AI accurately identifies infants with low risk of serious bacterial infection

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Artificial intelligence, or "supervised machine learning," could help identify which well-appearing infants with fever, who are 60 days old or younger, are at low risk for a serious bacterial infection, according to a study published in *Pediatrics*. Accurate risk determination could reduce unnecessary lumbar puncture, antibiotics and hospitalizations for these infants, as well as decreasing parental anxiety.

"In the Emergency Department, it is critical to determine which infants are at high risk for a serious bacterial infection, and which infants are at low risk," says lead author Sriram Ramgopal, MD, pediatric emergency medicine physician at Ann & Robert H. Lurie Children's Hospital of Chicago and Assistant Professor of Pediatrics at Northwestern University Feinberg School of Medicine. "We trained and assessed four different machine learning algorithms and found that the type called 'random forest' yields the most accurate results, surpassing the predictive capability of the current decision rules we use. Our results are very promising and may pave the way to an eventual use of this type of artificial intelligence clinically."

Fever in young infants is very common, but only about 10 percent turn out to have a serious bacterial infection, such as urinary tract infection, bacterial meningitis, or bacteremia (bacteria in the blood). However, using the available decision rules to determine risk produces too many false positives, meaning that those infants undergo invasive procedures, receive antibiotics and might be hospitalized unnecessarily.

In the study, among 1,240 patients who received a lumbar puncture, the artificial intelligence model could have prevented 849 (over 68 percent) of such procedures. The model produced results with both high sensitivity (accurate detection of true positives) and specificity (accurate detection of true negatives).

"It may still take many years before artificial intelligence algorithms become standard practice in medicine," says Dr. Ramgopal. "It is an exciting area of research with great potential to improve care of our patients."

Provided by Ann & Robert H. Lurie Children's Hospital of Chicago