

# Blood Inventory Management Best Practices for Hospital Transfusion Services



Ontario Regional Blood Coordinating Network

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 a limited resource. 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 some 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 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.**

**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 6-9 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 at least 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, or are in a remote location, 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.<sup>1</sup>
- If you report your disposition to Canadian Blood Services (CBS) by ABO/Rh group, review of your Inventory Index on the CBS web-based reporting system can help you determine optimum inventory levels by ABO/Rh based on your actual use.

### Consideration for Platelets

Unless agreed with your blood supplier as applicable, try not to use standing orders for platelets but order as required to keep minimal stock or if you do not stock platelets, order on demand as needed.

### Considerations for Plasma Protein Products (PPP)

If demand for a specific PPP is low consider:

- Ordering on demand from CBS (based upon clinical urgency) or make arrangements with a hospital in close proximity to supply the product.
- Within hospital corporations (multiple sites), stock lower demand PPPs at one site and distribute to other sites as required.

### Utilization Data Tools

- [Calculating your blood inventory](#)
- [Provincial Blood Utilization Graphs](#)
- [Inventory Calculators](#)



<p><b>Arrange your inventory</b> 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 to six 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 '<b>oldest unit first out</b>' policy is adhered to.<sup>2</sup> 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.</p>	<p style="text-align: center;"><b>ATTENTION:</b> Product at the front of this shelf is soon to expire. Please use first!</p>
<p><b>Perform an available inventory count</b> prior to placing an order with CBS ensure that the inventory count includes crossmatched stock, stock that is held in remote locations (Emergency Department 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 system on a regular basis can help provide helpful information to the blood supplier. This is especially important during times of shortage.</p>	
<p><b>Implement policies to address the management of group O Rh negative RBCs</b> 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).<sup>3</sup> The use of O Rh negative RBCs 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 CBS, request group specific. If your site has the capability, and time allows, consider finding units of the phenotype required from group specific stock within your own inventory if CBS is unable to provide. 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. If you are already stocking a minimum number of O Rh negative RBCs (2-4), you should be redistributing your near to expiry (7-10 days of shelf life remaining) units to a larger nearby site.</p> <p>Note: if your hospital reports the number of group O Rh negative units transfused to non-O Rh negative recipients, this information is available for you to monitor from the CBS web-based disposition reporting system.</p>	<p><b>O Neg Utilization Tools</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Ontario O Rh Negative Audit 2015 Report</a></li> <li>• <a href="#">Age of Child-Bearing Potential in Ontario Women in 2018</a></li> <li>• <a href="#">Maternal Age at Delivery Ontario LHINs Five Years of Data</a></li> <li>• <a href="#">CBS CL#2014-14</a></li> </ul>
<p><b>Implement policies to address the management of AB Frozen plasma</b> Policies to ensure appropriate management of AB Frozen plasma should be developed to minimize use of AB Frozen plasma. Monitor the use of AB Frozen plasma for non-AB patients to ensure use is appropriate. Where appropriate and based upon demand, stock different ABO groups of plasma.</p>	



<p><b>Limit the number of units that are held in ‘reserve’ inventory.</b> Use of electronic or immediate spin crossmatch techniques can aid in reducing the length of time units remain ‘on hold’ for a patient.<sup>2</sup> Regular review of any reserved units and returning them to available inventory as soon as possible (within 24 hours) 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.</p> <ul style="list-style-type: none"> <li>• <b>Frozen Plasma-</b> Only thaw plasma upon receiving an order. Order confirmation should be conducted to ensure the plasma is going to be transfused and that it is not just to have on hold for a patient.</li> </ul>	
<p><b>Establish a maximum surgical blood order schedule (MSBOS)</b> 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.<sup>2</sup></p> <p>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.</p> <p>Crossmatch requests that exceed the MSBOS guidelines may require consultation with the ordering physician. A 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.<sup>4</sup></p>	<p><b>MSBOS Tools</b></p> <ul style="list-style-type: none"> <li>• <a href="#">MSBOS Development Tool</a></li> <li>• <a href="#">Order Set for Transfusion</a></li> </ul>
<p><b>Implement redistribution to minimize outdates.</b> 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 component(s)/ product(s) are maintained at the appropriate conditions during transport using a validated shipping container and that the appropriate documentation accompanies the transfer.</p> <p>Monitor the number and group of units being redistributed. If the number is increasing, this can be an indicator that inventory levels are too high in relation to your utilization.</p> <p><b>Platelets-</b> If your hospital is not in close proximity to CBS, establish arrangements with a hospital in close proximity to obtain platelets in times of urgency or as needed.</p> <p><b>Frozen Plasma-</b> Consider redistributing frozen plasma/thawed frozen plasma to another hospital to reduce wastage (if frozen, redistribute with a minimum of 3 months shelf life remaining).</p> <p><b>Plasma Protein Products (PPP)-</b> Whenever possible, redistribute PPPs that are soon to expire (report when 6 months remain on shelf life) or you know you will not use with other hospitals. Participate in the ORBCoN/FCRP Redistribution Program.</p>	<p><b>Redistribution Tools</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Ontario Redistribution Program</a></li> </ul>



<p><b>Train your staff.</b> Studies show that staff training, and awareness can contribute to improved inventory management practices.<sup>2</sup> 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.</p>	<p><b>Training Tools</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Transporting Blood Products Internally</a></li> </ul>
<p><b>Collaborate with clinical staff.</b> This can make a significant difference in improving ordering practices.<sup>5</sup> 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.</p>	<p><b>Audit Tools</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Blood Utilization Audits</a></li> </ul> <p><b>Handbooks</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Bloody Easy for Healthcare Professionals</a></li> <li>• <a href="#">Transfusion Committee Handbook</a></li> </ul> <p><b>Guidelines/Resources</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Guidelines and Recommendations</a></li> <li>• <a href="#">Ontario Transfusion Quality Improvement Plan</a></li> </ul>
<p><b>Avoid large numbers of units expiring on the same day.</b> When replacing stock orders for RBC, 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.</p>	



## REFERENCES

1. Ontario Contingency Plan for Management of Blood Shortages and Toolkit. Ver 3 October 2016. Ministry of Health.
2. Platelet utilization and inventory management best practices. Canadian Blood Services. July 12, 2016. <https://professionaleducation.blood.ca/en/transfusion/bonnes-pratiques/bonnes-pratiques-dutilisation-des-produits-sanguins/platelethttps://professionale>.
3. Stanger SHW et al Transfusion Medicine Reviews, Vol 26 (2); April 2012: pp153-163.
4. Collins A, Lauzon D, Thompson T. Optimizing the use of type O negative red cells: Defining the age of child-bearing potential in Ontario hospitals. Ontario Regional Blood Coordinating Network. CSTM 2015 Abstract poster presentation.
5. Quang, J.K. et al. *Variations in red blood cell and frozen plasma utilization rates across 62 Ontario community hospitals*. Transfusion doi:10.1111/trf.15070. 29 November 2018.
6. Managing Blood and Blood Product Inventory – Guidelines for Australian Health Providers. November 2019. National Blood Authority Australia. [www.blood.gov.au](http://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. Chapman JF, Hyam C, Hick R. Blood inventory management. *Vox Sang* 2004;87 (Suppl 2):143-5.

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