Platelet Reactions & Recall

Dr Fatts Chowdhury
Consultant in Transfusion Medicine
Imperial College Healthcare NHS Trust
NHS Blood and Transplant
Senior Clinical Lecturer

Learning Objectives

1. Recognise factors that contribute to good transfusion practice
2. To be aware of why complications of transfusions occur and what these complications are
3. Reasons for implementation of Bacti screening
4. How to recognise a patient at risk of bacterial contamination, and how to treat patient.
5. Appreciate the complexity of the recall process

Good Transfusion Practice

SAFE and APPROPRIATE USE OF BLOOD

RIGHT BLOOD PRODUCT

RIGHT PATIENT

RIGHT TIME

This requires:

- TEAMWORK
- FOLLOWING PROCEDURES
- GOOD DOCUMENTATION
- CLEAR COMMUNICATION

What can go wrong?

ACUTE TRANSFUSION REACTIONS (<24 hours)

Severe

- ABO incompatible - haemolysis
- Anaphylaxis
- Bacterial contamination

Moderate – mild

- Transfusion-associated circulatory overload
- Febrile non-haemolytic transfusion reactions
- Allergic reactions

DELAYED TRANSFUSION REACTIONS (>24 hours)

- Delayed haemolytic transfusion reaction
- Alloimmunisation
- Transfusion-associated (TA) graft-versus-host disease (GvHD)
- Post transfusion purpura
- Transfusion-transmitted infection (viral, parasitic, prion)
- Iron overload

In the 70s and 80s over 4,500 people with bleeding disorders were multiply-infected with a range of blood-borne viruses including Hepatitis C and HIV via their treatment with contaminated blood products.

Government, pharmaceutical companies and clinicians were aware of the risks posed by these products but **did not inform patients and ignored all safety warnings**.

Successive Governments have refused to hold a public inquiry into what happened and **have never fully compensated those affected**.

I support the call for:

- ☑ a UK wide public inquiry that can compel witnesses under oath, will release all documents for public scrutiny and have a remit to consider failures in government policy and negligence by public bodies.
- ☑ the provision of compensation to those affected.

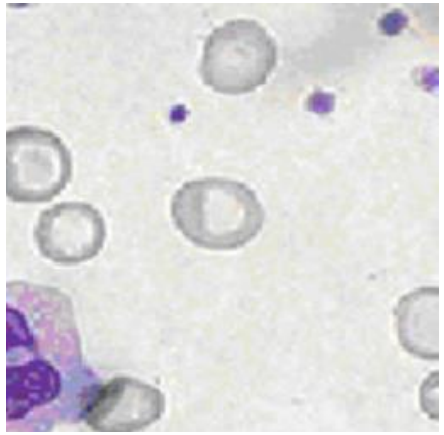
Tweet your support @HaemoSocUK calling for the #bleedingtruth

THE HAEMOPHILIA SOCIETY

What are the sources of bacterial contamination

- **Phlebotomy**
  - Skin contaminants (inadequate disinfection)
  - Skin plug (large bore collection needle)
- **Processing**
  - Contaminated collection bag, tubing, anticoagulant
- **Asymptomatic donor bacteremia**

Platelets



Bacterial Contamination

TYPES OF BACTERIA

BLOOD COMPONENTS	ORGANISMS
PACKED RBC	*Yersinia enterolotica* *Pseudomonas fluorescnes* *Serratia liquefaciens*
PLATELETS	*Stahplycoccus epedermidis* *Staphylococcus aureus* *Bacilus cereus* *Propionibacterium spp.* *Micrococcus spp.* *Group C Streptococcus*

BACKGROUND to BACTIALERT

Hematology Am Soc Hematol Educ Program. 2003:575-89.

Bacterial contamination of blood components: risks, strategies, and regulation: joint ASH and AABB educational session in transfusion medicine.

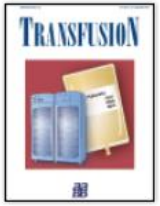
Hillyer CD[1], Josephson CD, Blajchman MA, Vostal JG, Epstein JS, Goodman JL.

Author information

Abstract

Bacterial contamination of transfusion products, especially platelets, is a longstanding problem that has been partially controlled through modern phlebotomy practices, refrigeration of red cells, freezing of plasma and improved materials for transfusion product collection and storage. Bacterial contamination of platelet products has been acknowledged as the most frequent infectious risk from transfusion occurring in approximately 1 of 2000-3000 whole-blood derived, random donor platelets, and apheresis-derived, single donor platelets. In the US, bacterial contamination is considered the second most common cause of death overall from transfusion (after clerical errors) with mortality

TRANSFUSION AABB



Volume 45, Issue 9
September 2005
Pages 1512-1517

Evaluation of BacT/ALERT plastic culture bottles for use in testing pooled whole blood–derived leukoreduced platelet-rich plasma platelets with a single contaminated unit

M.E. Brecher, S.N. Hay, A.D. Rose, S.J. Rothenberg

First published: 10 August 2005 | https://doi.org/10.1111/j.1537-2995.2005.00563.x | Cited by: 37

Transfusion. 2017 May;57(5):1122-1131. doi: 10.1111/trf.14085.

Bacterial screening of platelet components by National Health Service Blood and Transplant, an effective risk reduction measure.

McDonald C[1], Allen J[1], Brailsford S[1], Roy A[1], Ball J[1], Moule R[1], Vasconcelos M[1], Morrison R[1], Pitt T[1].

Author information

Abstract

BACKGROUND: Bacterial contamination of blood components remains a major cause of sepsis in transfusion medicine. Between 2006 and 2010 in the 5 years before the introduction of bacterial screening of platelet (PLT) components by National Health Service Blood and Transplant (NHSBT), seven cases of PLT component-associated transmission of bacterial infection were recorded for 10 patients, three of which were fatal.

STUDY DESIGN AND METHODS: Sampling of individual PLT components was undertaken at 36 to 48 hours after donation and tested in the BacT/ALERT system with 8 mL inoculated into each of aerobic and anaerobic culture bottles. Bottles were incubated until the end of the 7-day shelf life and initial reactive bottles were examined for contamination. Bacterial screened time-expired PLTs were tested as in the screen method.

RESULTS: From February 2011 to September 2015, a total of 1,239,029 PLT components were screened. Initial-reactive, confirmed-positive, and false-positive rates were 0.37, 0.03, and 0.19%, respectively. False-negative cultures, all with Staphylococcus aureus, occurred on four occasions; three were visually detected before transfusion and one confirmed transmission resulted in patient morbidity. The NHSBT screening protocol effectively reduced the number of clinically adverse transfusion transmissions by 90% in this reporting period, compared to a similar time period before implementation. Delayed testing of 4515 time-expired PLT units after screening revealed no positives.

CONCLUSION: The implementation of bacterial screening of PLT components with the NHSBT BacT/ALERT protocol was an effective risk reduction measure and increased the safety of the blood supply.

Bacterial TTI reports 2017

In 2017, no reported suspected bacterial TTI were confirmed, but 1 incident reported by the SNBTS is assigned as possible. The four UK Blood Services all use the BacTALERT system for bacterial screening which has had an impact on the number of confirmed bacterial TTI (McDonald et al. 2017). Each country uses slightly different sampling methods which are described in Table 17.1.

Case 17.1: Possible case: (Morbidity: Major; Imputability: 1-possible)

A 3-day old pooled platelet unit was transfused to a female patient in her 50s who was receiving a second cycle of chemotherapy for relapsed acute myeloid leukaemia (AML). She had a history of a perianal abscess and neutropenic fever, was reported as pyrexial prior to transfusion, and had been given antibiotic prophylaxis. Four hours post transfusion her condition worsened, she was found collapsed, confused, septic with a temperature of 40°C, hypoxic, and hypotensive with a tachycardia. She remained pyrexial over the following week and was treated with broad spectrum antibiotics; she continued to improve and recovered well. Bacterial screening signalled a reactive result after the pack had been transfused, and Staphylococcus capitis was isolated from the initial pouch sample and the anaerobic culture bottle, but the transfused unit was unavailable for culture. Blood cultures were taken from the patient but these results were not available to the Blood Service. The significant symptoms and persistent fever post transfusion resulted in the case being reported as a bacterial TTI although the symptoms may have been related to the patient's underlying condition. On the basis of these results this incident is reported as a possible TTI.

Bacterial screening methods

Table 17.1: Bacterial screening methods used by the UK Blood Services

	Time of sampling (hour)	Volume sampled (mL)	Apheresis sample	Time at release (hour)	Length of screening
NHSBT	36	2 x 8	Post-split	6	Day 7
NIBTS	48	2 x 8	Pre-split	6	Day 9
SNBTS	18	2 x 7	Pre-split	6	Day 7
WBS	16	2 x10	Pre-split	From start of screening	Day 7*

**Additional 10mL sample taken at day 4 to extend shelf-life from 5 to 7 days*

NIBTS=Northern Ireland Blood Transfusion Service; WBS=Welsh Blood Service

Time of sampling: time samples are taken from the pack for screening in hours after donation is made

Apheresis sample: two or three packs may be manufactured from one donation, NHSBT sample each pack i.e. 2 or 3 packs

Time at release: time bottles remain on the machine before packs are released as negative

NHS
Blood and Transplant

Colindale Centre
Charcot Road
Colindale
NW9 5BG

Dr Sarah Arnott
Consultant Haematologist
Haematology Department
Medway Hospital
Windmill Lane
Gillingham
Kent
ME7 5NY

Tel: 0208 957 2786
Fax: 0208 957 2838
www.nhsbt.nhs.uk

Ref: Recall Number W007222

17 July 2018

Dear Dr Arnott

Re: RECALL REPORT FOR A BACTERIAL SCREENING ALERT

QI Number:	QI9089
Date of recall:	09/07/18
Blood Component:	Platelet Pool
Donation Number:	G072 418 026 472 R
Pack number:	N/A
Results reference:	PS/BAC/281/18/W
Patient Name:	N/A
Patient Date of Birth:	N/A
Patient Hospital Number:	N/A

This letter is to inform you of the outcome of the recall initiated by NHSBT.

The unit was investigated at: National Bacteriology Laboratory, the results were:

Confirmed Positive: Bacteria Propionibacterim Acnes was identified by the National Bacteriology Laboratory. This result is most likely to represent contamination from the donor arm and unlikely to be clinically significant.

NHS
Blood and Transplant

If the patient had any adverse effects as a result of this transfusion, please contact me to discuss further. If the patient did not suffer any adverse effects, this recall can now be closed.

If you require any further information or advice with regards to this recall, please contact me.

Yours sincerely

Dr Fatts Chowdhury,
Consultant Haematologist in Blood Transfusion
(Tel: 0208 957 2788)

Copy to: Transfusion Laboratory Manager
Transfusion Practitioner
NHSBT QA

LCT120/C (MP04/17) C: 28/02/17 (Template Version 07/10/00)

Business Disability Forum
POSITIVE ABOUT DISABLED PEOPLE

Bacterial TTI 1996–2017

Screening of platelet components cannot guarantee freedom from bacterial contamination. Packs are released for issue as 'negative-to-date', which may be before bacteria have multiplied sufficiently to trigger an initial screening reaction. There have been 8 bacterial near misses, all but 1 in platelet components, reported to the PHE Epidemiology Unit between 2011 and 2017. Overall, out of a total of 44 bacterial transfusion-transmissions to individual recipients, 37 (34 incidents) have been caused by the transfusion of platelets, and 7 by red cells (Table 17.3) since reporting began.

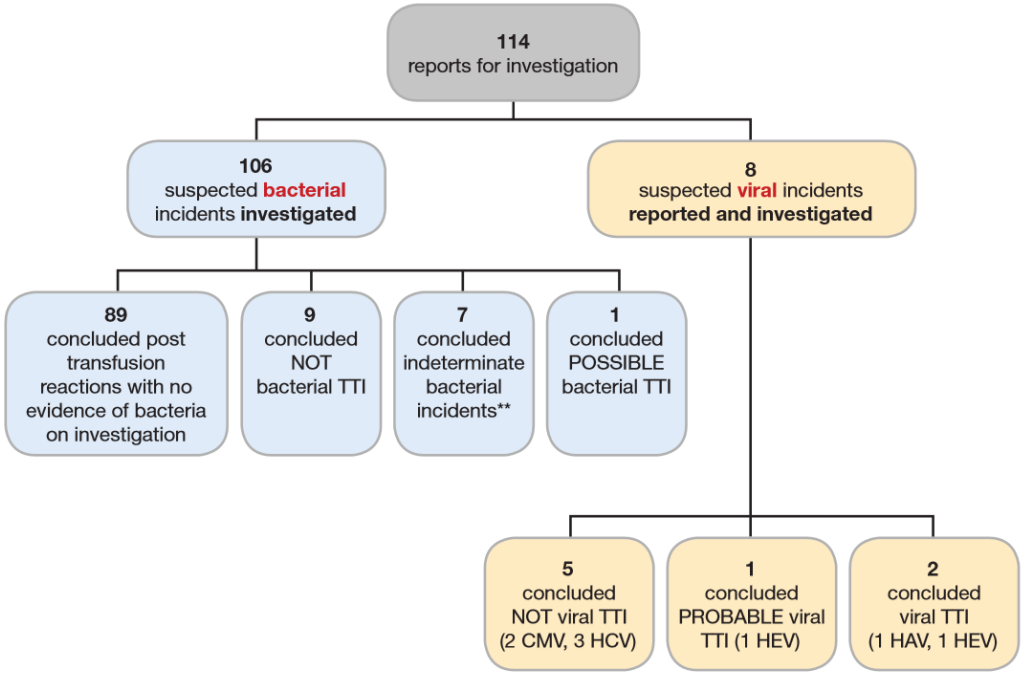


Figure 17.1: Outcome of reports of suspected TTI made to the NHSBT/PHE Epidemiology Unit in 2017*

**Hepatitis C virus (HCV) investigations where the transfusion was prior to screening are not included in the above figure (1 HCV incident reported in 2017, transfusion pre-1991)*

***No packs to test but investigation based on information received indicates unlikely to reflect a TTI*

TTI=transfusion-transmitted infection; CMV=cytomegalovirus; HEV=hepatitis E virus; HAV=hepatitis A virus

Case 1

- 65 year female with MDS – on regular platelet transfusion support.
- Baseline obs: Temp 36 C, P 86, BP 130/87, SaO2 98%
- Given 1 unit platelets – 10 minutes into transfusion
- Patient complains of feeling hot
- What would you do ?
- Why is this patient a high risk patient?

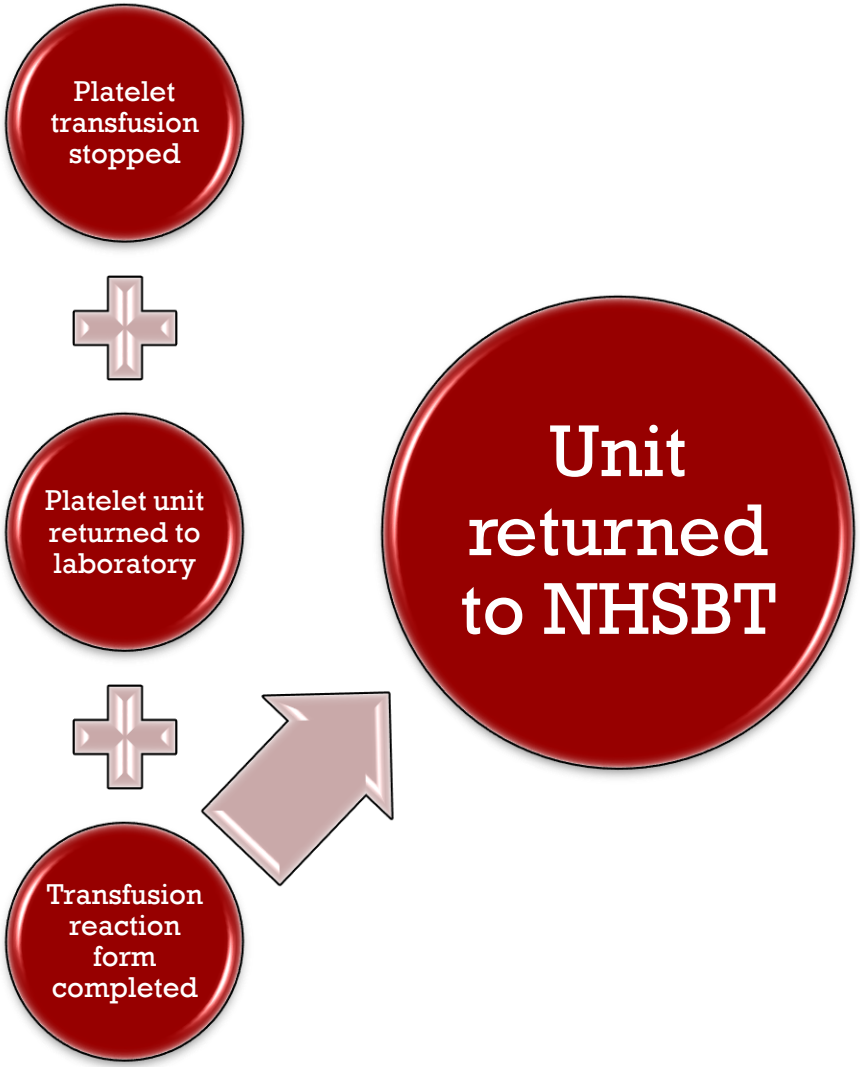
Case 1 continued

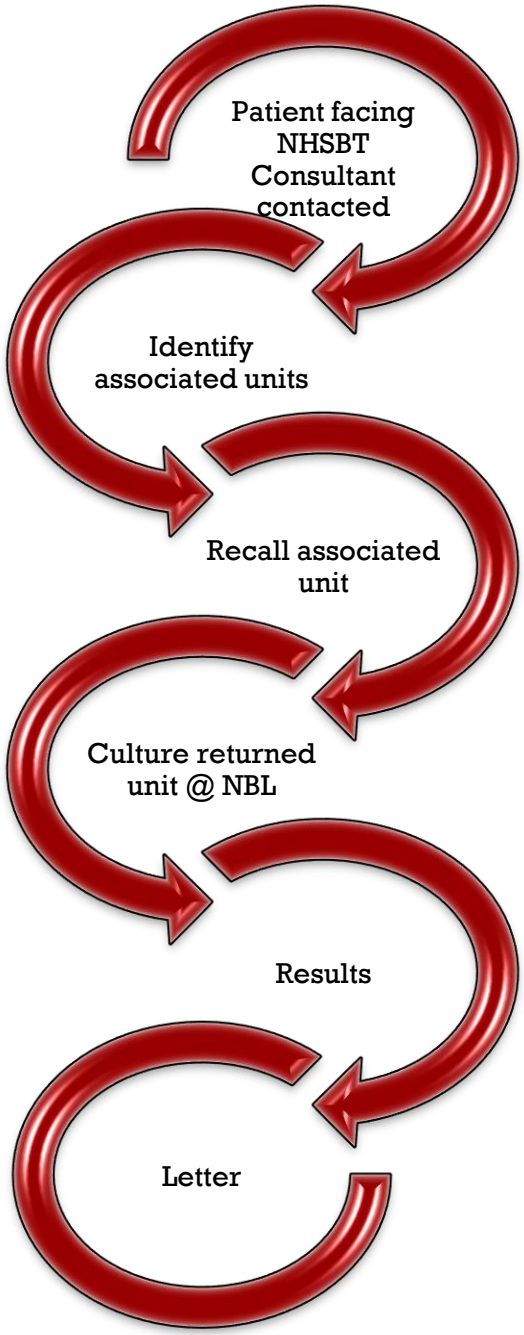
- Observations:
  - T 39 C, P 100, BP 170/90, SaO2 98

- What would you do ?

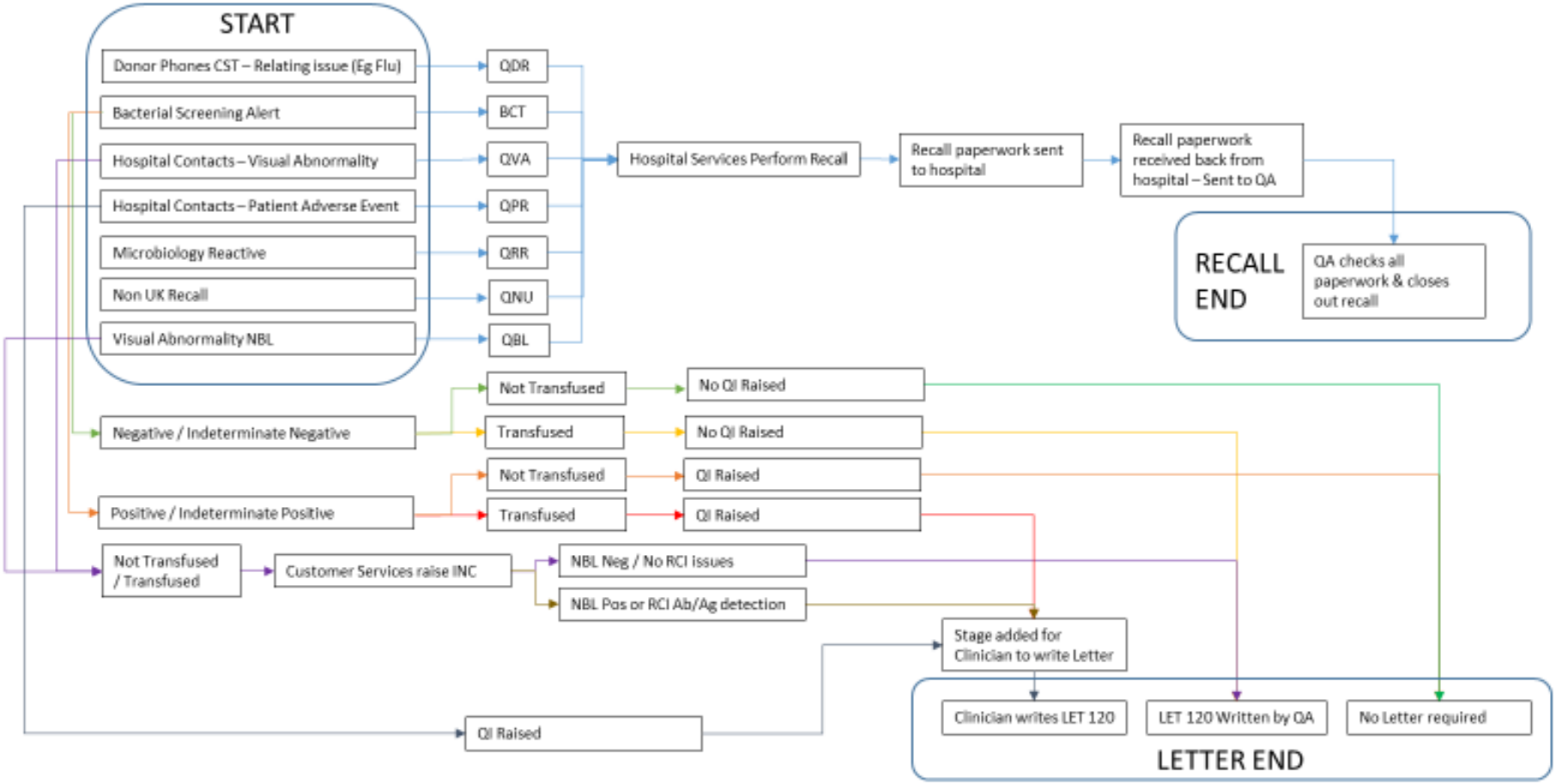
The Recall Process

Case 1 continued





Overview of Recall Process



Patient Adverse Event

Charcot Road
Colindale
NW9 5BG

Tel: 0208 957 2786
Fax: 0208 957 2838
www.nhsbt.nhs.uk

Dr Fiona Regan
Consultant Haematologist
Hammersmith Hospital
Haematology Department
4th Floor, Commonwealth Building
Du Cane Road
London
W12 0HS

Ref: Recall Number W006987

8 March 2018

Dear Dr Regan

Re: RECALL REPORT FOR A PATIENT REACTION

QI Number:	QI7044
Date of recall:	26/02/2018
Blood Component:	Platelet unit
Donation Number:	G072 418 157 635U
Pack number:	N/A
Results reference:	PT/BAC/019/18/W
Patient Name:	N/A
Patient Date of Birth:	N/A
Patient Hospital Number:	N/A

This letter is to inform you of the outcome of the recall initiated by NHSBT.

The unit was investigated at: National Bacteriology Laboratory, the results were:

Confirmed Negative: There is no evidence of bacterial or fungal contamination in the pack

Case 2

8 year boy having a thoracotomy.

Had reactions to platelets before.

What are the questions you would ask?

Case 2 continued

- Several platelet transfusion in past
  - Urticarial rash
  - Drop in BP
  - No fever

- What is the diagnosis?
- What investigation would you advice?
- Would you undertake a recall process?

Summary

1. Good transfusion practice
2. Aware of complications of transfusions occur
3. Reasons for implementation of Bacti screening
4. How to recognise a patient at risk of bacterial contamination, and how to treat patient.
5. Appreciation of the complexity of the recall process