Wrong Blood In Tube Incidents: Human Factors in Incident Investigations

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Definitions

- **W**inning **B**ecause **I** **T**ried
- **W**orld **B**ank of **I**nternational **T**erms
- **W**arwick **B**ehavioural **I**nsights **T**eam
- **W**arner **B**rothers **I**nternational **T**elevision/**T**heatre
- **W**ell **B**eing **I**ntegrative **T**herapy
- **W**e **B**uild **IT**
- **W**hose **B**oyfriend **I**s **T**his
- **W**ell **B**eing **I**ndia **T**rust
- **W**here **B**usiness **I**s Turning
- **W**ill **B**e **I**n **T**ouch
- **W**alk **B**ack **I**n **T**ime

WBITS

WBIT Definition – SHOT 2012

- **Blood is taken from the wrong patient and is labelled with the intended patient's details (in other schemes ‘miscollected’).**
- **Blood is taken from the intended patient, but labelled with another patient's details (in other schemes ‘mislabelled’, but the term ‘mislabelled’ could include missing core identifiers or other errors which are not WBIT in SHOT).**

Serious Hazards Of Transfusion SHOT

WBIT Reporting

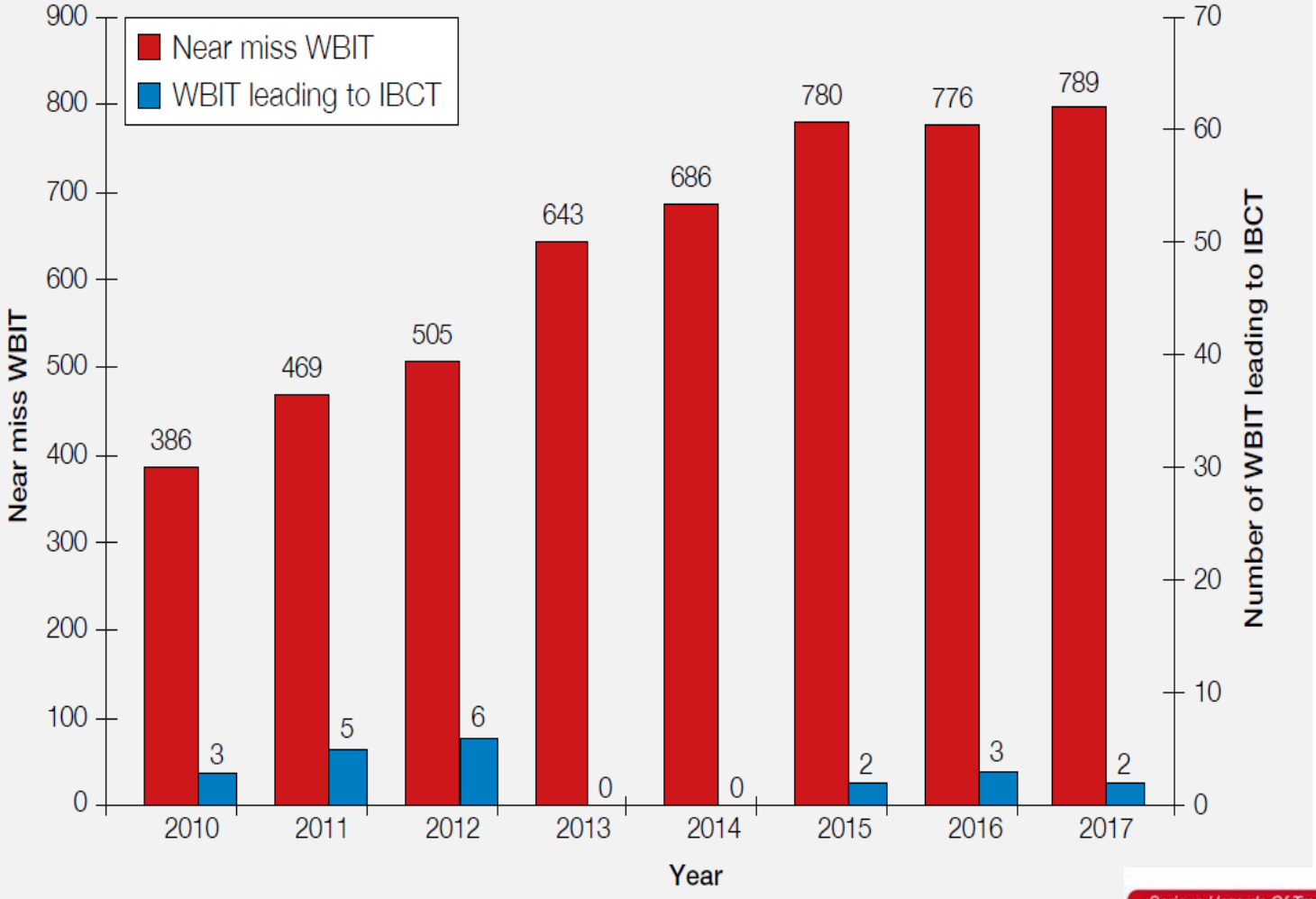

Figure 10.11: Cumulative comparison of near miss WBIT and those leading to IBCT

Serious Hazards Of Transfusion SHOT

WBITS – a TPs view

- The most preventable error a TP has to deal with
- Potential for a catastrophic outcome (IBCT)
- There is no common theme or trend to target and improve practice -
  - Happen in every clinical area
  - The blood samples are taken by all professions and grades
  - They happen during “working” hours and out of hours
  - They happen with emergency and non-urgent patients
- One WBIT impacts many people and processes

WBIT Impact

Effected	Impact
Patient	Patient has to be re-bled Potential delay to transfusion Loss of confidence in staff / safety of system
Clinical staff	Another member of staff usually re-bleeds the patient Possible transfusion delay might impact clinical work plan
Laboratory staff	Management of spurious result including information into LIMS Informing clinical area Keeping records of sample & request form
TP	Datix & WBIT investigation including SHOT report Staff discussion/ re-training
Risk /Quality Teams	Datix management
Ward Manager	Datix management
SHOT	Data collection
Organisation	Hidden costs of repeat samples ~ £25

Is it a problem?

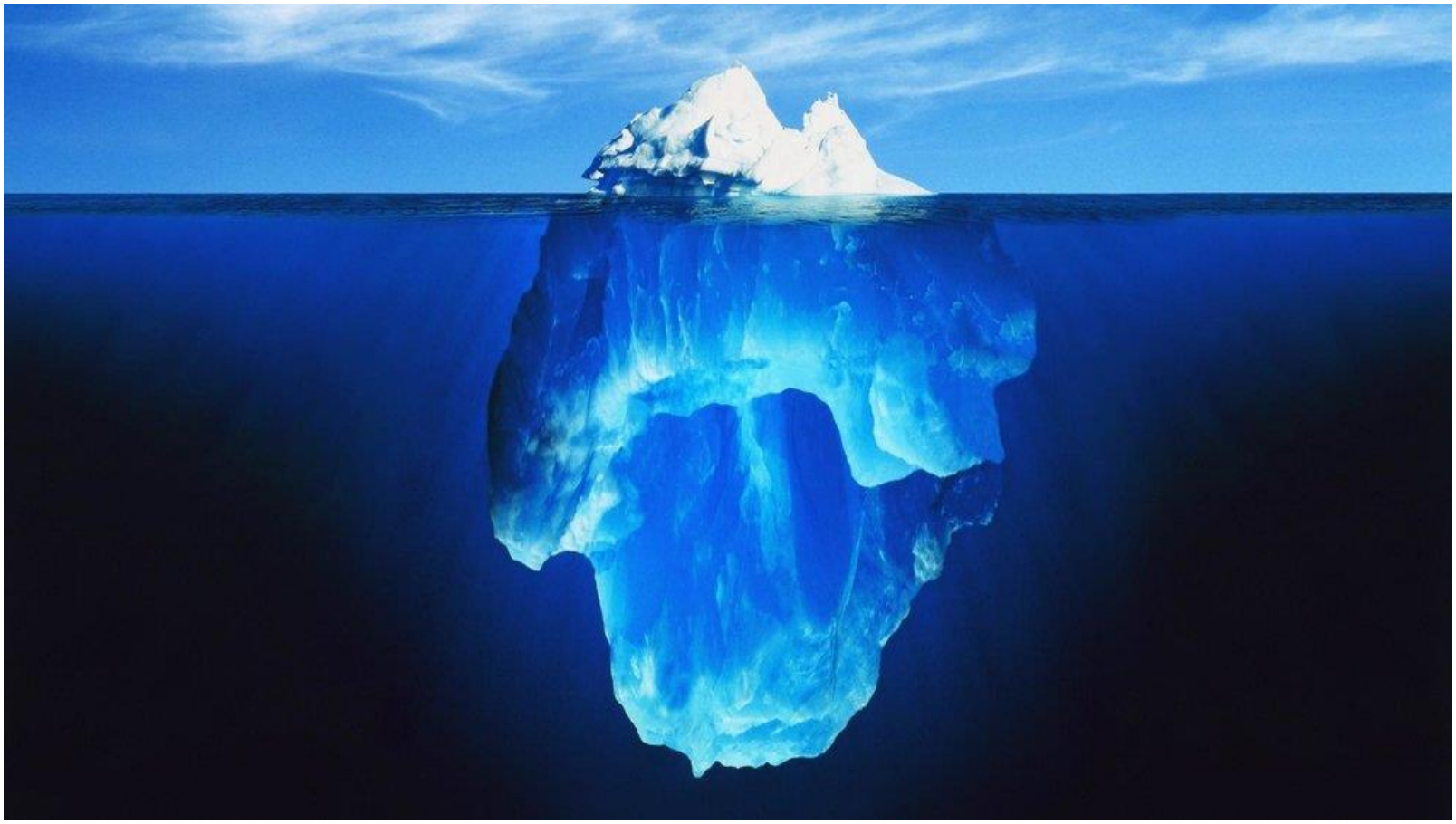

Table I. Rates of WBIT in selected studies.

Location	Rate of WBIT	Definition	Correction factor	References
UK, 27 hospitals	1 in 1303	Blood group not matching previous record	1·418	Murphy *et al* (2004)
International, 10 countries, 71 hospitals	1 in 1986	Blood group not matching previous record	1·6	Dzik *et al* (2003)
International, 122 institutions (95·1% USA)	1 in 2500	Blood group not matching previous record	None	Grimm *et al* (2010)
USA Single centre over 5 years	1 in 2283	Blood group not matching previous record, clinical service notification and others	None	Ansari and Szallasi (2011)
North East England, 15 hospitals over 12 months	1 in 2717	Blood group not matching previous record notifications from clinical areas	1·418	Varey *et al* (2013)
UK, national postal survey of 400 laboratories: 245 respondents	Estimated 1 in 6000 red cell units issued	Self reported by 20 respondents	None	McClelland and Phillips (1994)
France, 5-year study single blood bank for 35 hospitals	1 in 3448	Blood group not matching previous record	None	Chiaroni *et al* (2004)
Spain, single centre study over 6 months	1 in 2243	Detected by comparison with past samples	1·4388	Gonzalez-Porras *et al* (2008)

Rates have a correction factor applied to allow for undetectable WBITs where, by chanc,e two samples have the same ABO and Rh groups. This varies in different populations dependent on the ABO and Rh blood group frequencies. WBIT, wrong blood in tube.

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Bolton-Maggs et al. Wrong blood in tube – potential for serious outcomes: it can be prevented? BJH 2015, ***168****, 3-13*

Is it all about training?

- To better understand why WBITs happen, a survey in an acute medical admission ward was done
- Staff included phlebotomists, nurses and doctors
- Questions were asked about safe sample taking practice, their training history and knowledge on patient safety systems
- For some of the priority rating questions the HTT were also asked to score to see if they correlated

Question of priorities

Thinking about taking blood transfusion samples from patients, please rate the following statements in order (*1 being most important, 5 being the least important)*

a) The patient must be comfortable before the blood sample is taken

b) The patient must be positively identified before taking the blood sample

c) The patient must understand the reason for the blood sample being taken

d) The patient details on the request form must be correct

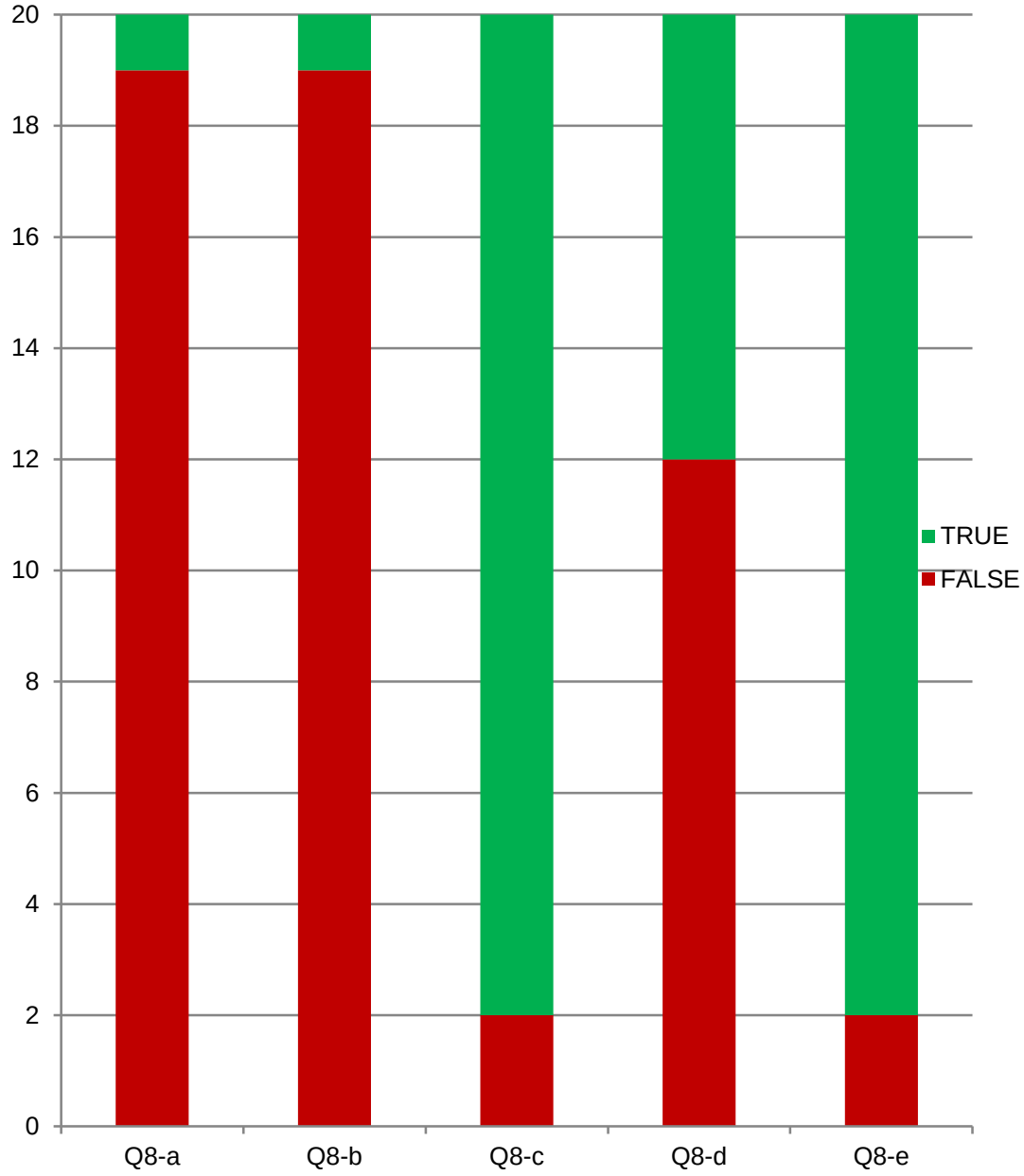
e) The patient must be wearing a wristband

Results

1	b) The patient must be positively identified before taking the blood sample	**60% rated this as the most important** **HTT agreed**
2	d) The patient details on the request form must be correct	**50% rated this as the 2nd most important** **HTT felt this was 3rd**
3	e) The patient must be wearing a wristband	**45% rated this as number 3** **HTT felt this was 2nd**
4	c) The patient must understand the reason for the blood sample being taken	**65% rated this as number 4** **HTT agreed**
5	a) The patient must be comfortable before the blood sample is taken	**85% rated this as number 5** **HTT agreed**

True or False?

a) The blood sample bottle can be labelled away from the patient so long as it is labelled from the request form and not the patient notes	TRUE	FALSE
b) If the information written on the sample bottle matches the Cerner printed wristband, the information on the request form doesn't have to match up	TRUE	FALSE
c) If a Cerner sample label is printed for blood transfusion samples it must not be used and the sample must be handwritten	TRUE	FALSE
d) If there is no wristband in place the blood sample can still be taken providing the patient can state their name and date of birth	TRUE	FALSE
e) The sample bottle should be labelled after the blood sample has been taken from the patient not before	TRUE	FALSE



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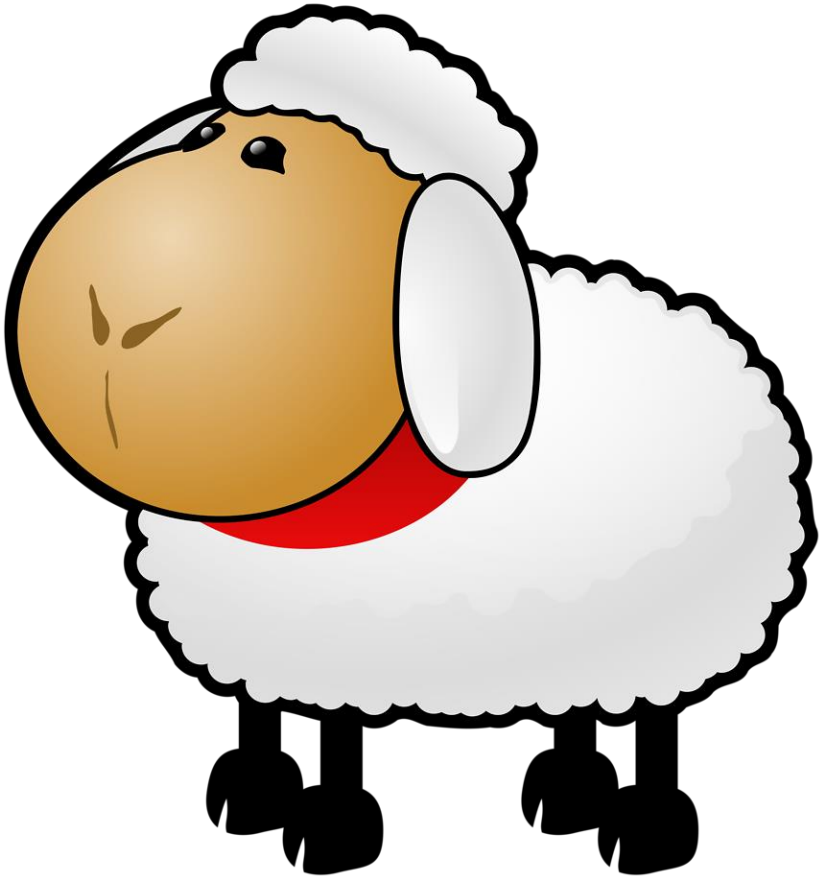
WBITs and human factors



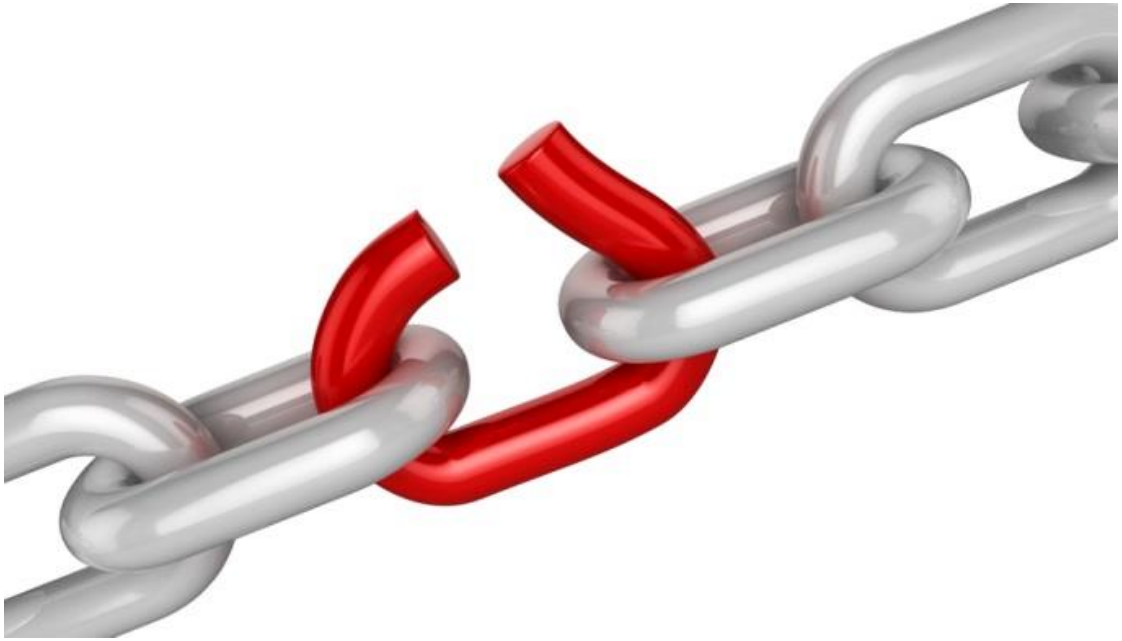
SHEEP

S	H	E	E	P
Systems	**Human interaction**	**Equipment**	**Environment**	**Personal**
Culture	Team dynamics	Equipment failures	Location	External influences
IT systems	Conflict	Lack of consumables	Interruptions	Problems based on who you are
Information flow	Leadership	User issues	physical	Pathology / physiology
Organisation flow	Behaviours of others	Non consumables (analysers, monitors)	Safety	Attitudes, behaviour, emotion
Improvement models	Communication		Ergonomics	

Human Factors

WBIT	
Systems	Culture to get things done quickly, manual systems, unfamiliar IT systems, not understanding rules & reasons, guidelines & SOPs, checklists……..
Human interaction	Team dynamics, behaviours, own confidence, approach to safety, mixed messages (TP, Consultant, peers), having to bleed patient twice……
Equipment	PDAs failing, ward printers not available, insufficient phlebotomy work stations……
Environment	Locations, side rooms & isolation, patient moving, busy ward, new admissions, discharges……..
Personal	Mood, stress levels, management of workload, mental well-being, physical well-being…….

Where are the WBIT weak points?



Sample taking Process Map

1. A group and save sample required to be taken

Reason: For blood group on file or transfusion *maybe* required or transfusion *definitely* required

Sample taking marked Routine or Urgent

Patient location: ward, out-patients, ED, ICU, Theatre

2. Blood test ordered through Cerner system

Access to Trust IT system Cerner using PC and smartcard access to order test

Requires user to be familiar with ordering blood tests for blood transfusion

Printer required for transfusion request form print out (not sample sticker unlike other Pathology tests)

Test ordered and transfusion request form printed

3. Blood sample taken from patient

Equipment ready for taking blood samples in advance of task including transfusion request form

Identify location of correct patient (e.g. bed space on ward)

Correctly identify patient by asking them to state their name and date of birth

Check wristband matches information given by patient and information on transfusion request form

Collect blood sample from the patient

Label the sample bottle at the patient bedside using the wristband

Before completing the task ensure the sample bottle labelled correctly matching the wristband and transfusion request form

4. Sample sent to the Transfusion Laboratory & processed

Sample travels from clinical areas and arrives in Transfusion Laboratory

Checked to ensure sample labelling information matches transfusion request form

Transfusion IT system checked whether new patient or has had previous samples(s) tested

Sample processed for blood group and antibody screen

5. ABO result authorised. Blood issued if required

***New patient:* 1st result on this patient therefore nothing to compare against. Group & screen only**

Previous patient: ABO group checked against historical group.

If mis-matched against historical group termed a WBIT. Identified for further investigation & repeat sample requested

Blood issued if ABO group comparison matched with historical result

CRITICAL POINTS

Test ordered and transfusion request form printed

Correctly identify patient by asking them to state their name and date of birth

Check wristband matches information given by patient and information on transfusion request form

Label the sample bottle at the patient bedside using the wristband

New patient: **1st result on this patient therefore nothing to compare against. Group & screen only**

Systems	Human interaction	Equipment	Environment	Personal

APPLYING HUMAN FACTORS

Systems

- Pressure to complete task
- Awareness of PPID policies

Equipment

- Sample taking equipment
- Blood Track equipment rationale

Human interaction

- Relationship with patient / family
- Distractions from others

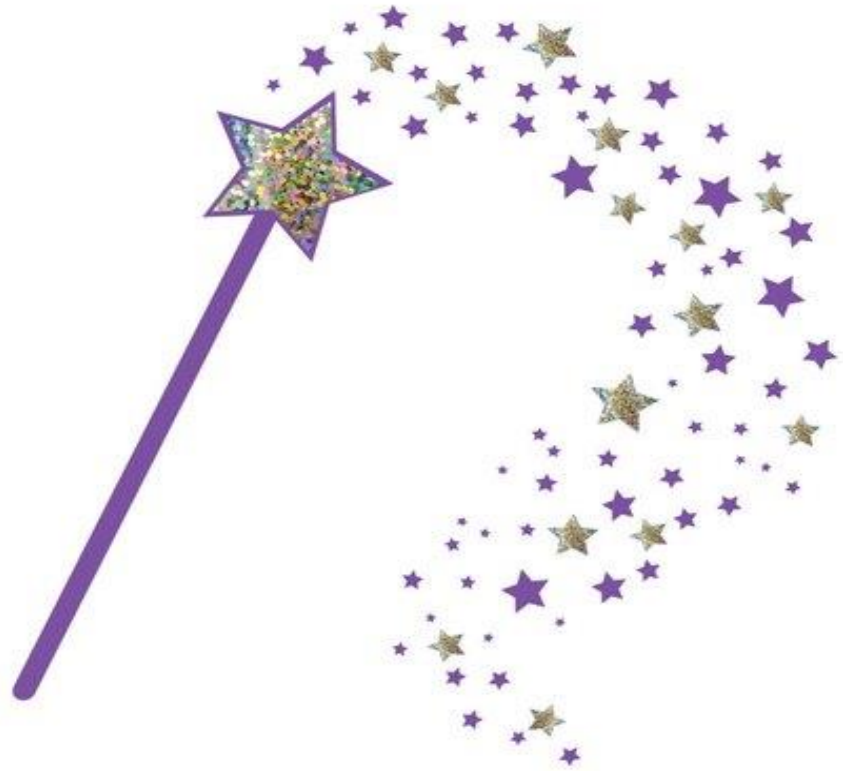
Environment

- Patient location
- Clinical area

Personnel

- Mood of HCP
- Tired/hungry/ready to go home

What are the WBIT solutions?



TOP 10 TIPS

Top 10 Tips for reducing sample rejections and Wrong Blood in Tube (WBIT) incidents	
1.	**Positive Patient Identification** *Positive patient identification is arguably the most important step in the sample collection process. Identifying the patient correctly significantly reduces the risk of a WBIT incident occurring.* ***Patient core identifiers are:** Last name, first name, date of birth, unique identification number.* ***Positive patient identification**: Whenever possible ask the patient to state their full name and date of birth. For patients who are unable to respond, ID verification should be obtained from a parent or carer (if present).*
2.	**Stand by the patient** *Consider Bedside Technology. Discuss and risk assess the use of bedside blood tracking to allow printed labels to be produced by the patient's bedside to reduce any omissions and transcriptional errors on the sample label.*
3.	**Have an agreed sample labelling and rejection policy** *All organisations must have a sample labelling policy and it is essential that this is adhered to. Any samples received where labelling does not comply with the organisations sample labelling policy should be rejected. Report non-compliance with the policy at the HTC and in the Annual report to the clinical governance committee.*
4.	**Zero Tolerance and 2 sample approach is the gold standard** *A zero tolerance policy states that no changes can be made to a sample label after it has been received by the laboratory. If a zero tolerance policy is implemented it should include all transfusion samples even 'precious samples'. If a mislabelled sample is received it will not be tested, thus no blood or blood component can be issued based on that sample.* *Unless secure electronic patient identification systems are in place, a second sample should be requested for confirmation of the ABO group of a first time patient prior to transfusion, where this does not impede the delivery of urgent blood components.*
5.	**It is up to the sample taker to ensure labelling is correct – ensure they know this** *Responsibility of correct sample labelling is with the person taking it. All samples should be labelled at the patient's bedside from the patient's wristband by the person who took the sample.*
6.	**Ensure the Trust is aware of the frequency of sample rejection and wrong blood in tube incidents** *Datix and report to Serious Hazards Of Transfusion all WBITs. Datix every mis-labelled sample to escalate the problem. Use department league tables on sample rejection to make people aware of the problem and use a 'name and shame' system to prompt a change in practice. Provide financial figures regarding the cost of sample rejection to highlight the problem at Trust level. Photocopy mislabelled samples to build up a library of possible errors which can be used in education sessions to change practice.*
7.	**Take a varied risk-assessed approach to tackle sample labelling problems** *Sample rejections and WBITs in different clinical areas may require different approaches. A solution that worked in Critical Care may not work in A&E or Maternity. Involve the users in understanding and solving the problem.*
8.	**Ensure that the staff taking samples for group and save are trained and competency assessed** *A section on the blood sample request form could prompt the person completing to indicate that they are trained and are solely responsible for the correctness of the sample.*
9.	**Rejection of a patient's sample does not mean that the patient cannot have blood in an emergency – make the users aware of this** *Also make them aware that blood issued will not be group specific or cross matched. Where full patient identification is not available, transfusion of group O blood may be a safer option, but supply of group O is limited and its use should be restricted, with a safe blood group being established as soon as possible.*
10.	**Be tough and keep at it – and celebrate success!** *Stand your ground and practice will change slowly, it takes time to change culture. Share success stories with colleagues in other hospitals.*

North East RTC Version 1 September 2013

Adapted from The London TP Group's Top 10 Tips for improving sample collection and labelling practice.

Group Check Rule

Before the Lab can issue blood, the patient's blood group needs to be confirmed

Two separate Positive Patient Identification events

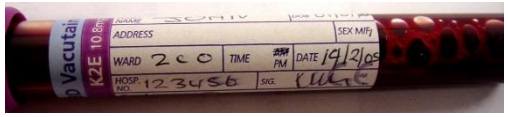
Samples taken at different times (preferably by different people)

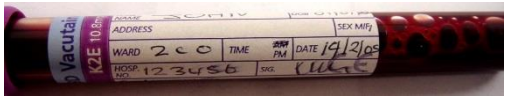
Can be 5 minutes or 5 years apart

Do not take 2 samples at the same time

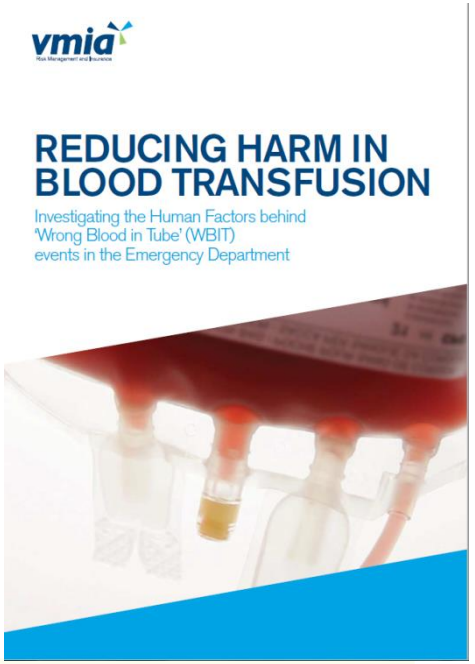
Blood Transfusion Laboratory do not need 2 samples every time

Discuss with Blood Transfusion Laboratory if in doubt





40 Recommendations



Summary of Recommendations and Areas for further research

ENVIRONMENT

Setting:

1. Protocols must consider real differences in setting and situation and where necessary allow for alternative processes (intermediate)

Stress and Fatigue:

2. Compulsory education should be introduced to ensure staff are aware of the impacts of stress and fatigue on performance (weak)
3. Development of objective tests of individual fatigue levels at start of shift (strong)

STAFF

Professional practice:

4. Attaching labels to patient e.g. ID scanner and handheld printer (strong)
5. Attaching labels to bed e.g. spare labels and pen for tubes (intermediate)
6. Attaching labels to cubicle e.g. designated tray for patient notes (weak)

Training:

7. Scenario-based training rather than isolated skills-based training (weak)
8. Senior leadership to help raise profile of phlebotomy risks (weak)
9. Mandatory cannulation competency for all clinical staff (intermediate)

Teamwork:

10. Teams must be established with appropriate supervision of inexperienced members (weak)

Interaction with Pathology Lab:

11. Formal protocols should be developed to feedback problems with samples (intermediate)
12. Orientation visits of clinical staff to the pathology laboratory (intermediate)

EQUIPMENT

Blood collection trolleys (all are intermediate to strong):

13. Number of dedicated blood collection trolleys should be increased
14. More frequent re-stocking of blood collection trolleys should occur
15. Non-trolley based store of blood collection equipment so that trolleys in use do not need to be accessed
16. A tray/storage container should be attached to the ED bed so that there is a place to gather and store equipment if bloods need to be taken in the corridor

Information technology:

17. Engagement of clinical staff in any IT system changes (intermediate)
18. Changes to work practices caused by the introduction of technology should be trialled in a simulation setting (strong)
19. Dedicated printers available for each cubicle to avoid confusion of e-order forms (strong)
20. Hand held scanners and label printers for patient ID and specimen labelling (strong)

Labels:

21. Sheets of labels should not be able to be separated from records in the ED (intermediate)
22. Trial and provision of printed stickers with e-order forms (strong)
23. Enforcement of protocols for keeping patient records by the bedside (weak)
24. Forcing functions to keep equipment by bed and keep tubes in bay (strong)

PATIENT

Interaction with patient:

25. Inclusion of a 'step back' process to address patient concerns (intermediate)

Variability of patients:

26. 'What if' provisions in protocols to address different clinical situations (intermediate)

PROCEDURE

Request forms:

27. Standing orders or for nurses to submit for patients fitting certain criteria (intermediate)

Feedback:

28. Supervising staff should be involved in the feedback process (intermediate)
29. Investigation of best methods of delivering and presenting information on errors (strong)

Patient identification:

30. Further work is needed to determine the level of knowledge of correct patient ID in the different staff groups (intermediate)
31. Increase education for staff about risks of failing to carry out positive patient ID and clarify that purpose of signatures on blood samples (weak)
32. Poster campaign to engage patients in their safety and need for repeated ID checks (strong)

CULTURE

Interruption:

33. Physical barriers such as the curtain be employed to indicate the need for concentration (intermediate)
34. Education about strategies to manage interruptions should be compulsory in the ED (weak)

Vigilance:

35. Education regarding importance of all tests, not just those that could lead to WBIT (weak)

Sample rejection and re-bleeding:

36. Design checklist to enable standard set of information surrounding sample rejection (intermediate)
37. Education on factors that hinder ability to deliver appropriate blood samples to lab (weak)
38. Re-design of laminated trolley sheets to highlight common risks and tubes (intermediate)
39. Poster campaign to raise patient awareness and 'decriminalise' re-bleeding (strong)

Resilience:

40. Use of handovers to promote sharing of lessons surrounding blood collection (intermediate)

2010

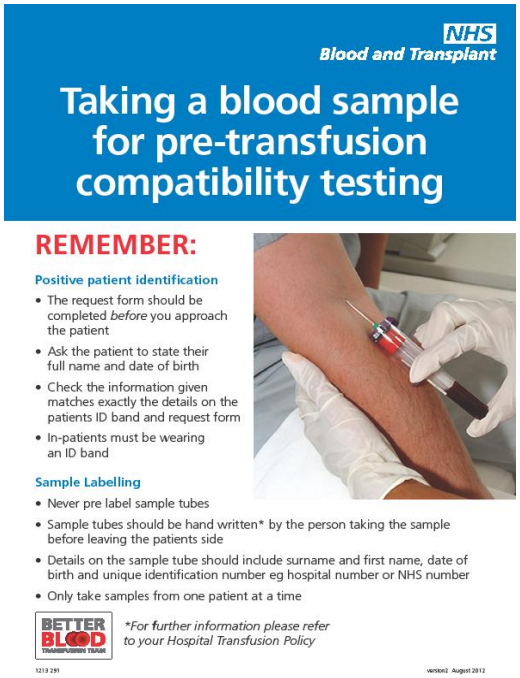
Recommendations

Table IV. Main causes of WBIT and strategies for their mitigation.

Causes of WBIT	Strategies to reduce WBIT incidence	Comments
Failure of correct identification of the patient at initial registration	Careful attention to patient identification detail on admission	Particular risks associated with newborn infants including twins
Failure to perform phlebotomy correctly, particularly medical staff	Phlebotomists for all transfusion samples	Routine in The Netherlands. Doctors consistently show highest rate of WBIT
	Improve transfusion training in medical education programmes at all levels	Inconsistent cover in medical curricula at all levels: need to improve effectiveness of training
	Recognition of the role of human factors in medical practice; reduction in multitasking and distraction	Difficult to achieve but training in increased situational awareness is essential
Medical or other staff failure to label samples at the bedside	Rigorous compliance with use of core identifiers on all samples. Rejection of all mislabelled samples. Training with competency assessments for all staff recommended in the UK since 2005	Reduction in deaths from ABO-incompatible transfusions associated with this and the introduction of European Union Directives in the UK
Failure to correctly identify patients	Positive patient identification at all contacts by all staff: to be specifically covered in training	Frequently missed out; staff (especially doctors) commonly deviate from protocols
	Confirmation of ABO group on a second independent sample	Group-check sample adopted in many places and recommended in the UK since 2013
	Confirmation of ABO group at the bedside by nursing staff	France and Germany; method itself prone to errors
	End-to-end electronic identification	Reduced incidence of error but expensive to put in place and not widely adopted

Bolton-Maggs et al. Wrong blood in tube – potential for serious outcomes: it can be prevented? BJH 2015, ***168****, 3-13*

Information



NHS
Blood and Transplant

Taking a blood sample for pre-transfusion compatibility testing

REMEMBER:

Positive patient identification

- The request form should be completed *before* you approach the patient
- Ask the patient to state their full name and date of birth
- Check the information given matches exactly the details on the patients ID band and request form
- In-patients must be wearing an ID band

Sample Labelling

- Never pre label sample tubes
- Sample tubes should be hand written* by the person taking the sample before leaving the patients side
- Details on the sample tube should include surname and first name, date of birth and unique identification number eg hospital number or NHS number
- Only take samples from one patient at a time

BETTER BLOOD TRANSFUSION TEAM

**For further information please refer to your Hospital Transfusion Policy*

1213 291 Version2 August 2012

Great Ormond Street Hospital for Children NHS Foundation Trust

Blood Transfusion Policy 2018

Blood Track

BloodTrack® Tx - Collect Samples

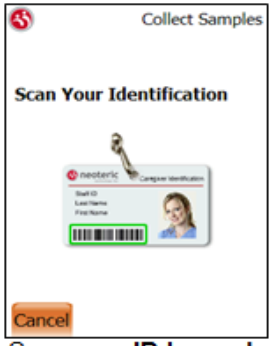
1

Attach the **printer** to the mobile computer

2

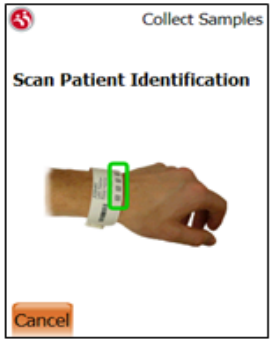
Choose **Collect Samples**

3



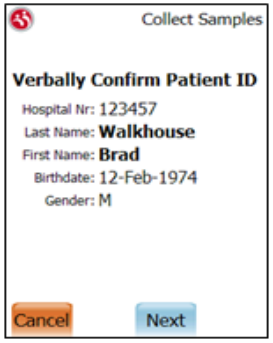
Scan your **ID barcode**

4



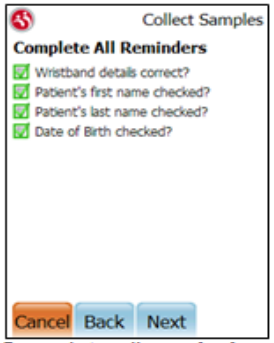
Scan the 2D barcode on the patient's **wristband**

5



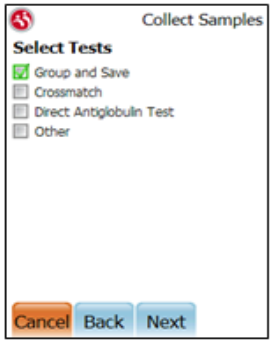
If the patient can't respond, **visually confirm** wristband

6



Complete all **reminders**

7



Select the appropriate **test**

8

Draw your sample, then attach the **printer** to the PDA

9

Select the **number of labels** to print, then choose **Print**

10

To ensure you're still at the same bedside, **rescan the wristband**

WBIT & Human Factors in Incident Investigations

- All interventions can reduce WBITs but no evidence that one solution is the answer
- Most health care professionals know what do to when asked so re-training for errors not always a preventative a solution
- TPs will continue to escalate the WBITs that occur to ensure the impact is understood by the organisation
- By considering the human factors associated we may better understand why they may be happening