

The American Red Cross has developed recommended strategies for managing temporary blood products shortages, including in massive transfusion situations. These measures can be used in conjunction with your hospital's policies and considering the treatment needs of your patients. This document should not replace the clinician's judgment about patient care.



Managing Blood Shortages

Recommended Strategies

Routine Actions

1. Assess available blood supply by reviewing Red Cross-National Inventory Snapshot in Connect <https://arc.bloodhub.com>
 - If the Red Cross product supply status is red or yellow, or if your hospital is notified that placed orders will not be filled as expected consider the following actions:
 - a) Review and determine the minimum required inventory for your hospital. Limit stocking orders during supplier shortages. Carefully monitor your inventory to minimize product expiration.
 - b) Place short-dated product up front so staff can easily access them. Establish an outdate target of zero.
 - c) Readily move products between hospitals in your community to limit outdating and ensure patient needs are met.
 - d) Prioritize communication with the operating room, emergency department, and floor staff to avoid wastage due to temperature limits/time out of the blood bank.
2. Ensure that elective surgeries which may require blood have completed a type and screen before the scheduled procedure to allow for the release of type-specific red blood cells (RBCs) and ensure time to screen available inventory for antigen negative units, if needed.
3. Share blood inventory status updates with key hospital staff, including medical staff, quality, nursing leadership and administration to communicate the degree (mild, moderate, or severe) of shortage you project and to emphasize the importance of vigilance.
4. Contact your Red Cross Medical Director as needed to discuss patient specific cases or review any recommended actions.
5. Actively promote blood donation within your hospital and your community.

Shortage Key

Mild Shortage (inventory 25% lower than planned)	Moderate Shortage (inventory 50% lower than planned)	Severe Shortage (inventory 75% lower than planned)
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	Mild Shortage Actions	Moderate Shortage Actions	Severe Shortage Actions
General Actions	<ul style="list-style-type: none"> • Establish best practice with emergency department and operating room staff to send type and screen samples as quickly as possible for a patient without a current type and screen • Consider antifibrinolytic therapies (e.g. tranexamic acid, aminocaproic acid) when appropriate • Encourage pharmacologic measures of optimizing hemoglobin (e.g. iron replacement therapy, erythropoietin stimulating agents), ideally in the setting of a preoperative anemia clinic 	<ul style="list-style-type: none"> • For routine transfusions, issue blood to the floor only when a transfusion is imminent (patient is in room, vascular access is established, etc.) • Implement a prospective review of all routine blood product ordering before release from the blood bank • Verify that transfusion is expected within the next 4 hours and cancel orders if the clinical need changes 	<ul style="list-style-type: none"> • Encourage pharmacologic measures of optimizing hemoglobin (e.g. iron replacement therapy, erythropoietin stimulating agents) and coagulation system • Consider holding anticoagulation or pursuing anticoagulation reversal when clinically appropriate for hospitalized patients or patients undergoing procedures • Evaluate additional surgical options to minimize blood utilization, including cell salvage and isovolemic hemodilution, with anesthesia and surgery teams • Discuss postponement of elective procedures with moderate to high bleeding risk
Red Blood Cells	<ul style="list-style-type: none"> • Ensure an evidence-based transfusion trigger is utilized in routine transfusion scenarios • Educate end users on the challenges with maintaining Group O RBC products. Issue type-specific blood whenever possible for trauma and massive transfusions • Communicate with emergency department and operating room staff to send type and screen samples as quickly as possible for a patient without a current type and screen • Notify surgical staff and medical leadership that Group O RBCs will not be available for "emergency release" for elective cases without a current type and screen • Notify adult and pediatric oncology leadership that outpatient RBC transfusions be limited to one unit whenever clinically appropriate • Do not routinely screen RhD-negative RBC inventory (especially O negative) as a convenient source for CEK-negative units • Transfuse one unit at a time and re-check target lab parameters between transfusions whenever feasible • Limit ability for medical staff to routinely order more than one product at a time 	<ul style="list-style-type: none"> • Provide antigen-negative RBC only to patients who have a need for antigen-negative cells • Postpone prophylactic red cell exchanges unless the hemoglobin S level is close to 30% (to prevent stroke) or 40-50% (to prevent other complications). In cases of significant anemia without an elevated HbS level, only a simple transfusion is required • If CEK availability is constrained (this information will be communicated or can be discussed with Red Cross medical director), consider limiting use of CEK-negative units to sickle cell disease patients who are alloimmunized to at least one clinically significant alloantibody • Reschedule prophylactic sickle cell patients based on (actual or anticipated) pre-procedure HbS (<30% for stroke and <40% for non-stroke) • Update pediatric transfusion policies to accept both AS-1 and AS-3 RBCs • Reevaluate CMV-negative transfusion guidelines to provide standard leukoreduced, CMV-safe units rather than CMV seronegative units for most transfusions • Canada's National Advisory Committee as well as transfusion practices in France consider leukoreduced products for all adult CMV-safe transfusion requirements. Canada reserves CMV seronegative units for intrauterine transfusions 	<ul style="list-style-type: none"> • Consider implementing limits on number of RhD-negative units to females of childbearing potential with unknown blood type • (More severe) Consider disregarding RhD-negative requirements units for females of childbearing potential

	Mild Shortage Actions	Moderate Shortage Actions	Severe Shortage Actions
Platelets	<ul style="list-style-type: none"> Ensure a restrictive transfusion trigger is followed: Platelet count <math>10 \times 10^3</math> per <math>\mu\text{L}</math> for hypoproliferative thrombocytopenia, <math>50 \times 10^3</math> per <math>\mu\text{L}</math> for major surgeries, and <math>100 \times 10^3</math> per $\mu\text{L}</math> for neurological surgeries$</math></math></math></math> Notify adult and pediatric oncology leadership that outpatient platelet transfusions be limited to one unit whenever clinically appropriate Transfuse one unit at a time and re-check target lab parameters between transfusions when feasible Limit ability for medical staff to routinely order more than one product at a time Accept Low Yield PR platelets Remove restriction to ABO/Rh- matched platelets for most patients Red Cross platelets are collected and stored in PAS, which contain significantly reduced ABO isoagglutinins. Rhlg ('Rhogam' or Rhophylac) may be administered to non-immunocompromised Rh-negative patients of childbearing potential who receive Rh positive platelet transfusions, although many centers forego this due to the extremely low incidence of alloimmunization from such exposure Reserve ABO-compatible platelet transfusions for stem cell transplant recipients and pediatric patients with small blood volume 	<ul style="list-style-type: none"> Remove restrictions on ABO-incompatible platelet transfusions for stem cell transplant recipients and pediatric patients with small blood volume. Consider volume reduction, if necessary 	<ul style="list-style-type: none"> When possible, split platelet units into smaller doses, which is an evidence-based, practice-based method for adult oncology inpatients based on the PLADO study (Slichter et al. N Engl J Med 2010;362:600-613) Avoid prophylactic transfusion of thrombocytopenic patients not actively bleeding so platelets are available for actively bleeding patients requiring therapeutic platelet transfusion Consider using platelet counts of <math>5 \times 10^3</math> per <math>\mu\text{L}</math> as the trigger for prophylactic platelet transfusions rather than <math>10 \times 10^3</math> per $\mu\text{L}</math>$</math></math></math>
Plasma	<ul style="list-style-type: none"> Use group A plasma for emergent and massive transfusions as standard of care for adults, regardless of inventory constraints. Implement this practice if not already in place Restrict use of Group AB plasma to patients that have an AB blood type; follow hospital procedures/policies in transfusing Group A plasma as an alternative when patient blood type is undetermined Reduce plasma use by maximizing the use of albumin as a replacement fluid for therapeutic apheresis procedures except where contraindicated Reserve plasma for use when INR > 2 	<ul style="list-style-type: none"> Use group A plasma for emergent and massive transfusions as standard of care for adults, regardless of inventory constraints. Implement this practice if not already in place. Restrict use of Group AB plasma to patients that have an AB blood type; follow hospital procedures/policies in transfusing Group A plasma as an alternative when patient blood type is undetermined. 	<ul style="list-style-type: none"> Consider antifibrinolytic therapies (e.g. tranexamic acid, aminocaproic acid) when appropriate Evaluate a more permissive policy for use of additional hemostatic therapies (e.g. prothrombin complex concentrates, activated factor VIIa)
Cryoprecipitate	<ul style="list-style-type: none"> Remove restriction to ABO/Rh- type-specific Pooled Cryoprecipitate for most adult patients receiving Cryoprecipitate transfusions RhD type need not be considered when using this component Reserve ABO-compatible cryoprecipitate transfusions for pediatric patients with small blood volume 	<ul style="list-style-type: none"> For non-pre-pooled cryoprecipitate, reduce pool size (from 10 to 8 single units if hospital is pooling). For pre-pooled cryoprecipitate issue one unit instead of two. 	<ul style="list-style-type: none"> Consider antifibrinolytic therapies (e.g. tranexamic acid, aminocaproic acid) when appropriate Evaluate a more permissive policy for use of additional hemostatic therapies (e.g. prothrombin complex concentrates, activated factor VIIa) Consider using FDA approved fibrinogen products, such as RiaSTAP® or Fibryga® for fibrinogen replacement

Managing Massive Transfusion Protocols in Times of Blood Shortage

Due to the relatively high utilization of universal blood components and risk of product wastage during massive transfusion protocol (MTP) activations, we encourage trauma hospitals periodically evaluate their MTP practices, particularly during blood shortages. Ideally, these evaluations will engage stakeholders in both the Trauma Service and the Transfusion Service, resulting in a partnership with shared outcome measures.

Consider implementing or optimizing a process to reliably draw a type and screen (and if required, a confirmatory ABO type) from MTP patients at the beginning of the resuscitation process. Such a practice could permit the safe transition to type-specific components. Hand delivering the type and screen tube and/or the confirmatory ABO type (if required) to the blood bank may also accelerate the transition to type-specific components.

A Red Cross Medical Director is available 24/7 should you require further support during inventory shortages.