

Method identified to reduce risk of brain damage in leukemia survivors

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Josh Wolf, MBBS, assistant member of the St. Jude Department of Infectious Diseases. Credit: St. Jude Children's Research Hospital

Children with acute lymphoblastic leukemia (ALL) are at an extremely high risk of sepsis compared to the general population. In the first-published study of its kind, St. Jude Children's Research Hospital scientists have discovered a link between sepsis during cancer treatment and long-term neurocognitive dysfunction.

Sepsis is a potentially life-threatening condition in which the body wages a massive immune response to a bacterial [infection](#) of the blood. The study revealed survivors with a history of sepsis performed worse than other participants on tests measuring multiple neurocognitive domains, including executive function and attention span.

"By preventing infection and sepsis, we're able to help avert long-term problems for survivors," said Josh Wolf, MBBS, assistant member of the St. Jude Department of Infectious Diseases.

The study, led by Wolf and Kevin Krull, Ph.D., a member of the St. Jude Department of Epidemiology and Cancer Control, appears today

in the journal *JAMA Pediatrics*.

"Cancer patients have a [high risk](#) of acquiring infection," Wolf said. "There's also a high risk of that infection becoming serious. Then, because their body can't control the bacteria, they're susceptible to sepsis."

The sepsis then leads to the late effects of neurocognitive dysfunction. Children who had bloodstream infections without sepsis avoided those late effects, although other factors, including ALL treatment, are associated with neurocognitive problems among ALL survivors. The severity of sepsis did not matter.

"The [children](#) who had sepsis did worse than the children who did not," Wolf said. "When we divided the kids who had sepsis into levels ranging from [severe sepsis](#) versus not-so-severe sepsis, they looked the same."

The patients in this study suffered long-term cognitive deficits, whether the instance of sepsis during treatment was mild or severe. This makes it important to identify the infection early and appropriately treat it.

"Aggressive management of infection before it progresses to sepsis is extremely important," Krull said. "If we know a child who develops sepsis will be at risk for future attention and executive-function problems as a long-term survivor, we can immediately start training these attention and executive function skills. The training can occur after the child recovers from sepsis and is still undergoing cancer therapy. If we strengthen the attention and executive function skills then, perhaps these children will not decline to below-average performance."

The mechanism behind the long-term cognitive effects of sepsis is not known, but pre-emptive neurocognitive interventions may prevent or

mitigate any neurological damage. Wolf and others are conducting research to understand the association between [sepsis](#) and neurocognitive problems.

More information: Association of Bacteremic Sepsis With Long-term Neurocognitive Dysfunction in Pediatric Patients With Acute Lymphoblastic Leukemia *JAMA Pediatr.* DOI: [10.1001/jamapediatrics.2018.2500](https://doi.org/10.1001/jamapediatrics.2018.2500)

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