Blood Inventory Management Best Practices for Hospital Transfusion Services

Inspiring and facilitating best transfusion practice in Ontario.

BLOOD INVENTORY MANAGEMENT BEST PRACTICE FOR HOSPITAL TRANSFUSION SERVICES

Blood and blood products are necessary for the treatment of many different types of patients; however these products are in limited supply. Although considerable efforts are put in place to ensure an adequate and sustainable supply, external factors such as disasters, pandemics, decreased donations or manufacturing interruptions have the potential to impact supply or demand, which can affect the availability of these products.

Good inventory management principles are essential in ensuring that the supply of blood components and products will be sufficient to meet the transfusion needs of patients while minimizing wastage. Listed below are 10 key strategies gathered from several referenced sources that are considered relevant to implementing and maintaining an effective blood inventory management system. Implementing these strategies can maximize utilization, minimize wastage (Celebrating Success) and help ensure safe and equitable access to all products for all patients.

NOTE: Implementation of some of the following may require prior consultation with the transfusion service Medical Director and/or hospital transfusion committee.

ONE	**Determine target inventory levels** and maintain these levels by using an 'order up to' policy. Rule of thumb is to maintain a stock inventory equivalent to approximately 10-11 days of your average daily use of red blood cells (RBCs) and 2 days of your average daily use of platelets (based on averaging your annual use divided by 365). Inventory levels should be reviewed annually and if there are any changes to blood utilization practices at your hospital, the target numbers should be revised as needed. Additional considerations: • A review of the pre-admission and next day's surgical schedule may also improve management of inventory by ensuring sufficient blood group specific units are available. • If you are located in an area that experiences significant seasonal fluctuations in use, inventory levels should be adjusted up or down as indicated by review of historical utilization patterns. • Inventory levels for other components/products should be reviewed and a target level defined • Target levels should be defined as part of your hospital emergency blood management plan[1] • If you report your disposition to CBS by ABO/Rh group, review of your Inventory Index on the Canadian Blood Services (CBS) web based reporting system can help you determine optimum inventory levels by ABORh based on your actual use	**Utilization Data Tools** • Calculating your blood inventory • Provincial Blood Utilization Graphs • PLT Inventory Calculator • RBC Inventory Calculator
TWO	**Arrange your inventory** to ensure the oldest units or vials (shortest remaining shelf life) are at the front of the storage equipment. If possible alert staff to units that will be outdating soon (e.g. RBC in the next 5 days, platelets same day, plasma protein products and frozen products in next three months) to help ensure they will be used first. Use visual aids such as an expiring units list posted in a visible location or place distinctive tags on the units. Ensure that a strict '**oldest unit first out**' policy is adhered to.[2] Remember to include reserved units or phenotyped units (which may be kept in a separate area) in this process by moving them into useable inventory before they reach the end of their shelf life.	**ATTENTION:** Product at the front of this shelf is soon to expire. Please use first!

THREE	**Perform an available inventory count** prior to placing an order with Canadian Blood Services (CBS). Ensure that the inventory count includes crossmatched stock, stock that is held in remote locations (Emergency Room or Operating Room) as well as units that are irradiated or phenotyped. Include a regular verification between your computer inventory count and the physical count. Reporting inventory on CBS web based reporting on a regular basis can help provide helpful information to the blood supplier. This is especially important during times of shortage.	
FOUR	**Implement policies to address the management of group O Rh negative RBC** to preserve these units that are often in scarce supply. These policies should include reserving them for female patients of child bearing potential (less than 45 years of age).[3] The use of O Rh negative RBC for non O Rh negative recipients should be minimized wherever possible. This practice should be monitored and reviewed regularly to ensure inventory levels are kept at optimum levels to avoid wastage and to ensure there is a sufficient supply for those patients who really need them. When requesting phenotyped units from Canadian Blood Services, request group specific. If your site has the capability, and time allows, attempt to find units of the phenotype required from group specific stock within your own inventory. If you are frequently issuing O Rh negative units to non O Rh negative recipients in order to avoid outdating, consider reducing your target inventory levels for O Rh negative.	**O Neg Utilization Tools** • Ontario O Rh Negative Audit 2015 Report • Age of Child-Bearing Potential in Ontario Women in 2016 • Maternal Age at Delivery Ontario LHINs Five Years of Data • CBS CL#2014-14
FIVE	**Limit the number of units that are held in 'reserve' inventory.** Use of electronic or immediate spin crossmatch techniques can aid in reducing the length of time units remain 'on hold' for a patient.[2] Regular review of any reserved units and returning them to available inventory as soon as possible (within 24 hours)[4] will also aid in reducing the number of units being held. For surgical patients, a review of the patient's blood use during surgery, the most recent post-operative hemoglobin result and the presence of any clinically significant alloantibodies may assist with the decision.	
SIX	**Establish a maximum surgical blood order schedule (MSBOS)** based on a hospital's past RBC use to serve as a guideline for future surgical and other treatment RBC requests. A MSBOS can guide clinicians in their ordering practice and avoid 'just in case' ordering.[2] Note: Endorsement by a hospital's Medical Advisory Committee, communication of the MSBOS guidelines to your hospital's physicians and surgeons, and regular review of the MSBOS guidelines are critical to the success of a MSBOS. Crossmatch requests that exceed the MSBOS guidelines may require consultation with the ordering physician. An MSBOS may not be required in hospitals that have fully implemented an electronic crossmatch. The use of pre-printed order sets can also improve ordering practices.	**MSBOS Tools** • MSBOS Development Tool • Order Set for Transfusion Example • MSBOS Policy and Procedure Example(SHSC)

SEVEN	**Implement redistribution to minimize outdates.** Smaller hospitals should consider an arrangement to transfer "soon to outdate" blood components and products to a nearby larger hospital with a higher demand. Packing procedures must ensure the blood components/ products are maintained at the appropriate conditions during transport using a validated shipping container and that the appropriate documentation accompanies the transfer.	**Redistribution Tools** • Redistribution Toolkit
EIGHT	**Train your staff.** Studies show that staff training and awareness can contribute to improved inventory management practices.[2,3] Providing clear standard operating procedures and ensuring staff understand the importance and value of the blood components and products can be key to minimizing wastage. Having experienced staff performing the inventory count and ordering can minimize variability in practice which will contribute to better overall inventory management and control. Establishing reorder levels with consideration of time until next routine delivery, can avoid unnecessary STAT or ASAP delivery for stock replenishment.	**Training Tools** • Transporting Blood Products Internally
NINE	**Collaborate with clinical staff.** This can make a significant difference in improving ordering practices.[5] Prospectively screening orders against locally developed/endorsed evidence based guidelines, audits, and consultation with a transfusion medicine physician can help reduce unnecessary or inappropriate ordering of blood. Increasing awareness of the value of blood components and products, the timelines for their availability and the risks involved with transfusion can also improve practice and minimize wastage.	**Audit Tools** • Bloody Easy Audits **Handbooks** • Bloody Easy 4 • Bloody Easy Coagulation-Simplified • Bloody Easy Blood Administration ver 2 • Transfusion Committee Handbook **Guidelines/Resources** • Top 10 Hints on Safe Transfusion • Guidelines/Recommendations • NAC Guidelines
TEN	**Avoid large numbers of units expiring on the same day.** When replacing stock orders for one blood type, ask CBS to send units with a mixture of expiry dates. Trying to manage large numbers of components all expiring on the same day can be challenging and may lead to higher wastage due to outdating.	

REFERENCES

1. Ontario Contingency Plan for Management of Blood Shortages and Toolkit. October 2016. Ministry of Health and Long-Term Care. http://transfusionontario.org/en/download/ontario-contingency-plan-for-management-of-blood-shortages-version-3/
2. Stanger SHW et al Transfusion Medicine Reviews, Vol 26 (2); April 2012: pp153-163.
3. Bhella S et al. Obstetric and trauma database review at a single institution finds the optimal maternal age restriction for the transfusion of O – blood to women involved in trauma to be 45 years. Transfusion (Letters to the editor) 2012;52:2488-2489.
   Chapman JF. Unlocking the essentials of effective blood inventory management. Transfusion 2007;47:190S-196S.
4. Managing Blood and Blood Product Inventory – Guidelines for Australian Health Providers. February 2014. National Blood Authority Australia. www.blood.gov.au

SUGGESTED READING

1. Circular of Information for the Use of Human Blood and Blood Components, Canadian Blood Services, latest edition. https://www.blood.ca/en/hospitals/circular-information
2. Callum JL et al Bloody Easy 4 Blood Transfusions, Blood Alternatives and Transfusion Reactions. A guide to transfusion medicine fourth edition. ORBCoN 2016.
3. Champion M. Delicate balance; hospital blood inventory management. AABB News, March/April 2004, 34-5.
4. Chapman JF, Hyam C, Hick R. Blood inventory management. Vox Sang 2004;87 (Suppl 2):143-5.

For more information on these and other useful resources please visit:
http://transfusionontario.org/en/documents/?cat=inventory-management-toolkits

ACKNOWLEDGEMENTS

This document was developed in collaboration with the Ontario Blood Collaborative which is made up of representatives from the Ontario Regional Blood Coordinating Network (ORBCoN), Canadian Blood Services Hospital Liaison Specialists and the Ontario Ministry of Health and Long-Term Care.