Preface

Pages 3 through 6 of this handbook are intended as an orientation relating to joining a Transfusion Committee. This initial section provides valuable background information on the blood system in Canada and helps to define the purpose of Transfusion Committees, which may be new information for new members.

The remainder of this document is designed to be used as a reference guide for all Transfusion Committee members to use as a resource for items related to the mandate of the committee. Throughout this section, a list of resources and tools available to support Transfusion Committee members is provided.

Acknowledgements

Ontario Regional Blood Coordinating Network (ORBCoN) is funded by the Ontario Blood Programs Coordinating Office of the Ministry of Health and Long-Term Care to provide educational resources to Ontario hospitals to ensure blood is utilized appropriately and safely.

We would also like to acknowledge the hospitals and other groups who have generously shared examples of their documents and resources that contributed to the creation of this handbook for Transfusion Committees:

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Welcome to your Transfusion Committee

*Why are you here?*

The Transfusion Committee (TC) needs representation from the physicians and nurses that order and administer blood for patients as well as from the laboratory that is responsible for providing blood for transfusion. The responsibility for ensuring that blood transfusion occurs safely at a hospital lies, in part, with the TC. You have been asked to participate on this committee because you can provide valuable expert knowledge from your area of specialty on how well the transfusion service meets your needs as well as those of your patients.

*What is the mandate of the Transfusion Committee?*

- To ensure blood is ordered appropriately and administered safely
- To ensure wastage of blood components and products is minimized
- To review reports of adverse reactions, incidents and complaints and make recommendations for their prevention to improve patient safety
- To provide healthcare professionals in your facility with current information and education relating to blood transfusion
- To review, edit and provide feedback on policies, procedures and guidelines to ensure transfusion practices are evidence-based and represent current best practices

*What do you need to know about the blood system?*

**Where does blood come from?**

The majority of blood for transfusion is collected as whole blood from volunteer donors in Canada by Canadian Blood Services (CBS) and, in Quebec, by Héma-Québec (HQ). The whole blood is processed into blood components (red blood cells, platelets, plasma and cryoprecipitate) for distribution to hospitals for transfusion to patients. Some components are collected through a process called apheresis which results in the collection of specific components like platelets and plasma. Blood components provided by CBS and HQ are leuko-reduced (LR). Platelets prepared from whole blood donation are provided as a pool from four donations. Transfusable plasma is from male donors only.

CBS and HQ are tasked with screening volunteer donors to ensure the blood collected will provide the most benefit to recipients while minimizing the risks. This includes screening each donor using a questionnaire and interview and testing the collected blood for pathogens that could be transmitted to the recipient. Both CBS and HQ must adhere to strict regulatory requirements mandated by Health Canada to ensure the blood supply is as safe as possible for all Canadians.

In addition, CBS and HQ ship plasma to manufacturing facilities in the United States and Europe that process the plasma into plasma protein products (PPP). CBS and HQ must then purchase the manufactured PPP from the manufacturers in order to issue them to hospital transfusion services for Canadian patients. Examples of PPP include recombinant and human
source coagulation factor concentrates used primarily for hemophiliac patients and blood derivatives such as albumin and immunoglobulins such as Intravenous Immune Globulin (IVIG), Rh Immune Globulin (RhIG) and Hepatitis B Immune Globulin (HBIG). As Canada is currently not self-sufficient with its supply of plasma to manufacture enough plasma protein products for all Canadian patients, the majority of these products must be produced from human blood that may be collected from paid donors and is sourced from companies based in the United States and Europe. These products require complex manufacturing processes and are often very costly.

**Who pays for blood in Canada?**

CBS and HQ are funded by the Provincial and Territorial Ministries of Health to collect, process and distribute blood components to hospitals in Canada and to purchase the required quantity of manufactured blood products from the various pharmaceutical suppliers licensed to provide products in Canada. Blood components and products are then provided by CBS and HQ to hospital transfusion services at no additional charge.

The funding formulas from each province are currently based on units of red blood cell (RBC) issued to hospitals (percentage use within each particular province) as well as the amount of manufactured products issued to hospitals within each province.

**Are there any ‘rules’ to follow relating to the handling and use of blood in Canada?**

There are accepted standards for the collection, testing, processing, storage, transportation, issuing, administration and tracking/documentation of blood for transfusion. These standards were developed by subject matter experts in the field of transfusion medicine.

- Canadian Standards Association (CSA) National Standard for Blood and Blood Components CAN/CSA Z902
- Canadian Society for Transfusion Medicine (CSTM) Standards for Hospital Transfusion Services

Hospitals are monitored for compliance to these standards through Accreditation Canada, Health Canada and, in Ontario, through the Institute for Quality Management in Healthcare (IQMH) Accreditation division. Consequences of non-compliance can include the loss of hospital accreditation and loss of laboratory license. Compliance requirements are based on the above National standards. Since the blood suppliers and manufacturers do considerable manipulation of blood into the components and products mentioned earlier, those organizations have been heavily regulated by Health Canada for many years. In October 2014, new blood regulations were introduced through Health Canada (Health Products and Food Branch) to regulate processes relating to transfusion that occur at hospitals. The *Blood Regulations* fall under the authority of the *Food and Drugs Act* and apply to all persons or establishments that process, label, store, distribute or transform blood (pool, separate, wash, irradiate) for transfusion or further manufacture. In September 2015, requirements for reporting adverse events to transfused components were added to the new regulations for hospitals that transform blood components/products. Adverse events relating
to transfusion need to also be reported to CBS (if related to product quality) and should be reported to the Ontario Transfusion Transmitted Injuries Surveillance System (TTISS-ON). The responsibility for reporting adverse events to these external organizations lies with your hospital Transfusion Medicine Laboratory (TML). TTISS-ON has developed a reporting algorithm to aid in clarifying reporting requirements for hospitals (see Appendix A).

**Are these Standards applicable to Transfusion Committees?**

Yes, there are specific standards that outline the requirements of TCs, including the need for Terms of Reference for the committee, membership of the committee and frequency of meetings.

A list of the standards relating specifically to the TC appears in Appendix B of this handbook.

**What will you need for your committee meetings?**

You should be provided with your TC’s Terms of Reference. A generic version is provided in the appendices of this handbook (see Appendix C).

**What will be discussed at Transfusion Committee meetings?**

Agendas may include discussions about:

- Blood utilization and wastage
- Development and approval of guidelines for ordering blood for transfusion
- Policies to improve the use and provision of blood for transfusion including informed consent
- Audits on blood utilization and administration
- Adverse reactions that are reported during or following a blood transfusion
- Incidents and errors or ‘near misses’ related to blood for transfusion
- New products offered through CBS or HQ
- Dissemination of transfusion information and education, staff training and competency
- Contingency/emergency planning for potential blood shortages

Within this handbook, you will find brief outlines of each section that may be discussed at a TC meeting and suggested tools that may support committee members in fulfilling their role. Example agendas are provided in Appendix D.

**Special Roles on the Transfusion Committee**

**Chairperson**

The chairperson’s role on the TC is to:

- Ensure Terms of Reference are developed and approved and provided to all members
- Schedule meetings to ensure the committee meets at least quarterly
- Set agendas to ensure the committee can fulfill its mandate
- Encourage all members to participate equally in discussions and provide their opinion
Ensure committee members are provided with the data and tools required to enable them to develop recommendations

- Arrange for minutes to be distributed, ensure action items are reviewed and completed
- Liaise between the Medical Advisory Committee (MAC) and the TC including bringing recommendations forward to MAC
- Maintain awareness of members about the ethical aspects of their decision making
- Provide an opportunity for all members to declare a conflict of interest at any time (see Appendix E for an example of conflict of interest guidelines)

**Secretary**

The secretary’s role on the TC is to:

- Record attendance at each meeting
- Record and distribute minutes of each meeting, ensuring action items and decisions and recommendations are documented within the minutes
- Distribute background documents for discussion to committee members as required
- Assist the chairperson in scheduling meetings as required

**Transfusion Safety Officer and the Transfusion Committee**

Some hospitals have created a role for a healthcare professional, with either Nursing or Laboratory background, whose focus is to improve patient safety relating to blood transfusion. This person is often tasked with developing policies and procedures for patient identification and blood administration, reviewing blood utilization, following up and reporting adverse reactions and incidents related to blood transfusion and developing and delivering educational programs. If the hospital does have a Transfusion Safety Officer, they should be a member of the TC.

Transfusion Safety Officers will often perform audits and present data to the TC for review and discussion in order to develop recommendations to improve performance and prevent errors and incidents. These activities can also be performed by either nursing or laboratory personnel, but having someone dedicated to this role is often more effective. A generic job description for a Transfusion Safety Officer appears in Appendix F of this handbook.

**Remember you are vital to your Transfusion Committee**

Your input can ensure that patients at your hospital receive safe and effective blood transfusion therapy only when it is truly needed. You will become more familiar with your hospital’s guidelines for ordering and administering blood, the benefits and risks associated with it, as well as contributing to recommendations to prevent errors and improve patient safety. As a participating member on the TC you will become more knowledgeable on blood and any new practices related to the use of blood or its alternatives. Blood is a precious resource that requires effective management to ensure an adequate and safe supply for all Canadians. Your active participation on your TC plays an important role in meeting this mandate.

We are confident that you will find your participation on the TC rewarding.
**Agenda Items for your Transfusion Committee**

**Blood Utilization and Wastage Review**

Blood utilization review includes review of: blood inventory management; utilization guidelines; blood ordering practices; blood administration practices; and review of standardized protocols such as massive transfusion.

Blood utilization data and graphs are provided to laboratories on a biweekly basis from CBS providing valuable site specific data that can be reviewed during the TC meeting. Blood inventory management can include supply issues from the blood supplier, blood wastage rates and inventory levels.

Review of blood ordering practices can be achieved by examining the frequency of transfusion orders, for example using a crossmatch to transfusion ratio to determine if many more units are ordered for certain procedures or by certain physicians than are actually transfused, or appropriateness of orders, for example performing an audit of blood orders for compliance with hospital guidelines. A Maximum Surgical Blood Order Schedule (MSBOS) is a tool for transfusion services, surgical services and anesthesia to predict blood utilization based on historical experience within an institution. The MSBOS is meant to be a guide and not interfere with the use of clinical judgment related to individual patient needs. A well designed MSBOS process provides flexibility to the user. The ultimate goal of using a MSBOS is to raise efficiency without compromising patient safety. Over-ordering of blood for surgical procedures raises surgical costs and removes blood from inventory that otherwise could be used for another patient, increasing the chances of wastage. (Refer to Appendix G for an example)

With the implementation of electronic or immediate spin crossmatching a more “on demand” approach is being established for blood product requests. Instead of using the MSBOS, a risk assessment can be made based on the risk of the patient requiring blood transfusions based on the procedure itself (see Appendix H for an example). This can reduce the amount of work that is required to crossmatch units and hold them outside of regular inventory, further reducing the potential for wastage.

Review of blood administration practice can involve monitoring for informed consent for transfusion, review of blood issuing and blood infusion (e.g. beside audit) to monitor compliance with hospital policies and procedures.

*Why should a Transfusion Committee monitor blood product utilization and wastage?*

- To improve patient care and safety
- To ensure efficient and effective use of the blood products in your facility
- To reduce the cost to the healthcare system due to unnecessary transfusion
➢ It is a requirement by Canadian Standards Association (CAN/CSA Z902)
➢ It is a requirement by IQMH Accreditation (IQMH)

Some reasons why utilization reviews are necessary at your facility:

➢ To identify cases of over-transfusion or under-transfusion
➢ To aid in the reduction of unnecessary patient exposure to blood products and prevent associated adverse events
➢ To identify misuse of specific blood products
➢ To promote efficient inventory management processes
➢ To promote effective communication between the Transfusion Medicine and blood user groups/members of the TC
➢ To ensure any trends or patterns in utilization are discussed

Examples of tools available to help review blood product utilization:

✓ 3-year utilization graphs (trend reports) available from CBS (Figure 1)
✓ Cross-match to Transfusion Ratio (C:T) graphs (Figure 2) (Template available on www.transfusionontario.org)
✓ MSBOS Appendix G
✓ Pre Op Order Guidelines Appendix H
✓ ORBCoN audit tools (available on www.transfusionontario.org)
✓ Follow up communication to ordering physician re: appropriateness Appendix I
Figure 1: 3 Year Utilization Graph (RBC)*

*example of trend report provided by CBS – hospital trend reports can be found on www.blood.ca
Figure 2: Example of Crossmatch to Transfusion Ratio Graphs by Physician and Department

For facilities that do not use a just-in-time (JIT) electronic crossmatch system, monitoring the number of units crossmatched to the number of units transfused, may be a helpful quality indicator.

1. Determine the group for analysis. Some examples are:
   - Patient group
   - Department
   - Physicians

2. Establish the timeframe for analysis: e.g. a month, 3-months or a year.

3. Tally the number of crossmatched units and determine how many of those units were actually transfused.

These ratios will assist facilities in identifying possible inefficiencies to the crossmatching process with regard to resources and personnel required. The review of C:T ratios also identifies differences in utilization practices by peer and department.

The literature demonstrates that a good C:T ratio is between 1.5 and 2.5.

See www.transfusionontario.org for downloadable templates.
**Additional Report Tools/Resources:**

1. ORBCoN Inventory Calculators for red cells and platelets.
   The inventory calculator tool is based on distribution of blood groups in the population and the amount transfused in a year to give a rough estimate of how much of each blood group should be stocked on site. An explanation of how to use the inventory calculator to determine inventory levels appears in the Inventory Management Toolkit.

2. Canadian Blood Services Trend Reports.
   Data collected and submitted to CBS by hospitals every month is collated in a data warehouse, and then made available to hospitals through password protected web access. The information is refreshed biweekly. Information on the number of units outdated by blood group, amount transfused and amount received all help to provide utilization data for reporting. Your hospital transfusion service personnel will have access to these reports/graphs.

3. ORBCoN (2011) FP: RBC Ratio.\(^{10}\) The FP:RBC ratio is internationally recognized as an indicator of plasma utilization as a ratio of red cell use. The ratio can be used for peer comparison as an indicator for audit of frozen plasma use.
Guideline Development and Review

Why implement Transfusion Guidelines?

Transfusion practice can vary widely by facility and by physician.

Guidelines can help support clinical decisions about appropriate transfusion practices and the use of blood components and products.\textsuperscript{11}

Establishing facility guidelines for transfusion will help to reduce inappropriate transfusions and increase patient safety.\textsuperscript{12}

Development of guidelines

Ensure that they are:

- Evidence based
- Appropriate for your facility
- Easy to comprehend
- Easily-accessible for clinicians
- Developed with both clinical and laboratory input
- Approved by your Medical Advisory Committee

Order Sets

Hospitals are moving toward pre-printed order sets for a variety of patient care situations. They are a pre-determined evidence based prescribing tool that hospital physicians and other healthcare professionals can use to effectively and efficiently implement best practices. When a hospital has established guidelines for transfusion they can be incorporated into the order sets to help physicians comply with the guidelines. For example order set, see Appendix J.

Why review and monitor?

Medical research is being done every day to help improve therapies for patients and to increase patient safety. Transfusion Medicine is always evolving and practices are continually improving. The committee should be monitoring and reviewing their current practices based on:

- New evidence (i.e. Restrictive Transfusion Strategies http://www.choosingwiselycanada.org/recommendations/transfusion-medicine/)
- Increased use of alternatives to transfusion in the management of anemia, i.e. Erythrocyte Stimulating Agents (ESAs) and Intravenous (IV) Iron. Refer to Appendix K for the ONTraC Perioperative optimization and anemia management algorithm.
- Opportunities to avoid the use of blood products for non-urgent warfarin reversal (http://www.nacblood.ca/resources/guidelines/PCC.html)
An example of ordering guidelines for blood components has been provided by Sunnybrook Health Sciences Centre (Figure 3). Please visit www.transfusionontario.org for more examples of guidelines.

Figure 3: Sunnybrook Guidelines for Transfusion of Red Blood Cells, Platelets, Plasma and Cryoprecipitate (Adult)

**TRANSFUSION GUIDELINES Adult Patient**

**Risks of transfusion**

<table>
<thead>
<tr>
<th>Event (1 in X)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in 100</td>
<td>Minor Allergic reaction</td>
</tr>
<tr>
<td>1 in 100</td>
<td>Transfusion Associated Circulatory Overload (TACO)</td>
</tr>
<tr>
<td>1 in 300</td>
<td>Febrile Non Hemolytic reaction</td>
</tr>
<tr>
<td>1 in 7000</td>
<td>Delayed Hemolytic reaction</td>
</tr>
<tr>
<td>1 in 10,000</td>
<td>Bacterial Sepsis to platelets (per platelet pool)</td>
</tr>
<tr>
<td>1 in 10,000</td>
<td>Transfusion Related Acute Lung Injury (TRALI)</td>
</tr>
<tr>
<td>1 in 40,000</td>
<td>Acute Hemolytic reaction due to ABO-incompatibility error</td>
</tr>
<tr>
<td>1 in 40,000</td>
<td>Severe Allergic reaction</td>
</tr>
<tr>
<td>1 in 60,000</td>
<td>Death from Bacterial Sepsis (per platelet pool)</td>
</tr>
<tr>
<td>1 in 250,000</td>
<td>Bacterial Sepsis to red cells</td>
</tr>
<tr>
<td>1 in 500,000</td>
<td>Death from Bacterial Sepsis (from red cells)</td>
</tr>
<tr>
<td>Less than 1 in 1,000,000</td>
<td>West Nile Virus</td>
</tr>
<tr>
<td>1 in 1,700,000</td>
<td>Hepatitis B Virus (HBV) transmission</td>
</tr>
<tr>
<td>1 in 4,000,000</td>
<td>Chagas Disease (Trypanosoma cruzi)</td>
</tr>
<tr>
<td>1 in 4,300,000</td>
<td>Human T-Cell Leukemia Virus (HTLV) transmission</td>
</tr>
<tr>
<td>1 in 6,700,000</td>
<td>Hepatitis C Virus (HCV) transmission</td>
</tr>
<tr>
<td>1 in 8,000,000</td>
<td>HIV transmission</td>
</tr>
</tbody>
</table>

**RED BLOOD CELLS** Non-Bleeding Patient

Typical infusion time: 1 unit over 2 hours (maximum 4 hours)

If at risk for overload or elderly, transfuse 1 unit over 3-4 hours with furosemide pre-transfusion

<table>
<thead>
<tr>
<th>HEMOGLOBIN g/L</th>
<th>UNITS of RBC</th>
<th>RECOMMENDATION</th>
</tr>
</thead>
</table>
| less than 60   | 1-2          | Transfusion highly recommended  
|                |              | - Young patients may tolerate greater degrees of anemia  
|                |              | - Patients with chronic iron deficiency can often be treated with IV iron alone |
| less than 70   | 1            | Likely appropriate |
| less than 80   | 1            | Likely appropriate in patients with cardiovascular disease |
| less than 90   | 1            | Only if there are signs and symptoms of impaired tissue oxygen delivery |
| greater than 90| none         | Likely inappropriate  
|                |              | - Consult Blood Bank physician and document indication in patient chart |

Transfuse 1 unit then re-assess patient’s symptoms (shortness of breath, chest pain, tachycardia, dizziness) as well as hemoglobin level prior to ordering another unit
RED BLOOD CELLS  Bleeding Patient

<table>
<thead>
<tr>
<th>CLINICAL SETTING</th>
<th>RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk patient</td>
<td>Maintain hemoglobin greater than 70 g/L during active bleeding</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>Maintain hemoglobin greater than 80 g/L during active bleeding</td>
</tr>
</tbody>
</table>

PLATELETS  Typical infusion time: 1-2 hours (maximum 4 hours)

<table>
<thead>
<tr>
<th>CLINICAL SETTING</th>
<th>PLATELET COUNT X 10^9/L</th>
<th>RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITP – Immune thrombocytopenia</td>
<td>less than 10</td>
<td>Transfuse platelets ONLY with life threatening bleeding</td>
</tr>
<tr>
<td>Non-immune thrombocytopenia</td>
<td>less than 10</td>
<td>1 platelet pool</td>
</tr>
<tr>
<td>Prior to procedures NOT associated with significant blood loss</td>
<td>less than 20</td>
<td>1 platelet pool</td>
</tr>
<tr>
<td>e.g. vaginal delivery, central venous catheter insertion, paracentesis, thoracentesis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therapeutic anticoagulation that cannot be stopped</td>
<td>less than 30</td>
<td>1 platelet pool</td>
</tr>
<tr>
<td>Significant Bleeding</td>
<td>less than 50</td>
<td>1 platelet pool</td>
</tr>
<tr>
<td>Major surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre invasive procedure associated with significant blood loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lumbar puncture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute promyelocytic leukemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• during acute presentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peri-neurosurgery</td>
<td>less than 100</td>
<td>1 platelet pool</td>
</tr>
<tr>
<td>Head trauma or CNS bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extreme life-threatening hemorrhage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelet dysfunction due to antiplatelet agents (e.g. clopidogrel) or post cardiopulmonary bypass pump AND marked bleeding</td>
<td>Any</td>
<td>1 platelet pool</td>
</tr>
</tbody>
</table>
**PLASMA** Typical infusion time: 30 min - 2 hours per unit (maximum 4 hours)

<table>
<thead>
<tr>
<th>CLINICAL SETTING</th>
<th>INR</th>
<th>RECOMMENDATION</th>
</tr>
</thead>
</table>
| Warfarin reversal or Vitamin K deficiency **AND**  
  - Pre emergency surgery  
  - Serious bleeding | greater than 1.5 | **DO NOT USE PLASMA**  
  **PCC** (prothrombin complex concentrates) 
  as per monograph on Sunnymet  
  **Vitamin K 10 mg IV** |
| Significant bleeding  
  - Liver disease coagulopathy **AND**  
  pre invasive procedure | greater than 1.8 | 3-5 units plasma  
  Note: plasma is not required prior to procedures not associated with blood loss irrespective of INR e.g. paracentesis, thoracentesis, central line placement |
| Microvascular bleeding  
  - Extreme life threatening hemorrhage | Unable to wait for results | 2-4 units plasma for every 4 units of RBCs  
  Note: If massive transfusion required follow the Code Omega policy available on Sunnymet |

**CRYOPRECIPITATE** Typical infusion time: 15-30 min (maximum 4 hours)

<table>
<thead>
<tr>
<th>CLINICAL SETTING</th>
<th>FIBRINOGEN g/L</th>
<th>RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microvascular bleeding</td>
<td>less than 1</td>
<td>10 units cryoprecipitate</td>
</tr>
<tr>
<td>Extreme life-threatening hemorrhage</td>
<td>less than 2</td>
<td>10 units cryoprecipitate</td>
</tr>
</tbody>
</table>
| Acute promyelocytic leukemia  
  - during acute presentation | less than 1.5 | 10 units cryoprecipitate |

Approved by Transfusion Medicine Committee (2 December 2014)
Policy Development and Review

Why should Transfusion Committees determine Transfusion Policies?

Policies, processes and procedures describe the purpose and objectives of the facility, how processes are anticipated to function, how they work together, how to perform the processes, areas of risk or control, what their requirements are, how to implement them and how to measure or evaluate them.\textsuperscript{13}

Many of the standards mandating the existence of a TC with defined Terms of Reference and minimum meeting intervals also charge the TC with defining or approving transfusion policies.\textsuperscript{7}

The clinical perspective in addition to the laboratory perspective is critical in obtaining the safest and most practical policies for transfusion activities. The members of the TC can help provide this input on behalf of, and preferably in collaboration with, members of their own departments. Review, revision and approval of these policies should be documented in the TC minutes, creating a record of the transfusion policy identification, development and approval process. It also ensures a transparent process to clinical areas, departments, administration and auditors.

What types of policies should Transfusion Committees consider?

Some of the key policies related to transfusion at your hospital (or group of hospitals if you have a regional TC model) that should be developed or reviewed by the TC are:

- Informed consent for transfusion and protocol for refusals
- Pre-transfusion testing orders: group and screen versus crossmatch, computer/electronic crossmatch, maximum surgical blood order schedules
- Medical indications for blood products and ordering best practices
- Patient identification for specimen collection and blood product administration
- Administration practices and guidelines/monographs for adults and neonates and pediatric patients where appropriate
- Massive hemorrhage protocols, including massive hemorrhage in obstetrical patients
- Transfusion adverse event identification, intervention, reporting and monitoring
- Non-conformance/error reporting, complaints, corrective and preventative measures, monitoring and evaluation from the laboratory, clinical areas and other pertinent departments
- Management and performance of audits
- Lookback/Traceback for reported transfusion transmitted infections
- Introduction of new blood products
- Blood shortage management
- Staff training and on-going competency for handling blood components/products
- Inventory management monitoring of blood products – usage, wastage and storage issues
ORBCoN has developed many tools to assist hospitals with development of transfusion related policies:

1. The Informed Consent Card
2. 8 Rights of Transfusion Card
3. Bedside Audit Toolkit
4. Patient information pamphlet
5. e-Tools that can be used as a competency tool for technologists, nurses and physicians
6. IVIG Toolkit
7. Bloody Easy handbooks
8. Inventory Management Toolkit
9. Home Infusion Toolkit
10. Ontario Contingency Plan for the Management of Blood Product Shortages
11. A Toolkit for the Introduction of a New Blood Product

All of the above can be found on www.transfusionontario.org

The regular review of policies and procedures for accuracy, currency and relevance is another important aspect of policy and procedure development.

Quality and Safety Review

Quality and safety reviews are essential in ensuring that quality improvement and risk management activities are planned, initiated, monitored and evaluated.

When reviewing quality and safety for Transfusion Medicine the committee should be reviewing and discussing the following at every TC meeting:

Quality Improvement Plan (QIP)

What is a QIP in Healthcare?

It is a tool used to track performance in identified priority areas like patient safety. It promotes ongoing commitment to achieve system wide quality and safety best practices that improve patient safety and outcomes. It also provides accountability for reaching the highest possible quality and value for healthcare.

Hospitals are now legislated to have established Quality Committees (QC) that develop an annual QIP which is submitted to Health Quality Ontario and the achievements of targets set out in the QIP are reported. This committee also reviews and monitors errors and critical incidents and improvements in quality and safety for patients. The TC and the QC should work closely in the management of quality improvements and the review of incidents related to blood transfusion.

A Provincial QIP template has been developed for Transfusion Medicine in Ontario to help hospitals improve and standardize the ordering and administration of red blood cells (RBC). The plan has been aligned with other provincial and national programs like Choosing Wisely.
Audits

What are audits?
The general definition of an audit is the inspection and examination of a process or quality system to ensure compliance with requirements for an organization, function, process, product or step.¹⁶

A function of the hospital TC is to assess and review the results of audits of transfusion practices at the hospital. Auditing can improve an organization’s effectiveness and efficiency by leading to recommendations that promote continuous quality improvement of transfusion practice. As part of the audit process, it is essential that the findings of audits, including any corrective action implemented, be documented.

Why should audits be done?

- The Canadian Standards Association Standards for Blood and Blood Components (CAN/CSA Z902) requires that each facility perform periodic reviews and audits. These internal audits should be performed annually at a minimum, to verify the continuing effectiveness of the quality system.¹⁷
- The Institute for Quality Management in Healthcare (IQMH) requirements state that internal audits must be conducted at intervals defined in the quality management system (suggest once per year) to verify that operations continue to comply with the quality management system, both managerial and technical.¹⁸
- The Canadian Society for Transfusion Medicine Standards (CSTM) for Hospital Transfusion Services states that the transfusion service must establish an internal audit program to ensure quality of processes and procedures.¹⁹

What kinds of audits should the Transfusion Committee get involved with?

- Blood utilization review is an example of an audit that is used to identify the appropriate use of blood components and products at your facility.
- Regular evaluations of blood ordering and transfusion practices should be conducted. Specific areas that are important to address are: ordering, distribution, handling, issuing, and administration of blood components and blood products.
- Additional auditing categories may include: policies and procedures, facilities management, training/personnel qualifications and competency, quality assurance, complaints/deviations, error/accident trends, adverse events, testing and lookback/traceback.²⁰

The format of any audit/review process must be established by each facility. A blood utilization review must include the criteria for appropriate blood utilization. Each review can
be conducted either prospectively or retrospectively, and data collection can be performed manually or by accessing laboratory information systems.

What audit tools are available?

**Bloody Easy Audits** is an electronic tool that has been developed to aid Transfusion Services and TCs in the audit process. This tool enables the user(s) to access the tool at any time and enter specified audit results into a web-based system. Upon completion of the audit period, reports can be automatically generated and used to report to the specific committees in your facility. Currently, there are five audits available for use, Platelets, Bedside audit, Frozen Plasma audit, Specimen Collection audit and the Red Blood Cell audit. To obtain program and log in information please contact your regional ORBCoN office as registration is required to access the audit tools. New audit tools may be added in the future.

**Note:** Your transfusion service may already have been granted access to these audit tools. They are only available for use by hospitals in Ontario.
What types of reactions/events should be discussed at your Transfusion Committee meetings?

A transfusion is an important component of numerous patient therapies. Transfusions, however, have potential serious risks. The Ontario Educational Committee for the Transfusion Transmitted Injuries Surveillance System (TTISS-ON) has developed a list of signs and symptoms to watch for along with a description of what to expect and how to treat an adverse transfusion event (Figure 4). This table is also included in the Bloody Easy Blood Administration handbook.

Figure 4: TTISS-ON (Transfusion Transmitted Injuries Surveillance System)
Transfusion Reaction Chart

Tracking the types of reactions and monitoring incidence rates helps the organization to identify:

- Appropriate treatment of reactions
- Investigation of cause of reaction
- Patient safety risks (e.g. hemolytic reaction due to patient identification error)
- Interventions to mitigate risk
- Prevention of reactions
Figure 5: Example of the types of Adverse Events recorded over a set period of time. Headings adapted from the Serious Hazards of Transfusion (SHOT) Summary Report 2014

<table>
<thead>
<tr>
<th>Month / Adverse Event Type</th>
<th>Adverse Events Caused by Error</th>
<th>Possibly / Probably Preventable</th>
<th>May not be Preventable</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;Year&gt; IBCT HSE I&amp;U Anti-D</td>
<td>BR ATR HTR TA/GvHD TACO TRALI</td>
<td>TAD PTP TTI</td>
<td></td>
</tr>
<tr>
<td>Jan</td>
<td>1 plt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb</td>
<td></td>
<td>2 fp</td>
<td>1 plt</td>
</tr>
<tr>
<td>Mar</td>
<td></td>
<td>2 fp</td>
<td>1 plt</td>
</tr>
<tr>
<td>Apr</td>
<td></td>
<td>2 plt</td>
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<tr>
<td>May</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jun</td>
<td></td>
<td>3 fp</td>
<td>1 fp/1rbc</td>
</tr>
<tr>
<td>Jul</td>
<td></td>
<td>1 IVIG</td>
<td></td>
</tr>
<tr>
<td>Aug</td>
<td></td>
<td>1 fp</td>
<td></td>
</tr>
<tr>
<td>Sep</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct</td>
<td></td>
<td>2 fp</td>
<td></td>
</tr>
<tr>
<td>Nov</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

Key: IBCT Incorrect blood component transfused; HSE Handling and storage errors; I&U Inappropriate/unnecessary; Anti-D Errors related to RHIG; BRATR Bacterial related adverse transfusion reaction; HTR Hemolytic transfusion reaction; TA/GvHD Transfusion associated graft versus host disease; TACO Transfusion associated circulatory overload; TRALI Transfusion related acute lung injury; TAD Transfusion associated dyspnea; PTP Post transfusion purpura; TTI Transfusion transmitted infection

Oversight of transfusion practices and adverse events requires active participation of physicians, nursing, laboratory, administrators and other healthcare providers to ensure prevention of adverse events and to identify appropriate corrective actions. Review of adverse reactions can aid in identifying sentinel events, near miss errors and potential product related issues. Implementation and subsequent monitoring of corrective actions can improve patient safety related to transfusion.
Hospitals are encouraged to submit their reportable adverse transfusion events on the Canadian Adverse Transfusion Event (ATE) Reporting form, referring to the Canadian ATE TTISS guidelines. Figures 6 and 7 illustrate examples of Adverse Reaction Summary Reports available from the Ontario TTISS database that can be discussed at Transfusion Committee meetings. Figure 9 provides a summary of ATE reported to Ontario TTISS from 2008 to 2014.

Figure 6: Adverse Transfusion Events (ATEs) N (%) by type of product and year as reported by the Ontario TTISS

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Components</td>
<td>103</td>
<td>68.2</td>
<td>122</td>
<td>70.1</td>
<td>155</td>
<td>77.5</td>
<td>117</td>
<td>68.4</td>
<td>120</td>
<td>66.6</td>
<td>617</td>
<td>70.8</td>
</tr>
<tr>
<td>Plasma Derivatives</td>
<td>47</td>
<td>31.1</td>
<td>51</td>
<td>29.1</td>
<td>45</td>
<td>22.5</td>
<td>51</td>
<td>29.6</td>
<td>52</td>
<td>29.1</td>
<td>246</td>
<td>28.2</td>
</tr>
<tr>
<td>Both Product Types</td>
<td>1</td>
<td>0.7</td>
<td>2</td>
<td>1.1</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>1.8</td>
<td>3</td>
<td>2.3</td>
<td>9</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>151</td>
<td>100</td>
<td>175</td>
<td>100</td>
<td>200</td>
<td>100</td>
<td>171</td>
<td>100</td>
<td>175</td>
<td>100</td>
<td>872</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 7: Number of ATEs per year by reaction type for blood component
Figure 8: Ontario TTISS ATE Reported 2008-2014

Adverse Transfusion Events N=1226
Ontario TTISS 2008-2014

- TACO, 326, 27%
- TRALI, 33, 3%
- Acute Hemolytic Reaction, 72, 6%
- Anaphylactic Shock, 3, 0%
- Aseptic Meningitis, 16, 1%
- Bacterial Infection, 29, 2%
- Other pain/unknown, 74, 6%
- Delayed Hemolytic Reaction, 222, 18%
- Hypotensive Reaction, 37, 3%
- IVG Headache, 58, 5%
- IVG pain/reaction, 66, 5%
- Other infection, 1, 0%
- PTP, 3, 0%
- Possible TRALI, 51, 4%
- Severe Allergic/Anaphylactic/Anaphylactoid, 190, 15%
Incident Management Review

The current CAN/CSA Z902 standards requires that any incidents, such as errors, accidents and deviations from normal operating procedures be identified, investigated, evaluated and corrective action taken when required. TCs should be a part of the development and maintenance of policies and procedures involving the transfusion of blood components and products, and should be closely involved with the all the steps concerning the incident management process.

IQMH requirements state that the process for formulating corrective action must include an investigation to determine the underlying root causes of the problem. Corrective action shall be appropriate to the magnitude of the problem and risks encountered.

In his primer for healthcare executives written for the Medical Event Reporting System for Transfusion Medicine (MERS-TM), Marx explains that it is through the lessons of our everyday errors that we can design our work environment to be less error prone and more error tolerant.

The Canadian Patient Safety Institute provides a toolkit for incident management based on the best available evidence and expert advice. This toolkit is regularly updated and is focused on managing patient safety, quality improvement, risk management and staff training in the healthcare setting.

The investigation of serious errors will usually be performed by trained individuals belonging to the Safety/Quality and Risk Management departments (valuable members of any TC). Figure 9 represents the key elements described in the toolkit.

![Figure 9: Patient Safety and Incident Management](image-url)
Introduction of New Blood Components/Products

New blood components or blood products are introduced in Canada on the advice of the National Advisory Committee (NAC) on blood and blood products (www.nacblood.ca). The NAC is a medical advisory body that has physician representation from all provinces and territories and provides advice on blood and blood products to the provincial and territorial ministries of Health that provide funding for the blood system in Canada.

The ministries of Health consider the recommendations made by NAC when determining whether a new blood product will receive funding to be supplied to hospitals in Canada.

What Role Does the Transfusion Committee play in approving New Blood Components or Products?

The transfusion committee at each hospital should:

- Determine if the new blood component/product will be used at their facility
- Develop and approve clinical guidelines for use of the component/product
- Develop and approve in-house administration policies and procedures
- Determine the quantity and availability of the new component/product
- Educate staff (laboratory, medical and nursing) about the new product and its appropriate use

Another role for the transfusion committee is to audit the use of the new component/product once it has been approved and its use implemented to ensure it is being ordered and used appropriately.

The Ontario Regional Blood Coordinating Network (ORBCoN) has, with input from hospital stakeholders, developed a toolkit to aid in the implementation of a new blood product. The toolkit can be found at www.transfusionontario.org under ‘Toolkits’. 
Education about Blood Transfusion

Blood transfusion involves personnel from diverse backgrounds with different levels of knowledge and understanding. In order to properly and safely accomplish their role in transfusion each individual needs to be trained to the appropriate level. Any person(s) involved in any step in the transfusion process must meet the competency requirements set out in the standards.

CAN/CSA Z902 standards states that each facility shall create, maintain, and document a formal competency assessment program. Competency shall be assessed following training and at regular and routine intervals thereafter.\(^{31}\)

IQMH requirements state that the hospital and blood transfusion service shall ensure that there is ongoing training for staff involved in blood component/product administration. A formal program to assess skills in transfusion-related activities shall be developed and maintained in conjunction with all healthcare professionals and staff involved in any transfusion medicine related activities.\(^{32}\)

Various tools have been created to help facilities meet the requirements for ongoing competency related to Transfusion Medicine. These resources are available free of charge to Ontario hospitals.

**e-learning Tools:**

**Bloody Easy for Healthcare Professionals**

Bloody Easy is a ten module electronic learning tool providing in depth practical information on Transfusion Medicine. It is designed to enhance the knowledge of physicians, nurses and technologists regarding blood transfusions and the alternatives. [orbcon.transfusionontario.org/bloodyeasy/](orbcon.transfusionontario.org/bloodyeasy/) Note: this program is currently under review and may be presented in a different format to align with the Bloody Easy 4 handbook.
Bloody Easy Lite

Bloody Easy Lite is a two module electronic learning tool providing basic information for physicians and healthcare professionals who prescribe blood components or blood products. The program is CME accredited and offers an optional participant tracking mechanism to assist healthcare facilities in meeting requirements for ongoing transfusion medicine education for healthcare professionals involved in transfusion medicine activities.

Bloody Easy Blood Administration

Bloody Easy Blood Administration is an electronic learning tool developed by a Transfusion Safety Nurse with input from RN’s, Transfusion Safety Officers and Transfusion Personnel across Ontario. The content reflects current best practices and you will learn about the risks of transfusion, the significance of the ABO and Rh blood group systems, and what these systems mean in terms of blood compatibility for your patients.

http://orbcon.transfusionontario.org/nurses/ Note: this program is currently under review and may be presented in a different format to align with the Bloody Easy Blood Administration handbook.

Bloody Easy Tech Assessments

Bloody Easy Tech Assessments includes a series of tests intended to provide Medical Laboratory Technologists in Ontario with a mechanism to assess and build on their technical and theoretical knowledge in Transfusion Medicine. Registration through an assigned site administrator is required. Tests are updated each year. A certificate is available for printing once each module has been completed and passed. Please contact your Regional ORBCoN office for registration information and instructions.

orbcon.transfusionontario.org/etools
Handbooks:


This educational handbook provides practical information on Transfusion Medicine in a concise booklet format. It is designed to enhance knowledge of physicians, nurses, and technologists on the clinical use of blood transfusions and blood alternatives. It is available in both English and French.

Note: this version of the handbook should be available by Fall 2016. Bloody Easy 3 will continue to be available until the new version is released.

Bloody Easy Blood Administration Handbook

This handbook is ideal for nurses or healthcare professionals administering blood. It provides an overview of blood and blood products, the risks associated with them, and how they should be administered. In addition, it describes the types of transfusion reactions that may occur. This handbook is available in both English and French and is the companion to the online course "Bloody Easy Blood Administration online program". Ver 2 was released in 2015.

Bloody Easy Coagulation Simplified

This handbook released in 2013 provides practical information on Coagulation. It is designed to enhance the knowledge of physicians, nurses and medical laboratory technologists about the basics of coagulation from laboratory testing to anticoagulant drugs and management of common bleeding disorders.

For more information on the above listed tools or other resources that are available please visit www.transfusionontario.org
PowerPoint Presentations:

Emergency Blood Management

This slide presentation outlines the background, definitions and phases of the Ontario Blood Shortage Plan and key elements of a Hospital Emergency Blood Shortage Plan. Its intended use is for education of hospital stakeholders about the importance of planning for the possibility of a blood shortage. [http://transfusionontario.org/en/cmdownloads/categories/emergency_blood/](http://transfusionontario.org/en/cmdownloads/categories/emergency_blood/)

Transporting Blood Products Internally

This template can be used to provide initial or refresher training to staff responsible for transporting blood from the laboratory to the patient care area and can be customized to site specific processes. [http://transfusionontario.org/en/cmdownloads/categories/bedside_audit/](http://transfusionontario.org/en/cmdownloads/categories/bedside_audit/)

Blood Administration made Bloody Easy: Module 1 – Transfusing the Patient, Module 2 – Indications and Compatibility and Module 3 – Transfusion Reactions

These 3 presentations, updated in 2015, were developed for nurses to support education and training related to the handling and administration of blood. These PowerPoint presentations are available in both English and French.

For more information on the above listed tools or other resources that are available please visit [www.transfusionontario.org](http://www.transfusionontario.org)
Disaster and Contingency Planning Related to Blood Transfusion

Blood components/products play a vital role in the provision of healthcare to patients. Unexpected events can occur that may result in a reduction of the supply of blood components or blood products. Hospitals need to have contingency plans in place to mitigate the impact and risk to patients should this occur. Examples of the type of situation that could result in a reduction of supply or the availability of transfusion services include:

- Facility catastrophic event such as fire, flood or earthquake causing building or building system failure
- Local disaster resulting in overwhelming request for provision of blood and/or blood products such as multi-vehicle accident, airplane or train accident
- Regional or national event resulting in a severe supply shortage or the distribution of blood and/or blood products

Local or Regional Disaster Plans

Most hospital laboratories will have plans in place to address events that would require displacement of laboratory services and large local disaster scenarios affecting a large number of patients. The TC should be familiar with these plans and review them periodically to ensure patient care will be addressed adequately in relation to the provision of blood components and products.

Regional or National Blood Shortage Events

A National plan for the management of Blood Shortages was developed by a working group of the NAC. First released in 2010, it has been revised, most recently in October 2015. The Ontario Ministry of Health and Long-Term Care, through a working group, developed and released a Contingency Plan for Management of Blood Product Shortages in January 2008. The most current version of the Ontario Plan is available at www.transfusionontario.org.

What does this mean for the Transfusion Committee?

Each hospital should have a plan developed to guide healthcare professionals through the response that will be required should a blood shortage ever occur. Hospitals will need to take steps to reduce the demand for the affected blood component/product, inform staff and patients that may be impacted as a result of delayed or deferred treatment, maintain communication with CBS as well as the Ministry of Health and Long-Term Care. This type of event would greatly impact the transfusion service and its ability to provide service within the hospital therefore, it is in the best interest of the TC to be familiar with and review the Hospital Emergency Blood Management Plan.
What role would Transfusion Committee members play during a blood shortage?

Each hospital should develop their own plan, addressing their own needs should a blood shortage ever occur. The Ontario Emergency Blood Management Committee developed a toolkit to guide hospitals in developing their own hospital specific blood shortage plan to ensure hospitals take a consistent approach and that patients across the province will be treated equitably. Some hospitals have elected to create a committee (Hospital Emergency Blood Management Committee) to specifically manage communication and triage orders for blood during a blood shortage. Other hospitals may use an existing committee (such as the TC or facility disaster management committee) to serve this purpose. Regardless of which committee is tasked with managing a blood shortage situation, TC members should be familiar with the hospital plans that relate to the management of blood resources in a disaster or critical shortage situation.
Committee Information

Committee Member’s Code of Conduct
In addition to the Terms of Reference of a committee, committee members should abide by a code of conduct that will ensure ethical and timely decision making and professional conduct.

Confidentiality
Members will consider issues non-confidential unless otherwise advised. Members will observe confidentiality when asked to do so.

Ethical Decision Making
Situations may arise where “doing the right thing” is not clear. These situations may be referred to as ethical dilemmas, which are not always easily identified. If you or your committee encounters any of the warning signs listed below, there is a significant possibility that there is an ethical dilemma to be resolved:

- A sense of discomfort when the situation is viewed through the lens of being published in a newspaper or viewed on television
- Wanting to proceed in the right direction, but confronting barriers
- Receiving information you wish you didn’t have
- An uneasiness caused by competing values (loyalty versus disclosure; safety versus financial prudence)
- Conflict in the group or committee from different perspectives, values, culture and professions
- A unique situation that has not been faced before. Policies and standards of practice do not apply
- An intuitive, gut feeling that something isn’t right

The most prepared organizations have ethics policies and an established decision framework to guide them with these difficult decisions. The goal of having a framework to guide decision making is to develop a common approach that can be applied to situations where existing policies and processes do not provide sufficient guidance. Some organizations also have ethics specialists that assist teams in reaching the best, most transparent decisions.

What is ethical decision making?

Ethical decision making is a disciplined reflection on how to make decisions about what should be done in a particular situation. Ethical decision-making usually involves four related questions:

- What should we do? (What options are good or right in this context?)
- Why should we do it? (Exploring the values and reasons that support each option.)
How should we do it? (What plan of action best aligns with these values and reasons?)

Who should do it? (Who is responsible for making the final decision and enacting and communicating it?)

The Canadian Medical Association (CMA) prepared a code of ethics (2004) to be used as an ethical guide for Canadian physicians, including residents and medical students. It is based on the fundamental principles and values of medical ethics and hopes to provide a common ethical framework for Canadian physicians. The following is an example of a responsibility included in the code of ethics guide that falls under responsibilities to society “Recognize the responsibility of physicians to promote equitable access to healthcare resources”  

The following statement from Hamilton Health Sciences pertains to the use of an ethical decision making framework: “Often there will not be an answer that pleases everyone and so it is our responsibility to ensure that our processes for decision-making are fair and legitimate. This tool is designed to help you think through difficult decisions and develop justifiable reasons for your choices in a rigorous, transparent and fair manner.”

Open, collaborative and transparent discussion with committee members, each providing their experience and knowledge is often a most efficient method to address situations that may present as an ethical dilemma.

Additionally, committee members should not hesitate to ask for outside assistance and input from non-committee members like staff, volunteers, patients and their families in order to make the best decision in a difficult situation.
References


Appendix A: TTISS Algorithm for Reporting Adverse Transfusion Events

Ontario Guide for Reporting Transfusion Reactions

The “Canadian Transfusion Adverse Event Reporting Form” (CTAERF) can be used for reporting to the Ontario Transfusion Transmitted Injuries Surveillance System (TTISS-ON), Canadian Blood Services (CBS), Canada Vigilance Program (Health Canada) and Manufacturers of Plasma Derivatives. To download the CTAERF go to: http://www.transfusionmedicine.ca/sites/transfusionmedicine/files/ctaer_form-eng.pdf
Note: Remove patient name and OHIP number before faxing or emailing the CTAERF.

1. Reporting to Ontario Transfusion Transmitted Injuries Surveillance System (TTISS-ON)
All reactions (excluding minor allergic, febrile non-hemolytic and delayed serological) are reportable to TTISS-ON, including those that are not required to be reported to the Canada Vigilance Program, CBS or the Manufacturer of Plasma Derivative (e.g. Acute Hemolytic reaction due to a mislabelled specimen). TTISS-ON reports aggregate de-identified data to the Public Health Agency of Canada as part of the National TTISS program.

- Enter information collected using the CTAERF into the REDCap TTISS-ON database at https://ttiss.mcmaster.ca or FAX the CTAERF to 905-524-2983. (Attention: TTISS)

- To obtain a password to enter information in the TTISS-ON database, fill out the contact information form by clicking the link: https://ttiss.mcmaster.ca/surveys/?s=R7EFM83X7A

- For more information about TTISS-ON contact:
  Joanne Duncan, TTISS Ontario Coordinator, McMaster University, Hamilton
  Tel: 905-525-9140 ext. 22934  Email: duncanj@mcmaster.ca

2. Reporting to the Canada Vigilance Program (as per Health Canada Blood Regulations)
Refer to Page 2 and FAX or Mail the CTAERF to:
Canada Vigilance Program
Marketed Health Products and Effectiveness Information Bureau
Marketed Health Products Directorate/Health Products and Food Branch
Health Canada, Postal Locator: 0701E
Ottawa, Ontario K1A 0K9
Fax (613) 957-0335  Telephone (613) 957-0337
E-mail: CanvadaVigilance@hc-sc.gc.ca (Do not send reports via email, for inquiries only)

For reporting to Health Canada under the Medical Device Regulations:

3. Reporting to Canadian Blood Services (CBS)
Refer to Page 2 and FAX the CTAERF to local Medical Office during business hours and central office for your region after hours:
Note that if patient blood samples are being sent to CBS for testing, the patient’s name is required

**During Business Hours** - Local Medical Offices (9-4 pm)
**Off Hours** - Central Office: Brampton (Hamilton/London/Toronto)
**Off Hours** - Central Office: Ottawa (North/East Ontario, Ottawa and Nunavut)

4. Reporting to Manufacturer of Plasma Derivative
Refer to Page 3 and FAX or Email the CTAERF to the appropriate Manufacturer of the implicated derivative. For contact information go to: https://www.blood.ca/en/hospitals/plasma-products and download the Manufacturer Contact List.

Developed by the TTISS-ON Education Committee - Version 1: 2015
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Reporting Transfusion Reactions to BLOOD COMPONENTS* for Hospital Transfusion Medicine Laboratories (TMLs)

*Red Blood Cells, Platelets, Frozen Plasma, Cryosupernatant Plasma, Cryoprecipitate

Investigate and identify type of transfusion reaction**

**Referred to in this document as Adverse Transfusion Event (ATE) and in the Blood Regulations as Adverse Recipient Reaction (ARR)

No Further Reporting Required

YES

Is the ATE one of the following?
- Minor Allergic
- Febrile Non-Hemolytic
- Delayed Serological

NO

COMPLETE the Canadian Transfusion Adverse Event Reporting Form (CTAERF) excluding patient name and OHIP No.

Is the ATE the result of transfusion practice or due to an error at the bedside?

Examples: Transfusion associated circulatory overload (TACO); Incompatible transfusion due to mislabeled sample; Transfusing the wrong patient
Note: ATEs resulting from device malfunction (e.g. blood warmer, infusion pump) are also reportable to Health Canada - Medical Devices Regulations

YES

Is the ATE attributable to an activity at the hospital that affected the safety/efficacy of the component?

Examples:
- ATEs due to mislabeling of the component by the TML (e.g. uniradiated blood labeled as irradiated)
- Bacterial contamination due to pooling of component at the hospital or storing of blood in a malfunctioning fridge
- REPORT TO BOTH the Canadian Blood Services and the Canada Vigilance Program if it is not clear whether an ATE is due to a hospital activity that affected the component or the component itself (e.g. contamination)

NO

Report ATE to Canada Vigilance Program (Health Canada Blood Regulations)
FAX or mail CTAERF within 24 hours of a fatality, otherwise within 15 days
(see Instructions p.1)
Final report is required once investigation is complete

YES

Is the ATE one of the following?
- Transfusion-Related Acute Lung Injury (TRALI or Possible TRALI)
- Severe allergic reaction/anaphylaxis
- Bacterial contamination
- Post transfusion infection (e.g. HIV, Hepatitis, Chagas, Malaria, West Nile)
- Adverse events due to suspected CBS mislabeling
- Unexplained new acute severe neutropenia or thrombocytopenia (transfusion-related alloimmune neutropenia or thrombocytopenia)
- Other unusual reaction where the hospital is concerned the blood component is the cause

NO

Report ATE to Canadian Blood Services (CBS)
FAX the CTAERF to local Medical Office
(see Instructions p.1)
Report the ATE immediately if fatality or if suspected to be attributable to quality of component (e.g. bacterial or viral contamination). Otherwise as soon as possible.
Note: CBS reports as required to the Canada Vigilance Program

YES

Report ATE to Ontario Transfusion Transmitted Injuries Surveillance System (TTISS-ON)
Enter data directly into the TTISS-ON web database or send CTAERF by FAX within 3 months
(see Instructions p.1)

NO

Developed by the TTISS-ON Education Committee -Version 1: 2015
Page 2 of 3
www.transfusionontario.org
Reporting Transfusion Reactions to PLASMA DERIVATIVES* for Hospital Transfusion Medicine Laboratories

*Ilg, Prothrombin Complex Concentrate, Rhlg, Albumin, S/D Plasma, Coagulation Factor Concentrates, etc.

Investigate and identify type of transfusion reaction**
**Refers to in this document as Adverse Transfusion Event (ATE)

No Further Reporting Required See

YES

Is the ATE a minor reaction common to the plasma derivative?
(e.g. Minor Allergic)

NO

COMPLETE the Canadian Transfusion Adverse Event Reporting Form (CTAERF) excluding patient name and OHIP No.

Could the ATE have been caused by an activity at the hospital that affected the safety/efficacy of the product or is the ATE due to a complication of transfusion practice or an error?

Examples: Improper storage, contamination during pooling, Transfusion Associated Circulatory Overload (TACO)

REPORT TO BOTH the Manufacturer of the Plasma Derivative and TTISS-ON if it is not clear whether suspected bacterial contamination is due to an activity at the hospital

YES

Is the ATE serious as defined by the Food and Drug Regulations?

Examples:
- Serious acute/delayed hemolytic reactions
- Aseptic meningitis
- Transfusion-Related Acute Lung Injury (TRALI) or Possible TRALI
- Severe allergic reaction/anaphylaxis
- Bacterial contamination
- Post transfusion infection (e.g. Hepatitis)
- Unexplained new acute severe neutropenia or thrombocytopenia (transfusion-related alloimmune neutropenia or thrombocytopenia)
- Other unusual reaction where the hospital is concerned the plasma derivative is the cause

NO

YES

Report ATE to Manufacturer of Plasma Derivative

FAX or email the CTAERF to the appropriate manufacturer (see Instructions p.1)

Report the ATE immediately if fatality or if suspected to be attributable to product quality (e.g. bacterial or viral contamination). Otherwise as soon as possible.

Note: The Manufacturer is required to report to the Canada Vigilance Program

NO

Report ATE to Ontario Transfusion Transmitted Injuries Surveillance System (TTISS-ON)

Enter data directly into the TTISS-ON web database or send CTAERF by FAX to Ontario TTISS within 3 months (see Instructions p.1)
Appendix B: Standards Relating to Transfusion Committees in Canada

Accreditation Canada

Accreditation Canada is a not-for-profit, independent organization accredited by the International Society for Quality in Healthcare (ISQua). Accreditation Canada provides accreditation to national and international healthcare organizations through an external peer review process to improve the services they provide to their patients and clients based on standards of excellence.

Accreditation Canada requirements that apply to Transfusion Committees include:

19.1 The organization has a transfusion committee that provides consultation and support on transfusion practices and activities. **Guidelines:**

The transfusion committee

- helps to define blood transfusion policies to the local clinical activities;
- ensures that regular evaluations of blood transfusion practices are conducted;
- sets criteria for the evaluation of ordering practices, usage, administration policies and the ability of services to meet recipient needs;
- recommends corrective measures if necessary;
- disseminates transfusion medicine information and education;
- evaluates reports of adverse transfusion events and transfusion errors within the facility as well as relevant federal and provincial or territorial reports on adverse transfusion events; and
- reviews available alternatives to allogeneic blood transfusion and makes appropriate recommendations on their use.

Accreditation Canada Standards; Transfusion Services v9 2014/01/01
www.accreditation.ca/en/

Canadian Society for Transfusion Medicine (CSTM) Standards for Hospital Transfusion Services

The Canadian Society for Transfusion Medicine is a multidisciplinary society which promotes and supports the best practice in Transfusion Medicine in Canada through education, communication and partnerships. It is through this mandate that the Standards for Hospital Transfusion Services were developed. These standards are intended to be incorporated into Canadian hospitals’ policies, processes and procedures.

CSTM Standards (v3 Feb 2011) that apply to Transfusion Committees include:

1.8: A transfusion committee shall be established to:

- a) identify transfusion policies as appropriate to local clinical activities
b) identify criteria for blood component and blood product utilization  
c) ensure regular audits of transfusion practices are performed, reviewed and appropriate corrective action taken  
d) identify inappropriate use of blood components and blood products and facilitate corrective action  
e) identify available alternatives to allogeneic blood transfusion and development of recommendations on their use  
f) ensure the dissemination of transfusion medicine information and education  
g) review reports of adverse reactions and errors in the facility, as well as relevant governmental reports on adverse transfusion events

1.9: The transfusion committee shall:

a) involve key members of the transfusion community, including physicians, nurses, transfusion service staff, and executive management  
b) meet at least quarterly  
c) The transfusion committee may operate regionally

2.2: The TS medical director shall attend all transfusion committee meetings or send a designate who is a physician

Canadian Society for Transfusion Medicine, Standards for Hospital Transfusion Services. Ottawa, Ontario; Ver 3 February 2011.

**Canadian Standards Association (CAN/CSA) Z902 National Standard for Blood and Blood Components**

The Canadian Standards Association (CSA) is a not-for-profit, non-statutory, voluntary association engaged in standards development and certification activities. These standards were developed through a consensus of volunteer experts involved in the Canadian Blood System with varied viewpoints.

CAN/CSA Z902-15 (Dec 2015) Standards that apply to Transfusion Committees include:

4.4: The transfusion service shall have a transfusion committee with documented terms of reference (defining, for example, its membership, scope of activity, and meeting frequency). The role of the committee shall be to provide consultative and support services with relation to transfusion practices and activities. The committee membership shall include key stakeholders, including physicians, nurses, transfusion staff, hospital administration, and other personnel as needed. It shall meet at least quarterly. The purpose of the transfusion committee shall be to:

a) help define blood transfusion policies as appropriate to the local clinical activities  
b) ensure that regular evaluations of blood transfusion practices are conducted  
c) set criteria for the evaluation of ordering practices, usage (including the discarding of blood and blood components), administration policies, and the ability of services to meet recipient needs
d) recommend corrective measures, if necessary

e) disseminate transfusion medicine information and education

f) evaluate reports of adverse transfusion events and all transfusion errors within the facility, as well as relevant federal and provincial or territorial reports on adverse transfusion events

g) review available alternatives to allogeneic blood transfusion and make appropriate recommendations on their use


**Health Canada - Health Products and Food Branch**

Health Canada Health Products and Food Branch has a mandate to minimize health risk to Canadians and maximize safety. In October 2014, regulations were brought into effect to ensure safe handling and management of blood components both at Canadian Blood Services and hospital transfusion services. The blood regulations fall under the Food and Drugs Act and apply to processing, labeling, storing, distribution, transformation for further manufacturing of human blood collected for transfusion. The regulations are referenced to the most current version of the CSA Standard for Blood and Blood Components (Z902).

Hospital transfusion services must comply with these regulations. There is no specific reference to a transfusion committee either within the regulations or the accompanying guidance document.


**Institute for Quality Management in Healthcare (IQMH), Accreditation Requirements**

IQMH, formerly known as Ontario Laboratory Accreditation (OLA) has been in operation since September 15, 2000. Its first accreditation certificates were issued in 2003.

IQMH is mandated to perform regular external peer assessments of all licensed laboratories in Ontario and is linked to the Standards Council of Canada, so organizations may request an ISO 15189 accreditation certificate to be issued by the Council.

IQMH accreditation requirements (v6.0 Dec 2013) that apply to Transfusion Committees include:

**Requirement II.D.1**: Laboratory management shall ensure that the laboratory participates in quality improvement activities. Some of these activities shall include clients and they shall deal with outcomes of patient care when possible.
TM182: There shall be a transfusion medicine committee with documented terms of reference. It shall meet at least quarterly and document its activities.

Institute for Quality Management in Healthcare (IQMH); Toronto, Ontario v 6.0 December 2013.
Appendix C: Example of Terms of Reference of a Transfusion Committee

<Hospital Name> Transfusion Committee

Terms of Reference

1.0 OVERVIEW
Each hospital in Ontario is required to have a transfusion committee\(^1\),\(^2\) with documented terms of reference. The committee shall review policies and activities to ensure that blood utilized in that facility occurs safely and effectively. The transfusion committee functions can be accomplished through another existing committee (such as pharmacy and therapeutics committee). The transfusion committee can function as a regional committee.

2.0 MANDATE
The mandate of the committee is to provide consultative and support services with relation to transfusion practices and activities. The purpose of the committee is to:

- Help define blood transfusion policies as appropriate to local clinical activities
- Ensure that regular evaluations of blood transfusion practices are conducted
- Set criteria for the evaluation of ordering practices, usage (including wastage/discards) and administration policies
- Ensure the transfusion service and clinical team are able to meet the needs of recipients
- Recommend corrective action/ measures as required
- Disseminate information and education related to blood transfusion
- Evaluate reports of adverse transfusion events and errors within the facility, as well as relevant reports from other jurisdictions (provincial, national)
- Review available alternatives to allogeneic blood transfusion and make recommendations on their use

3.0 ACCOUNTABILITY
The transfusion committee should report to the Medical Advisory Committee <or similar committee>

4.0 MEMBERSHIP
The transfusion committee is required to involve key physicians and nurses involved in the use of blood for transfusion, transfusion service staff and executive management.

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2 Institute for Quality Management in Healthcare (IQMH), Toronto, Ontario; v6.0 December 2013: II.D.1 TM 182.
The medical director responsible for the transfusion service must attend transfusion committee meetings. If unable to attend, a designate can be sent in their place but this designate must be a physician.

The transfusion committee must have a chairperson named and this person should ideally not be the medical director responsible for the transfusion service.

5.0 TERMS OF MEMBERSHIP

Each member of the committee shall have a term of <insert length of term> years with an option to renew at the end of each term. Rotation of terms should occur to ensure new members can gain experience from those that have participated on the committee for at least two years.

6.0 MEETING FREQUENCY

Meetings of the transfusion committee must occur at least quarterly.

6.1 Meetings

6.1.1 The Chair will be selected by the Medical Advisory Committee

6.1.2 The Vice Chair will be selected by the transfusion committee members (by vote) and be approved by the Medical Advisory Committee

6.1.3 The Vice Chair will take the role of the Chair when the Chair is not present

6.1.4 A secretary will be appointed to record and distribute minutes of meetings, decisions and recommendations

6.2 Review of Terms of Reference

6.2.1 The committee shall review the terms of reference at least every 2 years.

7.0 CONFIDENTIALITY AND CONFLICT OF INTEREST

In the participation on the transfusion committee, members may have access to information of a confidential nature. Members must not disclose confidential information obtained during the course of their role in the transfusion committee and must take all reasonable steps to avoid and declare, if necessary, any conflict of interest.
Appendix D: Examples of Transfusion Committee Agendas

### Agenda (Example 1)

<table>
<thead>
<tr>
<th>Meeting called by:</th>
<th>Date &amp; Time:</th>
<th>Meeting Location:</th>
<th>Participants:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agenda Item</th>
<th>Desired Outcomes</th>
<th>Person Responsible</th>
<th>Time Allotted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acceptance of Agenda</td>
<td>Approval</td>
<td></td>
<td>2 min.</td>
</tr>
<tr>
<td>2. Minutes of Previous Meeting</td>
<td>Approval</td>
<td></td>
<td>2 min.</td>
</tr>
<tr>
<td>3. Product Presentation (RiaSTAP)</td>
<td>Presentation</td>
<td></td>
<td>10 min.</td>
</tr>
<tr>
<td>5. Business arising from minutes:</td>
<td>Update</td>
<td></td>
<td>10 min.</td>
</tr>
<tr>
<td>a) Informed consent audit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Massive Transfusion Protocol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Contingency planning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. New Business</td>
<td>Discussion</td>
<td></td>
<td>10 min.</td>
</tr>
<tr>
<td>a) Bedside Audit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Revision of Guidelines for Frozen Plasma use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Round Table Discussion</td>
<td>Additional items</td>
<td></td>
<td>5 min.</td>
</tr>
<tr>
<td>8. Reports:</td>
<td>Review</td>
<td></td>
<td>10 min.</td>
</tr>
<tr>
<td>a) Blood Adverse Reaction report</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) CBS Hospital Disposition Reports</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Date of Next Meeting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Adjournment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Agenda (Example 2)

### Meeting:
Regional Transfusion Committee

### Date:

### Location:
Conference Room xxx/Teleconference #

### Time:
0730-0900

### Invitees:
Representatives from each regional site

<table>
<thead>
<tr>
<th>Agenda Item</th>
<th>Participants and Discussion Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Welcome, review of past</td>
<td>• Terms of Reference/relationship between regional HTC and individual site MACs</td>
</tr>
<tr>
<td>minutes and current agenda</td>
<td>• Consent to transfusion policy and associated MD memo</td>
</tr>
<tr>
<td>2. Review outstanding action</td>
<td>• Pre-printed order sheet for blood transfusion</td>
</tr>
<tr>
<td>items</td>
<td>• Testing of cord samples</td>
</tr>
<tr>
<td></td>
<td>• Meditech/IT support for laboratories</td>
</tr>
<tr>
<td></td>
<td>• Pediatric transfusion policies</td>
</tr>
<tr>
<td></td>
<td>• Issuing of Blood Products by RNs after hours</td>
</tr>
<tr>
<td>3. New business</td>
<td>• Procedure for therapeutic phlebotomy</td>
</tr>
<tr>
<td></td>
<td>• Guidelines for Appropriate Use of Blood Products</td>
</tr>
<tr>
<td></td>
<td>• Ontario IVIG Utilization Management Strategy</td>
</tr>
<tr>
<td></td>
<td>• Issuing of Blood Products from Non-IQMH accredited sites</td>
</tr>
<tr>
<td></td>
<td>• Report from IQMH assessments within region</td>
</tr>
<tr>
<td>4. Incident reports and acute</td>
<td>Presentation of reported adverse reactions since last meeting</td>
</tr>
<tr>
<td>transfusion reactions</td>
<td>Discussion of trends/action required</td>
</tr>
<tr>
<td>5. Report from CBS and ORBCON</td>
<td>Update on new processes or resources</td>
</tr>
<tr>
<td>6. Report from Hospital Sites</td>
<td>Site specific issues - discussion</td>
</tr>
<tr>
<td>7. Adjournment</td>
<td></td>
</tr>
</tbody>
</table>
Appendix E: Example Conflict of Interest Guidelines

Conflict of Interest Guidelines

Definition

Conflict of Interest – any personal financial or other interest which conflicts with the role the individual because it could:

1. Interfere with the individual’s objectivity
2. Be perceived to create unfair advantage for the individual

Purpose

To provide guidance to members of this committee to identify and address situations that may arise when an individual is in conflict with their professional, business, volunteer or personal interests. These guidelines serve to preserve the integrity of decisions made by this committee to ensure they serve the best interests of the committee and the organization it serves.

Procedure

If a committee member feels they are in conflict of interest, they must declare it and recuse themselves from the discussion/decision. This shall be documented in the meeting minutes. Examples of situations include:

- At the time of appointment to the committee
- Prior to each meeting upon review of agenda
- During the course of discussion at a committee meeting

If a committee member fails to declare their conflict of interest they may be asked to step down from the committee.

A conflict of interest is any situation where your decision or opinion could be influenced by:

a. your personal interest, or
b. those of a close friend, family members, business associate, corporation or partnership in which you hold a significant interest, or a person to whom you owe an obligation

Conflict of interest arises when a reasonably well informed person could perceive that a decision was made or advice was given that would promote your personal interests or those you have some relationship with as listed above.

If you feel you have a conflict of interest at any time, you must disclose this to the chairperson of the committee and ask to be excused from the discussion / decision. If you
are not aware of any conflict until after the discussion or decision has been made, you are still required to disclose your conflict immediately. Some committees require a conflict of interest form be signed. Alternatively, the disclosure of conflict of interest can be added as a standing agenda item and recorded in the committee meeting minutes.

Examples:

- Financial interest in or gifts received from a pharmaceutical company that manufactures blood products
- Research interest from a blood manufacturer (consulting fees, patents, royalties)

Reference: https://www.councilofnonprofits.org/tools-resources/conflict-of-interest
Appendix F: Sample Job description for a Transfusion Safety Officer (TSO)

Division or Department: Transfusion Medicine

Position Title: Transfusion Safety Officer

Technical / Clinical
- Collaborates with medical, technical, paramedical and nursing personnel to identify, implement and evaluate strategies for improving blood utilization
- Reviews, recommends and/or introduces blood transfusion equipment devices to the appropriate hospital personnel
- Reviews published guidelines, standards, and literature on blood component/product use, blood transfusion techniques, alternatives to transfusion and effects of transfusion and makes applicable recommendations
- Liaises with Canadian Blood Services, commercial companies and Transfusion Medicine regulatory bodies on transfusion related matters
- Liaises with Transfusion personnel from other healthcare institutions
- Reviews and investigates blood component/product occurrence reports and transfusion reactions and where appropriate, recommends changes to current practices
- Oversees the completion of lookback/traceback and patient inquiries regarding blood transfusions
- Consults with hospital stakeholders regarding program changes that will affect blood component/product use, blood transfusion equipment needs, etc.
- Identifies and investigates any trends related to transfusion practices, i.e. an increased occurrence of reactions
- Acts as a resource for blood administration related technical problems

Utilization Management
- Conducts prospective and retrospective audits on the utilization of blood components/products and their alternatives
- Monitors Transfusion Medicine product utilization and brings utilization issues to the attention of the Medical Director and the Transfusion Committee
- Maintains blood usage statistics
- Develops and maintains a resource library of alternatives to blood transfusion, and educational material

Quality and Risk Activities
- Participates in the investigation of errors and accidents and reports to Manager, Medical Director and Transfusion Committee
- Develops and monitors a blood product utilization program to ensure that appropriate products are requested and used and that wastage is minimal
- Promotes benchmarking and evidence-based practice in the transfusion of appropriate blood, blood products and their alternatives
- Works collaboratively with the Manager, Technical Specialist, and Blood Transfusion staff to ensure updating of policy and procedure manuals to reflect changes in transfusion practice
- Participates as a member of committees requiring Nursing Transfusion Medicine input such as new product evaluation and nursing procedures
**Professional and Educational Activities**
- Provides ongoing education to nurses, physicians, residents, technologists, paramedical personnel and patients on appropriate use of blood components/products and their alternatives, and blood transfusion devices and other related information
- Assists in planning educational symposiums on transfusion related topics
- Develops and maintains a personal education program that supports continuous improvement of the role of Transfusion Safety Officer
- Maintains a proactive involvement in professional organizations
- Fosters a regional focus through planning and education on transfusion related issues
- Acts as a resource to nurses, clinicians and staff related to Blood Transfusion issues
- Liaises with other paramedical organizations to ensure implementation of best practices in transfusion therapy (i.e. OPANA, IV Nurses Association, etc.)

**Research**
- Participates in transfusion related research
- Participates and assists in the preparation of scientific papers for publication and/or presentation at scientific meetings on transfusion related matters
- Liaise with clinicians, researchers and company representatives to identify research priorities

**Qualifications**

**Required:**
- MLT or RN licensed to practice in Ontario
- 5 years’ experience working in field of blood transfusion/transfusion medicine
- Able to travel between sites (if regional position)
- Self-directed individual
- Proficient in computer programs such as: MS Word, Excel, PowerPoint, email
- Working knowledge of blood standards (current) and blood system
- Excellent communication and interpersonal skills

**Asset:**
- Experience planning and performing clinical audits (utilization, patient safety)
- Experience working on committees
- Experience in teaching / presenting
- Experience working within a quality management system

**Acknowledgements**

*This generic job description was developed using the Hamilton, London, and University Health Network TSO job descriptions. We acknowledge and thank these institutions for sharing their information with us.*
Appendix G: Sample Maximum Surgical Blood Order Schedule

**Maximum Surgical Blood Orders Guidelines**

These are standard orders for procedures with the potential for blood transfusion. Procedures not listed have low likelihood for transfusion. The attending surgeon may upgrade the order when increased blood needs are likely.

**Group & Reserve / Type & Screen** include a blood group, antibody screen, and storage of patient plasma for the day of surgery. Compatible product will be added on quickly as needed.

For procedures with likelihood of transfusion, packed red cells may be ordered prior to OR. Orders for other blood products must be communicated directly to Transfusion Medicine/Blood Bank ASAP.

Informed written consent for blood products is required and is the responsibility of the surgeon.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>GR / T&amp;S</th>
<th>Packed Red Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ABDOMINAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdomino-perineal Resection</td>
<td>X</td>
<td>2 units</td>
</tr>
<tr>
<td>Bowel / Rectum Resection / Hemicolecotomy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Common Bile Duct Exploration</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Esophagectomy / Esophagogastrectomy</td>
<td>X</td>
<td>2 units</td>
</tr>
<tr>
<td>Gastrectomy</td>
<td>X</td>
<td>2 units</td>
</tr>
<tr>
<td>Liver Lobectomy / Resection</td>
<td>X</td>
<td>4 units</td>
</tr>
<tr>
<td>Pancreatectomy</td>
<td>X</td>
<td>4 units</td>
</tr>
<tr>
<td>Splenectomy – laparoscopic / open</td>
<td>X</td>
<td>2 units</td>
</tr>
<tr>
<td>Whipples Procedure</td>
<td>X</td>
<td>4 units</td>
</tr>
<tr>
<td><strong>CARDIAC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aortic Coronary Bypass / Valve</td>
<td>X</td>
<td>2 units</td>
</tr>
<tr>
<td>Redo Procedure</td>
<td>X</td>
<td>4 units</td>
</tr>
<tr>
<td><strong>GYNECOLOGY / OBSTETRICS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caesarian Section</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Hysterectomy / Oophorectomy / Myomectomy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Laparotomy / Anterior-Posterior Repair / Sling</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Omentectomy procedures / De bulking</td>
<td>X</td>
<td>2 units</td>
</tr>
<tr>
<td>Therapeutic / Incomplete Abortion / Miscarriage</td>
<td>OBMOM/ RIGW</td>
<td></td>
</tr>
<tr>
<td><strong>NEUROSURGICAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carotid Endarterectomy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Clipping Aneurysm</td>
<td>X</td>
<td>2 units</td>
</tr>
<tr>
<td>Craniotomy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lumbar Laminectomy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Meningioma</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Trans-sphenoidal</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>ORTHOPEDIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amputation</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Laminectomy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Fractured Hip / Open Reduction</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Spinal Decompression - Instrumentation</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Procedure</td>
<td>X</td>
<td>Units</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---</td>
<td>-------</td>
</tr>
<tr>
<td><strong>Total Joint Replacement (i.e. hip, knee, shoulder)</strong></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>OTOLARYNGOLOGICAL / MAXILLIOFACIAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commando</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>Laryngectomy</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>Leforte Osteotomy - BSSRO</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mastoidectomy / Parotidectomy / Thyroidectomy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Modified / Radical Neck Dissection</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td><strong>PLASTIC SURGERY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head or Neck Surgery</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mammoplasty</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>THORACIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lobectomy / Pneumonectomy</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>Mediastinoscopy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Resection – Mediastinal Mass / Chest Wall Mass</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>Thoracotomy / Thoracoscopy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Wedge Resection of Lung</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>UROLOGY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cystectomy / Ileal Conduit</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Nephrectomy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Nephrolithotomy (Anatropic) / Nephrolithotripsy</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Prostatectomy - TURP / Retropubic</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Retroperitoneal Lymph Node Dissection (Radical)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>VASCULAR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdominal Aneurysm</td>
<td>X</td>
<td>4</td>
</tr>
<tr>
<td>Amputation</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Aorto-femoral Bypass</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>Arterial Bypass</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>Fem-pop Bypass</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Peripheral Shunt / Bypass</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Profundoplasty</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Endo-vascular Aortic Repair</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix H: Sample Pre-Operative Risk Assessment for Blood Transfusion Tool

### London Health Sciences Pre-Op Ordering Guidelines

<table>
<thead>
<tr>
<th>ADULT PRE-OPERATIVE INVESTIGATIONS ORDER GUIDELINE</th>
<th>Low risk patient</th>
<th>Intermediate risk patient</th>
<th>High risk patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>London Health Sciences Centre</td>
<td>Exercise tolerance &gt; flight stairs or &gt; 1 city block Age under 70</td>
<td>Exercise &gt; 1 flight stairs or &gt; 1 city block Age of 70</td>
<td>Exercise &lt; 1 flight stairs or &lt; 1 city block</td>
</tr>
</tbody>
</table>
| St. Joseph’s Health Care, London September 2015    | Absence of known:  
  - Active malignancy  
  - Heart disease  
  - Pulmonary disease  
  - Hepatic/Renal disease  
  - Hematologic disorder | May have:  
  - Hypertension  
  - GERD  
  - History of angina/MI/atrial fibrillation  
  - Compensated heart failure  
  - Cerebrovascular disease  
  - Diabetes mellitus on oral hypoglycemic med  
  - Renal insufficiency: Cr > 170  
  - Respiratory disease / COPD  
  - Chronic steroid therapy  
  - Chronic anticoagulant | Unstable coronary syndrome  
  - Decompensated heart failure  
  - Significant arrhythmias (Pulse > 100 or < 50)  
  - Severe heart valve disease  
  - Severe COPD  
  - Severe liver disease / cirrhosis (ascites, platelets < 160, jaundice)  
  - Dialysis – dependent renal disease  
  - Diabetes mellitus on insulin |

### Low risk surgery

- Ambulatory  
  - Lithotripsy  
  - Hernia/cholecsystectomy  
  - Arthroscopy  
  - Endoscopic: Gynae, Uro, GI  
  - Ortho: Minor joint / peripheral, scopes  
  - Superficial: biopsy, skin, tonsils  
  - Plastic: breast

- None

### Intermediate risk surgery

- Orthopedic: Spine, major joint  
  - Head and neck surgery  
  - Carotid endarterectomy  
  - Intraperitoneal (laparoscopy)  
  - Intrathoracic (VATS)  
  - Prostate

- None

### High risk surgery

- Vascular: Aortic, major vessels, peripheral arteries  
  - Open intraperitoneal (laparotomy)  
  - Open thoracotomy  
  - Cardiac / Neurosurgery

- CBC  
  - Electrolytes  
  - Creatinine  
  - Group & Screen  
  - ECG if non within 1 month of screening appointment

- CBC  
  - Electrolytes  
  - Creatinine  
  - Group & Screen  
  - INR if liver disease  
  - ECG

### Cataract surgery

- No investigations

- CBC  
  - Electrolytes  
  - Creatinine  
  - Group & Screen

- CBC  
  - Electrolytes  
  - Creatinine  
  - Group & Screen  
  - INR if liver disease  
  - Group & Screen  
  - ECG

### Sickle cell screen

- Family Hx / Ethnic risk

- INR on a.m. of OR  
  - Warfarin therapy

- POC glucose on a.m. of OR  
  - Diabetic patients

### INR on a.m. of OR  

- Warfarin therapy

- B-hCG  
  - Offered if may be pregnant

- ECG  
  - Methadone treatment

- Dialysis patient: electrolytes on day of surgery, unless done after dialysis the day before.
Appendix I: Sample template for e-mail to ordering physician when red cell transfusion does not meet transfusion guidelines, per Laboratory values.

Subject: RBC Transfusion – Confidential Peer Review

Dear Dr. (name):

As you know, maintaining an adequate supply of blood continues to be a challenge across North America. The demand in Ontario continues to exceed the supply. The transfusion of blood products can also have an adverse effect on a recipient. One of your patients (patient name), (HFN/MRN), received (#) units of Red Blood Cells (RBCs) for transfusion on (date), despite a hemoglobin level of (hgb level) and (hgb level the day before, the day of, and the day after the transfusion). According to the laboratory data alone, this transfusion does not appear to meet the (hospital name) Transfusion Committee guidelines for the appropriate transfusion of RBCs (please see criteria below).

Would you please review this transfusion order and let us know the clinical indication for transfusion in this particular case? We are especially interested to learn if the patient was actively bleeding. You can send your reply to (name) at (email) or (phone number) or (address).

(Hospital name) Transfusion Committee is encouraging staff to carefully review the indications for transfusion in clinically stable patients. In addition, the Transfusion Committee is also encouraging staff not to order two units of RBCs when a single unit is likely to be sufficient.

Thank you for your assistance,
Physician’s reviewer’s name
On behalf of (hospital name) Transfusion Committee

Inc:  -Facility Guidelines: Transfusion of Red Blood Cells  
      -CSTM List of TEN Things Physicians and Patients Should Question

References:
   http://www.transfusion.ca/sites/default/files/CSTM%20Choosing%20Wisely%202010%20Things%20List_0.pdf
Appendix J: Example Transfusion Order Set

Blood Product Order Set Template: Red Blood Cells, Platelets, Frozen Plasma – Adult

<table>
<thead>
<tr>
<th>Allergies/Sensitivities</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ none known □ yes (specify)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Admitting Diagnosis:</th>
</tr>
</thead>
<tbody>
<tr>
<td>____________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Informed consent completed as per institutional guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ today □ other (DD/MM/YYYY) □ STAT (call blood bank at XXXXX)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date of transfusion:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ today □ other (DD/MM/YYYY)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre-transfusion laboratory tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ group and screen</td>
</tr>
<tr>
<td>□ previous transfusion within 3 months</td>
</tr>
<tr>
<td>□ previous pregnancy within 3 months</td>
</tr>
<tr>
<td>□ yes □ no</td>
</tr>
<tr>
<td>□ previous transplant</td>
</tr>
<tr>
<td>□ yes □ no</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre-transfusion medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ furosemide ______ mg po prior to transfusion or ______ mg IV prior to transfusion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Irradiated product required as per hospital guidelines, specify reason:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ yes □ no</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specially matched product required as per hospital guidelines, specify reason:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ yes □ no</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Red Blood Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-transfusion Hb: ______ g/L</td>
</tr>
<tr>
<td>Indication: □ low Hb □ significant bleeding □ symptomatic □ other</td>
</tr>
<tr>
<td>Transfuse ______ unit(s), each over ______ hours (e.g. 1 unit over 2-3 hours, maximum 4 hrs)</td>
</tr>
<tr>
<td>Note: consider IV iron instead of red blood cells for patients with stable iron deficiency anemia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Platelets (1 buffy coat pool or apheresis unit = 1 adult dose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-transfusion platelet count: ______ x 10^9/L</td>
</tr>
<tr>
<td>Indication: □ significant bleeding □ invasive procedure/surgery □ prophylactic (platelet count &lt;10 x 109/L)</td>
</tr>
<tr>
<td>Other, specify reason: ______</td>
</tr>
<tr>
<td>Transfuse ______ dose(s), each over ______ hours (e.g. 1 dose over 1-2 hours, maximum 4 hours)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frozen Plasma (dose 15 mL/kg = 3-4 units for an adult; each unit 250 mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg) ______</td>
</tr>
<tr>
<td>Pre-transfusion INR:</td>
</tr>
<tr>
<td>Indication: □ significant bleeding □ invasive procedure/surgery within 6 hours</td>
</tr>
<tr>
<td>Reason for coagulopathy: □ liver disease □ other (specify)</td>
</tr>
<tr>
<td>Transfuse ______ units, each over ______ hours (e.g. each unit over 30 minutes to 2 hours, maximum 4 hours)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Post-transfusion laboratory tests, if indicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ ______</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prescriber name (print): ___________________________ date: ______________ time: ______________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Prescriber signature: ___________________________ Pager #: ___________________________</th>
</tr>
</thead>
</table>
Appendix K: ONTraC Perioperative Optimization and Anemia Management

Algorithm

**Perioperative Hemoglobin Optimization and Anemia Management**

**Goal:** Transfusion avoidance through evidence-based hemoglobin optimization in pre-operative patients

**Risk factors:** Hemoglobin (HGB) <130 g/L, weight <65 Kg, elderly, female, complex or repeat surgical procedure, renal insufficiency (creatinine clearance <60), pharmacologicals (antiplatelet agents, anticoagulants), supplements

**Strategy:** Early assessment (28 days) and appropriate, coordinated interventions for patients at risk for perioperative transfusion.

---

**Hemoglobin optimization and anemia management strategies must be patient specific (e.g. age, gender, and pre-existing medical conditions). Patients with pre-existing thrombotic events should be monitored closely.**

CAUTION: Target maximum HGB optimization using erythropoietin in renal and oncology patients to ≤120g/L.


---

**Appendix K Flowchart**

1. **HGB**
   - **Less than (<) 100 g/L**
     - Consider delaying procedure. Refer to appropriate physician for investigation.

2. **Evaluate for blood loss**
   - GI, menstrual, recurrent epistaxis
   - Evaluate anemia status
     - Look for signs of renal/hepatic failure (treat underlying cause)
     - Check: CBC, differential, reticulocyte count, Ferritin, Folate, B12
     - *All patients over the age of 65 and those at risk for nutritional deficits should have serum B12 + folate evaluated*

3. **Microcytic (MCV <80)**
   - Iron deficiency, thalassemia, anemia of chronic disease, sideroblastic anemia
   - Consider: Appropriate Medical Consult and Lab Investigation

4. **Normocytic (MCV 80-100)**
   - Nutritional deficiency, renal insufficiency, hemolysis (Auto/Auto), anemia of chronic disease, primary bone marrow disorder
   - Consider: Appropriate Medical Consult and Lab Investigation

5. **Macrocytic (MCV >100 <110 mild; >110 marked)**
   - serum B12 deficiency, thyroid disease, alcoholism, hepatic disease, medications: HIV antiviral, Hydroxy®, Septa®, Methotrexate®, myelodysplasia (cytopenia), refractory anemia
   - Consider: Appropriate Medical Consult and Lab Investigations (i.e. liver function studies)

6. **TIBC 45-72 mcg/mL, Ferritin 30-100 mcg/mL**
   - Iron-low, retic-low
   - TIBC >72 mcg/mL, Ferritin <30 mcg/mL

7. **Iron-deficiency anemia**
   - Start Iron Therapy
     1. Oral Iron: 100 – 200 mg elemental iron by mouth per day (e.g. Ferrous Fumarate 300 mg, 1-2 tabs; Ferremal 150 mg, 1-2 tabs per day) or Hercept iron polypeptide 11 mg, 1-3 tabs by mouth per day (e.g. Pepferin)
     2. Iron infusion if patient cannot tolerate oral iron or short timeline (iron sucrose, sodium ferric gluconate, iron dextran)

8. **HGB < 130 g/L**
   - Consider Erythropoietin With Iron

---

**Epoetin Alfa (Erythropoietin)**

**Standard Dosing:** Epoetin Alfa 20,000 – 40,000 units subcutaneously (600 units/kg) weekly to a maximum of 4 doses depending on presenting hemoglobin and time to surgery.

**Short dosing schedule:** Epoetin Alfa 300 IU/kg should be given for 10 consecutive days prior to surgery, on the day of surgery, and for four days immediately thereafter.

**Access:** Third party coverage, cash, or government benefits plans (e.g. Trillium, Individual Clinical Review (ICR)).

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**Developed by Ontario Transfusion Coordinators (ONTTAC), a blood conservation initiative by the Ministry of Health and Long Term Care of Ontario (MOHLTC) – 2007, revised 2012, 2013**

www.onttacprogram.com