

Blood transfusions are not a silver bullet.

There is a greater demand for donor blood than is necessary, according to Professor Kai Zacharowski.

Professor Kai Zacharowski, an anesthesiologist and intensivist, has exerted a significant impact on patient blood management at the national and international levels. He advocates radical reforms in the healthcare system with regard to the handling of blood products, most importantly a shift towards the preservation of blood from the outset, commencing from diagnosis, and not merely in surgical procedures.

Dirk Frank: Professor Zacharowski, before we proceed with the topic of blood saving and patient blood management, would you agree that there may be a greater prevalence of anemia in our society than is generally recognized?

Kai Zacharowski: First and foremost, anemia, defined as a deficiency in healthy red blood cells, is a highly prevalent global health issue. It is estimated that approximately two billion people worldwide are affected by some form of anemia, representing approximately 25% of the global population. In fact, it is estimated that approximately one third of anemia cases are attributable to iron deficiency. In some countries, such as India, where a significant proportion of the population is vegetarian, or South Sudan, where meat is not widely available, there is a high prevalence of iron deficiency. Even in the developed world, iron deficiency poses a significant health issue. In Germany for example, vegetarians and vegans also require iron supplementation. I often administer an iron injection to patients once every one to two years in my clinic. Iron deficiency, in my view, is a disease rather than a symptom, as it has a direct impact on an individual's health.

Time and time again, there are significant shortages in the blood supply in Germany.

That means we need more blood donations to meet the huge demand, doesn't it?

That diagnosis is far from accurate. Germany has a population of about 85 million, and we perform 18 million surgical interventions per year, some of which can require blood either from the patient themselves or a donor. It is estimated that approximately 20% to 25% of the German population undergoes a surgical procedure annually. Do you think this is justified? No. My conservative estimate is that at least 20 percent, probably even

30 percent of operations and interventions in Germany, about 4.5 to 5 million, are unnecessary. Another consideration is the degree to which doctors are aware of a patient's need for blood. There is a lack of consistency in practice, as this is not a subject that has been adequately addressed in training. This is another reason why Germany, in a global comparison, has the highest blood use per capita. We use twice as much blood per person as the Netherlands. Both countries are the same in terms of their healthcare needs. Surely, that can't be right?

So, what we need to do is change the system and focus on saving blood. This is a paradigm shift that also requires a certain change in awareness. What would have to happen to achieve this?

The problem with our system is that planning is difficult. We have virtually no waiting lists in Germany. In today's climate, many people are quick to highlight the two-class society that we are increasingly becoming, pointing to the two-week wait for an appointment with a GP or specialist for those without private healthcare insurance. But that's not true! I worked in the UK for over eight years, and the National Health Service is undeniably an expert in waiting lists. All non-urgent cases can wait between six and twelve months. This is not a significant issue, as patients are better prepared for their surgical procedures at these facilities. This approach does not appear to be effective in the German healthcare system. If you tell a patient:

Patient blood management

Patient blood management (PBM) represents a medical concept designed to enhance patient safety by strengthening the body's own blood reserves. In practice, the concept is implemented in three main ways: (1) early detection and treatment of pre-existing anemia if present; (2) minimization of blood loss and intensified use of blood conservation measures; and (3) rational use of blood reserves. These three pillars form the foundation of PBM in everyday hospital practice.

The number of patient blood management initiatives worldwide is growing. In Germany, patient blood management was first introduced at the university hospitals in Frankfurt, Bonn, Kiel and Münster. The World Health Organization has been calling for the introduction of patient blood management into everyday medical practice since 2011.

<https://www.patientbloodmanagement.de/en>

“There’s another problem, and we’re going to treat your anemia before you get your new hip,” they might go to another surgeon. And that surgeon would do exactly what the patient wants. We need legislation for elective, that is, plannable operations so that we can prevent the potential need for a blood transfusion. This is irrelevant for minor interventions. But there are many operations, including hip surgery, where the probability of a (potentially risky) transfusion is over ten percent. The law should stipulate that a patient must be seen by an anesthesiologist at least ten days before their operation. The outcome, however, would be that the number of operations in Germany would suddenly plummet until the system returned to normal. But it would have a very positive impact on the German healthcare system. It is well established in the medical literature that preoperative anemia is associated with increased risks of complications, including kidney damage, infection and allergic reactions.

These, in turn, are associated with a higher demand for blood, longer hospital stays and higher mortality rates. For patients with pre-existing anemia, it is recommended that the condition be treated prior to the procedure to mitigate these risks.

A related consideration is the potential for blood loss during surgery. If significant blood loss during surgery happens, isn’t it imperative to compensate for it with donor blood?

If the medical team is well organized and knows that significant bleeding might occur during the procedure, they will collect the patient’s own blood, which can be “washed” using cell savers. After washing, the blood can be re-infused. This blood is, by nature, 100 percent compatible with the patient. In Germany, however, the legal requirements for this procedure have become more complex, and as a result many hospitals no longer apply it. Instead, the

system prefers to use donor blood, which is very precious. And we know that donor blood is never 100 percent compatible with another person because we are all genetically different. As a consequence, donor blood can lead to immunosuppression, for example. Don’t get me wrong, I’m not badmouthing blood transfusion. On the contrary, it has already helped me to save many people’s lives. But misuse is a serious problem.

Have you also examined diagnostic blood samples?

I coined the term “hospital-associated anemia” years ago. Let me give you an example: If a patient is seriously ill, we send their blood for extensive laboratory tests two to three times a day. If a patient is on a ventilator, we measure blood gas intermittently. That quickly adds up to 500 milliliters in a week. An older female patient weighing 60 kilograms with a blood volume of just under three



The many bags are deceptive: According to the blood group barometer of the German Red Cross Donor Service, blood reserves for groups A+, A-, O+ and O- are critically to threateningly low (July 2024).



liters will be missing a liter after just two weeks. Unfortunately, the situation for patients in intensive care is particularly critical: Due to immunosuppression, the body does not really replace much blood at first, which means all patients become severely anemic.

It would appear that the blood tubes currently used in laboratory analysis also present a problem.

Our research has demonstrated that the quantity of blood required for diagnostic purposes can be significantly reduced. However, this did not resolve the issue. The fact is that filling the tubes only halfway leads to erroneous results. We successfully negotiated with the manufacturer to develop blood tubes where the outer tube has the same volume, but the inner one only half. The substances that prevent clotting must be mixed differently when the volume is decreased. In Frankfurt, we have been saving almost 2,000 liters of blood per year for a decade, instead of taking it from our patients. These savings have another positive effect: Blood from the laboratory is highly infectious waste that has to be incinerated, so saving blood is also good for the environment.

Relying more on the patient's own blood is by all means cost-effective. Bear in mind that donor blood has to be analyzed before it can be used. It is essential to ascertain the patient's blood group, determine the required blood product and procure it when necessary. The blood must be transported in accordance with established protocols and undergo a final check before transfusion. Additionally, any potential complications must be considered.

One could argue that while saving blood does narrow the market to some extent, its primary benefit lies in ensuring a sufficient blood reserve for unavoidable transfusions.

Of course, the need for blood is not decreasing, as the population is aging. There will be more cancer cases in the future. With this in mind, we need to move forward with patient blood management. We have both a medical and an ethical obligation to save blood, in my opinion. If possible, the use of donor blood should be restricted so that it only goes to those who really need it.

Patient blood management is evidently becoming an increasingly widespread concept.

Hospitals that have implemented patient blood management, comprising over a hundred individual measures, are able to provide safer care for their patients. Furthermore, the German Patient Blood Management Network has been presented with the Humanitarian Award by the American Patient Safety Movement Foundation. This was awarded in recognition of the establishment of the network and our achievements to date. We are also delighted to report that the Barmer health insurance company has accepted the findings of the Patient Blood Management program and performed their own analysis of the data. Their conclusions are in alignment with ours, which is a testament to the success of our research. As part of a selective contract with Barmer, we can diagnose and treat patients preoperatively. The health insurance company covers the costs for its policyholders, but at the same time saves money. The goal, of course, must be for patient blood management to be introduced throughout Germany and for all health insurance companies to participate. We need about another five years for this to become law in Germany – hopefully. Until then, you will continue to see me as an ambassador for patient blood management.

The interview was conducted by Dr. Dirk Frank, Deputy Press Spokesperson at Goethe University Frankfurt.

1 The donor blood is separated into different components in a centrifuge.

2 Empty shelves: For a good supply, the cold room should be full.



About Kai Zacharowski

Kai Zacharowski, born in 1967, studied medicine in Mainz, where he also earned his doctoral degree (Dr. med.). After completing a second doctoral degree (Ph.D.) at Queen Mary University of London, he was appointed as junior professor at Heinrich Heine University Düsseldorf in 2002, where he worked at the Department of Anesthesiology and completed his postdoctoral degree (Habilitation) in 2003. In 2006, he was appointed as the director of the Department of Anesthesia and Critical Care, University Hospitals Bristol. He has been a professor at Goethe University Frankfurt and director of the Department of Anesthesiology, Intensive Care Medicine and Pain Therapy at University Hospital Frankfurt since 2009. He conducts research on patient safety, patient blood management, blood clotting, big data in anesthesia and intensive care medicine, innate immunity, cardiovascular and critical care medicine. He has received numerous awards, including the Humanitarian Award 2015 from the US Patient Safety Movement Foundation.

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