

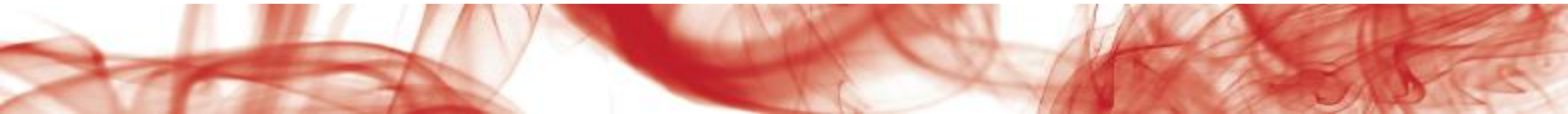
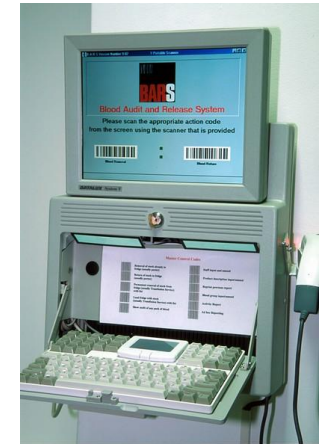


SHOT 2010

Adverse events involving IT



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July 6th 2009
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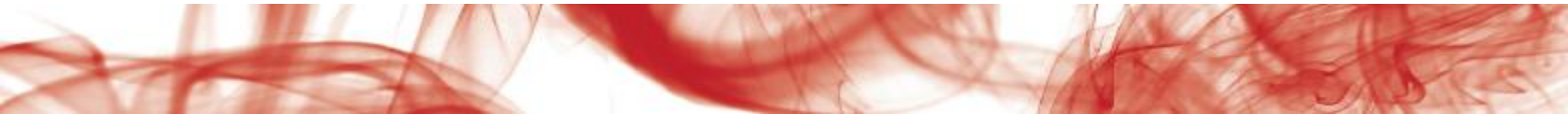
IT to support safe transfusion

- Has been a key element of routine transfusion laboratory practice for many years (LIMS)
- More recently introduced into other parts of the *transfusion chain* ranging from: Blood Tracking (in and out of fridges) to Positive patient ID *from vein to vein*
- From its inception, SHOT has recognised the enormous potential of IT whilst noting the importance of haemovigilance in its safe development and implementation



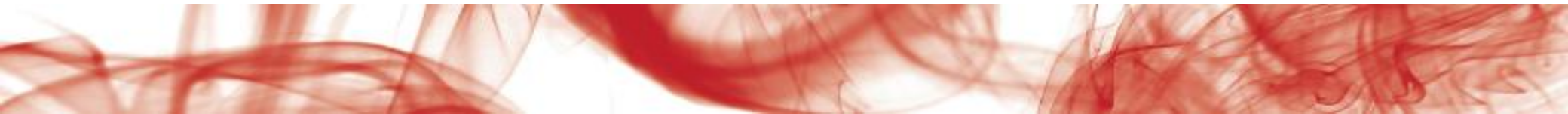
What IT can do well

- Add electronic ID checking at vulnerable points in the transfusion chain
- Provide accurate recall of data for users
- Scan and match bar codes
- Transfer data and print labels without transcription error
- Add high visibility warning flags to patient records
- Display alarms and warning messages if non-matching data scanned or pre-set algorithms violated



What IT can't do well

- ***Entirely eliminate the human factor***
 - ensure the correct bar code is scanned
 - ensure data is always transferred between the correct records (eg *merging*)
 - ensure that patient-specific information is accessed, read and understood
 - ensure that alarms, warning messages and flags are read (and heeded)
 - work to full potential without knowledge, skills and training of the users



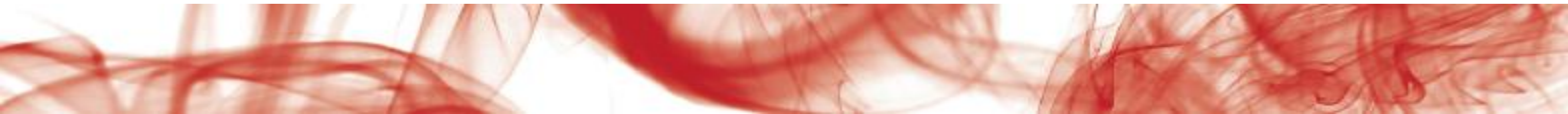
The need for vigilance

- Risk that reliance on IT systems could decrease understanding and engagement of staff in the transfusion process
- Potential to introduce new categories of error



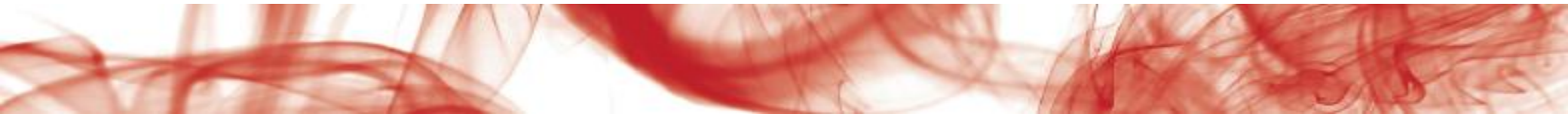
IBCT due to IT errors

- In 2009 there were 61 reported incidents (compared to 44 in 2008 and 25 in 2007)
- 46 incidents originated in the transfusion laboratory
- 12 (27%) lab errors occurred outside core working hours and staff not working regularly in the transfusion lab were responsible for 5 of these (a locum in one case) – mainly failure to identify the historical record or heed warning flags
- **But** – most (88%) errors were made by staff working regularly in the laboratory



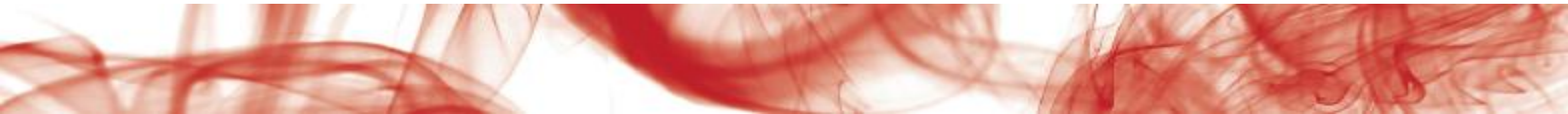
Summary of IT errors

- missed or ignored warning flag 20
- failure to update warning flags 5
- failure to consult historical record 5
- failure to merge or reconcile records 5
- data not transferred from old system 3
- computer “down” 1
- deficiency in, or misuse of IT system 13
- Blood Tracking system error or misuse 9



What were the outcomes?

- Transfusion of antigen positive (or unscreened) red cells in patients with previously documented alloantibodies 19
- Transfusion of components of the wrong group after stem cell transplant 11
- Failure to issue irradiated components 9
- Failure to issue CMV Neg components 3
- Errors in electronic issue of blood 5
- Miscellaneous (inc 2 ABO mismatch) 21



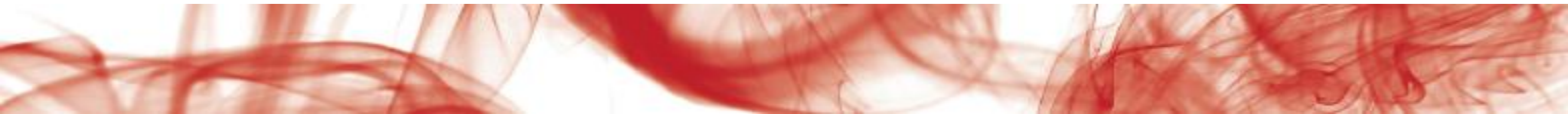
CASE STUDIES

1. Error at sampling



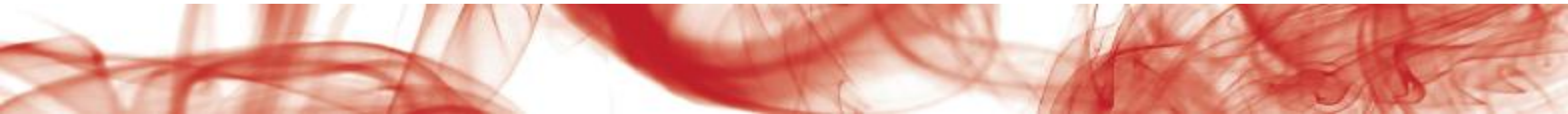
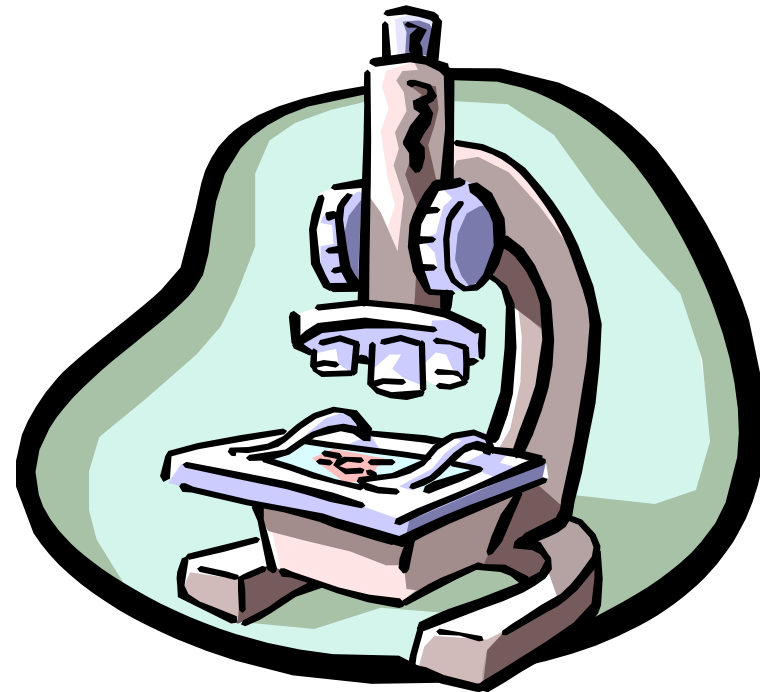
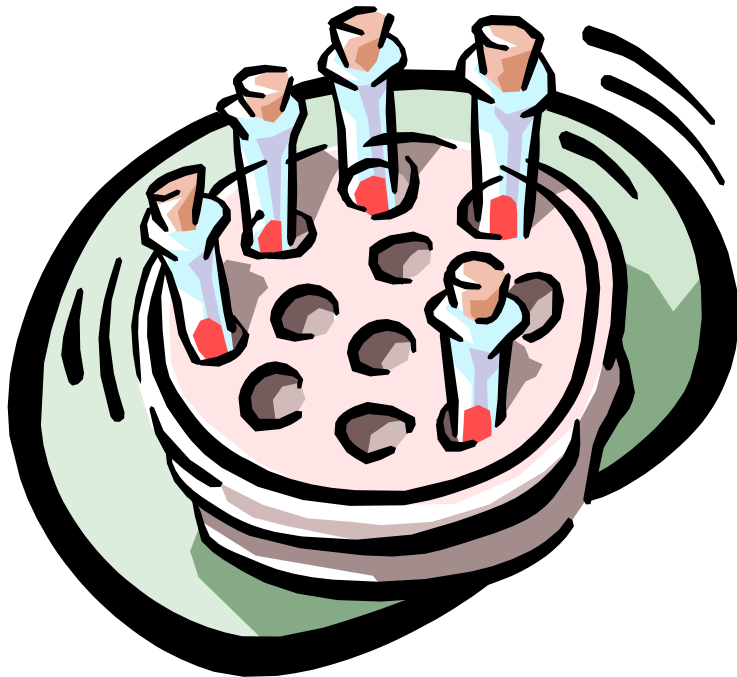
Human error beats IT system

- Group O Pos patient develops shock and respiratory arrest 50ml into a red cell Tx
 - had received A Pos red cells
 - computer generated bedside label on transfusion sample produced by trained Phlebotomist from bar-coded wrist band
 - *but still wrong blood in tube*
 - (patient survived)



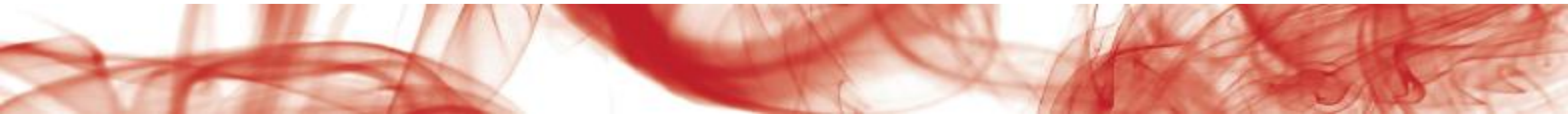
CASE STUDIES

2. Errors generated in the laboratory



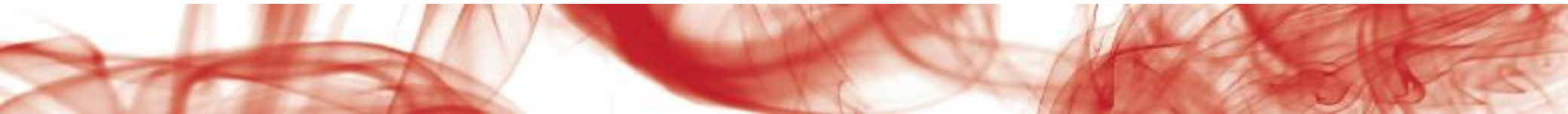
Failure to identify or heed the historical record

- Need for CMV Neg components in patient flagged on LIMS record under hospital ID number
 - specimen arrives labelled with NHS number and historical record not identified (CMV Neg not specified on request or prescription)
- RhD Pos patient has SCT from RhD Neg donor (“minor RhD mismatch”)
 - protocol specifies transfuse RhD Neg components after transplant and flagged on LIMS
 - BMS (in normal working hours) misses/ignores flag and issues 2 units of RhD Pos red cells



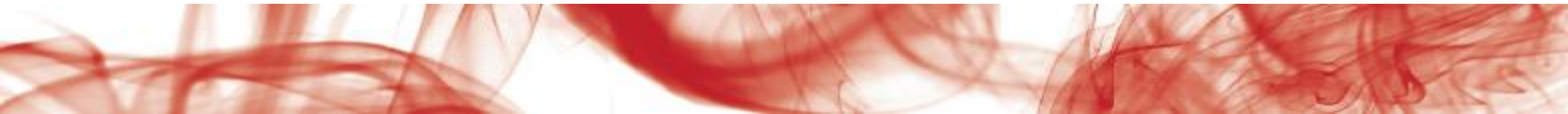
Data not transferred between IT systems

- Patient had a warning flag about previously detected anti-C and anti-E
 - new lab computer system installed but historical data not transferred
 - receives C and E Pos red cells
- Patient attending Haem clinics at 2 hospitals in same Trust
 - need for irradiated red cells flagged on LIMS at Hospital A but not transmitted to Hospital B, who have a separate IT system



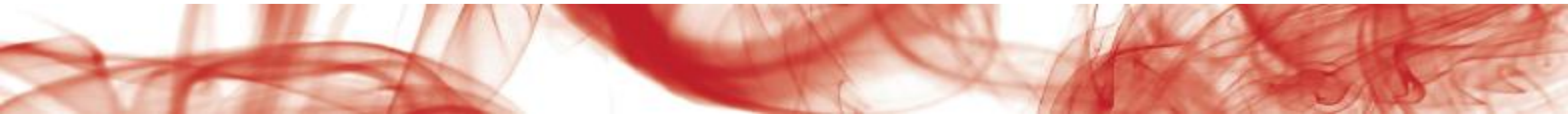
CASE STUDIES

3. Collection from Blood Fridge



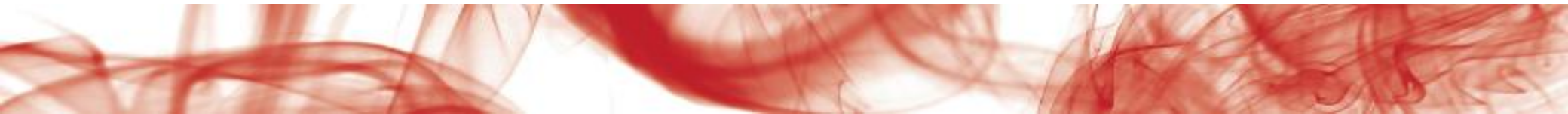
Expired unit of red cells transfused despite fridge alert

- Porter collects unit of red cells from fridge with electronic blood tracking
- Device produces audible and visual alert that unit has passed expiry date
- Porter ignores alert and takes unit to ward
- Nursing staff failed to notice the expiry date either on reception at ward or during the bedside check
- 7 similar cases reported in 2009



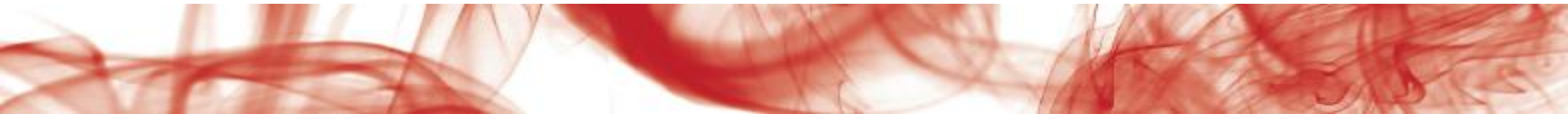
Inappropriate access to electronically controlled fridge

- Baby delivered by emergency C-section has Hb 6.2g/dl and needs urgent transfusion
- Staff Grade doctor, not trained or competency assessed in use of blood tracking system, “borrows” the access card from a midwife and removes the adult O Neg emergency blood (not CMV screened)
- This is noticed by the nurses doing the bedside check, but their concerns are over-ridden



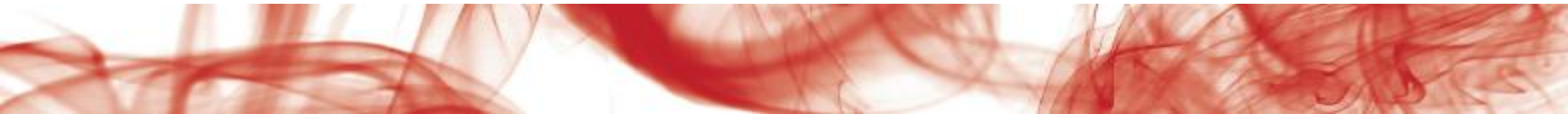
CASE STUDIES

4. Bedside administration



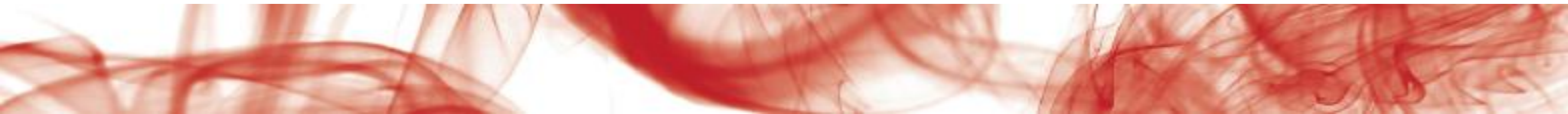
Access to bedside computer compounds misidentification error

- Agency nurse looking after 2 patients on ITU
 - Patient 1 is O Pos and Patient 2 is AB Pos
- For convenience, she opens Patient 2's record on bedside computer of Patient 1 and leaves screen open
- Patient 1's Hb is 6.6g/dl on blood gas analyser (actually 9.7g/dl on lab result) so transfusion requested
- Very busy, so asks colleague to print blood collection slip
 - which she does, from Patient 2's details
 - Porter (correctly) collects red cells intended for Patient 2



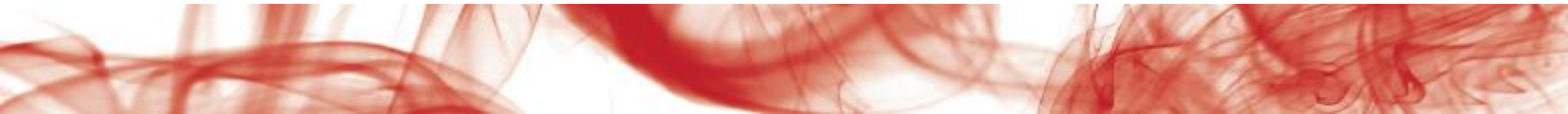
Access to bedside computer compounds misidentification error

- When red cells arrive, Agency Nurse goes to Patient 1's bedside but can't find an ID wristband (it was on the ankle)
- So, checks the red cells against the computer screen at Patient 1's bedside
 - still showing Patient 2's details
- Patient quickly develops acute transfusion reaction due to ABO incompatibility, but recovers quickly when transfusion stopped
 - error then discovered



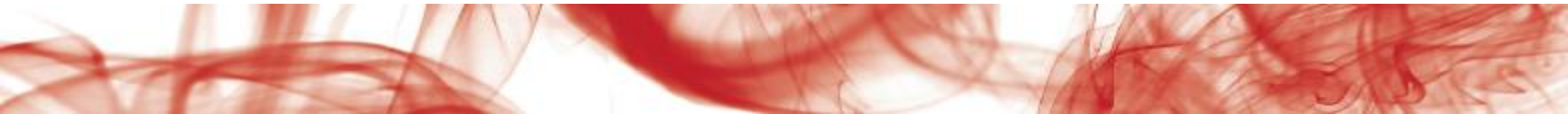
Recommendations

- Failure of lab staff to identify, or heed, the historical record remains a common cause of IBCT
- **Warning flags and important historical notes should be prominently displayed (ideally on the opening screen)**
- **Alert systems should not prevent the issue of clinically appropriate components of a different group (eg after SCT – *post transplant transfusion plan should routinely be agreed in advance, flagged in LIMS and notes and shared with referring hospitals*)**



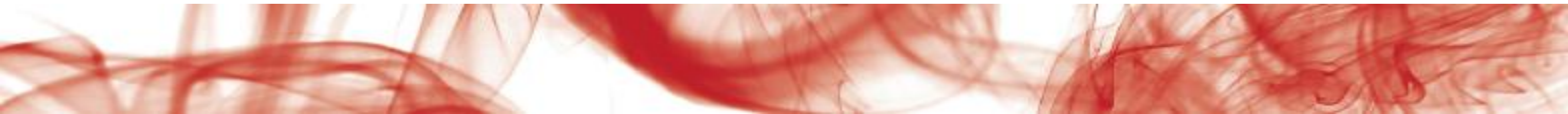
Recommendations

- There are a worrying number of cases where warning flags are over-ridden and automated results changed without a full appreciation of the significance of the action
- **All users of LIMS and autoanalyzers must be trained and competency assessed, in line with recommendations of UK Transfusion Laboratory Collaborative Initiative, including out-of-hours staff not working routinely in the lab and agency or locum staff**



Recommendations

- Need close liaison with manufacturers to develop standard, detailed specifications for IT systems in the lab, bedside and clinical/lab interface
- An education and training package, including minimum knowledge and skills, appropriate use of the system and appreciation of its limitations is essential
- **Action - a joint BCSH/BBTS guideline is being developed and the IT Working Group of NBTC has been re-established**



Conclusions

- More than 50% of all SHOT reports have some element of human error
- Although IT support has enormous benefits, it cannot always overcome the human factor
- Adequate knowledge and skills are essential, even where tracking and bedside systems are used
- Staff must understand what they are doing (and why) and able to cope if the system malfunctions or is not available
- **Haemovigilance reporting is important in identifying problems and solutions**



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