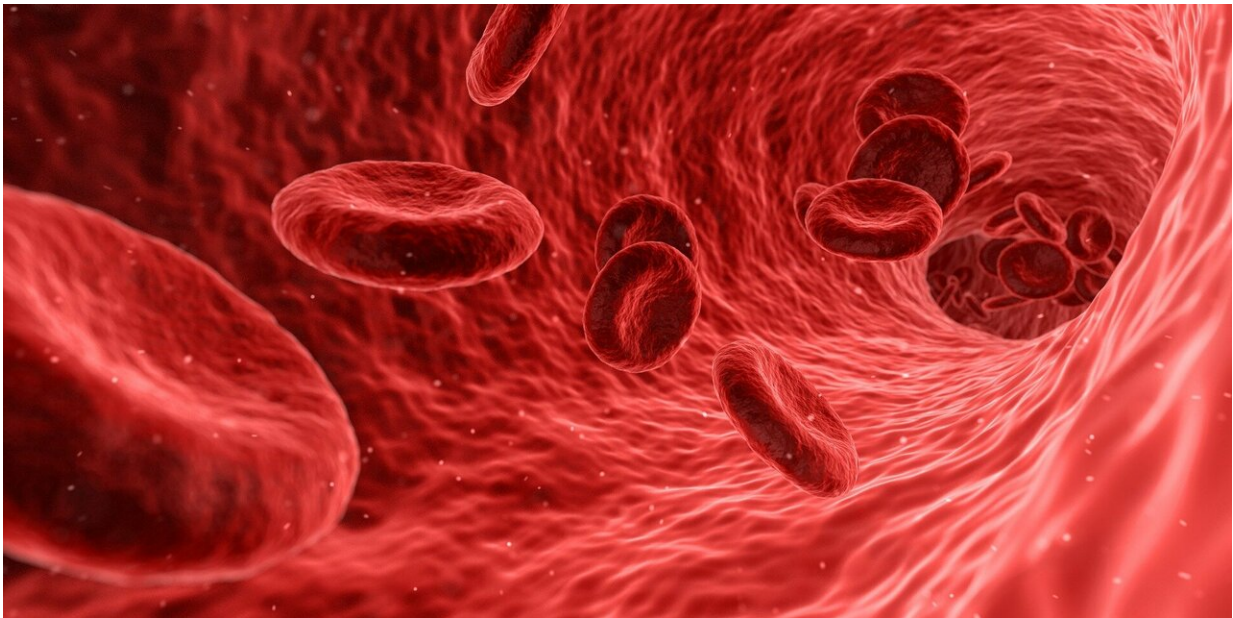


# Fresh red blood cell transfusions do not help critically ill children more than older cells

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Researchers have found that transfusions using fresh red blood cells—cells that have spent seven days or less in storage—are no more beneficial than older red blood cells in reducing the risk of organ failure or death in critically ill children. The findings, the researchers said, should reassure doctors that the standard practice of using older red cells is just as safe and effective in these children, who are among the sickest and most fragile of patients.

The study, one of the largest clinical trials to investigate red [blood](#) cell storage in critically ill [children](#), sheds light on a controversial aspect of transfusion medicine that has been understudied. It was funded in part by the National Heart, Lung, and Blood Institute (NHLBI), part of the National Institutes of Health, and the findings will appear online on Dec. 10 in the *Journal of the American Medical Association*.

"Our findings indicate that doctors should not be afraid to use older red cells in critically ill children," said study co-principal investigator Philip Spinella, M.D., a researcher with the Pediatric Critical Care Translational Research Program at Washington University School of Medicine in St. Louis. "Those who are showing a preference for fresh red cells might consider discontinuing this practice unless there are extenuating circumstances." Spinella added that the findings also provide good news for blood banks, which he said will likely feel less pressure to respond to requests for fresh red cells.

Red blood cell transfusions are commonly given to critically ill children for conditions such as trauma, cancer chemotherapy, intraoperative bleeding, and chronic conditions such as sickle cell disease and thalassemia. Transfusing the oldest red cells in the stored inventory first is [standard practice](#) among many hospitals. However, some hospitals preferentially give fresh red blood cells to critically ill children, even though [clinical studies](#) supporting the benefits of this practice have been lacking.

To help fill the research gap, scientists conducted the Age of Blood in Children in Pediatric Intensive Care Units (ABC-PICU) randomized trial at 50 medical centers between February 2014 and November 2018. They recruited critically ill patients from pediatric intensive care units in the United States, Canada, France, Italy, and Israel.

For the primary analysis, the researchers included a group of 1,461

critically ill children, half boys and half girls, between 3 days old and 16 years old. Half of the patients received transfusions with fresh red blood cells stored for less than seven days and half received transfusions with older, moderately aged red cells stored for 12 to 25 days. The researchers then measured the development of new or progressive multiorgan dysfunction (impairment of one or more organs) for 28 days or until the patients were discharged from the hospital or died.

The researchers found that fresh red cells did not reduce the incidence of new or progressive multiple organ dysfunction or death compared to older red cells and that the outcomes were not significantly different between the two groups. About 20.2% of those who received fresh red cells experienced new or progressive organ dysfunction while 18.2% of those who received older red cells experienced similar dysfunction.

Marisa Tucci, M.D., a co-principal investigator for the study and a researcher at the University of Montreal, noted that the study's relatively large size and geographic diversity were among its strengths, making it reasonable for researchers to generalize to the larger pediatric population.

The researchers did note some caveats. The study did not examine whether the use of the oldest red cells allowable (35-42 days old) affects outcomes, or if fresh red [cells](#) affect outcomes for children requiring large-volume red cell transfusions. The children in this study received low-volume red cell transfusions.

"The results of this study and other studies suggest that future research should be focused on deeper characterization of red blood cell products. This will help optimize the safety and effectiveness of these products among children, as well as others," said Traci Mondoro, Ph.D., the NHLBI project officer for the study. Mondoro, who also is chief of the Translational Blood Science and Resources Branch in the NHLBI

Division of Blood Diseases and Resources, added that becoming a blood donor can help advance this kind of research—and save lives, too.

**More information:** Effect of Fresh vs. Standard-issue Red Blood Cell Transfusions on Multiple Organ Dysfunction Syndrome in Critically Ill Pediatric Patients, *Journal of the American Medical Association* (2019). DOI: [10.1001/jama.2019.17478](https://doi.org/10.1001/jama.2019.17478)

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