

# Researchers rewrite obsolete blood-ordering rules

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Johns Hopkins researchers have developed new guidelines—the first in more than 35 years—to govern the amount of blood ordered for surgical patients. The recommendations, based on a lengthy study of blood use at The Johns Hopkins Hospital (JHH), can potentially save the medical center more than \$200,000 a year and improve patient safety, researchers say.

A report on the research that led up to the new guidelines, published online in the journal *Anesthesiology*, suggests millions of dollars a year nationwide could be saved in laboratory costs and wasted [blood](#) if other hospitals also reconsider how they prepare blood for surgery.

The researchers say the guidelines ensure that blood is readied for surgeries likely to require transfusions and that time isn't spent preparing blood for surgeries that rarely require them.

"In 1976, when the last guidelines were published, there were 60 surgical procedures on the list. Now, with the addition of laparoscopy, [robotic surgery](#) and other minimally [invasive techniques](#), there are 135 categories of surgical procedures," says study leader Steven M. Frank, M.D., an associate professor of anesthesiology and [critical care medicine](#) at the Johns Hopkins University School of Medicine. "[Blood loss](#) has declined over time as surgery has evolved, but the guidelines were never reconsidered, leading to a lot of unnecessary work to prepare blood for surgery."

Frank and his colleagues analyzed computerized anesthesia records—including blood use—for 53,000 surgeries performed at JHH over the course of 27 months from January 2010 through March 2012. They looked at how often blood transfusions were needed during various types of surgeries, and how much blood was transfused. Then they devised a new [mathematical formula](#) to determine whether patients undergoing each type of surgery would most likely need no blood, which ones might possibly need blood (for which a sample was sent to the lab to get the patient's blood type and other information) or whether blood was very likely to be needed.

In cases where the algorithm "guessed wrong," Frank notes, emergency blood (type O-negative) can be procured within minutes with minimal risk of reaction. That scenario occurred in three out of every 1,000 cases, he says, but those patients had substantial anemia prior to surgery, a condition for which blood should be ordered anyway, despite the new recommendations.

Surgeries unlikely to require transfusions include appendectomy, tonsillectomy, thyroidectomy (removal of the thyroid) and removal of the gallbladder. He says that in 1,605 cases of thyroid removal over the study period, only three transfusions were needed.

"What we've found is a better-safe-than-sorry approach that isn't actually helpful," Frank says. "We haven't transfused a thyroidectomy in over two years at our institution, so there's a huge opportunity to save money by following our new guidelines."

He says that when blood is ordered for a surgical case, there are expenses associated with typing a patient's blood and screening for various antibodies to ensure a good match is found, as well as with preparing the actual units and bringing them to the operating room. Time spent preparing blood for, say, thyroid removal could be better spent

preparing blood for open-heart surgery, where several units of blood will likely be required.

Meanwhile, he adds, unused blood set aside for [surgical patients](#) is removed from the available pool for 24 hours, and while it can be used eventually, recent research by his team suggests that blood stored longer than three weeks begins to lose the capacity to deliver oxygen-rich cells where they may be needed most.

In some cases, he notes, JHH was under-ordering blood, a condition also remedied by the new set of guidelines. Liver transplants are most likely to require the largest amount of blood, with the recommendation that 15 units be prepared and in the operating room.

Frank says that while the blood-ordering guidelines developed are specific to JHH, they can be adapted to other hospitals. Also, he says, hospitals with computerized anesthesia records—roughly 50 percent of hospitals in the United States—can use the algorithm developed by the Johns Hopkins team to develop their own hospital-specific guidelines.

Provided by Johns Hopkins University School of Medicine

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