

## Kaiser Permanente's Early Diagnosis & Therapy Reduces Sepsis Mortality Rate

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Sepsis can be a killer. When Kaiser Permanente looked at their mortality rates back in Spring 2008, they saw a higher average than the national Medicare average as well as Southern California averages. “We immediately did a drill down to understand what was behind the numbers,” said Barbara Crawford, vice president for quality and regulatory services. “We looked at the last 50 deaths in every northern California Kaiser facility, then looked at the mortality diagnostic.” The results – infection, specifically sepsis, was

the overwhelming majority of mortality – kicked off an intense undertaking.

The interesting part was, the further down the team drilled for answers, the more they discovered that most patients had sepsis when they came into the hospital. “We simply weren’t good at diagnosing those cases when they came in,” she said. There are over 200,000 deaths per year in the U.S. due to sepsis, which makes it a significant issue for all hospitals. Septic shock, the most severe form of sepsis, carries a 45% mortality rate, but if sepsis is caught at its earliest, that rate decreases to 16%. Infection prevention measures in the hospital would make a difference, as well, but diagnosing the infections that patients had when they walked in the door held the greatest potential for improvement.

The newly created cross-functional sepsis process redesign teams came together to standardize and pilot possible solutions. In a partnership that included the Gordon & Betty Moore foundation, 21 hospitals were involved. The pilot exercise chosen for implementation was a simple, inexpensive blood test. “We

said early on, if you suspect that any infection is present, and we put vitals criteria in place to help determine that, then you draw a lactate level when you do a blood culture. It stratifies if the infection is septic and to what degree,” Crawford explained. They implemented the process at every ED, which took the number of lactates being drawn from 3.5% to over 90% in just a couple of months. And from implementation through January 2009, Kaiser Permanente tripled the number of sepsis cases found.

The next step was assuring the correct treatment within the small window for curing the infections. Piloted exercises included developing a treatment bundle that the hospitals could use. Bundled treatment included early goal directed therapy, requiring aggressive fluid and antibiotics within the first two hours, which Kaiser Permanente changed to within the first hour. But there was a bump in the road: the central line necessary to deliver the high amount of fluids for resuscitation within the short window. “The insertion isn’t taken lightly because the large bore IV comes with its own risks and quite frankly, some of the

doctors hadn't done one in a while," said Crawford. They purchased simulation manikins and made sure everyone was up to speed on ultrasound guided central line insertion. The investment proved its worth.

Detecting sepsis early was hugely important to improving mortality rates, but Crawford said the real impetus came when clinicians saw real-life results. "At one of our pilot facilities, a single mom with a twelve year old son came into the emergency room. She thought she just had a urinary tract infection – it turned out she had sepsis, as well. She came to a Summit meeting and shared her story. Realizing that identifying sepsis was relatively easy and saved this woman's life

resonated strongly with the clinicians. After all, no one goes into healthcare with the intent of missing a diagnosis."

Sepsis diagnoses went from 35.7 per 1,000 admissions (July 2009) to 119.4 per 1,000 (May 2010). As a result of that early diagnosis and the treatment bundle, patient improvement within six hours went from 52% (2009) to 92% (early 2011). Mortality rates have dropped from 26% to 11% on average for sepsis cases across Kaiser Permanente's Northern California facilities. The average length of stay has dropped by 2.5 days. Crawford credited the multi-functional team and the Kaiser Permanente implementation model, called the four-wheel drive

approach. She shared the model's essential components:

1. Leadership alignment
2. Standardized workflow
3. Dedicated project manager role
4. Accurate data

Kaiser Permanente increased the number of patients identified with sepsis, a primary contributor to mortality rates. That, together with the "perfect bundle" has reduced their sepsis related mortality by over 40%. "The greatest motivator to me and to our clinicians is that we know more patients are going home to their families. We've given them more time," Crawford said.

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