

South Australian Perinatal Practice Guideline

Blood Transfusion and Massive Blood Transfusion (Perinatal)

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Note:

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Note: The words woman/women/mother/she/her have been used throughout this guideline as most pregnant and birthing people identify with their birth sex. However, for the purpose of this guideline, these terms include people who do not identify as women or mothers, including those with a non-binary identity. All clinicians should ask the pregnant person what their preferred term is and ensure this is communicated to the healthcare team.

Explanation of the aboriginal artwork:

The Aboriginal artwork used symbolises the connection to country and the circle shape shows the strong relationships amongst families and the Aboriginal culture. The horse shoe shape design shown in front of the generic statement symbolises a woman and those enclosing a smaller horse shoe shape depicts a pregnant woman. The smaller horse shoe shape in this instance represents the unborn child. The artwork shown before the specific statements within the document symbolises a footprint and demonstrates the need to move forward together in unison.



Australian Aboriginal Culture is the oldest living culture in the world yet Aboriginal people continue to experience the poorest health outcomes when compared to non-Aboriginal Australians. In South Australia, Aboriginal women are 2-5 times more likely to die in childbirth and their babies are 2-3 times more likely to be of low birth weight. The accumulative effects of stress, low socio economic status, exposure to violence, historical trauma, culturally unsafe and discriminatory health services and health systems are all major contributors to the disparities in Aboriginal maternal and birthing outcomes. Despite these unacceptable statistics the birth of an Aboriginal baby is a celebration of life and an important cultural event bringing family together in celebration, obligation and responsibility. The diversity between Aboriginal cultures, language and practices differ greatly and so it is imperative that perinatal services prepare to respectfully manage Aboriginal protocol and provide a culturally positive health care experience for Aboriginal people to ensure the best maternal, neonatal and child health outcomes.

Purpose and Scope of Perinatal Practice Guideline (PPG)

The purpose of this document is to assist clinicians with the management of pregnant and early postpartum women requiring blood transfusion or a massive blood transfusion. It includes guidance on the role of viscoelastic testing in these patients and the use of tranexamic acid.

Summary of Practice Recommendations

Blood Transfusion

Transfusion is associated with a number of risks to the patient, therefore blood transfusion should be carefully considered with the risks and benefits analysed and discussed with the woman prior to transfusing.

In healthy, stable, asymptomatic women without ongoing bleeding (or threat of major bleeding), an Hb >70 g/L in the postpartum period is rarely an indication for blood transfusion.

In all maternity patients, it is good clinical practice to optimise Hb during the antenatal period, minimise blood loss during birth and, in the event of haemorrhage, secure haemostasis as a matter of urgency. This is vital in women for whom transfusion is not an option.

Critical Bleeding/Massive Transfusion

Consider the causes and proceed to surgical measures early (where appropriate) to achieve surgical haemostasis and treat the cause.

A massive transfusion protocol must be activated and used.

Thromboelastometry (ROTEM), a viscoelastic test, needs to be performed early and repeated and acted upon as the clinical situation evolves. In absence of ROTEM, standard laboratory tests such as haemoglobin, platelet count, Prothrombin time/INR, APTT and fibrinogen level need to be measured.

Ensure calcium, pH and temperature meet target levels and consider other special circumstances (anticoagulant agents or anti-platelets).

Abbreviations

APTT	Activated partial thromboplastin time
Ca ²⁺	Ionised calcium
CBP	Complete Blood Picture
FDA	Food and Drug administration
g	Grams
Hb	Haemoglobin
INR	International normalised ratio
IV	Intravenous
kg	Kilogram(s)
L	Litre(s)
mg	Milligram(s)
mL	Millilitre(s)
mmol	Millimole(s)
NBA	National Blood Authority
NOAC	Novel Oral Anti-Coagulant
PBM	Patient Blood Management
PP	Practice point (from Patient Blood Management Guidelines)
PPH	Postpartum haemorrhage
PPG	Perinatal Practice Guidelines
PT	Prothrombin time
RCOG	Royal College of Gynaecology
ROTEM	Rotational thromboelastometry
TXA	Tranexamic acid
TEG	Thromboelastogram
TRALI	Transfusion related acute lung injury

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Blood transfusion

Decision to transfuse

Appropriate and timely use of blood products for maternal resuscitation saves lives and is discussed in the second part of this guideline (under [Massive Blood Transfusion](#)). It is important to distinguish this from transfusion decision-making in the elective setting in haemodynamically stable women once haemorrhage has stopped, which is the focus of the initial part of this guideline.

- > Transfusion should not be a default decision. It should be carefully considered, taking into account the full range of available therapies / strategies and balancing the evidence for efficacy and improved clinical outcomes against the risks.
- > Discussion of the risks, benefits and alternatives with the woman is essential for informed decision-making. The transfusion decision must be supported by the need to relieve clinical signs and symptoms of impaired oxygen delivery.
- > It is important that symptoms are adequately assessed and other causes considered (e.g. dizziness due to hypovolaemia). Transfusion decision-making should be based on assessment of the clinical status of the woman and not on the assumption that an arbitrary level of haemoglobin needs to be achieved (e.g. for establishment of breastfeeding).
- > In healthy women who are haemodynamically stable and in whom there is no significant continuing bleeding or threat of bleeding, transfusion is unlikely to be of benefit when the haemoglobin level is >70 g/L. Iron replacement therapy may be of benefit in these circumstances.^{1(PP8)}
- > However, the threshold for transfusion is lower for women in the antenatal period who have potential for significant blood loss.
- > In women who are not actively bleeding, where transfusion is indicated, a single unit of RBC, followed by clinical reassessment to determine the need for further transfusion, is appropriate. This reassessment will also guide the decision on whether to retest the Hb level.^{1(PP6)}
- > It is important that junior staff seek senior advice about the risks and benefits of transfusion versus not transfusing in individual cases, as they may not fully appreciate the threat of further haemorrhage or the difficulties in interpreting haemoglobin levels in the context of recent blood loss and fluid shifts.
- > In women who are not actively bleeding, non-transfusion therapies, including iron, should be considered as part of the treatment of anaemia.^{1(PP5)}

The prescriber is responsible for ensuring:

- > The transfusion is clinically appropriate
- > The expected benefits outweigh the potential hazards
- > Informed patient consent has been obtained and documented
- > Clinical staff caring for the woman are informed that the blood product has been prescribed
- > Patient risk factors are identified, and special requirements are documented
- > CMV safe (leucodepleted) or CMV seronegative blood products are used for pregnant women, regardless of patient CMV status, when transfusion occurs in the antenatal setting in the context of an ongoing pregnancy. The preference is for CMV seronegative blood products, where available; however, lifesaving transfusion should not be withheld if CMV seronegative products are not available.¹²



Transfusion guidelines

- > The National Blood Authority (NBA) has developed a series of evidence-based Patient Blood Management (PBM) guidelines in the form of six modules. These are currently in the process of being reviewed but the original modules remain available for use at <http://www.blood.gov.au/pbm-guidelines>.
- > Modules 1 and 5 cover *Massive transfusion* and *Obstetrics and Maternity* respectively.^{1,2} Module 5 - *Obstetrics and Maternity* outlines important general principles of transfusion decision making in stable patients and women with major obstetric haemorrhage.
- > International guidelines including the UK Green-top Guideline on *Blood Transfusion in Obstetrics*³, highlight that transfusion is rarely indicated in the stable woman when the haemoglobin level is >70 g/L.
- > For more information on transfusion seek advice from clinicians experienced in transfusion practice.

Transfusion risks

- > While transfusion can save and improve lives, it has inherent risks that need to be balanced against the benefits in each individual woman.
- > Each blood product transfused carries a small risk of an adverse effect.
- > Potentially significant and life-threatening reactions include acute and delayed haemolytic transfusion reactions, transfusion-transmitted bacterial infection, anaphylaxis and transfusion-related acute lung injury (TRALI).
- > In maternity patients, the risk of RBC alloimmunisation and potential clinical impact should be considered when balancing the risks and benefits of RBC transfusion.
- > Despite improvements in systems management, there remains a risk of harm due to administrative errors that have the potential to result in an acute haemolytic reaction from ABO incompatibility, which may be fatal.
- > Patient information to assist with obtaining informed consent for transfusion as well as the potential risks of transfusion can be found at <http://www.sahealth.sa.gov.au> (search "Transfusion Practice")

Obtaining consent

- > Informed consent is required for blood transfusion.
- > Document consent in the medical record either on a consent form or in the progress notes (as per organisation consent procedure).
- > In an emergency, when immediate intervention is necessary to preserve life or prevent serious harm, it may not be possible to obtain informed consent from the woman or next of kin. In these situations, the medical practitioner must abide by the *Consent to Medical Treatment Act 1995*. After executing 'emergency medical treatment without patient or relative consent' two medical practitioners must document on the SA Health Consent to Medical Treatment by a Third Party (form MR82B or health service equivalent), certification of inability to give consent for emergency procedures and in the patient's medical records. In these situations, the treating clinician must provide explanation and information to the woman and her family as soon as practical. This includes verbal and written information relating to the blood/blood products administered and why immediate intervention was necessary. Document the discussion in the medical record.
- > For women in whom transfusion is not an option, refer to Chapter 4.4 of *National PBM guidelines Obstetric and Maternity*¹ and local policy/refusal documentation requirements
- > Also see *Women who decline blood transfusion* PPG available at www.sahealth.sa.gov.au/perinatal.



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Pre transfusion testing

- > A current transfusion specimen is required (blood group and antibody screen) for compatibility testing.
- > Pre transfusion specimens expire 72 hours after collection during pregnancy. The 72-hour expiry applies for 3 months after birth and 3 months after transfusion.
- > Refer to organisation policies/procedures on pre-transfusion testing for more information.

Administration of blood and blood products

- > Refer to local policies/procedures for administration of blood and blood products.

Education and training

The SA Health Blood Supply Stewardship Policy Directive states the following:

“All SA Health staff that are involved in the handling, storage or administration of blood and blood products must complete the Transfusion Practice Courses [at BloodSafe eLearning] relevant to their area of work:

- *Clinical Transfusion Practice* and/or *Clinical Transfusion Practice (Refresher)* – medical staff, nurses, midwives, laboratory staff
- *Collecting Blood Specimens* – specimen collectors, phlebotomists and venepuncture staff
- *Transporting Blood* – hospital orderlies, couriers, porters and patient service assistants

All medical, nursing and midwifery staff must complete the *Patient Blood Management* general course. Consideration should also be given to medical, nursing and midwifery staff completing other patient blood management courses relevant to their area of clinical practice.”^(p6-7)

It is therefore recommended that staff undertaking these processes also complete the BloodSafe e-learning *Post-Partum Haemorrhage*, *Iron Deficiency Anaemia*, *Obstetric Haematology* and *Obstetric Blood Management* modules at <https://bloodsafelearning.org.au/>.

Massive Blood Transfusion / Critical Bleeding Protocol

The National Blood Authority Patient Blood Management Guideline on massive blood transfusion¹ has been used to inform this guideline.

- > In critical bleeding, a ROTEM-based algorithm should be used to guide product administration. In places where this is unavailable an institutional/organisational massive transfusion protocol with dose, timing and ratio of blood component therapy should be used.
- > An organised approach with effective communication with transfusion laboratory and the activation of the local Massive Transfusion Protocol (or critical bleeding protocol*) will facilitate the rapid availability of blood and blood products.
- > The different levels of service will have minor variations in the organisation of their local protocol, however, the basic principles remain the same
- > Familiarise yourself with the protocol of your institution and activation
- > Regular review and update of the protocol is recommended
- > Mock critical bleeding drills or simulation drills is recommended

*In recent practice there has been a shift from Massive Transfusion Protocol to a ROTEM-based **critical bleeding algorithm** whereby products are administered as per ROTEM-indicated deficiencies such as platelet and fibrinogen deficiency, extended clotting time or hyperfibrinolysis. ROTEM should be used for **all** critical obstetric bleeding where it is available.



Definition

In adults, 'massive transfusion' may be defined as transfusion of half of one blood volume in 4 hours, or more than one blood volume in 24 hours (approximately 70-80 mL/kg body weight in pregnancy).²

Other definitions are ≥ 5 units RBC in 4 hours and ≥ 10 units RBC in 24 hours.¹³

Causes of massive blood loss

Obstetric haemorrhage due to:

- > Early pregnancy complications (e.g. ectopic pregnancy, cervical pregnancy)
- > Antenatal and intrapartum conditions (e.g. placental abruption, placenta praevia, coagulopathy secondary to amniotic fluid embolism)
- > Postpartum (e.g. uterine atony, retained products of conception, genital tract laceration, coagulopathy)

Coincidental causes:

- > Ruptured splenic artery aneurysm, hepatic rupture or trauma

Activation

The trigger for activation of the Massive Transfusion Protocol/Critical Bleeding protocol is any life-threatening haemorrhage. The criteria are varied and include:

- > Actual or anticipated requirement for 4 units of red cells in less than 4 hours
- > Actual or anticipated blood loss of 50% of blood volume in 3 hours
- > Clinical or laboratory evidence of coagulopathy or a clinical diagnosis associated with coagulopathy (e.g. suspected amniotic fluid embolism)

In some health services, Transfusion Service can choose to activate the Massive Transfusion Protocol/Critical Bleeding protocol upon receiving a request for four (4) or more emergency O negative red cells.

Key elements of care in major obstetric haemorrhage include:

- > Prompt identification and treatment of the cause
- > Proceeding to surgical measures as indicated
- > Resuscitation and the administration of blood products as per a ROTEM-based algorithm (where available)
- > Collaboration between clinicians and laboratory staff to coordinate and optimise care, with escalation of care as required
- > An organisational massive transfusion protocol/critical bleeding protocol or management plan to facilitate communication and rapid and timely availability of blood components to optimise resuscitation where life-threatening haemorrhage has occurred.

Note: In regional areas, please refer to the *Critical Bleed Event management procedures and resources* available via the Regional LHN SharePoint at

<https://sagov.sharepoint.com/sites/CHSA/clinical/blood/Pages/Clinical-Information.aspx>:

- o Critical Bleed Event Management Procedure
- o Quick reference poster
- o Emergency Blood and Blood Product Location Map / SA Blood Inventory App (available from the App store or Google Play)
- o Fibrinogen concentrate use in Critical Bleed Procedure
- > Preventing oliguric shock as this carries a high mortality rate because of organ failure and disseminated intravascular coagulation
- > Restore blood volume to maintain tissue perfusion and oxygenation
- > Avoiding hypothermia as this increases the risk of disseminated intravascular coagulation and other complications. This may be prevented by pre-warming resuscitation fluids, using warm air blankets, and temperature controlled IV fluid (blood) warming devices
- > Ongoing monitoring, reassessment and resuscitation

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Management of critical bleeding should be goal-directed:

- > Perform regular
 - CBP
 - viscoelastic testing (ROTEM/TEG)
 - extended coagulation studies if ROTEM unavailable (e.g. APTT, INR, PT, fibrinogen),
 - ionised calcium
 - arterial/venous blood gases and
- > Use these measurements to guide transfusion management.
- > If ROTEM is used, follow local/institutional ROTEM algorithm to guide transfusion of blood products

Aim for and maintain:

- > Temperature >36°C (pre-warm resuscitation fluids, fluid warming, forced air warming blankets, ambient temperature adjustment and underbody warming mattress can be considered)
- > pH > 7.2
- > Base Excess < -6
- > Lactate < 4 mmol/L
- > Ca²⁺ > 1.1 mmol/L
- > Platelets > 50 x10⁹/L
- > APTT < 38 seconds
- > INR ≤ 1.5
- > Fibrinogen > 2.5 g/L

Consider special circumstances;

- > Warfarin: Consider the use of Vitamin K 5-10 mg IV and Prothrombinex 50 international units/kg
- > Anti-platelet agents: Consider additional platelets
- > NOAC: Contact the on-call haematologist

Transfusion and laboratory services

It is optimal to have a single person coordinating communication with the Blood Transfusion, laboratory staff and the haematologist and/or MedSTAR

- > Phone the Blood Transfusion Laboratory and identify themselves (and how to be contacted) as the clinician making the notification
- > Provide the name, date of birth, medical record number (MRN) and location of the woman. If the patient is unknown (trauma) provide transfusion service with whatever details that are available.
- > Inform the Transfusion laboratory staff member to activate Massive Transfusion Protocol/Critical Bleeding Protocol
- > Arrange appropriate care post-event, e.g. care in HDU, adult ICU or inter-hospital transfer

The transfusion laboratory should:

- > Prepare massive transfusion packs as per the local protocol or as requested by the clinician using a ROTEM-based algorithm (where available)
- > Contact the Duty Haematologist / on-call Duty Medical Scientist in regional areas if appropriate
- > The Transfusion Service will alert/notify other site laboratories such as haematology or biochemistry of the massive transfusion patient details to assist in prioritising pathology testing
- > Anticipate repeat testing (including ROTEM) and blood component requirements, including requesting further product support if needed from Australian Red Cross Life Blood or other local transfusion laboratory.
- > Minimise test turnaround times and consider staff resources



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Haematologist / MedSTAR

- > Liaise regularly with laboratory, clinical team and Blood Transfusion laboratory as required
- > Assist in interpretation of results, and advise on blood component support

Appropriate Red cell selection

- > Types of Red Cells available for emergency transfusion
 - **O RhD Negative uncrossmatched red cells** - when transfusion is required immediately and before testing can take place. A sample for subsequent testing must be collected prior to administration of blood.
 - **Group compatible uncrossmatched (type specific) red cells** - when transfusion is required urgently before full testing can be completed. The laboratory issues red cells based on the blood group from a current sample (historical records should not be used).
 - **Urgent full crossmatch** – If already crossmatched in advance for the patient. Use when available in the required timeframe based on urgency.
- > All maternity services should liaise with their Blood Transfusion laboratory to ensure that information on local blood access arrangements is available to all clinicians (e.g. time to process 'group and hold' and crossmatch blood, and availability of products).

Appropriate Blood Product selection

- > Blood product selection should be guided by viscoelastic testing where this is available. See [WCHN Critical Bleeding Protocol – Obstetric/Gynaecological Haemorrhage](#) for **example** protocol
- > Viscoelastic testing (ROTEM/TEG) aids in identifying specific coagulation deficiencies and also provides an objective measure of the degree of deficit and efficacy of treatment with repeated testing
- > Ensure calcium, temperature and pH are within normal ranges as the effects of these on coagulation will not be shown on viscoelastic testing

Pharmacotherapy

Tranexamic Acid

- > Tranexamic acid (TXA) has been shown to improve survival in non-obstetric major trauma patients with, or at risk of, significant haemorrhage by reducing the risk of death from bleeding and all-cause mortality⁴
- > The World Health Organization (WHO) updated its recommendations for the use of TXA for the treatment of PPH to⁵:
 - TXA should be used in all cases of PPH regardless of cause in addition to standard PPH treatment
 - TXA should be used early (within 3 hours). TXA use beyond 3 hours may be harmful and is not recommended
 - TXA should be avoided in women with a contraindication to antifibrinolytic therapy (e.g. thromboembolic event in pregnancy)
- > The results of the World Maternity Anti-fibrinolytic (WOMAN) trial suggest that early TXA may reduce the risk of death due to PPH and it has a good safety profile.⁶
- > Lower level research in obstetrics shows :
 - Prophylactic use of TXA reduces mean blood loss post vaginal and caesarean birth⁷
 - High dose TXA can reduce blood loss and maternal morbidity in ongoing PPH⁸
- > Until further evidence is available, the use of TXA should follow the WHO guidelines⁵, in consultation with a specialist familiar with its use and administration, or, in a retrieval situation, with the retrieval service



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Tranexamic acid dosage^{5,9}:

- > Administer 1 g undiluted tranexamic acid (100 mg/mL) IV over 10 minutes (1 mL/minute)
- > Dose may be repeated once after 30 minutes if bleeding continues or restarts within 24 hours of the first dose

Fibrinogen Correction

- > Fibrinogen deficiency is a common problem in major obstetric haemorrhage and can be detected using ROTEM or checking fibrinogen level on extended coagulation tests
- > Postpartum haemorrhage (PPH) can lead to a significant depletion in procoagulant factors as well as fibrinogen. A decrease in fibrinogen has been shown to be an early predictor of severity of PPH.¹⁰ Early use of fibrinogen-containing products should be prioritised in the management of PPH.¹¹
- > Fibrinogen can be replaced either by giving cryoprecipitate or by administering fibrinogen concentrate (if available- refer to local health service protocols)
- > If you intend to use cryoprecipitate, it requires time to thaw and therefore request it from the laboratory as early as possible
- > Aim to maintain fibrinogen level >2.5 g/L
- > Refer to organisation procedures for fibrinogen concentrate administration guidelines
- > Seek specialist advice from haematologist / MedSTAR

Resource: iTransfuse App

The iTransfuse App developed by Australian Red Cross Lifeblood provides clinicians with tools and resources to support the prescription of blood and blood products, diagnostic information and more:

- > Prescribing red cells, platelets and plasma
- > Warfarin reversal
- > Diagnosis and management of transfusion reactions
- > Checklists for administration of blood components
- > Maternity blood management
- > Blood volume calculator
- > Resources library
- > Podcasts
- > Educational games

It can be downloaded from the App store or via Google Play



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References

1. National Blood Authority. Patient Blood Management Guidelines: Module 5, Obstetrics and Maternity [Internet]. 2015 Mar [cited 2020 May 28]. Available from: <https://www.blood.gov.au/system/files/documents/20180426-Module5-WEB.pdf>
2. National Blood Authority. Patient Blood Management Guidelines: Module 1, Critical Bleeding/Massive Transfusion [Internet]. 2011 Mar [cited 2020 May 28]. Available from: <https://www.blood.gov.au/system/files/documents/pbm-module-1.pdf>
3. Royal College of Obstetricians and Gynaecologists. RCOG Green-top Guideline no. 47, Blood Transfusion in Obstetrics, 2015 May [cited 2021 Feb 4] available at: <https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg47/>
4. Shakur H, Roberts I, Bautista R. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial. *The Lancet* 2010; 376:23-32.
5. WHO. WHO recommendation on tranexamic acid for the treatment of postpartum haemorrhage. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO [cited 2021 Feb 4]. Available from <https://apps.who.int/iris/bitstream/handle/10665/259374/9789241550154-eng.pdf;jsessionid=3657683E30C3A758D28DA3573E066BF5?sequence=1>
6. WOMAN Trial collaborators. Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomised, double-blind, placebo-controlled trial. *The Lancet* 2017; 389:2105-16
7. Novikova N, Hofmeyr GJ. Tranexamic acid for preventing postpartum haemorrhage. *Cochrane Database of Systematic Reviews* 2010, Issue 7. Art. No.:CD007872. DOI: 10.1002/14651858.CD007872.pub3. Available from URL: <https://pubmed.ncbi.nlm.nih.gov/26079202/>
8. Ducloy-Bouthers A, Jude B, Duhamel A, Broisin F, Huissoud C, Keita-Meyer H, et al. High dose tranexamic acid reduces blood loss in postpartum haemorrhage. *Critical Care* 2011;15:R117.
9. SHPA. Australian Injectable Drugs Handbook, 8th Ed, 2020 [cited 2021 Feb 3], available at: https://aidh.hcn.com.au/browse/t/tranexamic_acid
10. Charbit B, Mandelbrot L, Samain, et al. The decrease of fibrinogen is an early predictor of the severity of postpartum haemorrhage. *J Thromb Haemost* 2007; 5:266-73
11. Onwuemene O, Green D and Keith LG. Early Use of Fibrinogen in the Treatment of Postpartum Hemorrhage. In: Sir Sabaratnam Arulkumaran, Mahantesh Karoshi, Louis G. Keith, Andre B. Lalonde and Christopher B-Lynch, editors. *A comprehensive textbook of Post-partum haemorrhage*. 2nd ed. London: Sapiens Publishing; 2012. p. 45-47.
12. Use of CMV-seronegative Blood Components Clinical Guidance Summary. https://www.sahealth.sa.gov.au/wps/wcm/connect/36aabf96-58ff-43a0-8c87-866ad32c2708/Clinical+Guidance+Summary+CMV-N+Blood+Products_FINAL+2Sep2019.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-36aabf96-58ff-43a0-8c87-866ad32c2708-nwKsBRd
13. Zatta A, McQuilten Z, Mitra B et al. Elucidating the clinical characteristics of patients captured using different definitions of massive transfusion: *Vox Sang*;107(1):60-70

[SA Health Blood Management Information](#)

- SA Health. *Blood Supply and Stewardship Policy Directive* (v2.1). 2019
- BloodSafe
- Clinicians working with blood and blood products
- Stewardship and Governance
- Transfusion Practice

Acknowledgements

The South Australian Perinatal Practice Guidelines gratefully acknowledge the contribution of clinicians and other stakeholders who participated throughout the guideline development process particularly:

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Document Ownership & History

Developed by: SA Maternal, Neonatal & Gynaecology Community of Practice
Contact: HealthCYWHSPerinatalProtocol@sa.gov.au
Endorsed by: SA Health Commissioning and Performance
Next review due: 02/06/2026
ISBN number: 978-1-76083-392-3
PDS reference: CG112
Policy history: Is this a new policy (V1)? **N**
 Does this policy amend or update an existing policy? **Y**
 If so, which version? **Blood Transfusion v4.0**
 Does this policy replace another policy with a different title? **Y**
 If so, which policy (title)? **Massive Blood Transfusion v6.0** (combines 2 x PPGs)

Approval Date	Version	Who approved New/Revised Version	Reason for Change
02/06/21	V5	Deputy CE, Commissioning and Performance Division, SA Department for Health and Wellbeing	Formally reviewed.
23/09/13	V4	SA Health Safety and Quality Strategic Governance Committee	Formally reviewed in line with 3-5 year scheduled timeline for review.
06/07/09	V3	SA Maternal & Neonatal Clinical Network	Formally reviewed in line with 3 year scheduled timeline for review.
23/04/07	V2	SA Maternal & Neonatal Clinical Network	Formally reviewed in line with 3 year scheduled timeline for review.
08/12/04	V1	SA Maternal & Neonatal Clinical Network	Original SA Maternal & Neonatal Clinical Network approved version.

