

Royal Hospital for Women (RHW)
NEONATAL BUSINESS RULE
COVER SHEET



Health
 South Eastern Sydney
 Local Health District

Ref: T24/78598

NAME OF DOCUMENT	Critical Bleeding Protocol Neonate (CBP)
TYPE OF DOCUMENT	Clinical Business Rule
DOCUMENT NUMBER	RHW CLIN106
DATE OF PUBLICATION	13 October 2025
RISK RATING	Medium
REVIEW DATE	October 2028
FORMER REFERENCE(S)	POWH and RHW Critical Bleeding Protocol (CBP) (Formerly Massive Transfusion Protocol) POWH CLIN072 NSW MoH Policy Directive PD2018_042 Blood Management NSW MoH Policy Directive IB2020_010 Consent to Medical and Healthcare Treatment Manual
EXECUTIVE SPONSOR	Sally Wise, Nursing Co- Director Neonatal Services Srinivas Bolisetty, Medical Co- Director Neonatal Services
AUTHORS	S, Bolisetty (Medical Co- Director Neonatal Services) Bryony Ross (Paediatric Haematologist, John Hunter Children’s Hospital), Eszter Jozsa (Clinical Nurse Specialist NCC), Ruth Jackson (Nurse Educator NCC)
SUMMARY	The critical bleeding in neonates often requires massive transfusion of blood products. This CBR is to assist the clinicians and the POWH Blood Bank to achieve timely intervention.
Key Words	Blood products, critical bleeding, neonate, transfusion

Critical Bleeding Protocol Neonate (CBP)
RHW CLIN106

Contents

1	BACKGROUND.....	3
2	RESPONSIBILITIES	3
2.1	Staff	3
3	PROCEDURE	4
3.1	Equipment.....	4
3.2	Clinical Practice	4
3.2.1	Initiate the Critical Bleeding Protocol Neonate (Appendix A)	4
3.2.2	Blood testing	6
3.2.3	Transfusion of blood products during critical bleeding	6
3.2.4	CBP blood target values*	7
3.2.5	Additional treatments to be considered:	8
3.2.6	Administration and Documentation.....	8
3.2.7	Patient Information	9
3.3	Documentation.....	9
3.4	Education Notes.....	9
3.5	Abbreviations	12
3.6	Related Policies/procedures.....	12
4	ABORIGINAL HEALTH IMPACT STATEMENT DOCUMENTATION.....	13
5	CULTURAL SUPPORT	13
6	NATIONAL STANDARDS	13
7	REVISION AND APPROVAL HISTORY	14
	Appendix A.....	15
	APPENDIX B.....	16
	Appendix 3 Blood and Blood Product Administration Form.....	17
	Appendix 4a Authority to Issue Blood Products	18
	Appendix 4b Return of Blood Products to Blood Bank (back of authority to issue blood products form).....	19
	Appendix 5 SEALS Blood Bank Issue Report Checklist.....	20

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

This Clinical Business Rule (CBR) is developed to guide safe clinical practice at the Royal Hospital for Women (RHW). Individual patient circumstances may mean that practice diverges from this Clinical Business Rule. Using this document outside RHW or its reproduction in whole or part, is subject to acknowledgement that it is the property of RHW and is valid and applicable for use at the time of publication. RHW is not responsible for consequences that may develop from the use of this document outside RHW.

1 BACKGROUND

The aim of this CBR is to assist clinicians in the process of recognition of the necessity, organisation and administration of blood products in critical bleeding. The aims are early recognition of blood loss, maintenance of tissue perfusion and oxygenation, restoration of blood volume and haemoglobin (Hb), management of coagulopathy, cessation of bleeding and usage of the appropriate blood products.

Critical bleeding in neonates may be defined as either:

- 40mL/kg in 3hr OR
- 80mL/kg in 24hr OR
- Hypovolaemic shock not responding to initial Packed Red Blood Cells (PRBC) 20mL/kg OR
- Evidence or suspicion of ongoing blood loss with haemodynamic/cardiovascular instability

2 RESPONSIBILITIES

2.1 Staff

2.1.1 Medical

- Timely identification of neonates with critical bleeding
- Initiating the critical bleeding protocol
- Maintain communication with Blood Bank
- Consult with paediatric haematologist

2.1.2 Nursing

- Collecting bloods for initial and ongoing testing
- Ensure availability of personnel to transport blood product promptly to patient location
- Administration of blood product
- Maintain communication with clinicians
- Informs Blood Bank if patient location changed

2.1.3 Blood bank

- Prioritise blood testing and blood product dispensing
- Dispatch requested blood products to patient location
- Ensure continuous availability of blood products

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

- Maintain communication with clinicians including paediatric haematologist
- 2.1.4 Porter**
- Transport required blood products to patient location

3 PROCEDURE

3.1 Equipment

- Transfusion giving set
- 50 mL syringe
- Extension tubing (as required)
- Blood warmer (as required)
- Blood collection tubes
- Blood gas syringe
- Cardiorespiratory monitoring

3.2 Clinical Practice

3.2.1 Initiate the Critical Bleeding Protocol Neonate (Appendix A)

- A senior clinician directly or another staff member under the direct instruction from a senior clinician contacting the hospital’s Blood Bank to:
 - Initiate the Neonatal CBP and place an order for Pack 1 or Pack 2 blood products depending on the clinical scenario

Table 1. Suggested Critical Bleeding Packs

Pack 1	Pack 2
PRBC 20mL/kg	PRBC 20mL/kg
FFP 15mL/kg	FFP 15mL/kg
Cryoprecipitate 5-10mL/kg	Platelets 10-15mL/kg

- If blood is required urgently (<15 minutes) request emergency release of O negative PRBC.

Note
O Negative PRBC stored in fridge in Operating Theatres

- Notify on call Haematologist/haematology registrar and provide the following information:
 - Neonatal bleeding
 - Abnormal neonatal bleeding from intravenous cannulation sites, haemorrhage or bruising
 - Maternal history of:
 - Allo-immune thrombocytopenia
 - Immune thrombocytopenia (ITP)

Critical Bleeding Protocol Neonate (CBP)










RHW CLIN016

- Maternal thrombocytopenia
- Familial bleeding disorders
- Warfarin or other anticoagulation other than prophylactic Low Molecular Weight Heparin
- Maternal blood group antibodies
- History of intra-uterine transfusion (IUT)
- Notify the Blood bank with information:
 - Location of patient
 - The name of the designated clinical contact
 - A contact phone number
 - Patient’s name (baby of “mothers name”)
 - Patient identification number
 - Date of birth
 - Number of units, dose of blood product or pack required. This is to be sent in the ‘Lifeblood shipper container’ with BT10 time strip sticker temperature indicator (Picture 1, 2 and 3)
 - A brief clinical scenario
- Inform parents/ carers as soon as possible



Picture 1

Australian Red Cross Lifeblood
Lifeblood Shippers - Receipt and Use by External Institutions
 WI-00635
 Version: 12

R1	Capacity	Validated Transport Time	Legend	Name	Quantity	Note												
	1 to 10 red cell units	6 hours		Foil pouch	1	Used to line shipper and contains all other items												
				Frozen -19°C ballast	2	Side by side inside foil pouch												
				Chilled ballast	2	Side by side inside foil pouch												
				Cardboard divider	1	Insulating barrier to maintain product temperature												
				Extra chilled ballast/s (as per table)		<table border="1"> <thead> <tr> <th>Number of red cells</th> <th>Number of extra ballasts</th> </tr> </thead> <tbody> <tr> <td>4 to 10</td> <td>0</td> </tr> <tr> <td>3</td> <td>1</td> </tr> <tr> <td>2</td> <td>2</td> </tr> <tr> <td>1</td> <td>3</td> </tr> <tr> <td>1 to 3 paediatric units</td> <td>4</td> </tr> </tbody> </table>	Number of red cells	Number of extra ballasts	4 to 10	0	3	1	2	2	1	3	1 to 3 paediatric units	4
Number of red cells	Number of extra ballasts																	
4 to 10	0																	
3	1																	
2	2																	
1	3																	
1 to 3 paediatric units	4																	
				Plastic liner bag	1	Used to contain red cells												
				Cardboard divider	1	Insulating barrier to maintain product temperature												
				Chilled ballast	2	Side by side inside foil pouch												
				Frozen -19°C ballast	2	Side by side inside foil pouch												

Notes

- R1 cannot be transported by air.
- R1 cannot be used when the anticipated transport time exceeds 6 hours.

Picture 2

BT10 Time strip sticker:

Overview:

The BT10 Time strip sticker is a single use irreversible temperature indicator which once activated will stain the test window blue if it reaches 10oC. It has two windows the first window to indicate if the label has been activated (yellow = not activate, green = activate) and the second to indicate if a temperature breach has occurred (white = <10oC, blue >10oC).



Picture 3

Note

Blood Bank staff use the BT10 time strip sticker to assess if unit can be returned to general stock. If the blood pack units are kept in the Lifeblood shipper with lid on and in between ice bricks, they can be kept in NCC for up to 6 hours. Complete the ‘Return of Blood Products to Blood Bank’ Form if products no longer required.

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

3.2.2 Blood testing

3.2.2.1 Initial testing collected as soon as practicable.

Test	Tube Type
Blood group and Cross match antibody screen	EDTA (Purple)
FBC	EDTA (Purple)
PT/INR/APTT/Fibrinogen*	Citrate Plasma (Blue)
UEC, Ca, Mg, PO4, LFT's	Serum (Gel) [Yellow]
Blood Gas – arterial or venous preferred	Blood gas syringe

Note

Umbilical cord samples are not suitable for pre-transfusion testing.

*Coagulation samples SHOULD NOT be taken from lines that have had heparin infused through as heparin contamination will affect results.

3.2.2.2 Ongoing testing repeated every 30-60 minutes where feasible if haemorrhage is ongoing.

Test	Tube Type
FBC	EDTA (Purple)
PT/INR/APTT/Fibrinogen	Citrate Plasma (Blue)
Blood gas including ionized calcium	Blood gas syringe

3.2.3 Transfusion of blood products during critical bleeding

- Choose between Pack 1 or Pack 2 and then alternate between 2 packs if ongoing transfusions required
- Packs can be administered rapidly (within 10 minutes) when haemodynamically unstable.
 - Resume typical transfusion infusion timing when clinically stable and bleeding is controlled.

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

- Alterations may be made to subsequent packs based on coagulation testing – clinical team to liaise with Haematology/Paediatric Haematology and the Blood Bank.
- Blood warmer is to be used when feasible for the rapid administration of large volumes of blood products.
 - **Urgent transfusion should not be delayed waiting for equipment to be present**
 - Red cells should only be warmed as they are being administered to the patient
 - The thermometer should be visible at all time
 - The temperature of the blood warmer must be documented in the patient’s clinical notes and must not exceed 40⁰ Celsius
- **Emergency issue of Red Blood Cells**
 - Un-cross matched Group O Rh(D) Negative, CMV negative, <7 days from collection, K factor negative red blood cells should be issued when possible
 - For **emergency transfusions, irradiated cellular components are not required**
- **Emergency issue of plasma products (FFP and Cryoprecipitate)**
 - Group AB plasma products should be selected
 - If group AB is not available, group A, low anti-B titre should be selected
 - ABO compatible plasma should be selected as far as possible
 - **Group O FFP** and cryoprecipitate must only be given to **O recipients**
 - **Extended Life Plasma (ELP) should not be used in neonates**
- **Emergency issue of platelets**
 - CMV negative, group A or O apheresis low titre anti-A/B or pooled Rh(D) negative platelets to be issued if available
 - In a term baby, consider dropping the CMV requirement if unable to source suitable CMV negative platelets
 - If time permits a neonatal sample must be collected and tested. Platelets issued should be ABO and RhD compatible with the patient
 - Caution should be exercised when transfusing non-ABO identical platelets to neonatal and paediatric patients due to the risk of haemolysis from donor anti-A and anti-B antibodies
 - **The use of group O platelets for non-O patients should be avoided as much as possible.**

3.2.4 CBP blood target values*

Hb	Greater than 100 g/L
Fibrinogen	Greater than 1.5 g/L, consider >2.0 g/L
Platelets	Greater than 50 x 10 ⁹ /L
PT/INR	Less than 1.5x normal (PT <20/INR <2.0)
APTT	Less than 1.5x normal (< 60-80 depending on gestation and day of life)
pH	Greater than 7.2
Base Excess	Less than -6
Lactate	Less than 4 mmol/L

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

Ionised Ca ₂₊	Greater than 1.1 mmol/L in term and 1.0 mmol/L in preterm [#]
--------------------------	--

Note
 *CBP targets are different to elective replacement of blood products.
 #Ionised Ca levels may not necessitate active intervention in an asymptomatic neonate and often levels of 0.8-1.0mmol/L in preterm neonates is accepted³⁻⁵

bleeding.

- Tranexamic Acid (see Australasian Neonatal Medicines Formulary [Tranexamic Acid](#))
- Factor Concentrates
 - Activated factor VII (Novoseven), Fibrinogen concentrate (Riastap) or prothrombin complex concentrates (Beriplex) may be indicated in certain bleeding scenarios.
 - Riastap is only licensed in congenital hypofibrinogenaemia associated bleeding. RHW has only approved it for ROTEM-guided obstetric bleeding
 - Suggest discussion between the clinical team and the on-call haematologist/paediatric haematologist for alternate products

Suggested doses of additional treatments

Treatment	Dose
Vitamin K	1mg IM or as a slow IV bolus injection
Fibrinogen Concentrate	70 mg/kg
Prothrombin concentrate	25-50 IU/kg
Factor VII	90 micrograms/kg
Tranexamic acid	Loading dose of 10-15 mg/kg, followed by maintenance of 2 mg/kg/hr until bleeding cessation

3.2.6 Administration and Documentation

- All clinical staff must be aware of the mandatory requirements for providing safe transfusion according to [NSW Health Policy Directive PD2018_042 Blood Management](#).
- Two appropriate staff members must independently identify the patient identification when the transfusion is being set up.
- The patient’s identity must be checked against the patient’s identification band.
- The following details on the blood pack component label must be checked and must match exactly the details on the blood request form, the prescription order AND the patient’s identification band:
 - Patients Surname, Given Name [or Baby of..., if applicable] and Date of Birth
 - Hospital Medical Record Number
 - Unique blood unit number
 - The ABO and Rh (D) group
 - The expiry date on the blood product
 - Any special requirements e.g. specific phenotypes, CMV negative, irradiated.

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

- In some instances, blood issued may be compatible but not identical to the patient's own ABO and Rh (D) group. *Check for compatibility with the laboratory before commencing transfusion if non identical blood group has been issued.*

3.2.7 Patient Information

- Clinical Excellence Commission
 - [Blood Transfusion Guide: Information for Patients and Families](#)
 - [Children Receiving a Blood Transfusion: A Parents' Guide](#)
- Australian Red Cross Lifeblood
 - [Babies receiving a Blood Transfusion](#)
 - [Children receiving a blood transfusion](#)

3.3 Documentation

- eRIC
- Blood and blood products administration form (Appendix 3)
- Authority to Issue Blood Product form (Appendix 4a and 4b)
- SEALS Blood Bank Issue Report checklist (Appendix 5)

3.4 Education Notes

- Critical bleeding is defined as half the blood volume loss. Blood volume of a neonate is 80-100 mL/kg.
- Clinically significant bleeding and critical blood loss in neonates is rare¹, but can be seen in:
 - Acute perinatal blood loss (feto-maternal haemorrhage, vasa praevia, placental abruption)
 - Intra-and extra- cranial haemorrhage (in particular subgaleal)
 - Gastrointestinal haemorrhage
 - Pulmonary haemorrhage
- Neonates are at-risk for critical bleeds due to:
 - Low total blood volume in absolute terms
 - Underdeveloped haemostatic system
 - Low concentration of pro- and anticoagulant proteins
 - Qualitatively dysfunctional fibrinogen existing in fetal form
 - Consequently, the haemostatic changes during massive transfusion in this population are profound, often resulting in an increased bleeding risk.²
- Assessment of blood loss is difficult due to unavailable well-established clinical algorithm to diagnose acute blood loss in neonate. Clinical and laboratory data remains a guide for clinicians.
 - Clinical:
 - Evidence of bleeding – subgaleal-, pulmonary- or gastrointestinal haemorrhage, surgical bleeding.

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

- Early symptoms/signs including respiratory distress, poor skin capillary refill, skin pallor, cold peripheries and rising heart rate or heart rate >180/minute.
- Late symptoms/signs including falling SaO₂/PaO₂ and falling blood pressure.
- Laboratory:
 - Low Hb and lactic acidosis
- Ultrasound:
 - Hypovolaemia on cardiac echo with low volume ventricles. In extreme cases, the walls of the ventricles can be seen “kissing” even in diastole.
- **Normal ranges for coagulation testing** in neonates remain contentious as there is limited data available to draw from. There is significant variation in results for very, extremely preterm, preterm and term infants on different days post birth. In the absence of an accepted normal or expected range, we suggest the following as a guideline:
 - PT < 16
 - INR < 1.6
 - APTT <60
 - Fibrinogen > 2
- Coagulation samples SHOULD NOT be taken from lines that have had heparin infused through as heparin contamination will affect testing. Correction of coagulopathy, particularly in asymptomatic neonates is not only based on laboratory investigations, but also on the assessment of the neonate’s clinical condition. (Appendix B)⁴
- **Emergency Treatment**
 - Pursuant to Section 174 of the Children and Young Persons (Care and Protection) Act 1998, consent is not required to treat a child or young person if treatment is required urgently to save the life or prevent serious damage to the health of the child or young person. This means that emergency medical treatment and emergency first aid treatment, including any procedure, operation or examination, may be provided without the consent of the minor or a parent/guardian.
 - In the event of blood or blood component administration being undertaken without prior consent, parents/guardians are to be informed as soon as possible and this conversation documented in the medical record by a medical officer.
- Published data on paediatric massive transfusion are limited to case reports, case series, small retrospective studies and single centre experiences⁷.
- The optimal strategy for the selection of volumes and types of blood components to be administered and for clinical and laboratory monitoring in neonatal patients requiring critical bleeding protocols remains unknown, and much is drawn from paediatric and adult experience.
- Management of the critically transfused neonatal patient, therefore, requires careful and ongoing close monitoring that is best achieved using a standardized management approach⁸
- PRBC are obtained by removing most of the plasma after centrifuging or by apheresis of whole blood collected into an anticoagulant. They may be resuspended in other additives to prolong storage and filtered to remove most of the leucocytes.
- Platelets are either collected as part of a whole blood donation or by apheresis.
- Whole blood derived platelets are produced by harvesting platelets from ABO and RhD identical whole blood donations. The platelets are resuspended in additive solution to

Critical Bleeding Protocol Neonate (CBP)
RHW CLIN016

produce the pooled platelet component. In the process of apheresis, platelets are resuspended in a platelet additive solution (PAS).

- Both apheresis and pooled platelets are leucodepleted during or soon after collection and irradiated before release.
- Group and Screen (G&S) or Group and Hold are Routinely performed prior to blood transfusion to detect the presence of potentially clinically significant blood group antibodies. It includes the following:
 - Confirmation that patient details on the blood sample and request form are identical.
 - The checking of historical information on the patient such as previous blood group, previous transfusion and obstetric history
 - ABO and RhD typing of the patient's red cells.
 - Antibody screen to detect antibodies in patient's plasma.
 - Identification of red cell antibodies (performed if positive antibody) screen detected.
 - Crossmatching appropriate donor red cells
- Crossmatch (CXM) is a compatibility test confirming the matching of blood donor and recipient and excludes the possibility of immediate haemolytic transfusion reactions. If a patient has a detectable red cell antibody, more time (potentially several hours) may be required to complete the test.
 - Maternal antibodies can cross over the placenta and be circulating in neonatal blood. Initial pretransfusion testing should be performed on both the mother and infant in the 4 months after delivery. Therefore, donor units are ABO and D compatible with both mother and baby
- Cryoprecipitated Antihemophilic Factor (Cryo) is prepared by thawing fresh frozen plasma between 1–6 °C and collect the precipitate. It contains most of the Factor VIII, fibrinogen, Factor XIII, von Willebrand Factor and fibronectin from fresh frozen plasma.
- Fresh Frozen Plasma (FFP) is the non-cellular fresh frozen plasma (FFP) is either separated from a single unit of whole blood or collected by apheresis where the plasma is retained and the remaining elements are either returned to the donor or harvested for the appropriate component types. Contains all coagulation factors including approximately 200 IU of Factor VIII plus the other labile plasma coagulation factor, Factor V.
- Irradiation of blood products may be performed (either using gamma irradiation or x-ray) to prevent TA-GVHD). The primary cause of TA-GVHD is the proliferation and engraftment of transfused donor T-lymphocytes in the bone marrow of susceptible recipients.
- Transfusion associated graft versus host disease (TA-GCHD) leads to profound marrow aplasia with a mortality rate >90%.
- Transfusion related acute lung injury (TRALI) is caused by passive transfer of [human leucocyte antigen \(HLA\)](#) or [human neutrophil antigen \(HNA\)](#) antibodies in the donor's plasma are directed against recipient leucocyte antigens. The resulting antigen-antibody reaction activates neutrophils in the lung microcirculation, releasing oxidases and proteases that damage blood vessels and make them leak.
- Leucodepletion is the removal of leucocytes from blood components by filtering at time of collection. The leucocytes present in donated blood play no therapeutic role in transfusion and may be a cause of adverse transfusion reactions.
- RhD (Rhesus D) refers to the D antigen and is the most immunogenic and important Rh antigen. At present, there are 55 antigens in the Rh system, however new antigens continue to be discovered.
- The ABO blood group system, the most important of the blood group classification systems. There are four different ABO blood groups, determined by whether an individual's red cells carry the A antigen, the B antigen, both A and B antigens, or neither antigens.

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

- Extended Life Plasma (ELP) is FFP thawed and kept in a monitored blood fridge for up to five days. This is to enable the issuing of thawed plasma in time-critical situations. A label must be attached to the ELP showing the change in component name, new component code, thawing date and time, expiry date and time and the identity (initials) of person who re-labelled the product.

3.5 Abbreviations

CBP	Critical Bleeding Protocol Neonate	Hb	Haemoglobin
PRBC	Packed Red Blood Cells	FFP	Fresh Frozen Plasma
ITP	Immune thrombocytopenia	IUT	intra-uterine transfusion
CMV	Cytomegalovirus	ELP	Extended life plasma
ROTEM	Rotational Thromboelastometry	PAS	Platelet Additive Solution
G&S	Group and Screen	CXM	Crossmatch
Cryo	Cryoprecipitated Antihemophilic Factor	FFP	Fresh Frozen Plasma
TA-GVHD	Transfusion associated graft versus host disease	TRALI	Transfusion related acute lung injury
RhD	Rhesus D Antigen	ELP	Extended Life Plasma

3.6 Related Policies/procedures

- RHW NCC Medical CBR- Surgery at the bedside – Perioperative Guidelines
- RHW NCC Medica CBR- Blood Product Transfusion and Management (Neonate)
- MoH- [PD2018 042 Blood Management](#)
- MoH- [IB2020 010 Consent to Medical and Healthcare Treatment Manual](#).
- POWH and RHW- CLIN072 Critical Bleeding Protocol (CBP) (Formerly Massive Transfusion Protocol)
- Australasian Neonatal Medicines Formulary.

4 References

- Alberto, E.C., et al., *Patterns of paediatric massive blood transfusion protocol use in trauma and non-trauma patients*. *Transfusion Medicine*, 2021. 31(6): p. 439-446.
- Blain, S. and N. Paterson, *Paediatric massive transfusion*. *BJA Education*, 2015. 16(8): p. 269-275.
- Cousineau, J., et al., *Neonate capillary blood gas reference values*. *Clin Biochem*, 2005. 38(10): p. 905-7.
- Mimouni, F. and R.C. Tsang. Neonatal hypocalcemia: to treat or not to treat? (A review). *J Am Coll Nutr*, 1994. 13(5): p. 408-15.
- Cheng, E M, George, A.A, Bansal, S.K., et al. Neonatal Hypocalcemia: Common, Uncommon, and Rare Etiologies. *Neoreviews* (2023) 24 (4): e217–e228.
- Monagle, P., P.T. Monagle, and G. Deveber, *Andrew's Pediatric Thromboembolism and Stroke*. 2006: Decker Publishing.

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

7. New, H.V., et al., *Guidelines on transfusion for fetuses, neonates and older children*. Br J Haematol, 2016. 175(5): p. 784-828.
8. Diab, Y.A., E.C.C. Wong, and N.L.C. Luban, *Massive transfusion in children and neonates*. British Journal of Haematology, 2013. 161(1): p. 15-26.
9. Guidelines for the administration of blood products. Australian and New Zealand Society of Blood Transfusion and the Royal College of Nursing Australia. 3rd Edition, 2018. Revised 2019. Accessed via www.anzsbt.org.au (accessed 25/10/2021).
10. Guidelines for Transfusion and Immunohaematology Transfusion Practice. Australian and New Zealand Society of Blood Transfusion. 1st Edition, November 2016. Revised January 2020. Accessed via www.anzsbt.org.au (accessed 25/10/2021)
11. Prevention of Transfusion-Associated Graft-Versus-Host-Disease (TA-GVHD). Australian and New Zealand Society of Blood Transfusion. January 2011. (Formerly ANZSBT Guidelines for Gamma Irradiation of Blood Components. May 2003). Accessed via www.anzsbt.org.au (accessed 25/10/2021).
12. National Blood Authority (NBA) (2016). Patient Blood Management Guidelines: Module 6 – Neonatal and Paediatrics. <https://www.blood.gov.au/module-6-neonatal-and-paediatrics-patient-blood-management-guidelines>. Accessed 10/6/2024

4 ABORIGINAL HEALTH IMPACT STATEMENT DOCUMENTATION

- Considerations for culturally safe and appropriate care provision have been made in the development of this Business Rule and will be accounted for in its implementation.
- When clinical risks are identified for an Aboriginal and/or Torres Strait Islander woman or family, they may require additional supports. This may include Aboriginal health professionals such as Aboriginal liaison officers, health workers or other culturally specific services

5 CULTURAL SUPPORT

- For a Culturally and Linguistically Diverse CALD woman, notify the nominated cross-cultural health worker during Monday to Friday business hours
- If the woman is from a non-English speaking background, call the interpreter service: [NSW Ministry of Health Policy Directive PD2017 044-Interpreters Standard Procedures for Working with Health Care Interpreters](#).

6 NATIONAL STANDARDS

- Standard 1 Clinical Governance
- Standard 2 Partnering with Consumers
- Standard 3 Preventing and Controlling Infections
- Standard 4 Medication Safety
- Standard 5 Comprehensive Care
- Standard 6 Communicating for Safety
- Standard 7 Blood Management
- Standard 8 Recognising and Responding to Acute Deterioration

7 REVISION AND APPROVAL HISTORY

Date	Revision No.	Author and Approval
10/6/2024 24.10.2024	1	S, Bolisetty (Medical Co- Director Neonatal Services) Bryony Ross (Paediatric Haematologist, John Hunter Children’s Hospital), Eszter Jozsa (Clinical Nurse Specialist NCC), Ruth Jackson (Nurse Educator NCC) Endorsed by NCC CBR Committee
2.4.2025	2	Change of terminology from Massive Haemorrhage to Critical Bleeding Protocol
1.10.2025	3	Addition of Lifeblood shipper and temperature sticker pictures and Appendix’s 3-5
13.10.2025	3	RHW BRGC

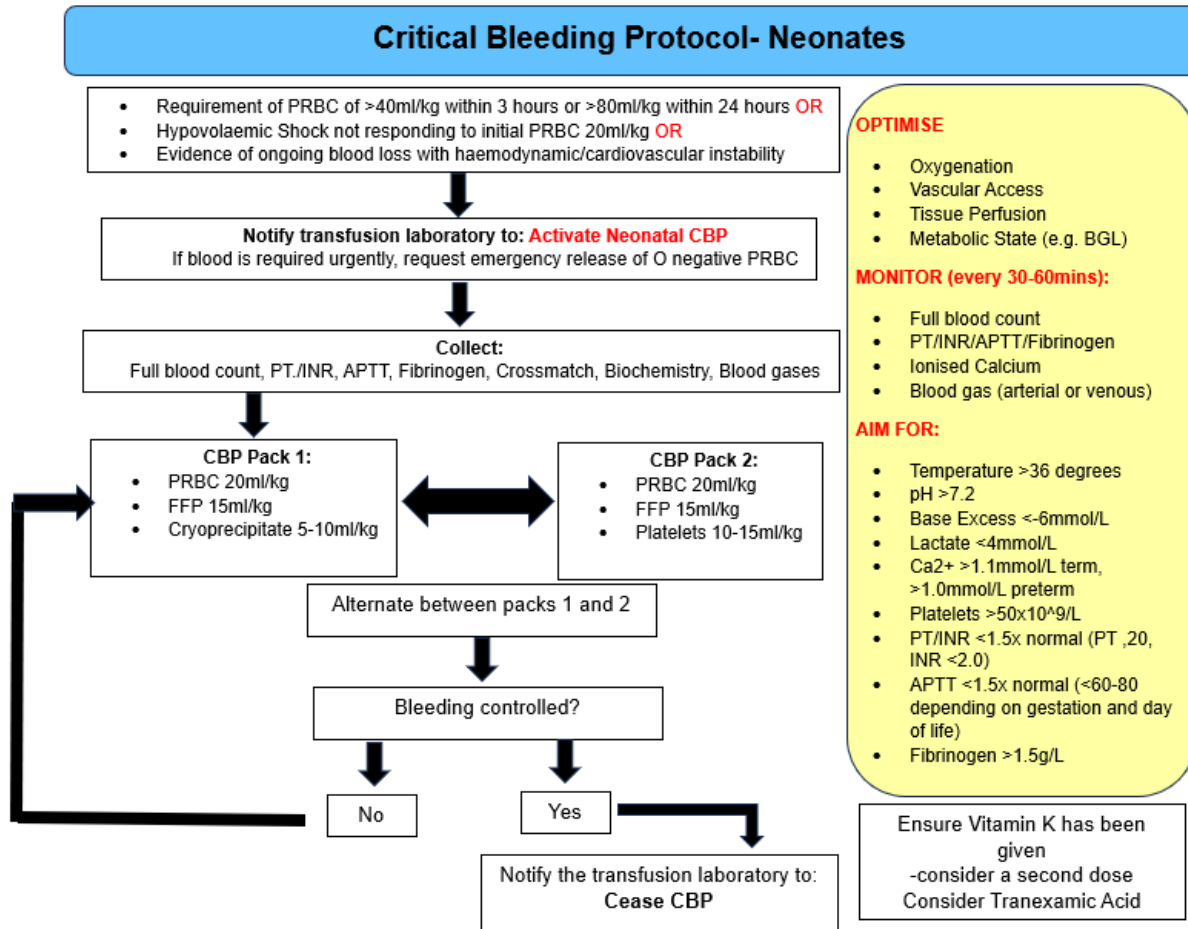
Royal Hospital for Women (RHW)

BUSINESS RULE

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

Appendix A



Royal Hospital for Women (RHW)

BUSINESS RULE

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

APPENDIX B

Normal ranges for coagulation testing in neonates

Full-term Neonates⁴

	Day 1	Day 5	Day 30
PT	13 (10.1 – 15.9)	12.4 (10.0 – 15.3)	11.8 (10.0 – 14.3)
INR	1.00 (0.53 – 1.62)	0.89 (0.53 – 1.48)	0.79 (0.53 – 1.26)
APTT	42.9 (31.3 – 54.5)	42.6 (25.4 – 59.8)	40.4 (32.0 – 55.2)
Fibrinogen	2.83 (1.67 – 3.99)	3.12 (1.62 – 4.62)	2.70 (1.62 – 3.78)

Preterm Neonates (30-36 weeks Gestation)⁴

	Day 1	Day 5	Day 30
PT	13.0 (10.6 – 16.2)	12.5 (10.0 – 15.3)	11.8 (10.0 – 13.6)
INR	1.00 (0.61 – 1.70)	0.91 (0.53 – 1.48)	0.79 (0.53 – 1.11)
APTT	53.6 (27.5 – 79.4)	50.5 (26.9 – 74.1)	44.7 (26.9– 62.5)
Fibrinogen	2.43 (1.50 – 3.73)	2.80 (1.60 – 4.18)	2.54 (1.50 – 4.14)



Royal Hospital for Women (RHW)

BUSINESS RULE

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

Appendix 3 Blood and Blood Product Administration Form

 SEI130060	 Health South Eastern Sydney Local Health District Illawarra Shoalhaven Local Health District Sydney Children's Hospital Randwick	FAMILY NAME	MRN
	Facility: BLOOD & BLOOD PRODUCTS ADMINISTRATION	GIVEN NAME	<input type="checkbox"/> MALE <input type="checkbox"/> FEMALE
		D.O.B. ____/____/____	M.O.
		ADDRESS	
		LOCATION / WARD	
	COMPLETE ALL DETAILS OR AFFIX PATIENT LABEL HERE		
MEDICAL OFFICER TO COMPLETE PRIOR TO ADMINISTRATION			
Indication for blood/blood products		Previous adverse reaction to blood products?	
_____		<input type="checkbox"/> Yes <input type="checkbox"/> No (if yes, give details): _____	
_____		_____	
_____		_____	
CONSENT FOR BLOOD/BLOOD PRODUCTS (to be signed by Patient/Parent/Guardian) Interpreter present? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Dr _____ has discussed my present condition and as part of the management has recommended the administration of blood products for myself / my child / person under guardianship.			
<input type="checkbox"/> I have received information about the risks, benefits and alternatives to treatment with blood / blood products.			
<input type="checkbox"/> I have read and understand the written information.			
<input type="checkbox"/> I have had the opportunity to ask questions and am satisfied with the explanations and answers to my questions.			
<input type="checkbox"/> I understand the nature of the treatment and that undergoing the treatment carries risks.			
<input type="checkbox"/> I understand that I may withdraw this consent at any time prior to, or during the treatment.			
<input type="checkbox"/> I understand that this consent will be reviewed if my condition or circumstances change.			
<input type="checkbox"/> I hereby consent to the treatment described above for myself / my child / person under guardianship.			
Consenting Medical Officer:			
Print Medical Officer's Name	Medical Officer's Signature	Pager No.	Date
_____	_____	_____	_____
If a valid consent has been sighted the patient DOES NOT need to sign again. Please write date of original consent here _____ and sign below.			
Print Medical Officer's Name	Medical Officer's Signature	Pager No.	Date
_____	_____	_____	_____
A) Sign here for one admission episode (refer to policy):			
Name of Parent/Career/Guardian	Signature	Date	
_____	_____	_____	
B) Sign here for multiple episodes over 12 months: I am / my child is receiving blood / blood products on a regular basis and would like to consent for multiple episodes for the next 12 months.			
Name of Parent/Career/Guardian	Signature	Date	
_____	_____	_____	
Interpreter			
Print Name Of Interpreter	Interpreter's Signature	Date	
_____	_____	_____	

Holes Punched as per AS2828, 1: 2012
 BINDING MARGIN - NO WRITING

BLOOD & BLOOD PRODUCTS ADMINISTRATION

SEI130.060

NO WRITING

Page 1 of 2

Royal Hospital for Women (RHW)

BUSINESS RULE

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

Appendix 4a Authority to Issue Blood Products

AUTHORITY TO ISSUE BLOOD PRODUCTS

Please check on Patient Product Inquiry to ensure the blood product is ready for collection prior to requesting the product from Blood Bank.

Unless you have a designated satellite blood fridge please do not request blood products until patient and staff are adequately prepared.

Ward _____

Theatre _____

Please deliver to the messenger:

_____ units Packed Red Cells

_____ units Platelets

_____ units Extended Life Plasma (adult size)

_____ units Fresh Frozen Plasma (adult size)

_____ units Fresh Frozen Plasma (paediatric size)

_____ units Cryoprecipitate

_____ 5% Normal Serum Albumin 500mL

_____ 5% Normal Serum Albumin 250mL

_____ 20% Normal Serum Albumin 100mL

_____ 20% Normal Serum Albumin 50mL

_____ grams Intravenous Immunoglobulin (specify) _____

_____ grams Subcutaneous Immunoglobulin (specify) _____

_____ Anti-D 250IU

_____ Anti-D 625IU

_____ Prothrombinex-VF®

_____ Tetanus Immunoglobulin-VF (250 IU)

_____ (other, please specify)

Authorized by: _____ (print)

Signature _____

Date: _____ Time: _____

Note:

1. The messenger must deliver the blood product to the ward/theatre immediately after collection
2. The blood product must not be stored in a ward or domestic fridge
3. If there is a delay in administering a blood product or it is no longer required it MUST be stored in a satellite blood fridge (red cells only) or returned to Blood Bank within 30 minutes of the product being dispensed
4. Single use dispensing applies unless critical bleeding protocol has been activated, apheresis procedure or satellite blood fridge is available to store red cells.

NHSIS1289 040324 See Over

Royal Hospital for Women (RHW)

BUSINESS RULE

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

Appendix 4b Return of Blood Products to Blood Bank (back of authority to issue blood products form)

RETURN OF BLOOD PRODUCTS TO BLOOD BANK

Blood products must be returned to Blood Bank as soon as possible for appropriate storage to prevent wastage. The following blood product(s) is/are to be returned to Blood Bank:

Product Type: _____ Product Number: _____ Patient Name: _____

Was the blood product kept at any time at room temperature? Yes No
If yes, please give details of time and place:

Authorised by: _____ (print)
Signature _____
Date: _____ Time: _____

TRANSFUSION REACTION INVESTIGATION

- In the event of a transfusion reaction, check the blood pack, patient ID, labels and forms for discrepancies and contact Blood Bank immediately
- In the event of a major reaction, consult the Haematologist on call
- Send the following samples with urgent request forms to Blood Bank
 - 1 x labeled clotted specimen (urea and electrolytes)
 - 2 x labeled EDTA specimens (repeat cross match, FBC and haemolytic markers)
 - 1 x labeled coagulation specimen
 - First void urine specimen
 - Blood cultures if the patient's temperature rises > 1.5°C above baseline or if bacterial sepsis is suspected

<p>PATIENT DETAILS</p> <p>MRN: _____</p> <p>SURNAME: _____</p> <p>FIRST NAME: _____</p> <p>DOB: ____/____/____</p> <p style="text-align: center; font-size: small;">AFFIX PATIENT ID LABEL</p>	<p>REQUESTING PRACTITIONER</p> <p>SURNAME: _____</p> <p>FIRST NAMES: _____</p> <p>SIGNATURE: _____</p> <p>PAGER NO: _____ PHONE NO: _____</p>
---	--

Date of report: ____/____/____ Time of report: _____ am/pm Ward/Unit: _____

Suspected blood product(s): _____ Blood product donation number: _____

Clinical Details: _____

Time transfusion commenced: _____ Time reaction noted: _____

Time transfusion stopped: _____ Estimate volume of blood product transfused: _____

Type of reaction suspected:

<input type="checkbox"/> Febrile non-haemolytic	<input type="checkbox"/> Urticarial
<input type="checkbox"/> Circulatory overload	<input type="checkbox"/> Haemolytic
<input type="checkbox"/> Bacterial contamination	<input type="checkbox"/> Transfusion-related acute lung injury (TRALI)
<input type="checkbox"/> Anaphylactic	<input type="checkbox"/> Other (please state): _____

Symptoms:

<input type="checkbox"/> Hypotension	<input type="checkbox"/> Dyspnoea	<input type="checkbox"/> Urticaria	<input type="checkbox"/> Oliguria / Anuria
<input type="checkbox"/> Tachycardia	<input type="checkbox"/> Bronchospasm	<input type="checkbox"/> Lumbar pain	<input type="checkbox"/> Jaundice
<input type="checkbox"/> Pyrexia	<input type="checkbox"/> Pulmonary Oedema	<input type="checkbox"/> Haemoglobinuria	
<input type="checkbox"/> Rigors	<input type="checkbox"/> Rash	<input type="checkbox"/> Other (please state): _____	

Royal Hospital for Women (RHW)

BUSINESS RULE

Critical Bleeding Protocol Neonate (CBP)

RHW CLIN016

Appendix 5 SEALS Blood Bank Issue Report Checklist

JO:



creating better health & justice systems
www.pathology.health.nsw.gov.au

NSWHP East-South Blood Bank Issue Report

Antibodies:

Patient Name: [Redacted]
Date of Birth: 23 JUN 2024
Patient Blood Group: O Pos
Special Instructions:

Facility/MRN: [Redacted]

Issued to: NICU RHW
Issued at: 24 JUN 2024 17:15
Issued by: 60277804

Hx Name: [Redacted]

Hx MRN: [Redacted]

Crossmatch Expiry: 21 OCT 2024 23:59

Transfusion Administration Checklist:

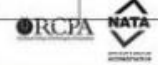
The following details must be independently checked by 2 accredited staff members, and both staff must sign this issue report

- 1. Check patient has received education (verbal / written) and is ready for procedure
- 2. Check that consent has been obtained
- 3. Validate patient details against patient identification band
- 4. Validate blood product against the issue report
- 5. Validate donation number and blood group on blood product against issue report
- 6. Visually inspect the blood product
- 7. Crosscheck for any special instructions and determine if premedication is required
- 8. Check Product Expiry date
- 9. Check Crossmatch Expiry date

Product Type	Product No.	Blood Group	Expiry Date & Time	Checked by: Signature	Administered by: Signature	Start Date	Start Time	Finish Date	Finish Time
PC IRR LD	2382230	O Pos	04 JUL 2024 23:59	<i>[Signature]</i>	<i>[Signature]</i>	17:40	24/6/24		

Accredited by compliance with NATA (Standards and ISO 15189)
NSW Pathology Accreditation Number 2208: NSWHP-Randwick Hospital Campus Laboratory, NSWHP St George Hospital Laboratory, NSWHP St Vincent's Hospital Laboratory, NSWHP Westmead Hospital Laboratory, NSWHP Westmead Hospital Laboratory
NSW Pathology Accreditation Number 2815: NSWHP-Randwick Hospital Laboratory, NSWHP St George Hospital Laboratory, NSWHP St Vincent's Hospital Laboratory, NSWHP Westmead Hospital Laboratory

Phone 1800 073 257



Transfusion