Transfusion Medicine Best Practices Policy: Identification and Management of Adverse Transfusion Events

1.0 Policy Statements

1.1 All Regional Health Authorities shall have policies, processes and procedures in place for documentation, reporting, evaluation, investigation and follow-up of all adverse transfusion events.

1.2 All Regional Health Authorities shall have policies in place for monitoring of recipients during transfusion of blood components or administration of blood products to detect signs and symptoms that indicate onset of an adverse transfusion reaction.

1.3 All Regional Health Authorities shall include a list of common signs and symptoms of transfusion-related adverse reactions in Nursing Practice policy manuals and Transfusion Medicine Laboratory policy manuals.

1.4 Transfusionists shall provide education to recipients regarding signs and symptoms that may indicate onset of an adverse transfusion reaction.

1.5 Transfusionists shall **immediately** report, to the health care provider and transfusion medicine laboratory, the following suspected adverse transfusion reactions:

- 1.5.1 Hemolytic transfusion reactions;
- 1.5.2 Bacterial sepsis;
- 1.5.3 Transfusion-transmitted acute lung injury (TRALI);
- 1.5.4 Systemic allergic reactions, including anaphylaxis;
- 1.5.5 Transfusion-associated graft versus host disease;
- 1.5.6 Post-transfusion purpura;
- 1.5.7 Transfusion-transmissible infections; and
- 1.5.8 Death.

1.6 All clinically significant adverse transfusion events shall be evaluated with documented follow-up.

- 1.6.1 Investigation shall be conducted by the transfusion medicine laboratory to determine probable cause.
- 1.6.2 Investigation shall include appropriate laboratory tests.

1.7 All errors or accidents that contribute, may contribute, or have the potential to contribute to a transfusion-related adverse event shall be investigated with documented follow-up.

2.0 Linkages

Algorithm for suspected transfusion reaction. Available at http://www.health.gov.nl.ca/health/bloodservices/pdf/algorithm_suspected_transfusion_reactions.pdf

Guidelines for initiation and termination of blood components and blood products. Available at http://www.health.gov.nl.ca/health/bloodservices/pdf/initiation_termination_of_blood.pdf

Guidelines for investigation of adverse transfusion reactions. Available at http://www.health.gov.nl.ca/health/bloodservices/pdf/guidelines_for_ate_investigation.pdf

Reporting adverse transfusion events. Available at http://www.health.gov.nl.ca/health/bloodservices/pdf/reporting_adverse_events.pdf

Signs and Symptoms–Adverse Transfusion Reactions. Available at http://www.health.gov.nl.ca/health/bloodservices/pdf/signs_symptoms_adverse_transfusion.pdf

3.0 Scope

This policy applies to:

3.1 All health care professionals who participate in transfusion of blood components and/or administration of (plasma-derived) protein products.

3.2 All health care professionals who participate in ***serological*** investigation of adverse transfusion reactions.

3.3 Transfusion Safety Officers and/or designated laboratory technologists.

4.0 General Information

4.1 Adverse transfusion reactions can occur with transfusion of any type of blood component or administration of any (plasma-derived) blood product.

4.2 Acute transfusion reactions occur *during* or *within 24 hours* following transfusion of blood components or administration of plasma-derived blood products.

4.3 Delayed transfusion reactions may occur 2 to up to 50 days following transfusion of blood components or administration of blood products.

5.0 Process

5.1 Procedure

If an adverse transfusion reaction is suspected:

5.1.1 **Stop** the transfusion or administration.

5.1.2 Infuse 0.9% sodium chloride–***connect directly to the IV access site. Do not infuse any blood or blood product remaining in the tubing.***

5.1.3 Check vital signs and asses the recipient.

5.1.4 Perform a clerical check of the recipient identification and the blood component or plasma derived blood product label.

5.1.5 Request a physician assessment.

5.1.6 Notify the transfusion medicine laboratory.

5.1.7 Document the event in the recipient health record.

5.1.8 Complete the blood component or blood product issue card, including volume infused, reaction type, and time transfusion/administration stopped.

5.1.9 Implement physician orders for therapeutic interventions and serological testing.

5.1.10 Return any un-transfused *implicated* blood component(s), container(s) and tubing to the transfusion medicine laboratory. Follow facility policy regarding return of blood products.

5.1.11 Implement facility protocol for transfusion reaction investigation.

5.1.12 Complete the facility *Transfusion Reaction* form and occurrence report, if applicable.

5.2 Guidelines

Common signs and symptoms of adverse transfusion reactions include the following:

5.2.1 Fever greater than 38ºC ***and*** greater than 1ºC above baseline temperature;

5.2.2 Chills with or without rigors;

5.2.3 Shortness of breath/dyspnea;

5.2.4 HYPOtension;

5.2.5 HYPERtension;
5.2.6 Tachycardia;
5.2.7 Skin manifestations–pruritis, rash, urticaria, flushing;
5.2.8 Edema;
5.2.9 Hemoglobinuria;
5.2.10 Abnormal bleeding;
5.2.11 Hypoxemia; and
5.2.12 Headache.

5.3 Materials (N/A)

6.0 Acronyms (N/A)

7.0 Definitions

Adverse Transfusion Event	An undesirable and unintended occurrence during or after the administration of blood, blood components or plasma-derived blood products. The event may or may not be considered related to the administration of the components or products.
Adverse Transfusion Reaction	An undesirable and unintended response to the transfusion of blood components and/or administration of plasma-derived blood products that is considered to be definitely, probably, or possibly related to the administration of blood components and/or blood products.
Transfusionist	A health care professional who administers blood components and/or plasma-derived blood products.
Transfusion Medicine Laboratory	Hospital Blood Bank

8.0 Records Management

8.1 The transfusion medicine laboratory shall retain the recipient administration data file indefinitely.

8.2 All administration records in the recipient's medical chart shall be retained in accordance with the health care facility policy.

8.3 Temperature monitoring records for blood components and blood products shall be retained a minimum of five years.

8.4 For each blood component or blood product issued, a record system shall be in place which documents:

8.4.1 Recipient's family and given names;

8.4.2 Recipient's identification number;

8.4.3 Name of blood component and/or blood product;

8.4.4 Blood component donation number;

8.4.5 Blood product lot number;

8.4.6 Expiry date;

8.4.7 Volume and/or potency;

8.4.8 Manufacturer;

8.4.9 Dosage/vials used;

8.4.10 Visual inspection;

8.4.11 Date and time of issue;

8.4.12 Identity of the person issuing the blood component or blood product;

8.4.13 Identity of the person transporting the blood product to the recipient's location;

8.4.14 Start and end time of transfusion; and

8.4.15 Volume infused.

8.5 The report of an adverse transfusion reaction shall be placed in the recipient's health record.

8.5.1 A copy shall be retained in the transfusion medicine laboratory.

8.5.2 The report of investigation of all serious adverse transfusion reactions shall be retained in the transfusion medicine laboratory indefinitely.

8.5.3 Recommendations pertaining to special blood component requirements or preparation requirements for subsequent transfusions shall be placed in the recipient's transfusion history.

8.6 Each facility shall have a record system that ensures a copy of all information relating to the patient and the administered blood component or blood product forms a permanent record for the patient.

8.6.1 The record system shall be organized and maintained in such a way that it is possible to trace blood components or blood products from distributor to final disposition (i.e. transfusion, administration or destruction).

8.6.2 The records system shall also provide a means to locate and access all records in the facility related to a given product.

9.0 Key Words

Adverse, reaction, transfusion

10.0 Supporting Documents

10.1 Process Flow/Algorithm

Algorithm for Suspected Transfusion Reaction

10.2 Tables/Charts

Suspected Transfusion Reaction – Signs and Symptoms

Signs and Symptoms – Adverse Transfusion Reactions

References

AABB. (2011). *Standards for blood banks and transfusion services* (27th ed.). AABB: Bethesda, Maryland.

Callum, J., Lin, Y., Pinkerton, P.H., Karkouti, K., Pendergast, J.M., Robitaille, N…Webert, K.E. (2011). *Bloody easy 3*. Toronto, ON: Ontario Regional Blood Coordinating Network.

Canadian Standards Association (2010). *Blood and blood components, Z902- 10*. Mississauga (ON): Author.

Canadian Standards Association (2012). *Blood and blood components, Z902- 10, Amendments.* Mississauga (ON): Author.

Canadian Society for Transfusion Medicine. (2011). *CSTM standards for hospital transfusion service.* Version 3. Ottawa: Author.

Davenport, R. D. (2012). Hemolytic transfusion reactions. In M.A. Popovsky (Ed.). *Transfusion reactions*, (4th ed), pp. 1-52. Bethesda, MD: AABB Press.

Health Canada. (2013). Blood regulations. *Canadian Gazette, Part II, 147*(22), pp. 2247-2314.

Heddle, N.M. & Webert, K.E. (2012). Febrile non-hemolytic transfusion reactions. In M.A. Popovsky (Ed.). *Transfusion reactions*, (4th ed), pp. 53-98. Bethesda, MD: AABB Press.

Jacobson, C.A., Anderson. K.C., and Alyea, E.P. (2012). Transfusion-associated graft versus host disease. In M.A. Popovsky (Ed.). *Transfusion reactions*, (4th ed), pp. 217-238. Bethesda, MD: AABB Press.

Kopko, P.M. and Popovsky, M.A. (2012). Transfusion-related acute lung injury. In M.A. Popovsky (Ed.). *Transfusion reactions*, (4th ed), pp. 191-218. Bethesda, MD: AABB Press.

Mazzei, C.A., Popovsky, M.A., & Kopko, P.M. (2011). In J. D. Roback, B. J. Grossman, T. Harris, & C. D. Hillyer (Eds.). *Technical Manual* (17th ed.), pp.727-762. Bethesda, MD: AABB Press.

McFarland, J.G. (2012). Posttransfusion purpura. In M.A. Popovsky (Ed.). *Transfusion reactions*, (4th ed), pp. 263-288. Bethesda, MD: AABB Press.

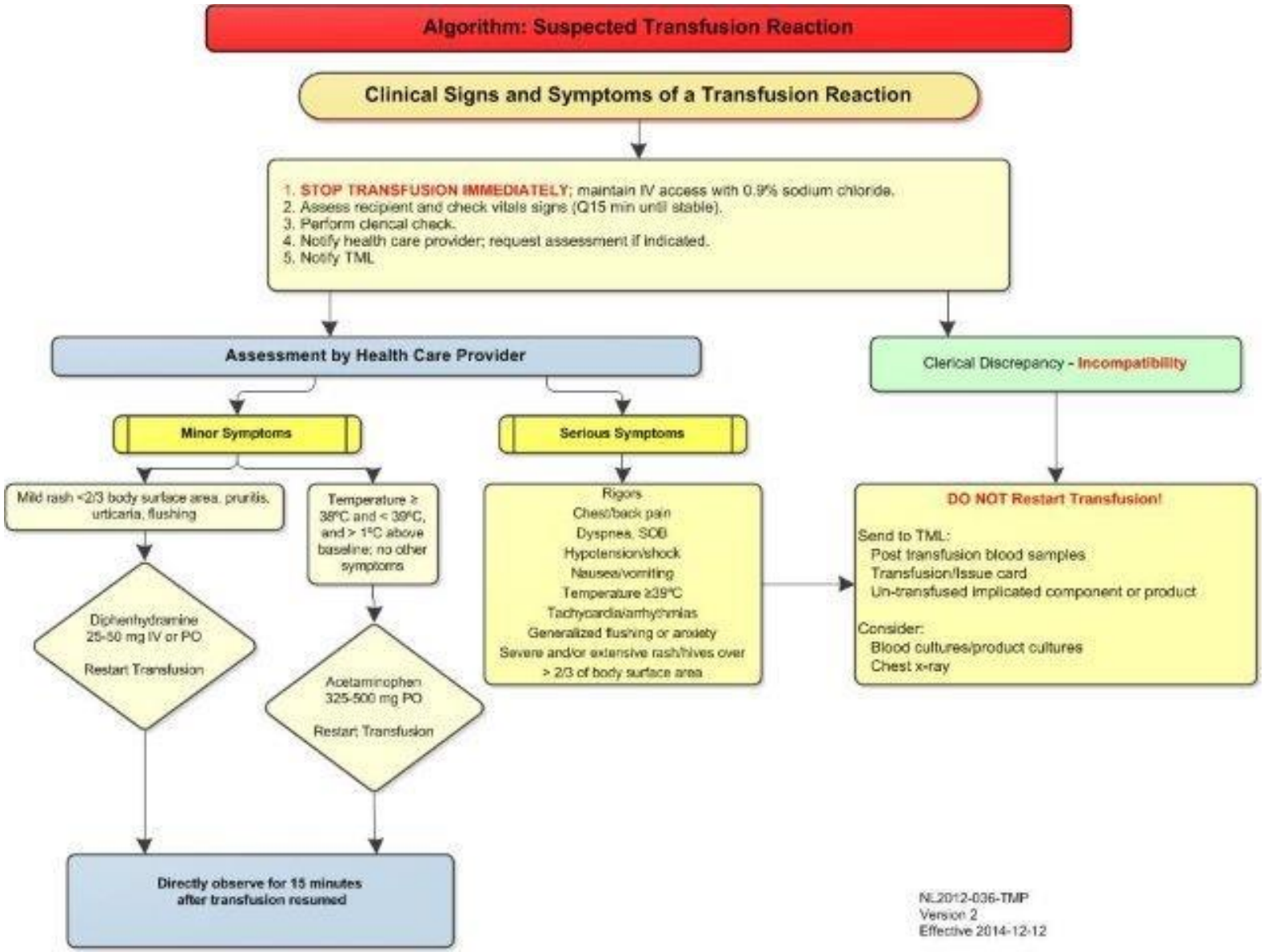
Popovsky, M. (2012). Transfusion associated circulatory overload. In M.A. Popovsky (Ed.). *Transfusion reactions,* (4th ed), pp327-338. Bethesda, MD: AABB Press.

Ramirez-Arcos, S. & Goldman, M. (2012). Bacterial contamination. In M.A. Popovsky (Ed.). *Transfusion reactions,* (4th ed), pp. 153-190. Bethesda, MD: AABB Press.

Stubbs, J.R., Bundy, K.L., & vanBuskirk, C.M. (2012). Preventing transfusion reactions. In M.A. Popovsky (Ed.). *Transfusion reactions,* (4th ed), pp 597-647. Bethesda, MD: AABB Press.

Vamvkas, E. C. (2012). Allergic and anaphylactic reactions. In M.A. Popovsky (Ed.). *Transfusion reactions,* (4th ed), pp. 99-148. Bethesda, MD: AABB Press.

Algorithm: Suspected Transfusion Reaction



NL2012-036-TMP
Version 2
Effective 2014-12-12

Adverse Transfusion Reaction – SIGNS AND SYMPTOMS

For all signs and symptoms: STOP TRANSFUSION IMMEDIATELY! Maintain IV access with 0.9% sodium chloride.

Type of Reaction	Suspected Transfusion Reaction Signs & Symptoms	Timing of Symptoms	Actions & Suggested Treatment / Investigations
ACUTE (< 24 hours)			
Minor Allergic Reaction	Intensely pruritic localized/or widespread urticaria less than 2/3 of the body; generalized erythema or flushing	During transfusion up to 2-3 hours from start	Consult with Physician–diphenhydramine hydrochloride 25-50 mg PO/IM or IV; proceed with **CAUTION**
Anaphylactic	Angioedema–localized non-pitting deep edema; upper airway obstruction–laryngeal edema, hoarseness, stridor, 'lump in the throat;' lower airway obstruction–bronchospasm, wheeze, chest tightness, dyspnea, cyanosis; profound hypotension	1-45 minutes after start of infusion; majority within 5 minutes	Epinephrine 0.3 - 0.5mg S/C or IV (up to 3 doses); fluid bolus; vasopressors if intractable hypotension; **DO NOT RESTART TRANSFUSION**
Hypotension	Abrupt onset of clinically significant hypotension–facial flushing with or without mild respiratory symptoms	Within 5 minutes after start of infusion	Supportive therapy; **DO NOT RESTART TRANSFUSION**
Febrile Non-Hemolytic	Cold sensation, rigors, nausea, vomiting with/without temperature greater than 1°C above baseline.	Usually within 30 minutes after start of infusion; up to one (1) hour after completed	Consult with Physician–Acetaminophen 325-500 mg PO; proceed with **CAUTION**
Acute Hemolytic (AHTR)	Temperature ≥39°C, hypotension, tachycardia, rigors/chills, anxiety, dyspnea, anemia, hyperbilirubinemia, anxiety, hemoglobinuria/oliguria, bleeding at IV site, nausea/vomiting, DIC, pain–back/chest/head/flank/abdomen/groin/IV site	Usually within first 15 minutes; up to 24 hours following transfusion.	Serologic testing: group and screen, cross-match, DAT, LDH, BUN, creatinine, TB; IV Fluids **DO NOT RESTART TRANSFUSION**
Circulatory Overload	Dyspnea, orthopnea, cyanosis, hypoxemia, tachycardia, hypertension, pulmonary/pedal edema, elevated JVP	Within 1-2, up to 6 hours following start of transfusion	Oxygen, diuretics; elevate head of bed. **DO NOT RESTART TRANSFUSION**
Transfusion Related Acute Lung Injury (TRALI)	Acute respiratory distress, dyspnea, cyanosis, severe hypoxemia, severe bilateral pulmonary edema, bilateral infiltrates on x-ray, hypotension unresponsive to fluid bolus	Within 1-2 hours during transfusion or within 6 hours post-transfusion	Oxygen, intubation and ventilation, vasopressors **DO NOT RESTART TRANSFUSION**
Bacterial Contamination	Fever, chills, hypotension, shock, nausea/vomiting, tachycardia, hypotension	During or within 4 hours of transfusion	Treatment of shock, DIC, renal failure, product and recipient cultures, antibiotics–broad spectrum initially; anti-*pseudomonas* if red cells implicated
DELAYED (>24 hours)			
Delayed Hemolytic	Weakness, unexplained fall in post-transfusion hemoglobin, elevated serum bilirubin	Within 3-7 days post-transfusion and up to 21 days post-transfusion	Provide antigen negative blood products for subsequent transfusions
Transfusion Associated Graft Versus Host Disease	Fever, erythematous cutaneous pruritic rash which progresses to generalized erythroderma, watery/bloody diarrhea, pancytopenia, liver dysfunction, anorexia, nausea/vomiting	Within 2-50 days of transfusion (usually 1-2 weeks)	Largely ineffective–Immunosuppressive therapy, cyclosporine/OKT3, cyclophosphamide/antithymocyte, T cell monoclonal antibodies, HPC transplants, irradiated components. Mortality is greater than 90%
Post Transfusion Purpura	Purpura, bleeding, platelet count less than 10x 10^9/L	1-24 days post transfusion	IVIG

NL2012-036-TMP
Version 2.0
Effective Date: 2014-12-12

SIGNS AND SYMPTOMS – Adverse Transfusion Reaction

For all signs and symptoms: STOP TRANSFUSION IMMEDIATELY! Maintain IV access with 0.9% sodium chloride.

Symptom Reported	Suspected Transfusion Reaction Signs & Symptoms	Timing of Symptoms	Possible Etiology
Fever ≥ 38 °C and > 1 °C	Temperature >38 °C, < 39°C and 1 °C above baseline.	Towards the end of transfusion or within 1 hour after transfusion.	Febrile non-hemolytic
and/or	Temperature >38.5°C; chills, rigors, nausea, vomiting, headache, hypotension, pain.	Early in transfusion, or shortly after transfusion.	Bacterial contamination.
Chills/rigors	Temperature >39; chills, rigors, nausea, vomiting, headache, hypotension, tachycardia, pain, bleeding, hemoglobinuria.	Early in transfusion (50-100mL required), up to 24 hours following.	Hemolytic reaction.
Urticaria **and/or** Itching **and/or** Rash	<2/3 of body; no other symptoms.	Within 2-3 hours of start of transfusion.	Minor Allergic
	>2/3 of body, +/- dyspnea, SOB, hypotension, decreased $SP0_2$.	1-45 minutes after start of transfusion.	Severe Allergic/ Anaphylactic/Anaphylactoid
	And profound hypotension, loss of consciousness,	Early in transfusion.	Anaphylactic Shock
Dyspnea **and/or** Decreased oxygen saturation	With hypertension, tachycardia, cyanosis, pulmonary edema.	During or within 6 hours of transfusion.	TACO
	With hypotension, fever/chills,+/- nausea/vomiting, DIC, hemoglobinuria, renal failure, +/- pain.	Early in transfusion, up to 24 hours following.	Acute Hemolytic, Bacterial Contamination
	Bilateral infiltrates on chest x-ray, +/-hypotension, +/-fever/chills, cyanosis.	During or within 6 hours of transfusion.	TRALI

NL-2012-036
Version 2.0
Effective Date: 2014-12-12