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Clinical Guideline	[Insert local health network or hospital name / logo]
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Single Unit Blood Transfusion Guideline

Document Registration Number: Insert

Sites where Clinical Guideline applies	All hospitals within [insert local health network or hospital name]. All areas outside of operating theatres where blood transfusions are administered.
This Clinical Guideline applies to:	Adults
Target audience	All medical officers, nursing / midwifery staff and transfusion laboratory staff
Description	<p>This guideline is adapted from the Single Unit Transfusion Guideline developed by the National Blood Authority, Australia.¹ It is intended for use by all clinicians responsible for prescribing blood transfusion to stable normovolaemic patients who are not actively bleeding and not in an operating theatre.</p> <p>The guideline is consistent with the National Blood Authority Patient Blood Management Guidelines.</p>
Keywords	Single unit, blood, transfusion, non-bleeding, normovolaemic, patient, symptoms.

Related jurisdictional legislation, Australian Standards, National Safety and Quality Health Service Standard , Professional Guidelines, Codes of Practice or Ethics:

- National Blood Authority Patient Blood Management Guidelines: Modules 2-4
<http://www.blood.gov.au/pbm-guidelines>.
- National Safety and Quality Health Service Standard 7: Blood and Blood Products
http://www.safetyandquality.gov.au/wp-content/uploads/2012/10/Standard7_Oct_2012_WEB.pdf.
- ANZSBT/RCNA Guidelines for the Administration of Blood Products Page 14 Section 1; Page 21 Recommendation 9
- [list as appropriate]

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GUIDELINE SUMMARY

This document establishes best practice for [insert local health network or hospital name]. While not requiring mandatory compliance, staff must have sound reasons for not implementing standards or practices set out within the guideline, or for measuring consistent variance in practice.

Introduction

This guideline is adapted from the Single Unit Transfusion Guideline developed by the National Blood Authority, Australia.¹ It is intended for use by all health care professionals responsible for prescribing blood transfusion to stable normovolaemic patients who are not actively bleeding and not in an operating theatre.

Situation – Risk Statement: Current practice does not always align with the evidence-based Patient Blood Management Guidelines.²⁻⁵ Morbidity from transfusion has been shown to be dose dependent.^{6,7} Two units are commonly prescribed when one unit may have met the clinical expectation and outcome of the transfusion. Excessive / over-transfusion exposes patients to increased risk of adverse event without commensurate benefit to outcome.^{8,9}

Background: Historically, two unit blood transfusions were considered normal. Transfusion was habitual / cultural, prescribed according to haemoglobin and not based on evidence of benefit. Increased morbidity, mortality and length of hospital stay have been directly attributed to transfusion.^{6,7} The Patient Blood Management Guidelines state “Where indicated, transfusion of 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”.^{3,4}

Assessment: Blood transfusion is a live tissue transplant. Emerging evidence of harm from transfusion requires a precautionary approach to balance risk with benefit for **each unit**.^{8,9} Restrictive transfusion thresholds and single unit transfusions are safe in patients who are not actively bleeding and reduce risk.^{10,11}

Recommendation: Ensure clinical practice is in line with the Patient Blood Management Guidelines:²⁻⁴ “Where indicated, transfusion of 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”.^{3,4}

GLOSSARY

Acronym or Term	Definition
NBA	National Blood Authority
ARCBS	Australian Red Cross Blood Service – “The Blood Service”.
NSQHS	National Safety and Quality Health Service Standards
PBM	patient blood management
unit	single bag of packed red blood cells
TACO	transfusion associated circulatory overload
Hb	haemoglobin
g/L	grams per litre
BloodNet	National Blood Authority inventory management system
CPOE	computerised physician order entry
RBC	red blood cell

GUIDELINE

AIM:

To ensure clinical practice aligns with the evidenced-based Patient Blood Management Guidelines. To ensure the safety and efficacy of blood transfusion by confirming every unit transfused is a clinical decision where the expected benefit outweighs the risks.

WHO:

This guideline applies to stable normovolaemic patients requiring a transfusion assessed on symptoms of anaemia AND haemoglobin level who are not actively bleeding and not in the operating theatre.

Health care clinicians responsible for the clinical assessment, care planning and management of patients potentially requiring red cell transfusion therapy, nurses carrying out transfusion related patient care including administration and monitoring of blood transfusions and laboratory staff monitoring transfusion practice should follow this guideline.

WHAT:

The guideline states: *Where indicated, transfusion of 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*"^{3,4}

- Transfuse one unit at a time and only when clinically indicated, to alleviate patient symptoms.
 - Symptoms may include dyspnoea, tachycardia, chest pain, hypotension, increased heart rate and decreased oxygen saturation.¹²⁻¹⁴
 - It may take more than 24 hours for patients to report an improvement in symptoms after a transfusion.³
- Transfusion should not be based on haemoglobin level alone.
- Each unit transfused is an independent clinical decision.
- Informed consent must be obtained with the patient or responsible person/guardian.

WHY:

- Current practice does not always align with the current evidenced-based recommendation.¹⁻⁵
- The *Patient Blood Management Guidelines* (Module 2 - Perioperative; Module 3 - Medical and Module 4 - Critical Care)²⁻⁴ support restrictive transfusion and a single unit strategy.
- The National Safety and Quality Health Service Standards (Standard 7: Blood and Blood Products) require blood and blood product policies and procedures to be consistent with national evidence based guidelines for pre-transfusion practices, prescribing and clinical use of blood and blood products.⁵ http://www.safetyandquality.gov.au/wp-content/uploads/2012/10/Standard7_Oct_2012_WEB.pdf
 - 7.1.1 Blood & blood product policies, procedures and/or protocols are **consistent with national evidence-based guidelines** for pre-transfusion practices, prescribing & clinical use of blood & blood products
 - 7.1.3 Action is taken to **increase the safety & appropriateness** of prescribing & clinically using blood & blood products
 - 7.2.2 Action is taken to **reduce the risks** associated with transfusion practices & the clinical use of blood and blood products
 - 7.4.1 Quality improvement activities are undertaken to reduce the risks of patient harm

from transfusion practices & the clinical use of blood & blood products

- Single unit transfusions are safe in stable, normovolaemic patients who are not actively bleeding and not in an operating theatre and reduce transfusion associated morbidity and mortality.^{10,11}
- If one unit has achieved the stated outcome for the transfusion, for example improvement in haemoglobin level or symptoms, further units will only increase the risks without adding benefit.
- Transfusion is a live tissue transplant. Risks associated with transfusion are dose dependent.^{6,7}
- A two unit transfusion increases the risk of nosocomial infection and other long term morbidities.^{6,7}
- Transfusion Associated Circulatory Overload (TACO) is among the high risks, estimated at 1 in 100 per unit transfused.^{2,15,16}
- Historically, two unit red blood cell transfusions were normal practice. Single unit transfusions remain only a small proportion of all transfusion.
- In addition to exposing patients to increased risk without commensurate benefit to patient outcome, red blood cell transfusion also poses on-going challenges in balancing supply and demand due to the increasing age of the population: demand for blood will increase but the available donor pool will decrease. Although blood is extremely safe from the currently known infectious agents, the potential threat from as yet unknown, or re-emerging pathogens deserves cautious consideration.⁸

HOW:

These are the indications for transfusion in stable normovolaemic patients who are not actively bleeding and not in an operating theatre:

- “Red blood cell transfusion should not be dictated by haemoglobin concentration alone, but should also be based on assessment of the patient’s clinical status.”^{3,4}
- “Where indicated, transfusion of 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.”^{3,4}
- The evidence-based Patient blood Management Guidelines^{3,4} state the haemoglobin transfusion thresholds as:
 - **Hb concentration <70 g/L**, RBC transfusion may be associated with reduced mortality and is likely to be appropriate. However, transfusion may not be required in well compensated patients or where other specific therapy is available.
 - **Hb concentration of 70 – 100 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, and the patient’s response to previous transfusions. No evidence was found to warrant a different approach for patients who are elderly or who have respiratory or cerebrovascular disease.
 - **Hb concentration >100 g/L**, RBC transfusion is likely to be unnecessary and is usually inappropriate. Transfusion has been associated with increased mortality in patients with ACS.
- For patients with **acute coronary syndrome (ACS)**, the evidence-based Patient Blood Management Guidelines^{3,4} state transfusion haemoglobin thresholds as:
 - **In patients with ACS and a Hb concentration <80 g/L**, RBC transfusion may be associated with reduced mortality and is likely to be appropriate.
 - **In patients with ACS and a Hb concentration of 80 – 100 g/L**, the effect of RBC transfusion on mortality is uncertain and may be associated with an increased risk of recurrence of MI. Any decision to transfuse should be made with caution and based on careful consideration

of the risks and benefits.

- **In ACS patients with a Hb concentration >100 g/L**, RBC transfusion is not advisable because of an association with increased mortality.
- For patients who are chronically transfused please refer to the relevant practice points in the Patient Blood Management Guidelines: Module 3 – Medical:³ “In patients with myelodysplasia who are regularly and chronically transfused, there is no evidence to guide particular Hb thresholds. Decisions around appropriate triggers and frequency of transfusion need to be individualised, taking into account anaemia-related symptoms, functional or performance status, and the patient’s response to previous transfusions.”
- Red cell transfusion is inappropriate therapy for Iron Deficiency anaemia unless an immediate increase in oxygen delivery is required, such as when the patient is experiencing end-organ compromise (eg, angina pectoris or cardiac failure), or IDA is complicated by serious, acute ongoing bleeding. Oral iron therapy, in appropriate doses and for a sufficient duration, is an effective first-line strategy for most patients. In selected patients for whom intravenous (IV) iron therapy is indicated, current formulations can be safely administered in outpatient treatment centres and are relatively inexpensive.¹⁷
- The Patient Blood Management Guidelines: Module 3 – Medical³ state “In patients with iron deficiency anaemia, iron therapy is required to replenish iron stores regardless of whether a transfusion is indicated.”
- All patients who receive one unit of red cells should be reassessed to determine their need for further transfusion therapy with red blood cell units.²⁻⁴
- The expected rise in Hb is dependent on patient’s body mass, refer to Australian Red Cross Blood Service *Blood Component Information 2012*.¹⁸
<http://www.transfusion.com.au/sites/default/files/BCI%202012.pdf>

IMPLEMENTATION PLAN

The following stepped approach may assist with the implementation of this guideline.¹⁹

1. Gain approval or endorsement of the guideline from the following:

- Transfusion Governance Committee / Patient Blood Management Committee
- Executive and Quality managers
- Relevant clinicians
- Transfusion medical staff

2. Identify key staff / team responsible for implementing the guideline

- Identify key staff
- Document the roles and responsibilities of the staff

3. Provide education

- Individual medical specialities
- All staff, including: medical; nursing; transfusion medicine and wards areas that may or may not use blood
- Consumer education
- Education of new staff at orientation

4. Key messages

Placement of key messages in the following areas:

- Hospital Intranets, websites
- Transfusion laboratory reports
- Internal hospital newsletters, magazines.
- Visible signage of key messages – e.g. posters

5. Support staff to implement the guideline

- The Single Unit Transfusion Guideline should be available to all staff.
- Provide prompts for staff to determine the reason for transfusion. For example questions to ask such as “Is the patient actively bleeding? What is the patient’s current haemoglobin? Has the patient been reassessed since last transfusion? Is the patient still symptomatic?”
- If a patient does not fall within the criteria, staff should have access to further advice e.g. Haematologist, identified medical staff or laboratory director for approval.

The following resources available from the National Blood Authority could assist with the implementation of the Single Unit Transfusion Guideline:

- Standard material to present to the hospital Transfusion Governance Committee / Patient Blood Management Committee seeking agreement to the guideline and details of how it would be implemented.
- Education material tailored for:
 - Consumers – For example, iTransfuse Fact Sheet, all about blood, I need to know about Patient Blood Management and Single Unit Red Blood Cell Transfusion^{20,21}
 - Individual medical specialities

- All staff
- Transfusion laboratory staff
- Visible signable

Reminder: This guideline only applies to the stable normovolaemic patient who is NOT actively bleeding and NOT in an operating theatre.

EVALUATION PLAN

Collect data and review data on a regular basis.

Some indications your hospital may be able to capture to determine the success of the policy are:

- number units ordered per day from the Blood Service (BloodNet data)
- number of units transfused per patient (you should see more “odd” numbers)
- number of patients who received a single unit transfusion per day who are not bleeding or in an operating theatre.

Where possible, developing an “intelligent” computerised physician order entry (CPOE) system with decision support tools and guides to appropriate ordering is likely to assist.

In the absence of an electronic prescribing / ordering system, incorporation of the haemoglobin thresholds and the Single Unit Transfusion Guideline within the blood order / prescription form will provide timely point of care reminders of the guideline requirements.

Consideration should be given to introducing data collection and analysis as a standing item on the Transfusion Governance Committee / Patient Blood Management Committee agenda. This committee may nominate a person responsible for this task.

A transfusion nurse specialist or quality management staff, may be involved with data collection and analysis.

Review and feedback

- Consider including audit feedback as a standing item on the Transfusion Governance Committee / Patient Blood Management Committee agenda
- Consider sharing statistics with transfusion staff to highlight the impact of the introduction of the Single Unit Transfusion Guideline
- Continue empowering transfusion staff
- Consider providing a forum to air / discuss difficulties and seek resolution to problems
- Consider providing access to articles / reports about progress and new developments in Single Unit Transfusion Guideline, restrictive transfusion thresholds and Patient Blood Management (PBM).

CONSULTATION WITH KEY STAKEHOLDERS

[List the key stakeholders consulted including name and title] Suggestions include:

Chair and membership of the Transfusion Governance Committee.

Directors of Medicine, Surgery, Haematology, Oncology and others.

Leading clinicians in specialties such as Haematology, Orthopaedics, Cardiology, Gastroenterology, Oncology, Renal medicine, Surgery specialties, Adolescent Specialties (and others).

Visiting Medical Officers / General Practitioners, where appropriate.

Nurse Unit Managers and educators of wards and units where transfusions occur.

Senior Laboratory staff responsible for transfusion services.

Patient / community consumer representative.

Tips on the consultation process: Whilst wide consultation is preferable thought should be given to managing the process to ensure the document is finalised within a timeframe. When asking for feedback clear instructions should be given regarding what is being requested, the date by which it should be received and the contact details of the staff member who will collect the information. There are two levels of consultation:

1. **Targeted consultation** - specific staff who are experts in the field and/or whose input is important for the drafting of the document. Involve staff from whom support for the implementation of the document is vital and include representation from the applicable geographic areas and types of clinical settings.
2. **Non-targeted consultation** - you may wish to notify a wider audience that the document is in development and give them the opportunity to provide feedback by a certain date. Nursing and Midwifery staff can be consulted via the Nursing and Midwifery Clinical Guideline and Procedure Coordinator .

APPENDICES

1. Audit Tool – An audit tool is currently under development

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