HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER
MATERNITY AND CHILDREN HOSPITAL

Department:	Laboratory and Blood Bank		
Document:	Internal Policy and Procedure		
Title:	Blood Utilization Monitoring, Auditing and Management		
Applies To:	All Blood Bank Staff		
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1. PURPOSE:

1.1 To establish system and set responsibilities for developing a toolkit for effective inventory Management and Utilization of blood and blood products aiming to:
- 1.1.1 Maximize utilization.
- 1.1.2 Minimize wastage.
- 1.1.3 Ensure effective use of limited blood resources.
- 1.1.4 Not compromise patient safety.
- 1.1.5 Provide equitable access to all products for all patients.

1.2 The purpose of a utilization review is to improve the processes involved in the ordering, distribution, handling, dispensing and administration of blood components and to monitor the effects of transfusion practices.

2. DEFINITONS:

2.1 **Crossmatch-to-transfusion (C/T) ratio:** is one of quality indicators of blood utilization. It is calculated by dividing the number of crossmatched units by the number of transfused units. It should be less than 2.0.

2.2 **Monitoring:** Monitoring is an on-going process usually directed by management to ensure processes are working as intended. Monitoring is an effective detective control within a process.

2.3 **Auditing:** Auditing is a formal, systematic and disciplined approach designed to evaluate and improve the effectiveness of processes and related controls. Monitoring mechanisms can be driven and/or validated by audit tests and results.

2.4 **Conformance:** Fulfilment of requirements.

2.5 **Non-conformance:** Failure to meet requirements.

2.6 **Corrective Action:** An activity performed to eliminate the cause of an existing non-conformance, or other undesirable situation in order to prevent recurrence.

2.7 **Preventive Action:** An action taken to reduce the potential for non-conformances or other undesirable situations.

3. POLICY:

3.1 Transfusion decisions should be based on clinical assessment of the patient and laboratory test results

3.2 There are no absolute indications and few contraindications to blood transfusion. The transfusion guidelines are intended as an aid in decision-making .

3.3 An effective hospital blood inventory management system can reduce the inventory that a hospital needs to keep on hand as well as contribute to lower blood outdate rates.

3.4 The blood bank selects and monitors key quality indicators that are measured monthly.

3.5 Blood Bank takes preventive and corrective actions in cases of any deviation or non-conformance.

3.6 Blood Bank reports the result of measurements and any action taken to lab Director to be directed to quality department.

3.7 Blood bank performs regular audits on blood transfusion by monitoring blood component utilization, instances of inappropriate use and corrective actions are taken.

3.8 Audit criteria should be produced in conjunction with blood utilization committee and medical specialties that use significant amounts of blood components.

3.9 There are three types of auditing; prospective, concurrent and retrospective:

3.9.1 Prospective audits will delay some transfusions that fail to meet audit criteria so emergency requests are excluded from prospective audits.

3.9.2 Because the concurrent audit will not delay the transfusion, the audit can include urgent transfusions.

3.9.3 Retrospective audits of blood utilization are commonly performed by blood bank personnel and reviewed by the Blood Utilization Committee.

3.9.4 The interaction with the requesting physician requires the involvement of a blood bank physician or blood bank supervisor/specialist/technician (as applicable).

3.10 Blood transfusion practices are reviewed by blood and blood products utilization committee (BUC).

3.11 Utilization reviews are generally focused on procedures and patient care units with high use, patients requiring special products, or transfusion situations at increased risk of adverse outcomes. The review criteria are approved by the Committee.

4. PROCEDURE:

4.1 Blood inventory management:

4.1.1 Effective inventory Management includes the safe and appropriate handling of blood products from receipt in the blood bank to final disposition and is directly dependent upon the ordering practices of physicians and upon technicians/specialists.

4.1.2 Whenever possible platelet concentrates should be prepared in addition to PRBCs & FFP. Whole blood is a waste of resources.

4.1.3 Determine the desired red cell inventory levels that meet the needs of your patient population. Refer to "Stock Monitoring Of Blood Component And Coping With Extreme Shortage Of Blood Supply" policy (LB-IPP-218).

4.1.4 Rotate your inventory ensuring the shortest outdate units in front of the refrigerator/freezer .

4.1.5 Whenever possible, provide ABO-identical red blood cells and plasma products to patients for transfusion. This will conserve group O red blood cells and AB plasma products for emergency situations.

4.1.6 To minimize RBC outdates, consider transfusing "soon to outdate" (<5 days) Rh Negative RBCs to Rh Positive patients.

4.1.7 To minimize RBC outdates, blood bank might consider an arrangement to transfer "soon to outdate "RBCs to other hospital with a higher demand for RBCs. Shipping procedures must ensure the RBCs are maintained at the appropriate conditions during transport . Refer to "Blood/Blood Component Storage, Transport, And Shipping" policy (LB-IPP-202).

4.1.8 Establish a maximum surgical blood order schedule (MSBOS). A MSBOS serves as a guideline for future surgical blood requests.Refer to "Ordering Of Blood/Blood Products And Tests" policy.

4.1.9 Consider a "Type and Screen" policy for patients where red blood cells are ordered but are unlikely to be required for transfusion. This will minimize the red blood cell inventory that is crossmatched/labelled for patients and unavailable for use by other patients.

4.1.10 Consider a cancellation policy that returns red blood cells to an "available" inventory as soon as the potential need for a transfusion has passed. Refer to "Ordering Of Blood/Blood Products And Tests" policy.

4.1.11 Monitor crossmatch-to-transfusion (C/T) ratios. A target C/T ratio of less than 2 is considered acceptable.

4.2 Blood utilization monitoring:

4.2.1 The primary motivation for monitoring blood utilization is to identify instances when blood product utilization is less than optimal. So, interventions can then be implemented to change transfusion practice.

4.2.2 Improving or ensuring optimal use of blood transfusions is important to minimize infectious and non-infectious complications of blood transfusion as well as the blood components are a

scarce and expensive resource.

4.2.3 Quality indicators required for monitoring:

4.2.3.1 Patient identification errors (discrepancy between the current result and history or between cross match and grouping samples).

4.2.3.2 Rejected specimens.

4.2.3.3 Turnaround Time of STAT and urgent requests.

4.2.3.4 Wasted units (low or high volume, open system, reconstituted whole blood...etc.).

4.2.3.5 Usage and discards (expired units).

4.2.3.6 Adverse donor reactions.

4.2.3.7 Donor satisfaction.

4.2.3.8 Nonconforming blood and blood components.

4.2.3.9 Ability to meet the patient's needs (stock management/ voluntary donors).

4.2.3.10 Blood ordering practices (cross matched/transfused ratio).

4.2.4 Objectives of indicators monitoring:

4.2.4.1 Maintain patient identification errors (discrepancy between the current result and history or between cross match and grouping samples) at 0.

4.2.4.2 Maintain the percentage of rejected samples to less than 5 %.

4.2.4.3 Maintain the percentage of delayed crossmatch of STAT requests to less than 1 %.

4.2.4.4 Maintain the non-occurrence of delayed crossmatch of emergency requests.

4.2.4.5 Maintain the percentage of RBCs wastage (wastage monitoring; not due to serology results nor expired) to less than 2 %

4.2.4.6 Maintain the percentage of expired RBCs bags to less than 10 %.

4.2.4.7 Maintain the percentage of donor adverse events to less than 5 %.

4.2.4.8 Maintain the percentage of donor dissatisfaction to less than 20 %.

4.2.4.9 Maintain the non-occurrence of release of nonconforming blood and blood components.

4.2.4.10 Maintain the times of decreased RBCs stock per month at < 2 times.

4.2.4.11 Maintain the percentage of voluntary donor at > 50 %.

4.2.4.12 The ratio of the number of cross match requests to the number of *the* transfused units (C/T ratio) must not exceed 2 to 1.

4.2.4.13 Maintain the non-occurrence of blood component release error.

4.2.4.14 Maintain the percentage of acute non hemolytic transfusion reaction at < 4%.

4.2.5 Who measures the indicators:

4.2.5.1 Supervisor of Blood bank technicians or his deputy.

4.2.6 Frequency of measurement:

4.2.6.1 Once every month.

4.2.7 Methods of measurement:

4.2.7.1 Number of discrepancies between the current result and history or between cross match and grouping samples.

4.2.7.2 Number of rejected samples / Total number of monthly received samples X 100.

4.2.7.3 Number of delayed cross match of stat requests / Total Number of stat requests X 100.

4.2.7.4 Number of delayed cross match of emergency requests.

4.2.7.5 Number of wasted RBCs bags / Total number of blood donors every month X 100.

4.2.7.6 Number of expired RBCs bags / Total number of TTD free donors every month X 100.

4.2.7.7 Number of blood donor adverse event / Total number of monthly donor X 100.

4.2.7.8 Number of dissatisfied blood donor / Total number of surveyed donor X 100.

4.2.7.9 Number of released Nonconforming blood and blood components.

4.2.7.10 The times of decreased RBCs stock per month.

4.2.7.11 The number of voluntary donor / Total number of monthly donors X 100.

4.2.7.12 The number of cross match units / the number of the transfused units.

4.2.7.13 The number of error in blood component release.

4.2.7.14 The number of acute non hemolytic transfusion reaction / Total number of released bags X 100.

4.2.8 Process improvement through corrective and preventive action:

4.2.8.1 Blood bank supervisor records results in 'Monitoring of Quality Indicator form' .

4.2.8.2 In any deviation from the objectives, the Lab and blood bank director and supervisor of BB technicians helped by blood bank physician search for the cause(s) and start improvement.

4.2.8.3 The blood bank has corrective action of deviations, non-conformances, and complaints relating to blood and components which includes the following elements:

4.2.8.3.1 Documentation- Description of the event.

4.2.8.3.2 Investigation of the cause.

4.2.8.3.3 Determination of the corrective action.

4.2.8.3.4 Evaluation to ensure that corrective action is taken and that it is effective.

4.2.8.4 The blood bank has preventive action that includes the following elements:

4.2.8.4.1 Review of information including quality control records and complaints to detect and analyse potential causes of non-conformances.

4.2.8.4.2 Determination of steps needed to respond to potential problems requiring preventive action.

4.2.8.4.3 Initiation of preventive action and application of controls to monitor effectiveness.

4.2.9 Reporting of deviations, non-conformances, and adverse events:

4.2.9.1 All quality indicators are reported monthly to lab Director to be directed to quality department.

4.2.9.2 Some indicators are reported to blood utilization committee like transfusion reaction, rejected samples, ordering practices and release of nonconforming blood and blood components.

4.3 Blood utilization auditing:

4.3.1 Introduction:

4.3.1.1 Auditing the use of blood transfusions is a required and necessary function for all hospital transfusion services.

4.3.1.2 It requires hospitals to collect data to monitor the performance of processes that involve risks or that may result in sentinel events, which includes the use of blood and blood components.

4.3.1.3 It monitors and addresses the transfusion practices for all categories of blood and components including "appropriateness of use."

4.3.1.4 By monitoring blood component utilization, instances of inappropriate use can be identified and corrective actions can be taken.

4.3.1.5 Regular audits are an essential activity for all transfusion services.

4.3.1.6 Audits of blood component use have concentrated on controlling or reducing the total number of blood components transfused, or individual "over-transfusion," or both.

4.3.1.7 Different interventions have been used to change the transfusion practice. After an intervention, ongoing monitoring allows for an assessment of the effectiveness of the interventions and an assessment of the need for ongoing or additional intervention.

4.3.1.8 There are three types of auditing; prospective, concurrent, and retrospective.

4.3.2 Prospective ("real-time") audit:

4.3.2.1 Description:

4.3.2.1.1 In a prospective audit, the transfusion requests are reviewed in "real-time" (i.e. review of individual transfusion requests before issuing of blood component).

4.3.2.1.2 A manual review by technicians can be undertaken and can compare the request to local transfusion audit criteria.

4.3.2.1.3 Audit criteria include:

4.3.2.1.3.1 Clinical data e.g. hematocrit (or Hemoglobin) and indication for red cell transfusion.

4.3.2.1.3.2 Ordering of blood unit.

4.3.2.1.4 Ideally, this information is obtained from the clinical staff as a part of the transfusion request process.

4.3.2.1.5 Prospective audits will delay some transfusions that fail to meet audit criteria for appropriateness. Therefore, a mechanism must be in place to ensure that neither emergency nor urgent transfusions are unduly delayed.

4.3.2.1.6 As a result, specific clinical areas such as emergency departments and operating suites, are commonly excluded from prospective transfusion audits.

4.3.2.1.7 Prospective audits also have the potential to create tension among ordering physicians when a transfusion request is questioned. As a result, the interaction with the requesting physician often requires the involvement of a blood bank physician or a blood bank supervisor/specialist.

4.3.2.1.8 To increase acceptance of transfusion audits, audit criteria should be produced in conjunction with blood utilization committees and medical specialties that use significant amounts of blood.

4.3.2.2 Procedure:

4.3.2.2.1 Transfusion requests are screened by blood bank staff to identify "inappropriate" transfusion requests. Bypass the review if blood is required urgently.

4.3.2.2.2 For all "inappropriate" transfusion requests, the requesting physician is contacted by the blood bank, as follows:

4.3.2.2.2.1 Contact the requesting physician is usually made by the blood bank physician or the blood bank supervisor/specialist.

4.3.2.2.2.2 Transfusions that do not meet the audit criteria are flagged and, before issuing the blood component, the requesting physician is contacted by the blood bank service to discuss changing the transfusion request.

4.3.2.2.2.3 The decision to change the transfusion request is made in conjunction with the ordering physician.

4.3.2.3 The potential benefits of a prospective audit are:

4.3.2.3.1 The ability to intervene directly and to change a specific transfusion request before the blood is issued.

4.3.2.3.2 It will also result in long-term changes in the transfusion practice of the ordering physician.

4.3.2.3.3 Reducing the proportion of patients transfused, the number of units transfused per patient, and the number of inappropriate transfusions.

4.3.3 Concurrent audit:

4.3.3.1 A concurrent audit is a review of individual transfusion requests that is performed very shortly after the event (usually within 24 hours) following the transfusion episode.

4.3.3.2 More remote retrospective audits allow the review of aggregate transfusion data, which can then be analysed in several ways.

4.3.3.3 The audit involves processes similar to those in the prospective audit. However, because it is a post-transfusion review, the individual transfusion event cannot be altered. Therefore, the concurrent audit seeks only to alter future transfusion practices.

4.3.3.4 Nonetheless, effective follow-up with the requesting physician occurs while the transfusion event remains fresh in his or her memory. It is hoped that this immediate contact will improve the chances of changing the physician's future transfusion practices.

4.3.3.5 Requests that do not meet the audit criteria are flagged for subsequent review by a

blood bank supervisor or blood bank physician.

4.3.3.6 When performing the review, the blood bank physician may have access to additional laboratory results that will help to determine appropriateness.

4.3.3.7 Because the concurrent audit will not delay the transfusion, the audit can include urgent transfusions and can use stricter criteria for appropriateness as compared to a prospective audit.

4.3.3.8 The less immediate nature of the request and the ability to use written communication may reduce any negative response on the part of the ordering physician and may actually result in a more meaningful dialogue.

4.3.4 Retrospective audit:

4.3.4.1 Retrospective audits of blood utilization are commonly performed and subsequently reviewed by blood bank personnel, by the Blood utilization committee (BUC), or by both.

4.3.4.2 The frequency of the audit is variable, but a quarterly review is common. Review periods should not typically extend beyond 6 months.

4.3.4.3 In comparison to prospective and concurrent reviews, a retrospective audit can look at aggregate transfusion data and trends in blood utilization. Individual transfusion requests can also be reviewed for appropriateness as part of a retrospective audit

4.3.4.4 The retrospective review can analyse the data in several ways.

4.3.4.4.1 The simplest analysis examines the total number of blood components transfused and the total number of patients transfused.

4.3.4.4.2 The mean or median number of units transfused per hospitalized patient or per procedure or both provides a more meaningful summary of blood component use. The proportion of patients transfused should also be determined and can be further examined either by procedure or by clinical specialty. This represents the minimum analyses required to monitor changes in blood component utilization.

4.3.4.4.3 Assessment of appropriate and inappropriate transfusion rates; such assessments would require the collection of additional clinical data and an individual review of transfusion requests, which may be a time-consuming exercise.

4.4 **Interventions to change transfusion practice**:

4.4.1 Prospective and concurrent audits that provide feedback to individual physicians are interventions in themselves.

4.4.2 The most commonly reported intervention is the retrospective audit, which has been combined with local guidelines, and education.

4.5 **Selecting an audit process to monitor transfusions**:

4.5.1 In general, concurrent reviews would be more practical in smaller hospitals or in hospitals with limited resources for blood bank physicians so that transfusions can be reviewed in the following 12 to 24 hours.

4.5.2 The frequency of review may increase with larger transfusion services or decrease for smaller hospitals.

4.5.3 Retrospective data can also allow smaller hospitals to compare their transfusion practices with those of other similar institutions [e.g. number of units transfused per patient by diagnosis-related group (DRG)].

4.7 **Blood utilization review committee** (=blood utilization committee "buc"): Refer to Blood Utilization Review Committee Terms of Reference (MCH-COM-10)

4.7.1 This committee is under the supervision of the medical director of the hospital. It includes the following members:

4.7.1.1 Chairman: Medical Director

4.7.1.2 Co Chairman: Laboratory Head of the Department

4.7.1.3 Members:

4.7.1.3.1 QM & PS Director

4.7.1.3.2 Blood Bank Supervisor

4.7.1.3.3 ICU Head of the Department
4.7.1.3.4 IPCD Director
4.7.1.3.5 Director of Nursing
4.7.1.3.6 Pediatric Head of the Department
4.7.1.3.7 Head of nursery Department.
4.7.1.3.8 OBS & GYNE Head of the Department
4.7.1.3.9 Anesthesia and Operating Room Head of the Department

4.7.1.4 Committee Recording Coordinator: Blood Bank Physician

4.7.1.5 Invitee/Ad Hoc Members: To be invited as needed

4.7.2 Activities/Charges:

4.7.2.1 To review mechanisms that ensures adequate supplies of blood and blood products, and to make recommendation for any necessary improvements.

4.7.2.2 To review all confirmed blood transfusion reactions and to evaluate the cause and possible preventive measures that should have been taken.

4.7.2.3 To review the usage report of all blood components and ordering practices of blood products.

4.7.2.4 To approve, review and monitor implementation of policies and procedures relating to the distribution, handling, storing, use and administration of blood components in the hospital that includes but is not limited to:

4.7.2.4.1 Taking blood samples from patients for type and cross matching.
4.7.2.4.2 Taking blood from donors and processing it.
4.7.2.4.3 Handling of blood outside the laboratory.
4.7.2.4.4 Use of blood warmers and infusion devices.
4.7.2.4.5 Venous access.
4.7.2.4.6 Addition of fluids and drugs other than 0.9% NaCL.
4.7.2.4.7 Bedside Identification of the blood product and the intended recipient.
4.7.2.4.8 Monitoring of patient during and after blood administration.

4.7.2.5 To ensures the optimal use of blood and blood products by establishing indications/triggers for the transfusion of blood, blood components and blood derivatives.

4.7.2.6 To monitor and review clinical indicators for transfusion services:

4.7.2.6.1 Blood units returned unused
4.7.2.6.2 Surgical cancellation due to unavailability of blood.

4.7.2.7 To ensure the optimal utilization of therapeutic phlebotomy.

4.7.2.8 To monitor the Blood Bank's performance and review all the procedures used for collecting, testing and storing blood and blood products.

4.7.3 The meeting is performed regularly every 2 months (maximally 3 months).

4.7.4 The recommendations of every meeting of the committee are sent to the medical and hospital directors for approval.

4.7.5 The review criteria for blood utilization reflect a consensus as to the generally accepted rationale for the use of blood components based on published clinical trials, consensus statements, and guidelines produced by national organizations. However, it must be noted that review criteria do not necessarily constitute indications, or triggers, for transfusion and that specific clinical situations may dictate transfusion practices that differ from the review criteria. The blood utilization committee (BUC) Committee recognizes that all transfusion decisions are clinical judgments that cannot necessarily be reduced to predefined indications.

4.7.6 Elements of utilization review include:

4.7.6.1 Number of monthly departmental blood units requested.

4.7.6.2 Number of monthly departmental emergency requests.

4.7.6.3 Blood utilization ratio (C/T): / blood bags crossmatched / blood bags transfused.

4.7.6.3.1 Component outdate rates are influenced surgical ordering practices. For example, when RBC units are crossmatched for surgical patients; the shelf life of the unit is shortened if the component is unused.

4.7.6.3.2 When crossmatch to-transfusion (C:T) ratios are monitored, a C:T ratio of >2.0 may indicate excessive ordering of crossmatched blood.

4.7.6.3.3 One approach to reducing excessive C:T ratios is to identify procedures that do not typically require blood, and use this information to develop guidelines for the use of type and screen units instead of crossmatched units.

5. MATERIALS AND EQUIPMENT:

5.1 **Forms and Records:**

- 5.1.1 "Monitoring of Quality Indicator" form
- 5.1.2 Cross match register.
- 5.1.3 Sample rejection form
- 5.1.4 Rejected samples register.
- 5.1.5 Release of untested blood in emergency form
- 5.1.6 Disposal of blood and blood components Register.
- 5.1.7 Donor adverse reaction form
- 5.1.8 Donor satisfaction inquiry form
- 5.1.9 Daily inventory of blood component file
- 5.1.10 Donor History Questionnaire (DHQ) and consent Form
- 5.1.11 Blood & Blood Products Request & Release Form
- 5.1.12 Blood Transfusion reaction file.
- 5.1.13 Undesirable event investigation form
- 5.1.14 Meeting minutes of blood utilization committee

6. RESPONSIBILITIES:

6.1 It is the responsibility of the clinicians to follow transfusion guidelines as an aid in decision making.

6.2 It is the responsibility of blood bank physician to monitor the blood and blood products utilization and presenting the results in blood and blood products utilization committee for reviewing.

6.3 It is the responsibility of blood bank staff to follow the policies and procedures.

7. APPENDICES:

7.1 Release of untested blood in emergency form

8. REFERENCES:

8.1 The Unified Practical Procedure Manual For Blood Banks In The Arab Countries, 1434-2013.

8.2 The Standard Policy For Blood Banks In The Kingdom Of Saudi Arabia, 1st edition, 1435-2014.

8.3 National Standards For Clinical laboratories and Blood Banks, 1st edition, 2015.

8.4 AABB Technical manual, 18th edition, 2014.

8.5 AABB Standards for Blood Banks and Transfusion Services, 30th edition, 2016.

8.6 Mollison's Blood Transfusion in Clinical Medicine; 12th edition, 2014.

8.7 https://www.ahia.org/assets/Uploads/pdfUpload/WhitePapers/DefiningAuditingAndMonitoring.pdf.

9. APPROVALS:

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