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2024-2025 Saskatchewan Transfusion Transmitted Injuries Surveillance System (TTISS) Summary Report

2025 Saskatchewan Transfusion Medicine Symposium
September 16, 2025

Healthy People, Healthy Saskatchewan

The Saskatchewan Health Authority works in the spirit of truth and reconciliation, acknowledging Saskatchewan as the traditional territory of First Nations and Métis People.

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Transfusion Safety and Reporting

TTISS Program

- The Transfusion Transmitted Injuries Surveillance System (TTISS) Program within the Blood Safety Contribution Program (BSCP) of the Public Health Agency of Canada (PHAC).
- Established in 2001, the TTISS monitors transfusion related adverse reactions occurring in Canadian healthcare settings.
- Reporting to the TTISS is voluntary; however, Transfusion Medicine Lab (TML) accreditation standards require monitoring of adverse transfusion reactions.
- Deidentified data from submitted SK Transfusion Adverse Event Report (TAER) Forms is input by TML Staff into an electronic portal that supports TTISS data collection.

- ***Thank you to the RNs for completing and submitting the TAER forms!***

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Transfusion Activity in Saskatchewan

- Saskatchewan is accountable for ~3.6% of the total amount of blood components (red cells, platelets, frozen plasma, cryosupernatant plasma and cryoprecipitate) transfused in Canada (excluding Quebec).
- **66 healthcare facilities** transfuse blood components and blood products in the province
- Transfusion adverse reaction reports are reviewed to ensure acute identification of blood component quality issues and blood product lot-number related serious adverse reactions or clusters.
- Provincial data submitted to TTISS is reviewed annually to understand adverse transfusion reaction rates and trends and may influence decisions made related to improve transfusion safety and patient care.

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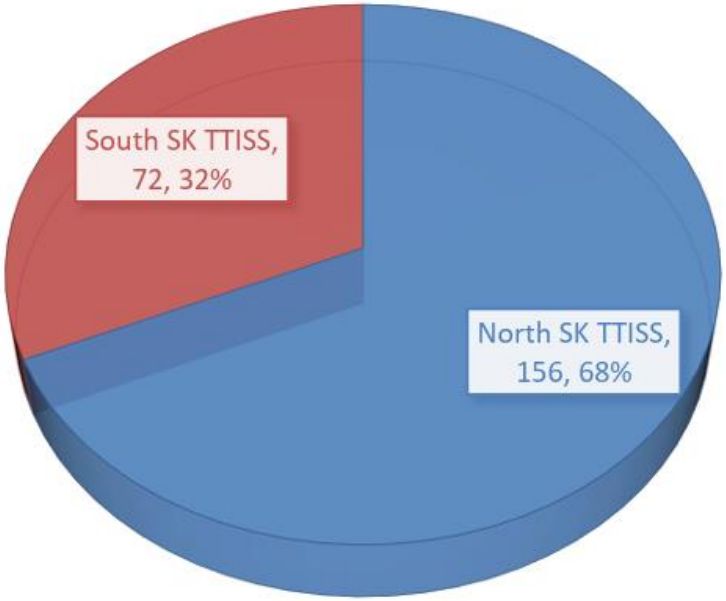
Total Adverse Reactions Reported by Transfusing Facilities to SK TTISS

- **228** adverse reactions were reported to SK TTISS by transfusing facilities in **2024**

Adverse Reactions Reported to SK TTISS – 5 Year Comparison

Surveillance Year	2020	2021	2022	2023	2024
Total Adverse Reactions Reported	227	208	212	254	228

Adverse Reactions Reported to North and South SK TTISS (N=228)



- **72 (32%)** adverse reactions were reported to **Regina (South TTISS)**
- **156 (68%)** adverse reactions were reported to **Saskatoon (North TTISS)**

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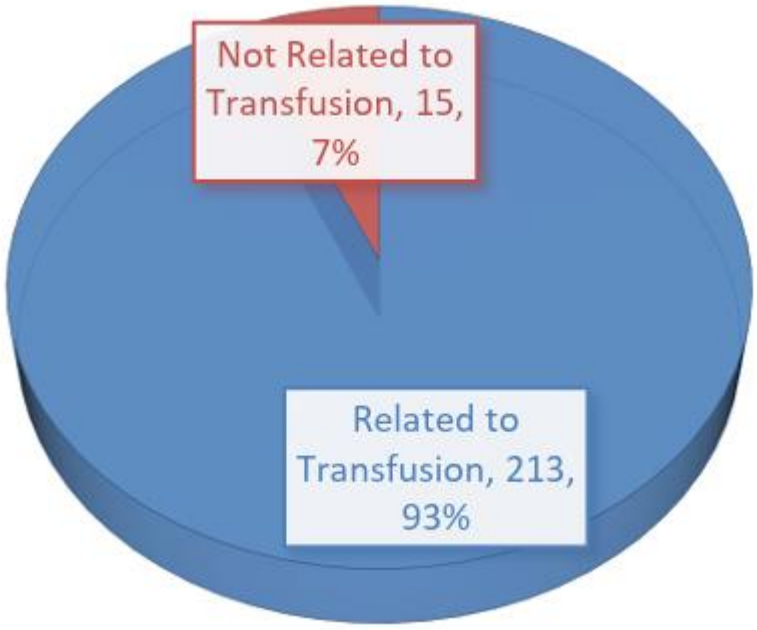
Relationship of Adverse Reaction to Transfusion

- **Of the 228 adverse events reported to SK TTISS in 2024:**
  - 15 (7%) adverse reactions were determined ‘NOT related to transfusion’ and were excluded from data evaluation
  - 213 (93%) adverse reactions were determined to be ‘related to the transfusion’ of blood components and plasma derivatives



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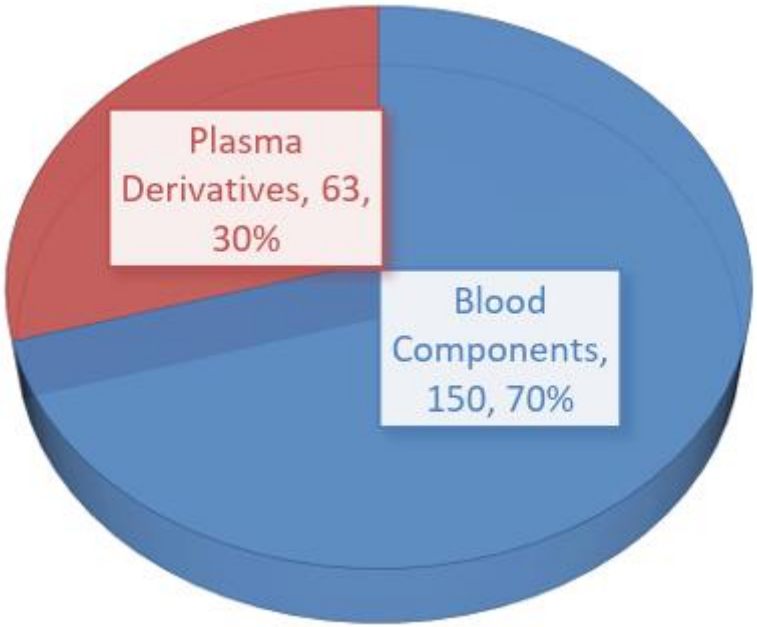
Adverse Reactions to Blood Components and Blood Products

- **Of the 228 (93%) adverse reactions related to transfusion:**
  - 150 (70%) adverse reactions were related to transfusion of blood components
  - 63 (30%) adverse reactions were related to transfusion of blood products (plasma derivatives)



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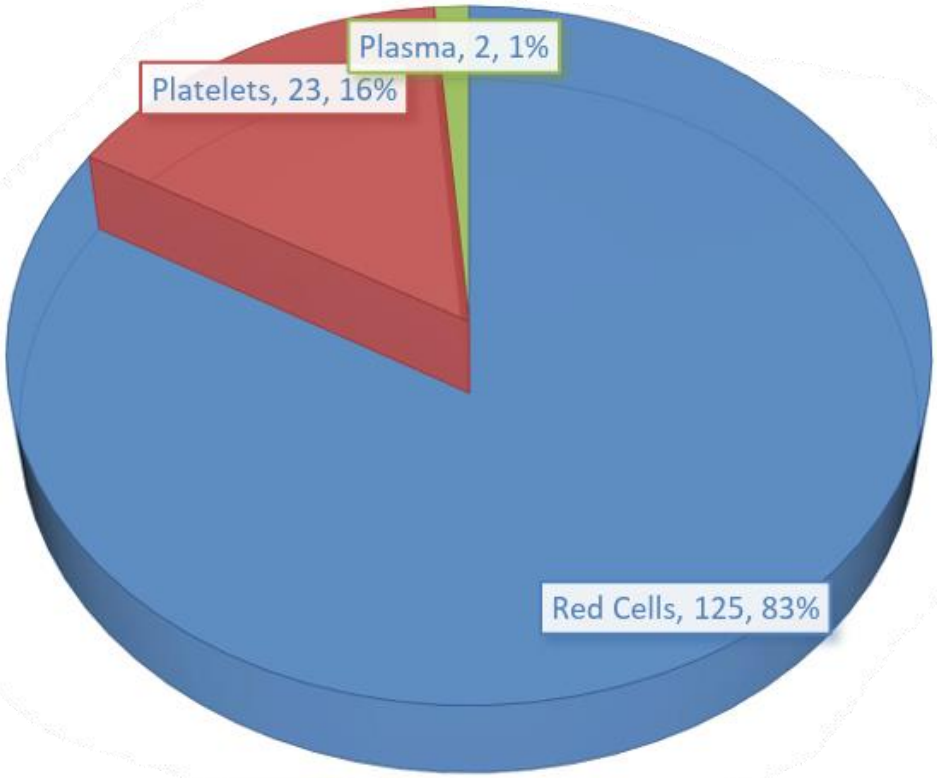
Types of Blood Components Associated with Adverse Reactions (N=150)



Reported reactions to platelets in 2024 included non-treated and psoralen treated (apheresis and pooled) platelets

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Reference List for Abbreviations of Reaction Types

Abbreviation	Full Name
AHTR	Acute Hemolytic Transfusion Reaction
DHTR	Delayed Hemolytic Transfusion Reaction
DSTR	Delayed Serological Transfusion Reaction
FNHR	Febrile Non-Hemolytic Transfusion Reaction
SAAR	Severe Anaphylactic/Anaphylactoid Reaction
TACO	Transfusion Associated Circulatory Overload
TAD	Transfusion Associated Dyspnea
TRALI	Transfusion Related Acute Lung Injury

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Reference List List of PHAC Definitions

SEVERITY OF ADVERSE REACTION	
Grade 1 (Non-Severe)	The recipient may require medical intervention (e.g. symptomatic treatment) but lack of such would not result in permanent damage or impairment of a body function.
Grade 2 (Severe)	• The recipient requires in-patient hospitalization or prolongation of hospitalization directly attributable to the event; • The adverse event results in persistent or significant disability or incapacity; or • The adverse event necessitates medical or surgical intervention to preclude permanent damage or impairment of a body function.
Grade 3 (Life-threatening)	The recipient required major intervention following the transfusion (vasopressors, intubation, transfer to intensive care).
Grade 4 (Death)	The recipient's death was suspected to be the consequence of a transfusion reaction.
NOT DETERMINED	The consequences of the transfusion reaction are not certain.
OUTCOME OF ADVERSE REACTION	
Death	Death was directly or indirectly transfusion-related.
Major or Long-Term Sequelae	The recipient developed either an infection with a persistent infectious agent (HIV, Hepatitis C, Hepatitis B), or a transfusion reaction with major or long-term sequelae or the anticipation of difficulties with future transfusions (e.g. development of antibodies to antigens present in more than 95% of donations).
Minor or No Sequelae	The recipient had no sequelae or permanent disability from the reaction or developed antibodies to low or medium frequency antigens (<95%).
Not Determined	The outcome of the adverse event is not certain.

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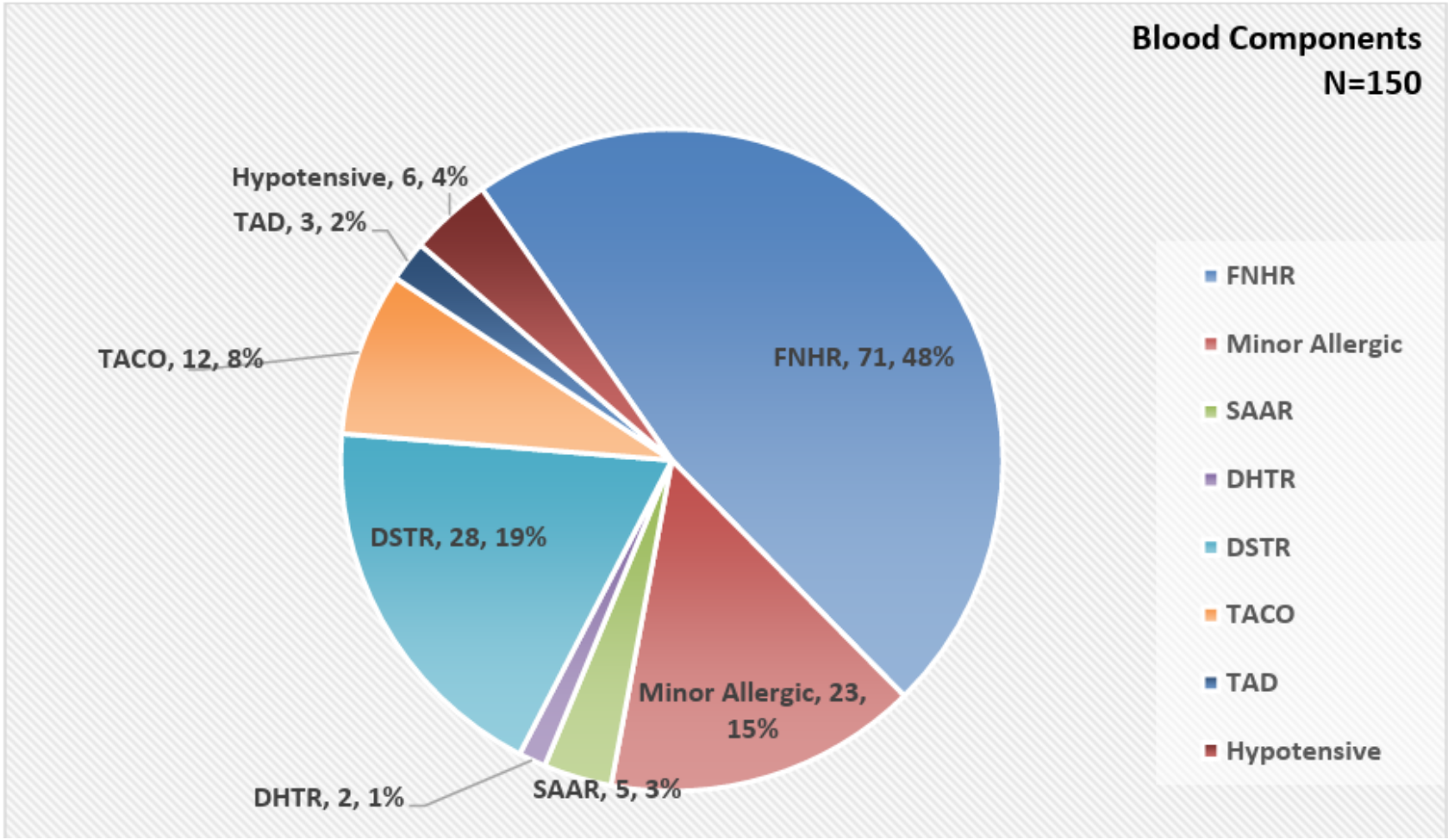
Frequency of Reaction Types to Blood Components (N=150)



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Severity and Outcome of Adverse Reactions to Blood Components

Severity of Adverse Reaction:

- 94% (141) were Grade 1 (non-severe)
- 5% (8) were Grade 2 (severe; e.g. longer hospitalization, recovery impact)
- <1% (1) adverse reactions to blood components were grade 3 (life threatening) severity and included severe/anaphylactic/anaphylactoid reaction (SAAR), transfusion associated circulatory overload (TACO), transfusion associated lung injury (TRALI) and 'Other'.

Outcome of Adverse Reaction:

- 3 (2%) adverse reactions resulted in patient having major or long-term sequelae after transfusion of a blood component.
- There were no deaths associated with blood component transfusion

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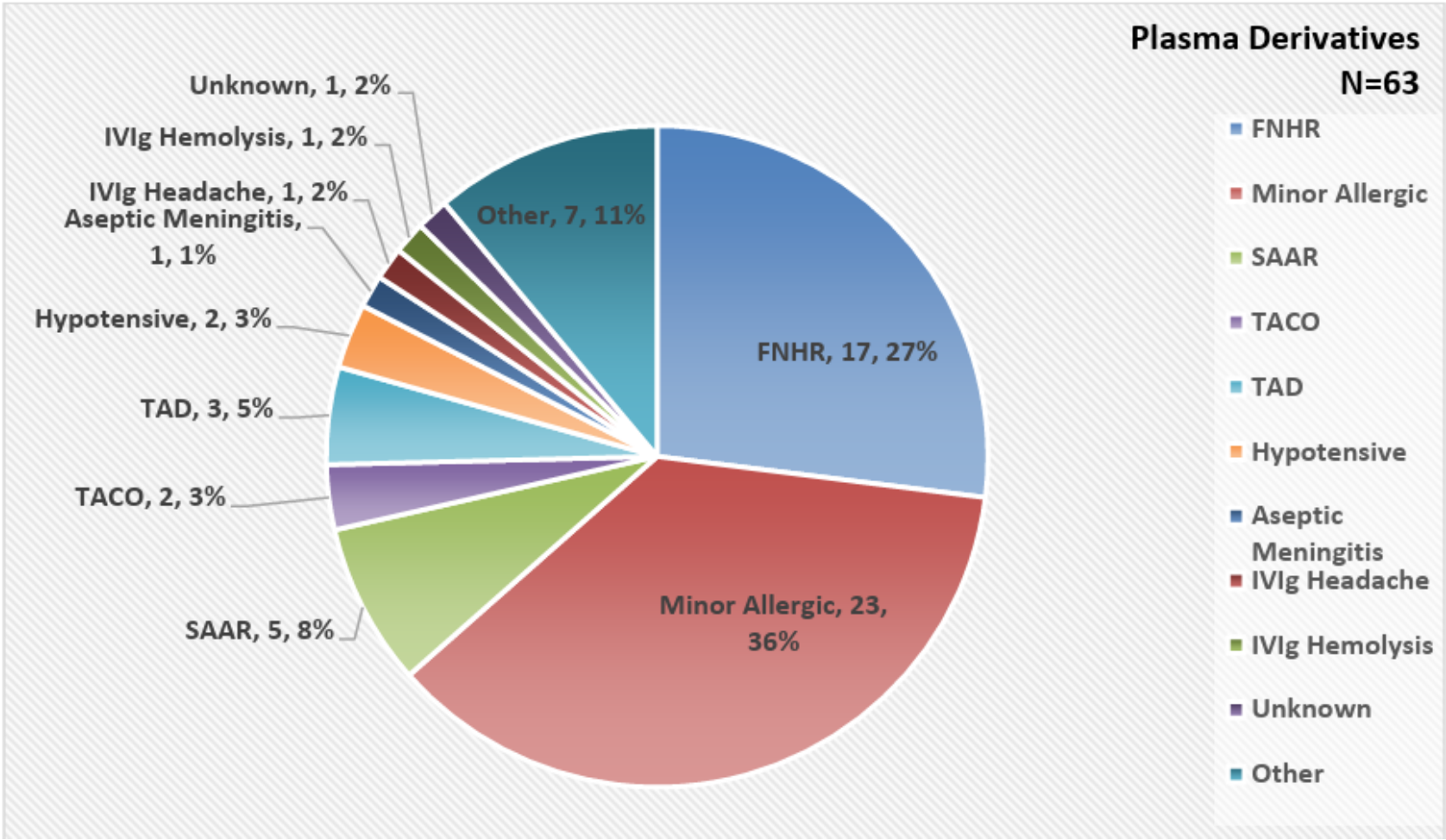
Frequency of Reaction Types to Blood Products (N=63)



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Severity and Outcome of Adverse Reactions to Blood Products

7.4 Table: Severity of Adverse Reactions to Plasma Derivatives (N=63)

Reaction Type	Grade 1	Grade 2	Grade 3	Death	Not Determined	Total
Febrile Non-Hemolytic	16	1	0	0	0	17
Minor Allergic	23	0	0	0	0	23
SAAR	2	2	1	0	0	5
TACO	1	1	0	0	0	2
TAD	3	0	0	0	0	3
Hypotensive	2	0	0	0	0	2
Aseptic Meningitis	1	0	0	0	0	1
IVIg Headache	1	0	0	0	0	1
IVIg Hemolysis	1	0	0	0	0	1
Unknown Reaction	1	0	0	0	0	1
Other	6	1	0	0	0	7
Total	**57**	**5**	**1**	**0**	**0**	**63**

- No major outcomes

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Transfusion Reaction Recognition

Report Using the TAER Form

TRANSFUSION MEDICINE

Transfusion Reaction Bedside Algorithm

PATIENT EXHIBITS SIGNS AND SYMPTOMS OF A TRANSFUSION REACTION

1. **STOP** the transfusion/infusion immediately – **DO NOT** discard blood component or blood product.
2. Maintain intravenous (IV) patency with compatible IV fluid on a new primary line.
3. Assess patient and check vital signs (every 15 minutes until stable).
4. Re-check patient identification, component/product ID and compatibility.
   - Call Transfusion Medicine Laboratory (TML) **IMMEDIATELY** if an error has occurred; another patient may be at risk!
5. Notify Most Responsible Practitioner (MRP) immediately and obtain management directives.
   - MRP will determine if safe to continue transfusion.
6. Notify TML- even if transfusion is restarted or completed.
7. **REPORT ALL SUSPECTED TRANSFUSION ADVERSE REACTIONS TO TML.**
   - Complete Transfusion Adverse Event Report (TAER) form and submit to TML.

Minor Symptoms

- Rash/pruritus covering less than 2/3 of body
  AND
- No other symptoms
  AND
- Onset greater than 15 minutes into the transfusion

- MRP may order antihistamine
- Resume transfusion cautiously as per MRP order if component/product not expired
- Patient should be directly observed for the first 15 minutes after resuming transfusion

- Temperature greater or equal to 38°C **AND** temperature rise greater or equal to 1°C from pre-transfusion baseline
- No other symptoms
  AND
- Onset greater than 15 minutes into the transfusion

- MRP may order an antipyretic drug
- Resume transfusion cautiously as per MRP order if component/product not expired
- Patient should be directly observed for the first 15 minutes after resuming transfusion

Serious Symptoms

Onset less than or equal to 15 minutes with ANY of the following symptoms:

- Temperature greater or equal to 39°C **OR** temperature rise greater than 1°C from pre-transfusion baseline **with** other symptoms.
- Shaking, chills or severe rigors
- Rash, pruritus (urticaria) covering greater than 2/3 body or generalized itching
- Airway or facial swelling
- Dyspnea/hypoxemia
- Cough/wheezing
- Hypotension
- Hypertension
- Tachycardia
- Nausea/vomiting
- Bleeding from IV site
- Diffuse bleeding/oozing
- Jaundice
- Pain (chest or back, headache or IV site)
- Dark urine (hemoglobinuria)
- Oliguria

STOP

1. **STOP the transfusion- DO NOT RESTART**
2. **Airway, Breathing, Circulation – Activate Emergency Response Team if necessary**
3. Validate with MRP if the following orders should be completed:
   - Urinalysis
   - Chest x-ray for severe dyspnea
   - Blood and product cultures if bacterial contamination or sepsis is suspected
4. Contact Transfusion Medicine Physician on-call for additional assistance as required
5. Send to TML:
   - post transfusion blood samples
   - blood component or blood product, administration set/ fluid and transfusion label/tag, along with TAER form

Patient develops new or reoccurring serious symptoms

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Transfusion Adverse Event Report (TAER) Form

SIGN APPLICABLE BOXES

Patient Demographics

Print full form and place patient identifiers on PAGES 1 to 3

Patient Legal Last Name: _____

Patient Legal First Name: _____

HSN/MRN: _____

Date of Birth (mmm/dd/yyyy): _____

Sex: ☐ Male ☐ Female ☐ Other

TO BE COMPLETED BY NURSING

Reporting Facility Name:_____ Phone Number: _____ Fax Number: _____

Diagnosis: _____ Indication for Transfusion: _____

Category BEST describing need for transfusion: ☐ Medical ☐ Surgical ☐ Trauma ☐ Oncology ☐ Hematology/BMT ☐ OB/Gyn ☐ NICU

1. Patient and Blood Component/Product Unique Identifier Verification (Clerical check)

Is information **IDENTICAL** on all the following? ☐ Patient ID band ☐ Transfusion label/tag ☐ Blood component/product label ☐ **YES** ☐ **NO**

IF NO, contact TM Lab **IMMEDIATELY. ANOTHER PATIENT MAY BE AT RISK!**

2. Clinical History (Initial all that apply)

☐ Pre-existing fever (Temp ≥ 38.0°C before transfusion)		☐ History or pre-transfusion evidence of hypervolemia		
☐ Premedication(s) → Specify: _____		☐ Immune-compromised → Describe _____		
☐ Transfused under anesthesia	☐ Yes General	☐ Yes Local/Regional	☐ No	
History of transfusion:	☐ Yes (within 3 months)	☐ Yes (> 3 months)	☐ No	☐ Unknown
History of pregnancies/miscarriages:	☐ Yes (within 3 months)	☐ Yes (> 3 months)	☐ No	☐ Unknown

3. Patient Care Area, Date and Time of Transfusion Reaction

Choose one: ☐ ICU ☐ ER ☐ Medical Ward ☐ Surgical Ward ☐ OR/PACU ☐ OB/Gyn ☐ Outpatient ☐ Chronic Care ☐ Other

Date (mmm/dd/yyyy)	Time Transfusion Started	Time Reaction Occurred	Time Transfusion Stopped	Time Transfusion Restarted Only upon Medical Direction	Time Transfusion Completed

4. Vitals & Clinical Signs and Symptoms

Pre-transfusion	Temp: °C (route)	BP (mm/Hg):	Pulse (BPM):	Resp (/min):	SpO_2 (%):	O_2 Source:
During reaction	Temp: °C (route)	BP (mm/Hg):	Pulse (BPM):	Resp (/min):	SpO_2 (%):	O_2 Source:
Post-transfusion	Temp: °C (route)	BP (mm/Hg):	Pulse (BPM):	Resp (/min):	SpO_2 (%):	O_2 Source:

Clinical Signs and Symptoms (Initial all that apply; attach transfusion administration record, medication record and clinical notes if available)

- ☐ Fever (oral temp ≥ 38°C AND ≥ 1°C rise above baseline)
- ☐ Chills (sensation of cold with shivering)
- ☐ Rigors (involuntary shaking)
- ☐ Urticaria (hives)
- ☐ Pruritus (itching) — ☐ < ⅓ body affected ☐ > ⅓ body affected
- ☐ Other rash
- ☐ Nausea/vomiting
- ☐ Facial or tongue swelling
- ☐ Hypotension
  - ≥ 18yrs: SBP drop by ≥ 30mmHg and <80 mmHg
  - 0 to 18yrs: SBP drop by 25% from baseline
- ☐ Hypertension
  - ≥ 18yrs: SBP rise by ≥ 30mmHg from baseline
- ☐ Hypoxemia: SpO_2 _____% or PaO_2 _____mmHg on:
  - ☐ Room air
  - ☐ Supplementary O_2 _____L/min
- ☐ Shock needing cardiorespiratory support
- ☐ Dyspnea (shortness of breath)
- ☐ Tachycardia (HR rise by > 40bpm)
- ☐ Jaundice
- ☐ Red or brown urine
- ☐ Oliguria
- ☐ Headache
- ☐ Pain → Specify _____
- ☐ Other → Specify _____

5. Blood Component/Product(s) and Equipment Information (Attach sheet with additional information if needed)

Component/Product Type	Product ABO/Rh	Unit Number or Lot Number	Expiry Date (mmm/dd/yyyy)	Volume Transfused (mL)	Transfusion Rate (mL/hr)

Blood Filters or Medical Devices Used	☐ Standard blood filter	☐ Other blood filter	☐ IV pump	☐ Blood warmer	☐ Rapid infusion device
	☐ Hemodialysis machine	☐ Apheresis machine	☐ Cell saver	☐ Other:	

6. Measures Taken and Notifications

6a. Transfusion Reaction Treatment Measures Taken (initial all that apply)

☐ None	☐ Analgesics	☐ Vasopressors	☐ Chest X-ray
☐ Transfusion Interrupted & Restarted	☐ Antihistamines	☐ Antibiotics	☐ Patient Blood Culture Ordered
☐ Transfusion Discontinued	☐ Steroids	☐ Respiratory Support	☐ Other Measures Taken (specify):
☐ Antipyretics	☐ Diuretics → ☐ Effective	☐ ICU Required	

6b. Notifications

Physician Name:	Date/Time:	TM Tech Name:	Date/Time:
Reported by (name and designation):			

7. Fax Saskatchewan Adverse Transfusion Event Report Form to local TM Lab ☐ Faxed

SHA 0481 (11/24)

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Transfusion Medicine

Monograph Quick Links

Updated documents posted May 27, 2025!

Monograph Quick Links- Blood Products and Blood Components (CS-P-0061)

Scan the QR Codes below to access Saskatchewan Health Authority Blood Administration Resources

Blood Components

Blood Products

Future Directions

- Encouragement to continue reporting adverse reactions!
- Enhance provincial Transfusion Adverse Reaction recognition and management educational opportunities
  - Webinars
  - Simulation sessions
  - Ward-specific in-person education
- Increase Transfusion Safety Officer (TSO) staff numbers provincially to support transfusion practice
  - Business Case via Lab is pending

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Transfusion Safety
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Complete SK TTISS Report:
https://saskblood.ca/programs/saskatchewan-transfusion-transmitted-injuries-surveillance-system-ttiss/

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Adverse Transfusion Reaction Resources

Clinical Guide to Transfusion – Chapter 10
https://professionaleducation.blood.ca/en/transfusion/clinical-guide/transfusion-reactions

Canadian Blood Services – Surveillance Report 2024
https://professionaleducation.blood.ca/en/transfusion/publications/surveillance-report

SaskBlood – Adverse Transfusion Reactions (especially Appendices 7, 8, 10)
https://saskblood.ca/resources/transfusion-adverse-events/

Clinical Standards – Blood Administration Resources
https://www.saskhealthauthority.ca/intranet/health-provider-resources/clinical-resources/z-list-clinical-resources/transfusion-resources/blood-administration-resources-clinical-resources

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