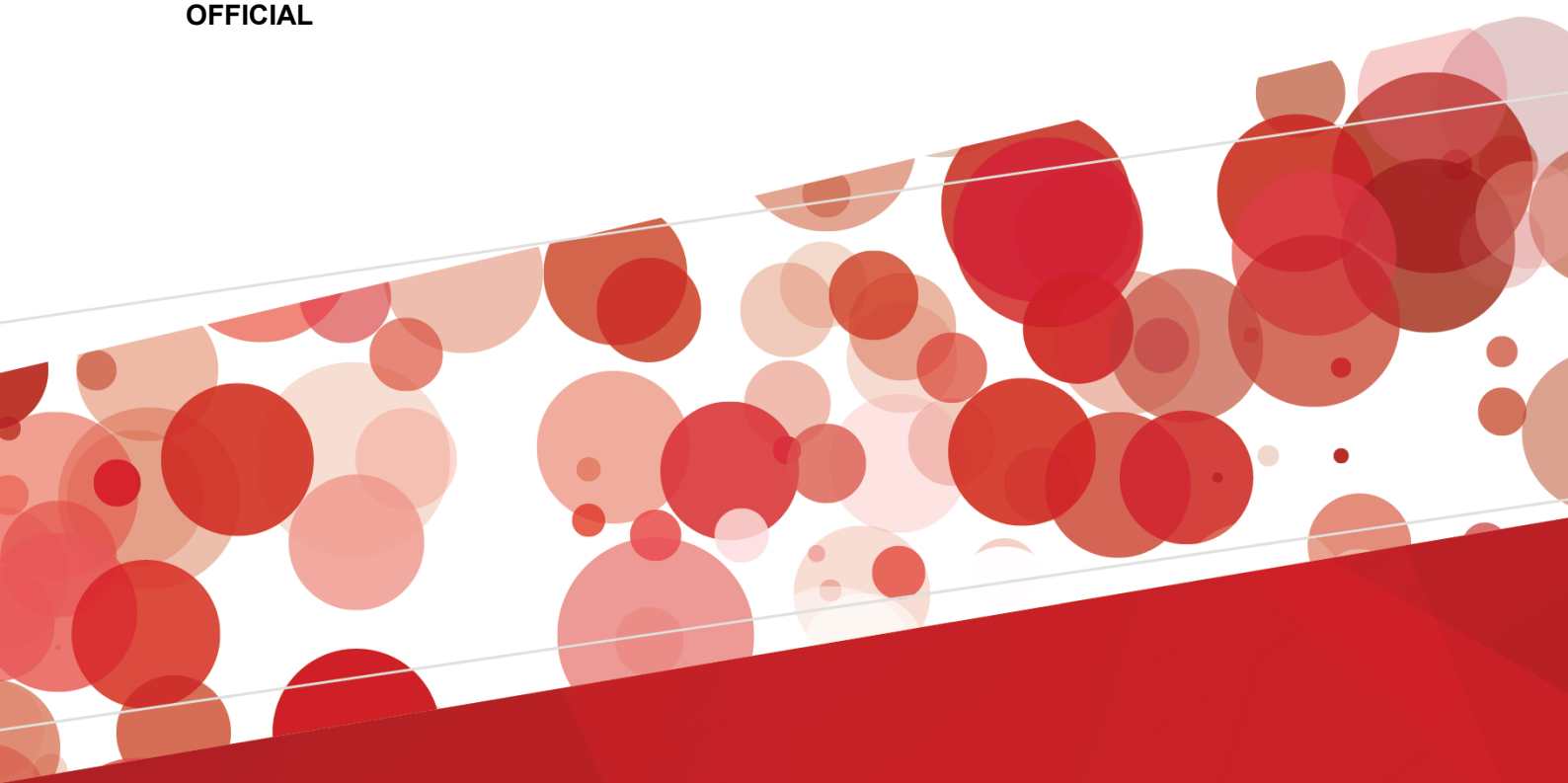
Serious Transfusion Incident Report (STIR) annual report 2023-2024

Blood Matters program

OFFICIAL



VICTORIA State Government

Australian Red Cross Lifeblood

Blood Matters

Serious Transfusion Incident Report (STIR) annual report 2023-2024

Blood Matters program

To receive this document in another format, phone 03 9694 0102, using the National Relay Service 13 36 77 if required, or email Blood Matters <bloodmatters@redcrossblood.org.au>.

Authorised and published by the Victorian Government, 1 Treasury Place, Melbourne.

ISSN 2651-8872 (online/PDF/Word) or (print)

Available at Blood Matters Serious Transfusion Incident Reporting < https://www.health.vic.gov.au/patient-care/serious-transfusion-incident-reporting-system>

Contents

Acknowledgements

The Serious Transfusion Incident Reporting (STIR) system is managed by the Blood Matters program.

Blood Matters is a collaboration between the Victorian Department of Health (the Department) and Australian Red Cross Lifeblood (Lifeblood). STIR provides haemovigilance information to support safer transfusion practice.

Public and private health services in Victoria, Tasmania, Australian Capital Territory and Northern Territory contribute to the system. This allows us to continue to provide information and recommendations for best practice.

Blood Matters acknowledges and deeply values the generous in-kind support of the STIR Expert Group. Their expertise is instrumental in reviewing incidents, offering recommendations, and guiding the program's efforts.

Abbreviations and acronyms

Abbreviation/acronym	Definition
ABO	major blood group system
AHTR	acute haemolytic transfusion reaction
ANZSBT	Australia and New Zealand Society of Blood Transfusion
ATR	acute transfusion reaction
BP	blood pressure
CMV	cytomegalovirus
DAT	direct antiglobulin test
DHTR	delayed haemolytic transfusion reaction
DSTR	delayed serologic transfusion reaction
ED	emergency department
ELP	extended life plasma
EMR	electronic medical record
FFP	fresh frozen plasma
FNHTR	febrile non-haemolytic transfusion reaction
FY24	financial year 24, 1 July 2023 – 30 June 2024
GP	general practitioner
Hb	haemoglobin
IBCT	incorrect blood component transfused
ICU	intensive care unit
IM	intramuscular
IV	intravenous
Lifeblood	Australian Red Cross Lifeblood
MCV	mean corpuscular volume
MET	medical emergency team
NBA	National Blood Authority
NICU	neonatal intensive care unit
PTP	post-transfusion purpura
RBRP	right blood, right patient
RBC	red blood cell
RhD	red cell antigen in the Rh blood group system
RhD Ig	RhD immunoglobulin
SHOT	Serious Hazards of Transfusion, United Kingdom
SR	severity rating

Abbreviation/acronym	Definition
STIR	Serious Transfusion Incident Reporting
TACO	transfusion associated circulatory overload
TAD	transfusion associated dyspnoea
TAGvHD	transfusion associated graft vs host disease
The Department	Victorian Department of Health
TRALI	transfusion related acute lung injury
WBIT	wrong blood in tube

Executive summary

This year's report includes 200 validated investigations consisting of 79 procedural events and 121 clinical reactions.

Wrong blood in tube (WBIT) events (36), followed by RhD immunoglobulin (RhD Ig) administration errors (15) and incorrect blood component transfused (IBCT) (16), are the most-reported procedural events.

Positive patient identification and adherence to the pretransfusion checking procedure can prevent both WBIT and IBCT events. Health services should:

- ensure that their health service policy has clearly documented procedures that align with the Australia and New Zealand Society of Blood Transfusion (ANZSBT) guidelines.
- train all staff involved in transfusion practice on how to undertake positive patient identification and the double-independent pretransfusion checking procedure.

Of the 121 clinical reactions reported, delayed serologic transfusion reactions (DSTR) (56), allergic/anaphylactic/anaphylactoid (24) and transfusion associated circulatory overload (TACO) (23) were the most frequently reported.

TACO is the most common cause of death and major morbidity reported internationally due to transfusion and is potentially avoidable.

Education should be provided to all staff involved in transfusion and the use of a TACO checklist can be a valuable tool to identify at-risk patients. Blood Matters conducted a TACO awareness campaign in 2017 and developed an information sheet for clinical staff, checklist swing tags and a poster that is available on the STIR webpage.[1]

[1] https://www.health.vic.gov.au/patient-care/serious-transfusion-incident-reporting-system-stir

Key messages

Area	Message
Patient identification	The final pre-transfusion patient and product identity check is the last chance to identify errors that may have occurred earlier in the transfusion chain. Health services should: • ensure that their health service policy clearly documents these procedures as outlined in the ANZSBT guidelines. • train all staff involved in transfusion practice how to undertake positive patient identification and the double-independent pretransfusion checking procedure.
Communication between clinicians, and clinicians and laboratory staff	Communication must always be clear. Any confusion must be clarified before proceeding with any procedure. Communication with the laboratory is vital to ensure the correct blood component/product for the patient can be provided. Information on patient pregnancy status, any special requirements or previous reactions must be communicated to ensure an appropriate blood component is supplied. Communication must be clear, timely and comprehensive. (Narayan, et al., 2024)
Monitoring of patients for transfusion reactions	Health services need policies for the monitoring of patients receiving blood components. This needs to include pre-transfusion assessment, as a baseline, ongoing monitoring throughout the transfusion, and awareness of the possibility of a reaction occurring after the transfusion has been completed. Consideration should be given to the transfusion as a possible cause of any change in patient condition during or shortly after a transfusion.
National antibody database	As in previous years we recommend a national antibody database to reduce the risk of haemolytic reactions in patients with existing antibodies and improve accessibility of information between laboratories.
Investigation of incidents	Investigation of an incident is not to assign blame, but to identify contributory factors that led to the event and investigate ways to minimise recurrence. Errors continue to be the source of most SHOT reports (83.1%). Errors must be investigated using human factors principles-based incident investigations and appropriate improvement measures should be implemented. (Narayan et al., 2024)

Introduction

Haemovigilance plays a role in promoting accountability and continuous improvement in blood transfusion (Narayan et al., 2024). Health services from Victoria, Tasmania, Northern Territory and Australian Capital Territory voluntarily contribute deidentified haemovigilance data to STIR that can assist in identifying trends in transfusion practice and areas for improvement. Blood Matters uses this information to guide work, including education, resource development for health services and data presentation to governance groups.

Throughout this report, identifying patient clinical details outlined in case studies have been changed to protect patient privacy.

STIR accepts reports of more serious transfusion reactions and incidents that meet STIR criteria, Please see the STIR reporting guide[2] for further information.

This year, commonly used STIR investigation forms were reviewed to improve the information received from health services without increasing the burden on reporters. These changes will assist health services in reporting and investigating an event and provide more information for reviewers to better understand reactions and how procedural events occurred. These forms will be available for reporting at the start of the 2026 financial year.

In financial year 2024 (FY24), 40 of 117 (34 per cent) health services contributed investigations to STIR, see Table 1.

Table 1: Financial year 24 reporting demographics

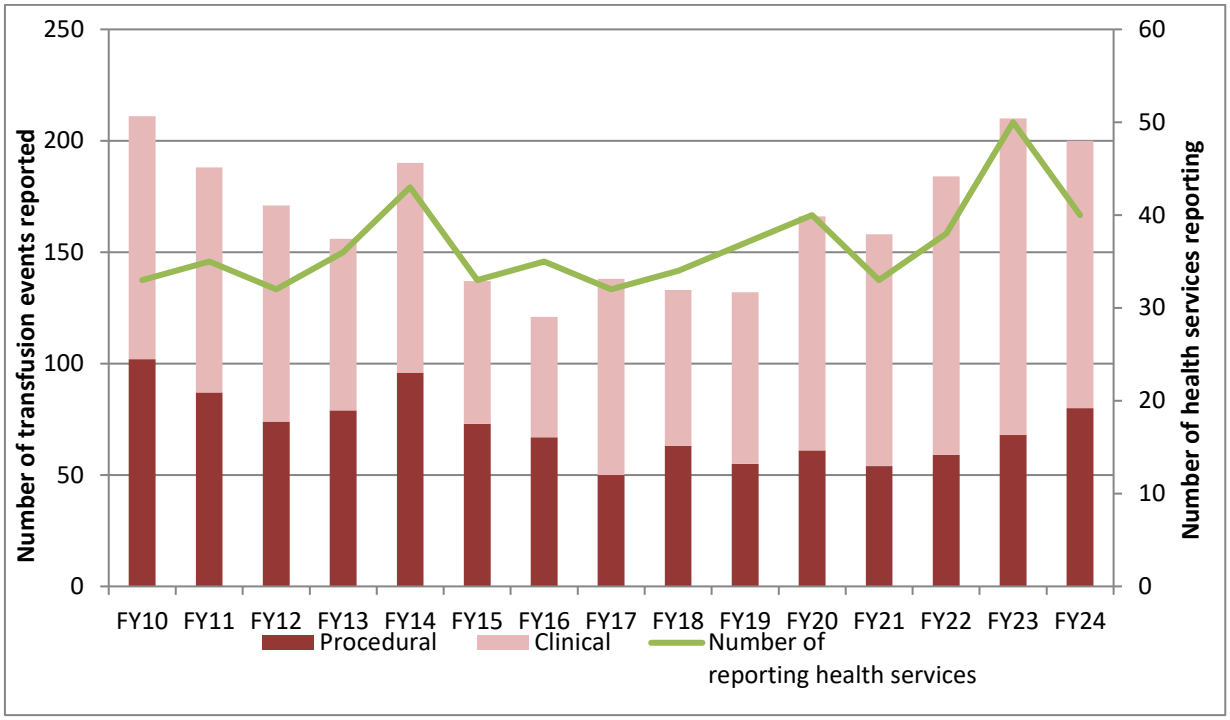
Demographic	Number (%)
Health services registered with STIR	117
Health services contributing to STIR (FY24)	40 (34)
Number of notifications received	248
Number of withdrawn investigations (by health service)	34 (14)
Number excluded after expert review	14 (6)
Number of validated investigations	200 (81)

While there was one severity rating (SR) 1 event reported for FY24 related to an ABO incompatible blood component transfused, there were no sentinel events reported. The ABO incompatible event reported had no associated haemolysis and therefore did not meet the Australian sentinel events guide, version 2.0: **“**Haemolytic blood transfusion reaction resulting from ABO incompatibility resulting in serious harm or death.”

Figure 1 shows the number of reporting health services and types of reports received by STIR for each reporting year.

[2] https://www.health.vic.gov.au/publications/blood-matters-serious-transfusion-incident-reporting-guide

Figure 1: Number of validated clinical and procedural reports and health services reporting each financial year, from 2009-10 to 2023-24



The National Blood Authority (NBA) provides information on the number of blood components sent to the jurisdictions that report to STIR each year (Table 2).

Table 2: Total blood issues per jurisdiction 2023-24 (FY24)

Total Issues 2023-24	VIC	ACT	TAS	NT
Red Cells	191,258	11,327	15,368	5,111
Platelets	41,958	1,594	3,440	955
FFP	25,857	1,085	1,244	589
Cryoprecipitate	38,197	4,961	2,020	1,143
Total all components	**297,270**	**18,967**	**22,072**	**7,798**

Table 3 shows the estimated frequency of clinical reactions for Victoria, noting reporting is voluntary and only the more serious adverse reactions are reported to STIR.

Table 3: Estimated frequency of clinical reactions* per component in Victoria (n = 111)

Component	Blood issued (Vic.)	Validated clinical events[1]	Frequency
Red Cells	191,258	92	1:2,079
Platelets	41,958	15	1:2,797
FFP	25,857	9	1:2,873
Cryoprecipitate	38,197	1	1:38,197

*Excludes RhD isoimmunisation

1 Multiple blood components may be selected for one reaction

Method

There are several steps to validate the investigations received by STIR, as shown in Table 4.

Table 4: Steps in the reporting and validation of health service notifications

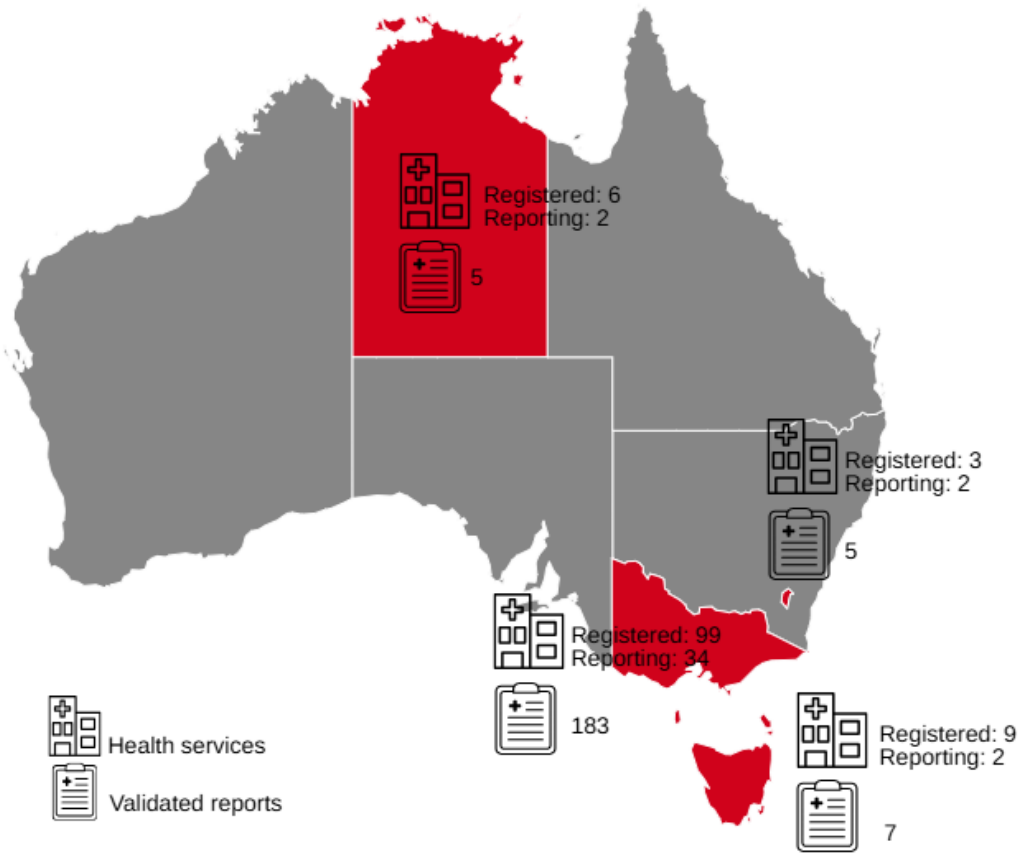
Step	Number of notifications/investigations
STIR notification	248 notifications from health services
Notification withdrawal	34 notifications withdrawn before investigation returned
Investigations returned	214 investigation forms returned by health service
Primary review	214 investigation forms sent to STIR expert group for review
Secondary review	31 investigation forms required second review
Expert Group exclusion	14 investigations excluded by Expert Group review
Validation	200 validated reports included for analysis

The review of returned investigation forms will sometimes lead to changes in incident type or severity rating. Changes in incident type and major changes in severity rating are relayed back to the reporter for their information.

Demographics

Figure 2 shows the number of registered and reporting health services and total number of reports for each jurisdiction. All jurisdictions that are associated with STIR have submitted reports this year.

Figure 2: Number of validated reports per reporting jurisdiction



Patient characteristics, as outlined in Table 5, remain consistent with previous years. The data reveals a broad age range, a higher number of reactions reported in females compared to males (excluding RhD immunoglobulin [RhD Ig] related events), and red blood cells (RBCs) being the most frequently implicated blood component.

Table 5: Characteristics for all validated reports (excluding RhD Ig and RhD isoimmunisation incidents)

Characteristic	Statistics
Age	Median 55 years (range 1 day – 94 years)
Sex	Male: 75 (41%) Female: 106 (59%)
Blood component notifications: (Multiple blood components may be selected for one reaction)	RBC: 113 Platelets: 13 Fresh frozen plasma (FFP): 11 Cryoprecipitate: 1
Other	Includes: WBIT 36, Near miss 7, Procedural other 5

Clinical reports

In FY24 there were 121 (61 per cent) validated reports of clinical reactions to blood components. As in previous years there are more clinical than procedural reports received.

Figure 3 shows validated clinical reactions for FY24. Table 6 shows all validated reports and percentage of reports to STIR. Table 7 shows validated reaction type by blood component.

As in previous reports a high proportion of clinical investigations relate to allergic, delayed serologic transfusion reactions (DSTR) and transfusion associated circulatory overload (TACO). There are a significantly reduced number of febrile non haemolytic transfusion reactions (FNHTR) reported this year compared to previous years. This may be due to the change in reporting criteria for FNHTR in 2022, which increased the rise in temperature from baseline, for STIR reporting purposes.

Figure 3. Validated clinical reactions FY24

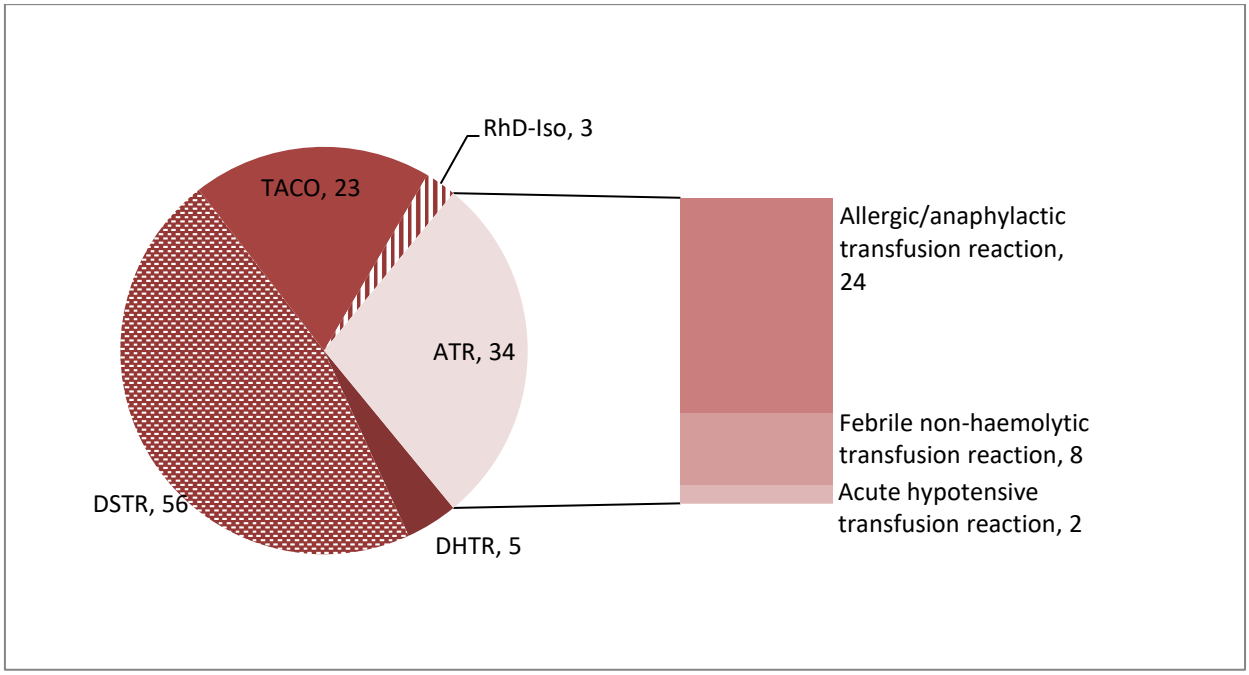


Table 6. Types of validated clinical reports, number and percentage

Reaction type	Number (%)
Allergic/anaphylactic/anaphylactoid	24 (20)
FNHTR	8 (7)
TACO	23 (19)
DSTR	56 (46)
DHTR	5 (4)
RhD isoimmunisation	3 (2)
Acute hypotensive reaction	2 (2)
Acute haemolytic transfusion reaction (AHTR)	-
Total	**121**

Table 7. Validated reaction type by blood component

Blood component	FNHTR n = 8	Allergic/ anaphylactic n = 24	Hypotensive n = 2	TACO n = 23
Red blood cells (RBC)	6 (75)	6 (25)	2 (100)	23 (100)
Platelets	2 (25)	9 (38)		1 (4)
Fresh frozen plasma (FFP); extended life plasma (ELP)		9 (38)		1 (4)
Cryoprecipitate	-	-	-	-
Other (Buffy coat granulocytes)	1 (12.5)	-		

*Multiple products may be reported for one event

Febrile non-haemolytic transfusion reactions (FNHTR)

In FY24 there were eight validated reports of FNHTRs, seven per cent of all clinical reports.

Table 8: Data summary – febrile non-haemolytic transfusion reaction, n = 8

Characteristic	Number (%)
Age: < 1 year	-
Age: 1-18 years	-
Age: 19-29 years	1 (13)
Age: 30-49 years	-
Age: 50-69 years	1 (13)
Age: 70-79 years	4 (50)
Age: 80+ years	2 (25)
Sex: male	6 (75)
Sex: female	2 (25)

*Multiple products reported for one event

Table 9: Severity rating and imputability – febrile non-haemolytic transfusion reaction

Severity rating (SR)	Imputability: certainly	Imputability: probably	Imputability: possibly	Total
SR1	-	-	-	-
SR2	-	-	-	-
SR3	-	2	4	6
SR4	-	-	2	2
Total	**-**	**2**	**6**	**8**

Case study 1. Febrile non-haemolytic transfusion reaction to buffy coat granulocytes

A patient was receiving a second transfusion of buffy coat granulocytes to manage an ongoing fungal infection. The previous transfusion on the day prior was without incident. The patient had received pre-medication of steroids, antihistamine and paracetamol prior to the transfusion. Despite this, they developed a fever (1.8°C rise) with chills, hypertension, tachycardia, tachypnoea and appeared diaphoretic. The patient was treated with further steroids, antihistamine and paracetamol and did not require transfer or increase in care. Bacterial testing of both patient and product was negative, and the product was compatible with the patient.

STIR Expert review: FNHTR, possibly, SR3

The reviewer noted the differential diagnosis included the underlying fungal sinus infection. It is also worth noting that fevers, chills, and respiratory reactions are not uncommon with granulocyte (buffy coat) transfusions.

Allergic/anaphylactic reactions

Allergic/anaphylactic transfusion reactions made up 20 per cent (n = 24) of clinical reactions reported to STIR in FY24. Anaphylactoid/anaphylactic reactions comprised 29 per cent (n = 7) of all allergic reactions, as outlined in Table 10.

Allergic reactions occurred across all age groups, except those less than one year and were evenly distributed across males and females. However, a greater proportion of women than men experienced anaphylactic/anaphylactoid reactions. Unlike other reaction types, more reactions occurred with platelets and plasma components than with red cells.

Tables 10a and 10b outline the severity rating and imputability of allergic and anaphylactic reactions respectively.

Table 10: Data summary – allergic/anaphylactic reactions

Characteristic	Allergic, n = 17 (%)	Anaphylactic, n = 7 (%)
Age: < 1 year	-	-
Age: 1-18 years	6 (35)	1 (14)
Age: 19-29 years	3 (18)	-
Age: 30-49 years	2 (12)	2 (29)
Age: 50-69 years	1 (6)	2 (29)
Age: 70-79 years	2 (12)	1 (14)
Age: 80+ years	3 (18)	1 (14)
Sex: male	9 (53)	2 (29)
Sex: female	8 (47)	5 (71)

*Note: multiple blood products may be involved.

Table 10a: Allergy – severity rating and imputability (n = 17)

Severity rating	Imputability: certainly	Imputability: probably	Imputability: possibly	Total
SR1	-	-	-	-
SR2	-	2	-	2
SR3	8	4	2	14
SR4	-	1	-	1
Total	8	7	2	17

Table 10b Anaphylactic – severity rating and imputability (n = 7)

Severity rating	Imputability: certainly	Imputability: probably	Imputability: possibly	Total
SR1	-	-	-	-
SR2	2	3	-	5
SR3	1	1	-	2
SR4	-	-	-	-
Total	3	4	-	7

Case study 2. Anaphylactic reaction to FFP during therapeutic plasma exchange

A patient was undergoing a plasma exchange procedure for a neurological condition. Three bags of FFP had been administered, but during transfusion of the fourth bag the patient developed urticaria to abdomen and arm, hypotension, tachycardia, erythema and acute 10/10 pain in left arm (history of neuropathic pain and thrombus to the left brachial vein). No shortness of breath, angioedema, stridor, hypoxia, or fever were noted. Plasma exchange was ceased, intravenous (IV) hydrocortisone, intramuscular (IM) adrenaline, 1L normal saline bolus, and oral paracetamol and pain relief medication were administered. The patient was admitted to the intensive care unit (ICU) due to the reaction. Blood pressure (BP) recovered but rash was still present on all extremities and back the next day.

STIR Expert review: Anaphylactic, certainly, SR2

Acute hypotensive transfusion reaction

In FY24 there were two validated investigations of hypotensive reactions. Demographics are shown in Table 11.

Table 11. Data summary – acute hypotensive

Characteristics	Case 1	Case 2
Age	50-69 years	50-69 years
Sex	Female	Female
Implicated product	RBC	RBC
Severity rating	SR3	SR4
Imputability	Possibly	Possibly

Case study 3. Possible hypotensive transfusion reaction

A patient with anaemia possibly caused by ongoing bleeding (site unknown) received a unit of RBC. Within 30 minutes of commencing the transfusion the patient's BP decreased from 105/69 to 70/57, without any other change in vital signs. The patient was treated with antihistamine and steroids and given IV fluids. There were no allergic signs or symptoms, aside from the hypotension. Investigations showed no incompatibility with the blood component or haemolysis. A chest x-ray showed no consolidation, effusion, or pulmonary oedema. The health service noted the possibility of hypovolaemia, however vital signs pre transfusion were stable.

STIR Expert review: acute hypotensive reaction, possible, SR4

The reviewer noted the association with transfusion was not entirely convincing however there was no other reason to explain the hypotension.

Hypotension during transfusion should always be treated as serious, as it is a possible indication of a more serious reaction occurring, such as AHTR or severe allergic reaction. Investigation to exclude these more serious reactions should occur.

An acute hypotensive transfusion reaction is considered a diagnosis of exclusion, meaning it is diagnosed by ruling out other possible causes of sudden hypotension during a blood transfusion. The STIR reporting criteria for acute hypotensive reaction is: Isolated fall in systolic BP of 30 mmHg or more occurring during or within one hour of completing transfusion AND a systolic BP 80mmHg or less in the absence of allergic or anaphylactic symptoms. More serious reactions might include hypotension, as previously defined, leading to shock (e.g. acidaemia, impairment of vital organ function) without allergic or inflammatory symptoms.

Acute haemolytic transfusion reactions (AHTR)

There were no validated AHTR reported during the reporting period.

Although there was one ABO incompatible transfusion (60mL of RBC) reported, there was no haemolysis associated with the incident (see IBCT case study 8).

Delayed haemolytic transfusion reaction (DHTR)

As in previous years the number of validated DHTRs is less than the number of validated DSTRs. This may, in part, be because post transfusion the degree of haemolysis is small and potentially the patient has been discharged from the health service and therefore not recognised without testing.

Table 12 summarises the validated investigations received.

Table 12. Data summary – delayed haemolytic and serologic reactions

Characteristic	Delayed haemolytic* n = 5 (%)	Delayed serologic* n = 56 (%)
Age: < 1 year	-	-
Age: 1-18 years	-	7 (13)
Age: 19-29 years	-	2 (36)
Age: 30-49 years	1 (20)	6 (11)
Age: 50-69 years	1 (20)	11 (20)
Age: 70-79 years	2 (40)	15 (27)
Age: 80+ years	1 (20)	16 (29)
Sex: male	1 (20)	23 (41)
Sex: female	4 (80)	33 (59)
Implicated blood component: RBC	5 (100)	56 (100)
Implicated blood component: platelets	-	4 (7)

Note: more than one product may have been implicated in some cases.

Table 12a. Severity rating and imputability – delayed haemolytic reaction

Severity rating	Imputability: certainly	Imputability: probably	Imputability: possibly	Total
SR1	-	-	-	-
SR2	-	2	-	2
SR3	1	1	-	2
SR4	-	-	1	1
Total	1	3	1	5

Table 12b. Severity rating and imputability – delayed serologic reaction

Severity rating	Imputability: certainly	Imputability: probably	Imputability: possibly	Total
SR1	-	-	-	-
SR2	-	-	-	-
SR3	3	2	-	5
SR4	38	10	3	51
Total	41	12	3	56

Case study 4: DHTR after routine transfusion

An elderly patient with a fractured neck of femur had a pre surgery haemoglobin (Hb) of 117 g/L. Post operatively their Hb was 69g/L requiring transfusion. The patient received five units of red cells over three days due to ongoing symptoms attributed to anaemia, resulting in a Hb post transfusions of 108g/L.

The patient developed fevers, jaundice, anaemia and dark urine, which clinical staff attributed to patient co-morbidities which included liver disease and did not consider the transfusion to be part of the differential diagnosis.

There were no antibodies detected in the pre transfusion testing and the historical record at the health service had no record of known antibodies.

Testing approximately one week after the transfusion detected a positive direct antiglobulin test (DAT), anti-Jk^{a} and anti-E were detected. Both antibodies can cause significant DHTRs.

On review it was noted the patient's bilirubin had risen over the time of the transfusions and the patient had had several febrile episodes during the same period.

The laboratory did retrospective testing of samples taken during the inpatient period and found the bilirubin began to rise immediately post transfusion of the five units, but it took four days for the DAT to become positive and six days for the antibody screen to become positive.

Three days after the patient's urine was noted to be dark, the colour had returned to normal. At the time of reporting the patient had not required further transfusion but phenotyping had occurred attempting to prevent further antibody development.

STIR Expert review: DHTR probably SR2

Delayed serologic transfusion reaction (DSTR)

These reactions are more commonly reported than DHTRs. Health services are aware of antibodies that have been detected by their own laboratory but may be unaware of antibodies detected by a different laboratory. A national antibody register would assist in preventing haemolytic reactions in patients.

Table 13 shows the antibodies implicated in haemolytic and serologic reactions. Reported haemolytic reactions were more commonly associated with anti Jk^{a} or E antibodies. Serologic reactions were also associated with anti-E and anti-Jk^{a}, but also anti-K. All of these antibodies are considered clinically significant, and several may be implicated in haemolytic disease of the fetus and newborn in women of childbearing age.

Table 13. Antibodies implicated in delayed haemolytic and serologic reactions

Antibody	Haemolytic (n = 5)	Serologic (n = 56)
Jk^a	3	9
Jk^b	1	3
E	2	20
e	-	1
D	-	3
C	-	3
c	-	5
K	-	9
Fy^a	1	2
Kp^a	-	3
S	-	2
P1	-	1
M	-	1
Lu^a	-	1
Unclear or unspecified	-	4

Note: more than one antibody may be reported for each event.

Case study 5: Woman receiving RhD positive platelets developed anti-D

A 52-year-old woman received numerous blood components during her admission for a haematologic condition. Several months later blood bank testing showed a strong anti-E and a weak anti-D, where pretransfusion and historical testing had shown no antibodies. There was no indication of any haemolysis at this time. A unit of red cells administered approximately two months prior was found to be E positive, and it was noted she had received many RhD positive platelet units (>10).

STIR Expert review: DSTR certainly.

While this woman would most likely not be considered of “childbearing potential”, the development of an RhD antibody will impact her future transfusion plans in addition to her anti-E.

The health service noted that the pathology provider was aware of the potential requirement for RhD Ig for a RhD negative woman receiving RhD positive blood products, but a formal process was not in place to provide this information to clinicians. The health service, with their pathology provider are working on a plan for providing this information to clinicians at the time of ordering/administration.

RhD Ig may be appropriate for management of transfusions of RhD positive RBCs or platelets to prevent alloimmunisation in some RhD negative individuals. However, the need for RhD Ig after the transfusion of RhD positive blood components appears to be unclear to many clinicians. In a previous reporting period, an elderly man was unnecessarily administered RhD Ig after receiving a

RhD positive unit of red cells. RhD Ig was not appropriate given his age and sex. RhD Ig may be administered to RhD negative women of childbearing potential to prevent the formation of D antibodies, thereby reducing the risk of haemolytic disease of the fetus and newborn, a condition that can lead to severe or even fatal outcomes for the infant.

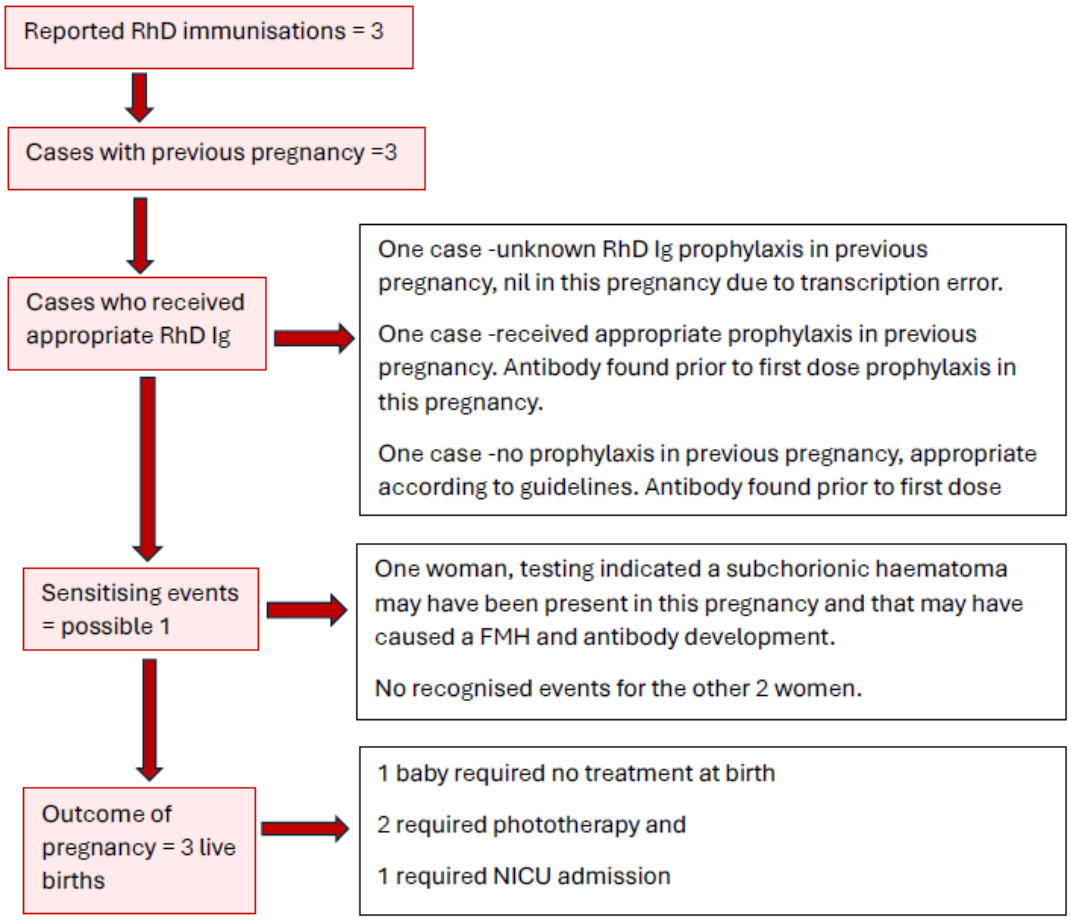
The STIR Expert Group developed a Bulletin, available on the Blood Matters website, to help guide clinicians in the appropriate use of RhD Ig. Bulletin 11: RhD immunoglobulin use in non-obstetric patients, Serious Transfusion Incident Reporting system (STIR) | health.vic.gov.au[3].

RhD isoimmunisation

In this financial year there were three reports of RhD isoimmunisation in pregnant women. One case occurred due to an error in blood grouping, it was unclear if this was due to a wrong blood in tube (WBIT), laboratory error or transcription error. This woman did not receive RhD Ig prophylaxis during this pregnancy and the antibody was not detected until 35 weeks gestation.

Two of the three babies required treatment with phototherapy at birth, with one baby requiring neonatal intensive care unit (NICU) admission and review post discharge.

Table 14: Reported RhD isoimmunisation cases



[3] RhD immunoglobulin (Ig) prophylaxis – non obstetric indications. https://www.health.vic.gov.au/patient-care/serious-transfusion-incident-reporting-system-stir

Despite multiple reports to STIR of missed prophylaxis there have only been a small number of reported isoimmunisation events, and not all of these were related to missed prophylaxis. It appears the development of an antibody in most of the reports has occurred during the current pregnancy and found prior to prophylaxis starting, not because of errors in previous pregnancies.

Transfusion associated circulatory overload (TACO)

As in previous years, TACO is one of the more commonly reported clinical reactions to STIR, with 23 events validated for FY24. RBCs are the most implicated component (91 per cent). Seventy-four per cent of reactions were in patients over 50 years of age. A further 13 per cent of reactions occurred in patients less than a year old, see Table 15. Both groups are at increased risk of TACO, older patients due to possible comorbidities, infants due to their smaller blood volume and the possibility of over transfusing.

Table 15: Data summary – TACO

Characteristic	TACO n = 23 (%)
Age: < 1 year	3 (13)
Age: 1-18 years	1 (4)
Age: 19-29 years	1 (4)
Age: 30-49 years	2 (9)
Age: 50-69 years	6 (26)
Age: 70-79 years	8 (35)
Age: 80+ years	3 (13)
Sex: male	11 (48)
Sex: female	12 (52)
Implicated blood component: RBC	23 (100)
Implicated blood component: platelets	1 (4)
Implicated blood component: FFP	1 (4)

Note: more than one product may have been implicated in some cases.

Most reactions were validated as SR3, as they required treatment but did not contribute to an increased length or stay or escalation of care (Table 16).

Table 16: Severity rating and imputability – TACO

Severity rating	Imputability: certainly	Imputability: probably	Imputability: possibly	Total
SR1	-	-	-	-
SR2	-	1	3	4
SR3	-	11	8	19
SR4	-	-	-	-
Total	-	12	11	23

Case study 6: TACO in a patient with comorbidities

An elderly patient with a history of congestive cardiac failure underwent emergency surgery for severe peritonitis. In the post operative period the patient was found to be hypotensive, and pale, requiring medical emergency team (MET) call. Testing showed a significant drop in Hb. Computed tomography showed active intraperitoneal bleeding, and a massive haemorrhage protocol was activated.

The patient was already in a positive fluid balance and received multiple blood components (RBC, FFP and platelets) in a relatively short timeframe. They were sent to theatre to locate and stop the bleeding, but the procedure was unable to proceed as the patient had rapid respiratory deterioration. The patient developed dyspnoea, reduced oxygen saturation with associated tachycardia and hypotension, requiring intubation and treatment with metaraminol and diuretics. A chest x-ray showed perihilar and lower zone airspace opacities with the appearance of pulmonary oedema, and small bilateral pleural effusions.

Unfortunately, the patient developed multi organ dysfunction and was moved to palliation.

STIR Expert review: TACO, possibly, SR2

In situations of critical bleeding or massive transfusion it is important to assess the patient regularly for potential overload. Patients with a low body weight or those with cardiac pathology are often more at risk of overload than others. It can be difficult to manage fluid volume in these patients as in addition to them receiving large volumes of blood products and potentially other fluids, they may already have a significant positive fluid balance prior to transfusion.

Transfusion-transmitted infection, bacterial

There were two notifications of bacterial infection with transfusion reported but neither were validated. Review of the information provided by the health service along with cross referencing with Lifeblood found these were unlikely related to bacterial contamination of the product and more likely related to the patient's underlying condition.

Transfusion associated graft vs host disease (TAGvHD)

In this year there were no notifications of TAGvHD investigations. This is a rare complication of transfusion in Australia.

Despite still receiving reports of non-irradiated components (RBC) being administered to patients who have a requirement for irradiation, Blood Matters does not receive notifications of associated TAGvHD.

Australia and New Zealand Society of Blood Transfusion (ANZSBT) released updated Guidelines for Prevention of Transfusion-Associated Graft-Versus-Host Disease[4] in January 2024.

Post-transfusion purpura (PTP)

In this year there were no notifications of PTP reported.

This is a rare complication of transfusion. In the last NBA Australian Haemovigilance Report Data for 2019-2020, there were two cases reported between FY16 and FY20. In the SHOT report for

[4] https://anzsbt.org.au/guidelines-standards/anzsbt-guidelines/

2023 there was one case reported, and they noted there had been 10 cases reported over an 11-year period.

Transfusion related acute lung injury (TRALI), Transfusion associated dyspnoea (TAD) and Transfusion transmitted infections (TTI) – viral/other

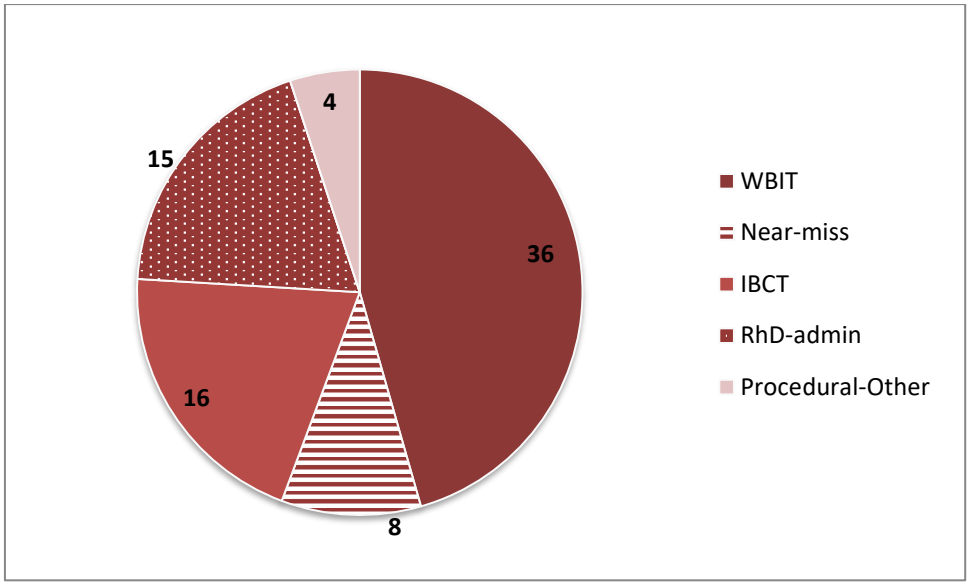
This year there were no validated TRALI (transfusion related acute lung injury), TAD (transfusion associated dyspnoea) or TTI (transfusion transmitted infections) reported.

Procedural events

Procedural events made up 40 per cent (n = 79) of validated investigations this year. This is an increase on FY23 (68 events, 33 per cent). WBIT is again the most frequently reported procedural event (n = 36). Figure 4 shows the number and types of procedural reports validated.

Circumstances contributing to these events require thorough investigation (local, case review or root cause analysis). Learning from these events helps to identify where things can go wrong and improve systems to prevent or minimise recurrence.

Figure 4: Validated procedural reports FY24



Incorrect blood component transfused (IBCT)

Incorrect blood component transfused errors continue to occur, this year representing 20 per cent (n=16) of all procedural errors. ABO incompatible errors are reported rarely to STIR; however, errors where the wrong blood is given to the wrong patient but fortuitously is ABO compatible are reported more often, see Figure 5. These errors often occur due to incorrect or lack of patient identification at the time of administration. Positive patient identification remains one of the most important things we can do to prevent harm to our patients from transfusion. See STIR Bulletin 9 Blood product checking, Serious Transfusion Incident Reporting system (STIR) | health.vic.gov.au[5]. Blood Matters has also produced information outlining the two person independent checking process needed for transfusion, Double independent pretransfusion check[6].

This year there are 16 validated IBCT reports. There was one ABO incompatible report for this period, see Table 17: Types of IBCT events FY24.

[5] https://www.health.vic.gov.au/patient-care/serious-transfusion-incident-reporting-system-stir

[6] https://www.health.vic.gov.au/sites/default/files/2025-02/double-independent-pretransfusion-check.pdf

Figure 5: Reported IBCT categories – FY10–FY24

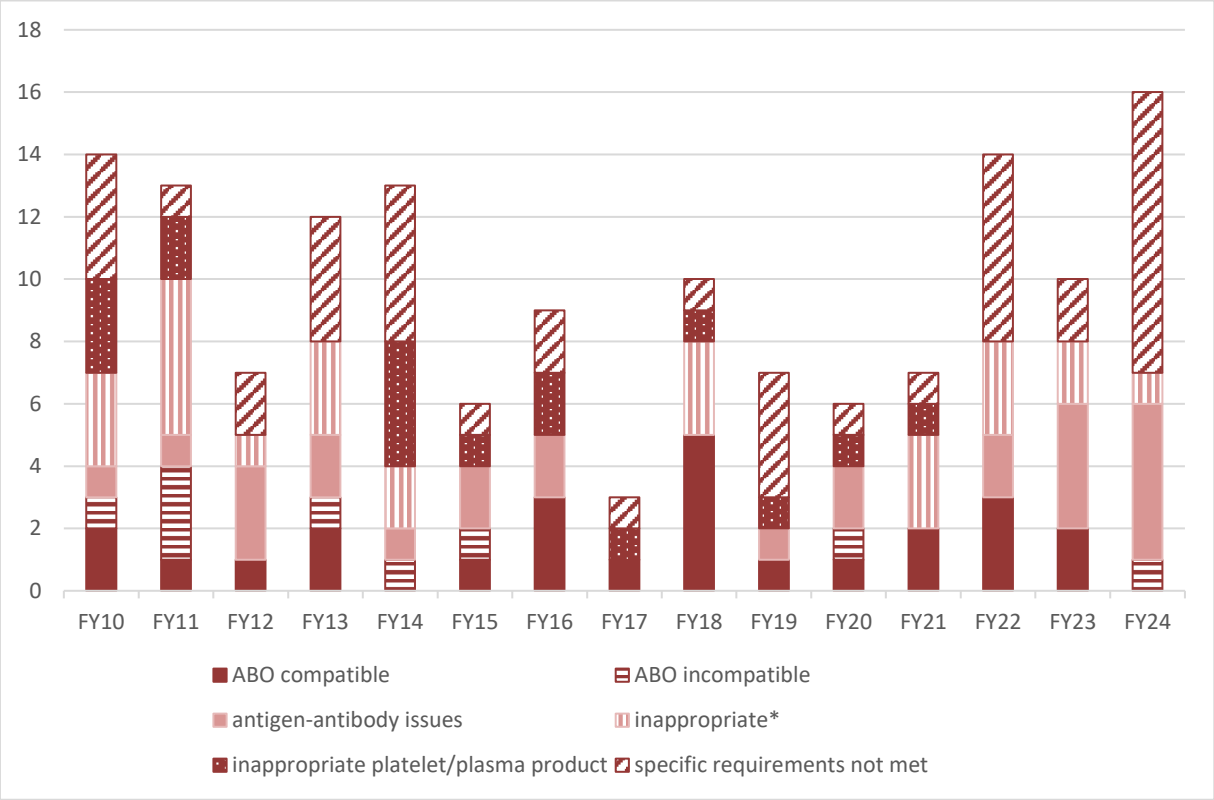


Table 17: Types of IBCT events FY24

Event	Count
ABO incompatible	1
ABO compatible	-
Specific requirements not met	9
Antigen-antibody incompatibility, including RhD	5
Inappropriate (no clinical need)	1

Table 18: Where IBCT events occurred

Location	Count
Ward	5
Emergency department (ED)	5
ICU	2
Operating theatre	2
Other - laboratory	2

Incompatible units found on post emergency transfusion testing

In FY24, there were three reports of IBCT associated with emergency units (O RhD negative in all cases).

This highlights that the use of emergency units is not without risk. In compatibility testing undertaken post transfusion it was found in each instance that the patient had an antibody that was incompatible with the unit transfused. For one patient it was found they had multiple antibodies. In two cases the patients succumbed to their massive blood loss. The third patient survived and did not have any indications of a reaction to the blood component.

Emergency units should only be used in urgent/emergency situations where the risk of waiting for group specific or cross matched units is too great. Emergency units should not be used for convenience.

If there are concerns regarding compatibility and the use of emergency blood, a laboratory haematologist should be consulted.

Case study 7: ABO incompatible red cell transfusion

A patient experienced significant haematuria postoperatively and had a drop in Hb from 93g/L to 86g/L over 12-24 hours, at which point a decision was made to administer a unit of red cells.

The transfusion was commenced with no apparent side effects. However, staff noticed that blood intended for this patient was at the bedside of the patient in the next cubicle. The transfusion was immediately ceased.

Investigation showed the patient blood group to be O RhD positive, while the unit (intended for the patient in the next cubicle) was A RhD positive, an ABO incompatible transfusion.

The patient received approximately 60mL of incompatible blood and showed signs and symptoms that may have indicated a relatively mild reaction, flushing, dyspnoea, headache and chest pain post transfusion. However vital signs remained stable.

STIR Expert group review: IBCT, ABO incompatible, certainly, SR1

This event was given SR1 due to the potential serious consequences of administering an ABO incompatible unit.

The reporter noted the pre transfusion checking procedure had not been followed and did not identify that the RBC were labelled for a different patient. However, they did not describe how the two units of blood ended up at the wrong patient’s bedside.

In the 2023 SHOT UK Annual Report there were seven ABO-incompatible RBC transfusions reported, resulting in major morbidity. All seven cases reported were in adult patients and were due to errors in the clinical space, four related to blood collection errors and three from administration errors and lack of pre-transfusion safety checks.

In a review of ABO incompatible RBC transfusion reports from American Blood Centers, Janatpour et al, (2008) found:

- All ABO-incompatible transfusions were due to error; 26 (62 per cent) of 42 occurred at the patient’s bedside.
- Of 36 patients who received more than 50 mL of incompatible RBC, 23 (64 per cent) showed signs or symptoms related to the incompatible transfusion, and 6 (17 per cent) died.
- Only 3 (25 per cent) of 12 patients who received 50 mL or less of incompatible RBC had associated signs or symptoms, and none died.
- Hypotension, haemoglobinuria, and/or haemoglobinemia were the most frequent findings in survivors and patients who died.

While STIR has not had reports of ABO incompatible transfusions directly causing a patient death, there have been instances where it may have contributed to a patient already at risk. Of the ABO incompatible RBC incidents reported to STIR there have been a number where the patient required an extended hospital stay or ICU admission. Of the 15 ABO incompatible transfusions reported since commencement of the STIR program, 10 related to RBC, and five to FFP. Two patients died, with the underlying condition thought to be the most likely cause, but an ABO incompatible transfusion could not be ruled out as a contributory factor. Four events resulted in ICU admission and another four resulted in an increased length of stay.

The importance of the pre-transfusion checks, performed at the patient side and including the patient stating and spelling their name and date of birth, where possible, cannot be stressed enough. Double independent checking requires both staff to perform the checks individually and in the presence of the other staff member. At the end of the checks, the staff members need to confirm that they are both sure that this blood component is meant for this patient and is compatible with the patient.

Case study 8: Specific requirements not met; cytomegalovirus (CMV) seronegative component

A pregnant woman with placental abruption was given an emergency transfusion of RBC in the operating room. The laboratory did not note the patient was pregnant and therefore did not provide a CMV negative component, as per health service policy. The staff administering the product did not check for CMV status, and it is unclear if the request to the laboratory or the prescription included this as a requirement. On review by the health service the woman was CMV positive and there was no apparent harm to the baby.

STIR Expert review: IBCT (as per health service policy), possibly, SR4

CMV seronegative units are required only during the pregnancy to protect the fetus, after delivery the woman no longer requires CMV seronegative products unless there are other indications.

Comments: Cytomegalovirus is a herpes virus that gives rise to chronic, persistent and, for the most part, asymptomatic infection in most adults worldwide, (SaBTO CMV tested blood components position paper, 2012).

Women who become infected with CMV while pregnant may pass the virus to their unborn child (congenital CMV). If an unborn baby is infected with CMV, they may develop serious health problems such as hearing loss, developmental delay or learning problems. Infection with CMV during pregnancy may also lead to stillbirth or infant death.

All cellular blood components in Australia are leucodepleted. Neither leucodepletion nor CMV seronegativity completely eliminates the risk of CMV transmission. Some data suggests CMV seronegative components and leucodepleted components have similar risk of CMV transmission. Whether using a combination of leucocyte depletion and CMV-seronegative components provides any additional safety benefit is unknown (Cytomegalovirus (CMV) seronegative components | Lifeblood)[7].

Lifeblood maintains an inventory of CMV seronegative RBC and platelet donations which are available on request for specific clinical indications.

[7] https://www.lifeblood.com.au/health-professionals/products/blood-components/modifications/CMV-seronegative

Lifeblood suggest CMV seronegative components should be used for the following clinical indications:

- pregnant women regardless of CMV status who require regular elective transfusions during pregnancy (but not during delivery)
- recipients of intrauterine transfusions
- neonates (up to 28 days post expected date of delivery), and
- granulocyte transfusions for CMV negative patients.

For other groups, the use of CMV seronegative or leucodepleted blood products (that is, CMV safe), will be dictated by local clinical policies:

- solid organ transplants
- haemopoietic stem cell transplants
- haematology and oncology patients, and
- immunodeficient patients, including those with HIV.

In an emergency, where blood is needed but CMV seronegative components are not available transfusion should not be delayed awaiting these products.

Procedural – other

There were four validated reports in this category for FY24.

These reports include:

- delayed, under or over transfusion, which has been included in the National Blood Authority (NBA) 2024 Australian haemovigilance minimum data set
- right blood, right patient (RBRP), where a patient is transfused correctly despite one or more serious identification (ID) or prescription errors that in other circumstances might have led to an IBCT
- handling and storage errors, where the unit is transfused to the patient despite errors that could cause damage to the unit, and subsequently the patient.

Table 19 describes the types of validated procedural events FY24.

Table 19: Types of validated procedural other events FY24

Category	Number
Delayed, under or over transfusion	1
Right blood, right patient (RBRP)	3
Handling and storage errors (HSE)	-

Case study 9: Incomplete patient handover, leading to unnecessary transfusion

A patient was transferred from ICU to the ward. On the ward a full blood count specimen was taken, however, prior to availability of results the clinical team prescribed and administered a unit of RBC, possibly due to previous result of Hb 71g/L.

After the RBC unit was transfused, it became apparent that the patient had already received a transfusion in ICU, and that the unit administered on the ward was unnecessary, pre transfusion Hb was 91g/L.

STIR Expert review: Procedural other certainly SR4

Comment: It is important that all care is communicated and documented during handover of patients. Where there is any uncertainty, this must be clarified before proceeding with treatment.

Case study 10: Double independent pretransfusion checking not completed prior to spiking bag

FFP was incorrectly requested for a patient in ICU instead of the platelets required for thrombocytopenia. The FFP was collected and taken to the ward where the nursing staff spiked the bag prior to completing the pretransfusion check. The health service noted this does not align with their policy for checking blood. When checking did take place, the staff found the blood component was not what was prescribed, disconnected the FFP and requested the correct component. Unfortunately, because the FFP had been spiked it could not be returned to inventory and was discarded.

STIR Expert review: Procedural other certainly SR4

Comment: Health services should ensure blood administration guidelines clearly state that the pretransfusion check of the blood component to the patient must occur immediately prior to spiking the bag.

Spiking of bags ahead of checking leads to waste if there is an error in ordering or the component has been taken to the wrong bedside. There may also be a degree of complacency if the bag is already spiked, the staff checking may assume the component is attached to the correct patient, despite the checks not yet occurring.

Near miss

This year, there were eight reports of near-miss events as shown in Table 20.

Table 20: Types of validated near miss events FY24

Event type	Count
Administration	-
Labelling/documentation	1
Inappropriate component issued	4
Laboratory	2
Incorrect prescription or request for blood	1

Case study 11: Missed alert to RhD incompatibility

A scientist was issuing a unit of RBC to a group AB RhD negative patient. The scientist chose an A RhD positive unit of RBC from the inventory in error. During the issuing process the laboratory information system alerted the scientist to both the discrepancy in ABO group and RhD group in one alert. The scientist expected and saw the alert for the ABO group but missed the second part of the alert regarding the RhD group discrepancy. The unit was issued and sent to the ward for

administration. Fortunately, the staff performing the pre-transfusion checks noted the wrong RhD group and contacted the laboratory, returning the unit.

STIR Expert review: Near miss, SR4

Comments: This is not the first time this type of error has been reported to STIR. A case study in the FY22 report led to the transfusion going ahead when the clinical staff did not note the error at the pre-transfusion checks. Displaying both ABO and RhD warnings in a single alert can be problematic. A scientist may carefully select an ABO-compatible, though not identical, unit but inadvertently overlook an RhD incompatibility. An alert is expected, due to the ABO, however if busy, distracted or simply acknowledging an expected alert, it is easy to miss the second part of the alert regarding RhD status. All alerts should be meaningful and require individual acknowledgement.

Wrong blood in tube (WBIT)

WBIT errors, most commonly by nurses and midwives (83 per cent, 30 of 36 events) collecting specimens, continue to form a significant proportion of the procedural errors received by STIR (Table 21).

WBITs occur in part due to factors such as high and variable workload, patients who may not be able to participate in identification procedures, or patients not yet identified. Emergency and midwifery (67 per cent, 24 of 36 events) remain the areas with the most WBIT errors (Figure 6). The error is often recognised by the laboratory when results are discrepant with historical records (Table 22) if the laboratory has a historical record for the named patient.

Table 21: WBIT collectors identified

Staff member	Number (%)
Medical	5
Nursing	26
Pathology collector	1
Other: Midwife	4

Figure 6: Location of WBIT errors

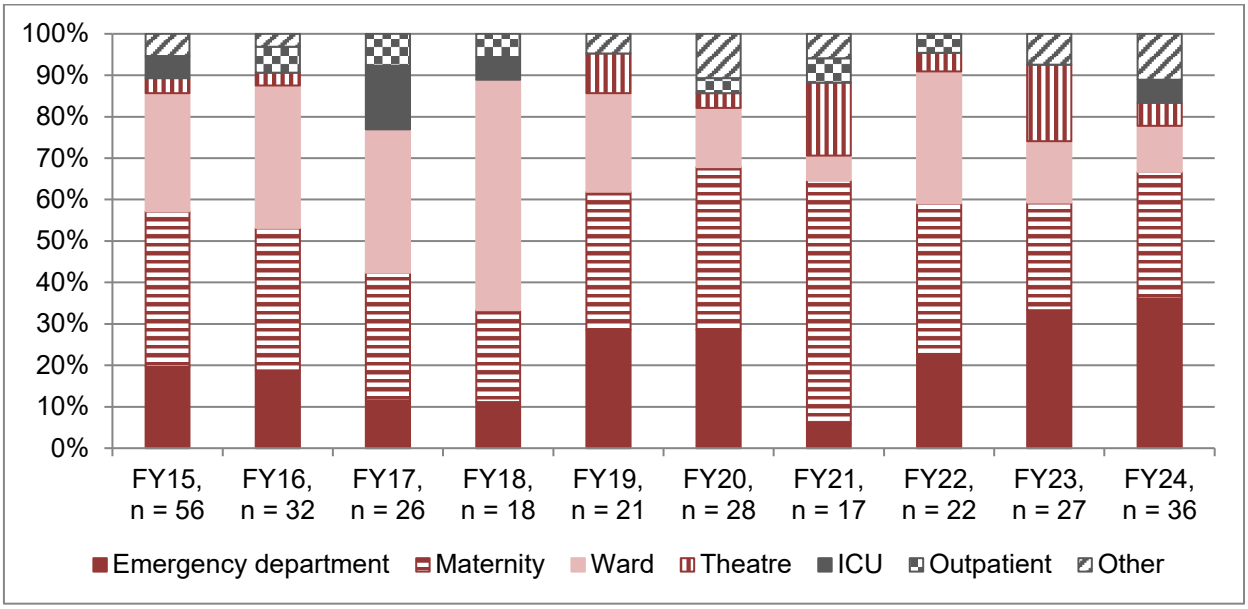


Table 22: How the WBIT was recognised

Category	Number (%)
Recognised prior to testing	10 (28)
Discrepancy noted when comparing sample results with historical record	20 (56)
Recognised post-testing but prior to issue	2 (6)
Significant change in mean corpuscular/cell volume (MCV) compared with prior testing	-
Recognised post-issue but prior to transfusion	-
Other (include two events where the Kleihauer film was reviewed and found to contain baby's cord blood, not mothers blood, as named on specimen and request)	4 (11)
Total incidents	**36**

The three most common contributing factors (Table 23) reported, are the correct checking procedure for patient identification not being followed, the sample tube not labelled at the patient side, and use of incorrect addressograph labels. This has been the case for all but one of the reporting periods in the last five years. Despite ongoing education, WBIT events continue to occur and appear to occur for the same reasons.

Table 23: WBIT contributing factors

Contributing factor	Number (%)
The correct checking procedure for patient identification was not followed	27 (75)
The sample tube was not labelled at the bedside	14 (39)
Use of incorrect addressograph labels	11 (31)
Incorrect use of electronic medical record (EMR) for specimen collection	6 (17)
Unknown	4 (11)
Patient not wearing a wristband	1 (3)
Other	1 (3)

Number is greater than total WBIT as more than one contributing factor could be selected.

Case study 12: More than one staff member involved in the specimen collection and labelling process

A staff member collecting a routine specimen during business hours on a ward, handed the specimen to a second staff member for labelling. The specimen and request were labelled away from the patient side without positive patient identification taking place. The discrepancy was found by the laboratory when results did not match the historical record for the named patient.

STIR Expert review: WBIT, certainly

Comments: To ensure the safety of the collection process local procedures must include:

- having a request form (either paper-based or EMR) with patient identification details completed prior to taking this to the patient side
- confirmation via positive patient identification prior to specimen collection matching the patient details with the paper request form or the EMR request
- only labelling specimens at the patient's side, immediately after specimen collection.
- most specimens can and should be labelled by the collector at the patient's side at the time of collection, where this cannot occur (e.g. collector performing sterile procedure), the person labelling and signing for the specimen needs to complete all patient and specimen identification.

Case study 13: WBIT associated with patient admitted under incorrect details

A blood group and antibody screen specimen that was sent to the transfusion laboratory was a different blood group to that on record for the named patient. On investigation it was found that the patient had been admitted under the hospital number of another patient with a similar name. The clerk admitting the patient had inadvertently chosen the wrong patient and then changed details to match the current patient. The staff member undertaking the specimen collection was unable to identify the issue as the name and date of birth matched the patient's (changed by clerk). The laboratory noted the discrepancy as the hospital number was for a different patient and brought up their blood group record.

STIR Expert review: WBIT, certainly

Comments: All health service staff must be informed and educated about the importance of, and how to perform correct patient identification. If these types of errors occur it is almost impossible for clinical staff to recognise the discrepancies.

Case study 14: Incorrect use of EMR for specimen ordering and collection

A staff member collected a group and screen specimen from a patient prior to placing an order in the EMR. The collected specimens were placed in their pocket before leaving the patient side to access a computer to place the order and print out specimen labels. This was despite a computer and printer being available in the patient's room. The error was detected when the patient's historical blood group did not match the current specimen. There was no positive patient identification undertaken for this specimen collection, and specimens were not labelled at the patient side.

STIR Expert review: WBIT, certainly

Comments:

An EMR generally includes steps to increase the safety of the specimen collection process. However, where staff deviate from the approved process, the safety aspects are no longer in place. If using an EMR for specimen collection:

- the order must be placed prior to collection of the specimens
- the workstation on wheels must be taken to the patient's side to complete patient identification against the EMR order, or if using a printed request, the request must be printed and taken to the patient's side
- any patient labels printed from the EMR should be printed at the patient's side and placed on the collected specimens prior to moving away
- if labels are unable to be printed immediately, specimen labelling should be handwritten prior to leaving the patient bedside with subsequently printed labels then attached, only if approved by laboratory and clinical procedures.

RhD immunoglobulin (RhD Ig) errors

This year RhD Ig administration errors were 20 per cent of all procedural errors. While administration errors such as missed dose and delayed dosing continue to occur, few reports of RhD isoimmunisation (three this year) are received. As shown, the majority of RhD Ig investigations relate to antenatal prophylaxis (Table 24) and involve omission of one or more doses (Table 25) for a RhD negative woman (10 of 15 events, 67 per cent).

Table 24: RhD Ig errors – intended administration (n = 15)

Intended administration indication	Number (%)
Antenatal prophylaxis	9 (60)
Sensitising event	1 (7)
Postnatal	5 (33)

Table 25: Types of RhD Ig incidents

Type of incident	Number (%)
Administered, not required (RhD negative mother with known RhD negative baby)	1 (7)
Administered, not required (RhD positive woman)	2 (13)
Administered, not required (woman with immune anti-D)	-
RhD Ig dose omitted	7 (47)
Delay in administration (> 72 hours)	3 (20)
Wrong or inadequate dose	-
Other: Patient identification: prescribed RhD Ig administered to different patient Storage & Handling: RhD Ig stored in fridge out of appropriate temperature range	2 (13)

Case study 15: Storage issues for RhD Ig in vaccine fridge

A health service reported the vaccine fridge that RhD Ig was stored in had a power outage for 4.5 hours, and a subsequent temperature rise above range required for RhD Ig storage. An alert that indicated a problem with the fridge was not followed up to investigate the problem. During this time, a dose of RhD Ig was removed from the fridge and administered to a woman. There was no comment on whether the staff member noted the fridge alarm, but if so, no action was taken. Twelve further vials of RhD Ig stored in the fridge had to be discarded due to unknown temperature range during storage. Investigation by the health service found it was likely that the power button on the fridge had accidentally been pressed.

The health service performed open disclosure with the woman and as it was unclear if the RhD Ig was out of correct storage and offered her another dose in case the original dose given was inadequate due to damage to the product. As a result of the incident, the health service protected the power button with a cover to prevent accidental pressing and reviewed the alarm and checking processes for when the fridge does alarm.

Case study 16: Delay in RhD Ig administration due to appointment availability to see doctor.

Appointment at 22 weeks delayed until 31 weeks when blood test was taken and RhD Ig administered.

A patient's 22-week antenatal appointment was cancelled due to the doctor being unwell. It was suggested at this time the patient make an appointment with her General Practitioner (GP) instead (shared care arrangement) however, the first available appointment was in four weeks' time. When this appointment was due, the GP was unwell, and the appointment was cancelled. The patient made an appointment at another medical clinic and was seen at 31 weeks, at which time she had blood tests taken, but no blood grouping. Two days later she presented at the health service antenatal clinic when a blood group and antibody screen specimen was taken. Her first RhD immunoglobulin dose was given at 32 weeks.

Comments: it appears the patient was aware that she required RhD Ig but was unable to make an appointment in the appropriate time frame. At the time of reporting the woman had not yet delivered, so it is unclear if she developed an RhD antibody due to delayed RhD immunoglobulin administration.

Unforeseen circumstances can sometimes mean that routine Rh D immunoprophylaxis is delayed. However, it is important for health services to follow up patients most at risk if not seen. This includes taking measures to ensure patients are able to communicate with the health service regarding accessing care to prevent missed or late administration.

Cell salvage

As in previous years there have been no reports of cell salvage errors. STIR accepts notifications of both intra-operative and post operative cell salvage events. Reactions or errors involving autologous blood use are included in other reporting forms, depending on the type of reaction of incident.

References

Janatpour, KA, Kalmin, ND, Jensen, HM, Holland, PV. *Clinical Outcomes of ABO-Incompatible RBC Transfusions,* Am J Clin Path, 2008; 129, 276-281.

Narayan, S. et al., 2024. The 2023 Annual SHOT Report, Manchester: Serious Hazards of Transfusion (SHOT) Steering Group. https://doi.org/10.57911/605r-em59

National Blood Authority, Guideline for the prophylactic use of Rh D immunoglobulin in pregnancy care, 2024. Guideline for the prophylactic use of Rh D immunoglobulin in pregnancy care Published 2024 (6).pdf

National Blood Authority, Australian Haemovigilance Report, Data for 2021-22.

New Zealand Blood Service, National Haemovigilance Programme, Annual Report 2023.

Appendix 1: STIR Expert Group members

Members as of 1/7/24

Name	Title and affiliation
Dr Mandy Davis (Chair)	Consultant Haematologist, Alfred Health, Victoria
Dr Giles Kelsey	Consultant Haematologist, Melbourne Health, Victoria
Ms Christine Akers	Transfusion Nurse, Blood Matters Program, Victoria
Ms Clare Hennessy	Manager, Blood Matters Program, Victoria
Dr Philip Crispin	Consultant Haematologist, The Canberra Hospital, Australian Capital Territory
A Prof Erica Wood	School of Public Health and Preventative Medicine, Monash University, Victoria
Ms Bridget Glazebrook	Data Manager, Blood Matters Program, Department of Health, Victoria
Dr Chris Hogan	Director Pathology Services, Austin Health
Dr Ellen Maxwell	Director of Haematology, Melbourne Pathology
Dr Tina Noutsos	Haematologist, Royal Darwin Hospital, Northern Territory
A Prof Merrole Cole-Sinclair	Director of Haematology, St Vincent's Hospital, Victoria
Dr Linda Saravanan	Haematologist, Melbourne Pathology
Ms Mary Comande	Blood Bank Scientist, Royal Children's Hospital
Dr James Daly	Medical Director of Pathology Services, Australian Red Cross Lifeblood
Ms Kaylene Bastin	Education Co-ordinator, Blood Matters Program, Victoria
Dr Kobie von Wielligh	Transfusion Medicine Specialist, Australian Red Cross Lifeblood
Ms Rae French	Scientist, Blood Matters Program, Victoria
Dr Anna Hutchinson	Haematologist, Royal Hobart Hospital, Tasmania
Dr Zhi Tan	Transfusion Medicine Specialist, Australian Red Cross Lifeblood

Appendix 2: STIR publications and promotions

Bulletins

- Bulletin 10: Wrong blood in tube (WBIT) – what can we do to reduce errors? (July 2023)
- Bulletin 11: RhD immunoglobulin -non obstetric indications (December 2024)

Appendix 3: Imputability and severity scores

Imputability scores

Imputability/causality	Definition
Not assessable	When there is insufficient evidence for an imputability definition
Excluded	When there is conclusive evidence that the cause of the incident is attributable to other causes and not the transfusion
Possibly	When the evidence is indeterminate for attributing the incident to either the transfusion or other causes
Probably	When the evidence is clearly in favour of attributing the incident to the transfusion
Certainly	When the evidence is conclusively attributable to the transfusion

Severity scores

Severity	Incident
1	Relatively infrequent, clear-cut events that occur independently of a patient's condition; commonly reflect health service system and process deficiencies; result in, or have the realistic potential to result in, an unexpected death or a permanent and disabling injury of psychological harm to a person and includes reportable sentinel events
2	Events that result in a temporary loss of function (sensory, motor, physiological or intellectual) which is unrelated to the natural course of the patient's illness and differ from the expected outcome of the patient's management
3	Events that result in a person requiring increased treatment, but not hospitalisation or an increased length of stay
4	Events that result in minor injury requiring only first aid treatment or no injury

Appendix 4: Case studies

Number	Case study
1	FNHTR to buffy coat granulocytes
2	Anaphylactic reaction to FFP during therapeutic plasma exchange
3	Possible hypotensive transfusion reaction
4	DHTR after routine transfusion
5	Woman receiving RhD positive platelets developed anti-D
6	TACO in patient with comorbidities
7	ABO incompatible red cell transfusion
8	Specific requirements not met, cytomegalovirus (CMV) seronegative components
9	Incomplete patient handover, leading to unnecessary transfusion
10	Double (two person independent) checking not completed prior to spiking bag
11	Missed alert to RhD incompatibility
12	More than one staff member involved in the sample collection and labelling process
13	WBIT associated with patient admitted under incorrect details
14	Incorrect use of EMR for specimen ordering and collection
15	Storage issues for RhD Ig in vaccine fridge
16	Delay in RhD Ig administration due to appointment availability to see doctor.