

Predicting infection risk in childhood cancer

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A statistical model can accurately predict the risk of bloodstream infections in a subset of children with cancer, according to a study

[published](#) in the *Journal of Clinical Oncology*.

For [children](#) with cancer, [fever](#) is a common complication. While [guidelines](#) exist for managing fever in children with cancer who have very low white blood cell counts, no such guidelines exist for children with cancer without severely low levels.

Because of this, identifying patients with cancer and fever who are at a higher risk for [bloodstream infections](#) can be difficult, said Jenna Rossoff, MD, assistant professor of Pediatrics in the Division of Hematology, Oncology and Stem Cell Transplantation and a co-author of the study.

While some hospitals may choose to pre-emptively administer antibiotics to a feverish child being treated for cancer, that can lead to other complications such as antibiotic resistance later on, Rossoff said.

In the study, Rossoff and her collaborators sought to test a model developed to predict the risk of bloodstream infections, which can develop into sepsis, in feverish children with cancer.

"This model has been designed to delineate bloodstream infection risk in these patients at presentation based on a variety of variables, and the overall goal is to reduce unnecessary antibiotic use and also identify patients obviously at high risk for a bloodstream infection," said Rossoff, who is also a member of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University.

To test the model, investigators collected data on fever episodes occurring in pediatric cancer patients from 18 [academic medical centers](#). They then compared the model's predictions to the seven-day clinical

outcomes in each of the 2,500+ cases and found that the model could accurately predict which patients were more likely to experience bloodstream infections, according to the study.

The findings suggest the model accurately identifies high-risk patients and could reduce unnecessary antibiotic use, Rossoff said.

"Importantly, the paper showed that in the patients whose predicted risk for bloodstream infections using this model was low, there was a very low rate of true bloodstream infections," Rossoff said. "For those few percent of patients who did have a bloodstream infection, there were no severe outcomes."

Moving forward, Rossoff said she would like to see more studies done testing the model in children with [cancer](#) who have undergone stem cell transplants and other novel therapies.

"Fevers are a pretty frequent complication during treatment and when our kids don't need antibiotics, we should be avoiding them to prevent [antibiotic resistance](#) and disruption of the gut microbiome," she said.

"As much as we can safely—safely being the key word—decrease antibiotic administration, that would be a great thing overall."

More information: Zhiguo Zhao et al, Prospective External Validation of the Esbenshade Vanderbilt Models Accurately Predicts Bloodstream Infection Risk in Febrile Non-Neutropenic Children With Cancer, *Journal of Clinical Oncology* (2023). [DOI: 10.1200/JCO.23.01814](https://doi.org/10.1200/JCO.23.01814)

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