KNOCKING OUT 79% OF CLABSI

Case Study in eLearning

CLABSI Prevention Courseware

amplifire

When Learning Matters

EXECUTIVE SUMMARY

PROBLEM
250,000 central line-associated bloodstream infections (CLABSIs) occur in the US every year. They have a mortality rate of 12% to 25%.

THE STUDY
In a hospital at a large healthcare system, 536 nurses received an Amplifire course on CLABSI.

Results from the pilot hospital were then compared to CLABSI rates in the other hospitals, which did not receive Amplifire training.

RISK REVEALED
- 29% of learners initially had confidently held misinformation (CHM) on the topic of blood draws
- 31% of learners initially had CHM on the topic of needleless connector maintenance
- 67% of learners were misinformed or uncertain on the topic of identification of infected central lines

TRAINING OUTCOME
CLABSI rates fell by 79.4% for the ten months following training.

CLABSI Rate

1.36

0.28

1

.5

0

Before Amplifire   After Amplifire
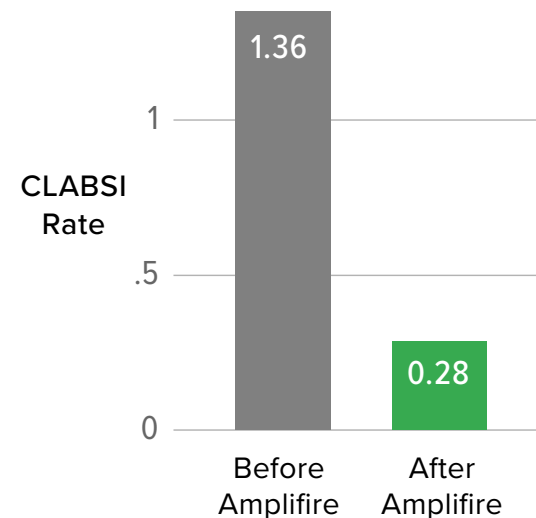
PROBLEM

250,000 CLABSIs occur in the US every year

Mortality rate of between 12% and 25%

Hospitals pay nearly $50,000 per incident

Central venous catheters (CVCs) are used for the administration of intravenous fluids, blood products, medications, and parenteral nutrition, and they provide access for hemodialysis and other forms of long-term treatment, such as chemotherapy.

Widespread and essential, CVCs are also the most frequent cause of healthcare-associated bloodstream infections. It is estimated that 250,000 central line-associated bloodstream infections (CLABSIs) occur in the US every year. The CDC estimates that CLABSIs are associated with a mortality rate of 12% to 25%[1]. The AHRQ estimates the average cost of each CLABSI at approximately $48,108[2].

If healthcare practitioners commit to "owning" the lines of patients with CVCs and adhere to evidence-based prevention strategies, CLABSIs can be eliminated.

1. Vital Signs: Central Line-Associated Blood Stream Infections

2. Estimating the Additional Hospital Inpatient Cost and Mortality Associated With Selected Hospital-Acquired Conditions

STUDY DESIGN

536 Nurses at a Colorado hospital

One hospital in a large Colorado healthcare system was selected to pilot the idea that CLABSIs could be addressed with training. No new equipment, no new procedures ... just training.

At this hospital, 536 nurses received an Amplifire course covering the topic of CLABSI. The other hospitals served as the control group; they did not receive training.

CLABSIs are often preventable, and rates can be reduced, if not eliminated, by adherence to evidence-based guidelines.

The Amplifire course reviews best practices used to prevent CLABSI, including relatively simple interventions such as sterile technique, disinfection, and (most critically) hand hygiene. The course also covers more sophisticated topics, such as antimicrobial lock solutions.

Course objectives include:

- Summarize the incidence and risk factors for CLABSI

- State the elements of the CLABSI prevention bundle

- Distinguish between the preferred insertion sites for each CVC type

- Understand how CVCs can become contaminated and how to prevent contamination

- Identify the indications for catheter, needleless catheter, and administration set replacement

- Demonstrate how to aseptically maintain needleless connectors, administration sets, and CVC dressings

AMPLIFIRE

How It Works

Amplifire first measures and classifies a clinician's knowledge in three categories:

Confidently Held Misinformation: When a learner is sure they are right, but they are actually wrong.
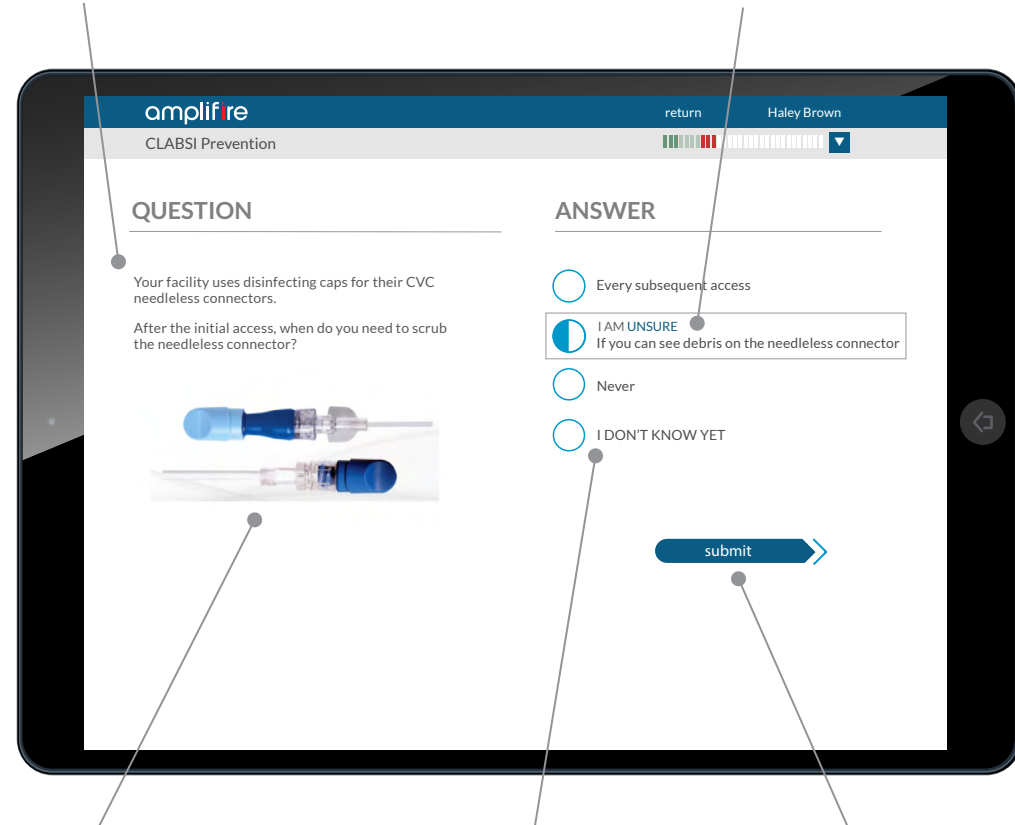
Uncertainty: When a learner is unsure.

Proficiency: When a learner is both confident and correct.

Once knowledge is categorized this way, the platform uses triggers from cognitive science to activate learning. It automatically customizes the course in real time for each learner, leading them to rapid proficiency across all topics.

Asking questions is a trigger that causes retrieval, curiosity, and attention—all drivers of lasting memory.

Asking about confidence causes metacognition (thinking about one's thinking), which drives long-term memory.

amplifire   return   Haley Brown

CLABSI Prevention

QUESTION

Your facility uses disinfecting caps for their CVC needleless connectors.

After the initial access, when do you need to scrub the needleless connector?

ANSWER

○ Every subsequent access

◑ I AM UNSURE
If you can see debris on the needleless connector

○ Never

○ I DON'T KNOW YET

submit

Images and interactives simulate real-life. Here, the learner is reminded of connector types, a vital topic in preventing CLABSI.

Learners can be honest about their knowledge, helping create the emotional state of "alert," which is optimal for learning.

Feedback will be delayed by a few minutes. This *spacing* boosts the durability of the learning.

EXTREME KNOWLEDGE VARIATION
(prior to learning)

These heatmaps from Amplifire's reporting dashboard show nurses sorted by their confidently held misinformation (CHM).

- 536 nurses generated 13,936 data points

- ■ 2,968 instances of confidently held misinformation were corrected

- ■ 4,014 instances of uncertainty were corrected

- ■ 6,954 instances of initial proficiency

- The most initially misinformed nurses needed an average of 19 minutes to complete the module, while those who were most proficient spent 11.

- By the end of the course, every single one of the nurses was proficient (both confident and correct) on all the material.
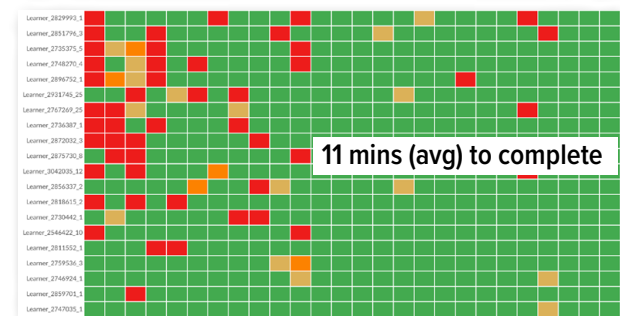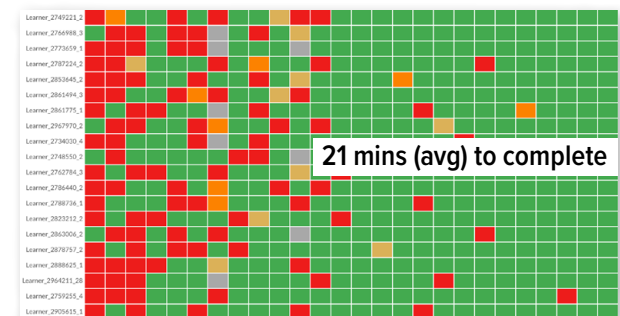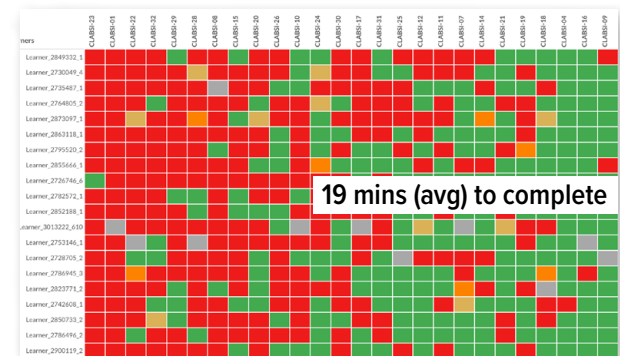
26 TOPICS – PREVENTING CLABSI

536
NURSES

20 nurses with highest CHM

19 mins (avg) to complete

20 nurses with average CHM

21 mins (avg) to complete

20 nurses with lowest CHM

11 mins (avg) to complete

KNOWLEDGE / LEARNING / STRUGGLE

When nurses began in Amplifire, they were either confidently misinformed or uncertain on nearly half of the material.

Fortunately, the cool colors of the middle heatmap show that learning was automatic for most nurses, meaning that these issues were quickly corrected.

But sometimes nurses struggled to master a topic. In those rare cases, despite being presented with the needed information, proficiency failed to emerge. Nurses may struggle due to temporary on-the-job distractions, or they may be dealing with acute or chronic personal issues.

For the 89 nurses who struggled to learn on multiple topics, Amplifire generated individual action plans in its reporting dashboard. Administrators and educators can use these plans for personal consultations.

Initial Knowledge
- 🟥 21% Misinformation
- 🟧 29% Uncertainty
- 🟩 50% Proficiency

Learning
- ⬛ 61% Knew it
- 🟦 31% Learned it
- 🟨 8% Struggle

Intervene
- 🟥 89 nurses

536 NURSES

TOPICS

TOPICS

TOPICS

Individual Action Plans
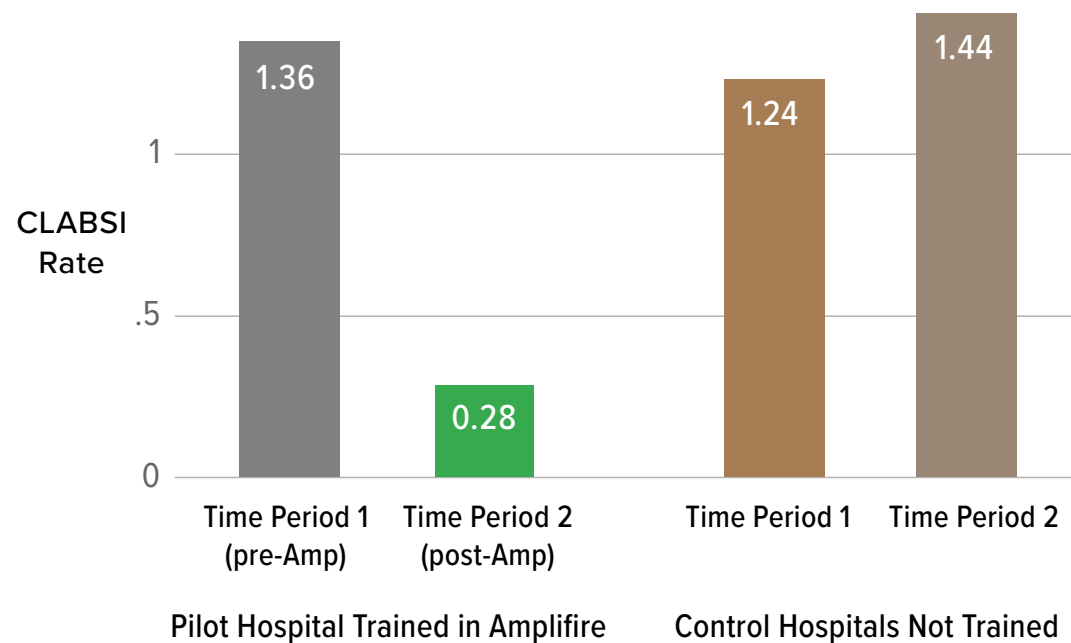
MEASURED TRAINING OUTCOME
79% reduction in CLABSI

In the time period following Amplifire training, the CLABSI rate at the pilot hospital fell by 79%, from 1.36 to 0.28 infections per thousand line-days. The pilot hospital was also compared to control hospitals in the same healthcare system for the same time periods. The control hospitals showed an average of between 1.24 and 1.44 infections per thousand line-days.


CLABSI Rate

| | 1.36 | | 1.24 | 1.44 |

Time Period 1 (pre-Amp)   Time Period 2 (post-Amp)   Time Period 1   Time Period 2

0.28

Pilot Hospital Trained in Amplifire   Control Hospitals Not Trained

ABOUT AMPLIFIRE

Empirical data shows that caregivers in every healthcare organization posess knowledge gaps, doubts, and medical misconceptions. The Amplifire learning platform tackles these issues using discoveries from cognitive science and algorithms that adapt evidence-based content to the needs of each individual caregiver.

Healthcare organizations embrace Amplifire as a change management tool that transforms training from a rote activity, where administrators can only hope for results, into a strategic activity that delivers measurably better outcomes. Popular course libraries include:

- Clinical Safety and Quality
- Compliance
- EHR
- Obstetrics
- Opioids
- Pediatrics
- Revenue Cycle Management
- Safe Surgery

With more than three billion learner interactions, Amplifire continues to harness scientific research, advanced analytic techniques, and artificial intelligence. Learners experience a faster, more engaging path to proficiency so they can attain their highest potential.
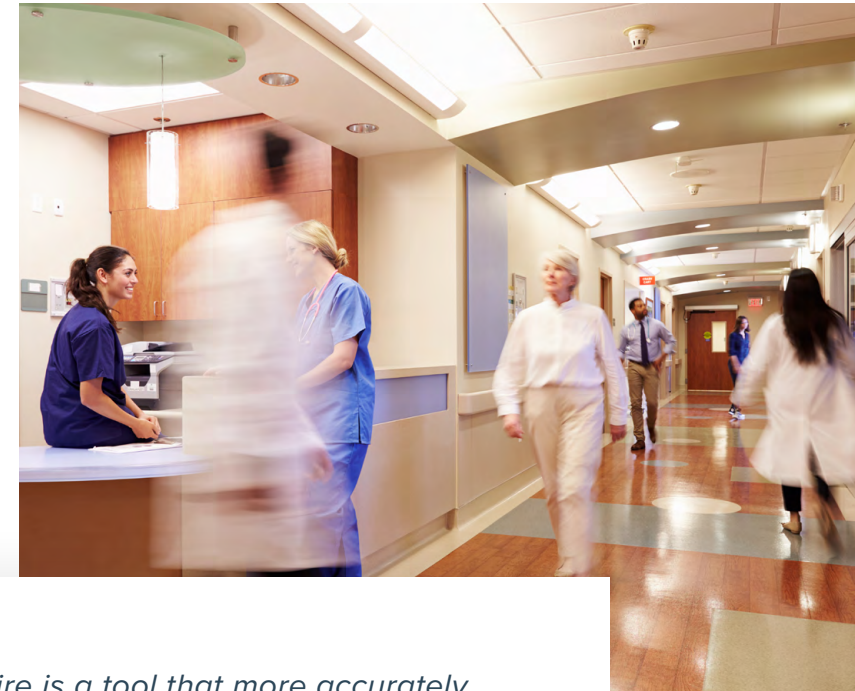
" *Amplifire is a tool that more accurately, completely, and rapidly loads complex clinical knowledge into expert minds. It gives us not only the ability to transmit knowledge, but the ability to measure how well we transmitted it and how well it stuck.* "

— **Brent James, MD**
  Clinical Professor at the Clinical Excellence Research Center at Stanford University

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