

Blood Conservation

This Clinical Evidence Summary was developed to provide a synopsis of the currently available evidence and guidelines for **Blood Conservation**.

Background

The use of blood product has declined approximately 30% since 2008, partially due to advances in blood conservation efforts and patient blood management programs implemented by hospitals.¹ Despite this trending decrease, the Red Cross, which supplies 40% of the nation's blood, estimates nearly 29,000 units of red blood cells, 5,000 units of platelets and 6,500 units of plasma are needed every day in the United States.² Data from the 2019 National Blood Collection and Utilization Survey (NCBUS) indicate a narrowing between the available supply of some blood products and total transfusions. The NCBUS estimates approximately 11.6 million units of red blood cells (RBC) were collected in 2019, a 5.1% decrease in total collections as compared to 2017 (12.2 million units).³ The overall number of RBC transfusions remained largely static during this same time period at 10.8 million.^{3,4}

The nation's blood supply is dependent on volunteer donors. Evidence indicates that the COVID-19 pandemic has put additional strain on blood product availability through reduced donations seen, in part, through cancelled blood drives and staffing limitations.² The Red Cross, reports a 10% decline in the number of donors since the beginning of the pandemic.² Access to safe blood product through an adequate blood supply is a hallmark of modern medicine and is a vital part of patient care.⁵ Any decrease in blood product demand due to cancellation of elective surgery and other non-urgent medical care is fading as hospitals resume normal operations. Similarly, transfusions continue to be required for those patients suffering from emergent trauma, hemorrhage, anemia, some cancers, and other urgent surgical needs.

Resources

Patient Blood Management (PBM) is defined by the Society for the Advancement of Patient Blood Management (SABM) as "...the timely application of evidence-based medical and surgical concepts designed to maintain hemoglobin concentration, optimize hemostasis and minimize blood loss in an effort to improve patient outcomes."⁶ There is substantial literature to support the use and implementation of PBM to enhance blood conservation efforts.^{1,5,7-9} The primary pillars of PBM frequently described in the literature include:

Summary

- Adequate blood supply is dependent on volunteer donors.
- COVID-19 has put a significant strain on the availability of blood resources.
- Strategies like Patient Blood Management help to optimize transfusion practice.
- Consideration of the whole clinical picture is important in transfusion related decisions.
- Frequent communication with blood banks and implementation of blood use metrics are helpful to maintain awareness of current supply.
- Education should involve the entire interprofessional team to ensure implementation of PBM strategies at all levels of care.

1. Optimizing red blood cell mass.
2. Minimizing erythrocyte loss.
3. Management of anemia.¹⁰

A fourth tenet is described in some publications as follows:

4. Patient-centered decision-making to incorporate the patient's needs and concerns.⁷

PBM supports the optimization of transfusion practice, considering the comprehensive clinical picture of the patient to ensure appropriate use of a limited resource. Various professional societies have issued blood strategies through the lens of Patient Blood Management.

- The Association for the Advancement of Blood & Biotherapies (AABB) is a leader in standards for transfusion medicine and offers a two-year accreditation certification with The Joint Commission for Patient Blood Management. The AABB offers various PBM toolkits and standards for hospitals to evaluate their own readiness and implement PBM programs.¹¹ Their 2016 *Clinical Practice Guidelines for Red Blood Cell Transfusion and Storage* indicate the importance of considering a patient's hemoglobin level and clinical context with regard to patient-centered transfusion decisions.¹²
- The American Society of Anesthesiologists (ASA) describes PBM during a pandemic which includes:
1. Good communication with hospital blood banks regarding awareness of stock; 2. Use of a PBM model of care; 3. Active promotion of blood donation.¹³
- The American College of Surgeons (ACS) described the role of the surgeon for blood management in a Clinical Update Brief. Steps include: adhering to PBM strategies during preoperative planning, tracking blood use metrics, using cell savers as indicated, and minimizing surgical blood loss through optimal hemostasis.¹⁰
- The Society of Thoracic Surgeons' (STS) 2021 *Update to the Clinical Practice Guidelines on Patient Blood Management*, specifies the essential use of an evidence-based, interprofessional blood conservation strategy that includes the use of PBM strategies.⁷
- The World Health Organization (WHO) offers guidance for maintaining an adequate blood supply, including continued awareness of blood stocks, communication with public health officials, blood drives, and PBM through the use of blood products only when clinically indicated.¹⁴
- Although not specific to the pandemic, the American Board of Internal Medicine's (ABIM) initiative *Choosing Wisely* included recommendations from the AABB related to management of blood transfusions. Steps included: 1. Transfusing only when necessary with implementation of a restrictive hemoglobin threshold as clinically indicated; 2. Avoiding transfusion for iron deficiency in the absence of hemodynamic instability; 3. Avoiding transfusion for warfarin reversal; 4. Avoidance of serial blood counts on stable patients; 5. Restrict transfusion of O negative blood to certain situations.¹⁵
- The American Hospital Association (AHA) offers a number of resources in association with the AABB to provide AHA members with information related to optimizing available resources and implementing PBM. Highlights include a blood management toolkit, which includes a PBM readiness assessment and various PBM resources, PBM infographics, and additional links to *Choosing Wisely*, the Clinical Update Brief from ACS, and other linked resources.¹⁶

Additional Considerations

While the large majority of blood transfusions take place in the hospital (inpatient medicine 38%; critical care 17%; outpatient and non-acute inpatient settings 15%; surgery 13% and the emergency department 12%), other settings can include dialysis centers, physician offices and skilled nursing facilities.³ All facilities utilizing blood product must be equipped to employ blood conservation strategies to ensure they are meeting patient need within the limits of the available supply.³ Hospitals and other healthcare centers can utilize the references provided to assess and implement strategies to support blood management. Additional considerations according to the literature may include:

- Consider the larger clinical picture when making transfusion decisions as opposed to a standard hemoglobin trigger.¹
- Simple strategies like ordering a single unit and reassessing need as opposed to first ordering two units can be effective in managing supply.¹
- Maintain communication with internal blood banks and consider implementing a system to track blood use metrics to constantly assess stock.¹³
- In the surgical space, PBM strategies can take place in the pre-, intra- and post-operative periods. This may include the pre-operative management of anemia, intraoperative cell salvage, antifibrinolytic medications, and fluid management as examples, and frequent post-operative assessment.¹³
- Education of the entire interprofessional team to ensure implementation of PBM strategies at all levels of care.⁵

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