Trivial Pursuit- Blood Edition 2008

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Canadian Blood Services
it's in you to give

Objectives - The game participants will learn:

- The most common complications of blood transfusion in Manitoba.
- The most common transfusion transmitted disease in Manitoba.
- Definition of TRALI.
- Status of bacterial contamination testing in Manitoba.
- Upcoming changes to platelets.
- New method to give platelets.

For your first piece of pie in the game:

- A 57 year old orthopedic surgeon is going for prostate surgery. What complication from blood transfusion is most likely to result in a fatality?
  (This is not an anesthesia talk, so we are not discussing the risks of the anesthetic)

A. Bacterially contaminated red cell
B. TRALI
C. Wrong Blood in Bag
D. Hepatitis C
E. HIV

A. Bacterially contaminated red cell

B. TRALI

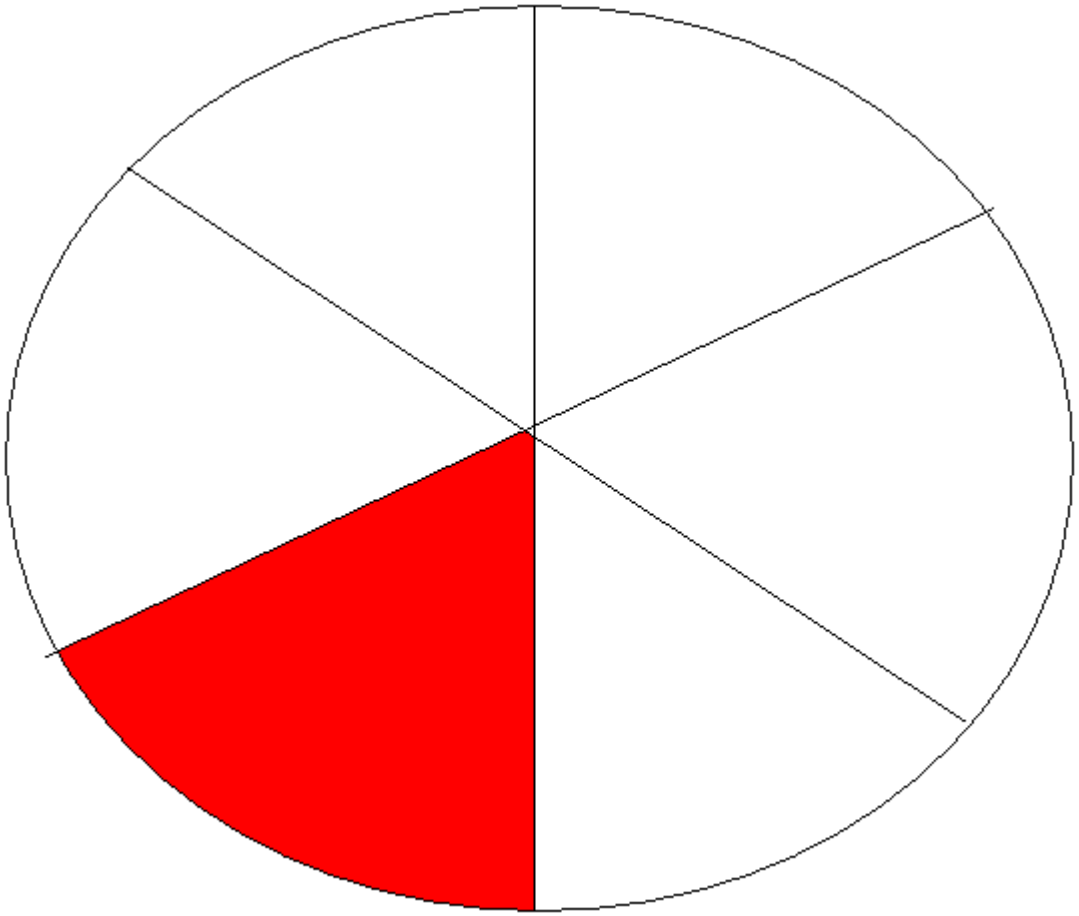
C. Receiving the wrong unit of blood

D. Hepatitis B

E. HIV or Hepatitis C infection

Estimated Number of Serious Adverse Events for Red Blood Cells Expected in Canada each year

TRALI	160
ABO-incompatible	20
Bacterial Sepsis	8
HCV	rare
HIV	rar



T.R.A.L.I. is the acronym for:

A. Transfusion Reaction Acute Lung Injury
B. Transfusion Related Acute Lung Injury
C. Tootsie Rolls are Local Indulgences
D. Transfusion Reaction and Acute Lung Injury

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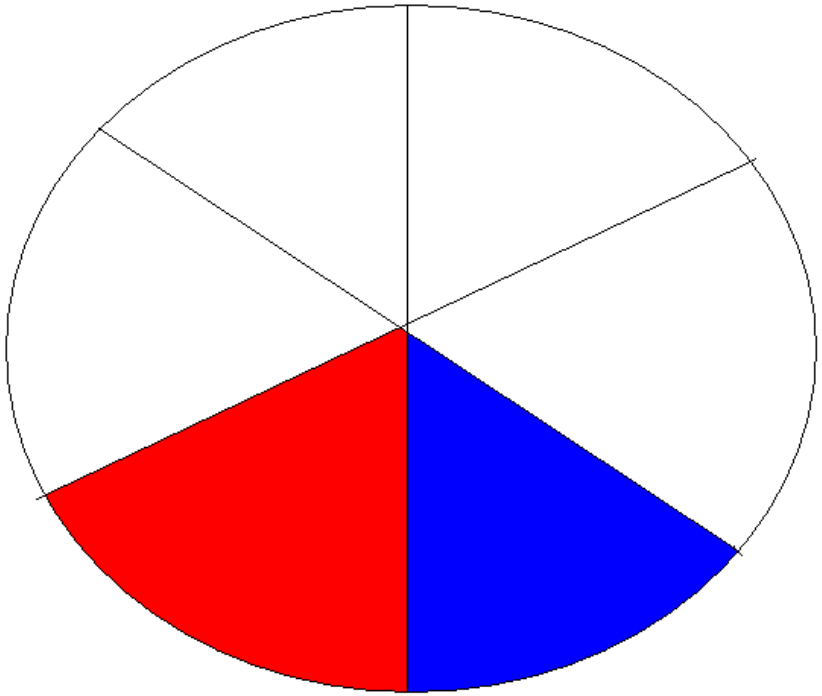
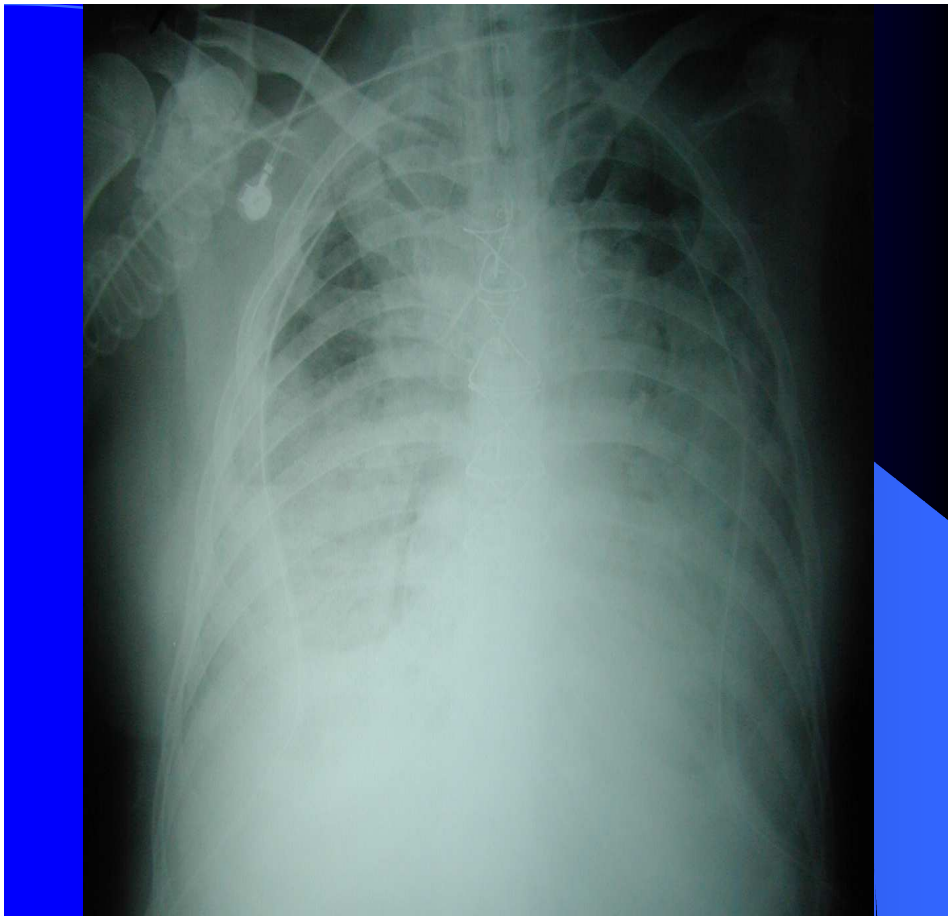
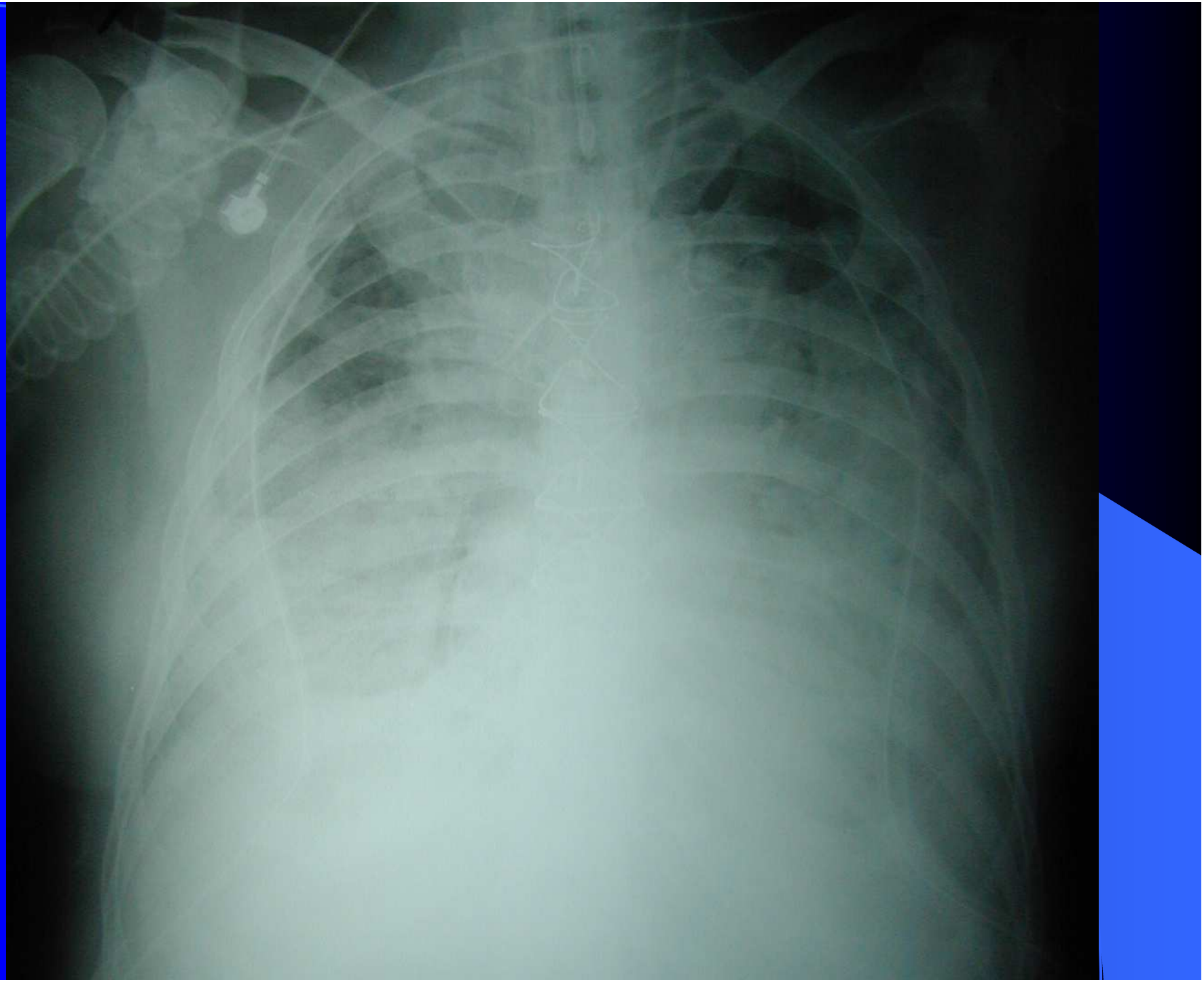


TRALI is characterized by:

- Acute respiratory distress
- Non-cardiogenic Pulmonary edema
- Hypoxemia
- Must occur with 6 hours of Transfusion





What is/are the Pathophysiologic Mechanisms of TRALI?

- A. Anti-HLA or anti-granulocyte antibodies in the blood donor
- B. Anti-HLA or anti-granulocyte antibodies in the patient
- C. Both
- D. We don’t really know for sure
- E All of the above

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Seminal Article by Popovsky and Moore Published 1985

- They studied all cases of respiratory distress that occurred within 4 hours of transfusion from June 1982 to October of 1984 at the Mayo Clinic served Hospitals
- 194,715 units were transfused to 22,292 patients
- TRALI was diagnosed in 36 patients
- 2 died

Popovsky and Moore

- Granulocyte antibodies were found in the serum of at least one donor unit in 32 of 36 cases
- Lymphocytotoxic antibodies were found in 26 cases
  - 21 cases after whole blood
  - 10 cases with red cells
  - 5 after FFP

G. Clark in Canada

- 14,602 transfusions of random donor platelets were studied between 1991 and 1993
- One death occurred
- A nested case-controlled study was done with those of 225 patients who had received random platelets and had no reaction
- Data suggested that oncology and cardiac patients are for some reason at greater risk

Palfi in the US - 2001

- Performed a double-blinded randomized controlled crossover study looking at the effect of plasma from multiparous blood donors
- ICU patients that were anticipated to get 2 units of plasma were randomized to receive control plasma from a non-multiparous donor and then a multiparous donor or in the reverse order

Palfi et al

- 5 transfusion reactions were detected in 100 patients
- 4 after the plasma from multiparous donors
- Multiparous female plasma gave a significantly lower oxygen saturation
- Differences were small but statistically significant
- Suggests that plasma from multiparous donors may be more likely to impair lung function in intensive care units than plasma from non-multiparous donors

Rouger in French Hemovigilance System

- From 1997 onward receives reports of 7 TRALI cases per year with 2.3 million cellular units transfused annually
- Less than 10% are fatal

UK Serious Hazards of Transfusion Program-SHOT

- In the year 2000 of 6 cases of TRALI were reported due to red cells per 2,354,487 units
- 3 cases were related to platelets out of 217,725
- Since that time the UK has instituted a measure not to use female plasma for transfusion, it is discarded
- They do not currently use any of their plasma for fractionation due to VCJD risk

FDA -US 2003-2004

- TRALI is the most common cause of death post transfusion
- In the US causes 24 deaths per year in 5.3 million transfusion recipients
- 1 / 220,000 mortality

Recommendations of the AABB TRALI Working Group

- Blood collecting facilities should implement interventions to minimize the preparation of high plasma-volume components from donors known to be leukocyte-alloimmunized or at increased risk of leukocyte alloimmunization.
- Blood transfusion facilities should work towards implementing appropriate evidence-based hemotherapy practices in order to minimize unnecessary transfusion.
- Blood collection and transfusion facilities should monitor the incidence of reported TRALI and TRALI-related mortality.

What is the second oldest problem in blood banking?

A. Blood compatibility
B. Bacterial Contamination
C. Transfusing the wrong patient
D. Febrile Transfusion reactions
E. Mis-labelling samples

A. Blood compatibility
B. Bacterial Contamination
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Bacterially Contaminated Red Cells

- This is the second oldest problem in blood banking
- Still is a problem
- Almost always unrecognized
- Patients develop sepsis for a number of reasons
- Blood is often not the suspect

Reasons Why Red Cells May Be Bacterially Contaminated:

- Bacteria in the donor's blood due to unrecognized infection
  - undiagnosed SBE
- Skin flora introduced at the time of phlebotomy
- Contamination introduced by processing

Canadian Risks of Bacteria Contaminated Red Cells

- Canada has implemented the **T**ransfusion **T**ransmitted **I**njuries **S**urveillance **S**ystem (TTISS) in 1999
- Of the 11 fatalities related to transfusion 3/11 were related to bacterially contaminated red cells in 2003
- 1/65,000 red cells are bacterially contaminated prior to the implementation of the sample diversion pouch and bacterial detection

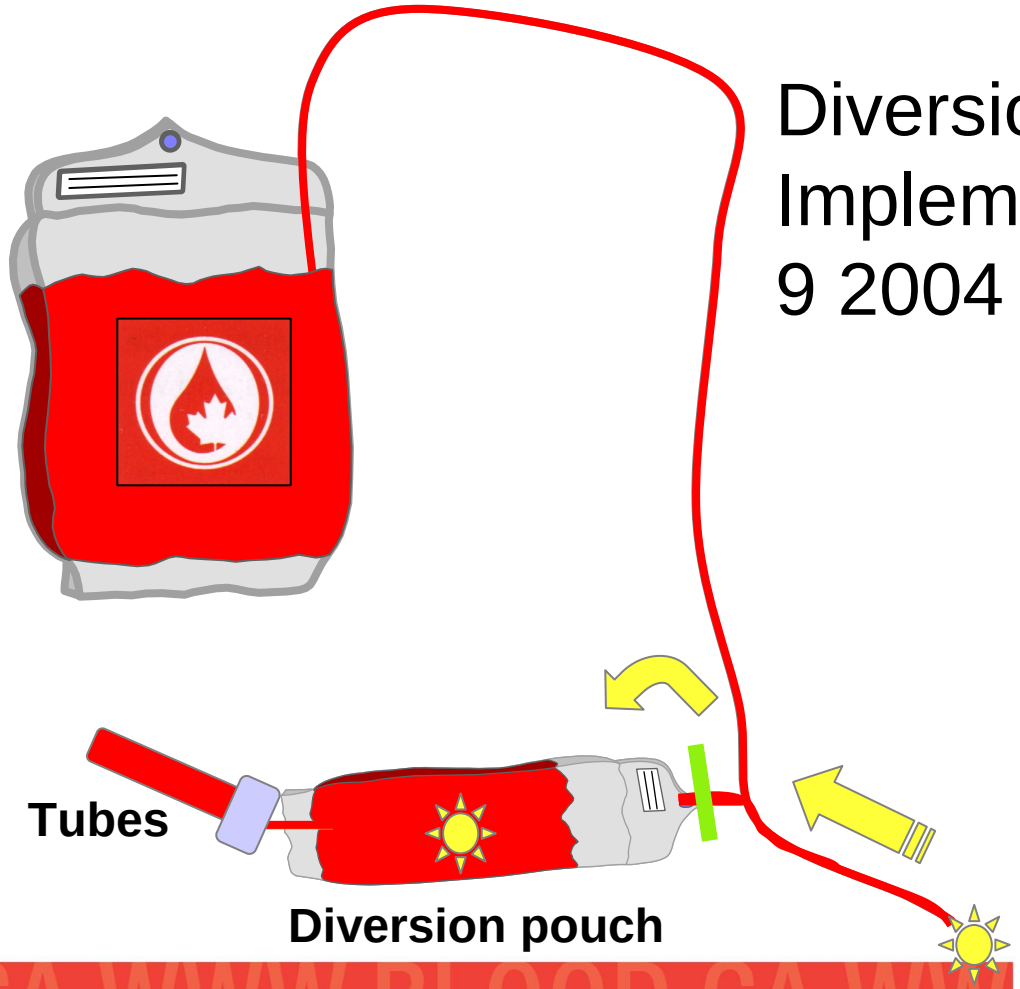
Canada

- Quebec was the first province to start Hemovigilance in its province
- One definite case where both the patient and the red cell grew the same organism
- 4 probable cases
- If all cases were attributed, it would give a rate of 3.6/100,000 transfused red cells
- If only the definite case it is 10.7/100,000 transfused red cells

What are We Doing to Prevent Bacterial Infection?

- All blood operators in Canada perform leukoreduction of all red cells and platelets
- The first 40 mls of blood collection is diverted and used for sample collection
- Bacterial detection in all platelets both apheresis and random platelets

Diversion Pouch Implemented Feb 9 2004



- A 69 year old Ophthalmologist is going in for his Coronary Artery by-pass. He is on Plavix. The anesthetist transfuses one unit of red cells.

What is the risk of getting HIV from the single unit of red cells?

A. 1/ 78,000

B. 1/ 780,000

C. 1/ 7.8 million

D. 1/ 78,000 million

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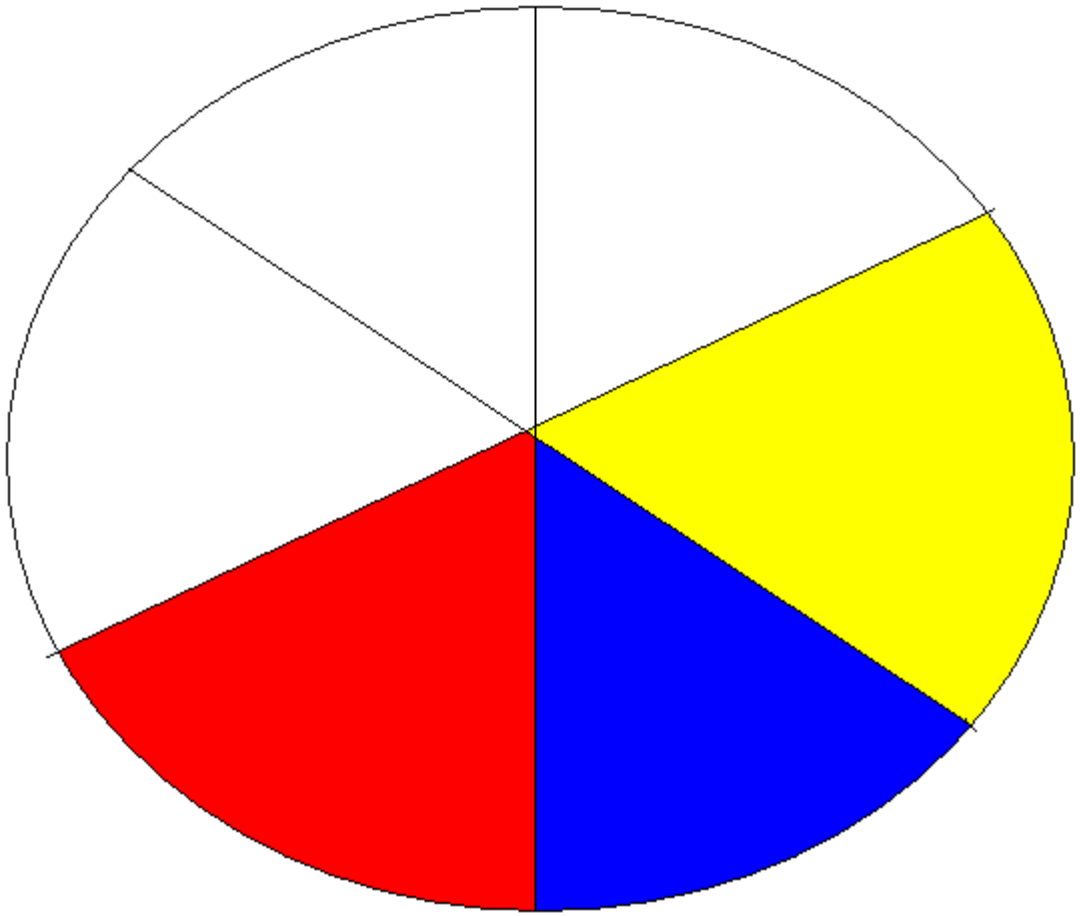
D. 1/ 78,000 million

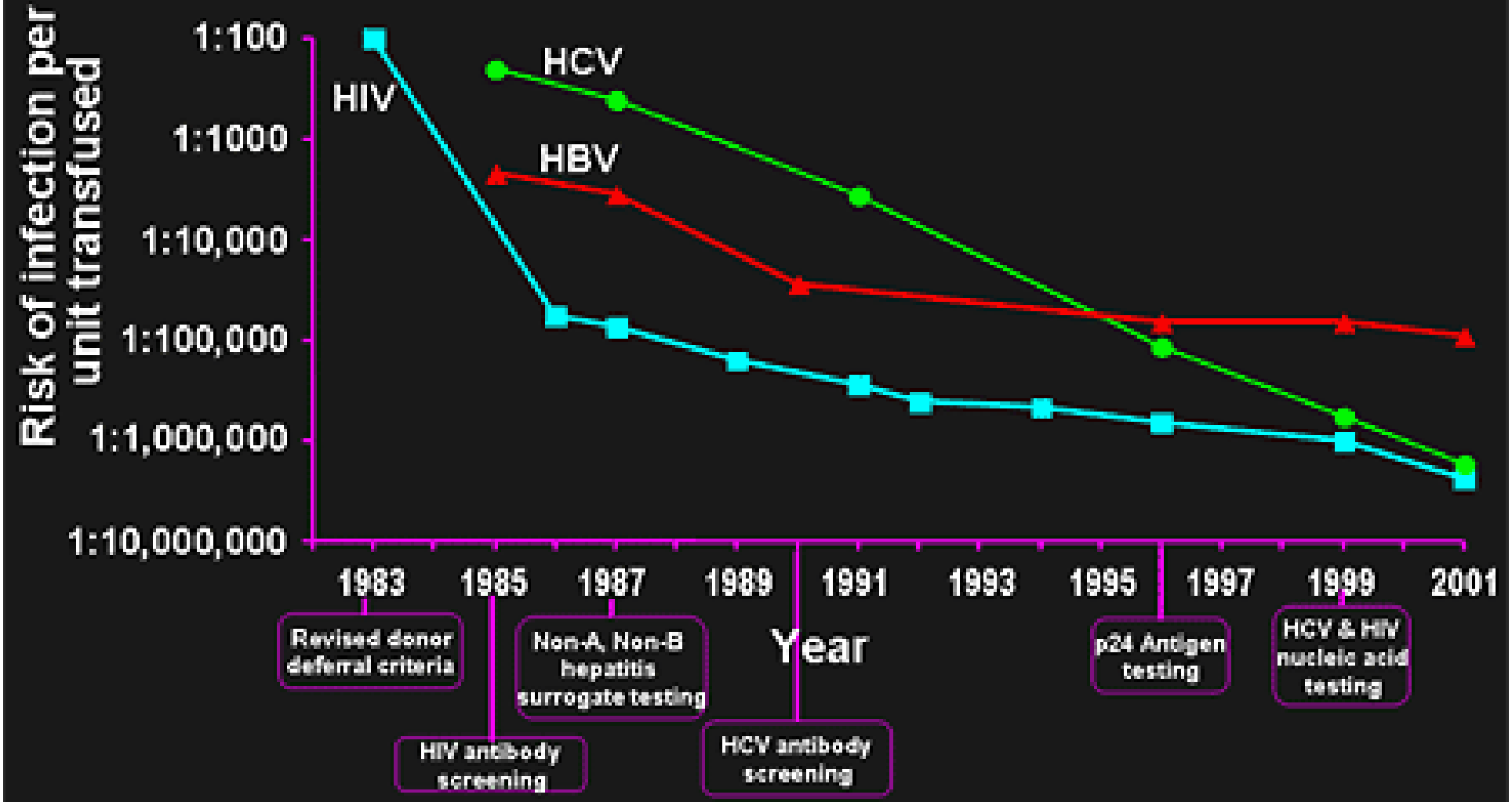
Current incidence and estimated residual risk of Transfusion-Transmitted infections in donations made to Canadian Blood Services, O'Brien et al,Transfusion,47, Feb 2007



Current Risk of HIV Transmission

- Current Canadian risk is 1 in 7.8 million blood components transfused
- We transfuse approximately a million components per year in Canada
- We might see one window case in 5 years
- The US transfused 10 million units per year and has seen a couple of window cases even with NAT testing

Decline in HIV, HBV, & HCV Risks of Transmission Through Transfusion



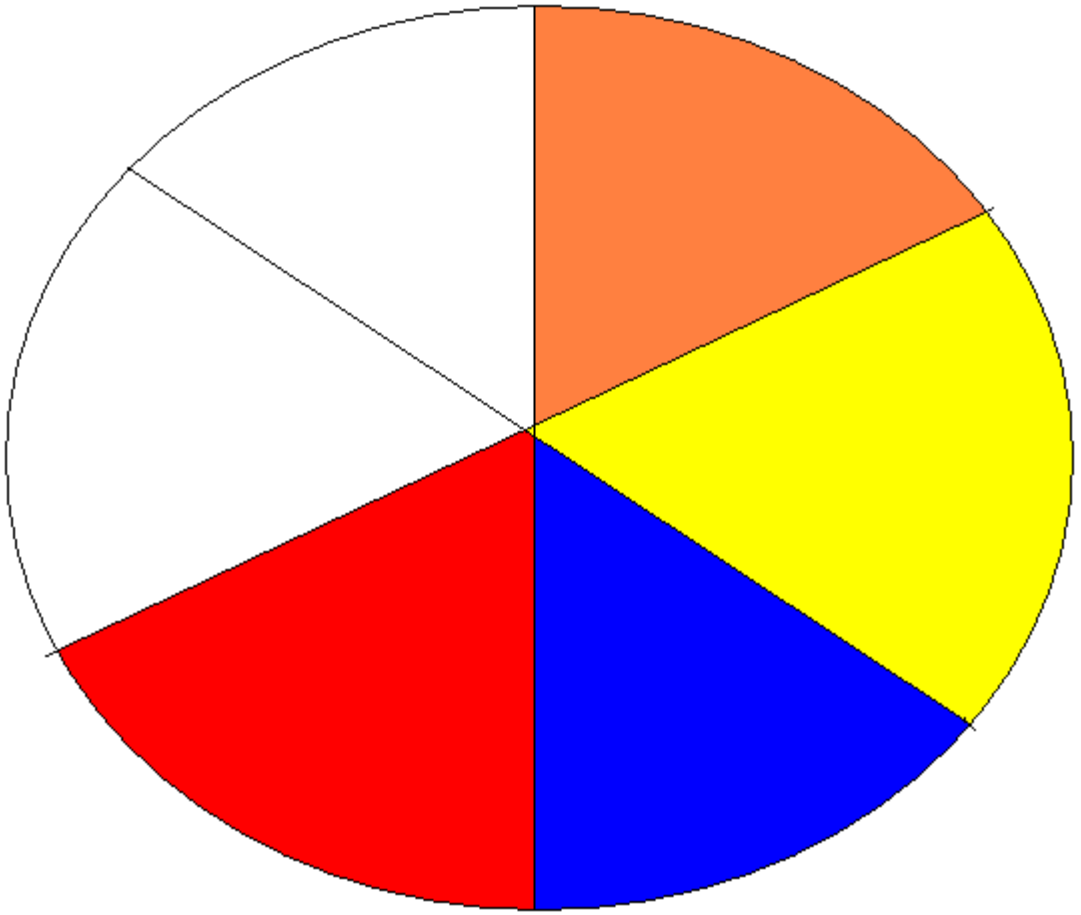
Adapted from Busch MP, et al. *JAMA*. 2003;289:959-962.
*Krombach J, et al. *Anesth Analg*. 2002;94:154-156.

What is the current risk of acquiring Hepatitis C post blood transfusion per unit of red cells?

A. 1/ 2300
B. 1/ 23,000
C. 1/230,000
D. 1/ 2.3million
E. 1/23 million

Current incidence and estimated residual risk of Transfusion-transmitted infectious in donations made to Canadian Blood Services, O'Brien, Transfusion, 2007 Vol 47, 316-325.

E. 1/2.3 million
The same odds as winning the Plasma TV in Tim Horton's "Roll up your Rim to Win" Contest



In Manitoba which Transfusion Transmitted disease will the Patient he most likely contract?

A. WNV

B. Hepatitis C

C. Chagas

D. Hepatitis B

E. HIV

A. WNV

B. Hepatitis C

C. Chagas

D. Hepatitis B

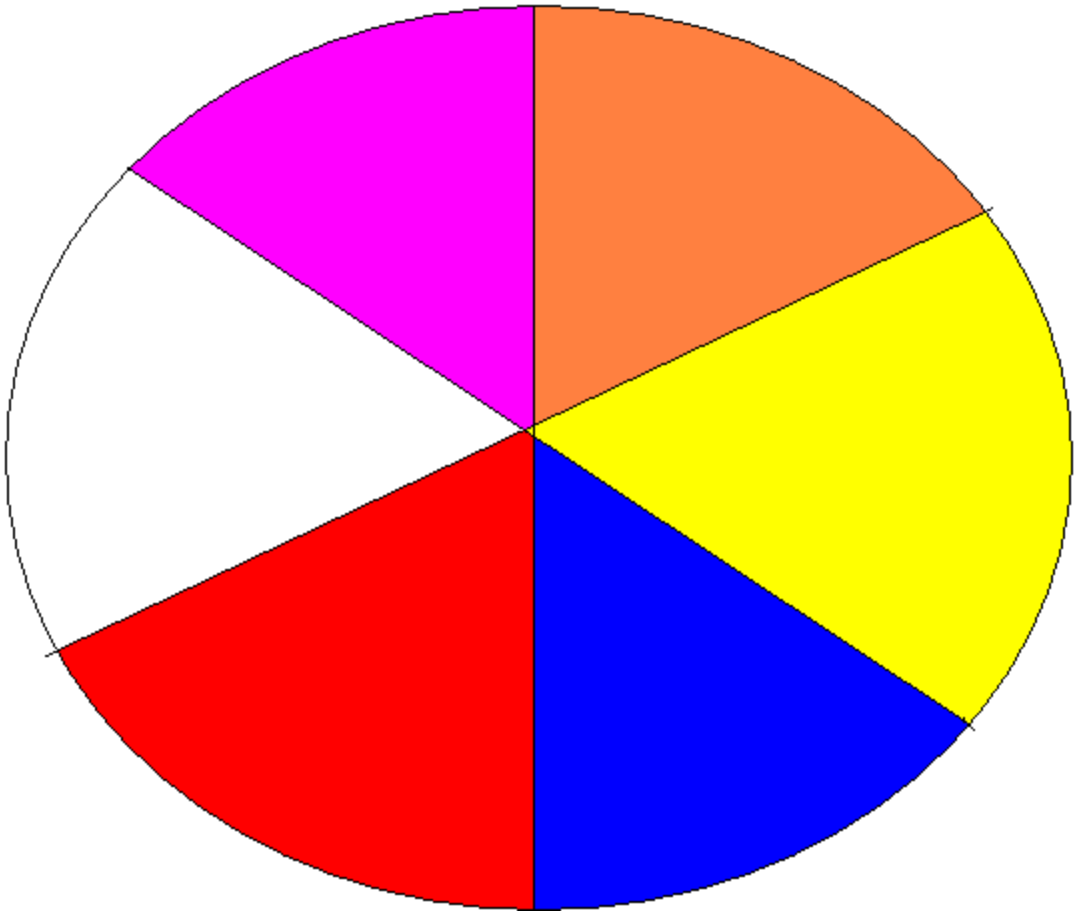
E. HIV

Hepatitis B

- Two reasons one may contract Hepatitis B from a blood donor
  - Donor is in a window period
  - HBSAg is not yet detected
- Risk 1/85,000 units prior to implementing Hepatitis B core testing
- CBS implemented anti-core testing in April 2005

Implementation of anti- Hepatitis B core testing

- CBS implemented testing for anti-Hepatitis B core in April 2005
- Hema-Quebec implemented this earlier
- It is estimated that the current rate of transfusion transmitted Hepatitis B is 1/85,000 units
- Majority cases are not fatal
- Most go undiagnosed



How many cases of transfusion transmitted WNV have been detected since CBS implemented NAT testing?

A. Zero

B. 1

C. 5

D. 10

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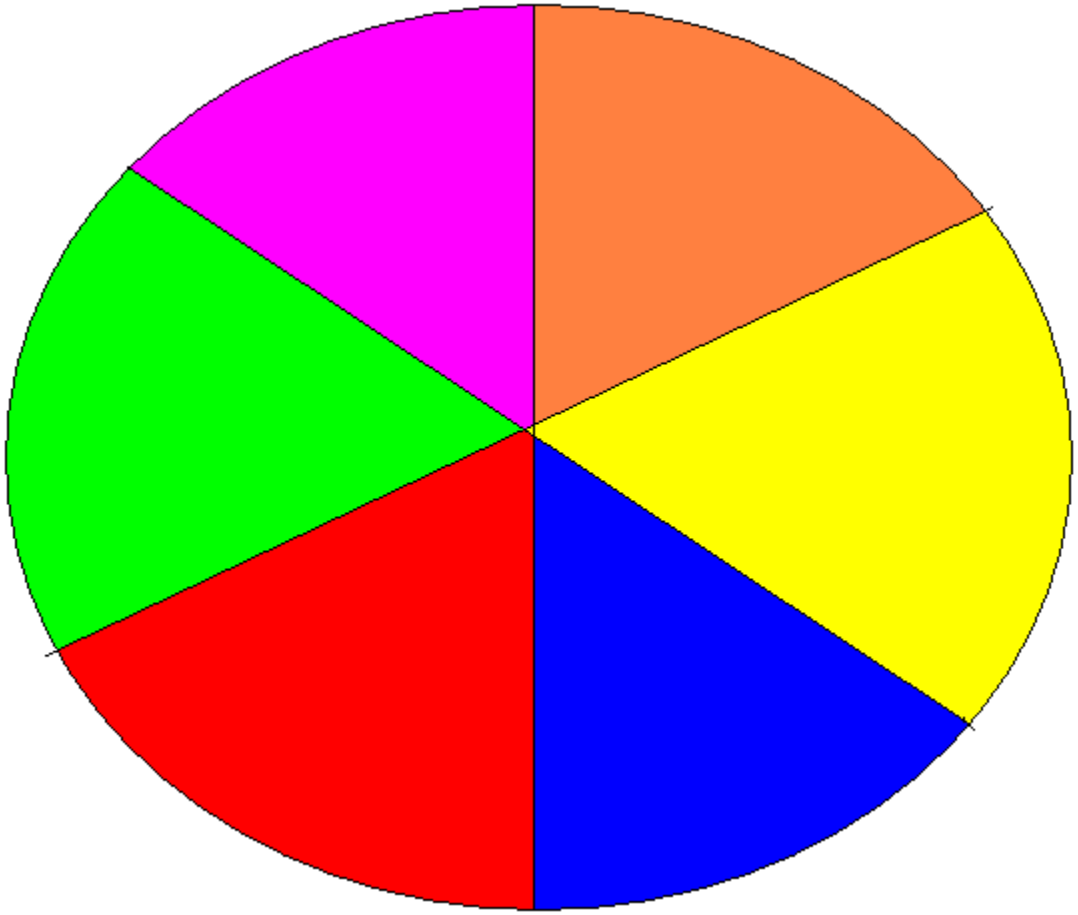

How many cases of Transfusion Transmitted Chagas disease cases have been reported in Canada?

- A. 1
- B 2
- C 3
- D 4

• A.	1
• B	2
• C	3
• D	4

Which Province in Canada has had the two cases of Transfusion Transmitted Chagas?

- A Ontario
- B Quebec
- C PEI
- D Manitoba

- A Ontario
- B Quebec
- C PEI
- D Manitoba

- Manitoba has had two cases of transfusion transmitted Chagas (*Trypanosoma cruzi)*
- There have been 7 cases in North America
- The first case was in
- The second case was in 1999
- Both were from the same Blood donor mobile

Chagas

- In both cases it was due to an immigrant from a foreign country
- In the first case the donor had lived in Paraguay as a child
- The second case the donor had been born in Germany lived in Paraguay as a child
- There has only been 9 cases of Transfusion transmitted T. Cruzi in Canada and the US
- It is endemic in some parts of the Mexico

Chagas

- Us has implemented Chagas tested in the past year

New Platelets

- In November, Canadian Blood Services is changing the way we make platelets
- Platelets will now come pooled
- Platelets will be ordered as a dose-
- One dose= 5 random platelets

Canadian Blood service Implemented Buffy Coat Platelets because?

A. We needed to get as much plasma out of each unit
B. Save cost on bacterial testing each unit
C. Save time for hospital staff –no pooling on the wards
D. Facilitate the production of platelets
E. All the above

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Why do we need to know about buffy coat platelets

A. The dosing is different
B. Each unit is bacterially tested
C. Units are suspended in Male plasma
D. New way to spike the unit-requires ¼ turn- do not over spike
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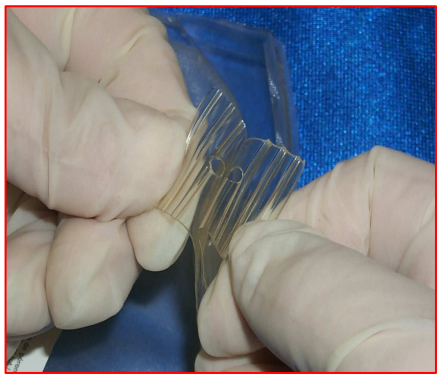
Use of Vendor Sets

- These slides show the use of specific vendor blood infusion administration sets.
- This is not an endorsement for the use of any vendor set.
- The ¼ turn technique is applicable to all IV blood administration sets.

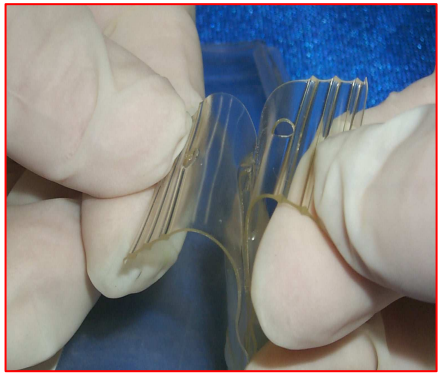
Spiking Procedure for Use with Baxter and MacoPharma Blood Bags

December 12, 2005

How To Access Port – Baxter Blood Bags



1. **Separate Port Protector at beveled edge.**



2. **Hold bottom side of port protector in dominant hand.**

3. **Peel top side of port protector downward towards the bag.**

4. **Fold over bottom port protector until tip of port slightly revealed.**

Baxter Transfusion Therapies

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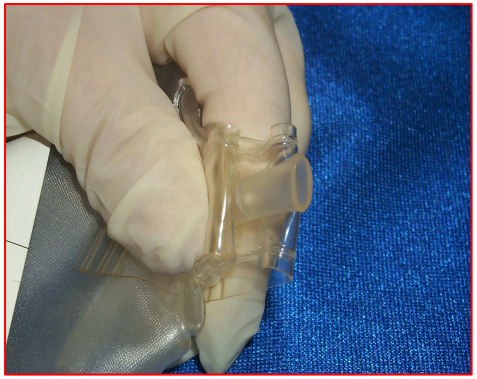
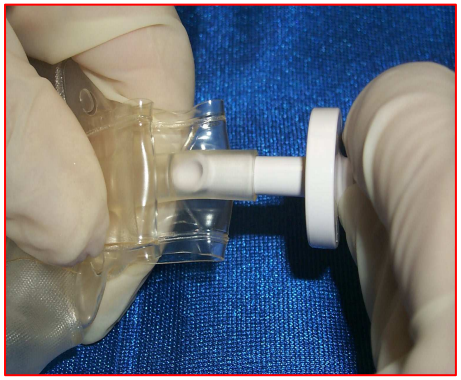
How to Spike the Bag – Baxter Blood Bag





1. **Grasp port at site of folded port protector. This stabilizes port during spiking.**
2. **With dominant hand grasp the blood set below tip of spike. Remove cap.**
3. **Insert spike firmly into bag port up to the septum in the port.**
4. **Continue to insert spike into port using ¼ turn clockwise twists until the septum has been pierced.**

DO NOT OVERSPIKE

.

Baxter Transfusion Therapies

D.CA WW

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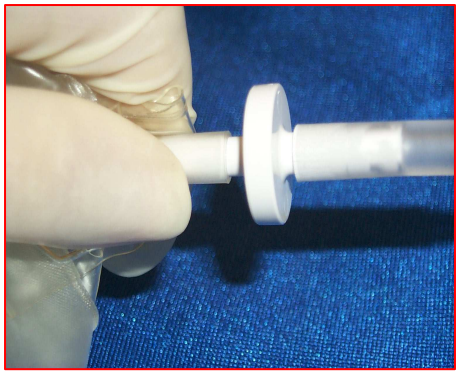
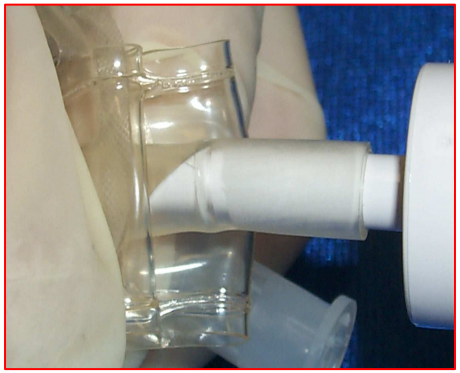
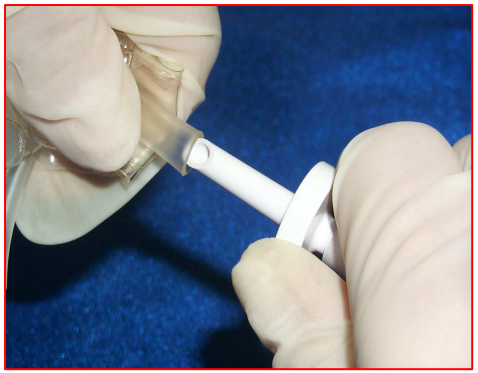
.C

How to Remove Spike – Baxter Blood Bag







1. **Remove blood bag from IV pole. Close on/off clamp. Grasp port between thumb and index finger using your non dominant hand.**
2. **With dominant hand grasp spike and twist ¼ turn in counterclockwise direction as pulling outward.**
3. **Continue to twist in ¼ turn segments as you pull out the spike.**
4. **Once spike is loosened from port remove by pulling straight down.**

Baxter Transfusion Therapies

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Trouble Shooting Tips for Spiking

1. **Do not over spike.** Over-spiking will result in the inability to remove the set.

2. **Always insert/remove spike using ¼ turn motions.** Pulling the spike in a straight downward motion will result in the tightening of the port on the spike.

Baxter Transfusion Therapies

Canadian Blood Services
it's in you to give

What key points to remember?

- TRALI- most common risk
- Bacterial contamination- all platelets are tested
- Misidentification-Patient/sample labelling
- HIV risk- 1/5 million
- HCV 1/3 million
- TRALI reduction- buffy coat platelets Plasma from male donors
- New blood bags- require a ¼ turn twist-do not over spike