

A New Pathway to Reduce Sepsis Morbidity and Mortality

Research findings by Morgan Ryan | Bethany Thompson

With more than 1.2 million Americans afflicted with sepsis annually, and 270,000 dying as a result, sepsis is a major public healthcare crisis.

In the world of stroke, they say “time is brain.” In sepsis, “time is organ function.” Early diagnosis and treatment can be the difference between life and death.

Sepsis is the body’s overwhelming response to infection. If not recognized early and managed promptly, it can lead to septic shock, multiple organ failure and death.

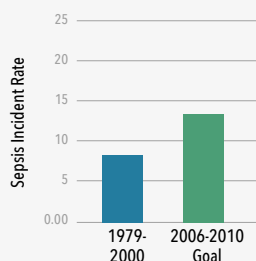
Every hour that a sepsis diagnosis is missed mortality increases 8%.

Any type of infectious pathogen can potentially cause sepsis. As many as 80% of sepsis deaths could be prevented with rapid diagnosis.

Sepsis is often difficult to recognize when it first presents

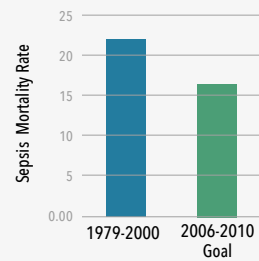
itself because it can mimic other conditions. Education and awareness are vital for positive patient outcomes.

In this case study, a large US health system employed Amplifire to train its nurses in the early detection and treatment of sepsis. Although nurses were alerted through their electronic health record (EHR) of possible systematic inflammatory response syndrome (SIRS), a common response to sepsis, they needed to recognize sepsis symptoms to determine if the sepsis bundle, which includes antibiotics, should be administered.



Rise of Sepsis Incidents :

According to a PMC article published online July 30, 2018, annual sepsis incident rates continue to increase from 8% in to 13%.



Decrease in Sepsis Mortality:

Epidemiological trends from the 2010 US census described a 4 year overall sepsis decrease in mortality estimate from 22% to 17%.

Sepsis Findings and Takeaways

Sepsis Crisis

- More than 1.2 million Americans are afflicted with sepsis every year
- Sepsis kills 270,000 Americans each year
- As many as 80% of sepsis death could be prevented with rapid diagnosis

The Puzzle

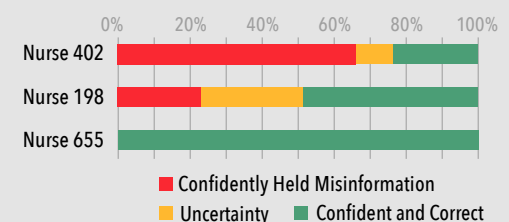
- Sepsis rates continue to rise each year

The Study

- A large US health system
- 1,051 participating nurses
- Based on Amplifire, an advanced learning tool that finds and fixes the misinformation that impacts performance

The Results

- 12,937 instances of confidently held misinformation—believed correct, but actually inaccurate
- 17,273 instances of doubt or uncertainty
- Analytic reports identified productive interventions for nurse supervisors and managers
- High variance among nurses as seen below



Confidently Held Misinformation (CHM) –The most important healthcare metric you’ve never heard of...

Confidently held misinformation lives in the minds of all clinicians and is one of the largest contributors to costly medical error.

CHM exists when a clinician is sure they are right, but they are wrong. It creates misjudgments and mistakes. Misplaced confidence can be perilous—especially in patient care.

Amplifire has the unique power to detect and correct CHM. The platform requires learners to state their certainty when they answer questions.

The system then classifies which answers were answered confidently but incorrectly—representing confidently held misinformation—and customizes a module in real time that will lead the learner to rapid mastery of the topic.

The cognitive science behind the platform has proven itself in over one billion learner interactions.

Finding and Fixing the CHM that Affects Performance

Knowledge and confidence about sepsis before and after Amplifire

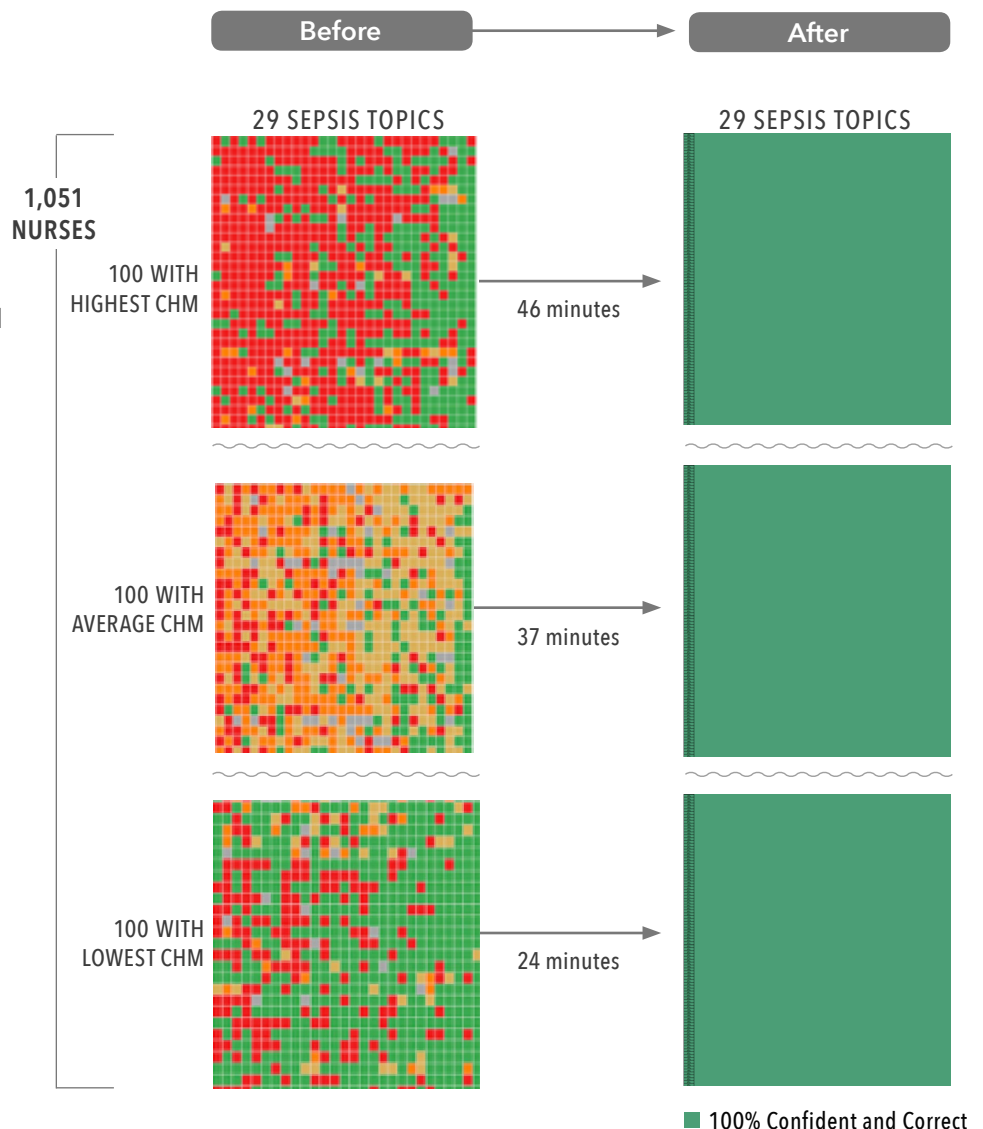
OVERALL RESULTS

Knowledge before Amplifire

- 24% CHM
- 43% Uncertainty
- 33% Confident and Correct

Observations

- 12,937 instances of CHM found and fixed
- 17,273 instances of uncertainty found and fixed
- The variation of knowledge was high, with some nurses quite misinformed and others showing confident mastery of the topic. The most knowledgeable were 100% confident and correct about sepsis. The least show that misinformation occupied up to 67% percent of their knowledge
- Nurses who were most misinformed or uncertain spent 46 minutes in the module, while nurses who were most knowledgeable about sepsis spent only 24 minutes
- By the end of the course, 100% of the nurses who completed were confident and correct on all the information



The Study: Confidently Held Misinformation and Implications

The Amplifire e-Learning platform probes the accuracy of a learner's knowledge and the confidence with which it is held. Confidence leads to action, and action to outcomes. When people know that they don't know a correct action for a given situation, they do nothing. When they are uncertain, they hesitate. When they are confident, they act. High-quality outcomes result when clinicians are both confident and correct in their knowledge.

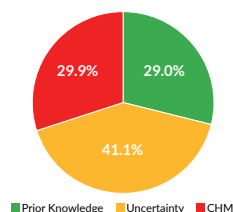
This study was conducted by a large US health system concerned with high rates of sepsis. Participants were asked to take an accredited, evidence-based, 29-question sepsis knowledge and performance course on Amplifire's confidence-based e-Learning platform. This course ran from late-February 2019 to mid-April 2019. Of the 1,176 total learners invited, 1,051 (90%) completed the training. Learners consisted of nurses from the following departments: Med-Surg, Progressive Care Unit, Emergency Department, Intensive Care Unit, Observation, Intermediate Care Unit.

CHM REMEDIATED

Masking Signs

Sepsis can often be confused with or masked by other infections. For example, appendicitis is a very frequent surgical procedure, and in nearly every case, the patient displays some or all of the symptoms of systematic inflammatory response syndrome (SIRS). When

asked questions about diagnosis and treatment of patients exhibiting signs that may or may not indicate sepsis, 29.0% of learners showed confident prior knowledge, 41.1% showed uncertainty, and 29.9% displayed CHM.



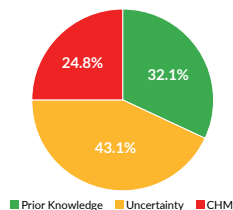
Clinical Implication: Meeting or failing to meet diagnostic criteria is not always a sepsis/no-sepsis traffic light. Sometimes the right call for suspicion of sepsis is increasing the intensity of monitoring. You can't simply wait for a borderline case to declare itself. Clinical prowess may entail that you wait and WATCH.

Vasopressors

Vasopressors are indicated if hypoperfusion persists after adequate resuscitation. However, waiting to confirm hypotension before considering vasopressors

may unnecessarily prolong the hypotension, with possible irreversible damage to organs due to hypoperfusion. When asked questions about this topic, only 32.1% of learners indicated confident prior knowledge, 43.1% showed uncertainty, and 24.8%

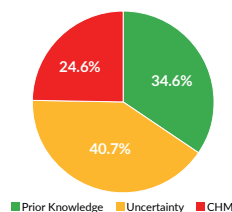
displayed CHM.



Clinical Implication: Experts point to undertreatment, timidity, and delay as the most correctable factors for better outcomes in sepsis. Aggressive treatment may include expecting and anticipating the need for vasopressors.

Fluid Management

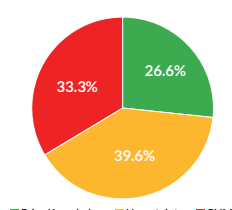
Guidelines call for weight-based (30 mL/kg) fluid resuscitation of patients diagnosed with sepsis. The immediate and direct benefit of IV fluid resuscitation is increased cardiac output. When sepsis causes the circulatory system to dilate and become porous, heart contractions push blood into a leaky system, and there is less fluid to return to the heart. Adding fluids increases the return (preload) and the volume of fluid ejected, which helps maintain blood pressure. When asked questions about this topic, 34.6% of learners indicated prior knowledge, 40.7% showed uncertainty, and 24.6% displayed CHM.



Clinical Implication: Sepsis patients must receive the proper amount of fluids at the proper time in order to reach optimal perfusion.

Guideline Confusion

There are currently three overlapping guidelines—the CMS Sepsis Core Measure (SEP-1), the new Sepsis-3 (2016), and the new guideline from the Surviving Sepsis Campaign. Each guideline contains slightly different criteria and definitions for sepsis, severe sepsis, and septic shock. When asked about these competing guidelines, 26.6% of learners indicated prior knowledge, 39.6% showed uncertainty, and 33.3% displayed CHM.



Clinical Implication: Ever-changing and conflicting guidelines can lead to misunderstandings and confusion—and, likely, non-adherence and variation in care.

About Amplifire

This study was conducted using Amplifire, the leading e-learning platform, which was built on the most current discoveries in cognitive science. The Amplifire learning algorithm detects and corrects the knowledge gaps, doubts, and misinformation that exist in the minds of clinicians in every healthcare organization. The platform adapts to the needs of individual learners as they take an Amplifire course until mastery of each topic is achieved.

Healthcare organizations have adopted Amplifire as a core operating asset. They have transformed training from a rote activity, where managers can only hope for results, into a strategic, measurable tool that delivers a clinical workforce aligned with the latest evidence-based medicine.

After the platform finds and fixes CHM and uncertainties held by clinicians, it delivers advanced analytics to organizations and managers that pinpoint where learners struggled, from the organization and unit level down to the individual learner.

With more than two billion learner interactions, Amplifire harnesses research, learner feedback, and artificial intelligence to provide a faster and more engaging path to mastery. This powerful combination has made Amplifire an innovative leader in the learning industry.

Amplifire has been deployed in multiple healthcare initiatives focusing on sepsis, CLABSI, CAUTI, SSIs, pressure injuries, *C. difficile*, patient falls, and other topics of avoidable patient harm. Additional courses are currently under development.

To learn more about the platform and its application in healthcare, contact us at:

- marketing@amplifire.com
- 720-799-1319
- <https://amplifire.com/contact-us/>

