

Transfusions of 'old' blood may harm some patients

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The oldest blood available for transfusions releases large and potentially harmful amounts of iron into patients' bloodstreams, a new study by researchers at Columbia University Medical Center (CUMC) has found.

Based on the new findings, the researchers recommend that the FDA reduce the maximum storage limit of [red blood cells](#) from 6 weeks to 5 weeks, as long as there are sufficient blood supplies available.

"Our recommendation will be controversial, but we think we have real data to support it," said the study's co-leader Steven Spitalnik, MD, professor of pathology & [cell biology](#) at CUMC and medical director of the clinical laboratories at NewYork-Presbyterian/Columbia. "Recent studies have concluded that transfusing old blood has no impact on patient outcomes, but those studies didn't exclusively examine the oldest blood available for transfusions. Our new study found a real problem when transfusing blood that's older than 5 weeks."

Their findings appear in the January issue of the *Journal of Clinical Investigation*.

Transfusion of red blood cells is the most common procedure performed in hospitalized patients, with approximately 5 million patients receiving red blood cell transfusions annually in the United States. "But the longer you store blood, the more the cells become damaged," said the study's co-leader Eldad Hod, MD, associate professor of pathology & cell biology at CUMC and clinical pathologist at NewYork-Presbyterian/Columbia.

Currently, the U.S. FDA allows units of red blood cells to be stored for up to 6 weeks before they must be discarded.

In the study, the researchers randomly assigned a group of 60 healthy volunteers to receive a unit of red [blood cells](#) that had been stored for 1, 2, 3, 4, 5, or 6 weeks. The volunteers were then monitored for 20 hours after transfusion.

Within hours after transfusion, 7 of the 9 volunteers who received the 6-week-old blood could not appropriately metabolize the damaged cells, thereby releasing large amounts of iron into their bloodstream. Only one volunteer who received younger blood had a similar response, with blood had been stored for five weeks.

None of the volunteers were harmed by the transfusion, but previous studies have shown that excess iron can enhance blood clots and promote infections. "Based on the amount of iron circulating in the blood of the volunteers who received 6-week-old blood, we'd predict that certain existing infections could be exacerbated," said Dr. Hod.

"Thus, for ill, hospitalized patients, this excess iron could lead to serious complications," said Dr. Spitalnik says.

The true impact of 6-week-old blood on the rate of complications in patients is likely to be small, the researchers say, but since millions of Americans receive transfusions each year, even a 1 percent difference in complications could affect a large number of patients.

"It's estimated that up to 10 to 20 percent of blood units used for transfusions have been stored for more than 5 weeks, so the number of patients who are likely to receive a unit of very old blood is substantial," Dr. Hod added.

"Based on our findings of potential harm, we think the prudent thing to do at this time is for the FDA to reduce the maximum storage period," said Dr. Spitalnik. "The U.K., Ireland, the Netherlands, and the National Institutes of Health have limited storage to 35 days, and we think that can be achieved throughout the U.S. without seriously affecting the [blood](#) supply."

The study is titled, "Prolonged red cell storage before transfusion increases extravascular hemolysis."

More information: Francesca Rapido et al, Prolonged red cell storage before transfusion increases extravascular hemolysis, *Journal of Clinical Investigation* (2016). [DOI: 10.1172/JCI90837](https://doi.org/10.1172/JCI90837)

Provided by Columbia University Medical Center

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