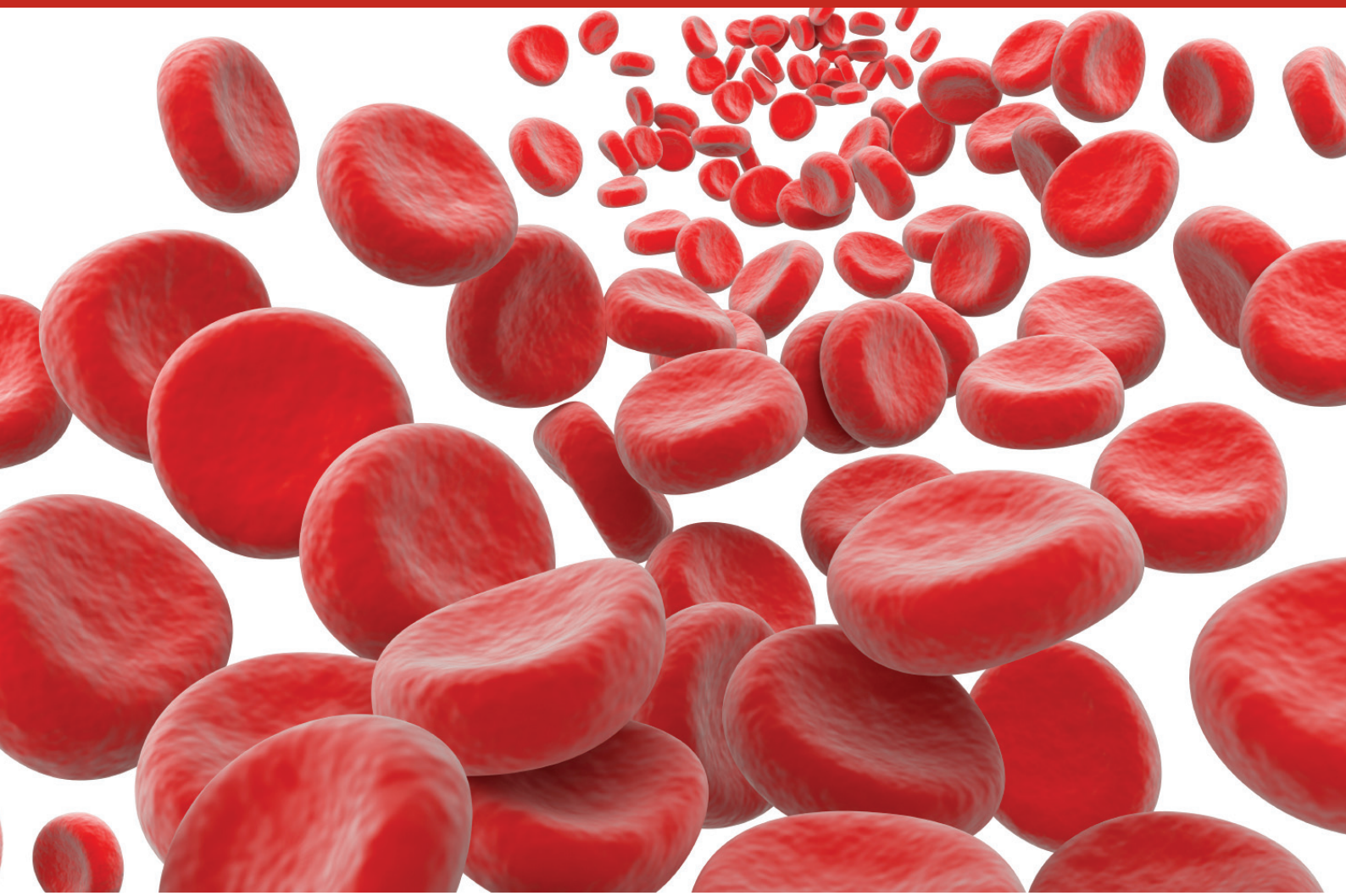
Audit of acute transfusion reaction management and knowledge 2013



Department of Health & Human Services

Australian Red Cross BLOOD SERVICE

State Government Victoria

Audit of acute transfusion reaction management and knowledge 2013

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Contents

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Abbreviations, acronyms and definitions

ACSQHC: Australian Commission on Safety and Quality in Health Care

AIHW: Australian Institute of Health and Welfare

ANZSBT: Australia and New Zealand Society of Blood Transfusion

AHMC: Australian Health Ministers' Conference

ATR: acute transfusion reaction

BP: blood pressure

BCSH: British Committee for Standards in Haematology

CEO: chief executive officer

CVP: central venous pressure

CXR: chest X-ray

FNHTR: febrile non-haemolytic transfusion reaction

HTC: hospital transfusion committee

hospital-wide policy: a stand-alone policy, included as part of hospital blood transfusion policy, or contained within an overall blood administration policy

ICU: intensive care unit

ID: identification

HLA: human leucocyte antigen

IV: intravenous

IVC: intravenous cannula

IVIg: intravenous immunoglobulin

MET: Medical emergency team

national standards (NSQHS): National Safety and Quality Hospital Standards

RCNA: Royal College of Nursing, Australia

SHOT: Serious Hazards of Transfusion

STIR: Serious Transfusion Incident Reporting

TACO: transfusion-associated circulatory overload

TAD: transfusion associated dyspnoea

the Blood Service: Australian Red Cross Blood Service

the department: Victorian Department of Health & Human Services

TRALI: transfusion-related acute lung injury

VHIMS: Victorian Health Incident Management system

Limitations

This audit includes the following limitations:

- the auditors are not formally instructed to collect the data in a consistent way
- Blood Matters relies on auditors following the audit tool instructions to ensure accuracy of data (Appendix 2).

The procedural management cases reported were selected at the auditors' discretion, and may have been influenced by their knowledge and understanding of transfusion reactions, along with the documentation and reporting at the time of the reaction. The level of reporting may be influenced by the reporting culture of the organisation.

Staff selection was also at the auditor's discretion; however examples of specialities that could be considered were included in the audit tool instructions.

Executive summary

This 2013 audit of acute transfusion reaction management and knowledge was undertaken to determine if health service policy, practice and knowledge were in line with national standards and guidelines.

We invited 146 health services (public and private) across Victoria, Tasmania, Northern Territory and the Australian Capital Territory to participate. Of those invited, 98 participated in at least one part.

All health services (n = 98) reported having a written policy/procedure for transfusion and a guideline for the management of a transfusion reaction. However, many of these policies/procedures did not include the level of detail required by the guidelines for administration (ANZSBT/RCNA 2011) and the requirements of the national standards (NSQHS). Areas for health services to review include details about documentation of the reaction and the review process for reported reactions.

Of the 97 health services that submitted data about procedural management, 98 per cent (n = 95) stated that blood products were transfused during the reporting period, and 56 per cent (n = 53) reported that at least one acute transfusion reaction occurred (a total of 286 events were reported). Forty-two health services reported that no transfusion reactions occurred during the audit period. However, there may be instances where reactions occurred but were either not recognised or not reported within the health service. Red cells were the component most commonly implicated in a transfusion reaction, reported in 73 per cent (n = 210) of reactions.

The ANZSBT/RCNA guidelines for administration recommend regular monitoring of the patient throughout the transfusion episode and indicate the minimum requirements for recording of vital signs. The audit results indicate that these minimum requirements are not always met, and this is an area for improvement. Reactions were reported to a medical officer in 97 per cent (n = 277) of cases and the advice included administering medications (61 per cent, n = 171), stopping transfusion (53 per cent, n = 149), observe the patient (52 per cent, n = 145) and take samples (44 per cent, n = 125). These results indicate education in relation to the basic management of transfusion reactions is an ongoing requirement.

A total of 2,092 staff responses were received for the clinical staff awareness survey with the majority (86 per cent, n = 1,806) from nurses and midwives. Only 34 per cent (n = 711) of all staff surveyed stated they had participated in the care of a patient who had experienced an acute transfusion reaction. Staff were generally able to accurately describe signs and symptoms that may indicate a transfusion reaction. However, there were issues with the management of reactions. First-line management is to stop the transfusion and maintain intravenous (IV) access. While 97 per cent (n = 2,029) of respondents would stop the transfusion, there appeared to be some ambiguity around maintaining IV access. These areas should be addressed in education for staff.

Summary of recommendations

Blood Matters recommendation: policy

All health services that transfuse patients should have a policy and process for recording and reviewing adverse events related to blood product transfusion, including near misses, that is consistent with ANZSBT/RCA guidelines and ACSQHC national standards.

The policy/procedure should include:

- the education, training and assessment of competency of staff to ensure recognition and appropriate response to adverse events
- the requirements for documentation of observations and the subsequent management of transfusion reactions
- the procedure for reporting adverse and near miss events in local incident management systems, state or national haemovigilance systems
- the mechanism for review of adverse events and near misses
- the requirements for reporting to the transfusion service provider and/or Blood Service or manufacturer.

Blood Matters recommendation: procedure

If a patient develops new symptoms or signs during a transfusion the following should occur:

- Stop the transfusion temporarily, and assess patient condition, severity of reaction and any required treatment. If transfusion is recommenced or slowed, take care to ensure the transfusion does not run longer than a total of four hours from time removed from storage.
- Maintain venous access. If the reaction is moderate to severe this may require changing the IV line to avoid transfusing any further blood product to the patient, which could worsen their condition.
- Assess the patient. Measure and record vital signs and temperature.
- Contact medical staff and pathology service to assess and treat the patient and perform investigations.
- Repeat all clerical and identity checks of the patient and blood pack. Any discrepancies should be immediately reported to the transfusion service provider.
- Treat symptoms as appropriate and as ordered by the medical officer.

At a minimum temperature, pulse, respiration rate and blood pressure must be measured and recorded during each transfusion as follows (check local policy/procedure):

- before the start of each individual blood component pack administered
- 15 minutes after commencing administration of each blood component pack
- on completion of each blood component pack.

In addition, vital signs must be measured and recorded if a transfusion reaction is recognised or suspected to assess the patient's clinical condition.

Systems should be in place to review and report transfusion reactions to appropriate internal and external providers.

The patient and, where appropriate, the carer should be informed of a transfusion reaction and its implications for future transfusions.

Blood Matters recommendation: knowledge

Education of staff should include, at a minimum:

- signs and symptoms of a transfusion reaction
- immediate management of acute transfusion reaction (ATR)
- reporting of ATR, both internally and to external services as required
- reporting of ATR to patients
- required laboratory investigations, including the need for a urine specimen to check for haemolysis.

Acute transfusion reaction checklist

Use the following checklist to support compliance with the requirements for recognising, reacting, reporting and reviewing acute transfusion reaction as outlined in the ANZSBT/RCNA guidelines, ACSQHC national standard and AHMC stewardship statement.

Element	Yes	No	WIP*
Does your health service have a policy for recording, reporting and reviewing transfusion reactions?			
Does the policy include the following: • education of clinical staff in the recognition and reporting of transfusion reactions • requirements for monitoring patients during the transfusion • a process for documenting the transfusion reaction • the initial steps to take in the management of a transfusion reaction: – stop the transfusion – maintain IV access – monitor and record vital signs – repeat all clerical checks of patient and blood pack – contact medical staff for management and/or investigation of the reaction. • the process for internal reporting of transfusion reactions, including: – to the pathology provider/blood bank – to the transfusion committee or equivalent – to the highest level of governance in the organisation • the mechanism for review of transfusion reactions • the process for external reporting of transfusion reactions where appropriate, including: – to the Blood Service – to recall product, investigate donors – to manufacturers – to ensure product integrity – to state or national haemovigilance systems, for example STIR. • the need to inform the patient and/or carer of a transfusion reaction that has occurred, and document that this has occurred • the recommendations for blood samples, urine samples or other testing required to investigate a reaction.			
Does education of staff include: • symptoms of a transfusion reaction • monitoring requirements for patients receiving a transfusion • immediate management of a reaction • reporting of ATR, both internally and to external services as required • reporting of ATR to patient/carer • laboratory investigations, including the need for a urine specimen to check for haemolysis.			

* Work in progress

Introduction

Blood and blood product transfusions are not without risk, and reactions or adverse events related to transfusion can produce significant morbidity and, much more rarely, mortality. Reactions can be unpredictable and they present in many varied ways.

Health service providers are expected to use blood and blood products responsibly and appropriately and there are many guiding documents outlining these expectations.

These include the Australian Health Ministers' Conference *Statement on national stewardship expectations for the supply of blood and blood products* (2010), the Australian Commission of Safety and Quality in Health Care (ACSQHC) *National Safety and Quality Healthcare standards* (2011) (the national standards) and the Australian and New Zealand Society of Blood Transfusion (ANZSBT) and Royal College of Nursing Australia (RCNA) *Guidelines for the administration of blood products* (2nd edition, 2011).

Section 8 of the ANZSBT/RCNA guidelines for administration state that it is essential to **recognise, react to and report** suspected adverse events.

This audit aims to improve the quality of care provided to patients by ensuring blood and blood product transfusion policies include the management of transfusion reactions. The audit confirms if policies are available, appropriate, understood and practised within hospitals.

Method

We invited 146 health services across Victoria, Tasmania, Northern Territory and the Australian Capital Territory that transfuse blood and blood products to participate in the three-part audit.

The three audit forms included (see Appendix1):

- **Policy** – audit of hospital-wide blood and blood product acute transfusion reaction policy
- **Procedural management** – retrospective audit of episodes of acute reaction management (maximum 10)
- **Survey** – survey of clinical staff awareness of transfusion reaction recognition and management (maximum 30).

The audit was conducted from 1 August 2013 to 14 November 2013.

The audit of **policy** was designed to determine if hospital policy for the management and reporting of transfusion reactions was in line with the *Guidelines for the Administration of Blood Products'* (ANZSBT/RCNA 2011). A definition of blood and blood products was outlined in the instruction sheets (Appendix 2).

The **procedural management** of acute transfusion reaction audit investigated the transfusion reaction management for up to 10 individual randomly selected retrospective episodes of acute transfusion reaction (ATR) that had occurred between August 2012 and November 2013.

The **survey** of clinical staff awareness aimed to determine clinical staff's understanding of the management of a blood or blood product transfusion reaction. Up to thirty staff whose scope of practice enables them to prepare, prescribe or administer a transfusion of blood or blood products were asked to participate. These staff could be medical, nursing, laboratory or perfusionists.

Health service transfusion committee or equivalent was asked to designate the staff to collect and report data. The auditors were not trained; however Blood Matters staff were available to provide guidance and clarification throughout the audit. Auditors entered data electronically through the Blood Matters website via an online survey tool on a SelectSurvey platform 5. Data was imported into a customised Microsoft Access database, before cleaning and analysis.

After the audit, each participating health service was sent a preliminary summary of their data for verification, and invited to correct any discrepancies or incomplete records.

Results and discussion

The following sections highlight aspects of the data reported, and discuss the results as they relate to the ACSQHC National Safety and Quality Health Service Standards (2011), and ANZSBT/RCNA, *Guidelines for the Administration of Blood Products* (2011). A full summary of the results is included in Appendix 3.

Policy

The audit of policy was designed to determine if health service policy and procedures for blood and blood product transfusion reaction management and reporting are in line with the *Guidelines for the Administration of Blood Products* 2nd edition, 2011(ANZSBT/RCNA) and meet the expectations of the stewardship statement and the requirements of the ACSQHC NSQHS standard 7: blood and blood products.

Policies that clearly outline all the important elements enable staff to understand the expectations of the health service in relation to patient care, and provide a basis from which to measure practice.

Of the 98 health services that submitted data for this section of the audit, all had written policies and procedures on blood transfusion practice, and all included a guideline for the management of a transfusion reaction.

However, when asked more specifically if these policies/procedures included statements relating to internal reporting, documentation and review of transfusion reactions, the results ranged from 69 per cent (n = 68) to 97 per cent (n = 95) (Table 1). Private hospitals included the requirement for internal reporting and documentation 100 per cent of the time, while public hospital policy included reporting 96 per cent (n = 74) and documentation 94 per cent (n = 72) respectively.

Table 1: Statements included in policy/procedure

	All hospitals n = 98 (%)	Private hospitals n = 21 (%)	Public hospitals n = 77 (%)
Internal hospital reporting of transfusion reactions (for example. Victorian Health Incident Management system (VHIMS) or Riskman)	95 (97)	21 (100)	74 (96)
Documentation of transfusion reactions	93 (95)	21 (100)	72 (94)
Reviewing transfusion reactions	68 (69)	16 (76)	52 (68)

The ANZSBT/RCNA guidelines section 8.2 and the ACSQHC national standard recommend health services' policy includes a mechanism of review. The importance of review should not be underestimated. It will determine if there are:

- ongoing risks for the patient if exposed to further transfusions
- risks that other products from the implicated donor could also cause potential reactions for other patients
- gaps in the health service processes.

Definitions of reaction types and management by type

National standard 7.1.1 states that blood and blood products policies and procedures and/or protocols should be consistent with national evidence-based guidelines, for pre-transfusion practices, prescribing and clinical use of blood and blood products.

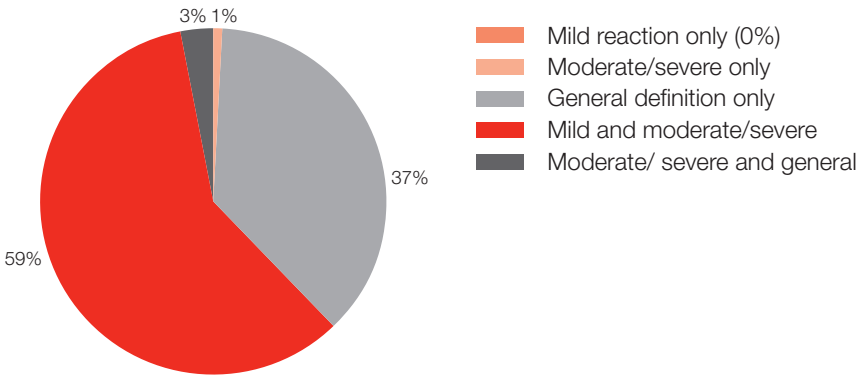
The ANZSBT/RCNA guideline outlines what could be considered signs of mild and moderate to severe transfusion reactions, including the steps to be taken to manage these reactions. Of the 98 health services, 63 per cent (n = 62) reported their policy/procedure included definitions of mild and moderate-to-severe reactions, 25 per cent (n = 25) included a general definition only, and seven per cent (n = 7) had no definition included.

Table 2 outlines the definitions as reported from health services and Figure 1 reports how the management of reactions is separated within these policies/procedures.

Table 2: Definition of reactions types as reported

Definition of reaction types included in policy/procedure	Count n = 98 (%)
Mild reaction only	0 (0)
Moderate/severe only	3 (3)
General definition only	25 (26)
No definition	7 (7)
Mild and moderate/severe	62 (63)
Moderate/severe and general	1 (1)

Figure 1: How the management of transfusion reactions is separated in policy/procedures



As transfusion reactions can be complex and require multifaceted reporting, it is recommended that health services have a policy/procedure in place that identifies the grades of transfusion-related adverse events that need to be reported to external services, for example the Blood Service. The policy should include how these are reported internally, including a timeframe for reporting, as per ACSQHC *NSQHS safety and quality improvement guide* (2012), section 7.6.3, p. 24.

Elements of transfusion reaction management included in policy/procedure

Health services were asked which of the following elements outlined in Table 3 were included in their policy/procedure. The elements of reaction management were taken from the ANZSBT/RCNA guideline section 8.1. As identified in Table 3 there are a number of areas where policy/procedures should be more specific.

The initial step in transfusion reaction management should be to stop the transfusion until a determination of the type and severity of the reaction has occurred. Where the reaction is deemed to be minor/mild it may then be appropriate to recommence the transfusion. In policies where management of minor/mild reactions are included, this step of stopping the transfusion was not clear, 91 per cent (n = 52) included stop the transfusion in their policy. There have been reports to Blood Matters' Serious Transfusion Incident Report (STIR) system of reactions that although initially mild, became more severe when the transfusion was not stopped and treatment was not given.

Clerical and identity (ID) check of the patient and blood pack is particularly important, to ensure the correct product is given to the correct patient. It is reported as a requirement in only 83 per cent (n = 33) of policies where the guideline for management is generalised for all reaction types. This increases to 98 per cent (n = 56) in policies with specific management of moderate to severe reactions, but only 88 per cent (n = 50) for management of mild reactions.

Both the Serious Hazards of Transfusion (SHOT) *Annual report 2012* <http://www.shotuk.org/wp-content/uploads/SHOT-Summary-20122.pdf> and the *STIR report 2009–2011* find that adverse events related to errors in patient identification are the most common cause of preventable harm to patients receiving transfusion. They recommend patient identification should be confirmed at each step of the transfusion process.

A patient experiencing a transfusion reaction should be assessed and the reaction investigated. All policies that dealt with moderate to severe reactions or were general included the requirement to either seek medical advice or contact the medical officer. In policies dealing with mild reactions only, 95 per cent (n = 54) included this requirement.

Of the health services with a general policy/procedure for management of transfusion reaction, only 85 per cent (n = 34) included monitoring and recording patient observations. Close observation of the patient during the transfusion is essential to identify reactions. Monitoring at the time of a reaction is necessary to assess the patient's clinical condition, to observe for signs of further deterioration or progression of the reaction, and to monitor the effects of treatment.

When management of reactions is separated into mild, and moderate to severe, the requirement to monitor and record patient observations is included more often. In previous Blood Matters audits against ANZSBT/RCNA guidelines (Blood Matters 2012), the requirement for pre-transfusion observations were stated in 99 per cent of policies, and post-transfusion observations in 95 per cent.

Reporting the transfusion reaction to the transfusion provider was a requirement in 93 per cent (n = 37) of the policy/procedures with general management guidelines, and in 98 per cent (n = 60) where the management was specified as moderate to severe. The requirement to report a mild reaction was 70 per cent (n = 40). It could be argued that depending on the type of reaction this may be appropriate, and it corresponds with the ANZSBT/RCNA guidelines of management of a mild reaction. For consistency it would be simpler if all reactions required reporting. This would provide health services the opportunity to review/audit management of all transfusion reactions, and respond to any issues.

The data showed considerable variation in the policy/procedures with regards to the provision of blood samples to the transfusion provider, and recording the volume and colour of urine passed. As noted previously a number of health service policies did not include reporting to the transfusion provider, and it could be assumed in these cases they would not provide samples for investigation. Blood samples required will depend on the type of reaction the patient is thought to be experiencing. This explains the variation in policy depending on the severity of the reaction, with mild reactions requiring less investigation and managed locally. Blood sample results could help determine the type of reaction, issues in the laboratory, and if further testing is required to provide safe transfusion for the patient in future.

The observation of urine volume and colour is recommended in the ANZSBT/RCNA guideline for moderate to severe reactions to look for evidence of haemoglobinuria. This action was included in 79 per cent (n = 48) of policies/procedures for moderate to severe management and in 55 per cent (n = 22) where general management guidelines were reported.

Table 3: Elements included in transfusion reaction policy/procedure by guideline

	Management guidelines of reaction type		
	Mild n = 57 (%)	Moderate to severe n = 61 (%)	General n = 40 (%)
Stop the transfusion	52 (91)	61 (100)	40 (100)
Seek medical advice	54 (95)	60 (98)	39 (98)
Maintain IV access	56 (98)	60 (98)	37 (93)
Check the right pack has been given to the right patient (clerical and ID check)	50 (88)	56 (92)	33 (83)
Monitor and record patient temperature	56 (98)	60 (98)	34 (85)
Monitor and record patient pulse	56 (98)	60 (98)	34 (85)
Monitor and record patient respirations	55 (96)	59 (97)	34 (85)
Monitor and record patient blood pressure	56 (98)	60 (98)	34 (85)
Contact medical officer	54 (95)	61 (100)	40 (100)
Report to transfusion service provider	40 (70)	60 (98)	37 (93)
Provide blood samples to pathology	30 (53)	57 (93)	30 (75)
Observe urine (volume and/or colour)	21 (37)	48 (79)	22 (55)

Reporting transfusion reactions and other related transfusion adverse events

Of the contributing health services, 89 per cent (n = 87) include a requirement for reporting the reaction to the transfusion service provider and/or the Australian Red Cross Blood Service (the Blood Service) or manufacturer in their policy/procedure. The audit did not seek to determine which specific provider was included in the policy/procedure.

The importance of documenting and reporting transfusion-related events is highlighted in both the ANZSBT/RCNA guideline and the ACSQHC national standards. Reporting to the Blood Service and/or manufacturers is important to help identify potential risks to other patients receiving product from the implicated donor, and to monitor the safety and quality of the products. In some instances the Blood Service may also be able to offer advice on management of the patient experiencing a reaction and source suitable products for future use if required.

Blood Matters recommendation: policy

All health services that transfuse patients should have a policy and process for recording and reviewing adverse events related to blood product transfusion, including near misses, that is consistent with ANZSBT/RCA guidelines and ACSQHC national standards.

The policy/procedure should include:

- the education, training and assessment of competency of staff to ensure recognition and appropriate response to adverse events
- the requirements for documentation of observations and the subsequent management of transfusion reactions
- the procedure for reporting adverse and near miss events in local incident management systems, and state or national haemovigilance systems
- the mechanism for review of adverse events and near misses
- the requirements for reporting to the transfusion service provider and/or Blood Service or manufacturer.

Procedural management

The purpose of this part of the audit was to determine if appropriate steps are taken once a transfusion reaction has been identified. The results below are presented in line with the ANZSBT/RCNA guidelines (2011) and the NSQHS recommendations for the management and reporting of adverse events and near miss events relating to blood product therapy.

Of the 97 health services submitting data to this section of the audit, 98 per cent (n = 95) stated that blood products were transfused during the reporting period. Of these health services, 56 per cent (n = 53) reported that at least one ATR occurred. Health services could report up to 10 events. The average was 5.4. In total 286 transfusion reactions were reported.

Adverse reactions relating to blood and blood products often go unrecognised and unreported (NSQHS, p15). Forty-two health services reported no acute transfusion reactions. This may be due to a number of factors: no acute transfusion reaction occurring, no reaction identified, poor documentation, or reaction identified but not reported.

Demographics

The majority of transfusion reactions occurred in three areas. These were medical wards (20 per cent, n = 56), surgical wards (19 per cent, n = 55) and oncology/haematology wards (19 per cent, n = 55). A small number of reactions (8 per cent, n = 24) were reported from areas including palliative care, rehabilitation and a number of day areas (Table 4). The majority of patients who experienced a transfusion reaction were patients with oncology/haematology conditions (36 per cent, n = 103) (Table 5).

Table 4: Location of transfusion that resulted in acute transfusion reaction

Location of transfusion	Count n = 286 (%)
Medical ward	56 (20)
Surgical ward	55 (19)
Oncology/haematology	55 (19)
ICU/critical care	26 (9)
Ambulatory care / day ward	21 (7)
Emergency department	20 (7)
Maternity/birthing suite	15 (5)
Theatre/perioperative	13 (5)
Other *	24 (8)

* Paediatric, offsite chemotherapy, cardiac unit, renal dialysis, bone marrow transplant, apheresis, palliative care, urgent care centre, small rural hospital, rehabilitation, orthopaedic unit.

Note: one missing data point. May not add to 100 per cent due to rounding.

Table 5: Patient specialty

Patient specialty	Count n = 286 (%)
Oncology/haematology (including bone marrow transplant)	103 (36)
Surgical	72 (25)
Medical	45 (16)
Obstetrics	21 (7)
Critical care	9 (3)
Paediatrics	4 (1)
Other **	32 (11)

** Neurology, renal, orthopaedics, gastroenterology, emergency, rehabilitation, palliative care, infectious diseases, gerontology.

Note: may not add to 100 per cent due to rounding.

Implicated blood components

Red blood cells were the most frequent (73 per cent, n = 210) blood component to be implicated in an acute transfusion reaction. However, 43 per cent (n = 123) of patients were known to have received other blood products prior to the identified reaction. The types of other blood products administered prior to the implicated transfusion were distributed in a similar proportion as shown in Table 6, with some small (2 per cent) instances of cryoprecipitate and clotting factors.

Table 6: Implicated blood component

Blood component	Count n = 286 (%)
Red blood cells	210 (73)
Platelets	32 (11)
Fresh frozen plasma	25 (9)
IVIg	16 (6)
Cryoprecipitate	0 (0)
Clotting factors	0 (0)
Other (Albumex, buffy coats)	3 (1)

Note: may not add to 100 per cent due to rounding.

Time to onset of reaction

The SHOT *Annual report 2012* (p. 114) reported the median time to onset of symptoms from the start of transfusion to be 45 minutes (range 1–270 minutes). Data from the audit indicates that in 45 per cent (n = 129) of reactions the onset of symptoms occurred within 60 minutes of the start of the transfusion (Table 7). In a small number of reactions the time to onset of symptoms was unknown. Time to onset should be part of the documentation of a transfusion reaction.

Table 7: Time from commencement of transfusion to reaction

Time frames	Count n = 286 (%)
Less than 30 minutes	84 (29)
Between 30 minutes and 60 minutes	45 (16)
Between 1 and 2 hours	66 (23)
Between 2 and 6 hours	69 (24)
Between 6 and 12 hours	8 (3)
Between 12 and 24 hours	4 (1)
Greater than 24 hours	2 (1)
Unknown	6 (2)

Note: two missing data points. May not add to 100 per cent due to rounding.

Observations and monitoring

Serious and life-threatening reactions can occur unpredictably and progress rapidly, reinforcing the need for close observation throughout the transfusion. The ANZSBT guidelines (section 6.11, 'Observations and monitoring') require as a minimum that temperature, pulse, respiration rate and blood pressure (BP) are measured and recorded prior to commencement of transfusion, 15 minutes after commencing and at completion. Table 8 shows which observations were reported.

Table 8: Observations recorded during the transfusion process

Timing	Temperature n = 286 (%)	Pulse n = 286 (%)	Respiration rate n = 286 (%)	Blood pressure n = 286 (%)	None n = 286 (%)
Baseline	265 (93)	278 (97)	272 (95)	275 (96)	9 (3)
15 minutes	224 (78)	234 (82)	229 (79)	229 (80)	34 (12)
At completion	217 (76)	225 (79)	218 (76)	220 (77)	27 (9)

Baseline observations are documented at a rate of (93–97 per cent, n = 265–278) depending on the observation, with three per cent (n = 9) of patients having no documented observations. Baseline observations provide an assessment of the patient pre-transfusion and comparison for during the transfusion to assist in determining if a reaction is occurring.

Fifteen-minute observations help to ensure the close monitoring of the patient during the period when more serious reactions may occur. In the audit a number of reactions had occurred within this 15-minute period and could explain why some observations were unavailable at this time. Most recorded observations include pulse and BP but temperature and respirations are frequently omitted at the 15-minute time point and at completion.

At completion observations were documented poorly. All transfusions, including those stopped early due to a reaction should have observations recorded. It is difficult to know if the lack of observations is due to staff not performing this task or missing documentation.

Reactions often involved more than one sign or symptom. Fever was the most commonly reported sign (45 per cent, n = 129). Table 9 describes the signs and symptoms documented.

Table 9: Signs and symptoms documented in the medical record

Sign/Symptom	Count ** n = 286 (%)	Other signs/ symptoms identified	Count ** n = 286 (%)
Fever	129 (45)	Tachycardia	43 (15)
Itching/rash	65 (23)	Temperature rise (less than 1.5° C)	32 (11)
Dyspnoea/difficulty breathing	56 (20)	Hypertension	17 (6)
Rigors	34 (12)	Facial oedema	7 (2)
Chills	31 (11)	Flushed	5 (2)
Hypotension	22 (8)	Pain at IV site	4 (1)
Respiratory wheeze	17 (6)	Sweats	3 (1)
Nausea/vomiting	17 (6)	Shaking	2 (1)
Chest pain/discomfort	14 (5)	Patient feels cold	2 (1)
Restlessness/anxiety	12 (4)	Other: Confusion, bilateral pulmonary infiltrates as seen on CXR, burning sensation to extremities, decreased CVP, dizziness, fluid overload, loss of consciousness, tingling of face, sneezing, and throat tightness.	
Headache	6 (2)		
Back pain	6 (2)		
Cardiac arrest	5 (2)		
Abdominal pain	4 (1)		
Red urine	1 (0)		
No symptoms	5 (2)		

** Total greater than 100 per cent as multiple signs and symptoms reported.

Management of transfusion reactions

The symptoms and signs reported in this audit have been placed into a number of clusters, relating to likely or possible types of acute transfusion reactions.

It is important to note that the initial advice given and management instituted by the medical officers, as described below is only as documented in the patients' histories, as captured in the audit data. Data collected do not allow further discovery or commentary on what advice or actions were taken for various clinical types of possible transfusion reactions, when it was not formally documented.

Once a reaction was identified, a medical officer was informed 97 per cent (n = 279) of the time, with 65 per cent (n = 180) contacted within 15 minutes. The medical officer was reported to see the patient in 86 per cent (n = 247) of the cases. Table 10 describes the advice given by the medical officer when the transfusion reaction was reported.

Table 10: Type of advice provided by the medical officer consulted by symptom clusters documented

	Fever and chills/rigors (but no rash, no dyspnoea)	Fever and Hypotension	Rash (but no dyspnoea)	Rash with dyspnoea, or airway obstruction or hypotension	Dyspnoea (but no rash and no hypotension)	Dyspnoea and hypertension	Dyspnoea and hypotension	Hypotension and/or tachycardia	Miscellanea
All patients	125 (%)	3 (%)	52 (%)	14 (%)	35(%)	5(%)	3 (%)	8 (%)	41 (%)
Patients who had medical advice provided	124 (99)	3 (100)	51 (98)	14 (100)	35 (100)	5 (100)	3 (100)	7 (88)	37 (90)
Stop the transfusion	79 (64)	1 (33)	22 (43)	8 (57)	17 (49)	3 (60)	2 (67)	5 (71)	12 (32)
Administer medications	66 (53)	1 (33)	40 (78)	13 (93)	28 (80)	2 (40)	2 (67)	1 (14)	18 (49)
Observe the patient	75 (60)	2 (67)	25 (49)	7 (50)	14 (40)	3 (60)	1 (33)	3 (43)	15 (41)
Take blood samples	68 (55)	0 (0)	11 (22)	8 (57)	17 (49)	2 (40)	2 (67)	3 (43)	14 (38)
Slow the rate	7 (6)	0 (0)	2 (4)	1 (7)	2 (6)	0 (0)	0 (0)	1 (14)	2 (5)
Continue as before	6 (5)	0 (0)	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (8)
Admit to higher level of care*	1 (1)	0 (0)	3 (6)	1 (7)	1 (3)	1 (20)	0 (0)	0 (0)	3 (8)
Chest X-ray*	4 (3)	0 (0)	0 (0)	0 (0)	3 (9)	0 (0)	0 (0)	0 (0)	3 (8)
Transfusion already stopped*	5 (4)	0 (0)	1 (2)	1 (7)	2 (6)	0 (0)	1 (33)	0 (0)	1 (3)
Urine volume/colour*	2 (2)	0 (0)	0 (0)	0 (0)	1 (3)	0 (0)	0 (0)	0 (0)	1 (3)
Ventilate*	0 (0)	0 (0)	0 (0)	1 (7)	1 (3)	1 (20)	0 (0)	0 (0)	0 (0)
Other	12 (10)	0 (0)	5 (10)	1 (7)	7 (20)	0 (0)	0 (0)	2 (29)	6 (16)
Unknown	2 (2)	0 (0)	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (8)

Denominator for percentage of type of advice provided is the number of patients who had the potential for medical advice (that is, either a medical officer was informed and/or the patient was seen by a medical officer)

* Advice included in the free text 'other'.

** Total greater than 100 per cent as multiple advice reported.

Stopping the transfusion

In the case of a suspected transfusion reaction it is important to stop the transfusion temporarily to assess the patient, determine the severity of the reaction and confirm the identity of the component and the patient.

In this audit the following actions were requested by the medical officer:

- stopping the transfusion completely, 53 per cent (n = 149)
- continue at slower rate, 5 per cent (n = 15)
- continue at same rate, 4 per cent (n = 10).

Three per cent (n = 9) of transfusions had already been stopped by ward-level staff.

In another question in the audit, it was reported that 71 per cent (n = 202) of transfusions were stopped, an additional 20 per cent (n = 57) had been completed. Eight per cent (n = 22) of transfusions reported as a suspected ATR were not stopped. The ANZSBT guidelines (8.1.1 and 8.1.2) recommend that to assist the immediate clinical management of a suspected transfusion reaction, the transfusion must be stopped, whether suspected to be mild, moderate or severe reaction.

Of the 202 transfusions stopped, 12 per cent (n = 24) had the transfusion re-started. In addition, 24 patients were known to have had a subsequent transfusion immediately following the reaction, with 9 per cent (n = 3) experiencing further symptoms.

Treatment

In 78 per cent (n = 222) of cases, it was indicated that some form of medication was administered to treat the reaction; 38 per cent (n = 85) used combinations of two or more drugs.

The most common medication administered for a reaction was paracetamol, 35 per cent (n = 99) as would be expected. Treatment differed depending on reaction type as indicated in Table 11 below.

Medical review of the documented management and treatment of the cluster groups as outlined in Table 10 and 11 is discussed below:

Fever and chills/rigors (no rash, no dyspnoea) (n=125)

This cluster may be seen in a septic transfusion reaction, in haemolysis and in febrile non-haemolytic transfusion reactions. In the audit 99 per cent (n = 124) of patients in this cluster were reviewed by a medical officer.

Sixty-four per cent (n = 79) documented advice to stop the transfusion. Only 55 per cent (n = 68) of these patients had samples/cultures taken, despite that a septic reaction is a differential diagnosis of this presentation. Also, in 5 per cent (n = 6) of cases hydrocortisone was administered, which may not strictly be indicated in the types of transfusion reactions presenting with this pattern of symptoms.

Fever and hypotension (n = 3)

This presentation during a transfusion could be potentially grave, and may be seen in an acute septic reaction or in a severe ABO haemolytic transfusion reaction. There were only three patients with this presentation in the audited cohort. All were reviewed by a medical officer. However, only one of these three patients had documentation that the transfusion was stopped. Given the potential diagnoses in this clinical setting, this is of concern.

Rash and no other symptoms (n = 52)

This is a feature usually of allergic reactions, without other serious manifestations. Of these episodes, 98 per cent (n = 51) were reviewed by a medical officer. In only 43 per cent (n = 22) of these cases did the documented medical advice include the instruction to stop the transfusion.

Seventy three per cent (n = 38) and 46 per cent (n = 24) of these patients received an antihistamine or hydrocortisone respectively. In 2 per cent (n = 1) of cases adrenaline was administered.

Rash with dyspnoea, or airway obstruction, or hypotension (n = 14)

This symptom pattern may be seen in severe allergic reactions, or anaphylaxis. All patients in this grouping were reviewed by a medical officer.

Only 57 per cent (n = 8) included documentation in the patient file of an instruction to stop the transfusion.

Patients in this clinical setting were administered antihistamines (79 per cent, n = 11), adrenaline (36 per cent, n = 5) and hydrocortisone (64 per cent, n = 9). Given that this presentation represents the most severe subset of likely allergic reactions, it is noteworthy that adrenaline was not used more frequently or as a standard treatment.

Dyspnoea alone (n = 35)

Dyspnoea may be seen in a wide range of types of acute transfusion reaction types, including: TACO, transfusion associated dyspnoea (TAD), TRALI, in reactions to bacterial contamination of a blood product, allergic reactions and sometimes in haemolytic reactions.

All these patients presenting with dyspnoea and no other symptoms had a medical officer review. In only 49 per cent (n = 17) of cases was there documentation of an instruction to stop the transfusion.

Interestingly, only 29 per cent (n = 10) of this group received a diuretic and despite the absence of other clinical features that might indicate that the patient's dyspnoea was secondary to an allergic aetiology, 23 per cent (n = 8) were prescribed an antihistamine, and 26 per cent (n = 9) given hydrocortisone.

Table 11: Types of medications administered by symptom clusters documented

	Fever and chills/rigors (but no rash, no dyspnoea)	Fever and Hypotension	Rash (but no dyspnoea)	Rash with dyspnoea, or airway obstruction or hypotension	Dyspnoea (but no rash and no hypotension)	Dyspnoea and hypertension	Dyspnoea and hypotension	Hypotension and/or tachycardia	Miscellanea
Total patients	125 (%)	3 (%)	52 (%)	14 (%)	35(%)	5(%)	3 (%)	8 (%)	41 (%)
Paracetamol	76 (61)	1 (33)	4 (8)	1 (7)	9 (26)	1 (20)	0 (0)	1 (13)	6 (15)
Antihistamine	4 (3)	0 (0)	38 (73)	11 (79)	8 (23)	0 (0)	0 (0)	1 (13)	4 (10)
Adrenaline	0 (0)	0 (0)	1 (2)	5 (36)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hydrocortisone	6 (5)	0 (0)	24 (46)	9 (64)	9 (26)	0 (0)	0 (0)	1 (13)	5 (12)
Diuretic	8 (6)	0 (0)	2 (4)	1 (7)	10 (29)	3 (60)	1 (33)	0 (0)	4 (10)
Antibiotics*	6 (5)	0 (0)	2 (4)	0 (0)	3 (9)	0 (0)	0 (0)	0 (0)	1 (2)
IV fluids	5 (4)	2 (67)	1 (2)	5 (36)	0 (0)	0 (0)	1 (33)	2 (25)	4 (10)
Bronchodilators*	2 (2)	0 (0)	0 (0)	1 (7)	7 (20)	0 (0)	0 (0)	0 (0)	2 (5)
Oxygen*	1 (1)	0 (0)	1 (2)	1 (7)	4 (11)	1 (20)	0 (0)	0 (0)	0 (0)
Antiemetic*	4 (3)	0 (0)	0 (0)	0 (0)	1 (3)	0 (0)	0 (0)	1 (13)	2 (5)
Pain relief*	2 (2)	0 (0)	0 (0)	0 (0)	0 (0)	1 (20)	0 (0)	0 (0)	5 (12)
Vasodilators*	1 (1)	0 (0)	0 (0)	0 (0)	1 (3)	1 (20)	0 (0)	0 (0)	5 (12)
Nothing	38 (30)	1 (33)	4 (8)	0 (0)	3 (9)	1 (20)	0 (0)	4 (50)	13 (32)

* Medication included in the free text 'other'

Adrenaline is the first-line drug for anaphylaxis, and antihistamine and hydrocortisone may have a role in shortening the anaphylactic reaction and preventing recurrence (SHOT 2011). Hydrocortisone and antihistamine are recommended as having a role in second-line treatment of anaphylaxis but outside this clinical indication, hydrocortisone does not have a clear role (SHOT 2012).

There are several studies of prevention/prophylaxis, including one large randomised controlled trial (Kennedy et al. 2008; Sanders et al. 2005; Wang et al. 2002; Patterson et al. 2000). None showed that premedication with an antihistamine (diphenhydramine), as widely practised in the United States, was effective whether or not patients had experienced a previous reaction. There are no studies that assess the use of steroids (BCSH 2012).

Antibiotics were administered to patients experiencing febrile reactions as well as a small number of patients in the other groups. It is difficult to know from the limited data if this was appropriate, but it would be if there were indications of possible sepsis. Appropriate antimicrobial stewardship should govern the use of antibiotics in all instances.

Diuretics were used in the treatment of a number of patients in the various symptom clusters, which may indicate these patients had several different symptoms occurring together. Surprisingly, not all patients who presented with symptoms indicating possible circulatory overload are recorded as being administered a diuretic.

A significant number of patients received no medications in the treatment of the transfusion reaction.

Appendix 6 outlines the recommended steps for managing a suspected transfusion reaction based on presented symptom clusters.

The audit provides support to promote better education and understanding in relation to the recognition and initial management of acute transfusion reactions. Nursing staff and medical staff (often more junior medical staff) must react to acute symptoms and signs developing in patients receiving a transfusion. At initial presentation, with the exception of allergic and anaphylactic reactions, usually the specific diagnosis of the reaction type is unclear. Thus, initial management should attend to relevant significant differential diagnoses. Indeed this principal is a key recommendation of the recent British Committee for Standards in Haematology guideline, which states that ‘initial treatment of ATR is not dependent on classification, but should be directed by symptoms and signs. Treatment of severe reactions should not be delayed until the results of investigations are available’ (BCSH 2012).

The National Haemovigilance Advisory Committee of the National Blood Authority, in partnership with the Australian Red Cross Blood Service and the Australian and New Zealand Society of Blood Transfusion, is supporting the development of local guidelines and education material, targeted at junior medical staff, for the initial management of acute transfusion reactions.

Investigations

The purpose of investigations is to contribute to patient management, for example, by excluding other non-transfusion related causes for the patient’s symptoms/signs, or by guiding management of further transfusions by identifying a likely cause for the present reaction. Specific blood and/or urine specimens can assist with this. This audit looked at whether blood and/or urine samples were taken as part of investigating the reaction.

The ANZSBT guidelines (recommendation 8.1) outline the management of transfusion reactions, including the investigations that should be undertaken. In the case of a moderate to severe transfusion reaction, the volume and colour of any urine should be observed and recorded, for the purpose of identifying the evidence of haemoglobinuria. Urine samples were known to have been taken in 29 per cent (n = 82) of the reactions reported.

In addition, the recommendation states that following the report of a reaction to the transfusion service provider, it may be advised that further blood or urine samples may be needed from the patient. Blood samples were known to have been taken in 70 per cent (n = 199) of cases audited.

In all moderate to severe transfusion reactions, standard investigations, including full blood count, renal and liver function tests and assessment of the urine for haemoglobin should be performed (BCSH 2012).

Reporting

A number of different reporting requirements are addressed in national standard 7, and supported by the ANZSBT guidelines (8.2). Reporting of adverse reactions is important to develop assessment of risks and implementation of risk mitigation strategies.

Action 7.3.1 requires that adverse blood-related incidents are included in regular incident reports, with recommendations that they are captured in a local management system (for example VHIMS/ Riskman) and routinely reported to the hospital transfusion governance group (or equivalent). In addition, it is recommended that hospitals participate in state or national haemovigilance activities (action 7.3.3).

Action 7.6.3 requires a hospital to report adverse events to the pathology service provider, the Blood Service, or the product manufacturer depending on the reaction and blood product type. Reporting to these organisations is important as adverse transfusion events may assist in the identification of other patients at risk because of patient identity error (for example ABO-incompatible transfusion to a second patient), because other blood components collected from the implicated donor may also be affected (for example in cases of bacterially contaminated blood components to trace blood products), or because it may assist in monitoring safety and quality of a product (for example, test the donor, TRALI).

The types and level of reporting in line with standard 7 are outlined in Table12.

Table 12: Types and level of reporting in line with standard 7

Standard 7 action	Where reaction reported to	Count (%)
7.3.1	Local incident reporting	236 (83)
	– hospital transfusion committee	211 (74)
	– either local report and/or HTC	258 (90)
7.3.3	Serious transfusion incident reporting	61 (21)
7.6.3	Australian Red Cross Blood Service	21 (7)

Overall, nine per cent (n = 25) of adverse events audited were not reported to any authority to allow for potential assessment of and implementation of risk mitigation strategies.

Communicating with patients and carers

Twenty-two per cent (n = 63) of the patients involved in an acute transfusion reaction were known to be informed and provided with information about the reaction.

The national standards include a number of criteria around communication. These include:

- Standard 9: Communicating with patients and carers – 9.7 'Ensuring patients, families and carers are informed about, and are supported so that they can participate in, recognition and response systems and processes'
- Standard 6: Clinical handover – 6.5.1 'Mechanism to involve a patient and, where relevant, their carer in clinical handover (including providing information about clinical reactions/ adverse events) are in use'
- Standard 7: Blood and blood products – 7.9.2 'Plans for care that include the use of blood and blood products are developed in partnership with patients and carers'.

As this was a retrospective audit the number of patients known to have been informed of the transfusion reaction may be less than the number of patients actually informed. However there is room for improvement and a need for clearer documentation of these discussions if they are taking place.

Blood Matters recommendation:

If a patient develops new symptoms or signs during a transfusion the following should occur:

- Stop the transfusion temporarily, and assess patient condition, severity of reaction and any required treatment. Take care to ensure the transfusion does not run longer than a total of four hours from time removed from storage.
- Maintain venous access. If the reaction is moderate to severe this may require changing the line to avoid transfusing any further blood product to the patient which could make their condition worse.
- Assess the patient. Measure and record vital signs.
- Contact medical staff and pathology service to assess and treat the patient and perform investigations.
- Repeat all clerical and identity checks of the patient and blood pack. Any discrepancies should be immediately reported to the transfusion service provider.
- Treat symptoms as appropriate and as ordered by the medical officer.

At a minimum the vital signs of temperature, pulse, respiration rate and blood pressure must be measured and recorded during each transfusion as follows (check local policy/procedure):

- before the start of each individual blood component pack administered
- 15 minutes after the commencing administration of each blood component pack
- when administration of each blood component pack is completed.

In addition vital signs must be measured and recorded if a transfusion reaction is recognised or suspected to assess the patient clinical condition.

Systems should be in place to review and report transfusion reactions to appropriate internal and external providers as appropriate.

The patient and carer should be informed of a transfusion reaction and its implications for future transfusions.

Clinical staff awareness survey

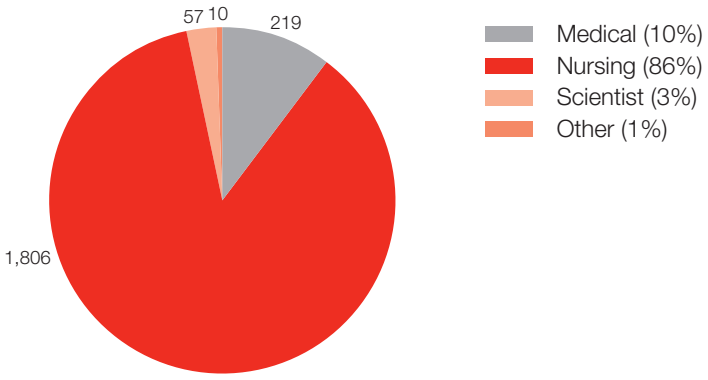
The ANZSBT/RCNA administration guideline states it is essential to 'recognise, react and report' suspected adverse events. The aim of the survey was to determine the level of ATR knowledge and management of clinical staff who are involved in transfusion practice (that is, preparing, prescribing, and administering products). The audit instructions supplied by Blood Matters included examples of staff specialties that could be surveyed, such as medical, nursing, laboratory or perfusionist staff.

Ninety-eight health services provided responses from staff whose scope of practice enables them to prepare, prescribe, or administer blood and blood products.

Clinical role and years of experience

A total of 2,092 responses were received, with the majority from nurses and midwives (86 per cent, n = 1,806). Figure 2 outlines the proportion of surveys received from each clinical role.

Figure 2: Responses by clinical role



The level of experience of the respondents varied from less than one year to 20 plus years (Table 13). Nursing and scientific staff tended to have a greater proportion of respondents with greater than 10 years' experience (61 per cent, n = 1,107 and 67 per cent, n = 38 respectively).

Table 13: Count of respondents by clinical role and years of experience

		Years of experience				
Clinical role	Total	1 year (%)	1–5 years (%)	5–10 years (%)	10–20 years (%)	20+ years (%)
Nursing	1806	100 (6)	311 (17)	288 (16)	423 (23)	684 (38)
Medical	219	28 (13)	69 (32)	44 (20)	40 (18)	38 (17)
Scientist	57	2 (4)	4 (7)	13 (23)	14 (25)	24 (42)
Other	10	1 (10)	1 (10)	3 (30)	2 (20)	1 (10)

Note: Two respondents in 'other' clinical role did not provide years of experience.

The 57 scientists participating in the survey reported from 19 health services. The roles classified as other include staff working in education (two), quality (two), haemodialysis, nursing resource coordinator, and perioperative, with three participants not indicating their role.

Only 34 per cent (n = 713) of the respondents reported having participated in the care of a patient who had experienced an ATR.

Frequency of ATRs

Transfusion risks in Australia range from 1:100 to 1:1,000,000; with the most common being minor allergic reaction (1:100). The range of responses is indicative of the potential variation in reaction rates depending on the specific type of reaction. The only incorrect response is 1:10 and this was only reported by four per cent (n = 79) of participants. The majority of survey participants (65 per cent, n = 1,356) were able to accurately indicate how often transfusion reactions occurs in Australia (Table 14).

Table 14: Knowledge of frequency of transfusion reactions

	Australian transfusion reaction ratio				
	1:10 (%)	1:100 (%)	1:1,000 (%)	1:10,000 (%)	Unsure (%)
Participant response (%)	79 (4)	519 (25)	457 (22)	377 (18)	657 (31)

Note: three respondents did not answer.

Symptoms associated with ATRs

It is important that staff are able to recognise the signs and symptoms of an ATR, so appropriate and timely action can be taken. The audit required respondents to identify in an open-ended question four symptoms (or signs).

Sixty-six per cent (n = 1,381) were able to accurately name four different symptoms (average correct response across all participants was a score of 3.6 out of a maximum of four). The most common symptom included by the respondents was fever (90 per cent, n = 1,889), as shown in Table 15.

Table 15: Signs and symptoms of ATR as identified by respondents

Signs and symptoms	Number of responses (%)	Signs and symptoms	Number of responses (%)
Fever	1,889 (90)	Dread	76 (4)
Localised rash/ pruritus/urticia	1,320 (63)	Flushing	74 (4)
Dyspnoea	974 (47)	Respiratory wheeze	57 (3)
Tachycardia	895 (43)	Haemoglobinuria,	57 (3)
Hypotension	652 (31)	General muscle/ joint pain	35 (2)
Rigors	243 (12)	Pulmonary oedema	27 (1)
Nausea or vomiting	184 (9)	Hypoxaemia	23 (1)
Chills	172 (8)	Renal failure/oliguria	15 (1)
Chest pain/discomfort	171 (8)	Unexplained/abnormal bleeding	13 (1)
Back pain	165 (8)	Bronchospasm, laryngospasm	8 (0.4)
Hypertension	151 (7)	Stridor	4 (0.2)
Pain at IV site	113 (5)	Diarrhoea	2 (0.1)
Restlessness	96 (5)	Cyanosis	2 (0.1)
Tachypnoea	91 (4)		

Awareness of symptoms to look for in a transfusion reaction varied depending on clinical role and number of years of experience (Table 16).

Table 16: Correct symptoms (score out of a maximum of 4) identified by respondents by clinical role and years of experience

	Years of experience					
Clinical role	All years	1 year	1–5 years	5–10 years	10–20 years	20+ years
Nursing	3.56	3.34	3.46	3.58	3.52	3.66
Medical	3.47	3.18	3.45	3.57	3.53	3.53
Scientist	3.63	3.50	3.25	3.77	3.36	3.79
Other	3.50	4.00	4.00	3.33	4.00	2.00
All roles	3.55	3.31	3.45	3.58	3.52	3.66

A detailed outline of the method and analysis of the open-ended responses can be found in Appendix 5.

First-line management of an ATR

Once an ATR has been recognised, it is important to react. First-line of management should always be stopping the transfusion.

Appropriate actions (developed using the *ANZSBT/RCNA guidelines* 2011) include the following:

- Stop the transfusion.
- Maintain IV access.
- Assess, monitor and record patient temperature, pulse, respirations and blood pressure.
- Repeat all clerical and identity checks of the patient and the blood pack.
- Contact medical staff and pathology service (or others as per hospital protocol).
- Treat symptoms as appropriate.

Staff were asked what would be their first line of management of a patient experiencing a reaction to a blood or blood product. The intent of the question was for respondents to identify 'stop transfusion'.

Stopping the transfusion is an important action in the management of ATR and 97 per cent (n = 2,034) of respondents did identify this. The rate of response, not surprisingly, varied depending on clinical role (Table 17).

Table 17: First line management of a transfusion reaction

Reaction response					
Clinical role	Stop transfusion (%)	Maintain IV access (%)	Monitor patient (%)	Patient ID check (%)	Contact medical staff (%)
Nursing	1,767 (98)	331 (18)	908 (50)	144 (8)	1,183 (66)
Medical	207 (95)	26 (12)	86 (39)	22 (10)	30 (14)
Scientist	50 (88)	4 (7)	12 (21)	6 (11)	17 (30)
Other	10 (100)	1 (10)	5 (50)	1 (10)	7 (70)
All roles	2,034 (97)	362 (17)	1,011 (48)	173 (8)	1,237 (59)

Three per cent (n = 58) of the participants did not include 'stop transfusion' as a response. This included five per cent (n = 12) of medical responses, two per cent (n = 39) nursing responses and 12 per cent (n = 7) scientist responses.

Five nurses indicated to slow the transfusion which was consistent with information available on Blood Service website <www.transfusion.com.au/adverse_events/management_steps> for mild to moderate transfusion reaction at the time of the audit. The website was updated 24 July 2014 to state unambiguously that all transfusions should be stopped immediately upon recognising a reaction).

Any hospital policies that state 'slow transfusion' for any reaction type (including mild) should be updated.

Ten per cent (n = 200) of the responses included 'Medical Emergency Team (MET) call'. At health services that have MET call available, this may be the first line of management for the patients with an altered medical situation, where MET call criteria are met and would be an appropriate way to contact medical staff.

The ACSQHC (2010) consensus statement includes within the guiding principles an escalation protocol which sets out the organisational responses required when dealing with different levels of abnormal physiological measurements and observations. This response may include appropriate modifications to nursing care, increased monitoring, review by medical officer or team or calling for emergency assistance from intensive care or other specialist teams.

The guidance documents recommends that the escalation protocol should allow for the capacity to escalate care based only on the concern of the clinician at the bedside, in the absence of other documented abnormal physiological measurements ('staff member worried' criterion).

The introduction of national standard 9 'Recognising and responding to clinical deterioration in acute health care', along with the track and trigger observation charts, in 2012 appear to have improved staff awareness of recognition and reporting of alterations in patient condition.

Many survey responses indicated: treat patient symptoms, support the patient hemodynamically, and administer oxygen. These may be appropriate but are not necessarily the first-line management.

Tests associated with an ATR

The survey included questions to test the knowledge of staff relating to investigation of suspected bacterial contamination.

Eighty-two per cent (n = 1,714) of respondents identified the need to take cultures from the product involved, however only 78 per cent (n = 1,630) identified the need to take patient blood cultures. Twenty-one per cent (n = 432) also indicated a urine sample would be required. This may have been checked as part of routine septic work up in a febrile patient or to observe for haemoglobinuria in a patient who is having a serious reaction to a blood product. From the results it is unclear what the indication was, but either reason would be valid.

A percentage of staff also indicated they would perform a chest X-ray, again this may be as part of a septic workup in a febrile patient or if TACO or TRALI was suspected.

Table 18: Survey responses by clinical role to identify routine tests to identify bacterial contamination

	Tests options provided as routine in a suspected bacterial contamination					
	Correct responses		Less suitable responses			
Clinical role	Patient blood cultures (%)	Product pack cultures (%)	Patient blood samples (%)	Chest X-ray (%)	Urine sample (%)	Unknown (%)
Nursing	1,396 (77)	1,465 (81)	1105 (61)	84 (5)	363 (20)	51 (3)
Medical	179 (82)	189 (86)	132 (60)	34 (16)	48 (22)	10 (5)
Scientist	45 (79)	51 (89)	28 (49)	3 (5)	18 (32)	0 (0)
Other	10 (100)	9 (90)	5 (50)	2 (20)	3 (30)	0 (0)
All roles	1,630 (78)	1,714 (82)	1,270 (61)	123 (6)	432 (21)	61 (3)

Survey respondents also demonstrated a good knowledge and awareness of how to describe haemolysis. As shown in Table 19, scientists were more able to identify the correct description (98 per cent, n = 56).

Table 19: Responses regarding description of haemolysis

	Responses provided in multi-choice question for defining haemolysis				
	Correct response	Incorrect responses			
Clinical role	Damage of the red cells, releasing haemoglobin (%)	Increase in red cells in blood (%)	Disintegration of white cell membrane (%)	None of the above (%)	Unsure (%)
Nursing	1,402 (78)	67 (4)	79 (4)	65 (4)	190 (11)
Medical	193 (88)	1 (0.5)	7 (3)	10 (5)	8 (4)
Scientist	56 (98)	0 (0)	0 (0)	0 (0)	1 (2)
Other	8 (80)	0 (0)	1 (10)	1 (10)	0 (0)
All roles	1,659 (79)	68 (3)	87 (4)	76 (4)	199 (10)

Reporting associated with an ATR

The importance of reporting ATRs has been outlined previously in the report and to confirm if this is commonly understood questions were included in the survey. Staff were asked 'who needs to be informed of a presumed reaction, at the time of the reaction?' They were given six responses, and were able to select multiple responses. The results are outlined in Table 20.

Table 20: Survey responses by clinical role to identify who to inform at the time of reaction

	Responses provided in multi-choice question for who needs to be informed of a presumed reaction, at the time of the reaction					
	Correct responses				Less suitable responses	
Clinical role	Medical (%)	Pathology (%)	Nurse in charge (%)	Patient (%)	Haematologist (%)	CEO (%)
Nursing	1,706 (94)	1,303 (72)	1,686 (93)	1355 (75)	618 (34)	74 (4)
Medical	209 (95)	179 (82)	179 (82)	162 (74)	105 (48)	8 (4)
Scientist	53 (93)	51 (89)	40 (70)	15 (26)	27 (47)	1 (2)
Other	10 (100)	8 (80)	10 (100)	10 (100)	2 (20)	1 (10)
All roles	1,706 (94)	1,303 (72)	1,686 (93)	1,355 (75)	618 (34)	74 (4)

The responses considered correct are medical, pathology, nurse in charge and patient. While it would be appropriate to contact the haematologist especially if they are managing the patient, many health services may not have a haematologist on staff, so for the purposes of this audit, contacting the medical officer would be a more appropriate response. From the data reported we are unable to determine if these responses are reflective of their individual health services policy. The chief executive officer (CEO) may need to be informed of serious reactions that are sentinel events or require a root cause analysis, but this is not necessarily something that is done at the time of the reaction.

It is pleasing to see 94 per cent (n = 1,706) responded that medical staff needed to be notified of a presumed reaction at the time of the reaction. Pathology was included in 72 per cent (n = 1,303) of nursing responses and 82 per cent (n = 179) of medical responses. Awareness of a transfusion reaction allows the pathology provider the opportunity to assess the blood product needs of the patient and ensure all special requirements were met and to provide advice on potential investigations required.

Encouragingly, 75 per cent (n = 1,355) responded the patient should be notified. This is in contrast to the procedural part of the audit in which only 22 per cent (n = 63) of actual reactions were known to have been reported to the patient. As awareness of the national standards patient involvement improves, this may further increase.

To further explore staff understanding of the reason reporting is so important, staff were asked why serious acute reactions are reported to the Blood Service. The results are outlined in Table 21. The majority of respondents could correctly identify why serious acute reactions are reported to the Blood Service.

Table 21: Survey responses by clinical role to identify why serious ATRs are reported to the Blood Service

	Responses provided in multi-choice question to identify why ATRs should be reported to the Blood Service				
	Correct responses				
Clinical role	Trace blood products (%)	To test the donor (%)	Offer medical advice (%)	Provide more products (%)	Reporting is not required (%)
Nursing	1,739 (96)	832 (46)	628 (35)	141 (8)	141 (8)
Medical	213 (97)	101 (46)	121 (55)	21 (10)	21 (10)
Scientist	53 (93)	31 (54)	23 (40)	2 (4)	2 (4)
Other	10 (100)	4 (40)	6 (60)	1 (10)	1 (10)
All roles	2,015 (96)	968 (46)	778 (37)	165 (8)	165 (8)

The steps for the management of a suspected transfusion reaction are available on the Blood Service's transfusion website: <www.transfusion.com.au/adverse_events/management_steps>

The Blood Service acknowledges that this is a guide, and health service policies and guidelines must be followed. Health services should inform the Blood Service of any adverse reaction that may:

- relate to the quality of the product which will prompt the Blood Service to recall any associated products, for example: transfusion associated sepsis, transfusion transmissible infection, severe allergic reactions (anaphylaxis) and TRALI
- cause an alternative product to be requested for example HLA matched platelets in a patient with antibodies and poor platelet count increments.

Blood Matters recommendation:

Education of staff should include, at a minimum:

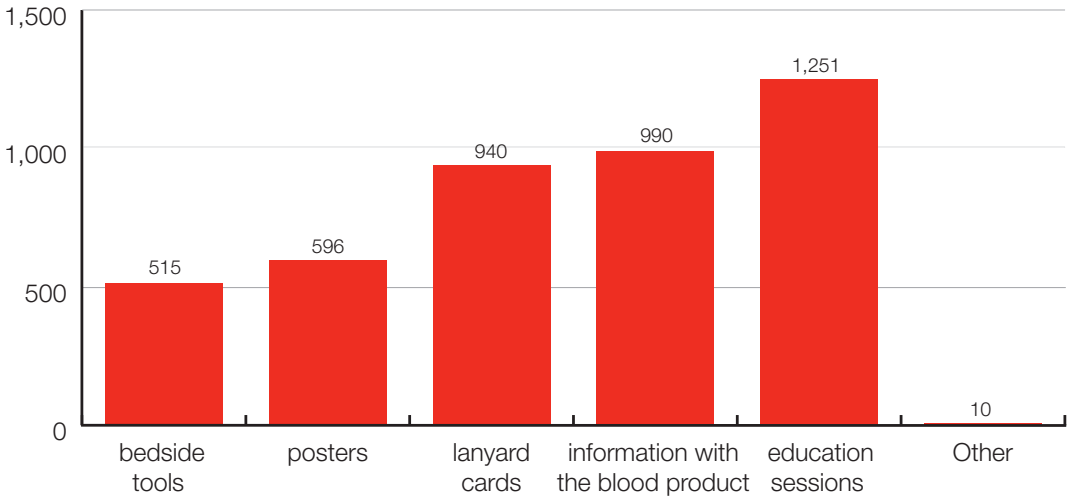
- symptoms of a transfusion reaction
- immediate management
- reporting of ATR, both internally and to external services as required
- reporting of ATR to patients
- laboratory investigations, including the need for a urine specimen to check for haemolysis.

Information to assist management of an ATR

Participants were asked what other information about managing reactions they would like, or need to assist with managing them. Figure 3 summarises the preferred suggestions. The other category included suggestions for smartphone apps, a 24-hour information hotline, management of ATR to be included in policies and medical education sessions.

This feedback provides useful information to all those involved in providing information and tools to support transfusion. It is interesting that 47 per cent (n = 990) would like information to be included with the blood product.

Figure 3: Suggested educational tools



The Blood Matters program was approached by some health services to provide the expected responses to the staff knowledge survey to enable them to use it as an education tool. In response to this the program and the STIR Expert Group developed a response sheets, and this was forwarded to participating health services with their interim results. It is available in Appendix 6.

Resources

The transfusion website of the Blood Service
http://www.transfusion.com.au/adverse_events/management_steps

Blood Matters website
http://www.health.vic.gov.au/bloodmatters/

British Committee for Standards in Haematology, *Guideline on the investigation and management of acute transfusion reactions*
http://www.bcshguidelines.com/documents/ATR_final_version.pdf

Australian and New Zealand Society of Blood Transfusion Ltd/ Royal College of Nursing Australia *Guidelines for the Administration of Blood Products*, 2nd edition, 2011
http://www.anzsbt.org.au/publications/documents/ANZSBT_Guidelines_Administration_Blood_Products_2ndEd_Dec_2011_Plain_Tables.pdf

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Appendix 1

Audit of acute transfusion reaction knowledge and management

Audit of hospital-wide policy and procedure(s) for blood and blood product acute transfusion reactions

This audit measures your hospital policy and procedure for blood and blood product transfusion reactions against ANZSBT Guidelines for the Administration of Blood Products 2nd Ed, December 2011, Section 8

Please note that when entering data electronically the number sequencing may vary depending on your response. Please check that questions and responses align.

*Questions with * must contain an answer.*

1. **Does your hospital have written policies/procedures on blood transfusion practice?***
   (If no, go to Qu 8)
   ☐ yes ☐ no

2. **Does your hospital policy/procedure include a statement regarding:**

internal hospital reporting of transfusion reactions (e.g. Riskman)	☐ yes	☐ no
documentation of transfusion reactions	☐ yes	☐ no
reviewing of transfusion reactions (e.g. root cause analysis, hospital transfusion committee)	☐ yes	☐ no

3. **Does your hospital policy/procedure include guidelines for management of a transfusion reaction?***
   ☐ yes ☐ no (If no, go to Qu 7)

4. **Does your hospital policy/procedure include a definition of transfusion reaction:***
   Select at least 1 response and no more than 2 responses.
   ☐ mild reaction ☐ moderate to severe ☐ general definition only
   ☐ no definition included

5. **Are the guidelines for management separated into:***
   Select at least 1 response and no more than 2 responses.
   ☐ mild reaction ☐ moderate to severe reaction ☐ general guidelines, no differentiation

6. **Does the written management of transfusion reaction include:***

	mild reaction policy	moderate to severe	general guidelines
stop the transfusion	☐	☐	☐
seek medical advice	☐	☐	☐
maintain IV access	☐	☐	☐
check the right pack has been given to the right patient (clerical and ID check)	☐	☐	☐
monitor and record patient temperature	☐	☐	☐
monitor and record patient pulse	☐	☐	☐
monitor and record patient respirations	☐	☐	☐
monitor and record patient blood pressure	☐	☐	☐
contact medical officer	☐	☐	☐
report to transfusion service provider	☐	☐	☐
provide blood samples to pathology	☐	☐	☐
observe urine (volume and/or colour)	☐	☐	☐
does not include any of the above	☐	☐	☐

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7. **Does your hospital policy/procedure include requirements for reporting to the transfusion service provider and/or Australian Red Cross Blood Service or manufacturer?*** (e.g. suspected reaction, adverse event etc, per guideline 8.2)

   ☐ yes ☐ no

8. **Other comments**

   Do you wish to add any comments about the audit just completed?

_____

_____

_____

Thank you for your involvement.

Audit of procedural management of acute transfusion reactions

Please include retrospective episodes of acute reaction management that have occurred in the previous 12 months (from August 2012 – present), with a maximum of 10 per health service.

Reactions that have occurred may be identified through incident reporting system, the hospital quality department, pathology service or transfusion service. Alternatively, reactions may be picked up through auditing of documentation. Blood Matters has developed a data collection tool that can assist with this auditing that can be found on the Blood Matters website.

Please note that when entering data electronically the number sequencing may vary depending on your response. Please check that questions and responses align.

*Questions with * must contain an answer.*

1. **Did your hospital transfuse any blood or blood products during the reporting period?***

   ☐ yes ☐ no

2. **Did any of the transfusions result in an acute reaction?***

   ☐ yes ☐ no (go to Qu29) ☐ cannot identify (go to Qu29)

Continue only if an acute reaction was identified within your hospital

3. **Transfusion reaction audit number***
   (Please number your audits sequentially from 1 – 10)

4. **Date of transfusion***
   The value must be from August 2012.

   (DD / MM / YYYY)

5. **Location of transfusion***

   ☐ surgical ward ☐ medical ward ☐ oncology/haematology
   ☐ maternity/birthing suite ☐ ICU/critical care ☐ theatre/perioperative
   ☐ ambulatory care/day ward ☐ emergency department
   ☐ other, please specify

6. **Patient clinical specialty***

   ☐ surgical ☐ medical ☐ oncology/haematology
   ☐ obstetrics ☐ paediatrics ☐ critical care
   ☐ other, please specify

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7. **Type of blood component transfused that is implicated in the reaction***

- ☐ red blood cells
- ☐ platelets
- ☐ fresh frozen plasma (FFP)
- ☐ cryoprecipitate
- ☐ IVIg
- ☐ clotting factors
- ☐ other, please specify

8. **Did the patient receive other blood products, prior to the reaction?***

- ☐ yes
- ☐ no (go to Qu10)
- ☐ unknown (go to Qu10)

9. **If yes, indicate the other blood products administered***
(may answer more than one)

- ☐ red blood cells
- ☐ platelets
- ☐ fresh frozen plasma (FFP)
- ☐ cryoprecipitate
- ☐ IVIg
- ☐ clotting factors
- ☐ other, please specify

10. **If documented, what was the time frame from commencement of transfusion to reaction?***

- ☐ < 30 minutes
- ☐ < 1 hour
- ☐ 1 – 2 hours
- ☐ 2 – 6 hours
- ☐ 6 – 12 hours
- ☐ 12 – 24 hours
- ☐ > 24 hours
- ☐ unknown

11. **Please indicate which observations were recorded for the transfusion episode at?***

	Pulse	Blood pressure	Temperature	Respiratory rate	None
Baseline	☐	☐	☐	☐	☐
At 15 minutes after commencement	☐	☐	☐	☐	☐
At completion	☐	☐	☐	☐	☐

12. **Indicate the signs and symptoms of the reaction (more than one maybe ticked)***

- ☐ fever (rise > 1.5 C)
- ☐ chills
- ☐ rigors
- ☐ chest pain/discomfort
- ☐ headache
- ☐ back pain
- ☐ nausea and/or vomiting
- ☐ itching/rash
- ☐ respiratory wheeze
- ☐ dyspnoea/difficulty breathing
- ☐ abdominal pain
- ☐ red urine
- ☐ restlessness/anxiety
- ☐ hypotension
- ☐ cardiac arrest
- ☐ No symptoms
- ☐ other, please specify

13. **Was a doctor informed***

- ☐ yes
- ☐ no
- ☐ unknown

14. **If known, how soon after the reaction,**

- ☐ < 15 minutes
- ☐ 15 – 30 minutes
- ☐ 30 – 60 minutes
- ☐ > 60 minutes
- ☐ unknown

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15. **Did a doctor see the patient?***

☐ yes ☐ no ☐ unknown

16. **What type of advice was provided by the doctor?***

☐ administer medications ☐ observe the patient ☐ continue as before
☐ slow the rate ☐ take blood samples ☐ stop transfusion
☐ unknown
☐ other, please specify

17. **If medications or fluids were administered as treatment for the reaction, what was given?** (more than one maybe ticked)?*

☐ paracetamol ☐ antihistamine ☐ diuretic
☐ hydrocortisone ☐ adrenaline ☐ IV fluids
☐ nothing administered
☐ other, please specify

18. **Was the transfusion stopped?***

☐ yes ☐ no (go to Qu21) ☐ unknown (go to Qu21)
☐ transfusion already completed (go to Qu21)

19. **If known, what volume of the unit had been transfused?** (provide volume in mLs)

20. **Was the transfusion re-started?**

☐ yes ☐ no ☐ unknown

21. **Was the pathology/transfusion provider notified?***

☐ yes ☐ no ☐ unknown

22. **Were blood samples taken?***

☐ yes ☐ no ☐ unknown

23. **Was a urine sample taken?***

☐ yes ☐ no ☐ unknown

24. **Was a subsequent blood product given, immediately (within 4 hours) following the reaction?***

☐ yes ☐ no (go to Qu26) ☐ unknown (go to Qu26)

25. **If yes, was the subsequent unit tolerated well and completed?***

☐ yes ☐ no ☐ unknown

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26. **If known, what was the presumed cause or diagnosis of the reaction?***

- ☐ febrile reaction
- ☐ allergic reaction
- ☐ volume circulatory overload
- ☐ unknown
- ☐ other, please specify

27. **If known, did the patient receive information about the reaction?***

- ☐ yes
- ☐ no
- ☐ unknown

28. **Was the reaction reported to any of the following?***
(more than one maybe ticked)

- ☐ local incident reporting
- ☐ hospital transfusion committee or equivalent
- ☐ Australian Red Cross Blood Service
- ☐ Serious Transfusion Incident Reporting system
- ☐ not reported

29. **Other comments**
Do you wish to add any comments about the audit just completed?

Thank you for your involvement.

Survey of clinical staff awareness of acute transfusion reactions

Clinical staff can include anyone whose scope of practice enables them to prescribe, administer or be otherwise involved in transfusion of blood and blood products.

This audit is to gain a measure of the clinical understanding of the management of blood and blood product transfusion reactions.

Please note that when entering data electronically the number sequencing may vary depending on your response. Please check that questions and responses align.

Questions with * must contain an answer.

1. **Survey number***

   Please number your audits sequentially
   The value must be between 1 and 30, inclusive.

2. **Main Clinical Speciality:***

   - ☐ surgical
   - ☐ medical
   - ☐ oncology/haematology
   - ☐ obstetrics
   - ☐ paediatrics
   - ☐ critical care
   - ☐ perioperative
   - ☐ pathology services
   - ☐ other, please specify

3. **Clinical Role:***

   - ☐ medical
   - ☐ nursing/midwifery
   - ☐ scientist
   - ☐ other, please specify

4. **How many years of experience?***

   - ☐ < 1 year
   - ☐ 1 – 5 years
   - ☐ 5 – 10 years
   - ☐ 10 – 20 years
   - ☐ > 20 years

5. **Have you participated in the care of a patient who has experienced an acute transfusion reaction (ATR)?***

   ☐ yes ☐ no

6. **How often do you think transfusion reactions occurs in Australia?***

   - ☐ 1:10
   - ☐ 1:100
   - ☐ 1:1000
   - ☐ 1:10000
   - ☐ unsure

7. **Can you name four symptoms associated with acute transfusion reactions?**

   symptom 1
   symptom 2
   symptom 3
   symptom 4

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8. **In 15 words or less what would be your first line of management of a patient experiencing a reaction to a blood or blood product?***

9. **What tests are routinely used to determine that a transfusion was involved in a suspected bacterial contamination?***

You may choose more than one answer. Select at least 1 response.

- ☐ patient blood sample
- ☐ patient blood cultures
- ☐ product pack cultures
- ☐ chest x-ray
- ☐ urine sample
- ☐ unknown

10. **Choose the best response that describes haemolysis?***

1 answer required

- ☐ an increase in the number of red cells in blood
- ☐ damage of the red cells that causes release of haemoglobin
- ☐ disintegration of the white cell membrane and release of contents into the blood
- ☐ none of the above
- ☐ unsure

11. **Who needs to be informed of a presumed reaction, at the time of the reaction?***

Can be more than one person. Select at least 1 response.

- ☐ medical
- ☐ pathology
- ☐ nurse in charge
- ☐ haematologist
- ☐ CEO
- ☐ patient

12. **Serious acute reactions are reported to the Australian Red Cross Blood Service in order to?***

More than one box may be ticked.

- ☐ provide more products
- ☐ trace blood products
- ☐ offer medical advice
- ☐ to test the donor
- ☐ reporting is not required

13. **What other information about managing reactions, would you like or need to assist with managing them?**

Tick all that apply

- ☐ bedside tools
- ☐ posters
- ☐ lanyard cards
- ☐ information with the blood product
- ☐ education sessions
- ☐ other, please specify (maximum 15 words)

14. **Other comments**

Do you wish to add any comments about the survey just completed?

Thank you for your involvement.

If you would like more information on transfusion reactions, go to **bloodmatters.health.vic.gov.au**

Appendix 2

Audit of acute transfusion reaction management and knowledge instructions

Background

The Blood Matters Program works with hospitals to ensure that blood components are administered to patients appropriately and safely. With the introduction of the Australian Commission on Safety and Quality in Healthcare (ACSQHC), National Safety and Quality Health Service Standards there is an increased emphasis for health services to regularly assess risks associated with transfusion practices and clinical use of blood products.

The Blood Matters Program has identified the area of 'Acute transfusion reaction knowledge and management' to audit, to determine if current practice and awareness are consistent with national guidelines and standards.

The Australian and New Zealand Society of Blood Transfusion (ANZSBT)/ Royal College of Nursing Australia (RCNA) Guidelines for the Administration of Blood Products 2nd edition, 2011; state it is essential to "recognise, react and report" suspected adverse events." "If a transfusion reaction or other adverse event is suspected, other patients may be at risk either because of patient identity error or because other blood components collected from the implicated donor may also be affected."[1]

Aim

This audit aims to improve the quality of care provided to patients by ensuring blood and blood product transfusion policies include the management of transfusion reactions. This audit will confirm if policies are available, appropriate, understood and practised within hospitals. These policies should be consistent with the ANZSBT/ RCNA Guidelines for the Administration of Blood Products 2nd edition, 2011[1]; ACSQHC - National Safety and Quality Heath Service Standards[2] and the Australian Health Ministers' Conference (AHMC) – Statement on National Stewardship Expectations for the Supply of Blood and Blood Products[3].

Objectives

- To determine if blood and blood product transfusion reaction policies are available within hospitals, and are consistent with the ANZSBT/RCNA Guidelines for the Administration of Blood Products 2nd edition 2011
- To identify if blood and blood product transfusion reactions have occurred and/or documented that they have occurred within a 12 month period
- To determine the awareness of acute transfusion reaction knowledge and management of clinical staff who are involved in transfusion practice (i.e. preparing, prescribing, and administering products).

Method

Three audit forms are provided:

Policy: Audit of hospital-wide blood and blood product acute transfusion reaction policy.

Procedural management: Retrospective audit of episodes of acute reaction management (maximum 10).

Survey: Of clinical staff awareness of transfusion reaction recognition and management (maximum 30).

- Each electronic audit tool includes a hospital/health service drop down box. This is to aid data analysis and to provide individual organisations who contribute data with their results once the audit is completed and analysed. All results published from the audit will be de-identified.
- We request that all hospitals submit at least one response per audit tool (policy, procedural and survey).

The **Policy** – Audit of hospital-wide blood and blood product acute transfusion reaction policy' may be completed at any time within the specified time-frame. This audit is an assessment of the hospital policy for the management and reporting of transfusion reaction in line with the ANZSBT/RCNA 'Guidelines for the Administration of Blood Products' 2nd edition, 2011. (Please refer to definitions of blood and blood products).

- Please complete once for each hospital/health service.

Procedural management of acute transfusion reaction audit is to determine if the procedure of transfusion reaction management was followed for up to 10 individual randomly selected retrospective episodes of acute transfusion reaction management.

- Please include retrospective episodes of acute transfusion reaction management that have occurred in the previous 12 months (from August 2012 – present), with a maximum of 10 per health service.
- Please complete question 1 and 2 as a minimum to participate.
- Reactions could be identified through incident reporting systems, hospital quality departments, and pathology or transfusion service. Alternatively, reactions may be identified through auditing of documentation. Blood Matters has developed a data collection tool that can assist with this auditing that can be found on the Blood Matters website www.health.vic.gov.au/bloodmatters/tools/data-collection

Survey of clinical staff awareness of acute transfusion reactions requires engaging thirty clinical staff, whose scope of practice enables them to either prepare, prescribe, or administer a transfusion of blood and blood products.

- These questions can be asked of medical, nursing, laboratory or perfusionist staff whose scope of practice enables them to prepare, prescribe, or administer blood and blood products.
- Some health services may require permission through Ethics Committees to undertake this part of the audit. If gaining this permission will delay the timely return of audit data, please advise the Blood Matters program.

Please reassure staff survey participants that no identifying information is provided to the Blood Matters program.

Definitions

For the purposes of the audit, ANZSBT guidelines 2011 recommend: A hospital-wide policy for management and reporting of adverse events and near miss events relating to blood product therapy that includes in part:

- Guidelines for management of transfusion reactions.
- The procedure for reporting adverse and near miss events in local incident management systems, state or national haemovigilance systems.
- Requirements for reporting to the transfusion service provider and/or Australian Red Cross Blood Service or manufacturer.

- The policy for management and reporting of adverse events and near miss events relating to blood product therapy may or may not identify management of mild and moderate to severe transfusion reaction, but should contain information that covers the spectrum off transfusion reaction.

Transfusion practice

Includes all aspects of the transfusion process

Blood and blood product

Red cells, platelets (pooled or apheresis), fresh frozen plasma (FFP), cryoprecipitate, intravenous immunoglobulin (IVIg) and clotting factors. Other blood products could include albumin and RhD Immunoglobulin.

Policy and procedure: Policy/procedure refers to a document that is for hospital-wide use and that is authorised in accordance with hospital clinical policy/procedure processes for such documents [e.g. the hospital executive or delegate is responsible for authorising the document(s)].

This term includes operating procedure, instruction guide, and any other procedural information that is used in your health service to guide practice.

A hospital-wide blood and blood product transfusion reaction policy and/or procedural guideline maybe a stand alone policy/procedural guideline or included as part of your transfusion policy.*

Acute blood transfusion reaction

A reaction occurring at any time during or up to 24 hours following a transfusion of blood or blood components, this includes but is not limited to temperature rise of >1°C, fever, chills, rigors, chest pain/discomfort, headache, back pain, nausea and/or vomiting, itching/rash, respiratory wheeze, dyspnoea/difficulty breathing, red urine, restlessness/ anxiety, hypotension, and cardiac arrest.

Adverse event

An incident that resulted in harm to a person receiving care.

Mild transfusion reaction

Isolated temperature rise <1.5ºC above baseline without any signs of serious reaction, local rash/pruiritis.

Moderate to severe reaction

Any of the following could be considered signs of moderate to severe, temperature rise >1.5ºC above baseline, hypotension or hypertension, tachycardia, tachypnoea, wheeze, stridor, rigors, chills, nausea vomiting, pain (local chest, back).

Guidelines/Standards supporting the management of acute transfusion reaction are

- Australian and New Zealand Society of Blood Transfusion (ANZSBT)/ Royal College of Nursing (RCN) – 'Guidelines for the Administration of Blood Products' 2nd edition, 2011.
- Australian Commission on Safety and Quality in Health Care National Safety and Quality Heath Service Standards, Blood and Blood Products, Standard 7.2, 7.3, 7.6.
- Australian Health Ministers' Conference – Statement on National Stewardship Expectations for the Supply of Blood and Blood Products – November 2010 http://www.nba.gov.au/policy/stewardship-statement.pdf

Data Set

The hospital transfusion committee (or equivalent), are asked to take this opportunity to ensure that steps for acute transfusion reaction management are identified, documented and included in your hospital policy and procedures. This includes adequate documentation in the medical record as stated in the ANZSBT/RCNA guidelines 2nd edition (2011) and ACSQHC – National Safety and Quality Heath Service Standards.

Time Frame

Data collection from 1 August 2013 with a final return date of **31 October 2013**.

Data Entry

Data is to be entered **electronically** using the hospital name via the Blood Matters Program website located at http://www.health.vic.gov.au/bloodmatters/audit.htm. and can be entered anytime from 1 August 2013.

For hospitals that do not have access to the internet or are having difficulties submitting data, completed forms can be posted to the Blood Matters program at:

Blood Matters Program
Department of Health & Human Services
Sector Performance, Quality and Rural Health Branch
Australian Red Cross Blood Service
100-154 Batman Street
West Melbourne Vic 3003

Data Collection

The Transfusion Committee (or equivalent) should designate member(s) of staff to complete the information requested on the audit proformas provided.

The Department of Health & Human Services (the department) is committed to protecting privacy. Information collected during this audit is not capable of identifying any individual and names will not be provided to the department.

The Blood Matters secretariat will co-ordinate the audit, taking responsibility for the distribution of audit collection tools and analysis, and will disseminate results to the participating hospitals.

References

1. Australian and New Zealand Society of Blood Transfusion/ Royal College of Nursing Australia – Guidelines for the Administration of Blood Products 2nd edition, 2011
2. Australian Commission on Safety and Quality in Health Care National Safety and Quality Heath Service Standards, Blood and Blood Products, Standard
3. Australian Health Ministers' Conference – Statement on National Stewardship Expectations for the Supply of Blood and Blood Products – November 2010 http://www.nba.gov.au/policy/stewardship-statement.pdf

If further information is required please contact:
Ms Linley Bielby, Program Manager –
Tel: **03 96940102** or email: bloodmatters@redcrossblood.org.au

Appendix 3

Policy, procedural management and knowledge summary

Audit of hospital-wide policy and procedure(s) for blood and blood product acute transfusion reactions

This audit measures your hospital policy and procedure for blood and blood product transfusion reactions against ANZSBT Guidelines for the Administration of Blood Products 2nd Ed, December 2011, Section 8

1. Does your hospital have written policies/procedures on blood transfusion practice?

	All hosp, n=98
	100%

2. Does your hospital policy/procedure include a statement regarding:

internal hospital reporting of transfusion reactions (e.g. Riskman)	97%
documentation of transfusion reactions	95%
reviewing of transfusion reactions	69%

3. Does your hospital policy/procedure include guidelines for management of a transfusion reaction?

100%

4. Does your hospital policy/procedure include a definition of transfusion reaction:

	All hosp, n=98
mild reaction ONLY	0%
moderate/severe ONLY	3%
general definition ONLY	26%
no definition	7%
mild AND moderate/severe	63%
moderate/severe AND general	1%

5. Are the guidelines for management separated into:

	All hosp, n=98
mild reaction ONLY	0%
moderate/severe ONLY	1%
general definition ONLY	38%
mild AND moderate/severe	58%
moderate/severe AND general	3%

6. Does the written management of transfusion reaction include:

	mild	moderate to severe	general
	All, n=57	All, n=61	All, n=40
stop the transfusion	91%	100%	100%
seek medical advice	95%	98%	98%
maintain IV access	98%	98%	93%
check the right pack has been given to the right patient (clerical and ID check)	88%	92%	83%
monitor and record patient temperature	98%	98%	85%
monitor and record patient pulse	98%	98%	85%
monitor and record patient respirations	96%	97%	85%
monitor and record patient blood pressure	98%	98%	85%
contact medical officer	95%	100%	100%
report to transfusion service provider	70%	98%	93%
provide blood samples to pathology	53%	93%	75%
observe urine (volume and/or colour)	37%	79%	55%
does not include any of the above	0%	0%	0%

7. Does your hospital policy/procedure include requirements for reporting to the transfusion service provider and/or Australian Red Cross Blood Service or manufacturer? (e.g. suspected reaction, adverse event etc, per guideline 8.2)

All hosp, n=98
89%

Summary Report of
Audit of procedural management of acute transfusion reactions

1. Did your hospital transfuse any blood or blood products during the reporting period?
   Hospitals transfusing, n=95 (98%)
2. Did any of the transfusions result in an acute reaction?
   Hospitals reporting acute reactions, n=53 (56%)

5. Location of transfusion that resulted in ATR

	All, n=286
surgical ward	55 (19%)
maternity/birthing suite	15 (5%)
ambulatory care/day ward	21 (7%)
medical ward	56 (20%)
ICU/critical care	26 (9%)
emergency department	20 (7%)
oncology/haematology	55 (19%)
theatre/perioperative	13 (5%)
other, please specify	24 (8%)

6. Patient clinical specialty

	All, n=286
surgical	72 (25%)
obstetrics	21 (7%)
medical	45 (16%)
paediatrics	4 (1%)
oncology/haematology	102 (36%)
critical care	9 (3%)
other, please specify	33 (12%)

7. Type of blood component transfused that is implicated

	All, n=286
red blood cells	210 (73%)
cryoprecipitate	0 (0%)
platelets	32 (11%)
IVIg	15 (5%)
FFP	25 (9%)
clotting factors	0 (0%)
other, please specify	4 (1%)

8. Did the patient receive other blood products, prior to the reaction?

	All, n=286
yes	123 (43%)
no	160 (56%)
unknown	3 (1%)

9. If yes, indicate the other blood products administered

	All, n=123
red blood cells	92 (75%)
cryoprecipitate	3 (2%)
platelets	19 (15%)
IVIg	1 (1%)
FFP	16 (13%)
clotting factors	2 (2%)
other, please specify	6 (5%)

10. If documented, what was the time frame from commencement of transfusion to reaction?

	All, n=286
<30min	84 (29%)
< 1 hour	45 (16%)
1-2 hours	66 (23%)
2-6 hours	69 (24%)
6-12 hours	8 (3%)
12-24 hours	4 (1%)
> 24 hours	2 (1%)
unknown	6 (2%)

blood matters

Australian Red Cross BLOOD SERVICE

State Government Victoria

Please note: Summary data from question 3 and 4 excluded, please see page 31.

11.Please indicate which observations were recorded for the transfusion episode at?

	Pulse	Blood pressure	Temperature	Respiratory rate	None
	All	All	All	All	All
Baseline	97%	96%	93%	95%	3%
15 minutes	82%	80%	78%	79%	12%
At completion	79%	77%	76%	76%	9%

12. Indicate the signs and symptoms of the reaction (more than one maybe ticked)

	All, n=286
fever	129 (45%)
chills	31 (11%)
rigors	34 (12%)
chest pain/discomfort	14 (5%)
nausea/vomitting	17 (6%)
dyspnoea/difficulty breathing	56 (20%)
restlessness/anxiety	12 (4%)
headache	6 (2%)
itching/rash	65 (23%)
abdominal pain	4 (1%)
hypotension	22 (8%)
back pain	6 (2%)
respiratory wheeze	17 (6%)
red urine	1 (0%)
cardiac arrest	0 (0%)
no symptoms	5 (2%)
other, please specify	
tacchycardia	43 (15%)
hypertension	17 (6%)
temperature rise,< 1.5	32 (11%)
other	35 (12%)

13. Was a doctor informed?

	All, n=286
yes	277 (97%)
no	5 (2%)
unknown	2 (1%)

14. If known, how soon after the reaction was the doctor informed:

	All, n=277
< 15 minutes	180 (65%)
15-30 minutes	28 (10%)
30-60 minutes	9 (3%)
> 60 minutes	9 (3%)
unknown	52 (19%)

15. Did a doctor see the patient?

	All, n=286
yes	247 (86%)
no	27 (9%)
unknown	10 (3%)

16. What type of advice was provided by the doctor?

	All, n=279
administer medications	171 (61%)
slow the rate	15 (5%)
observe the patient	145 (52%)
take blood samples	125 (45%)
continue as before	10 (4%)
stop the transfusion	149 (53%)
unknown	6 (2%)
other, please specify	
Transfusion already stopped	9 (3%)
chest Xray	10 (4%)
urine volume/colour	4 (1%)
admit tohigher level of care	10 (4%)
ventilate	3 (1%)
other, please specify	36 (13%)

17. If medications or fluids were administered as treatment for the reaction, what was given?

		All, n=286
paracetamol		99 (35%)
hydrocortisone		54 (19%)
antihistamine		66 (23%)
adrenaline		6 (2%)
diuretic		29 (10%)
IV fluids		20 (7%)
nothing administered		64 (22%)
other, please specify		
bronchodilators	0 (0%)	12 (4%)
oxygen	1 (10%)	8 (3%)
antiemetic	0 (0%)	8 (3%)
pain relief	1 (10%)	8 (3%)
vasodilators	0 (0%)	8 (3%)
antibiotics	1 (10%)	12 (4%)
other, please specify	2 (20%)	15 (5%)

18. Was the transfusion stopped?

	All, n=286
yes	202 (71%)
no	22 (8%)
transfusion already completed	57 (20%)
unknown	3 (1%)

19. If known, what volume of the unit had been transfused? (provide volume in mLs)

range: 10 - 800, avg:166 mL

20. If transfusion stopped, was it re-started?

	All, n=202
yes	24 (12%)
no	175 (87%)
unknown	2 (1%)

21. Was the pathology/transfusion provider notified?

	All, n=286
yes	239 (84%)
no	35 (12%)
unknown	9 (3%)

22. Were blood samples taken?

	All, n=286
yes	200 (70%)
no	76 (27%)
unknown	7 (2%)

23. Was a urine sample taken?

	All, n=286
yes	82 (29%)
no	179 (63%)
unknown	22 (8%)

24. Was a subsequent blood product given, immediately following the reaction?

	All, n=286
yes	32 (11%)
no	238 (83%)
unknown	13 (5%)

25. If yes, was the subsequent unit tolerated well and completed?

	All, n=32
yes	29 (91%)
no	3 (9%)
unknown	0 (0%)

26. If known, what was the presumed cause or diagnosis of the reaction?

	All, n=286
febrile reaction	99 (35%)
allergic reaction	61 (21%)
volume circulatory overload	22 (8%)
unknown	42 (15%)
other, please specify	
bacterial	1 (0%)
IVIg side effects	3 (1%)
haemolytic	4 (1%)
process issues	3 (1%)
FNHTR	8 (3%)
other underlying issues	24 (8%)
unable to determine	15 (5%)

27. If known, did the patient receive information about the reaction?

	All, n=286
yes	63 (22%)
no	19 (7%)
unknown	201 (70%)

28. Was the reaction reported to any of the following?

	All, n=286
local incident reporting	236 (83%)
hospital transfusion comm or equ	211 (74%)
Aust Red Cross Blood Service	21 (7%)
Serious transfusion incident reporting	61 (21%)
not reported	25 (9%)

Survey of clinical staff awareness of acute transfusion reactions

Clinical staff can include anyone whose scope of practice enables them to prescribe, administer or be otherwise involved in transfusion of blood and blood products.
This audit is to gain a measure of the clinical understanding of the management of blood and blood product transfusion reactions.

Please note that when entering data electronically the number sequencing may vary depending on your response. Please check that questions and responses align.

Acceptable answers to knowledge questions are written in bold italics

2. Main Clinical Specialty included:

	All, n=2092
surgical	18%
medical	27%
oncology/haem	10%
obstetrics	8%
paediatrics	3%
critical care	7%
perioperative	7%
pathology services	3%
other	18%

3. Clinical role of respondent

	All, n=2092
medical	10%
nursing/midwifery	85%
scientist	3%
other	2%

4. How many years of experience

	All, n=2092
<1yr	6%
1-5yrs	18%
5-10yrs	17%
10-20yrs	23%
>20yrs	36%

5. Have you participated in the care of a patient who has experienced an acute transfusion reaction

	All, n=2092
Yes	34%

6. How often do you think transfusion reactions occurs in Australia?

	All, n=2092
1:10	4%
1:100	***25%***
1:1000	***22%***
1:10000	***18%***
Unsure	31%

7. Can you name four symptoms associated with acute transfusion reactions?

Average score from maximum of 4, n=2092
3.6

8. In 15 words or less what would be your first line of management of a patient experiencing a reaction to a blood or blood product?

	All, n=2092
% ***"Stop the transfusion"*** Critical first line of management	***97%***
% "Maintain IV access" Responses difficult to categorise into "maintain IV", due to ambiguity of "flush line"	17%
% "Monitor/record patient"	48%
% "Contact medical advice"	59%
% "Repeat identity checks"	8%

blood matters

Australian Red Cross BLOOD SERVICE

State Government Victoria

Please note: Summary data from question 1 excluded, please see page 35.

9. What tests are routinely used to determine that a transfusion was involved in a suspected bacterial contamination?

	All, n=2092
Pt blood sample	61%
Pt blood cultures	***78%***
Product pack culture	***82%***
Chest xray	6%
Urine sample	21%
unknown	3%

10. Choose the best response that describes haemolysis?

	All, n=2092
an increase in the number of red cells in blood	3%
damage of the red cells that causes release of	***79%***
disintegration of the white cell membrane and release of contents into	4%
none of the above	4%
unsure	10%

11. Who needs to be informed of a presumed reaction, at the time of the reaction?

	All, n=2092
medical	***95%***
pathology	***74%***
nurse in charge	***92%***
haematologist	36%
CEO	4%
patient	***74%***

12. Serious acute reactions are reported to the Australian Red Cross Blood Service in order to?

	All, n=2092
provide more products	8%
trace blood products	***96%***
offer medical advice	***37%***
to test the donor	***46%***
reporting is not required	1%

13. What other information about managing reactions, would you like or need to assist with managing them?

	All, n=2092
bedside tools	24%
posters	28%
lanyard cards	45%
information with blood product	47%
education sessions	59%
other	4%

Appendix 4

Recommended steps for managing a suspected transfusion reaction

Below is a guide only, and all hospital guidelines need to be followed.

Acute symptom cluster – During or soon following the implicated transfusion	Differential diagnosis (if caused by the transfusion) – at that bedside moment	Preferred initial advice/ action by medical or nursing attendee
Fever and chills/rigors (but no rash, no dyspnoea)	• Sepsis from product • Haemolysis • FNHTR	• Stop blood* • Obs/clinical examination • Clerical checks of patient ID • Paracetamol • (Consider actions as per "fever and hypotension" if not resolving or worsening)
Fever and hypotension	• Sepsis from the product • Severe (ABO) haemolytic transfusion reaction	• Stop blood • Obs/clinical examination • Oxygen • Clerical checks of patient ID • Take cultures • Repeat cross match & haemolysis (include urine) screening • Consider empiric antibiotic therapy
Rash (but no dyspnoea)	• Allergic reaction – mild, not yet severe	• Stop blood* • Obs/clinical examination • Clerical checks of patient ID • Antihistamine
Rash with dyspnoea, or airway obstruction or hypotension	• Severe allergic reaction – anaphylaxis or evolving to anaphylaxis	• Stop blood • Obs/clinical examination • oxygen • Clerical checks of patient ID • Antihistamine • Adrenaline • Corticosteroids
Dyspnoea (but no rash and no hypotension)	• TACO • TAD • TRALI • *Bacterial contamination* • *Acute haemolytic transfusion reaction*	• Stop blood • Obs/clinical examination • Oxygen • Clerical checks of patient ID • Chest x-rays • Sit patient upright • Trial of diuretic

* May restart blood following medical advice after the patient has been reviewed, and symptoms resolve. Please note that the transfusion must not exceed four hours from removal from storage.

Acute symptom cluster – During or soon following the implicated transfusion	Differential diagnosis (if caused by the transfusion) – at that bedside moment	Preferred initial advice/ action by medical or nursing attendee
Dyspnoea & hypertension	• TACO	• Stop blood • Obs/clinical examination • Oxygen • Clerical checks of patient ID • Chest x-rays • Sit patient upright • Trial of diuretic
Dyspnoea & hypotension with/without tachycardia	• Anaphylaxis • TRALI • Bradykinin-mediated hypotension	• Stop blood • Obs/clinical examination • Oxygen • Clerical checks of patient ID
Hypotension and/or tachycardia	• Sepsis from the product • Acute haemolytic transfusion reaction • TRALI • Anaphylaxis • Bradykinin-mediated hypotension	• Stop blood • Obs/clinical examination • Clerical checks of patient ID

Appendix 5

Analysing open-ended questions

The survey of staff included two questions requiring open-ended input from the participants. While the inclusion of open-ended text added complexity to analysis and interpretation it was felt that multiple choice responses could be too leading and not provide the true knowledge of staff in relation to the symptoms and the management of an ATR.

Recognising symptoms

To analyse the responses relating to the four symptoms associated with ATR an interpretational approach was used. The aim was to generate categories of symptoms by using content analysis of the response provided. While reviewing this data it was recognised the participants had included both signs and symptoms which were accepted.

To generate the list of accepted responses the following resources were used:

- the Blood Service <www.transfusion.com.au>
- ANZSBT/RCNA guidelines
- BloodSafe eLearning Australia – Module 5 (Transfusion reactions – signs and symptoms) <www.bloodsafelearning.org.au>
- STIR Expert Group.

Participant responses were organised into categories of signs and symptoms, with 51 symptoms finalised. Twenty-eight of these were considered an appropriate response (table 21) and the remaining 23 were considered incorrect. With the finalised list, all responses were coded. A correct sign/symptom was given a score of 1, and an incorrect sign/symptom 0. Each respondent could score up to a maximum of four. Using this methodology the average correct response across all participants was a score of 3.6 out of four.

Participant responses accepted and not accepted

Responses accepted		Responses not accepted	
Summary symptom	Total responses	Summary symptom	Total responses
fever	1,889	No response	200
itching/rash	1,320	allergic/anaphylaxis	169
dyspnoea/difficulty breathing	974	sweating	87
tachycardia	895	headache	71
hypotension	652	facial oedema	67
rigors	243	altered conscious state	62
nausea and/or vomiting	184	faint	42
chills	172	cardiac arrest	23
chest pain/discomfort	171	delayed haemolytic reactions	16
back pain	165	lethargic	11
hypertension	151	TACO	10
pain due to IV	113	skin pallor	9
restlessness	96	TRALI	8
tachypnoea	91	death	8
Dread	76	acute haemolytic reactions	6
flushing	74	WBIT	6
respiratory wheeze	57	signs of sepsis	6
red urine	57	transmission of disease	5
general muscle/joint pain	35	hypothermia	4
pulmonary oedema	27	jaundice	3
hypoxaemia	23	bradycardia	3
renal failure/decreased urine output	15	hypocalcaemia	1
DIC/abnormal bleed	13	dermatitis	1
bronchospasm/ laryngospasm	8	potassium effects	1
stridor	4	transfusion related graft vs host	1
diarrhoea	2	bacterial contamination	1
cyanosis	2	vasodilation	1
		anaemia	1
		immune responses	1
		occurs within 15 minutes	1

First line of management

The intent of the question was for respondents to identify 'stop transfusion', however, other responses were also categorised. Responses to this question were limited to 15 words or less which did provide some challenges when analysing the data.

To collate the responses, text identifiers were applied and acceptable descriptors were defined. Where the text did not fall into defined identifiers, responses were reviewed and included in line management deemed best aligned:

- Stop the transfusion.
- Maintain IV access.
- Assess, monitor and record patient temperature, pulse, respirations and blood pressure.
- Repeat all clerical and identity checks of the patient and the blood pack.
- Contact medical staff and pathology service (or others as per hospital protocol).
- Treat symptoms as appropriate.

Ambiguity arose in regards to aligning to the response of 'maintaining IV access'. Due to the limited text allowed, the documented responses indicated the respondent had correct knowledge; however responses 'flush the line' rather than flush IV cannula (IVC) to keep line patent were not included. Although the respondent may have meant IVC, the guidelines state if moderate or severe transfusion reaction is suspected "Maintain IV access using a new administration set … do not flush the original line". If a mild transfusion reaction is suspected, the guidelines state "maintain IV access".

A variety of responses were included in the group of 'assess, monitor and record patient temperature, pulse, respirations and blood pressure', for example, 'ABC assessment', 'get vital signs'.

Where participants have documented 'MET call', but do not list monitoring vital signs these have been included in 'contact medical staff' response and not with the assess and monitor patient group, although the MET call process implies frequent assessment and recording of patient vital signs.

Participants included the administration of medications and resuscitation with fluids within first line management; however it must be noted for this to occur there must be a medical order or a standing order for these actions to occur independently to medical review.

Appendix 6

Suggested responses to survey of clinical staff awareness of acute transfusion reactions

This information has been compiled from the enclosed references and ratified by the Serious Transfusion Incident Reporting (STIR) Expert group.

1. **How often do you think transfusion reactions occur in Australia?**
   Response options were:

   1:10, 1:100, 1:1000, 1:10000, unsure

   Transfusion risks range from 1:100 to 1: 1,000,000, the most common being Minor allergic reaction 1:100
   This question was designed to raise awareness of frequency of transfusion reaction.

   The response 1:10 is not correct. All other answers would be acceptable

   An example of risk frequency can be found at
   Clinical transfusion practice, Module 1 (Risk and benefits) BloodSafe ELearning Program.
   https://www.bloodsafelearning.org.au

   Other information regarding transfusion reaction can be found at
   http://www.transfusion.com.au/adverse_transfusion_reactions

2. **Can you name four symptoms associated with acute transfusion reactions?**

   Signs and Symptoms associated with acute transfusion reactions can include:

   - temperature rise to ≥38°c or ≥1°c above baseline (if baseline ≥37°c
   - fever
   - localised rash/pruritus/urticia
   - hypotension/shock or hypertension
   - tachycardia
   - tachypnoea, wheeze, stridor, dyspnoea, orthopnoea, cyanosis
   - pulmonary oedema
   - bronchospasm , laryngospasm
   - hypoxaemia
   - rigors or chills
   - nausea, vomiting or pain (local, chest; back)
   - haemoglobinuria, oliguria
   - unexplained/abnormal bleeding
   - diarrhoea

   Other symptoms include: flushing, sense of dread, restlessness

   Reference:

   Australian Red Cross Blood Service http://www.transfusion.com.au/

   Australian and New Zealand Society of Blood Transfusion and Royal College of Nursing, Australia. Guidelines for the Administration of Blood Products. 2nd ed 2011

   Further information can be found at Clinical transfusion practice, Module 5 (Transfusion Reactions. Signs & symptoms) BloodSafe E-Learning Program.
   https://www.bloodsafelearning.org.au

3. **In 15 words or less what would be your first line of management of a patient experiencing a reaction to a blood or blood product?**

   The response should include:

   1. Stop the transfusion
   2. Maintain IV access
   3. Assess, monitor and record patient temperature, pulse, blood pressure and respirations
   4. Repeat all clerical and identity checks of the patient and the blood pack
   5. Contact medical staff and pathology service (or others as per Hospital protocol)
   6. Treat symptoms as appropriate

   Further management will depend on the severity of the reaction

4. **What tests are routinely used to determine that a transfusion was involved in a suspected bacterial contamination?**

   Response options were:

   - patient blood sample
   - patient blood cultures
   - product pack cultures
   - chest x-ray
   - urine sample
   - unknown

   Correct responses:

   - Patient blood culture
   - product pack cultures

   Other important information:

   Start broad-spectrum antibiotics once cultures have been taken, including cover for staphylococcal infections.

   Provide cardiovascular support.

   Send blood pack to the Transfusion Service Provider for urgent culture and Gram Stain

   Advise Transfusion Service Provider to **notify the Blood Service** to ensure quarantining and testing of related components from the same donation/donor.

5. **Choose the best response that describes haemolysis?**
   Response options were:

   - An increase in the number of red cells in blood
   - Damage of the red cells that causes release of haemoglobin
   - Disintegration of the white cell membrane and release of contents into the blood
   - None of the above
   - Unsure

   Correct response:

   - Damage of the red cells that causes release of haemoglobin

6. **Who needs to be informed of a presumed reaction, at the time of the reaction?**

   Response options were:

   - Medical
   - pathology
   - Nurse in charge
   - haematologist
   - CEO
   - patient

Correct responses:

- medical
- pathology
- nurse in charge
- patient

7. **Serious acute reactions are reported to the Australian Red Cross Blood Service in order to?**

   Response options were:

   - provide more products
   - trace blood products
   - offer medical advice
   - to test the donor
   - reporting is not required

Correct responses:

- trace blood products
- offer medical advice
- to test the donor
- provide more products (in some cases)

*In some situations the Australian Red Cross Blood Service may also wish to test the patient

If you would like more information on transfusion reactions, go to http://www.transfusion.com.au/adverse_transfusion_reactions

or participate in the BloodSafe eLearning clinical transfusion practice course https://www.bloodsafelearning.org.au/

References:

1. Australian and New Zealand Society of Blood Transfusion and Royal College of Nursing, Australia. Guidelines for the Administration of Blood Products. 2nd ed 2011
2. *BloodSafe E-Learning Program. Clinical transfusion practice* https://www.bloodsafelearning.org.au.