ALBERTA PRECISION LABORATORIES
Leaders in Laboratory Medicine

Platelets

APPLICABILITY: This document applies to APL, AHS, Covenant Health, and all other health care professionals involved in the transfusion of blood components and products in Alberta.	***OTHER NAMES:*** *pooled platelets, apheresis platelets, pooled platelets psoralen treated (PPPT), apheresis platelets psoralen treated (APPT),apheresis platelets PAS Added* ***Company:*** *Canadian Blood Services (CBS)* ***Class:*** *Human blood component, derived from whole blood*

ROUTES	Intravenous	Subcutaneous	Intramuscular	Intraosseous
Acceptable Routes*	Yes	No	No	Yes

***** Administration of blood components and blood products is a restricted activity. For specific conditions that apply to a profession's authorization to administer blood components and blood products, consult the applicable discipline-specific regulation under the Health Professions Act (Alberta). Health care professionals with this authorization require the applicable education, training and competency.

DESCRIPTION:

- Platelets are a platelet concentrate prepared by Canadian Blood Services from volunteer donors.
- Platelets are either suspended in plasma or platelet additive solution E (PAS-E).
- Psoralen treated platelets are Pathogen reduced which is achieved with the Cerus INTERCEPT® DS Blood System for Platelets.
- Psoralen treated platelets are treated to destroy viruses, bacteria, and protozoan parasites. Residual leukocytes are also inactivated therefore they are equivalent to irradiated.

Details (per unit)	Apheresis Platelets, Non-Pathogen Reduced	Pooled Platelets Psoralen Treated (PPPT)	Apheresis Platelets Psoralen Treated (APPT)	Apheresis Platelets PAS Added, Non-Pathogen Reduced
Collection	Each unit is collected from a single donor in ACD-A anticoagulant using automated apheresis techniques, which include leukocyte reduction. Donor may be selected to match HLA typing of recipient, if indicated.	Prepared by separation of the buffy coat layer from whole blood collected in CPD anticoagulant from seven donors of the same ABO group. The seven buffy coats are pooled in PAS-E and then leukocyte reduced by filtration. The pool is then split into two single transfusion units.	Each unit is collected from a single donor in ACD-A anticoagulant using automated apheresis techniques, which include leukocyte reduction and addition of PAS-E. Donor may be selected to match HLA typing of recipient, if indicated.	Each unit is collected from a single donor in ACD-A anticoagulant using automated apheresis techniques, which include leukocyte reduction and addition of platelet additive solution E (PAS-E). Donor may be selected to match HLA typing of recipient, if indicated.
Number of Donors	1	7	1	1
Donor Screening	Donors are screened and blood donations are tested for, at minimum: • ABO and Rh types • Clinically significant antibodies against red cell antigens • Antibodies to human immunodeficiency virus (HIV-1 and HIV-2), • Hepatitis C virus (HCV), human T-cell lymphotropic virus type I and II (HTLV-I/II), hepatitis B core antigen (HBcore) • Hepatitis B Surface Antigen (HBsAg) • Presence of viral RNA (HIV-1 and HCV) and viral DNA (hepatitis B virus (HBV)) • Syphilis			

Details (per unit)	Apheresis Platelets, Non-Pathogen Reduced	Pooled Platelets Psoralen Treated (PPPT)	Apheresis Platelets Psoralen Treated (APPT)	Apheresis Platelets PAS Added, Non-Pathogen Reduced
Available size(s) (approximate)	200mL	180mL	270mL	270mL
	Apheresis platelets may be split into multiple smaller volume bags to facilitate small doses and reduce donor exposure. *Contact your local laboratory/Transfusion service regarding availability of split units*	*Cannot be volume reduced, washed, or aliquoted.*		
Platelet Yield per unit	330 $x10^9$	250 $x10^9$	250 $x10^9$	280 $x10^9$
Plasma volume (approximate)	170mL	75mL	115mL	115mL
Resuspension Solution	Plasma	Approximately 60% PAS-E, 40% Plasma		
Storage bag information	Polyvinyl chloride (PVC) - n-butyryl-tri-n-hexyl citrate (BTHC) bags. Tubing contains di-ethyl hexyl phthalate (DEHP)	Ethylene vinyl acetate (EVA) bags Tubing contains DEHP		
Latex	Not guaranteed to be latex-free			

PRETRANSFUSION TESTING & COMPATIBILITY:

PRETRANSFUSION TESTING:

- Pretransfusion ABORH testing is required for the provision of platelets and must be performed unless delaying platelet transfusion would be life-threatening.
- The ABORH may be ordered independently, or as part of a Type and Screen.

COMPATIBILITY:

- Platelets labelled as “All Groups” and “Low Anti-A/B” have been confirmed by the transfusion medicine laboratory and CBS respectively to have a low titre of ABO antibodies and are safe for transfusion for patients of any ABO group.
- ABO compatible platelets may not be ABO identical with the patient. See the *ABORH Compatibility Chart*.
- In emergencies, if ABO compatible platelets are not available, any available platelet may be given.
- RhD Negative patients of childbearing potential should receive RhD Negative platelets if available.
- If RhD Negative platelets are not available, RhD positive platelets may be given. Rh Immune Globulin (RhIG) may be recommended for RhD Negative patients with childbearing potential who receive RhD Positive platelets, and in other circumstances as recommended by the Transfusion Service/Laboratory.

AVAILABILITY:

- Supplied by Canadian Blood Services.
- Contact your local laboratory/transfusion service regarding stock availability on site.

INDICATIONS:

- Prevention or treatment of bleeding due to platelet deficiency or dysfunction.
- The decision to transfuse platelets depends on several factors besides the platelet count. Clinical judgment must be exercised when applying the following guidelines to a specific clinical situation.

	Appropriate Ordering Guidelines				
PLT Count	**Less than or equal to 10×10^9/L***	**Less than or equal to 40×10^9/L**	**Less than or equal to 50×10^9/L**	**Less than or equal to 100×10^9/L**	**N/A**
Clinical Indication	Prophylactic use (to prevent bleeding) when there is a regenerative thrombocytopenia (e.g. chemotherapy, aplasia) *less than or equal to 15×10^9/L is an acceptable trigger for outpatients due to the ability to monitor the platelet count on a daily basis and logistics.	Prophylactic use (to prevent bleeding) in a neonate	Active bleeding, peri-operative, or planned invasive procedure **Not** indicated for idiopathic thrombocytopenic purpura (ITP), unless there is life-threatening bleeding.	▪ Surgery or bleeding into critical area (e.g. spinal cord; brain; retinal hemorrhage) ▪ Extensive microvascular bleeding (e.g. post cardiopulmonary bypass presumed to be secondary to acquired platelet dysfunction) ▪ Neonate with bleeding, perioperative or planned invasive procedure ▪ Extracorporeal Membrane Oxygenation (ECMO)	▪ Life-threatening bleeding or extensive wet purpura in ITP. ▪ Active bleeding, perioperative, or planned invasive procedure and known congenital or acquired platelet dysfunction unresponsive to desmopressin (ddAVP®) (includes acetylsalicylic acid (ASA) within past 3 days and non-steroidal within past 24h, or clopidogrel therapy).

Don't Misuse My Blood Project
DMMB Clinical Decision Support Tools (albertahealthservices.ca)

CONTRAINDICATIONS:

- Platelet transfusion is not indicated for:
  - Bleeding unrelated to decreased numbers of, or abnormally functioning, platelets.
  - Patients with destruction of endogenous and exogenous platelets, such as in thrombotic thrombocytopenic purpura (TTP), idiopathic thrombocytopenic purpura (ITP), and heparin-induced thrombocytopenia (HIT), except in the case of life-threatening hemorrhage.
- Since platelet components contain donor plasma, recipients with known anaphylaxis to plasma should have Transfusion Medicine service consultation about available alternatives or options.
- Patients with undetectable levels of IgA, antibodies against IgA, and a history of transfusion reactions should receive platelets from IgA deficient donors.
- Do not use platelets psoralen treated for patients with a history of hypersensitivity reaction to amotosalen or other psoralens.

WARNINGS:

- Refer to compatibility section.
- Multiple transfusions of platelets in PAS-E may lead to over dosage of potassium and magnesium. Monitor changes in electrolyte concentration and acid-base balance when multiple transfusions of platelets in PAS-E are administered.

DOSE:

- Dose is to be determined by the most responsible health practitioner (MRHP).
- **Adults:** recommended dose: 1 pooled platelet or 1 apheresis platelet unit or 1 pooled platelet psoralen treated or 1 apheresis platelet psoralen treated or 1 apheresis platelet PAS-E added
- **Neonates and Pediatrics:**

Pediatrics		Neonates
Less than 25kg	**Greater than 25kg**	
Recommended dose 10mL/kg up to a maximum of 1 unit. Order platelets by volume (mL/kg) up to a maximum of 1 unit	Order by full unit	Recommended dose 10-15 mL/kg

ADMINISTRATION:

Administer per the AHS *Transfusion of Blood Components and Blood Products Policy.*

In non-urgent/non-bleeding/inpatient settings, blood components should be transfused during daytime hours (for patient safety) and transfused one unit at a time**.**

Confirm signed consent has been obtained and documented prior to requesting blood components or products (human-source) from lab/transfusion service where possible. *Refer to the AHS Consent to Treatment/Procedure(s) Policy Suite.*

Pre-Infusion:

- Ensure recent patient weight and height is on file.
- Ensure pertinent labs are available as required (i.e. CBC).
- Ensure any ordered pre-medications have been given (antihistamines, antipyretics prn).
- Perform pre-transfusion checks per AHS Transfusion Policy and Procedure.
- Report any new onset acute illness to MD/authorized prescriber prior to commencing infusion.
- Perform a visual inspection of the unit. Refer to the CBS Visual Inspection Tool.
- Platelets should be thoroughly mixed prior to transfusion.

Access:

- Platelets can be given via CVAD, peripheral venous line, intraosseous device, or umbilical venous catheter.
- Use an IV catheter suitable for the size of vein and purpose of transfusion.

Equipment:

- Administer through a standard blood transfusion set (170 – 260-micron filter).
- Air eliminating micron filters are not compatible with platelet transfusions.
- Transfusion of platelets after other blood components can cause the filter to become blocked. Changing the infusion set prior to starting the platelet transfusion set is recommended.
- Change set as needed, but at minimum every 8 hours or per manufacturer's recommendation.
- A pull/push device or 3-way-stopcock system or custom neonatal transfusion set is acceptable for delivering partial aliquots. Blood component aliquots must be filtered (as above) and should not stand in the syringe.
- Platelets may be infused using a pressure infusion device, rapid infuser, blood warmer or syringe pump as ordered by the authorized prescriber or as defined by an approved protocol as long as the device is Health Canada approved.
- Rapid infusers and other pressure infusion devices must not exceed 300mmHg.

ADMINISTRATION cont'd:

Compatible IV Solutions:

- 0.9% Sodium Chloride (Normal Saline) only.
- Blood components should be administered one unit at a time, however if required, co-administration of plasma, red cells, or 5% albumin may be performed at the discretion of the MRHP.
- Do not mix with other products, medications, or solutions.

Other Solutions:

- Studies in Alberta have shown other IV solutions to be compatible with citrated blood components.*
- These solutions should only be considered in situations where the use of 0.9% Sodium Chloride would lead to undesirable metabolic abnormalities.
- Only isotonic, calcium-free IV solutions should come in contact with blood products. Calcium may bind with the citrate anticoagulant and promote clotting in the tubing. Excess glucose and/or dextrose causes hemolysis and shortens red cell survival.
- Solutions meeting these criteria include:
  - Plasma-Lyte A®: Contains Sodium 140mEq/L, Potassium 5mEq/L, Magnesium 3mEq/L and Chloride 98mEq/L at pH 7.4.
  - Other isotonic, calcium and glucose/dextrose free commercial electrolyte solutions (i.e., Normosol®-R)
  - Ringer's Lactate (LR). **Note:** Studies have shown LR to be compatible with citrated blood components. However, additional studies around the safe use of LR as a citrated blood component diluent are needed.

***** This information differs the Canadian Blood Services circular of information. As studies in Alberta have shown compatibility with the listed IV solutions, their inclusion within this document is in compliance with CSA Standards.

Medications:

- Medications **must not** be added to the blood component bag.
- If it is necessary to administer medications simultaneously with blood components, it is safest to use an alternate site for the medication.
- If administration using a separate site is not possible:
  - Pause the blood component transfusion and flush the IV line with 0.9% Sodium Chloride.
  - Administer the medication.
  - Flush the IV line again with 0.9% Sodium Chloride before resuming the transfusion.

Infusion Rate:

- Administration rate should be specified by the MRHP after patient assessment.
- Infusion rate depends on the patient's blood volume, cardiac status and hemodynamic condition.
- **Recommended rates for routine transfusion:**

Patient Weight	Infusion Rate: For the First 15 Minutes	Infusion Rate: After the First 15 Minutes
Greater than 25 kg	50 millilitres per hour (mL/h), if possible	For all patient weights: Continue transfusion at the prescribed rate as per the authorized prescriber's order. Recommended infusion time is over 30-60 minutes per dose, as long as it does not exceed four (4) hours from the time of blood component removal from the approved storage device / location
Less than or equal to 25 kg	1 millilitre per kilogram per hour (mL/kg/h) or slower for the first 15 minutes, if possible	

***** Program pump as 0.25mL/ kg (millilitre per kilogram) or slower for the first 15 minutes, if possible.

POTENTIAL HAZARDS WITH PARENTERAL ADMINISTRATION:

- Potential adverse events related to a blood transfusion range in severity from minor with no sequelae to life-threatening.
- All adverse events occurring during a transfusion should be evaluated to determine whether or not the transfusion can be safely continued/restarted.
- All adverse events suspected to be related to a transfusion (whether during or after a transfusion) should be reported to your local transfusion service and documented.
- Platelets may cause Acute Respiratory Distress Syndrome (ARDS) with large volume platelet transfusions. The most common reactions to platelets are mild allergic reactions, febrile non-hemolytic transfusion reactions (FNHTR), and transfusion associated circulatory overload (TACO). Refer to the *Acute Transfusion Reaction Chart* for symptoms indicative of transfusion reaction.

NURSING IMPLICATIONS:

Patient Vital Signs and Monitoring:

	Pre Transfusion Vitals?	Stay At Patient Bedside?			Vital Signs During Transfusion		Post Transfusion Monitoring
		First 5 min	First 10 min	First 15 min	After 15 min	Remainder of transfusion	
All Patients	**Yes**	**Yes**	**NO**, but must be immediately available*		**Yes**	**q1h**	Set of vital signs Monitor for minimum of 15 minutes post transfusion **

*Defined as performing non-dedicated tasks with the patient in view.
**If patient has had a previous adverse reaction to component transfusion, or this is the first time the patient is receiving that component type, monitor for 30 to 60 minutes.

Note: Vital signs/patient monitoring may be conducted more frequently, or continuously, as determined by clinical condition of patient.

Patients receiving blood product transfusions must be observed closely for signs of any unexpected or untoward reactions. These reactions may occur during or after the infusion of blood or blood products. For follow up instructions to a transfusion reaction, go to Transfusion Reactions | Alberta Health Services

Documentation:

- Ensure documentation is completed per the *AHS Transfusion of Blood Components and Blood Products Policy.*
- Patient tolerability should be documented in appropriate flow chart or clinical record (electronic or paper).
- Document vital signs as required in the appropriate flow chart or clinical record (electronic or paper).
- Provide patient notification documentation where required.

LABORATORY MONITORING

- The "post" platelet increment level is important and is recommended to determine the appropriateness of therapy or refractoriness. It should be collected 15 minutes to one hour after platelet transfusion.
- One dose of donor platelets should raise the platelet count by least 15 x 10^9/L

STORAGE & STABILITY

- Store at 20-24°C with continuous gentle agitation in an approved temperature-controlled environment.
- Do not refrigerate**.** Cold temperatures and lack of gentle agitation decrease platelet viability.
- Shelf life is up to 7 days after collection.
- Untreated Pooled and apheresis platelets may be manipulated (i.e. aliquoting) which may alter shelf life.
- Platelets psoralen treated should not be irradiated.
- Platelets psoralen treated should not be volume reduced (centrifuged and supernatant removed) or aliquoted.

CONTACT INFORMATION:

Approved By: APL Transfusion Medicine Discipline Council
For questions or comments please contact: Transfusion.SafetyTeam@aplabs.ca

REFERENCES

Canadian Blood Services Circular of Information For the Use of Human Blood Components available from www.blood.ca

Platelets - Pooled Platelets, Apheresis Platelets. November 2022.

Pathogen Reduced Platelet Concentrates - Pooled Platelets Psoralen Treated. April 2023.

Pathogen Reduced Platelet Concentrates - Apheresis Platelets Psoralen Treated June 2023

Non-Pathogen Reduced Platelet Concentrates - Apheresis Platelets PAS Added June 2023

Canadian Blood Services FAQ: Information for health professionals on pathogen-reduced platelets. Available from Professional Education (blood.ca)

Canadian Blood Services. Visual Inspection Tool. CBS Visual Inspection Tool January 2024

CBS Clinical Guide to Transfusion. Available from https://professionaleducation.blood.ca/

Ten Things Physicians and Patients Should Question. Canadian Society for Transfusion Medicine. Available from choosingwiselycanada.org

CSA. Blood and Blood Components. National Standard of Canada. CAN/CSA-Z902:20. Ottawa, ON. Standards Council of Canada; 2020.

AHS Policy Transfusion of Blood Components and Blood Products policy PS-59.