Blood Component Inventory
How much is enough? How much is too much?

Rationale

Ideal or optimum inventory levels for blood components need to be defined to maximize management of your inventory. An ideal balanced approach to Inventory Management supports patient safety (adequate supply) foremost, while recognizing the big picture means adequate supply for all hospitals by avoiding overstocking or stockpiling practices.

Inventory levels should be sufficient to ensure blood components are available, when required, to maintain expected patient daily needs while not being excessive resulting in high rates of discard due to outdating. Blood components should be considered a valuable and scarce resource and efforts should be made to avoid discarding them unnecessarily.

Transfusion services should establish both minimum and ideal inventory levels. Inventory levels should be evaluated periodically and adjusted if needed. Once inventory levels are determined, it is important to review, at least annually, to ensure they are still accurate. Any change within the hospital that may affect the demand for blood products, such as increases or decreases in services or significant changes to surgical or clinical staff, warrant a review of inventory levels.

Important indicators for monitoring whether or not inventory levels are sufficient are:

- **Rate of outdating product.** If the outdating rate is too high, it may be possible that inventory levels are set too high. If the outdating rate is too low, there is a risk that insufficient inventory is on hand and this may compromise patient care.
- **Number of STAT requests for blood components from the blood supplier.** If there are frequent needs for urgent requests (outside of routine delivery) from the blood supplier, this may indicate that insufficient inventory is being held by the Transfusion Medicine Service.

Suggested Methods for Determining Optimum Inventory Levels

There are several methods to use to determine the desired red cell inventory levels to be stocked at your hospital. These include:

1. **Weekly usage** record blood use weekly by ABO group and Rh type for 6 months. Discard the highest week and then calculate the average weekly usage. This will give you the levels of red cell units to stock, by ABO and Rh for an ideal inventory level.

2. **Daily usage** record blood use each day by ABO group and Rh type over several months. Calculate the average. This will provide an estimated average of your needs per day. Ideal inventory to have on hand is recommended to be 4 x your average estimated daily use. This can be increased to 5, 6 or 73 days if your hospital is at a greater distance from the blood supplier, or if transportation for delivery of products is not dependable or infrequent.
3. Inventory Calculator for Red Cells  ORBCoN has developed a tool for hospitals to use to perform a very quick and rough estimate of what their ideal inventory may be. By entering your annual number of red cell units transfused (for the most current year), an estimate of average daily use will be calculated by the formula locked in to the table.

Once the daily estimate is calculated, the table below will populate with respect to ABO group and Rh type. These numbers are based on current population probabilities for ABO and Rh.

The table will provide a display of calculated 1 day, 4 day and 6 day inventory levels. It is necessary to review these numbers and then determine what you should stock as a minimum and maximum inventory for each group. For example, if a 4 day inventory of Group O Rh Positive red cells is calculated as 24.6, the suggested inventory level to enter in your maximum for that blood group / Rh would be about 25 units.

If the table calculated a 4 day inventory of less than 2 units, it is likely that this group and Rh is not required to be held at the hospital on a routine basis. It is good practice, however, to order group and Rh specific for a patient if time allows rather than issuing non group and Rh specific.

Note: if the estimated inventory level for your site is small, you should ensure your inventory is sufficient to provide basic care for patients. In other words, generally, minimum on hand red cell stock should not be lower than 4 group O Rh Positive and 2 group O Rh Negative.

Inventory Calculator for Red Cells.xls

4. Inventory Calculator for Platelets  ORBCoN has also developed a tool to calculate the estimate of the number of platelets used, on average, daily. This is helpful for sites that find it useful to hold platelet inventory on site and estimate the number of platelet doses to keep on hand. Platelet usage can vary quite a bit, therefore, this tool is only constructed to provide a starting point or to validate existing stock inventory levels.

It is always important to consider outdating of platelets when they are held in stock. Excess rates of outdating may result in shortages for patients at other hospitals. Therefore, if platelets are held as stock, communication with other nearby hospitals around redistributing or sharing the product may be helpful in reducing this possibility.

Inventory Calculator for Platelets.xls

2. Ibid: p90
3. Ibid: p90