RECOMMENDATIONS FOR THE NOTIFICATION OF RECIPIENTS OF A BLOOD COMPONENT RECALL:

A NAC AND CBS COLLABORATIVE INITIATIVE

NAC / CBS RECIPIENT NOTIFICATION WORKING GROUP

NAC Chair:	Jennifer Fesser, MD
NAC / CBS RECIPIENT NOTIFICATION WORKING GROUP Members:	Margaret Fearon, MD Mindy Goldman, MD Lakshmi Rajappannair, MD
Provincial Ministry Representative:	Judy Hoff (SK)
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LIST OF ABBREVIATIONS

CBS	Canadian Blood Services
EBV	Epstein Barr Virus
NA	Not Applicable
NAC	National Advisory Committee on Blood and Blood Products
NAT	Nucleic Acid Testing
NRAC	National Recipient Advisory Committee
P/T CBS BLC	Provincial / Territorial Canadian Blood Services Blood Liaison Committee
TD	Transmissible Disease
TM	Transfusion Medicine
TRALI	Transfusion Related Acute Lung Injury

LIST OF DEFINITIONS

Associated Blood Component – a blood component that is directly associated in a recall

Companion Blood Component – a blood component that has been produced from the same donation.

Large Scale Recall – a recall of a large number of blood components involving multiple provinces or a single province, OR, a recall of a small number of blood components involving multiple provinces or a single province. This does not include reasons for common recalls outlined in this document.

Recall – the removal from further distribution, or use, of a product (blood component) that violates legislation administered by Health Canada (a regulatory requirement).

Unusual Recall – a recall due to an unanticipated event impacting a large or small number of blood components

Withdrawal – the voluntary removal by the manufacturer (blood supplier) of a product (blood component) that does not violate legislation administered by Health Canada.

SUMMARY OF REVISIONS

Page	Detail
7	Under 3.8, removed recommendation for consultation re: donor re-testing as this step is not likely to be helpful
9	Clarified title of Table 1
9	Added category to Table 1: Possible donor infection in donor with a travel history (not related to malaria risk)
10	Added category to Table 1: Zika virus infection, lab confirmed
10	Updated list of most common unacceptable medications in Table 1
10	In the Mononucleosis category in Table 1, edited the Notification criteria
10	Updated relative risk of recalls due to variant CJD versus classic CJD in Table 1
10	Removed category “Miscellaneous – Vaccinations” from Table 1 owing to very low frequency of recalls
10	Updated the % of total recalls captured within the reason list in Table 1
11	Clarified title of Table 2
11	Updated BacT/ALERT testing / Quality Control section in Table 2 to reflect new platelet testing process and edited the Notification criteria
11	Updated examples of screening errors in Table 2
11	Removed category “Appearance” from Table 2 owing to very low frequency of recalls
11	In the Sterility Breach category in Table 2, edited the Notification criteria
12	In the Unacceptable QC WBC results category in Table 2, edited the Notification criteria
12	Updated the % of total recalls captured within the reason list in Table 2
16	Updated Section 10 (Acknowledgements)
18	Added information on ‘Possible donor infection in donor with a travel history (not related to malaria risk)’ to Appendix A
18	Updated deferral period for tattoo and piercing in Appendix A
18-19	Updated information on vCJD and classical CJD in Appendix A
19	Removed category “Miscellaneous – Vaccinations” from Appendix A owing to low frequency of recalls
20	Added information on ‘Zika virus infection, lab confirmed’ to Appendix A.
20	Updated Invalid BacT/Alert Testing section in Appendix A to reflect new platelet testing process
20	Removed category “Appearance” from Appendix A owing to low frequency of recalls
23-26	Updated references

SECTION 1.0: OVERVIEW AND GENERAL RECOMMENDATIONS

The National Advisory Committee on Blood and Blood Products (NAC) is an interprovincial medical and technical advisory body to the provincial and territorial health ministries and the blood supplier Canadian Blood Services (CBS). Its mandate is to provide professional leadership and advice in matters directly affecting the practice of transfusion medicine in hospitals. In 2010, NAC was asked by the Provincial / Territorial Canadian Blood Services Blood Liaison Committee (P/T CBS BLC) to:

- Develop national recommendations ensuring consistent recipient notification when a recall or a withdrawal of a blood component has occurred;
- Identify who is responsible for each stage of the notification process;
- recommend a group of resource experts that would be convened in the event of an unusual or large scale recall/withdrawal to provide direction regarding recipient notification for a situation that is not specifically addressed in the national recommendation document.

NAC collaborated with Canadian Blood Services in the development of this recommendation document. It is recommended that this document be used as a reference by hospital transfusion services, the blood supplier and Provincial / Territorial representatives.

Although the definition for a recall or a withdrawal of blood components differ (refer to the list of definitions); from a practical perspective the consequences for the blood component is the same. The blood supplier removes the blood component from inventory and hospital transfusion services supplied by CBS are notified if they have received associated or companion blood components. This document does not distinguish between the two terms. The term ‘recall’ is used as a comprehensive term throughout the remainder of the document.

The recommendations for recipient notification outlined in this document are the suggested actions required in terms of notification. The general recommendations presented are applicable to causes of blood component recalls that are known to occur and initiated by the blood supplier; the blood supplier being CBS in all provinces and territories with the exception of Quebec. This document does not prevent provinces, territories or individual hospitals from implementing notification processes above and beyond what has been recommended, or modifying processes as determined locally.

It is recommended that all hospitals have their own policies and procedures for the process of notification in accordance with applicable provincial regulations. Throughout this document when notification is recommended every hospital should have an internal procedure outlining who is responsible for notification and the process by which it should occur. It is recommended that local risk management be consulted in the development of this process.

This document does not address recalls initiated due to a donor testing positive for a transmissible disease test. i.e., Hepatitis B, Hepatitis C, HIV, HTLV, Syphilis, WNV or T.cruzi

(Chagas disease). In these instances, CBS indicates to the hospital the required actions via standard lookback procedures.

The clinical situation of the recipient is an important factor when considering notification of a blood component recall. These recommendations for notification have been made in consideration of the available literature. The clinical situations of recipients that may be considered by the treating physician in further evaluating the recommendations for notification contained in this document include, but are not limited to:

- Presence or absence of symptoms during or after transfusion (relevant for possible bacterial contamination, malaria risk)
- Pregnancy (relevant for teratogenic drugs)
- Underlying condition (relevant if patient is immunocompromised and donor developed EBV infection)
- The age of the patient
- Relevant prognosis

Depending on the age and prognosis of the recipient; the treating physician may consider notifying next of kin or family members as an alternative to notifying the recipient directly about a blood component recall. This should be done in accordance with applicable provincial regulations.

For instances where recipient notification is not recommended and a review of recipient records are required to confirm this, it is recommended that hospitals maintain a record of their activities related to the review of information as appropriate. Recipient notification and any follow-up testing should occur as soon as possible in relation to the relative risk that is associated with the cause of the blood component recall.

It is recommended that consultation with a CBS Medical Director occur as necessary should further information or clarification be required with respect to any notification received regarding a blood component recall.

This document currently only addresses recipient notification in terms of recalls associated with the transfusion of fresh blood components collected, produced and distributed by CBS (i.e., red blood cell, platelet and frozen plasma components). However, there may be applicability to a recall of fractionated or recombinant plasma protein products i.e., an unusual or large scale recall. The National Recipient Advisory Committee (NRAC) in Section 9 may be convened.

SECTION 2.0: RECALL AND RECIPIENT NOTIFICATION PROCESS

Recalls and withdrawals of blood products are initiated by CBS in accordance with Health Canada regulations and standard operating procedures.

Once CBS makes the decision to recall or withdraw blood components from inventory, the required notification to hospitals is conducted as per standard procedure. If on notification the hospital concludes that the identified blood component was transfused, a decision with regard to recipient notification must be made.

For recalls associated with infectious disease markers, CBS will provide direction to hospitals regarding recipient notification in accordance with lookback procedures. As per Figure 1, if the reason to recall a blood component is unusual or if the recall involves a large amount of blood components, a recommendation for recipient notification may be made by the National Recipient Advisory Committee (NRAC). The recommendation made by the NRAC will be communicated to hospitals by CBS through regular communication methods. In these instances hospital reference to the NAC Recommendations for Recipient Notification is not required unless information with respect to the functionality and scope of the NRAC is needed.

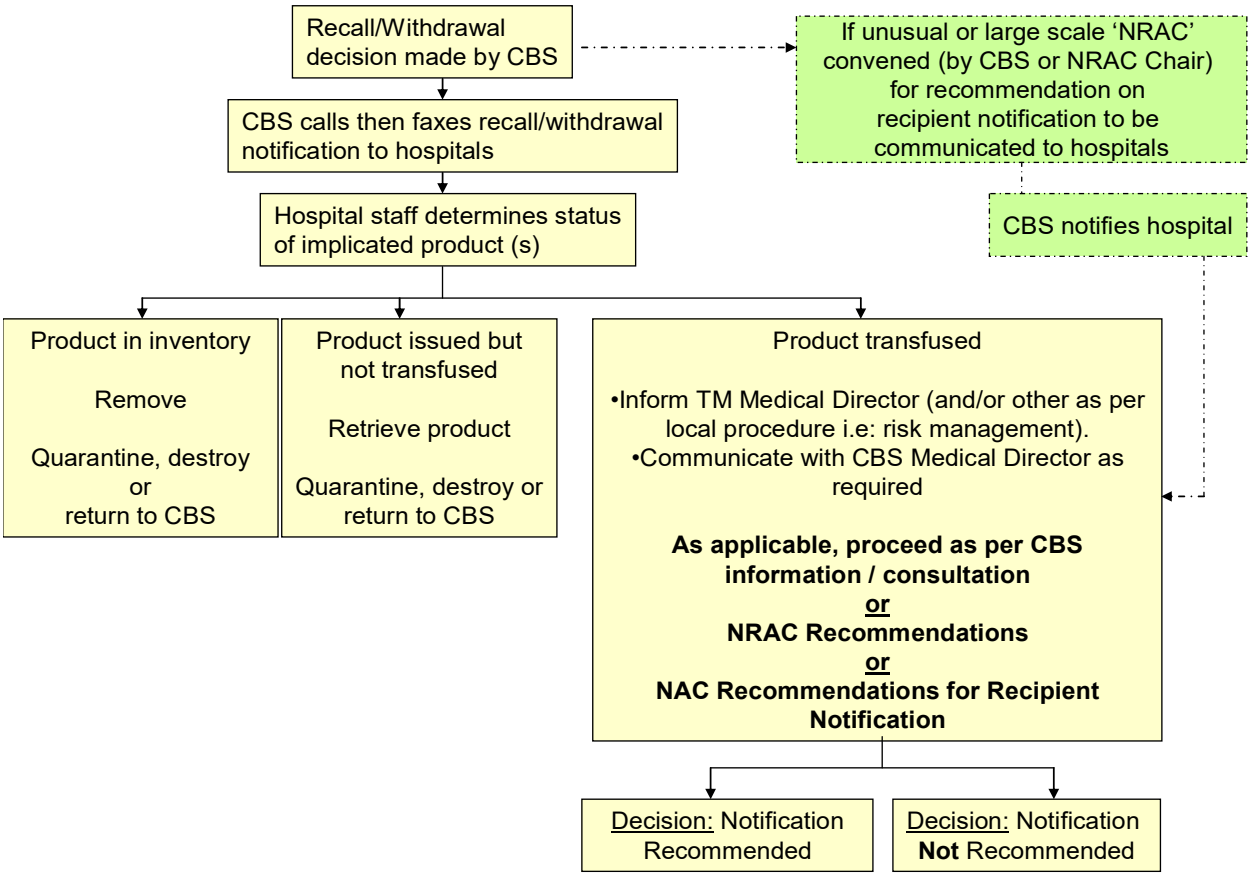

Figure 1 Flow chart indicating the process prior to recipient notification being conducted

SECTION 3.0: POST-DONATION INFORMATION

Table 1: Recalls initiated as a result of post donation information received by the blood supplier

Reason	Description / Rationale	Notification recommended	Notification NOT recommended
Cancer	There are no documented cases of transfusion-transmitted cancer See Appendix A.	NA	√
Malaria Risk	History of, Travel to, or Residence in an endemic area. Vast majority, 94%, are travel related. See Appendix A.	Confirmed case with history of blood donation.	Donor traveled to a malaria risk zone.
High Risk Behaviour	Includes donors who had MSM, partners with unknown backgrounds, IV drug use, intranasal cocaine, household contact with HCV/HBV. See Appendix A	√	Contact CBS to determine if the donor is available for repeat testing. The donor has screened negative (via subsequent donation or follow up testing) for the marker.
Tattoo / Piercing / Electrolysis	These activities are a weak risk of transmission of a viral disease provided they are performed under good conditions, disinfection techniques and with the use of single use needles. See Appendix A.	NA	√
Possible donor infection, including cold, flu, diarrhea, fever	Immunocompromised patients may be at risk. See Appendix A.	NA	√
Possible donor infection in donor with a travel history (not related to malaria risk)	Immunocompromised patients may be at risk. Other pathogens (such as Dengue fever) should be considered. See Appendix A.	If within the first week after transfusion of suspect unit, contact attending physician to assess immune status of recipient and potential risk. Notification is only required if a clinically significant reaction was observed in the recipient within three to seven days after transfusion.	Majority do not require notification.
Viral	Mumps, rubella, rubeola (measles) rash, chicken pox, Primary Herpes Simplex 1 or II, disseminated herpes zoster, or shingles (68% in this category were shingles). There are no known reported cases of transfusion transmission. See Appendix A.	Contact attending physician to assess immune status of recipient and potential risk.	√

Table 1 continued

Reason	Description / Rationale	Notification recommended	Notification NOT recommended
Zika virus infection, lab confirmed	Rare transfusion-transmitted cases have been reported. See Appendix A.	Contact attending physician if recipient may be pregnant.	Majority do not require notification.
Medication, unacceptable	Most common - Finasteride, Dutasteride See Appendix A.	1. If teratogenic and recipient is of child bearing age 2. Anti-platelet therapy received by an apheresis platelet donor and patient did not have an adequate hemostatic response post transfusion.	Majority do not require notification.
Mononucleosis (Epstein-Barr Virus)	See Appendix A.	Contact attending physician to assess immune status of recipient and potential risk. Notification is only required if a clinically significant reaction was observed in the recipient within three to seven days after transfusion or the donor develops a clinically significant episode.	If the donor develops a clinically insignificant episode (or none) and no reaction was observed in the recipient within three to seven days after transfusion.
variant CJD Risk: Donor travel to an at risk country	96% of recalls are due to variant CJD risk. See Appendix A.	NA	√
CJD Risk: Donor disclosed risk factor or developed classical CJD		NA	√
Miscellaneous – Medical Conditions	Hematological, positive external testing for WNV, Lyme disease / tick bites, tuberculosis	NA	Majority do not require notification. Consult CBS Medical Director as required.

Note: The reasons listed above account for approximately 100% of the total annual recalls in this category (based on CBS 2017/18 data).

SECTION 4: TECHNICAL MANUFACTURING ISSUES

Table 2 – Recalls initiated by the blood supplier owing to technical manufacturing issues

Reason	Description / Rationale (including but not limited to)	Notification Recommended	Notification NOT Recommended
BacT/ALERT testing / Quality Control	Includes errors that lead to invalid results (e.g. taking sample prior to 36 hours from collection; incomplete, incorrect, missing documentation; incorrect incubation and failure to hold following innoculation). See Appendix A.	If the recipient experienced symptoms (i.e., developed fever, chills, or other signs of sepsis during or in the hours post-transfusion); recipient blood cultures are recommended.	If the recipient was asymptomatic at the time of transfusion.
Screening Error	Incorrect assessment or documentation by RN/screener, donor registered incorrectly (wrong gender). Includes errors from Registration to Collection. See Appendix A.	If specifically requested by the manufacturer for the given situation.	√
Documentation Errors	Majority are missing or incorrect documentation on Irradiated Blood Component Records. See Appendix A.	If specifically requested by the manufacturer for the given situation.	√
Labelling Error	See Appendix A.	If specifically recommended by the manufacturer for the given situation	√
Component production	Extraction errors, in process storage or processing times or conditions incorrect, unacceptable volume, inadequate SAGM added to RBCs.	CBS will provide hospitals with information on the precise reason for recall and the possible clinical risks to recipients.	
Retrieval / Release Related	Majority are issues with improper storage or documentation of storage; units not quarantined after improper site transfer conditions.	CBS will provide hospitals with information on the precise reason for recall and the possible clinical risks to recipients.	
Sterility breach	Incomplete seals, leaks found in companion components; incomplete arm prep or clamping errors during collections. See Appendix A.	If the recipient experienced symptoms (i.e., developed fever, chills, or other signs of sepsis during or in the hours post-transfusion); recipient blood cultures are recommended.	If the recipient was asymptomatic at the time of transfusion.

Table 2 continued

Rh D or red cell antigen phenotyping errors	Errors/discrepancies with phenotyping testing. See Appendix A.	Alloimmunized patients should be observed for hemolysis. Patients receiving antigen negative units to prevent alloimmunization may be retested to determine if they have developed an antibody.	√
Unacceptable (elevated) QC WBC results	See Appendix A.	Contact attending physician to assess immune status of recipient and potential risk of serious CMV infection. Notification is required only if there is a concern of possible recipient illness due to underlying clinical status.	√

Note: The reasons listed above account for 98% of the total annual recalls in this category (based on CBS 2017/18 data).

SECTION 5.0: BACTERIAL CONTAMINATION

Table 3: Recalls initiated as a result of the possibility of bacterial contamination in a blood component

Reason	Description / Rationale	Notification recommended	Notification NOT recommended
Positive Bac T/ALERT culture	See Appendix A	Recipient notification and testing (blood cultures) is recommended in a recipient who developed fever or other signs of sepsis during or in the hours following transfusion. Clinical judgment is necessary to assess if blood cultures are necessary in a patient who is already on antibiotic therapy and has not experienced any symptoms post-transfusion.	NA
Contamination or possible contamination of companion component	See Appendix A	Inspection, Gram stain, and culture of any residual transfused component may be performed if the bag is still available. Notification and blood cultures are recommended if the recipient was recently transfused and developed fever or other signs of sepsis during or in the hours post-transfusion. Since the likelihood of actual bacterial contamination is low, clinical judgment is required to determine the need and urgency of blood cultures and other possible actions.	NA

SECTION 6.0: TRALI

Table 4: Recalls initiated as a result of a reported transfusion reaction - TRALI

Reason	Description / Rationale	Notification recommended	Notification NOT recommended
A companion blood component has been associated with a TRALI reaction	Note: CBS is not aware of any cases where 2 recipients of components from the same donation developed TRALI (recipient with target antigen and volume of plasma in transfused component). See Appendix A.	Assess recipient health record for transfusion reaction occurring within 12 hours of transfusion and notify attending physician if TRALI is suspected.	NA

SECTION 7.0: NATIONAL RECIPIENT ADVISORY COMMITTEE

In the event that an unusual situation triggers a recall of blood components, or a large number of blood components are involved in a recall, it is recommended that the National Recipient Advisory Committee (NRAC) be convened to make recommendations regarding recipient notification. This group of resource experts may also be convened to provide recommendation regarding recipient notification for recall situations that are not currently addressed in the preceding sections of this document.

CBS will accept the NRAC recommendation as the principal consideration in rendering a decision regarding recipient notification.

The Terms of Reference for this committee are as follows:

7.1: Mandate

The National Recipient Advisory Committee (NRAC) will develop recommendations and provide advice to Canadian Blood Services (CBS) with respect to recipient notification in the event of a blood component recall situation that involves a large number of blood components or if the situation is not currently addressed in available national recommendations.

Prior to convening the larger secondary NRAC, the primary NRAC may be convened to discuss the recall situation.

To this end the primary NRAC will:

- discuss if recipient notification is required
- determine if the secondary NRAC committee should be convened
- develop strategies and next steps for consideration and discussion by the secondary NRAC (as applicable)

To this end the secondary NRAC (if convened) will:

- develop a recommendation for consistent recipient notification across the country with respect to specific recall scenarios
- indicate if follow-up testing should be considered for recipients that were transfused impacted blood components
- provide recommendations regarding the communications issued to hospitals via CBS

7.2: Membership

The Chair of the primary and secondary NRAC will be the current chair of the National Advisory Committee on Blood and Blood Products (NAC). The Vice-Chair of NAC shall act as chair in the absence of the NAC Chair.

Primary NRAC

- CBS Chief Supply Chain Officer
- NAC Chair and Vice Chair (or designates)
- CBS Vice President, Medical Affairs and Innovation
- Blood Portfolio Lead Province Representative
- Additional expertise as required

Secondary NRAC

- Members of the Primary NRAC (if not also a member of the established NEBMC)

- Members of the established National Emergency Blood Management Committee (NEBMC)
- A provincial legal representative (Lead Province Blood Portfolio)
- Two blood transfusion recipient representatives; one should be an actual blood transfusion recipient (past or present) and the other should be a representative of an appropriate patient society
- Ethicist
- Public Health Agency of Canada representative
- CBS Vice President Quality Assurance and Regulatory Affairs

Every member of the primary and secondary NRAC is responsible for naming a designate in the event that he/she is unavailable. The primary and secondary NRAC may invite additional experts to meetings on an ad hoc basis to provide expertise on the subject matter being discussed.

Meetings

Meetings will be convened at the request of CBS or the Chair as required. Decisions of the primary and secondary NRAC will be made by consensus. Consensus is defined as 80% (or greater) agreement of the voting members present.

In the event that consensus cannot be reached at the primary NRAC level, the secondary NRAC will be convened. In that event that consensus cannot be reached at the secondary NRAC level, CBS will make decisions considering the advice received from the NRAC.

The NEBMC Secretariat will arrange teleconferences/meetings and record and distribute minutes of the meetings/ record of decisions, maintain the membership list and respective contact information for both the primary and secondary NRAC.

SECTION 8.0: ACKNOWLEDGEMENTS

NAC and CBS wish to acknowledge Dr. Mindy Goldman and Dr. Margaret Fearon, Canadian Blood Services and Nancy Heddle, McMaster University, for their valued contributions in the development of the initial version and Drs. Goldman and Fearon for ongoing refinement of medical sections of this document.

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INFECTION

Possible donor infection, including cold, flu, diarrhea, fever

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Possible viral infection

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Herpes simplex viruses 1 and 2, varicella zoster (chicken pox, shingles): 96S-98S.
Influenza A or B viruses: 110S-112S
Mumps virus: 133S-135S
Mononucleosis (Epstein-Barr Virus): 78S-79S

Measles, Mumps, Rubella

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TRALI

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APPENDIX A SUPPLEMENTARY INFORMATION

POST-DONATION INFORMATION

Cancer

Donors who have had most forms of cancer are deferred from donation. Donors reporting a diagnosis of cancer post-donation are a frequent cause of post-donation information. Components are recalled if they may still be untransfused at the time the information is obtained (up to 12 months from donation for plasma or cryoprecipitate). A large Scandinavian cohort study of cancer incidence in recipients of blood from donors who had subclinical cancer at the time of donation demonstrated no excess risk of cancer compared to recipients who had received blood from donors who did not develop cancer post-donation. The FDA found no evidence that development of cancer in donors affected the safety, purity or potency of blood components, and does not require recall of components after a diagnosis of cancer is made in donors.

Malaria Risk

Recalls are usually due to unreported malaria risk travel. Cellular components are recalled if the donor left an at risk area 6 months or less prior to donation. The overall risk of transfusion-transmission of malaria in the US and Canada is estimated as less than 1 per million cellular components transfused. Since 1997, there have been no cases of transfusion-transmitted malaria reported in Canada, and approximately 1 to 2 cases of transfusion-transmitted malaria reported annually in the US. Cases are most commonly associated with donors who are immigrants from malaria-risk areas, rather than short-term travelers. Symptoms and signs of post-transfusion malaria include fever, fatigue, anemia, and altered mental status, usually developing from 2 to 3 weeks post-transfusion for *falciparum* malaria. The incubation period may be longer after other species, and up to 73 days for *P. malariae*.

High Risk Behaviour

Occasionally, donors report high risk behaviour, such as illicit intravenous drug use that would have led to indefinite deferral. Components are recalled if such behaviour occurred recently. Since infectious disease testing at the time of donation was negative, risk of disease transmission is likely extremely low. At the present time, the window periods for HIV, HCV, and HBV are estimated at 11, 10, and 39 days respectively. However, recipient infection with any of these viruses may be asymptomatic at the time of transfusion, but have major health consequences both for the individual and their household and sexual contacts.

Possible donor infection, including cold, flu, diarrhea, fever

Donors who develop symptoms such as fever, chills, and diarrhea in the days post-donation may have been bacteremic at the time of donation. Culture of all platelet components has provided more information about possible sources of asymptomatic bacteremia in donors. Donors in the incubation phase of a gastrointestinal or upper respiratory tract bacterial infection are extremely rarely associated with positive bacterial cultures.

Possible donor infection in donor with a travel history (not related to malaria risk)

Donors with a travel history who develop symptoms such as fever, joint pain with or without rash and conjunctivitis necessarily have a more broad differential diagnosis than donors who have not traveled abroad. Discussion with the CBS Medical Office is recommended, as the further information / testing may narrow the etiology, as is correlation with clinical signs / symptoms in the recipient. For donors with a travel history to areas of malaria risk, refer to Malaria Risk above.

Tattoo, piercing, electrolysis

Donors are temporarily deferred for 3 months after any tattoo and after any piercing, and for 6 months after electrolysis with non-single use needles. Donors who return after temporary deferral are not at increased risk of positive HBV or HCV infectious markers compared to other donors. Recent tattoo, piercing or electrolysis are not risk factors for HCV or HBV infections in CBS donors. Therefore, there appears to be little increased risk associated with these activities occurring in these time frames prior to donation.

Medication, unacceptable

Blood is recalled if donors are identified to be taking highly teratogenic medications that have been associated with birth defects when taken by pregnant women. However, there is limited data on the risk of a one-time exposure through blood transfusion. The one published study did not show any adverse outcomes such as malformations in infants of women taking one of these medications, acitretin, before or during pregnancy. Therapeutic efficacy of platelets may be decreased if a donor was taking medication with anti-platelet effects, such as ASA, at the time of donation. Depending on the medication, some of the platelet function defect may be reversible after transfusion.

Travel or transfusion, vCJD risk area

There have been 4 probable cases of vCJD transmission through blood transfusion. All of these cases occurred in the UK. The involved donors developed vCJD from 17 months to 3.5 years after donation. As of November 2017, 230 vCJD cases have been reported in 12 countries, the majority in the UK (178) and France (27). Non-UK cases have been linked to previous residence in the UK or residence in other countries with a risk of BSE in the food chain from meat imported from the UK. The risk of transmission of vCJD from donors who have resided in or have been transfused in a vCJD risk area but have not developed vCJD is therefore extremely small.

Health Canada directives do not contain any information regarding notification of recipients. However, the FDA Guidance document referenced below specifically mentions that the FDA does not believe it is appropriate to conduct tracing and notification of recipients of components from donors who have resided in or been transfused in vCJD geographic risk areas.

Classical CJD risk

Donors are deferred for use of human pituitary derived growth factor and gonadotrophin hormones, and for a history of CJD in family members. Donors may report that they or a family member have developed CJD or did not report risk at the time of donation.

Two large cohort studies, one in the UK and one in the US, followed recipients who received blood components from donors who developed CJD. To date, after more than a decade of follow up in over 100 recipients, there has been no evidence of CJD transmission. The FDA Guidance document referenced below specifically mentions that the FDA does not believe it is appropriate to notify recipients of components from donors who develop CJD themselves or whose family members develop CJD.

Mononucleosis (Epstein-Barr Virus)

As a precautionary measure, all components donated in the 30 days prior to development of mononucleosis are recalled. Transmission of EBV has been documented in immunosuppressed recipients, especially following transplantation. Since EBV is a B lymphocyte associated virus, risk of transmission is substantially decreased by universal leukoreduction. Additionally, life time chronic carriage of the virus occurs in over 90% of the adult population. Therefore most recipients would be expected to be already infected.

Viral

As a precautionary measure, all components are recalled when donors are diagnosed with symptoms of these infections developing up to 7 days post-donation. Theoretically, the donor may have been viremic at the time of donation. In practice, transmission of these agents has rarely, if ever, been documented.

Recipient Follow up for Viral Infections Reported by Donor				
Viral Infection Reported by Donor	**Incubation Period**	**Length of Viremia**	**Reported Cases of Transfusion Transmission**	**Recipient Health Risk**
Measles	10 – 14 days	From 2 days post-exposure to 5 – 7 days post exposure	None	Possible
Mumps	16 – 18 days (range 2 – 4 weeks)	Transient – first 2 days of illness	None	Remote
Rubella	14 – 21 days	As early as 9 days before rash onset to 2 days after rash appears	None	Possible
Varicella (chicken pox	10 – 21 days	From rash onset up to 14 days	None	Possible
Varicella zoster (shingles)	Reactivation of latent virus	Transient, at onset of symptoms	None	Remote
Herpes simplex I/II	2 – 12 days	Transient, at onset of symptoms, primary infection only	None	Remote

Zika virus infection, lab confirmed

Probable cases of transfusion-transmitted Zika virus infection have been rarely reported, and in these instances recipients were asymptomatic. Correlation with the patient's pregnancy status is important, as Zika virus is unlikely to be a significant risk to non-pregnant individuals. For pregnant recipients, follow up including testing for Zika virus is recommended.

TECHNICAL MANUFACTURING ISSUES

Invalid BacT/Alert Testing

Testing may not have been properly performed (for example, sample taken less than 36 hours post collection), or machine malfunction may have invalidated the results of BacT/ALERT culture. Since the platelet component did not have adequate testing performed, there is an increased risk of bacterial contamination of approximately 1 in 10,000 (rate of true positive bacterial cultures of platelets at CBS).

Documentation errors - donor screening and production
Documentation errors on the CBS Record of Donation or during component manufacturing are most often due to incomplete information, such as lack of a signature or missing documentation of storage time. These are errors of Good Manufacturing Process (GMP) therefore the product is being recalled. However, it is extremely unlikely that there is any additional risk associated with transfusion of the component.

Labeling Errors
Errors may occur in the product code listed on the label, the volume of the component, or any other product attribute listed on the label. There are errors of Good Manufacturing Process (GMP), therefore the product is being recalled. However, in most cases, there is not additional risk associated with transfusion of the component. Exceptionally, there may be recipient risk; an example would be an incorrect ABO group.

Sterility Breach
Incidents such as incomplete seals may lead to a slightly increased risk of bacterial contamination of the component. The risk will vary depending on the component involved and the exact problem that occurred.

Rh D or red cell antigen phenotyping errors or discrepancies
These errors may be of importance if the recipient is alloimmunized against the mistyped antigen (for example, unit now known to be Kell positive transfused to recipient with anti-K); a delayed hemolytic transfusion reaction may occur. A recipient receiving units erroneously typed as antigen negative to prevent alloimmunization may actually develop an antibody.

Unacceptable Quality Control, WBC Counts
Products with elevated WBC counts over the maximum permitted in the CBS Circular of Information may have an increased risk of transmission of CMV. Transmission of CMV may be of major clinical significance in CMV seronegative recipients receiving a CMV seropositive product. Patients at risk for significant transfusion-transmitted CMV disease include recipients of allogeneic stem cell transplants from CMV seronegative donors.

BACTERIAL CONTAMINATION

Positive BacT/ALERT culture

Donation components will be recalled if the BacT/ALERT automated culture system indicates a positive reaction. Further information may follow the initial report. Subsequent investigation may show actual bacterial contamination (true positive), as well as identification of the organism. In other cases, further investigation may indicate a false positive reaction. Bacterial proliferation is most common in platelet units, however septic reactions have been reported with red cell and frozen components as well. Signs and symptoms of post-transfusion sepsis include fever, chills, and hypotension usually developing during or in the four hours post-transfusion. Investigation of a suspected reaction may include inspection, Gram stain, and culture of any residual component, if available. In addition, patient blood cultures may be indicated, particularly if recall notification is obtained shortly after transfusion, or the recipient has developed fever and chills post-transfusion.

Contamination or possible contamination of companion component

All components of a donation are recalled if a positive BacT/ALERT culture is found on an individual component, or if CBS is informed of a possible septic reaction in a patient having received a transfusion with one component from the donation. Further clarifying information may follow, such as repeat culture results or organism identification. In the case of positive bacterial cultures on a buffy coat platelet pool, all red cell and plasma components associated with the pool will be recalled. A small minority of these companion products will actually be bacterially contaminated.

TRANSFUSION RELATED ACUTE LUNG INJURY (TRALI)

TRALI, increased risk:

Components may be recalled for increased TRALI risk if a companion blood component from the same donation or a component from a later donation from the same donor has been associated with a TRALI reaction. The pathogenesis of TRALI is poorly understood. The presence of an anti-HLA or anti-granulocyte antibody in the donor directed against the cognate antigen in the recipient, plasma content of the component, and underlying disease in the recipient all play a role in the development of a TRALI reaction. In lookback studies performed on recipients of components from donors who have been clearly implicated in an antibody mediated TRALI reaction, the frequency of pulmonary complications and TRALI is slightly higher than in transfusion recipients in general. However, the majority of recipients did not develop TRALI reactions.