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Could better patient outcomes be as simple as implementing a comprehensive patient blood management (PBM) program? Developed by Prof. Kai Zacharowski, recipient of one of the Patient Safety Movement Foundation's 2015 Humanitarian Awards, and Prof. Patrick Meybohm (both from Frankfurt), the World Patient Blood Management Network has taken a simple yet innovative approach to improving patient safety – namely to spare and preserve the patient's own, natural resources.

Patient Blood Management isn't a new concept. Since 2010, the World Health Organization has recommended PBM as a new standard, but many hospitals have not implemented it at all or only in part in clinical practice.¹

"Transfusions should be rated just as transplantation because you're getting cells from someone else. There needs to be more awareness around this. For example, we now know that if you have colon cancer and you need surgery then it's a very simple procedure. But if you need a transfusion, your risk for reoccurrence increases substantially. It has a major impact on outcome," said Prof. Kai Zacharowski, Director of the Department of Anesthesiology, Intensive Care Medicine and Pain Therapy at Frankfurt University Hospital.

Founded last year at the 2017 World Patient Safety, Science & Technology

Summit, Zacharowski's and Meybohm's World Patient Blood Management Network has been gaining the respect and recognition of the healthcare industry long before that. In Germany, PBM was initially implemented at the University Hospitals Frankfurt, Bonn, Kiel and Munster. In 2014, they were honored with the Christoph Lohfert Awards and in 2016, they were honored with the German Patient Safety Awards. Now, PBM is evolving to a major quality indicator in German hospitals.² The World Patient Blood Management program has now been implemented in more than 100 hospitals across ten countries.

SO WHAT IS PBM?

PBM is an evidence-based, multidisciplinary approach to optimizing the care of patients who might need transfusion. It encompasses all aspects of patient evaluation and clinical management surrounding the transfusion decision-making process, including the application of appropriate indications, as well as minimization of blood loss and optimization of patient red cell mass.³ PBM can reduce the need for allogeneic blood transfusions and reduce health-care costs, while ensuring that blood components are available for the patients who need them. It eliminates unnecessary blood transfusions and the associated complications that can result such as transfusion related infections, allergic reactions and human error. But a proper PBM can also improve patient outcomes.⁴

Zacharowski and his team developed an innovative PBM system that along with intravenously treating anemia preoperatively and conserving blood draws has demonstrated up to 20% reduction in red blood cell transfusions, risk of acute kidney injury and overall costs, without any negative impact to patient safety.

Evidence shows that Prof. Zacharowski's PBM program saves \$1 Million for every 1000 beds, and is built upon three sustaining pillars:

- Early detection and treatment of preoperative anemia in patients undergoing surgery with a high transfusion probability
- Minimizing blood loss and intensified use of blood conserving measures
- Rational and guideline appropriate use of allogenic blood products

"Treating anemia is important because mortality for operating on patients who are anemic is five times greater than a regular operation. If the patient is severely anemic, that mortality rate

increases to thirteen times. So, if we are performing 320 Million surgeries a year, then treating anemia prior to surgery could save about 6 Million lives," explained Zacharowski.

The second pillar of the PBM focuses on reducing Hospital-Acquired Anemia through a combination of reducing the number of blood withdrawals to the necessary minimum, use of smaller blood sampling tubes with the smallest volume sufficient for the analysis (e.g. use of smaller tube sizes or minimizing the filling level of the tubes), and avoid discarding diluted blood residues in withdrawal syringes by using closed blood sampling systems.

"Ninety percent of patients will suffer hospital-acquired anemia due to venal procedures," Prof. Zacharowski explained. "When a patient had heart surgery, about five liters of blood will be taken from them for testing during their hospital stay. That's their entire blood volume. In Frankfurt alone, we are saving 2,000 liters of blood a year by not taking blood or taking less for diagnostics."

PBM's third pillar involves creating guidelines regarding red blood cell transfusions. For example, the German Medical Association specifies the indication criteria for a RBC transfusion and should be put into practice. If a RBC transfusion is indicated in case of patients not actively/acutely bleeding, only a single RBC should be administered.⁵ The reason as Zacharowski notes is that **"Every one unit of blood given is associated with higher risks for mortality, infection, hospital stay and cost."**



Prof. Kai Zacharowski at the 5th Annual World Patient Safety, Science & Technology Summit announcing the launch of the World Patient Blood Management Network

Implementation of the third pillar at Frankfurt University Hospital has reduced the amount of blood being ordered by 20% and blood being given by 40%. Elsewhere, implementation of the third pillar resulted in a reduction of transfusions by 58% in a study of 47 centers across the United States and Canada.⁶



And implementation of all three pillars, what's referred to as a multimodal patient blood management program, has been proven to have profound effects. A recent study across four Australian hospitals involving internal medicine and surgery of over 600,000 patients was proven to reduce transfused patients (41%), preoperative anemia (33%), length of hospital stay (15%), infections (21%), mortality (28%), and reduce costs by 41%.⁷

"It's an ethical responsibility to give patients the best care possible and this is the new standard and the highest quality. The only way you can change is through simple measures. We used simple measures to show they used less blood and had better results. We know that this program reduces hospital stay, infections, and mortality. Now, we need patients to get involved and ask for this," explained Prof. Zacharowski.

Hospitals interested in the PBM can download information from patientbloodmanagement.eu.

¹ The Patient Blood Management Concept. Joint recommendation of the German Society of Anaesthesiology and Intensive Care Medicine and the German Society of Surgery. *Anästhesiologie und Intensivmedizin* 2017;58:568-571. DOI: 10.19224/ai2017.568

² <https://www.patientbloodmanagement.de/en/>

³ <http://www.aabb.org/pbm/Pages/default.aspx>

⁴ <https://healthmanagement.org/c/icu/news/kai-zacharowski-honoured-by-patient-safety-foundation-for-pbms>

⁵ Executive Committee of the German Medical Association, Cross-sectional Guidelines for Therapy with Blood Components and Plasma Derivatives 2014, 4th revised edition

⁶ Weber CF, Gorlinger K, Meininger D, Herrmann E, Bingold T, Moritz A, et al: Point-of-care testing: a prospective, randomized clinical trial of efficacy in coagulopathic cardiac surgery patients. *Anesthesiology* 2012;117:531-47

⁷ Leahy MF, Hofmann A, Towler S, Trentino KM, Burrows SA, Swain SG, et al: Improved outcomes and reduced costs associated with a health-system wide patient blood management program: a retrospective observational study in four major adult tertiary-care hospitals. *Transfusion* 2017;57:1347-58