

# Persistent inflammatory state found in half of pediatric sepsis deaths

June 30 2023, by Leigh MacMillan

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About half of pediatric patients who died of sepsis over the past 20 years at Vanderbilt University Medical Center had evidence of an inflammatory state called PICS (persistent inflammation,

immunosuppression and catabolism syndrome), according to a study reported in the journal *Chest*. Children with PICS were more likely to have undergone heart surgery and had a higher incidence of fungal infections.

"These associations have never been explicitly linked before, especially in the context of children, and can inform further research into these uniquely vulnerable populations," said Ryan Stark, MD, assistant professor of Pediatrics at Monroe Carell Jr. Children's Hospital at Vanderbilt and senior author of the study.

Sepsis is an exaggerated response to infection with a mortality rate of up to 25%. Although early recognition and improvements in critical care medicine have reduced the overall mortality rate of [sepsis](#), some patients who survive the initial insult develop PICS and remain vulnerable to sepsis-related illness and death.

"PICS has been associated with increased late mortality, but most of the literature is from adult populations," said Stephanie Patterson, MD, MS, assistant professor of Pediatrics and first author of the study. "The impact of PICS in critically ill children, particularly those with sepsis, remains mostly undescribed."

For the study, the researchers used VUMC's de-identified database of [electronic health records](#) to examine all [pediatric patients](#) (age 21 or younger) who died of sepsis from a known source from 1997 through 2020. They evaluated laboratory data to determine the presence of pediatric PICS (pPICS) and studied associated pathogens and comorbidities.

The researchers found that of 557 patients who died of sepsis, 262 (47%) had evidence of pPICS. Patients with pPICS were more likely to have underlying hematologic, oncologic or cardiac disease and to have

an associated fungal infection compared to those who did not have pPICS. Patients with pPICS were also more common in the cardiac intensive care unit compared to the pediatric ICU.

The association of fungal infection with pPICS suggests that patients with this syndrome may benefit from prophylactic antifungals, the researchers said.

Because the study examined only patients who died, it does not offer conclusions about the prevalence of pPICS in patients who survived sepsis or in patients who did not have sepsis.

"Further studies are needed to assess overall prevalence and risks for pPICS, as well as potentially modifiable factors that could improve outcomes for this group of patients," Stark said. "Clinicians should be aware of the potential for pPICS in children who have had surgery for [congenital heart disease](#) or other heart-related conditions, or who have underlying hematologic or oncologic disease."

**More information:** Stephanie G. Patterson et al, Pediatric Persistent Inflammation, Immunosuppression, and Catabolism Syndrome Prevalence in Sepsis-Related Mortalities, *Chest* (2023). [DOI: 10.1016/j.chest.2023.05.002](#)

Provided by Vanderbilt University

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