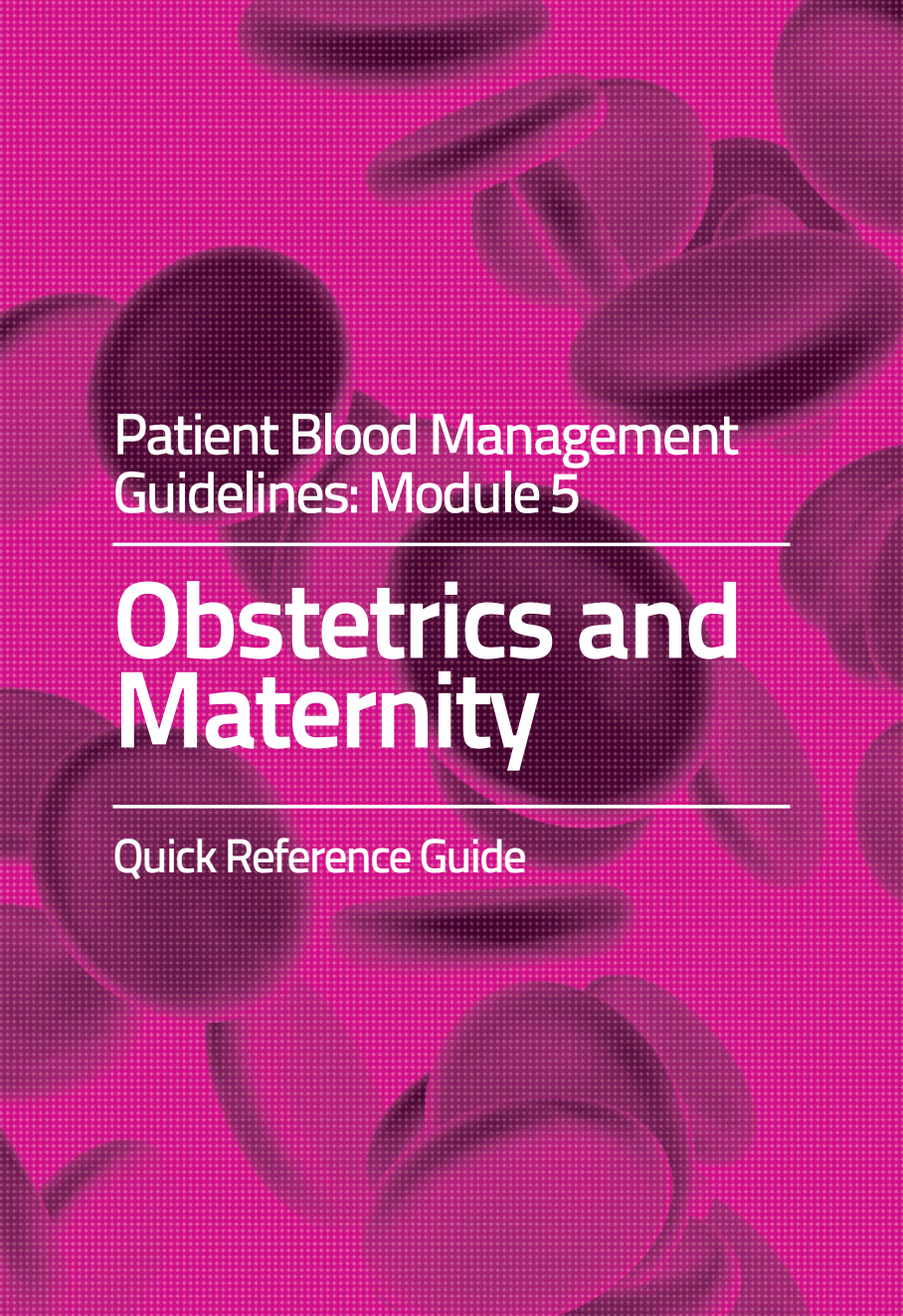

Patient Blood Management Guidelines: Module 5

Obstetrics and Maternity

Quick Reference Guide

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For more information:

Patient Blood Management Guidelines
National Blood Authority
Locked Bag 8430
Canberra ACT 2601
Telephone: 1300 025 663
Email: guidelines@blood.gov.au
Website: www.blood.gov.au

Disclaimer

This document is a general guide to appropriate practice, to be followed subject to the circumstances, clinician's judgement and patient's preferences in each individual case. It is designed to provide information to assist decision making. Recommendations contained herein are based on the best available evidence published up to 12 June 2013. The relevance and appropriateness of the information and recommendations in this document depend on the individual circumstances. Moreover, the recommendations and guidelines are subject to change over time.

Each of the parties involved in developing this document expressly disclaims and accepts no responsibility for any undesirable consequences arising from relying on the information or recommendations contained herein.

Patient Blood Management Guidelines: Module 5 – Obstetrics and Maternity

Development of this quick reference guide was achieved through clinical input and expertise of representatives from the colleges and societies listed below, a patient blood management consultant and an independent consumer advocate (see Appendix A in the Module).

Australian and New Zealand College of Anaesthetists

Australian and New Zealand Intensive Care Society

Australian & New Zealand Society of Blood Transfusion

Australian College of Midwives

Australasian Society of Haemostasis & Thrombosis

College of Intensive Care Medicine of Australia and New Zealand

Perinatal Society of Australia and New Zealand

Royal Australian and New Zealand College of Obstetricians and Gynaecologists

Society of Obstetric Medicine of Australian and New Zealand

The National Blood Authority gratefully acknowledges these contributions. College and society endorsement of the Module can be found at www.blood.gov.au.

NATIONAL BLOOD AUTHORITY
AUSTRALIA

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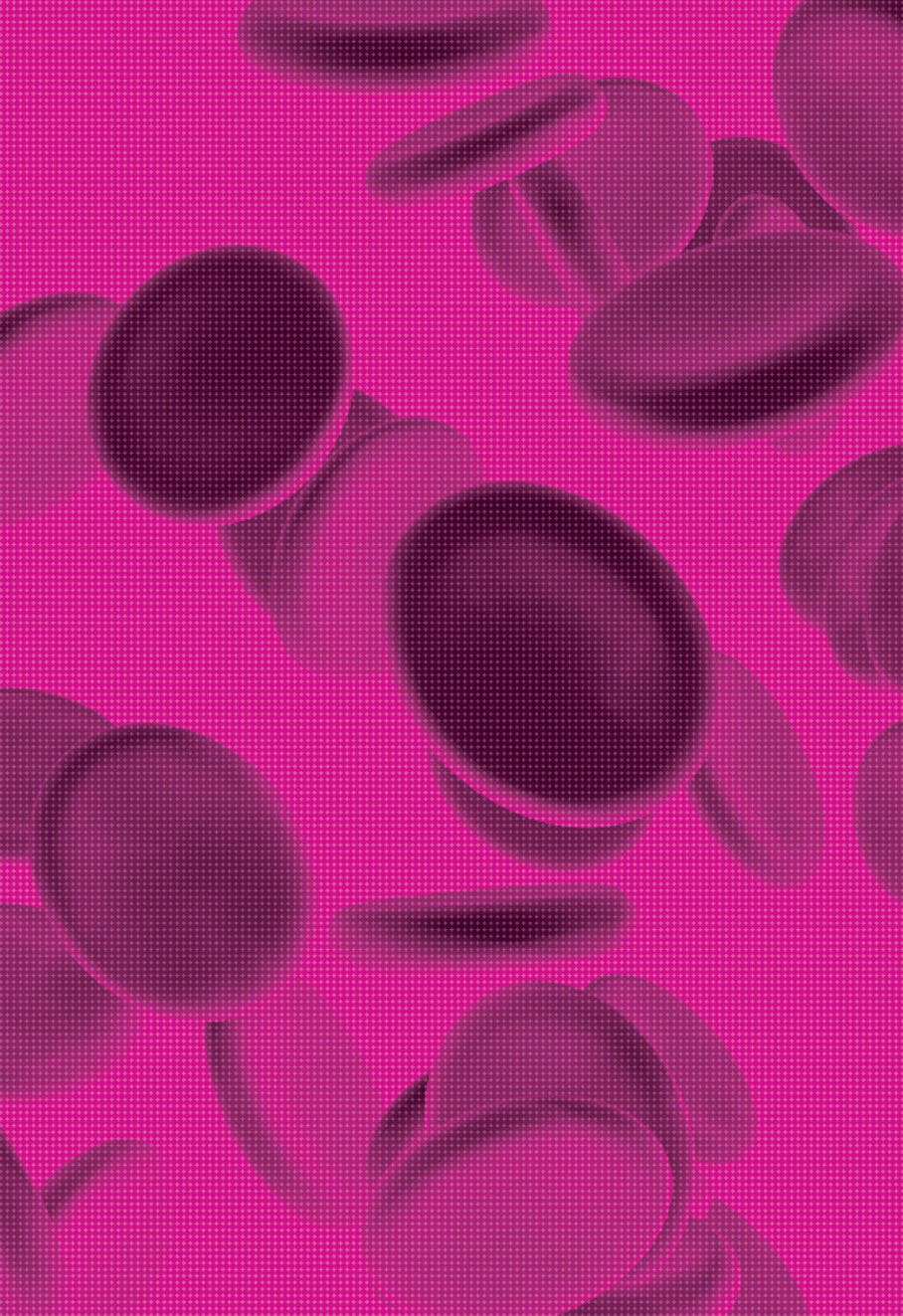
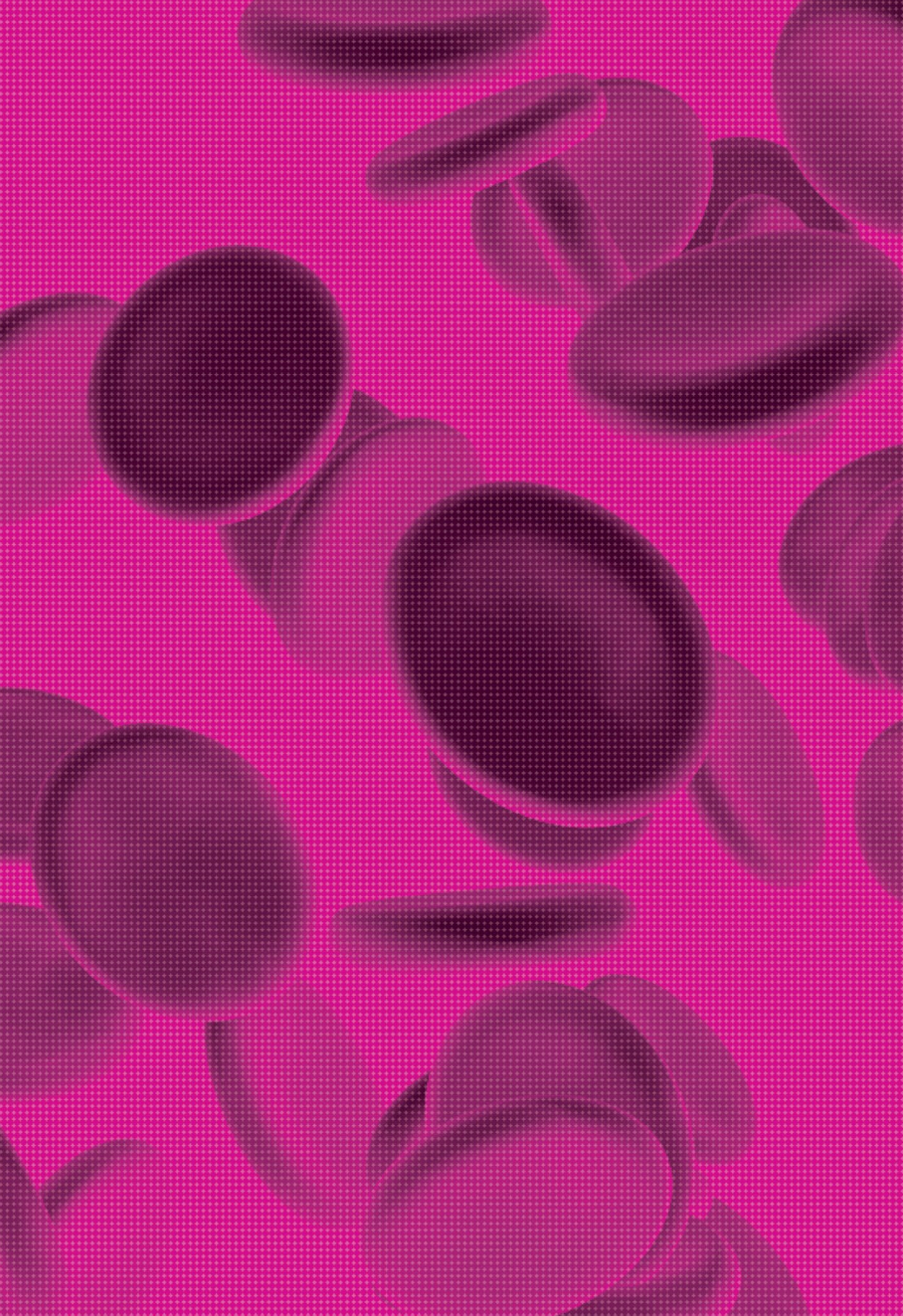


Abbreviations and acronyms

APTT	activated partial thromboplastin time
ASBT	Australasian Society of Blood Transfusion
CMV	cytomegalovirus
CRG	Clinical/Consumer Reference Group
ESA	erythropoiesis stimulating agent
FBC	full blood count
FFP	fresh frozen plasma
Hb	haemoglobin
HDN	haemolytic disease of the newborn
IM	intramuscular
INR	international normalisation ratio
IR	interventional radiology
IV	intravenous
MTP	massive transfusion protocol
NBA	National Blood Authority
NHMRC	National Health and Medical Research Council
PP	practice point
PT	prothrombin time
R	recommendation
RBC	red blood cell
rFVIIa	recombinant activated factor VII
Rh D	rhesus D
TGA	Therapeutic Goods Administration
TXA	tranexamic acid



Contents

1. Introduction

The *Patient Blood Management Guidelines: Module 5 – Obstetrics and Maternity*[1] (Module 5 – Obstetrics and Maternity), is the fifth in a series of six modules that focus on evidence-based patient blood management. The other five modules are critical bleeding/massive transfusion, perioperative, medical, critical care and paediatrics/neonates. Together, Module 2 – Perioperative and Module 3 – Medical cover all the patient groups addressed by the 2001 document *Clinical Practice Guidelines on the Use of Blood Components*[2] (National Health and Medical Research Council/Australasian Society of Blood Transfusion, NHMRC/ASBT). Thus, the 2001 guidelines have now been replaced.

Module 5 – Obstetrics and Maternity was developed by a Clinical/Consumer Reference Group (CRG) representing specialist colleges, organisations and societies, with the active participation of the clinical community.

This quick reference guide of Module 5 – Obstetrics and Maternity includes:

- a summary of the recommendations that were developed by the CRG, based on evidence from the systematic review;
- a summary of the practice points that were developed by the CRG through consensus decision making, where the systematic review found insufficient high quality data; and
- a summary of the expert opinion points that were developed by the CRG through consensus decision making, where relevant guidance that is outside the scope of the systematic review is required.

Details of the systematic reviews used in the development of Module 5 – Obstetrics and Maternity, for which the electronic searches included articles published before 12 June 2013, are given in the technical reports[3,4] available on the National Blood Authority (NBA) website.

2. Development of recommendations, practice points and expert opinion points

Recommendations

The CRG developed recommendations where sufficient evidence was available from the systematic review of the literature. The recommendations have been carefully worded to reflect the strength of the body of evidence. Each recommendation has been given a grade, using the following definitions, which were set by the NHMRC:

GRADE A	**Body of evidence can be trusted to guide practice**
GRADE B	**Body of evidence can be trusted to guide practice in most situations**
GRADE C	**Body of evidence provides some support for recommendation(s) but care should be taken in its application**
GRADE D	**Body of evidence is weak and recommendations must be applied with caution.**

Practice Points

The CRG developed practice points where the systematic review found insufficient high-quality data to produce evidence-based recommendations, but the CRG felt that clinicians require guidance to ensure good clinical practice. These points are based on consensus among the members of the committee.

Expert Opinion Points

The CRG developed expert opinion points where the CRG felt that clinicians require guidance to ensure good clinical practice that is outside the scope of the systematic review. These points are based on consensus among the members of the committee.

This quick reference guide summarises the recommendations, practice points and expert opinion points in a sequence that reflects clinical practice.

3. Categorisation of recommendations and practice points

The following table categorises the recommendations and practice points according to different elements of patient blood management. It also identifies where to find the recommendations and practice points within this quick reference guide and Module 5 – Obstetrics and Maternity, where references are provided.

This section is followed by a series of tables giving the full recommendations and practice points for each element.

ELEMENTS OF PATIENT BLOOD MANAGEMENT	RECOMMEN-DATION	PRACTICE POINT	EXPERT OPINION POINT	RELEVANT SECTION OF THIS QUICK REFERENCE GUIDE	RELEVANT SECTION OF MODULE 5 – OBSTETRICS & MATERNITY
Non-transfusion interventions					
Oral and/or parenteral iron	R1-3	PP9-13		4.1	3.3.1
Erythropoiesis-stimulating agents	R4	PP14		4.2	3.3.2
When transfusion is not an option			EOP16-18	4.5	4.4
Appropriate transfusion practices – RBC, FFP, fibrinogen concentrate and cryoprecipitate, and platelets					
Blood group and screen during pregnancy			EOP9-11	4.3	4.2
Anaemia			EOP1-2	4.4	4.1
Women who are not actively bleeding		PP4-8		4.6	3.2
Blood component transfusion – modified blood components CMV seronegative & phenotyped			EOP12-13	4.7	4.2
Coagulopathic patients at risk of bleeding		PP19-22		4.8	3.4

ELEMENTS OF PATIENT BLOOD MANAGEMENT	RECOMMEN-DATION	PRACTICE POINT	EXPERT OPINION POINT	RELEVANT SECTION OF THIS QUICK REFERENCE GUIDE	RELEVANT SECTION OF MODULE 5 – OBSTETRICS & MATERNITY
Obstetric haemorrhage/ critical bleeding		PP1-3, 15-18	EOP7	4.9	3.2, 3.4, 4.2
Massive transfusion protocol for maternity care			EOP8, 14-15	4.10	4.2, 4.3
Obstetric haemorrhage/ critical bleeding – transfusion support for maternity services			EOP3-6	4.11	4.2
Blood conservation strategies					
Recombinant activated factor VII		PP29-31		4.12	3.5.4
Tranexamic acid		PP32-33		4.13	3.5.5
Cell salvage		PP23-26		4.14	3.5.2
Interventional radiology		PP27-28		4.15	3.5.3

RBC, red blood cell; CMV, cytomegalovirus; FFP, fresh frozen plasma

4. Recommendations, practice points and expert opinion points

4.1 Oral and/or parenteral iron

RECOMMENDATIONS - oral and/or parenteral iron	
R1 **GRADE C**	The routine administration of iron supplementation to all pregnant women is not recommended.[a] [a] In accordance with *Clinical practice guidelines: Antenatal care – Module 1*[5]
R2 **GRADE C**	The administration of iron to pregnant women with iron deficiency anaemia is recommended; IV iron is preferred when rapid restoration of Hb and iron stores is required.
R3 **GRADE C**	In maternity patients who require iron therapy for the treatment of anaemia, the routine addition of folic acid is not recommended.[a] [a] Folic acid should be administered for the prevention of neural tube defects, in accordance with *Clinical practice guidelines: Antenatal care – Module 1*[5]
PRACTICE POINTS - oral and/or parenteral iron	
PP9	In maternity patients with iron deficiency anaemia, a therapeutic dose of elemental iron (100–200 mg daily) should be prescribed, and the response to therapy monitored. If the response to oral iron is inadequate, IV iron should be used.
PP10	In maternity patients with iron deficiency without anaemia, a low dose of elemental iron (e.g. 20–80 mg daily) may be considered, and may be better tolerated than higher doses.
PP11	In maternity patients requiring iron, IV iron is preferred when oral iron is poorly tolerated (affecting compliance), or absorption is likely to be impaired.
PP12	When IV iron is prescribed, calculation of the dose should take into consideration the iron deficit.
PP13	The routine use of IM iron is not advised where alternatives are available.

Hb, haemoglobin; IM, intramuscular; IV, intravenous; PP, practice point; R, recommendation

4.2 Erythropoiesis stimulating agents

RECOMMENDATION - erythropoiesis stimulating agents	
R4 **GRADE C**	ESAs should not be routinely used in maternity patients.

PRACTICE POINT - erythropoiesis stimulating agents	
PP14	In maternity patients with anaemia, where an ESA is used, it should be combined with iron therapy.[a] [a] ESAs are currently registered with the TGA for anaemia therapy in patients with chronic renal disease, non-myeloid malignancies and those scheduled for elective surgery with an expected moderate blood loss.

ESA, erythropoiesis stimulating agent; PP, practice point; R, recommendation; TGA, Therapeutic Goods Administration

4.3 Blood group and screen during pregnancy

EXPERT OPINION POINTS - blood group and screen during pregnancy	
EOP9	All women should be offered routine blood group and antibody testing during pregnancy, with follow-up testing for Rh D negative women and women with alloantibodies capable of causing HDN. Women with antibodies associated with moderate and severe HDN (-D, -c, -K) should consult with a specialist obstetrician with relevant expertise.[a] [a] In accordance with *Guidelines for blood grouping & antibody screening in the antenatal & perinatal setting*[8]
EOP10	Women with clinically significant alloantibodies should have a blood group and antibody screen on admission, in labour or prior to vaginal or caesarean birth, to avoid potential delays in blood provision. Where complex antibodies or rare red cell phenotypes are identified, and provision of compatible blood may be difficult, the management plan should include timely access to specialist blood product support.
EOP11	Decisions regarding blood group and antibody screen prior to vaginal or caesarean birth should include a risk assessment for peripartum haemorrhage, and the presence of any factors that may delay access to blood, should it be required. Such factors include the presence of red cell alloantibodies, and the local arrangements for provision of testing and blood products.

EOP, expert opinion point; HDN, haemolytic disease of the newborn; Rh D, Rhesus D

4.4 Anaemia

EXPERT OPINION POINTS - anaemia	
EOP1	In women at high risk of anaemia, ferritin should be tested along with FBC early in pregnancy to assess iron stores and anaemia. Other factors contributing to anaemia, such as deficiencies in folic acid and vitamin B12, or hookworm, should be screened for in selected women.
EOP2	Women should be provided with information and advice in relation to minimising anaemia, for example, by adequate spacing of pregnancies, consumption of a healthy diet and optimal management of any medical comorbidities.

EOP, expert opinion point; FBC, full blood count

4.5 When transfusion is not an option

EXPERT OPINION POINTS - when transfusion is not an option	
EOP16	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 patients for whom transfusion is not an option.
EOP17	To arrest significant and life-threatening haemorrhage, when transfusion is not an option, the definitive procedure to minimise ongoing blood loss is hysterectomy, which must be considered and acted upon early.
EOP18	Early identification of women for whom transfusion is not an option is vital, to enable a comprehensive multidisciplinary plan to be developed and implemented.

EOP, expert opinion point; Hb, haemoglobin

4.6 Women who are not actively bleeding

PRACTICE POINTS – women who are not actively bleeding	
PP4	In maternity patients who are not actively bleeding, RBC transfusion should not be dictated by a Hb concentration alone, but should also be based on assessment of the patient's clinical status (e.g. the risk of further haemorrhage). Most maternity patients are otherwise healthy and can generally tolerate moderate degrees of anaemia while medical therapies take effect.
PP5	In maternity patients who are not actively bleeding, non-transfusion therapies, including iron, should be considered as part of the treatment of anaemia. (See recommendations R2 and R3, and practice points PP9–PP14)
PP6	In maternity patients 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.
PP7	In maternity patients, the risk of RBC alloimmunisation and potential clinical impact should be considered when balancing the risks and benefits of RBC transfusion.
PP8	Direct evidence of the efficacy of RBC transfusion for treatment of anaemia is not available in maternity patients. Evidence from other patient groups and CRG consensus suggests that, with a: ▪ Hb concentration >90 g/L, RBC transfusion is usually inappropriate. ▪ Hb concentration of 70–90 g/L, RBC transfusion is not associated with reduced mortality. The decision to transfuse patients (with a single unit followed by reassessment) should be based on the need to relieve clinical signs and symptoms of anaemia, the availability of other therapies for the treatment of anaemia, the expected timeframe to giving birth and the presence of risk factors for haemorrhage. ▪ Hb concentration <70 g/L, RBC transfusion may be associated with reduced mortality and may be appropriate. However, transfusion may not be required in well-compensated patients, or where other specific therapy is available.

CRG, Clinical/Consumer Reference Group; Hb, haemoglobin; PP, practice point; RBC, red blood cell

4.7 Blood component transfusion – modified blood components (CMV seronegative and phenotyped)

EXPERT OPINION POINTS - blood component transfusion – modified blood components (CMV seronegative and phenotyped)	
EOP12	CMV safe blood products should be offered to all pregnant women, regardless of CMV status, when transfusion occurs in the antenatal setting in the context of an ongoing pregnancy. Preference is for CMV seronegative blood products, where available; however, life-saving transfusion should not be withheld if CMV seronegative products are not available. ** CMV 'safe' means through leucodepletion or antibody testing of donor blood. Neither process excludes the possibility of transfusion-transmitted infection; rather, they both provide a significant risk reduction. It is unknown whether CMV seronegative blood products provide significant additional protection over routine leucodepletion.*
EOP13	Where possible, K negative RBC should be selected for transfusion for all females of child-bearing potential who are K negative or whose K antigen status is unknown.

CMV, cytomegalovirus; EOP, expert opinion point; RBC, red blood cell

4.8 Coagulopathic patients at risk of bleeding

PRACTICE POINTS - coagulopathic patients at risk of bleeding	
PP19	In general, a platelet count ≥50 $\times 10^9$/L is considered acceptable for vaginal or caesarean birth; however, lower platelet counts may be tolerated.
PP20	In maternity patients with abnormal coagulation tests who are not bleeding (note: concealed bleeding should be excluded), the *routine* use of cryoprecipitate or FFP is not supported. There was no evidence to define a threshold fibrinogen level or prothrombin ratio/INR that is associated with significant adverse events.
PP21	In maternity patients, underlying causes of coagulopathy should be assessed and treated. Where transfusion of platelets, cryoprecipitate or FFP is considered necessary, the risks and benefits should be considered for each patient, and expert guidance sought.

PP22	Maternity patients with pre-existing haematological conditions (e.g. thrombocytopenia, inherited or acquired disorders of coagulation) should have their condition optimised before giving birth, and have a multidisciplinary plan in place for birth and the postnatal period.

FFP, fresh frozen plasma; INR, international normalisation ratio; PP, practice point

4.9 Obstetric haemorrhage/critical bleeding

PRACTICE POINTS – Obstetric haemorrhage/critical bleeding	
PP1	Major blood loss can develop rapidly around the time of giving birth in the absence of haemodynamic compromise; hence, close monitoring of all women, and early recognition and rapid response, are critical.
PP2	In maternity patients requiring massive transfusion, the use of RBC and other blood components may be life-saving. However, in non-maternity patients, transfusion of RBC and other blood components is independently associated with increased morbidity and mortality.
PP3	In maternity patients with critical bleeding, a structured approach to patient care that includes escalation procedures, and timely and appropriate use of RBC and other blood components (e.g. an MTP), may reduce the risk of morbidity and mortality.
PP15	All providers of birthing services should develop a plan to manage obstetric haemorrhage. The plan should give consideration to local resources, transport and access to relevant specialist advice, blood products and equipment.

PP16	In women with major obstetric haemorrhage, in addition to clinical observations, the following parameters should be measured early and frequently: ▪ temperature ▪ acid–base status ▪ ionised calcium ▪ haemoglobin ▪ platelet count ▪ PT/INR ▪ APTT ▪ fibrinogen level With successful treatment, values should trend towards normal.
PP17	Values indicative of critical physiologic derangement include: ▪ temperature <35°C ▪ pH <7.2, base excess worse than –6, lactate >4 mmol/L ▪ ionised calcium <1.1 mmol/L ▪ platelet count <50 × 10^9/L ▪ PT >1.5 × normal ▪ INR >1.5 ▪ APTT >1.5 × normal ▪ fibrinogen level <2.0 g/L.
PP18	In women with major obstetric haemorrhage requiring massive transfusion, suggested doses of blood components are:[a] ▪ FFP: 15 mL/kg ▪ platelets: 1 adult therapeutic dose ▪ cryoprecipitate: 3–4 g. [a] Or as directed by the haematologist/transfusion specialist. See Appendix E[1] (section 6 in this QRG) for dose equivalents.

EXPERT OPINION POINT – Obstetric haemorrhage/critical bleeding

EOP7	In pregnant women at risk of major obstetric haemorrhage (e.g. women with placenta accreta or major placenta previa), a multidisciplinary management plan is strongly advised.

APTT, activated partial thromboplastin time; EOP, expert opinion point; FFP, fresh frozen plasma; INR, international normalisation ratio; MTP, massive transfusion protocol; PP, practice point; PT, prothrombin time; RBC, red blood cell

4.10 Massive transfusion protocol for maternity care

EXPERT OPINION POINTS - massive transfusion protocol for maternity care	
EOP8	It is strongly advised that maternity services develop an MTP that includes access to RBC and the dose, timing and ratio of blood component therapy, for use in maternity patients with critical bleeding requiring massive transfusion.
EOP14	In the maternity population, activate MTPs early.
EOP15	The MTP should be modified for the maternity patient, because fibrinogen levels approaching 2 g/L are indicative of critical physiological derangement and are associated with severe haemorrhage.

EOP, expert opinion point; MTP, massive transfusion protocol; RBC, red blood cell

4.11 Obstetric haemorrhage/critical bleeding – transfusion support for maternity services

EXPERT OPINION POINTS - obstetric haemorrhage/critical bleeding – transfusion support for maternity services	
EOP3	All maternity services must have procedures in place to manage the critically bleeding maternity patient. This includes agreed communication and transport arrangements, access to transfusion medicine expertise and defined escalation strategies.
EOP4	All maternity services should liaise with their local pathology provider to ensure that information on local blood access arrangements is available to all clinicians (e.g. time to process 'group and hold' and cross-match blood, and availability of products).
EOP5	Maternity services in rural and remote areas should develop management plans to minimise any delay in accessing specialist health-care services and resources, including blood products.
EOP6	Women with identifiable risk factors for obstetric haemorrhage should, wherever possible, give birth in a maternity service capable of providing the appropriate level of care.

EOP, expert opinion point

4.12 Recombinant activated factor VII

PRACTICE POINTS - recombinant activated factor VII	
PP29	The administration of rFVIIa may be considered in maternity patients with life-threatening haemorrhage, but only after conventional measures (including surgical haemostasis and appropriate blood component therapy) have failed.[a] [a] Refer to PP8, PP9 in *Patient Blood Management Guidelines: Module 1 – Critical Bleeding/Massive Transfusion*[2] and PP20 in *Patient Blood Management Guidelines: Module 2 – Perioperative*[8] NB: rFVIIa is not licensed for this use. Its use should only be considered in exceptional circumstances.
PP30	Ideally, rFVIIa should only be administered to maternity patients as part of a locally adapted MTP. The MTP should include strict attention to the control of bleeding, physiological and metabolic parameters, coagulation status and temperature maintenance.
PP31	When rFVIIa is administered to maternity patients with life-threatening haemorrhage, an initial dose of 90 µg/kg is suggested.

MTP, massive transfusion protocol; PP, practice point; rFVIIa, recombinant activated factor VII

4.13 Tranexamic acid

PRACTICE POINTS - tranexamic acid	
PP32	In maternity patients with significant blood loss, the early use (within 3 hours of the onset of haemorrhage) of TXA may be considered.[a] [a] The use of TXA in this context is considered off label.
PP33	TXA should only be administered in the context of overall patient management; the protocol should include strict attention to the control of bleeding, physiological and metabolic parameters, coagulation status and temperature maintenance.

PP, practice point; TXA, tranexamic acid

4.14 Cell salvage

PRACTICE POINTS - cell salvage	
PP23	In maternity patients, cell salvage should be considered if anticipated blood volume loss is likely to result in transfusion.[a] [a] In accordance with *Guidance for the provision of intraoperative cell salvage.*[6]
PP24	In maternity patients who are at increased risk of bleeding and in whom transfusion is not an option, cell salvage should be considered.
PP25	Cell salvage requires a local procedural guideline that should include patient selection, use of equipment and reinfusion. All staff operating cell salvage devices should receive appropriate training, to ensure that they are familiar with and proficient in the technique.
PP26	In Rh D negative maternity patients receiving salvaged blood where the cord blood group is Rh D positive, a dose of Rh D immunoglobulin is required, with additional doses based on the result of assessment of fetomaternal haemorrhage test.

PP, practice point; Rh D, Rhesus D

4.15 Interventional radiology

PRACTICE POINTS - interventional radiology	
PP27	Preventative IR may be appropriate in selected maternity patients; however, the risk of complications from this procedure should be balanced against the potential benefits.
PP28	Although the role of therapeutic IR in the treatment of major obstetric haemorrhage is unknown, it may be considered in the overall approach to management.

PP, practice point; IR, interventional radiology

5. Product information

For information on blood products available in Australia, see the website of the Australian Red Cross Blood Service (www.transfusion.com.au).

For information on blood products available in New Zealand, see the website of the New Zealand Blood Service (www.nzblood.co.nz).

6. References

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