

# Ontario Contingency Plan for the Management of Blood Shortages Version 4.0

Copies of this document can be obtained from: <http://transfusionontario.org/>

**Note:** This document is for information purposes only and is not intended to provide either legal or medical advice. If you have a legal question, you should consult a lawyer. If you have a medical question, you should consult a qualified medical professional.

# Table of Contents

Acknowledgements.....	4
Executive Summary.....	5
Abbreviations.....	7
Definitions.....	8
1 Introduction .....	13
<b>1.1 Purpose and Scope .....</b>	<b>14</b>
<b>1.2 Assumptions .....</b>	<b>14</b>
<b>1.3 Key Stakeholders.....</b>	<b>15</b>
1.3.1 Canadian Blood Services (CBS).....	15
1.3.2 Hospitals (HTS and HEBMC).....	16
1.3.3 Ministry of Health (MOH) .....	19
1.3.4 National Advisory Committee on Blood and Blood Products (NAC).....	19
1.3.5 National Emergency Blood Management Committee (NEBMC) .....	20
1.3.6 Ontario Emergency Blood Management Committee (OEBMC).....	20
1.3.7 Provincial/Territorial Blood Liaison Committee (P/T BLC).....	21
<b>1.4 Communications .....</b>	<b>21</b>
1.4.1 Short term regional/provincial shortages.....	22
1.4.2 Regional (short term) shortages specific for platelets.....	22
1.4.3 Figure 1. Communication Flow .....	24
2 Plan Structure .....	25
<b>2.1 Inventory Levels/Phases .....</b>	<b>25</b>
2.1.1 Green Phase and Green Phase Advisory.....	25
2.1.2 Amber Phase.....	27
2.1.3 Red Phase .....	27
2.1.4 Recovery Phase.....	28
<b>2.2 Roles and Responsibilities of Key Stakeholders .....</b>	<b>28</b>
2.2.1 Green Phase.....	28
2.2.2 Green Phase Advisory .....	31
2.2.3 Amber Phase.....	33
2.2.4 Red Phase .....	36
2.2.5 Recovery Phase.....	40

3 Helpful Resources ..... 42

3.1 Ontario Hospital Toolkit for Emergency Blood Management ..... 42

3.2 Ontario Transfusion Quality Improvement Plan (OTQIP) and Toolkit ..... 42

3.3 ORBCoN Inventory Management Toolkit..... 42

3.4 Canadian Blood Services Blood Utilization Best Practices ..... 42

3.5 Ontario Massive Hemorrhage Protocol (MHP) Recommendations..... 42

3.6 National Plan..... 42

3.7 Emergency framework for rationing of blood for massively bleeding patients during a red phase of a blood shortage..... 43

4 Contingency Planning Working Group ..... 44

5 References ..... 45

Appendix A – Example of Hospital Notification from NEBMC and Canadian Blood Services..... 46

Appendix B – Guideline for the Use of Red Blood Cell (RBC) Transfusions in Children and Adults in Shortage Situations<sup>1</sup> ..... 47

Appendix C – Guideline for the Use of Platelet Transfusions in Children and Adults in Shortage Situations<sup>1</sup> ..... 49

Appendix D – Revision Table ..... 51

# Acknowledgements

The Ministry of Health acknowledges the National Emergency Blood Management Committee for the development and maintenance of the National Plan for Management of Shortages of Labile Blood Components, as well as the contributions of the members of the Ontario Contingency Planning Working Group (a working group of the Ontario Emergency Blood Management Committee), past and present, and the Ontario Regional Blood Coordinating Network for their participation in the development, maintenance and dissemination of the Ontario Contingency Plan for the Management of Blood Shortages.

## Executive Summary

The Ministry of Health (MOH) is committed to ensuring that Ontarians have access to a safe, equitable, and adequate supply of blood and blood products across the province. Canadian Blood Services (CBS) as the national blood supplier to all provinces and territories in Canada (excluding Québec) ensures the best practice for inventory management and equitable distribution of blood and blood products across Canada.

While CBS, MOH, and many other champions in the blood system in Ontario work to ensure an uninterrupted supply of blood, there still exists a risk of blood shortages, in particular of labile blood components. Possible circumstances include information system and transportation chain failures, manufacturing or testing delays or failures, communicable disease outbreaks, major weather disruptions, shortage of donors, labour disruptions, or mass casualty event(s).

To help Ontario respond to such a blood supply shortage quickly and effectively, the Ontario Contingency Planning Working Group (CPWG) has updated the Ontario Contingency Plan for the Management of Blood Shortages (“Ontario Plan version 4”) which outlines roles and required actions during a shortage for key stakeholders – the National Emergency Blood Management Committee (NEBMC), CBS, MOH, Ontario Emergency Blood Management Committee (OEBMC) and Ontario’s hospitals. The Ontario Plan version 4 has incorporated the changes in the National Plan for Management of Shortages of Labile Blood Components<sup>1</sup> dated November 7, 2025 (“National Plan”) as well as feedback received following previous blood shortages and blood shortage exercises held in Ontario. This Ontario Plan version 4 addresses labile blood components, however, many of the principles are also applicable to a shortage of fractionated plasma protein products. Regarding Immunoglobulins specifically, these have been included in the [National Plan for Management of Shortages of Immunoglobulin Products, 2024](#) and a corresponding provincial plan is under development at the time of this publication.

The purpose of this document is to provide a framework to Ontario hospitals and other key stakeholders to prepare for a consistent and coordinated response to primarily five different levels of blood inventory in relation to demand – Green, Green Phase Advisory, Amber, Red, and Recovery Phases, to minimize impact on patient care and ensure equitable distribution of health care and resources to Ontarians.

- **Green Phase:** Normal blood component inventory levels exist, where supply generally meets demand. This phase includes a broad range of inventory levels ranging from an ideal inventory to brief shortages that occur periodically and can be managed with existing CBS and hospital actions. Depending on where the national or regional inventory sits within the green phase inventory range, some hospital actions may be required.

- **Green Phase Advisory:** When declared it implies that CBS inventory levels are low with respect to a particular blood component(s) but the lack of information regarding the hospital inventories does not allow for an accurate assessment of amber or red phase risk. It will result in review of combined CBS and hospital inventories to determine the likelihood of crossing into amber or red phase. It may act as a warning of potential shortage if conservation initiatives are not implemented and serve as a signal for hospitals to consider activating mitigation strategies. Mitigation strategies may be recommended by NEBMC and OEBMC.
- **Amber Phase:** Insufficient national inventory is available to ensure routine transfusion practices. Hospitals will be required to implement specific measures, as outlined in this document and as guided by NEBMC and OEBMC, in order to reduce blood usage.
- **Red Phase:** Insufficient national inventory levels exist to ensure that patients with non-elective indications for transfusion will receive the required transfusion(s). The triaging of patients requiring red blood cell transfusion for massive hemorrhage will be required.
- **Recovery Phase:** National inventories have begun to increase and are expected to be maintained at a level that would enable the return to Green Phase.

Hospitals are encouraged to review this Plan and develop, during green phase, their own hospital emergency blood management plan (HEBMP) with specific requirements and settings for their hospital. This can be tasked to the hospital emergency blood management committee (HEBMC) or equivalent.

A French version of this document is available at [www.transfusionontario.org](http://www.transfusionontario.org) under Ressources/Trousses à outils /Emergency Blood Management.

# Abbreviations

ADRD	Average Daily Red Cell Demand
BLC	Blood Liaison Committee
CBS	Canadian Blood Services
CPWG	Contingency Planning Working Group (Ontario)
DOH	Days on Hand
HEBMC	Hospital Emergency Blood Management Committee
HEBMP	Hospital Emergency Blood Management Plan
HII	Hospital Inventory Index
HLS	Hospital Liaison Specialist
HQ	Héma-Québec
HSEMB	Health System Emergency Management Branch (of MOH)
HTS	Hospital Transfusion Service
LIS	Laboratory Information System
MEOC	Ministry Emergency Operations Centre
MHP	Massive Hemorrhage Protocol
MOH	Ministry of Health (Ontario)
NAC	National Advisory Committee on Blood and Blood Products
NAC-BSWG	NAC Blood Shortage Working Group
NEBMC	National Emergency Blood Management Committee
OBCG	Ontario Blood Consultation Group
OEBMC	Ontario Emergency Blood Management Committee
ORBCoN	Ontario Regional Blood Coordinating Network
PEBMC	Provincial Emergency Blood Management Committee
P/T	Provincial/Territorial or Province/Territory
RBC	Red Blood Cells (Unit)
WOH	Weeks on Hand

# Definitions

## Average Daily Red Cell Demand (ADRD)

ADRD is a calculation determined from the CBS web-based hospital disposition reporting system, the Blood Component and Product Disposition System, as follows: <sup>1</sup>

$$\text{ADRD annually} = \frac{\text{[hospital's annual red cell demand in units]}}{365}$$

or

$$\text{ADRD quarterly} = \frac{\text{[hospital's red cell demand in units over 90 days]}}{90}$$

(Red cell demand = transfused + outdated + wasted)

## Blood Component

Whole blood, donated at CBS, is processed into different labile components including red blood cells (RBC), platelets, plasma and cryoprecipitate.

## Blood Conservation strategies

Blood conservation strategies to mitigate risk in the context of blood shortage management may include:

- Redistribution of blood between CBS production/distribution sites to equalize inventory levels across Canada.
- Distribution of blood to hospitals by CBS production/distribution sites to conserve supply and to balance inventory levels across a region (may include adjustments to order/fill rate).
- Reduction of target blood stocks held in HTS and screening of transfusion orders to ensure adherence with published guidelines for appropriate transfusion thresholds.
- Deferral or cancellation of non-urgent, elective procedures associated with blood use.
- Focused efforts to utilize alternative therapies (e.g., IV Iron, erythropoietin, antifibrinolytics, thrombopoietin mimetics, prothrombin complex concentrate, plasma derived factor concentrates such as fibrinogen, as well as recombinant factor concentrates).

## Blood Product

Blood products are manufactured from plasma (e.g., albumin, factor concentrates including fibrinogen concentrate, immune globulins).

## Days on Hand (DOH)

Alternative term for the inventory index at the blood supplier (CBS).

Calculated as:  $\frac{\text{[Actual inventory]}}{\text{[ADRD]}}$

**Elective/Urgent/Emergency surgical procedures**

Elective surgical procedures are those that are not emergency or urgent procedures.

Urgent procedures are those for which a patient is likely to have major morbidity if surgery is not performed within the next one to 28 days.<sup>1</sup>

Emergency procedures need to be performed within 24 hours to prevent the patient's death or major morbidity such as paralysis.<sup>1</sup>

**Emergency Framework**

Emergency framework refers to the document *Emergency framework for rationing of blood for massively bleeding patients during a red phase of a blood shortage* developed by the National Advisory Committee on Blood and Blood Products (NAC) as a supplement to the National Plan. It is an ethical decision-making framework to provide guidance to hospital triage officers so that decisions made on blood allocation for massively bleeding patients during a red phase blood shortage are as consistent and equitable as possible for patients across Canada.<sup>2</sup>

**Ethical Framework**

To ensure acceptance and cooperation by all participants in the application of this plan, based on the National Plan, a fair and transparent priority-setting process for rationing must be developed. The decision-making process used in the preparation of this Plan was based on established ethical principles as discussed in more detail in Appendix H of the National Plan.<sup>1</sup>

In addition, MOH and ORBCoN sought an Ethical Review of the Ontario Plan. The resulting 2021 McMaster University ethics report highlights numerous strengths of the plan, as well as a need for greater inclusion of stakeholders, such as consultation and simulations, reducing bias and ensuring equitable decision making in triaging during a blood shortage.

**Health System Emergency Management Branch (HSEMB)**

Health System Emergency Management Branch serves the entire ministry and health sector as it responds to urgent and/or emergency situations, develops ministry emergency readiness plans, informs health sector planning and directs, as necessary, health sector emergency response and recovery. It implements strategies to ensure continuity of critical ministry services during an emergency; and ensures compliance with the *Emergency Management and Civil Protection Act* and other relevant legislation. HSEMB has representation on the Ontario Emergency Blood Management Committee and provides linkage between the blood system and ministry-wide emergency response if required.

## **Hospital Emergency Blood Management Committee (HEBMC) and Hospital Emergency Blood Management Plan (HEBMP)**

According to the *Public Hospitals Act*, Regulation 965<sup>3</sup> and CAN/CSA Z902:25 Standard<sup>8</sup> hospitals are required to develop plans for emergency situations that could place a greater than normal demand on the services provided by the hospital or disrupt the normal hospital routine. Hospitals should therefore develop and maintain a plan to respond to blood shortages by reducing their demand for the affected blood component or product.

HEBMC is a multidisciplinary committee and can be a separate hospital committee, or subcommittee of another hospital committee such as the Transfusion Committee in smaller hospitals. HEBMC should include hospital staff who order, issue and administer blood, as well as senior administration. Responsibilities include assisting in emergency planning for shortages of blood components and products and implementing the plan during a shortage.

The HEBMP is developed by or in consultation with the Hospital Emergency Blood Management Committee and outlines actions to be taken at the hospital including inventory management, guidance on internal communication, screening of transfusion orders and triage of massively bleeding patients.

### **Hospital Inventory Index (HII)**

A proportion of RBC inventory is held at CBS and the remainder, typically the majority, in hospital inventory. The common index to define inventory levels in relation to anticipated daily need is referred to as the inventory index. Inventory index can describe national and/or provincial and/or hospital inventory levels.

HII is calculated as: 
$$\text{[actual hospital inventory]} / \text{[ADRD]}$$

where actual inventory represents the hospital's inventory at the time it is reported to CBS in the CBS Hospital Portal. The HII can be used by CBS in times of shortage to aid in decisions for allocating inventory. The HII can also be used for comparison to regional, provincial and national indices to provide information to decision makers during blood shortages. Although no ideal HII has been defined, the National Plan suggests that HII for green phase would be about >8 days, green phase advisory 7-8 days, amber phase 5-7 days and red phase less than 5 days.<sup>1</sup>

Recommendations for these levels may be adjusted by NEBMC for specific blood groups during a shortage.

The HII can be calculated by blood group if hospitals report their disposition to CBS by ABO/Rh. Hospitals are strongly encouraged to routinely report disposition of blood components to CBS by blood group, and are required to do so during a blood shortage (including green phase advisory).

### **Medical Procedures**

Includes but not limited to simple transfusion, exchange transfusion, high dose chemotherapy and stem cell transplant.

### **National Plan**

National Plan refers to the National Plan for Management of Shortages of Labile Blood Components, developed by the NAC Blood Shortage Working Group. The National Plan provides guidance to provincial and hospital decision makers on how to manage and allocate resources during a blood shortage. The National Plan is based on established ethical considerations in a blood shortage (outlined in Appendix H of the National Plan).<sup>1</sup>

### **Non-surgical anemias**

Anemia associated with bone marrow failure, post traumatic injury, extracorporeal membrane oxygenation (ECMO), post-operative, and associated with obstetrics.

### **Ontario Plan**

Ontario Plan refers to the Ontario Contingency Plan for the Management of Blood Shortages, which was developed by the Contingency Planning Working Group (CPWG) - a subgroup of the Ontario Emergency Blood Management Committee (OEBMC), to outline the provincial response to a blood shortage.

### **Shipment Index**

The shipment index serves as a proxy for hospital inventory index in days (the number of days for which current inventory will cover average demand), where CBS shipments are used as denominator, instead of hospital daily demand or disposition. This is calculated for each hospital, per blood group, as:

$$\text{Shipment Index (days)} = [\text{actual inventory}] / [\text{average daily CBS Shipments}]$$

Hospital Inventory Index remains the standard, but Shipment Index can be used during shortages if a hospital's daily demand or disposition (the denominator in HII) is not fully reported per blood group.

### **Toolkit**

The Toolkit refers to the Ontario Hospital Toolkit on Emergency Blood Management, a resource to support Hospital Emergency Blood Management Committees (HEBMC) in the development of a HEBMP to respond to a potential or actual blood shortage. The Toolkit includes:

- Preparedness checklists.
- Sample HEBMC Terms of Reference and template for a HEBMP.
- Checklist and supporting resources to train staff on the HEBMP.

- Memo templates to support internal communication during a blood shortage.
- Log sheets to document cancelled/deferred surgeries and other procedures.
- One-pager educational and training documents (job aids) for roles and responsibilities of health care professionals during a blood shortage.

**Triage**

Triage refers to transfusion rationing decisions pertaining to massively hemorrhaging patients during a red phase, made by clinicians and/or triage officers/teams within a hospital, to allocate blood components affected by the shortage.

To assist with triage of patients in need of massive transfusion during a red phase, the NAC has developed the Emergency framework<sup>2</sup> which is included as a supplement to the National Plan. In addition, an updated publication was released from the National Blood Transfusion Committee of the United Kingdom which provides guidance.<sup>4</sup>

**Weeks on hand**

Calculated as:  $[\text{Actual inventory}] / [\text{Average weekly demand}]$

Typically used in relation to plasma inventory.

# 1 Introduction

The Ministry of Health (MOH) ensures adequate and sustainable supply and appropriate use of blood as part of the provincial blood utilization strategy. Based on stakeholder feedback and advice from the Ontario Blood Consultation Group (OBCG), planning for a potential or actual blood shortage was identified as a key priority for MOH.

As a result, the Contingency Planning Working Group (CPWG) was formed in February 2007 to develop a contingency plan for the management of blood in Ontario during a blood shortage. The first version of the Ontario Contingency Plan for Management of Blood Product Shortages (“Ontario Plan”) was released in January 2008.

The National Advisory Committee on Blood and Blood Products (NAC), in collaboration with Canadian Blood Services (CBS), released the National Plan for the Management of Shortages of Labile Blood Components (“National Plan”) in February 2010. Updated versions were released in January 2012, October 2015, March 2020, January and March 2022, and July 2025. The objective of the National Plan is to maximize the effectiveness of a national response to any crisis that impacts the adequacy of the blood supply in Canada.<sup>1</sup>

The National Plan uses a colour-coded system of shortage phases and recommends actions to be taken during the various phases relating to activation of a blood shortage. It also establishes a process to facilitate communication at the national, provincial and hospital levels to achieve a coordinated and consistent response throughout the country. This is imperative because blood inventory in Canada (outside of Québec) is managed at the national level, by one supplier, CBS, irrespective of Provincial/Territorial (P/T) health systems. Provincial plans are all based on the same colour-coded system for alerting stakeholders to blood shortages and actions to be taken. This allows CBS to respond to a blood shortage in a uniform manner, independent of P/T borders.

As recommended in the National Plan, the Ontario Emergency Blood Management Committee (OEBMC) was formed in 2009 to advise MOH and provide provincial specific guidance to hospitals during a blood shortage. OEBMC has coordinated several province-wide exercises to test the Ontario Plan (2010, 2014 and 2018).<sup>5,6,7</sup> For a brief history of actual blood shortage events in Canada, see the National Plan.<sup>1</sup>

In early 2015, the potential for a labour disruption at CBS in Ontario led to heightened awareness of the need to prepare for a potential blood shortage and particularly, for the development of guidelines for the use of platelets. In February 2023, a regional shortage of platelets enforced the need for a separate provision for short-term platelet shortages which may be regional, and not necessarily dealt with at a national level. Recommendations made

following blood shortage exercises and actual supply shortage events will be incorporated into the Ontario Plan with each new revision.

## 1.1 Purpose and Scope

The purpose and scope of the Ontario Plan is to:

- Ensure a standard and equitable approach to managing low blood inventory throughout the province, consistent with the National Plan.
- Outline the provincial response to a blood shortage.
- Describe communication processes, including how national as well as provincial recommendations are communicated and monitored during a blood shortage.
- Assist Hospital Emergency Blood Management Committees (HEBMCs) to develop their Hospital Emergency Blood Management Plan (HEBMP or ‘Hospital Plan’).
- Educate hospitals to assist them in meeting certain standards of practice and regulatory requirements (e.g., the most recent versions of CAN/CSA Z902 Standard on Blood and Blood Components <sup>8</sup>, Canadian Society for Transfusion Medicine Standards for Hospital Transfusion Services <sup>9</sup>, *Public Hospitals Act* <sup>3</sup>).

Although the Ontario Plan was developed with labile blood components in mind (red blood cells, platelets, plasma), a similar approach may be taken to address shortages of manufactured blood products (e.g. albumin, factor concentrate products) if a specific plan regarding the affected blood product is not available.

## 1.2 Assumptions

The Ontario Plan is based on the following assumptions:

- The blood shortage may be regional, provincial or national in scope.
- CBS will make every effort to address the blood shortage and put actions into place to correct the blood shortage as soon as possible, including strategies in the Green Phase to reduce the risk of a blood shortage.
- If a blood supply shortage occurs at CBS, efforts will be made to have the effect carried by all jurisdictions equally, with the possible exception of short-term regional platelet shortages.
- All jurisdictions will respond in an ethical, transparent, coordinated, and collaborative manner.
- The Ontario Plan is reviewed and revised as needed following each simulation exercise or actual event or any significant revisions to the National Plan.
- Hospitals comply with recommendations and guidance provided by the national and provincial emergency blood management committees.

- Blood conservation strategies will follow existing regulations.
- The National Plan acknowledges concerns around potential legal liability.
- A blood shortage may be caused by a variety of events, such as information system and transportation chain failures, manufacturing or testing delays or failures, communicable disease outbreaks, major weather disruptions, shortage of donors, labour disruptions, or a mass trauma event.
- A blood shortage may be short-term or may be a prolonged event.
- Several small rural hospitals maintain minimum stock to support ‘just in case’ transfusion needs (referred to as the ‘red line’ inventory in the National Plan<sup>1</sup>). These sites may have limited access to transfusion medicine expertise. During a blood shortage, for Ontario, this inventory would remain on site; however, if urgent need arises elsewhere, this inventory may need to be redistributed.
- During a blood shortage, heightened efforts would be made to redistribute any components to avoid discards due to outdated.
- An ideal HII or Shipment Index has not yet been defined and may vary for Canadian hospitals. These may also vary by blood group, in particular for group O red cells.

## 1.3 Key Stakeholders

### 1.3.1 Canadian Blood Services (CBS)

CBS is a non-governmental, not-for-profit organization whose mission is to manage the supply of blood and blood products for Canadians, excluding Québec, which is served by Héma-Québec (HQ). Core functions include donor recruitment and management; whole blood, platelet and plasma collection; testing, processing, storage/distribution and inventory management. CBS has agreements in place with HQ and other jurisdictions to obtain blood components during blood shortages. CBS has a key role in notifying and communicating with hospital transfusion services (HTS) via the CBS production/distribution sites in the event of a blood shortage regarding change in inventory phase and ongoing inventory status.

#### 1.3.1.1 CBS production/distribution site

CBS production/distribution site personnel prepare blood components from whole blood donations and distribute both blood components and blood products to hospitals. In Ontario, there are two CBS production/distribution sites: Brampton and Ottawa. The Brampton site provides service to approximately 120 hospital sites in Central, Northeast and Southwest Ontario. The Ottawa site provides service to 24 hospital sites in Eastern Ontario and one hospital in Nunavut. Twelve hospitals in northwest Ontario receive blood components from CBS Winnipeg due to distances for shipping; inventory at these sites is included in Ontario provincial inventory reports and these sites also fall under the Ontario Shortages Plan and OEBMC.

## 1.3.2 Hospitals (HTS and HEBMC)

### 1.3.2.1 Hospital Transfusion Services (HTS)

The HTS is responsible in collaboration with HEBMC for developing their hospital HEBMP. During shortages and optimally at all times the HTS reports red blood cell inventory daily to [CBS Hospital Portal](#). HTS will also be responsible for adjusting inventory levels according to their HEBMP. During a shortage HTS is responsible for communication within their hospital. As blood components may be brought in from Héma-Québec during a shortage, hospitals are encouraged to have Héma-Québec codes built in their Laboratory Information System (LIS), to be able to receive these components without delay.

### 1.3.2.2 Hospital Emergency Blood Management Committee (HEBMC)

Hospitals establish a HEBMC to develop the HEBMP and to ensure adherence to this plan in times of blood shortages. In smaller hospitals the HEBMC may not be a separate committee but could be represented by another committee such as the hospital transfusion committee. All key stakeholders tasked with the development and implementation of the HEBMP should be represented on the committee. This ensures joint input and decision making on the determined strategies required to reduce blood use at the hospital and a collaborative response should it be necessary to implement them (see the [Toolkit](#) for a sample HEBMC Terms of Reference). The HEBMC should delineate the lines of responsibility to ensure effective communication within their facility during a blood shortage and define this in their HEBMP. The National Plan strongly recommends that hospitals also define their target inventory levels by blood shortage phases (green, green phase advisory, amber, red, and recovery) within their HEBMP.<sup>1</sup>

### 1.3.2.3 Hospital Emergency Blood Management Plan (HEBMP)

This plan should be developed and maintained during the normal green phase so that it is available to guide the hospital's response during a blood shortage. Usually, transfusion service personnel and the medical director respond to minor shortages in the supply of one or more blood groups or blood components by screening of transfusion orders as they are received, to verify compliance with hospital transfusion guidelines (or published guidelines<sup>10</sup> where no hospital guidelines exist) and/or reducing the amount of inventory stocked on site. Often, there is no requirement for action to be taken outside of the transfusion service. Should a larger scale or prolonged blood shortage occur however, this response may fail to reduce blood usage to the degree needed to ensure blood components are available to support all routine requests.

Prolonged or severe blood shortages (current or imminent) must be communicated to professional staff outside of the transfusion service to ensure that the required multidisciplinary and coordinated reduction of blood use is achieved.

The HEBMP should (see the [Toolkit](#) for guidance):

- Define the notification of personnel required for various phases of blood shortages and include an updated contact/fan out list.
- Include inventory levels at the hospital by phase, for green, green phase advisory, amber and red phases and how they are monitored.
- Ensure inventory levels are reported to CBS Hospital Portal, as directed.
- Address actions for green phase advisory, amber, and red phases.
- Include how blood conservation strategies (e.g., optimizing hemoglobin prior to any surgical procedure, use of intraoperative cell salvage, non-invasive surgery and use of image guided procedures) and use of transfusion alternatives (e.g., use of erythropoiesis stimulating agents, intravenous or oral iron, thrombopoietin mimetics, antifibrinolytics, and factor concentrates) may be safely and appropriately implemented to avoid anemia or risk of bleeding and reduce the demand for blood.
- Include how screening of transfusion orders will be performed (pre-defined guidelines, use of patient categories, direct medical approval, use of a triage officer/team for massively bleeding patients), documented and monitored in Amber and red phases. This may include:
  - strict adherence to published guidelines for appropriate transfusion thresholds
  - reduction in number of components given per treatment (e.g., splitting of platelet units, single unit red blood cell transfusions)
  - deferral or cancellation of non-urgent elective surgeries that historically involve transfusion of blood components (greater than 10% probability of blood use)
  - categorization of patients for prioritizing transfusion needs (emergency, urgent, elective)
- Establish how decisions (cancellation, deferral or reduction of blood transfusions) are documented and clinicians notified, and how these records will be archived.
- Address prioritization of the recall of patients for deferred or cancelled procedures following the recovery phase include a communication strategy to notify patients and their families who may be affected by the blood shortage (refer to Toolkit for patient communication template).
- Be incorporated into the overall facility emergency/contingency or disaster plan.
- Define responsibilities and actions required by key individuals.
- Include a training plan to ensure staff are familiar with the plan, roles and responsibilities.
- Include a plan for debriefing and assessment following resolution of a blood shortage, to be shared with the hospital Transfusion Committee.

- After a red phase blood shortage, direct completion (by HEBMC) of a required report on the use of the red phase Emergency framework for massively bleeding patients to the OEBMC, who then is required to provide a summary report to the NEBMC. Review of the triage protocol application from all hospitals in each P/T helps to validate its use and identify any gaps or need for revisions.
- Be reviewed and revised as needed following each simulation or actual blood shortage event.

#### 1.3.2.4 Triage

A triage team is the person or group of persons within a hospital tasked with the responsibility of performing triage of blood requests/needs specifically for massively hemorrhaging patients. The triage team follows guidelines approved by their HEBMC. In contrast, transfusion indications assessment for non-massively hemorrhaging patients can be managed through adherence with published transfusion guidelines and directions provided within the Ontario Plan (refer to [Appendix B](#) and [C](#)) and the National Plan.

**Should the NEBMC direct hospitals to apply the red phase Emergency framework for massively bleeding patients, the triage team should:**

- be appointed by the HEBMC
- be or include physician(s) experienced in triaging critically ill patients
- be supported by a multi-disciplinary team which is available to provide consultation as required (if one individual is assigned the duty)
- not be responsible for direct patient care (of those patients being triaged)
- include a sufficient number of physicians to provide 24-hour coverage and to account for the volume of transfusions in the hospital
- include support personnel for completing documentation of triage assessments, decisions and outcomes (registered nurse, medical laboratory technologist to scribe)
- include personnel with background in patient and family support (palliative care, social worker, spiritual care)
- have access to a medical ethicist
- ensure fair and equitable processes, free of bias (i.e., inclusion, diversity, equity) and recognize social inequities that create health disparities
- have access to psychological support
- have training and education on the Emergency framework and documentation requirements.

It is critical that the triage team have the endorsement of all those involved in patient care and hospital senior management. This allows for decisions to be made with confidence within the

Emergency framework. Refer to the Synopsis for triage team <sup>13</sup> as well as the Emergency framework<sup>2</sup> available on the NAC website for more detailed information on triage of massively bleeding patients.

For those denied transfusion therapy as a result of the triage, immediate alternative care should be made available.

In addition, during red phase shortage, patients eligible for transfusion should be treated first come first served, and the component in shortage should not be held back for possible future patients. A scenario may arise where at one time more than one eligible patient (not massively bleeding) needs a blood component and only a single unit is available. Although the National Plan does not address this scenario, hospitals may need to be prepared to apply criteria such as those in the Emergency framework, or developed in hospital during the COVID pandemic, to allocate the scarce resource.

### **1.3.3 Ministry of Health (MOH)**

P/T Ministries of Health are responsible for funding CBS. P/T Ministers of Health are also corporate members of CBS and are responsible for approval of CBS's annual budget, oversight of the expenditure of public funds by CBS in delivering the blood program, selection of the CBS Board of Directors, ensuring the effectiveness of the blood system and providing recommendations to the Minister of Health (Canada) on proposed regulatory changes.

The Ontario MOH is responsible for activating the Ministry Emergency Operations Centre (MEOC), as needed, which is dedicated space within the Health System Emergency Management Branch (HSEMB) that serves as the central command centre from which emergency situations facing the health care system and requiring MOH support are coordinated. MOH may activate the MEOC to coordinate the ministry's response depending on the scope of the blood shortage and its impact on the healthcare system. This coordination is particularly important if the blood shortage is related to a concomitant emergency. MOH personnel will act as co-chair and secretariat for the Ontario Emergency Blood Management Committee (OEBMC). MOH is responsible for communications to stakeholders outside of those carried out by CBS to recruit donors and provide inventory status updates.

### **1.3.4 National Advisory Committee on Blood and Blood Products (NAC)**

NAC provides medical and technical advice on the utilization management of blood and blood products to the P/T ministries of health and CBS. Each P/T is represented by up to two members from their respective jurisdictions.

### **1.3.5 National Emergency Blood Management Committee (NEBMC)**

NEBMC develops recommendations and provides advice to CBS, P/T Ministries of Health and hospitals to support a consistent and coordinated response to critical blood shortages in Canada. NEBMC consists of all NAC members and all P/T Blood Liaison Committee (BLC) members to address the need for all regions to share information and have input into decision-making. Membership also includes CBS officials, ex-officio members from Québec's Ministry of Health, Héma-Québec, Health Canada and two blood recipients. NEBMC is co-chaired by the current chair of the NAC and the CBS Vice-President Medical Affairs and Innovation. For additional details on NEBMC membership, refer to the National Plan.<sup>1</sup> NEBMC is responsible for activation of the National Plan, determining each supply phase, developing inventory and clinical recommendations for CBS and hospital personnel to aid in the management of a blood shortage.

### **1.3.6 Ontario Emergency Blood Management Committee (OEBMC)**

The National Plan recommends that each P/T establish an EBMC to plan for and respond to blood shortages. In Ontario, this committee is OEBMC. Generally, one of Ontario's NAC representatives and Ontario's P/T Ministry of Health representative co-chair the OEBMC. Ontario's NAC representatives are members of both NEBMC and OEBMC. Other members include representatives from hospitals, CBS and the provincial blood coordinating network (ORBCoN). OEBMC members provide medical and technical advice to MOH.

OEBMC is responsible for communicating national common messages, which may include information regarding inventory status and recommendations on mitigation strategies from NEBMC, as well as any provincial or regional specific recommendations as provided by OEBMC. If a regional or provincial inventory shortage occurs, OEBMC may meet even though it may not be necessary for NEBMC to be convened. The Chair of OEBMC will notify the Co-Chairs of NEBMC if the decision to convene is made. It is a responsibility of OEBMC to remind hospitals of the requirement to develop a blood shortage plan and to report inventory to CBS as requested. OEBMC is also responsible for monitoring hospital preparedness and compliance through regular provincial blood shortage exercises and may work with provincial partners to ensure that hospitals are aware of any new versions of the Ontario Plan and modify their HEBMP accordingly.

#### 1.3.6.1 The Contingency Planning Working Group (CPWG)

CPWG is a sub-group of OEBMC tasked with maintaining the Ontario Plan and Toolkit and facilitating blood shortage exercises. CPWG includes representation from MOH, ORBCoN, CBS and hospital personnel. Any revisions to the Ontario Plan require approval by OEBMC and MOH.

#### 1.3.7 Provincial/Territorial Blood Liaison Committee (P/T BLC)

The P/T BLC facilitates the work among the participating governments and CBS to support CBS in the provision of a safe, secure and affordable national blood system and other programs. Each P/T has one representative on the BLC. Ontario's P/T Blood Representative is a delegate of the MOH, who may also act as the Co-Chair for OEBMC.

## 1.4 Communications

As indicated in the National Plan, a blood shortage is most likely to be first identified by CBS. When concern for inventory levels exists or a supply shortage is imminent:

1. CBS contacts the Co-Chairs of NEBMC to convene a meeting of NEBMC, typically to occur within 24 hours depending on the severity of the situation.
2. NEBMC decides whether to declare a blood shortage and makes the final determination of the phase (green phase advisory, amber, red).
3. NEBMC develops and provides key messages and recommendations, (i.e. mitigation strategies, impact on clinical practice) to provincial EBMCs via P/T BLC and NAC representation on NEBMC, to support a consistent and coordinated response to a critical blood shortage across the country.
4. OEBMC, once informed of the shortage and NEBMC key messages and recommendations, will be convened as required. OEBMC provides medical and technical advice to MOH which may include recommendations for hospital orders (based on hospital inventory data from CBS); need for mitigation measures; handling of blood components such as splitting units and the need to communicate with hospitals/the public, including identifying any key messages or actions required specific to Ontario.
5. MOH communicates to hospital senior management and HTS to reinforce their responsibility to ensure that all relevant hospital staff are aware of the need to reduce blood orders and blood use. This may be done through the HEBMC. The Hospital System Emergency Management Branch (HSEMB) will be made aware of the inventory shortage and its implications through OEBMC communications facilitated by the MOH.
6. Ontario HTS are notified of the blood shortage directly by their regional CBS production/distribution site via fax and/or phone depending on the severity of the shortage.
7. CBS (on behalf of NEBMC) notifies HTS of any change to inventory phases (i.e., green phase advisory, amber or red phase, recovery phase, and return to green phase).

During the shortage CBS will provide data on hospital inventory, average daily red cell demand and inventory index to MOH via NEBMC, to inform MOH and OEBMC on Ontario hospitals' compliance with recommended actions to correct the shortage. Decisions to fill orders may be determined in consideration of hospital inventory index to help ensure equitable distribution of the affected component.

### **1.4.1 Short term regional/provincial shortages**

If a blood shortage is restricted to a provincial scope:

- I. CBS will notify hospitals of the low inventory status via their standard communication channels.
- II. The CBS supply chain representative for Ontario will inform the Co-Chairs of OEBMC of the potential inventory shortage.
- III. Depending on the severity of the situation, the Co-Chairs of OEBMC will inform OEBMC members of the situation via email.
- IV. The Co-Chairs of OEBMC will also notify the Co-Chairs of NEBMC to inform them of the provincial inventory shortage as a shortage in the province of Ontario has the potential of becoming a national shortage due to the percentage of blood used in the province (approximately 50% of CBS issues are to Ontario hospitals).
- V. The Co-Chairs of NEBMC will determine whether to convene a meeting of NEBMC or to inform the members of NEBMC in the event of an inventory shortage within Ontario.

### **1.4.2 Regional (short term) shortages specific for platelets**

A regional shortage may be called by the CBS production centre in either Brampton or Ottawa, if a predicted short-term shortage does not necessitate implementation of shortage mitigation strategies by the OEBMC or NEBMC. Notification of the regional platelet shortage to OEBMC will be done as per 1.4.1 sub II.

CBS aims to anticipate any potential platelet shortage, based on historic daily distribution to hospitals, two days in advance. Whenever possible, CBS will attempt to proactively adjust platelet production and/or negotiate platelet orders with hospital staff in order to mitigate the risk of such shortages.

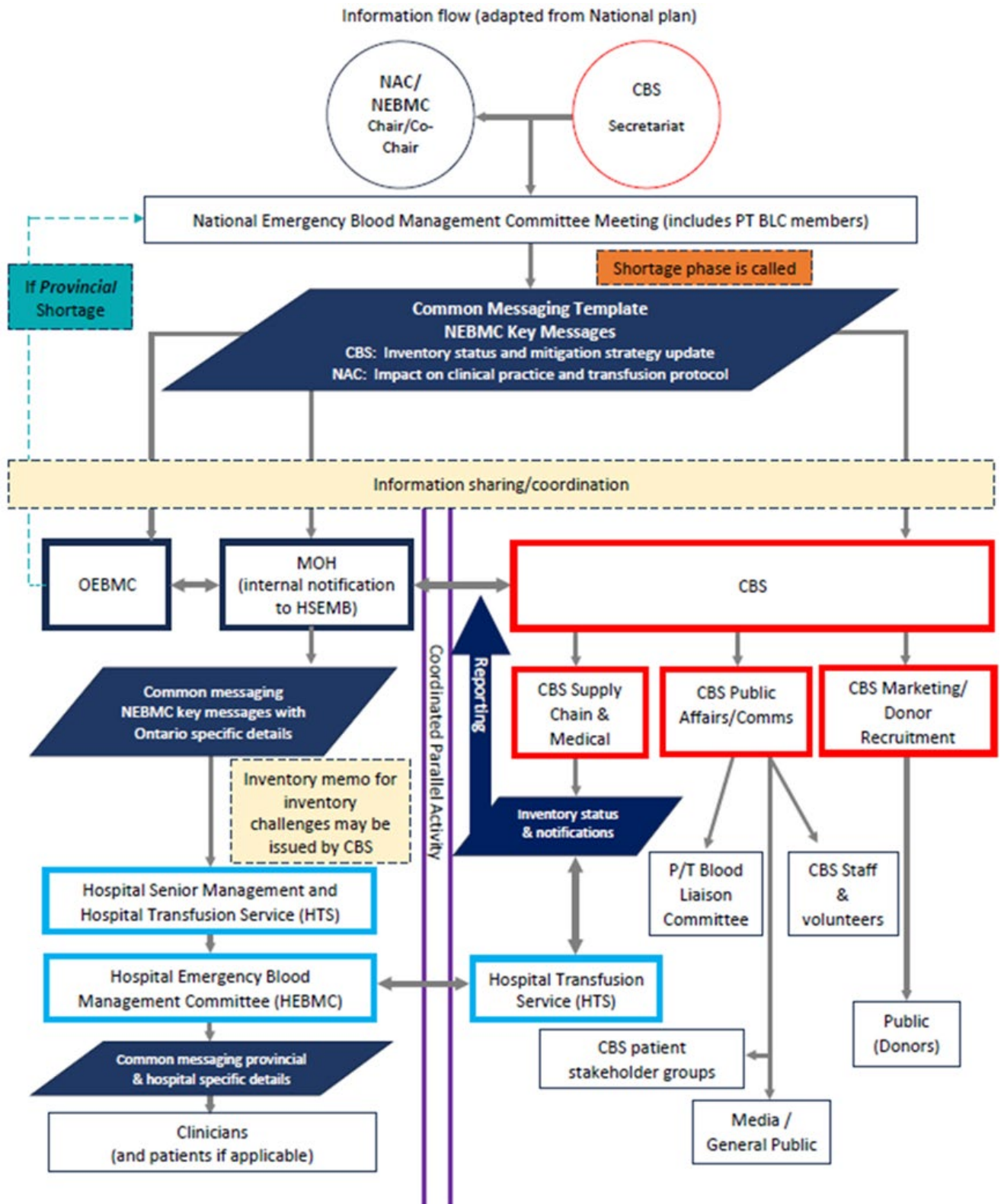
In the event of a short-term platelet shortage (green phase advisory, amber phase):

- CBS will endeavor to inform all hospitals as early in the day as feasible.
- HTS in hospitals performing cardiopulmonary bypass surgery and with trauma centres are to consider or implement deferral of prophylactic platelet transfusions, to later in the day or next day, for non-bleeding non-surgical patients (See [Appendix C](#)). The goal is to avoid rescheduling cardiopulmonary bypass surgery.

- Within these hospitals platelet shortage also needs to be communicated as soon as possible, prior to induction of anesthesia for cardiopulmonary bypass, to avoid scheduled surgeries proceeding in the absence of available platelets.
- CBS will work with hospitals in planning for replenishment of stock.
- Hospitals may need to implement mitigation strategies and [Appendix C](#).

Effective and consistent communication of key messages among stakeholders at all levels is essential to the effective implementation of this Plan. [Figure 1](#) provides an overview of the two-way flow of information from the national and provincial levels to the hospitals during a blood shortage.

1.4.3 Figure 1. Communication Flow



## 2 Plan Structure

### 2.1 Inventory Levels/Phases

Although no ideal Hospital Inventory Index (HII) has been defined, the National Plan suggests that HII for RBC in green phase would be about >8 days, green phase advisory between 7-8 days, amber phase about 5-7 days and red phase less than 5 days.<sup>1</sup> Recommendations for these levels may be adjusted by NEBMC for specific blood groups. Appropriate Hospital inventory index levels also vary by hospital size, distance to blood supplier distribution site (CBS) and whether a distribution site to, or receiving site from, other hospitals closer in distance than CBS distribution site.

The Shipment Index was introduced in 2023 as a proxy for the HII, for those hospitals that cannot calculate or report their ADRD by blood group.

CBS National Inventory levels associated with green, green phase advisory, amber and red phase are indicated below.

#### 2.1.1 Green Phase and Green Phase Advisory

Green phase implies that normal blood component inventory levels exist, and supply adequately meets demand.<sup>1</sup> This phase includes a broad range of inventory levels ranging from an ideal inventory to temporary shortages that occur periodically and can be managed within the scope of existing CBS and hospital actions. See: CBS National inventory numbers by phase in the National Plan, Table 4. Decisions on inventory phases are guided by CBS national inventory<sup>1</sup> levels as defined below:

Green Phase	RBC Days on hand (DOH)*	Platelets	Plasma (non-AB) Weeks on hand (WOH)**	AB Plasma or Cryoprecipitate***
CBS	>3.5 DOH for O Rh positive and A Rh positive, and >3 DOH for all Rh-negative blood groups	Can provide >90% daily national requirement	> 2 WOH	> 3 WOH

Green Phase Advisory	RBC Days on hand (DOH)*	Platelets	Plasma (non-AB) Weeks on hand (WOH)**	AB Plasma or Cryoprecipitate***
CBS	> 3 successive days of 3-3.5 DOH for either O Rh positive or A Rh-positive OR > 3 successive days of 2-3 DOH for either O Rh negative or other multiple Rh-negative groups	Can provide 80-90% of the national daily requirement.  May include a lower unit/fill rate for some sites but recovery must occur within 12-24 hours	1-2 WOH	2-3 WOH

\*DOH defined as the available inventory at CBS in comparison to the average daily red cell units issued from CBS

\*\*WOH defined as the average weekly issues of plasma from CBS in comparison to the average weekly issues of plasma from CBS

\*\*\* Cryoprecipitate largely replaced with fibrinogen concentrates by CBS

**Green Phase Advisory:** a particular blood type or component is in limited supply and temporary inventory adjustments are required by CBS. Green phase advisory may also be called if there is concern about the blood supply based on projections related to factors reducing the availability of donors, such as an infectious disease pandemic. In a blood shortage situation or when informed of a supply concern, hospitals will be required to submit their inventory to CBS by blood group and component within a specific timeframe. Hospitals may be asked to take actions, as requested by NEBMC to mitigate the risk of shortage and to aid in recovery of supply.

HII (or Shipment Index, when used) reflects the estimated number of days on hand (DOH) for red cells, per blood group, at the hospital level, and can be used to determine hospitals' optimal levels of inventory. Shipment Index is calculated by dividing the reported hospital inventory level by the average daily CBS shipments. Target HII or Shipment Index during a green phase advisory will be communicated by NEBMC.

Note: General use of fibrinogen concentrates, in Ontario and other provinces, as an alternative source of fibrinogen may eliminate the need for CBS to call a blood shortage in response to supply constraints of cryoprecipitate.

### 2.1.2 Amber Phase

Amber phase implies that blood inventory levels are insufficient to continue with routine transfusion practice and is declared by NEBMC. It may apply to a single blood group or blood component or to all blood components. CBS has defined mechanisms to respond if the red blood cell inventory is below 3 days on hand for three successive days. CBS will assess their ability to improve the supply through increased collections. National inventory levels which would automatically trigger the declaration of amber phase are not defined and may depend also on factors such as clinical activity and anticipated length of the shortage.

For platelets and plasma CBS generally applies the following levels to trigger amber phase:

Component	Platelets	Plasma
	25-79% daily national requirement (recovery NOT expected within 12-24 hours)	3-7 DOH for non AB 6-14 DOH AB plasma

Note: CBS may attempt to equalize hospital red blood cell inventory based on HII within a region or fill orders based on the hospital target inventory levels for Amber phase.

Note: The HII will reflect historical blood use as it is based on historical average daily demand. It is important to recognize that the actual numbers of blood inventory calculated in days on hand may change if there are changes in demand made by hospitals in response to a causative event.

### 2.1.3 Red Phase

Red phase implies that blood inventory levels are insufficient to ensure that patients with even non-elective indications for transfusion will receive the required transfusion(s). If inventory levels cannot recover in the short-term, CBS may notify NEBMC to request that a move from amber phase to red phase be declared. If an imminent threat to or precipitous drop in the blood supply is identified, a move directly to the red phase from green phase may be called. A red phase may be called if all other measures to improve supply have failed.

For platelets and plasma CBS generally applies the following levels to trigger red phase:

Component	Platelets	Plasma
	<25% of daily national requirement (recovery NOT expected within 12-24 hours)	<3 DOH for non AB <6 DOH AB plasma

Note: In the red phase, hospitals may be advised by the NEBMC to use the Emergency framework for rationing of blood for massively bleeding patients during a red phase of a blood

shortage (Emergency framework) which includes an algorithm and guidance document to triage blood for massively bleeding patients in a red phase blood shortage.<sup>2</sup>

Inventory needs will be monitored carefully and assessed to determine if there is a need to redistribute blood between facilities to meet urgent patient needs.

### 2.1.4 Recovery Phase

The recovery phase signals that blood inventory levels have begun to increase and are expected to be maintained at a level that would allow gradual resumption of normal transfusion activities. Recovery phase will be communicated to hospitals by CBS based on national inventory in consultation with NEBMC.<sup>1</sup> During the recovery phase, hospital blood utilization should continue to be monitored closely (as in amber phase) as recommended by NEBMC or until CBS provides notice of return to green phase.

## 2.2 Roles and Responsibilities of Key Stakeholders

### 2.2.1 Green Phase

In the green phase, key stakeholders should develop plans to prepare for a blood shortage.

NEBMC/NAC
<ul style="list-style-type: none"> <li>• Develop, maintain and distribute the National Plan.</li> <li>• Plan and hold exercises for the National Plan and incorporate lessons learned into the National Plan.</li> <li>• Develop recommendations to aid clinicians in planning for allocation of blood resources during a blood shortage.</li> </ul>
CBS & CBS production/distribution sites
<ul style="list-style-type: none"> <li>• Confirm support for the Ontario Plan at CBS and ensure its compatibility with the CBS internal plan.</li> <li>• Provide ongoing linkage between CBS and the OEBMC/CPWG by participating on the OEBMC/CPWG.</li> <li>• Collaborate with NEBMC and OEBMC to review and revise the National and Provincial Plans as needed.</li> <li>• Manage the inventory nationally and fill hospital orders as requested except for the times when CBS experiences temporary short-term supply challenges for a particular blood group or component.</li> <li>• Notify NAC/NEBMC and MOH when inventory reaches or approaches green phase advisory level.</li> </ul>
MOH
<ul style="list-style-type: none"> <li>• Ensure the Ontario Plan is maintained and distributed to all Ontario hospitals and encourage hospitals to prepare for a blood shortage.</li> </ul>

- Chair and provide secretariat support for the OEBMC and ensure OEBMC meets as per Terms of Reference.
- Provide the conduit for communications between NEBMC/OEBMC and hospitals.
- Ensure all relevant areas of the provincial government are aware of the Ontario Plan and its implications for their areas of responsibility.

### OEBMC

- Develop and maintain the Ontario Plan, to be consistent with National Plan.
- Plan and hold exercises to test the Ontario Plan and hospital preparedness and incorporate lessons learned into the Ontario Plan.
- No actions required unless otherwise advised by NEBMC.
- Encourage hospitals to report inventory regularly to CBS via the Hospital Portal. Support hospitals reporting their blood component disposition by blood group.
- Determine how inventory held at small sites for ‘emergency’ stock will be managed in green phase advisory, amber and red phase scenarios.

### Hospitals (HTS, HEBMC)

- Report inventory levels to CBS (on a daily basis) using the CBS Hospital Portal. Include ALL units available in inventory not yet transfused or issued to a patient, i.e., for RBC include phenotyped and crossmatched (allocated) units.<sup>11</sup>
- Report monthly disposition of blood components to CBS by blood group (if possible) to facilitate the calculation of HII by blood group.
- Establish good blood utilization and inventory management practices to minimize wastage of blood components:
  - Regularly review inventory stocking to assess appropriate levels (define target levels for green, green phase advisory, amber and red phase).
  - Develop and implement transfusion guidelines, patient blood management strategies, use of blood alternatives and regular auditing of blood ordering practices. Refer to [Appendix B](#) and [C](#) for suggested RBC and platelet guidelines.
  - Identify surgical procedures that have a greater than 10% probability of blood use (refer to hospital Maximum Surgical Blood Order Schedule if available).
  - Adopt a massive hemorrhage protocol. Refer to [provincial MHP recommendations](#)
- Establish redistribution partnerships.
  - Develop agreements among hospitals to support the redistribution of blood components if/when necessary.

- Outline the policies and procedures for the [redistribution of blood components](#) including the requirement for appropriate storage conditions and appropriate documentation.
- Build Héma-Québec codes in LIS for possible acceptance into inventory.
- Establish a HEBMC or make use of an existing committee, such as a transfusion committee.
  - Develop HEBMP to respond to NEBMC/OEBMC request to reduce blood use during a shortage and to document release or non-release of blood in an amber or red phase.
  - Familiarize clinical hospital staff with the HEBMP. Staff should be trained on roles, responsibilities and actions required during a shortage according to the HEBMP.
  - Identify triage and blood conservation strategies to reduce blood demand and be prepared to implement them.
  - If appropriate for your hospital, identify triage officer/team and provide training on their specific role and responsibilities in a blood shortage.

### 2.2.2 Green Phase Advisory

In the green phase advisory, the roles and responsibilities required by key stakeholders would be similar to those required in the amber phase although frequency of meetings and communication may be lower.

#### NEBMC/NAC

- Determine the need to declare a green phase advisory.
- Develop recommendations for distribution to stakeholders on actions to take in order to prevent the need to escalate to amber or red phase through planning for management and allocation of blood resources.
- Monitor the national inventory and escalate to amber or red phase as required.

#### CBS & CBS production/distribution sites

- Notify hospitals of green phase advisory if directed to do so via NEBMC.
- Communicate any recommendations for hospitals made by NEBMC.
- Report information to MOH (Ontario P/T Representative) on Ontario HII, by individual hospital and provincially, to aid in monitoring of the affected component(s).
- Provide linkage between NEBMC and OEBMC through a common CBS representative on both committees.
- Follow up with any hospitals not reporting inventory as requested.

#### MOH

- Convene OEBMC and provide NEBMC updates and any potential change to shortage situation, e.g., green phase advisory to amber or red phase.
- Provide reports of hospital inventory reporting data received from CBS to OEBMC. Hospitals will be directed to report inventory daily in a green phase advisory.
- Monitor hospital compliance with inventory reporting/stocking/ordering through information received from CBS via the P/T Blood Representative.
- Communicate any information from the NEBMC/OEBMC to all appropriate areas within the MOH as necessary.
- Provide the conduit for communications between NEBMC/OEBMC and hospitals.

#### OEBMC

- Review and discuss recommendations, key messages and strategies from the NEBMC.

- Review regular updates from CBS on inventory status (both CBS and hospitals), and from hospital representatives and ORBCoN representatives, on the status of hospital responses/questions raised in Ontario.
- Provide medical and technical advice to MOH specific to Ontario.
- Collaborate with the MOH to develop Ontario specific recommendations and guidance for health system partners in addition to the NEBMC key messages as necessary.

### Hospitals (HTS, HEBMC)

- Inform internal hospital personnel as per HEBMP.
- Report inventory levels to CBS as requested within the NEBMC specified daily timeframe, using the CBS Hospital Portal. Include ALL units available in inventory, not yet transfused or issued to a patient, i.e., for RBC include phenotyped and crossmatched (allocated) units.<sup>11</sup>
  - Review transfusion orders to ensure they adhere to hospital transfusion guidelines. Refer to [Appendix B](#) and [C](#) for suggested RBC and platelet guidelines.
  - Use redistribution processes to avoid outdating blood components.
- Follow guidance provided by NEBMC and OEBMC. Ensure available blood alternatives and blood conservation strategies are being used and that front line medical staff are aware of risk mitigation strategies.
- Keep CBS informed of any potential changes in demand for blood.

### 2.2.3 Amber Phase

In the amber phase key stakeholders should take action beyond green phase advisory procedures as indicated in the table below:

NEBMC
<ul style="list-style-type: none"> <li>Assess the “total” national inventory and make decision on declaration of amber phase.</li> <li>Develop national key messages and response strategies (e.g., review of blood order requests) to ensure a standardized approach across Canada and disseminate the key messages to HTS via CBS communication channels.</li> <li>Notify P/T Ministries of Health through the respective P/T Blood Representatives.</li> </ul>
CBS & CBS production/distribution sites
<ul style="list-style-type: none"> <li>Notify HTS of amber phase and provide national key messages, response strategies and updates on behalf of NEBMC.</li> <li>Distribute components between distribution sites to ensure fair, equitable and transparent distribution to hospitals across the country.</li> <li>Communicate regularly with HTS and the MOH (via Ontario’s P/T Blood Representative) to provide status reports of inventory levels.</li> <li>Report to MOH any hospitals not reporting their inventory.</li> <li>Provide linkage between NEBMC and OEBMC through a common CBS representative on both committees.</li> <li>Report information to MOH (Ontario P/T Representative) on Ontario HII, by individual hospital and provincially, to aid in monitoring of the affected component(s). If inventory levels at CBS cannot support hospital requests, or hospitals are not complying with requests to reduce inventory demand, inform the MOH.</li> <li>Distribute blood to hospitals following direction from NEBMC (refer to the National Plan for determination of allocation of blood components in amber and red phase).</li> <li>Coordinate and oversee media announcements on the blood inventory status and any call for donors.</li> </ul>
MOH
<ul style="list-style-type: none"> <li>Ontario P/T Blood Representative (MOH) will inform appropriate contacts within the Ministry of the amber phase national blood shortage.</li> <li>The P/T Blood Representative will convene the OEBMC upon NEBMC declaration of blood shortage and activate the Ontario Plan.</li> </ul>

- Activate the MEOC as required - If activated, MEOC will coordinate steps that need to be taken within the MOH and any other relevant areas in the government of Ontario. This coordination is particularly important if the blood shortage is related to a concomitant emergency.
- Monitor hospital compliance with inventory stocking/ordering through information received from CBS via the P/T Blood Representative and follow up with non-compliant sites.
- Disseminate key messages from NEBMC/OEBMC to hospital senior management and HTS. This may include cancellation or deferral of elective medical and surgical procedures with a greater than 10% chance of requiring blood components.

### OEBMC

- Review and discuss recommendations, key messages and strategies from the NEBMC.
- Review regular updates from CBS on inventory status (both CBS and hospitals), and from hospital representatives and ORBCoN representatives, on the status of hospital responses/questions raised in Ontario.
- Provide medical and technical advice to the MOH specific to Ontario.
- Collaborate with the MOH to develop Ontario specific recommendations and guidance for health system partners in addition to the NEBMC key messages as necessary.
- Provide guidance to CBS on how blood should be distributed among Ontario hospitals.

### Hospitals (HTS, HEBMC)

- Upon notification of the blood shortage, initiate HEBMP and launch internal communication plan.
- Convene HEBMC, if needed, to monitor and control utilization of the affected blood components. Follow NEBMC/OEBMC recommendations and guidance for screening transfusion orders (see [Appendix B](#) and [C](#)). If outside of guidelines, ensure review of orders by Transfusion Medicine Medical Director or designate.
- Report ALL blood component inventory, by blood group and Rh, into the CBS Hospital Portal daily as requested within the NEBMC timeframe.
- Participate in CBS production/distribution site coordinated teleconferences as scheduled.
- Reduce inventory target levels of affected blood component(s) for amber phase as defined in the HEBMP.
- If the situation continues to worsen or if it has a potential to be prolonged, if directed by NEBMC/OEBMC:
  - Defer non-urgent elective surgical/medical procedures identified with a greater than 10% probability of requiring the affected blood component.
  - Defer/cancel non-urgent transfusions requiring the affected blood component.
- Document all decisions for deferral/cancellation of surgical/medical procedures.

- Increase use of blood conservation strategies and blood alternatives to decrease demand for blood.
- Prioritize use of fibrinogen concentrate as a fibrinogen replacement (rather than cryoprecipitate) to maximize platelet production.
- Heighten vigilance and redistribute to avoid any wastage of components due to outdating.
- Group A plasma may be considered as an alternative to AB plasma for use in Massive Hemorrhage Protocols, if blood group undetermined and no historic group B or AB, to use until the switch to group-specific plasma can be made).
- Ensure patients and their families are notified if treatment is to be deferred, and the reason for the deferral is provided. (see [Toolkit](#) for example template)

### 2.2.4 Red Phase

The roles and responsibilities required by key stakeholders in a red phase blood shortage mimic those required in the amber phase although frequency of meetings and communication may be escalated. The major difference is to the response required at hospitals.

#### NEMBC

- Assess the “total” national inventory and make decision on declaration of red phase.
- Develop national key messages and response strategies (e.g., reduction of hospital stock inventory, triage of blood order requests, cancellation of elective procedures) to ensure a standardized approach across Canada.
- Notify P/T ministries of health through the respective P/T Blood Representatives.
- Implement the use of the Emergency framework for massively bleeding patients if needed.

#### CBS & CBS production/distribution sites

- Notify HTS of Red Phase and provide national key messages, updates and direction on response strategies on behalf of NEBMC.
- Distribute components between CBS distribution sites to ensure fair, equitable and transparent distribution to hospitals across the country.
- Communicate regularly with HTS and the MOH (via Ontario’s P/T Blood Representative) to provide status reports of inventory levels and the anticipated recovery time.
- Ensure hospitals are complying with inventory reporting and ordering as per NEBMC requests. Inform NEBMC and the MOH of any non-compliant hospitals.
- Provide linkage between NEBMC and OEBMC through a common CBS representative on both committees.
- Distribute blood to hospitals following direction from NEBMC (refer to the National Plan for determination of allocation of blood components in amber and red phase).
- Coordinate and oversee media announcements on the blood inventory status and any call for donors.

#### MOH

- Ontario P/T Blood Representative (MOH) will update appropriate contacts within the Ministry of the red phase national blood shortage.
- The P/T Blood Representative will convene the OEBMC upon NEBMC declaration of red phase blood shortage (within 24 hours following the NEBMC meeting to share information/recommendations with OEBMC members) and activate the Ontario Plan.

- Activate the MEOC as required. If activated, MEOC will coordinate steps that need to be taken within the MOH and any other relevant areas in the government of Ontario. This coordination is particularly important if the blood shortage is related to a concomitant emergency.
- Monitor hospital compliance with inventory stocking/ordering through information received from CBS via the P/T Blood Representative. Follow up with any hospitals not following NEBMC recommendations.
- Disseminate key messages from NEBMC/OEBMC to hospital senior management and HTS. This will most likely include deferral of all medical and surgical procedures requiring the affected blood components with the exception of emergency procedures as defined in the National Plan.

### OEBMC

- Review and discuss recommendations, key messages and strategies from the NEBMC.
- Review regular updates from CBS on inventory status (both CBS and hospitals), and from hospital and ORBCoN representatives, on the status of hospital responses/questions raised in Ontario.
- Provide medical and technical advice to MOH specific to Ontario.
- Collaborate with the MOH to develop Ontario specific recommendations and guidance for health system partners in addition to the NEBMC key messages.
- Provide guidance to CBS on how blood should be distributed among Ontario hospitals.

### Hospitals (HTS, HEBMC)

- Activate HEBMP for red phase. Launch internal communication plan to notify key stakeholders in the hospital of the declaration of a red phase and its potential impact on patient care.
- Continue to report ALL blood component inventory using the web-based CBS Hospital Portal daily as requested by NEBMC.
- Participate in CBS production/distribution sites coordinated teleconferences as scheduled.
- Convene HEBMC to support decision-making required to further reduce demand for the affected blood component(s).
- Follow NEBMC/OEBMC recommendations and guidance. This may include the following actions:
  - Reduce target inventory levels of affected blood group(s) or blood component(s) according to red phase inventory needs as defined in HEBMP.
  - Defer/cancel all non-emergency surgical or medical procedures requiring the affected blood components.

Emergency surgical procedures are defined in the National Plan as those that are needed to prevent the death or major morbidity of a patient.

Emergency medical procedures are defined as those where a transfusion is required to prevent the death or major morbidity of a patient.

- Activate screening of transfusion orders:
  - Determine which patients are to receive the blood component(s) (refer to [Appendix B](#) and [C](#)). Decisions must be transparent and documented. All requests not complying with pre-approved criteria should be reviewed by the Transfusion Medicine Medical Director or designate prior to issuing.
  - Document all decisions carefully using a log sheet (see [Toolkit](#) for template examples) as well as in individual patient medical chart.
  - Report all decisions to the HEBMC.
  - Communicate decisions to defer transfusion to the patient, the patient’s family and the patient care team (see Toolkit for template example).
- Consider that other strategies may be needed such as deferral of chemotherapy and hematopoietic stem cell transplants or splitting of available components where the technology is available (e.g. sterile connecting device).
- Increase focus on use of blood conservation strategies and blood alternatives to reduce blood use as much as possible. Consideration of:
  - use of prothrombin complex concentrate (PCC) as alternative to plasma if supply is critical
  - use of fibrinogen concentrates
  - (on recommendation from NEBMC) extending expiry of some blood components
  - group A plasma as an alternative to AB plasma when in shortage, in Massive Hemorrhage Protocols, unless the patient has historical group B or AB on file, to use until the switch to group-specific plasma can be made
- Heighten vigilance to avoid any wastage of components due to outdating, for example by minimizing or eliminating thawed plasma stock, and avoiding premature thawing of plasma during MHP activation.
- In consultation with local CBS personnel and hospital clinicians determine if transfer of blood components between facilities is required to best serve the needs of patients in a region.

**If directed to do so by NEBMC - activate the Emergency framework for massively bleeding patients and notify front line medical staff.**

- Consideration may need to be given to stopping transfusion in those who have very low probability of survival. Note that the Emergency framework<sup>2</sup> provides guidance for patients who are massively bleeding only and not those who require smaller volumes of blood.
- Reassess those patients who were denied blood daily (minimum) or sooner if their clinical situation changes (deteriorates or improves). If a patient is not to receive blood, they should continue to

receive supportive care, which may include application of blood conservation techniques, supportive care for pain and management of clinical symptoms, and/or palliative care support.

- Documentation of decisions made is imperative.
- The National Plan does not address the situation where a specific component is required at one time and fewer units are available than eligible patients needing transfusion (and splitting of units is not feasible or not sufficient), outside of the scenario of massive bleeding patients. In this rare event we suggest the allocation of the scarce resources to be done by the triage team. The allocation may involve using the decision algorithm used in the NAC Emergency framework for rationing of blood for massively bleeding patients during a red phase of a blood shortage- Synopsis for Triage Team<sup>13</sup>, or other established decision process for allocation of scarce medical resources during shortages.

### 2.2.5 Recovery Phase

Recovery of hospital blood inventory and return to normal transfusion activities should be gradual to ensure the overall blood inventory level does not return to shortage levels.

#### NEBMC

- Convene to determine when a move to recovery phase is feasible and develop key messages and response strategies to ensure a standardized approach across Canada to ensure return to normal operations does not threaten the recovery of the blood supply.
- Once the green phase has been announced, within 4-6 weeks, convene relevant personnel to debrief and identify recommendations to improve the response. Take into consideration provincial debrief comments.

#### CBS & CBS production/distribution sites

- Notify HTS of move to recovery phase and provide national key messages and direction on response strategies on behalf of NEBMC.
- Slowly adjust inventory levels / fill rates of affected components to levels consistent with those previously determined as appropriate for effective recovery.
- Communicate regularly with HTS and MOH to provide status reports of inventory levels.
- Provide linkage between NEBMC and OEBMC through a common CBS representative on both committees.
- Coordinate and oversee media announcements regarding the recovery of the blood supply, manage donor response and return to normal operations as deemed appropriate.
- Once the green phase has been announced, within 4-6 weeks, convene relevant personnel to debrief and identify recommendations to improve the response.

#### MOH

- Notify hospital senior management and appropriate contacts within the Ministry of move to Recovery Phase.
- Convene or inform OEBMC of any NEBMC updates.
- Provide Ontario specific recommendations from OEBMC to hospital senior management and HTS. Reinforce with senior management, the importance of keeping HTS personnel informed of any operational changes (such as resumption of surgery) that will impact the demand for blood components.
- Once CBS has declared a return to green phase, convene OEBMC (within 4-6 weeks) to debrief and recommend improvements to the Ontario Plan to ensure continual improvement of the response to a blood shortage.
- Provide OEBMC with debrief comments to NEBMC.

### OEBMC

- Collaborate with MOH to develop Ontario specific recommendations and guidance for health system partners in addition to the NEBMC key messages if necessary.
- Participate in debrief and provide feedback on the lessons learned during the shortage and how the Ontario plan/response could be improved.

### Hospitals (HTS, HEBMC)

- When the hospital receives notification that recovery phase has been declared, implement communication fan-out to notify internal hospital personnel.
- Continue to report blood component inventory to CBS in the Hospital Portal.
- Convene HEBMC to support decisions required to maintain close surveillance of blood use (24-48 hours) until notified by CBS of a return to a stable green phase inventory. At this point hospitals may return slowly to normal operations.
- Ensure CBS HLS is kept informed of return to normal operations to ensure supply will be able to continue to meet rising demand.
- Initiate recovery phase of HEBMP. This may include the following actions:
  - Gradual return to green phase inventory levels of affected blood component(s) or group(s) according to HEBMP once CBS has notified hospitals of a return to a stable green phase inventory.
  - Management of recalling and rescheduling patients for elective surgeries and non-urgent transfusions to ensure there is no surge of blood demand that could result in a return to a shortage.
  - Continued application of blood conservation strategies and use of blood alternatives to support good blood management.
  - HEBMC should maintain continued vigilance of transfusion orders to ensure they follow hospital approved transfusion guidelines and return to normal operations is gradual and based on urgency of need.
- Once CBS has declared a return to green phase, within 4-6 weeks, convene HEBMC to debrief and recommend changes to the HEBMP for continual improvement of the response to a blood shortage.
- Suggestions for improvement to the Ontario Plan may be submitted to your [Regional ORBCoN](#) representative.

## 3 Helpful Resources

### 3.1 Ontario Hospital Toolkit for Emergency Blood Management

This [toolkit](#) provides templates of communication documents, a generic hospital emergency blood management plan, tracking sheets to support documentation of decisions regarding deferral of transfusion, training documents and job aids.

### 3.2 Ontario Transfusion Quality Improvement Plan (OTQIP) and Toolkit

The [OTQIP and toolkit](#) provide Ontario practice recommendations for blood components, screening algorithms and training support resources.

### 3.3 ORBCoN Inventory Management Toolkit

This [toolkit](#) provides resources to support best practices in inventory management, discussion of how to determine your inventory, inventory calculators for red cells and platelets, guide to developing a maximum surgical blood order schedule.

### 3.4 Canadian Blood Services Blood Utilization Best Practices

CBS has gathered [utilization best practices](#) from skilled transfusion medicine specialists from across the country. This resource is provided to share these practices with hospitals and physicians to optimize utilization and patient care.

### 3.5 Ontario Massive Hemorrhage Protocol (MHP) Recommendations

These [recommendations](#) were developed by a panel of clinical experts and evidence-based literature. They provide guidance for large, medium and small hospitals. A [MHP Toolkit](#) is available to provide added resources and templates to support hospitals in the development of their hospital specific MHP.

### 3.6 National Plan

The [National Plan](#) was developed by the NAC-BSWG to ensure a consistent approach is taken across the country in the management of blood shortage events.

### **3.7 Emergency framework for rationing of blood for massively bleeding patients during a red phase of a blood shortage**

The [Emergency Framework](#) was developed and validated by a panel of clinical experts on triage of critically injured patients. This will only be applied on the recommendation of the NEBMC during a red phase blood shortage and applies to patients potentially requiring massive transfusion.

## 4 Contingency Planning Working Group

The following current members of the Contingency Planning Working Group (CPWG) were involved in the review and revision of the Ontario Plan for the version 4. The CPWG is a subcommittee of the OEBMC and was originally formed under the direction of the OBCG to develop a provincial contingency plan in the event of a blood shortage. Members marked with \* also form Core CPWG.

Name	Organization
Dr T (Dorien) Ruijs, Chair*	Ontario Regional Blood Coordinating Network (ORBCoN)
Ms. Rebecca Barty, Vice Chair*	ORBCoN
Dr. Katerina Pavenski	National Advisory Committee on Blood and Blood Products (NAC); and Unity Health Toronto - St. Michael's Hospital
Mr. John Wall*	Canadian Blood Services, Medical Services & Hospital Relations, Northeast region
Dr. Michelle Zeller*	Canadian Blood Services, Medical Services & Hospital Relations; and Hamilton Health Sciences Centre/McMaster University
Dr. Jeannie Callum*	Kingston Health Sciences Centre
Dr. Alan Tinmouth	OEBMC Co-Chair, Ontario NAC Representative; and the Ottawa Hospital/University of Ottawa
Mr. Jeff Kinney*	London Health Sciences Centre
Mr. Owen McMorris	OEBMC Co-Chair, Ministry of Health (MOH)
Ms. Jessica Han*	P/T Blood Liaison Committee Representative, Ministry of Health (MOH)
Ms. Sophie Yang/Mr. Peter Nielsen	MOH

## 5 References

1. [The National Plan for Management of Shortages of Labile Blood Components](#). National Advisory Committee on Blood & Blood Products & Canadian Blood Services; July 14, 2025
2. [Emergency Framework for Rationing of Blood for Massively Bleeding Patients during a Red Phase of a Blood Shortage](#). Working Group on Emergency Disposition of Blood during a Red Phase Blood Shortage: National Advisory Committee on Blood and Blood Products; April 14, 2012.
3. [Public Hospitals Act](#) R.S.O. 1990, c.P.40 e-Laws–Ontario
4. [Triage tool for the rationing of blood for massively bleeding patients during a severe national blood shortage: guidance from the National Blood Transfusion Committee](#). Doughty H, Green L, Callum J, Murphy MF; National Blood Transfusion Committee. *Br J Haematol*. 2020 May 20;10.1111/bjh.16736. doi: 10.1111/bjh.16736. Online ahead of print. PMID: 32436251
5. Ontario Blood Shortage Simulation Exercise – Final Report. Ontario Emergency Blood Management Committee; August 25, 2010.
6. Report on Ontario Blood Shortage Exercise – Held February 2014. Ontario Emergency Blood Management Committee; December 22, 2014.
7. [Ontario 2018 Blood Shortage Exercise Report](#) – Held May 2018. Ontario Emergency Blood Management Committee, December 14, 2018.
8. National Standard of Canada, CAN/CSA-Z902-25, Blood and blood components; March 2025. CSA Group; Toronto, Ontario.
9. CSTM Standards for Hospital Transfusion Services v.5; December 2021 (revised December 2022). Canadian Society for Transfusion Medicine; Ottawa, Ontario.
10. [Bloody Easy 5.1](#), 2023, and [Ontario Transfusion Quality Improvement Plan \(OTQIP\)](#), 2025
11. User Guide - Canadian Blood Services Hospital Portal. V 2.0 Feb 2, 2021. Canadian Blood Services.
12. Blood conservation for hemoglobinopathy patients during a pandemic blood shortage. v1.4 Apr 24, 2020. [www.CanHaem.org](http://www.CanHaem.org)
13. [Emergency framework for rationing of blood for massively bleeding patients during a red phase of a blood shortage – Synopsis for Triage Team](#). National Advisory Committee on Blood and Blood Products; October 11, 2012.

# Appendix A – Example of Hospital Notification from NEBMC and Canadian Blood Services

 National Advisory Committee on Blood and Blood Products | Comité consultatif national sur le sang et les produits sanguins

 Canadian Blood Services BLOOD PLASMA STEM CELLS ORGANS & TISSUES

**URGENT: IMMEDIATE ACTION REQUIRED**

**To:** ALL HOSPITAL SITES  
**From:** National Emergency Blood Management Committee (NEBMC)\*  
**Subject:** <appropriate colour> PHASE

**National Inventory Advisory**

<b>Date and time of issue</b>	<Date and Time> (EST)	
<b>Inventory Availability Phase</b>	<appropriate colour or recovery> PHASE	
<b>Product(s)</b>	<product type, ABO and Rh as required>	
<b>Description</b>	<p>&lt;Include the following in this section:</p> <ul style="list-style-type: none"> <li>• what has contributed/caused this shortage</li> <li>• what corrective actions are being taken</li> <li>• how long the shortage is expected to last&gt;</li> </ul>	
<b>Impact on hospitals</b>	<p>&lt;In this section provide direction for hospitals&gt;</p> <p>&lt;for advisory activation&gt;                  Follow directives in the &lt;&lt;insert phase here&gt;&gt; section of The National / Provincial / RHA or Hospital blood shortage plan.</p> <p><b>Action required:</b>                  All hospitals are to provide inventory levels by Noon EST &lt;&lt;indicate frequency here&gt;&gt; until further notice. Hospital inventory is to be reported via the Blood Component and Product Disposition system: <a href="https://www.blood.ca/en/hospitals/blood-component-and-product-disposition-system">https://www.blood.ca/en/hospitals/blood-component-and-product-disposition-system</a> or in accordance with usual provincial practices (British Columbia and Manitoba).</p> <p>Hospitals are still encouraged to provide inventory levels on a regular basis to Canadian Blood Services/responsible party per routine process.</p>	
<b>For more information</b>	<p>&lt;appropriate colour or recovery&gt; PHASE:                  &lt;product type, ABO and Rh as required&gt;</p> <p>The French translation of the advisory will be shared as soon as it becomes available.</p> <p>For information about the National Blood Shortages Plan, please see:  <a href="http://www.nacblood.ca/resources/shortages-plan/index.html">http://www.nacblood.ca/resources/shortages-plan/index.html</a></p> <p>For additional info, contact:</p> <ol style="list-style-type: none"> <li>1. Your representative to the Provincial Emergency Blood Management Committee;</li> <li>2. Your representative to your Hospital Emergency Blood Management Committee;</li> <li>3. Your Hospital Liaison Specialist, Canadian Blood Services.</li> </ol>	<p><b>PHASE &lt;couleur appropriée&gt; OU PHASE de retour à la normale : &lt;type de produit, ABO et Rh, selon les besoins&gt;</b></p> <p>La version française de cet avertissement vous sera communiquée dès qu'elle sera disponible.</p> <p>Pour en savoir plus sur le Plan national de gestion en cas de pénuries de composants sanguins labiles, consultez le site suivant: <a href="http://nacblood.ca/fr/penurie-de-produits-sanguins">nacblood.ca/fr/penurie-de-produits-sanguins</a></p> <p>Pour plus d'informations, veuillez communiquer avec:</p> <ol style="list-style-type: none"> <li>1. votre représentant(e) au Comité provincial d'urgence pour la gestion du sang;</li> <li>2. votre représentant(e) au comité hospitalier d'urgence pour la gestion du sang;</li> <li>3. votre agent(e) de liaison de la Société canadienne du sang.</li> </ol>

## Appendix B – Guideline for the Use of Red Blood Cell (RBC) Transfusions in Children and Adults in Shortage Situations<sup>1</sup>

Green Phase	Amber Phase	Red Phase
<b>Major Hemorrhage</b>	<b>Major Hemorrhage</b>	<b>Major Hemorrhage</b>
Follow your hospital guidelines.	Follow your hospital guidelines.	Follow your hospital guidelines. Follow triage/Emergency framework if instructed by NEBMC. <sup>a</sup>
<b>Surgery/Obstetrics</b>	<b>Surgery/Obstetrics</b>	<b>Surgery/Obstetrics</b>
Follow your hospital guidelines.	Urgent <sup>b</sup> and emergency <sup>c</sup> surgery in consultation with HEBMC.  Peri/post-partum hemorrhage: consider use of alternatives to minimize RBC requirements.  For all situations, the minimal number of units to stabilize patients should be used.	Emergency situations in consultation with HEBMC. Follow triage/Emergency framework if instructed by NEBMC. <sup>a</sup>
<b>Non-Surgical Anemias/Medical Procedures<sup>d</sup></b>	<b>Non-Surgical Anemias/Medical Procedures<sup>d</sup></b>	<b>Non-Surgical Anemias/Medical Procedures<sup>d</sup></b>
Follow your hospital guidelines.	All requests for RBC transfusion in patients with a Hb level >60 g/L must be reviewed by designated medical personnel.  For patients with hypoproliferative anemias or other chronic transfusion needs, single unit transfusion should be provided if alternatives to red cells are unsuccessful and significant symptoms associated with anemia are present.  Reassessment of severity of symptoms after each unit is required.	All requests for RBC transfusion in patients with a Hb level > 50 g/L must be reviewed by designated medical personnel.  For patients with hypoproliferative anemias or other chronic transfusion needs, single unit transfusion should be provided if alternatives to red cells are unsuccessful and significant symptoms associated with anemia are present.  Reassessment of severity of symptoms after each unit is required.  Follow the guidance found in the CanHaem <sup>12</sup> <a href="#">Blood conservation for hemoglobinopathy patients during pandemic blood shortage.</a>

- a. These guidelines are available on NAC website: [Emergency framework for rationing of blood for massively bleeding patients during a red phase blood shortage.](#)
- b. Urgent surgery: a patient likely to have major morbidity if surgery not performed in the next 1 to 28 days.
- c. Emergency surgery: patients are likely to die or have major morbidity within 24 hours without surgery.

- d. Non-surgical anemias include anemia associated with bone marrow failure, post traumatic injury, extracorporeal membrane oxygenation (ECMO), post-operative states and associated with obstetrics. Medical procedures include but are not limited to simple transfusion, exchange transfusion, high-dose chemotherapy and stem cell transplant.

### Notes

- Given the relatively small volumes/numbers of units required, transfusions for neonates (i.e. patients less than 4 months of age) and intrauterine transfusions would be given according to usual guidelines (i.e. would not be restricted even in times of shortage). However, measures to share units among neonates or between neonates and larger patients should be used to the extent possible.
- In red phase or amber phase, the hospital transfusion medicine director, in consultation with the patient's physician, may consider the use of a blood component which has passed its Health Canada approved storage period. In such cases the justification for the use of an outdated product must be documented by the responsible physician in the patient's chart, and every effort must be made to obtain specific patient consent.

# Appendix C – Guideline for the Use of Platelet Transfusions in Children and Adults in Shortage Situations<sup>1</sup>

Green Phase	Amber Phase	Red Phase
Major Hemorrhage	Major Hemorrhage	Major Hemorrhage
<p>Immune thrombocytopenia and life- or limb-threatening bleeding maintain PC &gt;10 x 10<sup>9</sup>/L.</p> <p>For head trauma or CNS bleeding maintain a PC &gt;100 x 10<sup>9</sup>/L.</p> <p>Other significant bleeding, or acute promyelocytic leukemia at acute presentation, maintain a PC &gt;50 x 10<sup>9</sup>/L.</p>	<p>For head trauma or CNS bleeding maintain a PC &gt; 80 x 10<sup>9</sup>/L.</p> <p>Withhold routine platelet issue in massive hemorrhage packs in the absence of a confirmed indication for platelet transfusion (e.g. platelet dysfunction, PC &lt; 50 x 10<sup>9</sup> /L).</p>	<p>Same as amber phase.</p>
Invasive Procedures/Surgery/ECMO	Invasive Procedures/Surgery/ECMO	Invasive Procedures/Surgery
<p>For non-surgical invasive procedures maintain a PC &gt; 20 x 10<sup>9</sup>/L (central venous catheter insertion, paracentesis, thoracentesis).</p> <p>For lumbar puncture maintain a PC &gt; 20 x 10<sup>9</sup>/L.</p> <p>For CNS surgery maintain a PC &gt; 100 x 10<sup>9</sup>/L.</p> <p>For ECMO maintain a PC &gt;50-80 x 10<sup>9</sup>/L</p>	<p>Urgent<sup>a</sup> and emergency<sup>b</sup> surgery in consultation with HEBMC.</p> <p>In presence of active bleeding or surgical procedure maintain a PC &gt; 30 x 10<sup>9</sup>/L or if CNS trauma/surgery a PC &gt; 80 x 10<sup>9</sup>/L.</p> <p>For non-surgical invasive procedures (other than bone marrow aspiration or biopsy) maintain a PC &gt;10 x 10<sup>9</sup>/L with image guidance.</p> <p>For lumbar puncture, maintain a PC &gt;10 x 10<sup>9</sup>/L.</p> <p>For ECMO maintain a PC &gt;50 x 10<sup>9</sup>/L</p>	<p>Emergency surgery in consultation with HEBMC.</p> <p>All requests for platelet transfusion must be reviewed by designated medical personnel.</p>
Bone Marrow Failure/ Hematopoietic Stem Cell Transplantation/Chemotherapy/ Chronic transfusion recipients	Bone Marrow Failure/Hematopoietic Stem Cell Transplantation/ Chemotherapy/ Chronic transfusion recipients	Bone Marrow Failure/ Hematopoietic Stem Cell Transplantation/Chemotherapy/ Chronic Transfusion recipients
<p>Adhere to a maximum threshold PC of 10 x 10<sup>9</sup>/L for prophylactic platelet transfusions.</p>	<p>Adhere to a maximum threshold PC of 10 X10<sup>9</sup>/L for outpatient prophylactic platelet transfusions; consider lowering this threshold to 5 x 10<sup>9</sup>/L for inpatient prophylactic transfusions.</p>	<p>Cease all prophylactic transfusions.</p> <p>All requests for platelet transfusions in non-bleeding patients must be reviewed by designated medical personnel.</p>

Green Phase	Amber Phase	Red Phase
	<p>Transfuse autologous stem cell transplant patients only if symptoms of bleeding.</p> <p>All requests for a platelet transfusion in non-bleeding patients with a PC &gt;10 x10<sup>9</sup>/L must be reviewed by designated medical personnel.</p> <p>Split PC doses and use of half doses in non-bleeding patients if necessary.</p>	

- Urgent surgery: patient likely to have major morbidity if surgery not performed within the next 1 to 28 days.
- Emergency surgery: patient likely to die or have major morbidity within 24 hours without surgery.

Notes

- PC = Platelet Count.
- Given the relatively small volumes/numbers of units required, transfusions for neonates (i.e. patients less than 4 months of age) and intrauterine transfusions would be given according to usual guidelines (i.e., would not be restricted even in times of shortage). However, measures to share units among neonates or between neonates and larger patients should be used to the extent possible.
- Follow the same guidelines for cancelling/performing surgery as described in [Appendix B](#).
- Split doses of platelets (apheresis or pooled buffy coat) should be considered if available. Health Canada advises that splitting doses of platelets is considered aliquoting and is not a processing activity which requires registration.
- Lower PC thresholds for platelet transfusions for surgical bleeding or special procedures should be used.
- In Red Phase or Amber Phase, the hospital Transfusion Medicine Director, in consultation with the patient’s physician, may consider the use of a blood component which has passed its Health Canada approved storage period. In such cases, the justification for the use of an outdated product must be documented by the most responsible physician in the patient’s chart, and every effort must be made to obtain specific patient consent.

# Appendix D – Revision Table

Summary of changes made in Version 4.0

Section	Change
Global changes	<p>Formatting changes made throughout the document, including breaking up of some paragraphs into bullet points.</p> <p>Updated: OBAC to OBCG and MOHLTC to MOH and EMB to HSEMB; updated version dates for Ontario Plan and National Plan; removed reference to LHINS; EMCT; CBS Communication Plan.</p> <p>Updated Contingency Phases to five phases to include green phase advisory as a separate phase, conform National Plan July 2025.</p> <p>Clarified that hospital actions during a shortage situation should follow direction provided by the National Emergency Blood Management Committee and the Ontario Emergency Blood Management Committee.</p>
Acknowledgements	Added: National Emergency Blood Management Committee
Abbreviations	<p>Removed: MERP, EMB and EMCT, LHIN, PATB</p> <p>Added: HLS, HQ, HSEMB, LIS, MHP, ORBCoN</p>
Executive Summary	<p>Removed: section related to communications</p> <p>Added: mention of National Immunoglobulin Shortages plan, and of French translation</p>
Definitions	<p>Added: Ethical Framework</p> <p>Added: Hospital Emergency Blood Management Committee (HEBMC)</p> <p>Removed: Emergency Management Communication Tool</p> <p>Added: Health System Emergency Management Branch</p> <p>Updated: Triage</p> <p>Added: Shipment Index</p> <p>Updated (under HII): CBS Hospital Portal; previously CBS Hospital Web Based disposition reporting system</p>
1.0 Introduction	Green phase advisory - Removed reference to specific blood shortage exercises.
1.1 Purpose and Scope	Removed specific date versions for CAN/CSA-Z902 and ASTM Standards.

Section	Change
	Added reference to provincial plan for management of Immune Globulin shortages.
1.3.1 Canadian Blood Services	Added: CBS has agreements with other jurisdictions to obtain components during a shortage.  Renumbered CBS Production/Distribution Sites as 1.3.1.1 and updated information.
1.3.2.4. Hospitals, Triage	Added scenario of scarce resource allocation between eligible patients, not massively bleeding (not fulfilling criteria for triage need)
1.3.3 Hospital Emergency Blood Management Committee	Changed section 1.3.3 to 1.3.2 Hospitals (HTS, HEBMC)  Moved: HEBMP and Triage team sections into 1.3.2  Added: <ul style="list-style-type: none"> <li>• Reference to green phase advisory</li> <li>• Single unit to reduction of number of components transfused</li> <li>• Defined suggested blood conservation strategies and use of alternatives</li> <li>• Reference to National Plan Patient/Family Communication Template</li> </ul>
1.3.4 Ministry of Health	Renumbered to 1.3.3. Revised wording regarding role of MEOC
1.3.6 National Emergency Blood Management Committee	Renumbered to 1.3.5. Added that the Co-Chair of NEBMC will be the Chair of NAC and VP Medical Affairs CBS. Referred to National Plan for details on NEBMC.
1.3.7 Ontario Emergency Blood Management Committee	Renumbered to 1.3.6.  Contingency Planning Working Group added in this section.
1.4 Communications	Clarified that NEBMC determines phase declaration.  Clarified internal communication in MOH.  Clarified that CBS communicates to HTS on behalf of NEBMC and MOH communicates to hospital senior management and HTS on behalf of OEBMC.  Added sections 1.4.1 and 1.4.2 to expand on regional shortage and short term platelet shortage  Updated Figure 1 Communication Flow, to bring more in line with NAC National Plan
2.1 Inventory Levels	<u>Green Phase</u> Added that green phase advisory may be declared in any situation where there is concern around projected collections versus demand (e.g., pandemic)

Section	Change
	<p><u>Amber Phase</u> Updated definition to match National Plan</p> <p><u>Red Phase</u> Updated definition to match National Plan</p>
2.1.1 Green Phase and Green Phase Advisory	Inventory table updated CBS in green and green advisory phases to >3.5 DOH for O Rh positive and A Rh positive, conform National Plan July 2025
2.2. Roles and Responsibilities of Key Stakeholders	<p>Process clarified based on green phase advisory declared in March 2020 due to COVID-19.</p> <p><u>Green Phase:</u> General guidance for action during green phase advisory added. Moved some responsibilities from MOH to OEBMC</p> <p>Hospitals – removed ‘located in proximity to one another’ relating to developing agreements from redistribution statement.</p> <p><u>Green Phase Advisory:</u> Added as a separate table.</p> <p><u>Amber Phase</u> MOH – clarified internal communication; to convene committee following NEBMC meeting to provide updates to OEBMC members.</p> <p>OEBMC – Hospital issues to be raised by HLS and ORBCoN in addition to hospital representatives - include HTS in hospital communications</p> <p>Hospitals – changed ‘triage’ to refer to transfusion eligibility assessment of massively bleeding patients during red phase only – added ‘screening of transfusion orders’ to assess eligibility for transfusion during amber and red phase for non-massively bleeding patients using established utilization recommendations – included reference to fibrinogen concentrate – removed Platelet TIPS (document retired) – added use of group A plasma as substitute for AB plasma in Massive Hemorrhage</p> <p><u>Red Phase</u> NEBMC – added authorize use of Emergency Framework if required MOH – convene OEBMC within 24 hours of NEBMC meeting</p> <p>OEBMC – changes as per amber phase</p> <p>Hospitals – added alternatives for (AB) plasma and cryoprecipitate and splitting or extended expiry of components</p> <p><u>Recovery Phase</u></p>

Section	Change
	<p>Added: to ensure return to normal operations does not threaten the recovery of the blood supply and recommendation for all stakeholder groups to hold a debrief and share feedback with NEBMC via MOH.</p> <p>MOH – inform Hospital Senior Management to ensure HTS is kept informed of any change in operations that may affect a change to demand for blood</p> <p>Hospitals – inform CBS of any forecasted changes in demand in relation to return to normal operations; provide suggestions for improvement to Ontario Plan to ORBCoN representative</p>
3.0 Helpful Resources	<p>Added: Canadian Blood Services Blood Utilization Best Practices</p> <p>Added: Ontario Massive Hemorrhage Protocol recommendations</p> <p>Added: both National Plan and Emergency Framework</p>
4.0 Contingency Planning Working Group	<p>Updated membership list. Added Core CPWG</p>
5.0 References	<p>Updated or added:</p> <ul style="list-style-type: none"> <li>• Report on 2018 Ontario Blood Shortage Exercise</li> <li>• Publication - Triage tool for the rationing of blood for massively bleeding patients during a severe national blood shortage: guidance from the National Blood Transfusion Committee.</li> <li>• CanHaem 2020 Guidance document for management of hemoglobinopathy patients during blood shortages</li> <li>• CAN/CSA Z902</li> </ul>
Appendices	<p>Removed:</p> <p>Appendix A and B – CPWG and OEBMC Terms of Reference</p> <p>Appendix C – Emergency Framework Synopsis for Triage</p> <p>Changed:</p> <p>Appendix D – Example of phase declaration notification for hospitals - to Appendix A, newer example inserted conform National Plan (2025)</p> <p>Appendix E and F – Guidelines for Red Cell and Platelet Use - to Appendix B and C; and updated to match National Plan (2025) Table 5 and 6, respectively.</p>