SHOT & Lessons Learned from Major Haemorrhage

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SHOT Aims

- **Improving patient safety by**
  - Raising standards of hospital transfusion practice
  - Informing policy with UK Blood Services
  - Aiding production of clinical guidelines
  - Educating users on transfusion hazards and their prevention

Haemovigilance in the UK

MHRA

Medicines & Healthcare Products Regulatory Agency

- Competent Authority' for the BSQR 2005
  - QMS in blood establishments and hospital blood banks.
- Competent Authority for the Medicines Act 1968
- Competent Authority for the Medical Devices Regulations 2008
- **STATUTORY** reporting

SHOT

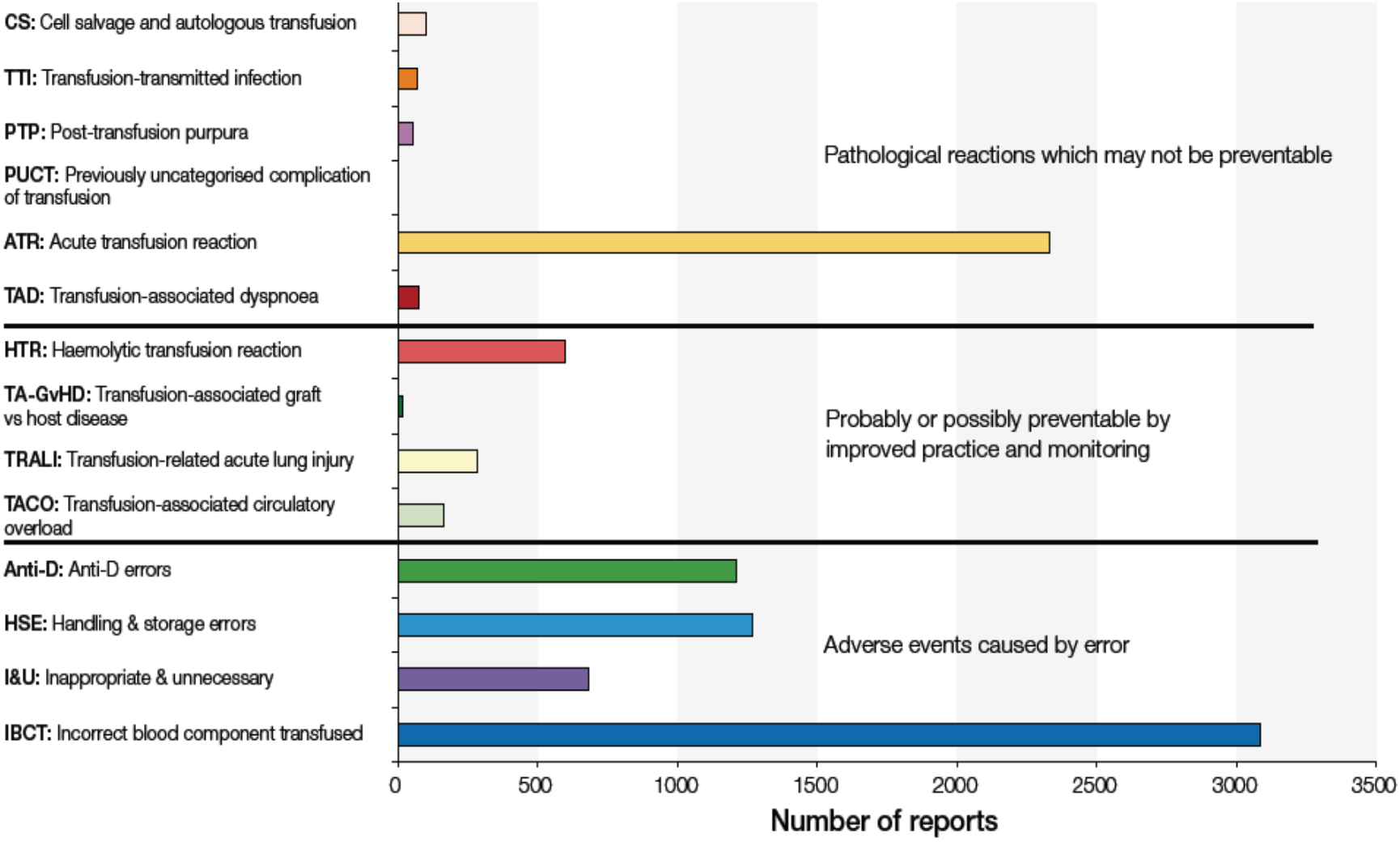
Serious Hazards of Transfusion

- Confidential enquiry
- Serious adverse reactions/events AND near misses all of which occur in BOTH a laboratory and CLINICAL environment.
- **PROFESSIONALLY MANDATED r**eporting

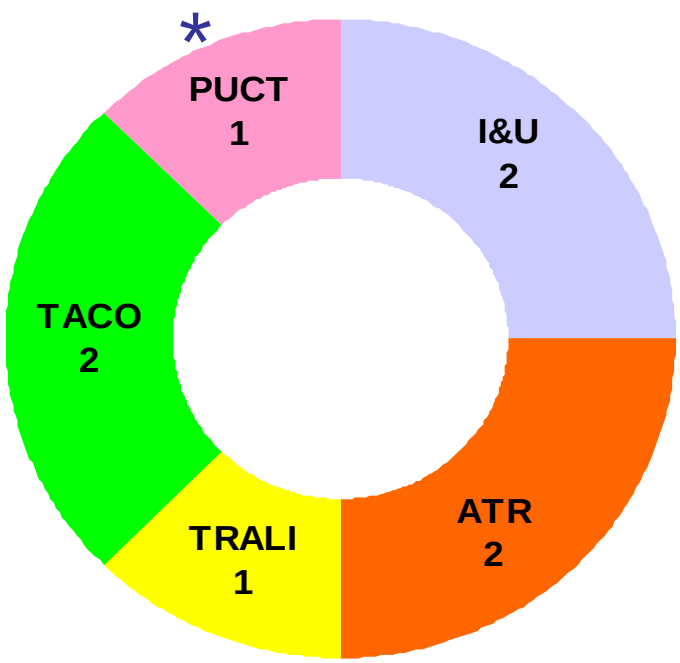
SHOT Reports 2011

- 3435 reports made to the scheme
  - 2768 analysed
    - 204 in an inappropriate category, moved
  - 667 withdrawn (20%)
- + 270 reports made in 2010, but only completed in 2011
- 3038 cases including ‘near miss’ and ‘right blood right patient’

Cumulative Reports 1996-2011



Deaths where transfusion was causal or contributory 2011 (n=8)



I&U – Inappropriate & unnecessary transfusion

ATR – Acute transfusion reaction

TRALI – Transfusion related acute lung injury

TACO – Transfusion associated circulatory overload

PUCT – Previously uncharacterised complication of transfusion

**The PUCT incident was a case of NEC in a baby that is not categorically linked to the transfusion, but is an association that could not be ignored*

Critical points in the transfusion process

- Decision to transfuse
- Prescription/request
- Sampling for pre-transfusion testing
- Laboratory testing
- Collection of blood from storage site
- Bedside administration

NHS
National Patient Safety Agency

Rapid Response Report

NPSA/2010/RRR017

From reporting to learning 21 October 2010

The transfusion of blood and blood components in an emergency

For **action** by Trusts by April 2011

Key points from NPSA RRR

- Local protocols with a trigger phrase
- Dedicated communicator / coordinator
- Early / easy release of components by lab
- Adequate support (eg porters / transport)
- All cases reviewed by Hospital Transfusion Committee and delays or problems investigated locally / reported externally

MAKE A PHONE CALL

to the **Blood Bank**
or
on-call **Haematology BMS**

Tell them...

- Situation
- Patient Details
  - Name
  - Sex
  - ID number
- What blood component is required, how much and how soon.

TAKE SAMPLES

Label them properly and ensure they get to the lab.

- Blood Bank sample
- FBC
- Coagulation screen

Overview of process (military)

- Alert Major Haemorrhage Team
- Inform OR, ICU, Radiology & Laboratory
- Transfer patient to relevant location

Assess Bleeding

Bleeding approaches **500ml** and is continuing

Bleeding approaches **1000ml** and is continuing

Bleeding approaches **2000ml** and is continuing, and/or suspected amniotic fluid embolus

Bleeding continues after >12 units red cells, and appropriate administration of at least 2 doses platelets and/or 2 litres FFP / 10 bags cryo in <12 hours and surgical measures have failed.

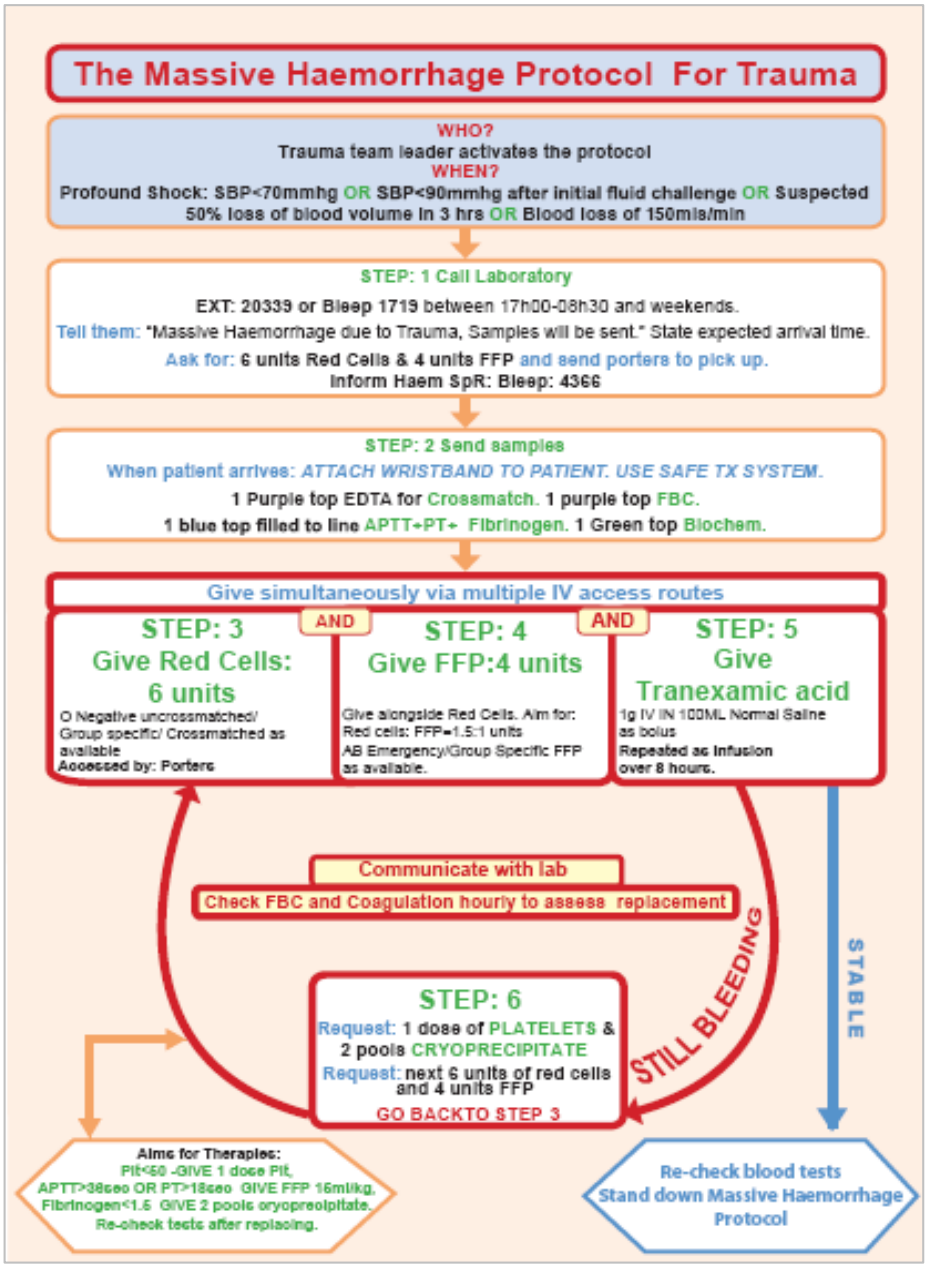
Contact Blood Bank
FBC, PT, APTT, Fib.
Crossmatch 4 units

Transfuse Red Cells
If cross match blood is not available, use **O Neg** emergency stock if appropriate (no more than 2), or **group-specific** units if patient is known.
If bleeding continues, order **group-compatible** units (6 at a time)

Contact Haematologist. Transfuse **platelets** and /or **FFP** and/or **cryoprecipitate** to maintain platelet count >50 PT<30 sec Fibrinogen >1.5g/l

- **ONE ATD** of **platelets**
- **ONE LITRE** of **FFP**
- **TWO** packs of **cryoprecipitate**

Discuss possible use of rFVIIa with Haematologist
Initial dose of 90ug/kg, followed by a second dose 2 hours later if blood loss continues.


The Massive Haemorrhage Protocol For Trauma
WHO?
Trauma team leader activates the protocol
WHEN?
Profound Shock: SBP<70mmhg OR SBP<90mmhg after initial fluid challenge OR Suspected 50% loss of blood volume in 3 hrs OR Blood loss of 150mls/min
STEP: 1 Call Laboratory
EXT: 20339 or Bleep 1719 between 17h00-08h30 and weekends.
Tell them: "Massive Haemorrhage due to Trauma, Samples will be sent." State expected arrival time.
Ask for: 6 units Red Cells & 4 units FFP and send porters to pick up.
Inform Haem SpR: Bleep: 4366
STEP: 2 Send samples
When patient arrives: ATTACH WRISTBAND TO PATIENT. USE SAFE TX SYSTEM.
1 Purple top EDTA for Crossmatch. 1 purple top FBC.
1 blue top filled to line APTT+PT+ Fibrinogen. 1 Green top Biochem.
Give simultaneously via multiple IV access routes
STEP: 3
Give Red Cells:
6 units
O Negative uncrossmatched/ Group specific/ Crossmatched as available
Accessed by: Porters
AND
STEP: 4
Give FFP:4 units
Give alongside Red Cells. Aim for: Red cells: FFP=1.5:1 units
AB Emergency\Group Specific FFP as available.
AND
STEP: 5
Give
Tranexamic acid
1g IV IN 100ML Normal Saline as bolus
Repeated as infusion over 8 hours.
Communicate with lab
Check FBC and Coagulation hourly to assess replacement
STEP: 6
Request: 1 dose of PLATELETS & 2 pools CRYOPRECIPITATE
Request: next 6 units of red cells and 4 units FFP
GO BACKTO STEP 3
STILL BLEEDING
STABLE
Aims for Therapies:
Plt<50 -GIVE 1 dose Plt,
APTT>38sec OR PT>18sec GIVE FFP 16ml/kg,
Fibrinogen<1.5 GIVE 2 pools cryoprecipitate.
Re-check tests after replacing.
Re-check blood tests
Stand down Massive Haemorrhage Protocol

Failure to monitor transfusion requirements during a GI haemorrhage

- *An elderly patient was admitted to the MAU with a haematemesis and an initial Hb of 10.6 g/dL.*
- *She had further episodes of vomiting blood.*
- *Five units of red cells were transfused before a repeat Hb was performed, which was 20.4 g/dL.*
- *The patient was recognised to have circulatory overload and died shortly thereafter.*

Failure to monitor transfusion requirements during a GI haemorrhage

- *An elderly patient with a severe GI bleed had repeat Hbs of 6.1 and 6.4 g/dL.*
- *Six units of red cells were transfused prior to rechecking the Hb, which was 17.1 g/dL.*
- *The patient developed circulatory overload and required venesecting 2 units.*

Transfusion of unnecessary components and with inappropriate doses

- *A patient was bleeding after a sub-total colectomy and a request was made for 2 doses of platelets and 2 units of FFP.*
- *The patient had a normal platelet count (245 × 10^9/L) and a normal INR of 1.2 but the doctor did not check these results.*
- *The BMS did not telephone these results to the doctor or contact the consultant haematologist in order to challenge the inappropriate decision.*

Lack of knowledge around major haemorrhage protocol (1)

- *A middle-aged male was admitted to A&E with a massive haematemesis and received 2 litres of colloid.*
- *No Incident Communication Coordinator had been identified in A&E and the transfusion laboratory had not been alerted to activate the major haemorrhage protocol*
- *The clinical staff in A&E were unaware of how to access the 2 emergency O RhD negative units, which were then issued by the lab*

contd...

Lack of knowledge around major haemorrhage protocol (2)

- *A further 2 units of red cells were then requested and issued as group specific.*
- *The clinicians also requested FFP and cryoprecipitate but were refused on the basis that a coagulation screen should have been interpreted by a haematologist prior to issue.*
- *The patient subsequently arrested and died, having received 10.5 L of colloid and 4 units of red cells.*

Delay in obtaining units following major haemorrhage protocol being initiated

- *A child involved in a road traffic accident (RTA) was found to be asystolic at the scene and cardiopulmonary resuscitation (CPR) was commenced.*
- *The ambulance staff had alerted A&E to major blood loss and had requested blood to be available there on arrival.*
- *The major haemorrhage protocol, however, required a unique patient number to be allocated prior to issuing emergency O RhD negative units from the transfusion laboratory and there was a delay following the patient's arrival in A&E for any red cells to be made available.*

Failure to replace blood volume after post partum haemorrhage

- *A woman in her mid-thirties had a ventouse-assisted vaginal delivery for fetal distress at term, complicated by massive haemorrhage.*
- *The major haemorrhage protocol was activated, six units of blood were delivered within 5 minutes and one was started immediately.*
- *She was transferred from the delivery room to theatre and the bleeding was controlled within 30 min.*
- *The blood loss was unclear with losses recorded in both the delivery suite and theatre. A second unit was commenced.*
- *About 2 hours later, she suffered cardiac arrest from which she could not be resuscitated despite transfusion of 12 units of blood and 3 units of Fresh Frozen Plasma (FFP).*
- *The coroner confirmed cause of death to be cerebral hypoxia secondary to haemorrhage.*

Late request for blood to cover surgery leads to inappropriate use of emergency O RhD negative blood.

- *An elderly lady was admitted on the morning of surgery for major abdominal surgery and a sample was sent for grouping with request for a crossmatch.*
- *She was taken to theatre without waiting for results.*
- *The antibody screen was positive - the BMS phoned theatre, but surgery was already underway.*
- *Four units of O RhD negative emergency blood and 4 units of FFP were transfused.*
- *The antibody was anti-E and fortunately the O RhD negative units used were compatible.*

Delay in patient transfusion during AAA surgery caused by a BMS error and IT malfunction

- *A 75 year old man was bleeding in theatre during repair of AAA. The massive haemorrhage protocol was activated, and 6 units of group-specific blood were issued to the theatre refrigerator using the electronic blood tracking system.*
- *The units were retrospectively cross matched and results added to the Laboratory Information Management System which sent a message to the theatre refrigerator to quarantine the units, possibly because the system had received two conflicting messages about the units.*
- *Theatre staff were denied access to the refrigerator and nobody knew how to proceed*
- *Eventually the refrigerator was unlocked remotely and the blood obtained after a 25 minute delay.*

Obstetric major haemorrhage with delay in transfusion caused by a fire alarm.

- *A 40 year old woman was undergoing elective caesarean section and started to bleed excessively. At the same time, the fire alarm sounded.*
- *The obstetrician and theatre staff were aware of the alarm, but management of the bleeding continued.*
- *Urgent bloods were sent to haematology via the tube system and the laboratory was telephoned to alert them to the need for urgent analysis and a need for blood products.*
- *However, there was no answer so an assumption made that the laboratory had been evacuated.*
- *The general manager (outside the building with evacuated staff) was contacted and located haematology staff who were cleared to return to the laboratory.*
- *Blood samples were analysed and major haemorrhage pack was issued*

Misidentification during multiple trauma

- *Multiple RTA involving 5 victims*
- *2-year old female allocated ‘Unknown Female 1’*
- *Child’s mother allocated ‘Unknown Female 2’*
- *Theatre nurse volunteered to help ED teams*
- *Nurse administered blood for ‘Unknown Female 2’ to the child, as she interpreted the ‘2’ as the age of the patient*
- *The child died of her injuries soon afterwards*

Lack of correct final identity check leads to a Haemolytic Transfusion Reaction

- *A patient with a haematemesis needed an urgent blood transfusion.*
- *The patient's wristband was contaminated with blood and could not be read, so the electronic bedside checking system was not used.*
- *The compatibility form filed in the patient's notes, which belonged to another patient, was used to provide the identifiers for collecting the blood.*
- *O Pos patient was transfused with >50 mL of A RhD positive red cells before the error was noticed.*
- *The patient was admitted to ITU with intravascular haemolysis and renal impairment.*

Communication failure results in inappropriate transport of red cell units

- *Telephone request from ED for 4 units of blood which was subsequently issued to the laboratory fridge.*
- *2 hours later, the ED called asking if blood was ready, as the patient was being transferred*
- *The ward were told that it would take 10–15 minutes to package the blood and issue the appropriate documentation, but the BMS found that it had already been removed*
- *The receiving hospital contacted the lab to inform them that 1 unit had arrived with the patient and had been transported in an ASDA bag.*

Unlabelled products transfused to wrong patient in error

- *Platelets for a patient on ITU were delivered to the ED by taxi from BTS*
- *The ED had also requested platelets for a different patient.*
- *ED took delivery of the platelets, assumed they were for their patient, and transfused them despite there being no documentation or label with any patient details.*

Blood gas analyser Hb used as trigger for emergency transfusion

- *An Hb of 5.0 g/dL was obtained from an ED blood gas machine on a middle-aged female patient who was asymptomatic and not actively bleeding.*
- *Two units of O RhD negative red cells were issued as an emergency*
- *One unit of O neg had already been transfused when the laboratory result became available which was 8.9 g/dL.*
- *The second unit of O neg was wasted due to inappropriate storage (on the patient's bed)*

Overestimation of blood loss from acute GI bleed

- *A patient was admitted to the ED with a GI bleed. Hb on admission was 12.1 g/dl.*
- *2 units of emergency blood were given, followed by 6 units of crossmatched blood over the next 12 hours.*
- *The FBC was not re-checked until all 8 units had been transfused, and the Hb was 18.5 g/dl*

Excessive transfusion follows misinterpretation of verbal instructions

- *A 48 year old male patient in ED with a GI bleed.*
- *Five units of blood ordered and a verbal order for 2 units was given by the doctor, who then wrote them up on a prescription chart.*
- *Staff nurse asked the doctor if he wanted the blood given through the rapid infuser, and he confirmed that "all the blood can go though this".*
- *All five units were transfused instead of the intended 2 units.*

In brief....

- *Delay in provision of blood to an off-site obstetric haemorrhage as the courier had not been trained.*
- *Adult with Hb of 4.7 g/dl in ED. Nurse was sent for the emergency O Neg, but returned with a paedipack, which was administered after checking at the bedside by two doctors.*
- *Had to resort to using O Negs during an obstetric haemorrhage as SpR had labelled crossmatch sample with another patient's details.*

Key Learning Points

- Continue to sample, monitor and observe during a transfusion
- Appropriate assessment and prescription
- Good patient ID at all stages
- Communication with laboratory
- Early release of components by laboratory
- Clear instructions / easy to follow protocol
- Do your **own** job well


Trigger phrase
Inform
Transfusion boss
Discuss
Clinical assessment
Policy
Review
Practice
Team leader
Runners
Debrief
Contact
Transport
Porters
Stand down
Communication lead
Drill
Protocol
Communication
Alert
Telephone

Thanks to

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- Paula Bolton-Maggs, SHOT Medical Director
- **You for listening**

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