Using Artificial Intelligence in early prediction of SEPSIS

DR NADER SADIGH MD.
DEPARTMENT OF EMERGENCY MEDICINE

The High Cost of Pediatric Severe Sepsis

72,000 Pediatric Severe Sepsis Hospitalizations

2016 Nationwide Readmissions Database Age 0-19 years

$7.31 Billion
Total Nationwide Estimate

18% of all hospitalization costs

An average severe sepsis hospitalization is 12x costlier than a non-sepsis hospitalization

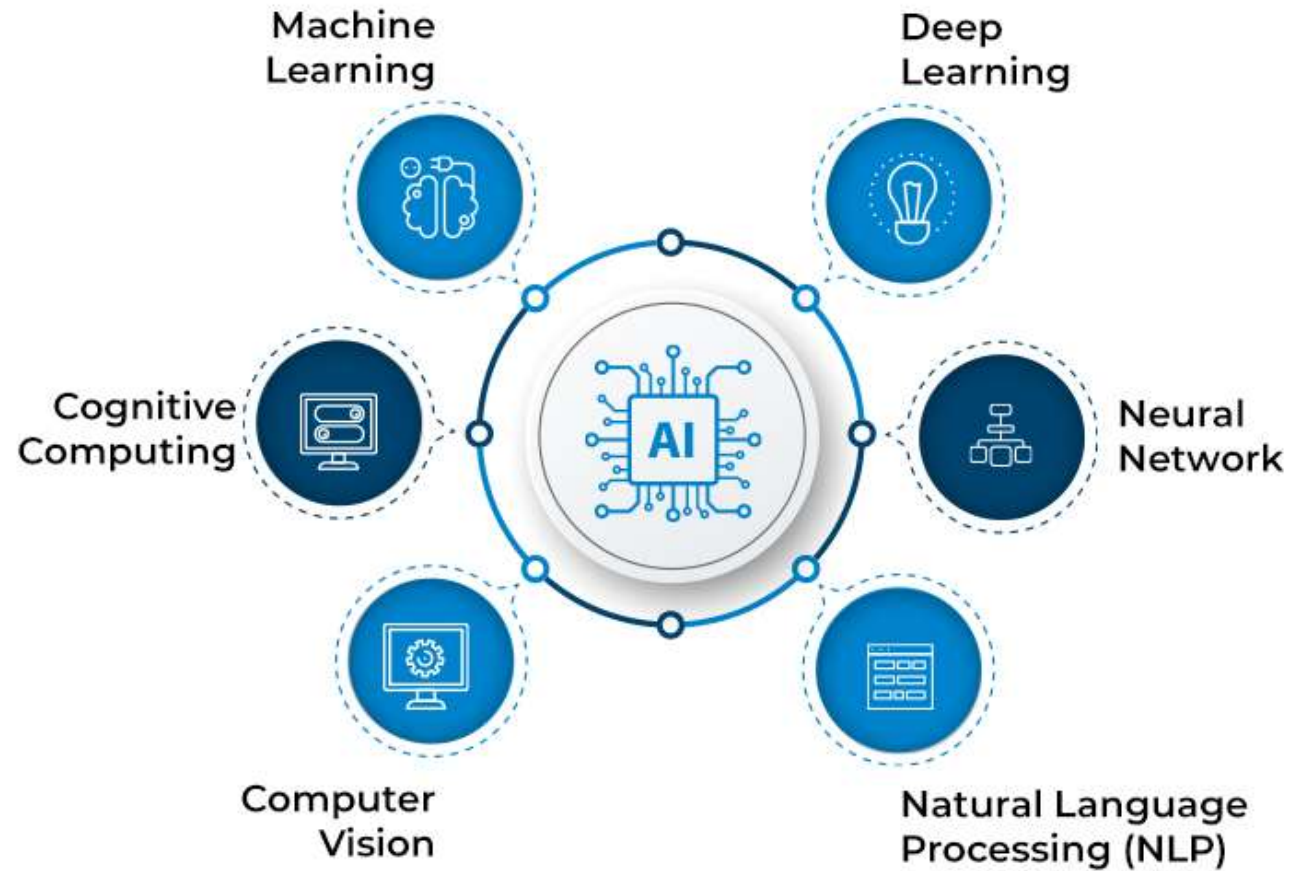Children with Chronic Conditions Impacted Disproportionately

77%
of severe sepsis hospitalizations occur in children with complex conditions

M | C.S. MOTT CHILDREN'S HOSPITAL
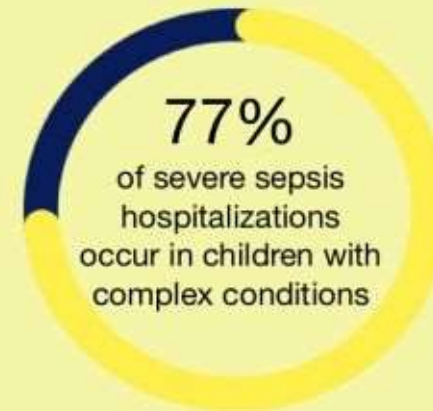
- Traditionally, generalized disease severity scoring systems have been used for sepsis detection

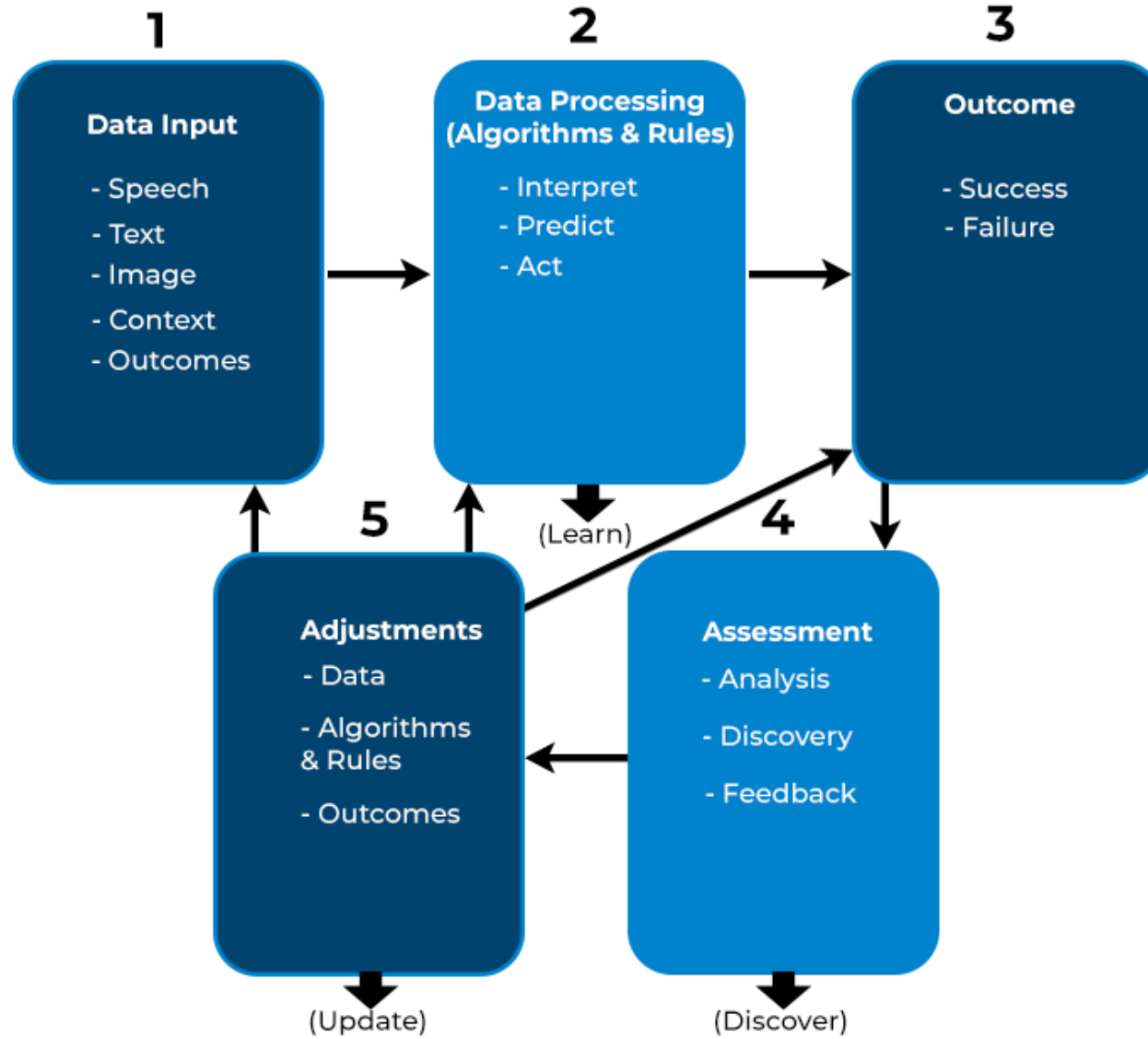- SIRS: sensitive but not specific for sepsis.

What is AI

- Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems.

- Artificial intelligence (AI) makes it possible for machines to learn from experience, adjust to new inputs and perform human-like tasks.

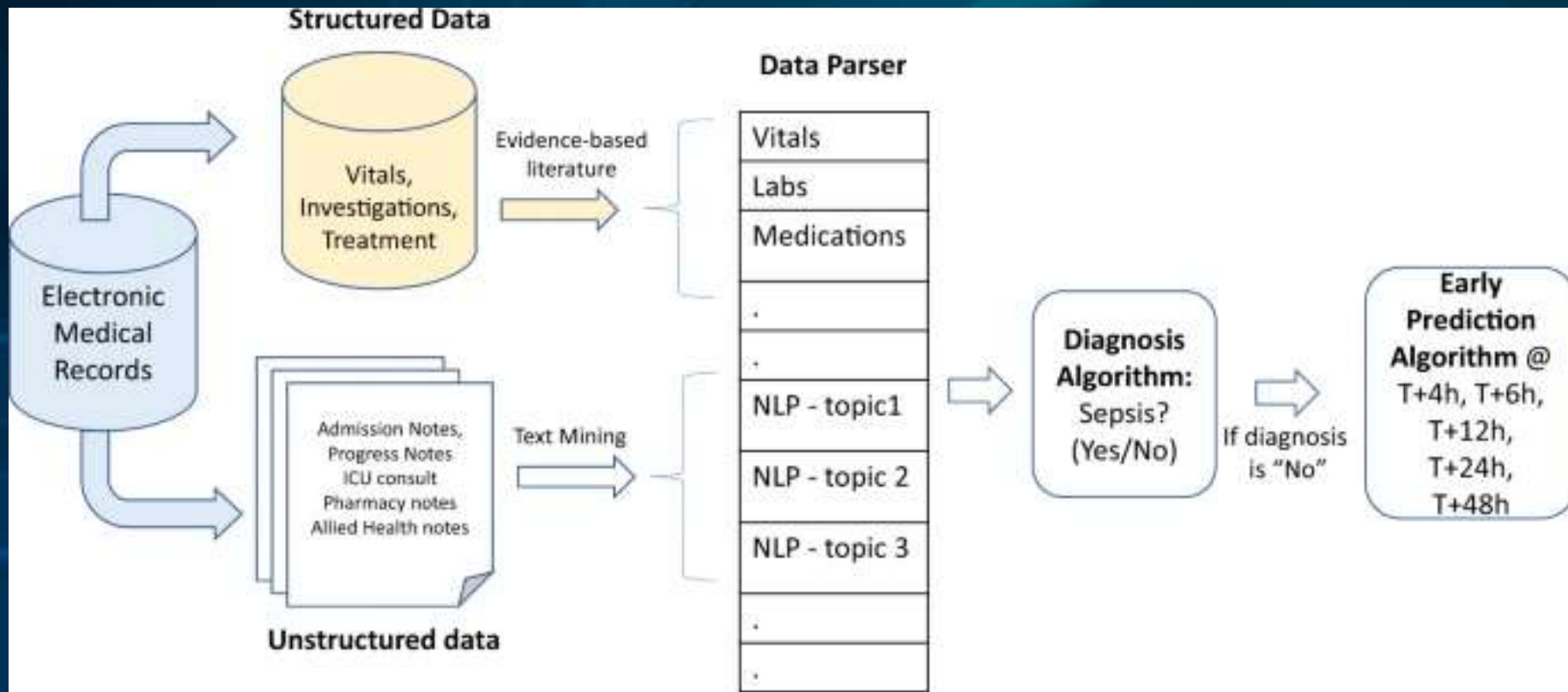- chess-playing computers, self-driving cars

SERA algorithm vs. physician
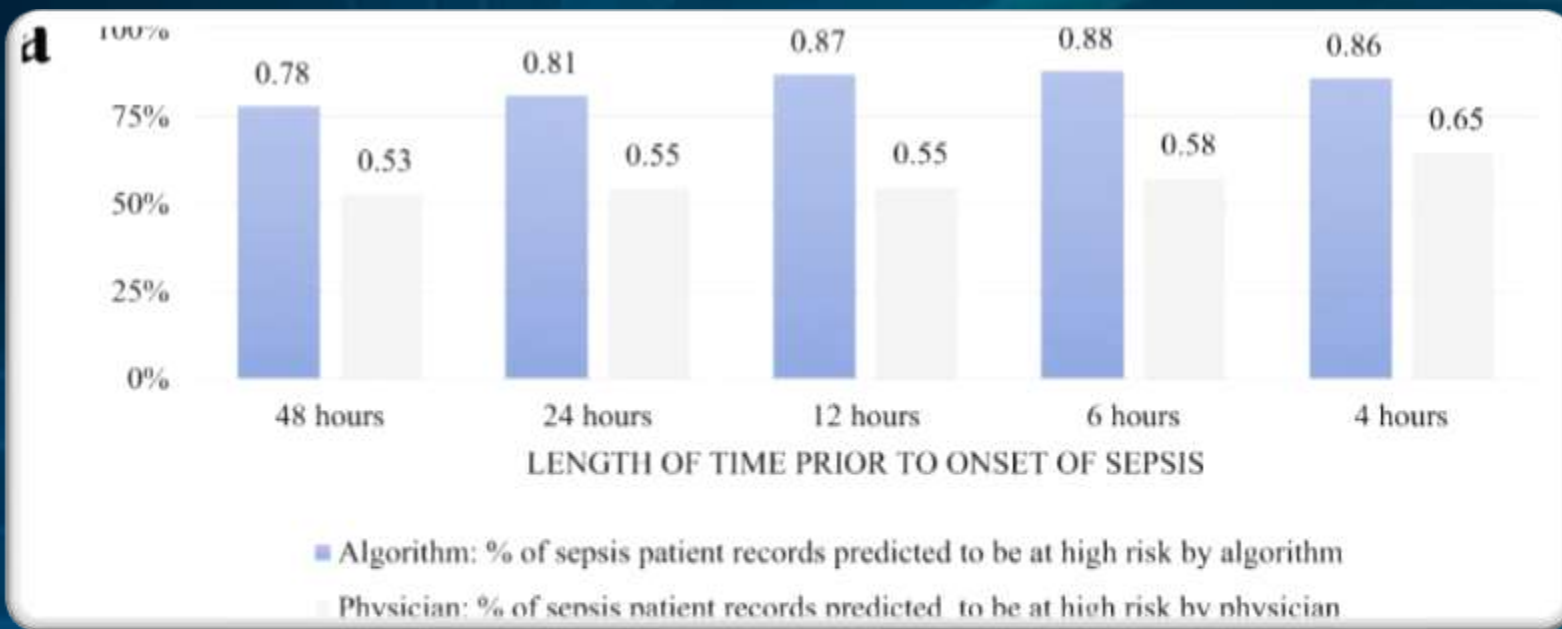
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Chart showing algorithm vs physician sepsis prediction at various time points prior to onset of sepsis.

Length of time prior to onset of sepsis	48 hours	24 hours	12 hours	6 hours	4 hours
Algorithm	0.78	0.81	0.87	0.88	0.86
Physician	0.53	0.55	0.55	0.58	0.65

LENGTH OF TIME PRIOR TO ONSET OF SEPSIS

■ Algorithm: % of sepsis patient records predicted to be at high risk by algorithm

Physician: % of sepsis patient records predicted to be at high risk by physician
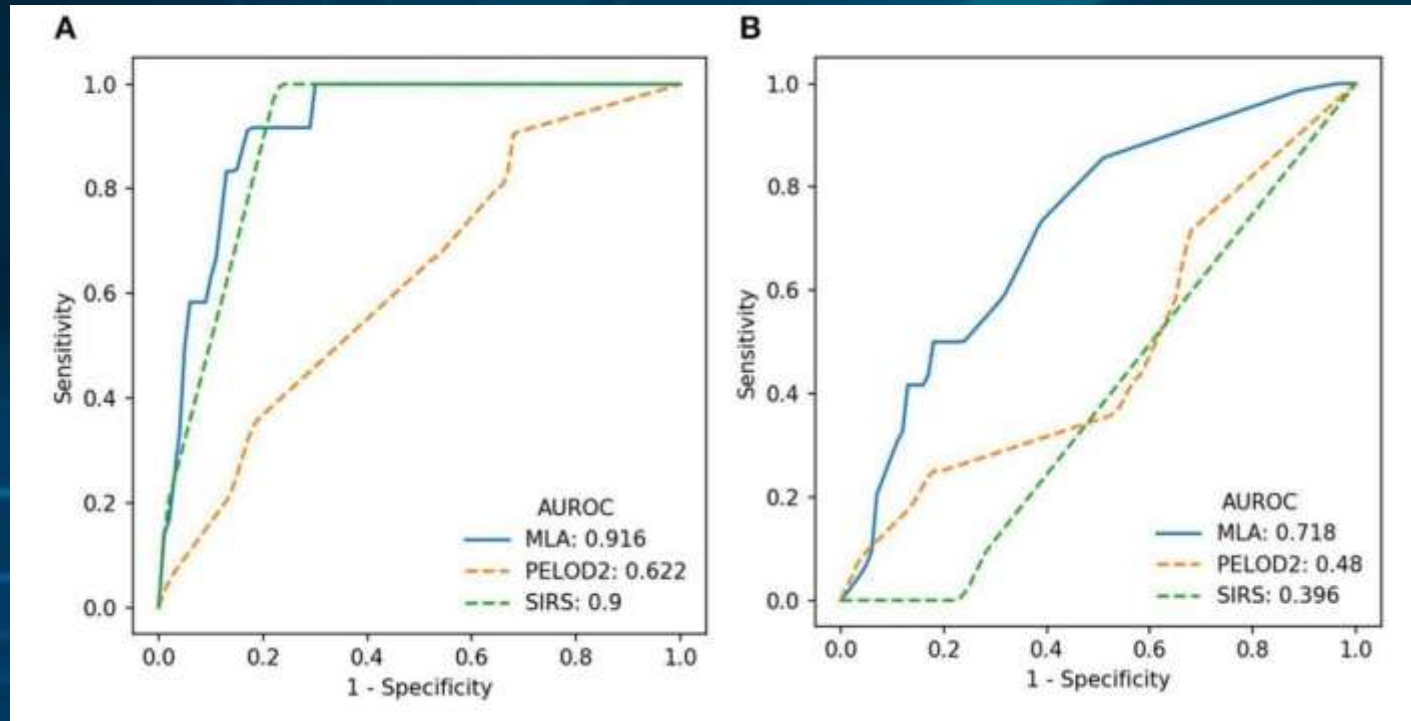
UCSF 2019-pediatric sepsis

New evidences:

- **Artificial intelligence in sepsis early prediction and diagnosis using unstructured data in healthcare**

  - **https://www.nature.com/articles/s41467-021-20910-4#Fig3**

- **Artificial Intelligence for Clinical Decision Support in Sepsis:**

  - https://www.frontiersin.org/articles/10.3389/fmed.2021.665464/full

- **A sepsis early warning system is associated with improved patient outcomes**

What is the future?