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"Sepsis Sniffer": Prediction Tool For Early ID and Care



Researchers at Penn Medicine have developed an early warning and response tool dubbed the “sepsis sniffer” which uses laboratory data and vital sign readings in patients’ electronic health records to automatically alert physicians when a patient has reached a dangerous threshold and should be stabilised. By identifying those patients at high risk for developing sepsis, more cases can be quickly transferred to the ICU for appropriate care, ultimately resulting in fewer sepsis deaths. The study appears online in the *Journal of Hospital Medicine* .

Sepsis is an all-too-common infection complication, contributing to organ failure and, potentially, death. In the United States alone, 750,000 deaths are attributed to sepsis each year, out of three million annual cases of severe sepsis. A tool which can detect the complication in its early stages stands to benefit patients who can be urgently evaluated and treated with antibiotics and fluids to stabilise their conditions, thereby improving survival.

The tool may also influence triage decisions in crowded ICUs, according to lead author [Craig A. Umscheid, MD, MSCE](#), director of [Penn's Center for Evidence-based Practice](#). “By better identifying those with sepsis requiring advanced care, the tool can help screen out patients not needing the inevitably limited number of ICU beds,” he said.

The Penn Medicine tool was developed using data from 4,575 patients at the University of Pennsylvania Health System (UPHS); all were admitted in October 2011. During a pre-implementation period that lasted from June to September 2012, data were evaluated for admitted patients, with alerts being triggered in a database. This control period did not involve notifications being sent to providers. A post-implementation period one year later (June to September 2013) generated data to be compared with the control period. A total of 31,093 patients were involved in the two periods.

According to the researchers, the tool was effective in achieving the following:

- Orders for tests which could identify the presence of sepsis increased two to three-fold.
- Antibiotics and IV fluids were administered 1.5 to two-times more often.
- More than 50 percent more patients were transferred to the ICU in a timely manner.
- There was a 50 percent increase in sepsis documentation within patients' EHRs.

Both before and after the implementation of the "sepsis sniffer" tool, the trigger rate was four percent. Overall, 90 percent of patients who triggered an alert were evaluated by care teams within 30 minutes. The results showed a non-significant reduction in sepsis death rates and increase in patients successfully discharged to their homes.

"Our study is the first we're aware of that was implemented throughout a multihospital health system," said Dr. Umscheid. "Previous studies that have examined the impact of sepsis prediction tools at other institutions have only taken place on a limited number of inpatient wards. The varied patient populations, clinical staffing, practice models, and practice cultures across our health system increases the generalisability of our findings to other health care settings."

Dr. Umscheid authored the study with Penn colleagues Joel Betesh, MD; Christine Vanzandbergen, PA, MPH; Asaf Hanish, MPH; Gordon Tait, BS; Mark E. Mikkelsen, MD, MSCE; Benjamin French, PhD; and Barry D. Fuchs, MD, MS. His contribution was supported by Grant # UL1TR000003 from the National Institutes of Health (NIH) ,National Center for Advancing Translational Sciences.

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