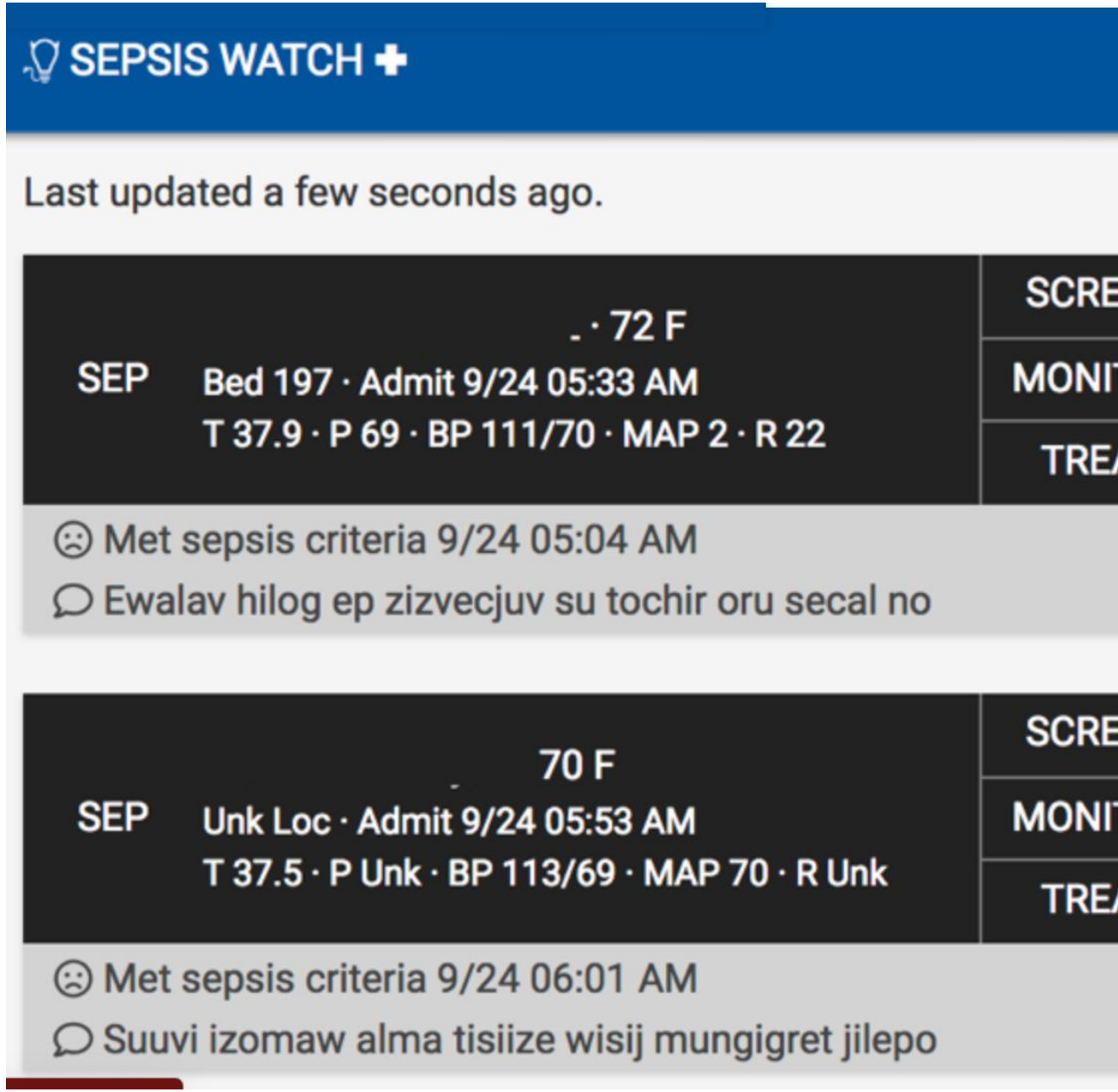
CONS OF SYSTEM

- There are a lot of false alarms and doctors working in the ICU and ER often undergo alarm fatigue and sometimes it is hard for them to determine when to take the alarms seriously
- Treatment due to false alarm can lead to antibiotic resistance and pulmonary edema from giving excessive fluids
- Medical AI systems such as this are not currently regulated by the FDA –there is not as much oversight as other medical tools
    - Epic System tool was worse than advertised



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