

RESULTS FROM THE

2004

ANNUAL REPORT

- **Launched in 1996**
- **UK-wide confidential, voluntary anonymised scheme which aims to collect data on adverse events of transfusion of blood and blood components, and to make recommendations to improve transfusion safety**
- **Based at Manchester Blood Centre**

SHOT - Organisation

Steering group

- **Strategic direction and “ownership”**
- **Royal Colleges and professional bodies**
- **Affiliated to the Royal College of Pathologists**

Standing Working Group

- **Operational aspects**

Funding

- **Four UK Blood Services on pro-rata basis according to the number of red cells issued**

Aims of SHOT

Through the participating Royal Colleges and professional bodies, SHOT findings can be used to:

- **inform policy within transfusion services**
- **improve standards of hospital transfusion practice**
- **aid production of clinical guidelines for the use of blood components**
- **educate users on transfusion hazards and their prevention**

Categories of adverse events covered in the 2004 report

- **Incorrect blood/component transfused (IBCT)**
- **Acute transfusion reaction (ATR)**
- **Delayed transfusion reaction (DTR)**
- **Transfusion-associated graft-versus-host-disease (TA-GVHD)**
- **Transfusion-related acute lung injury (TRALI)**
- **Post-transfusion purpura (PTP)**
- **Transfusion transmitted infection, including bacterial contamination (TT)**
- **Near Miss events**

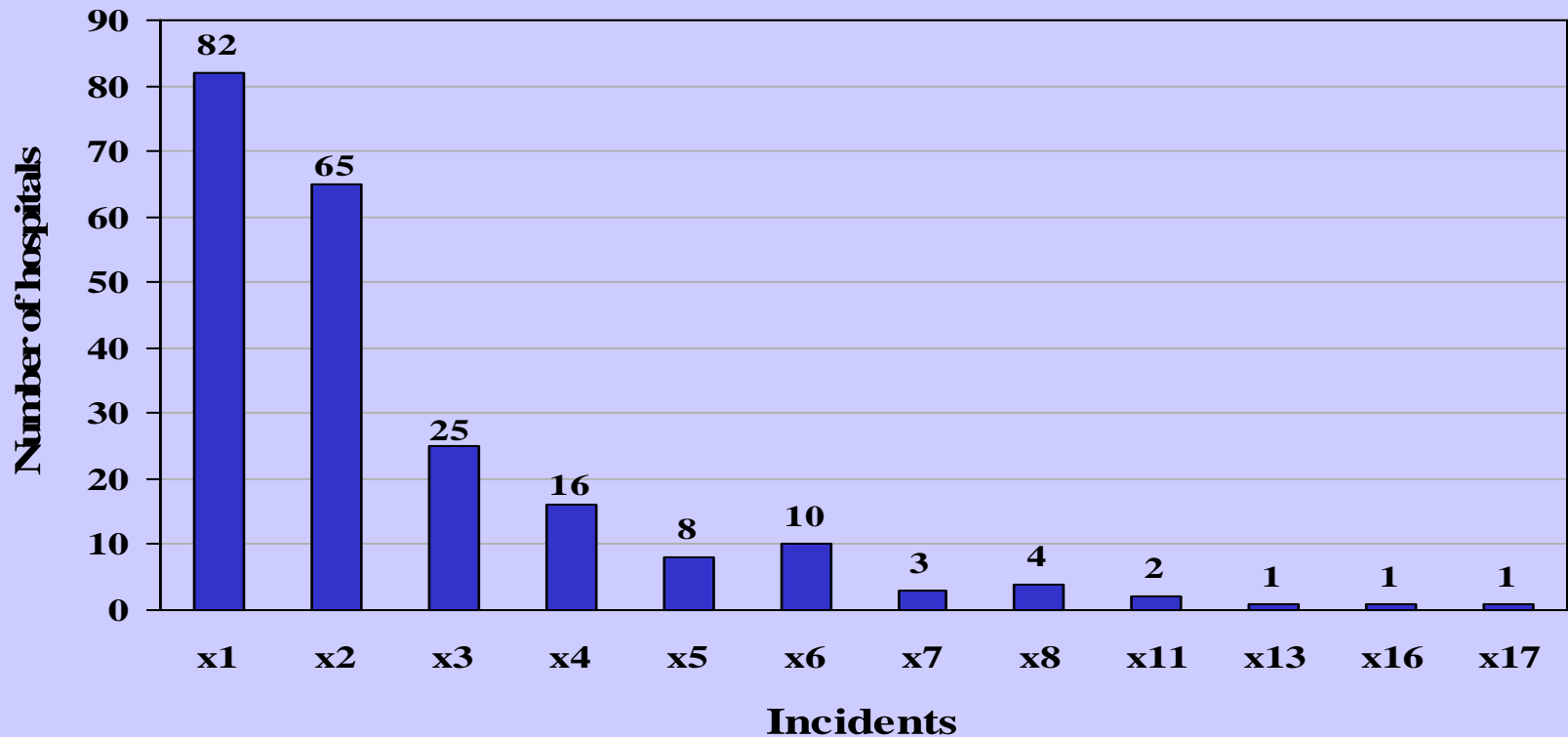
Hospital participation - 2004

With the adoption of confidential identification numbers, SHOT is now able to provide every hospital with verification of participation.

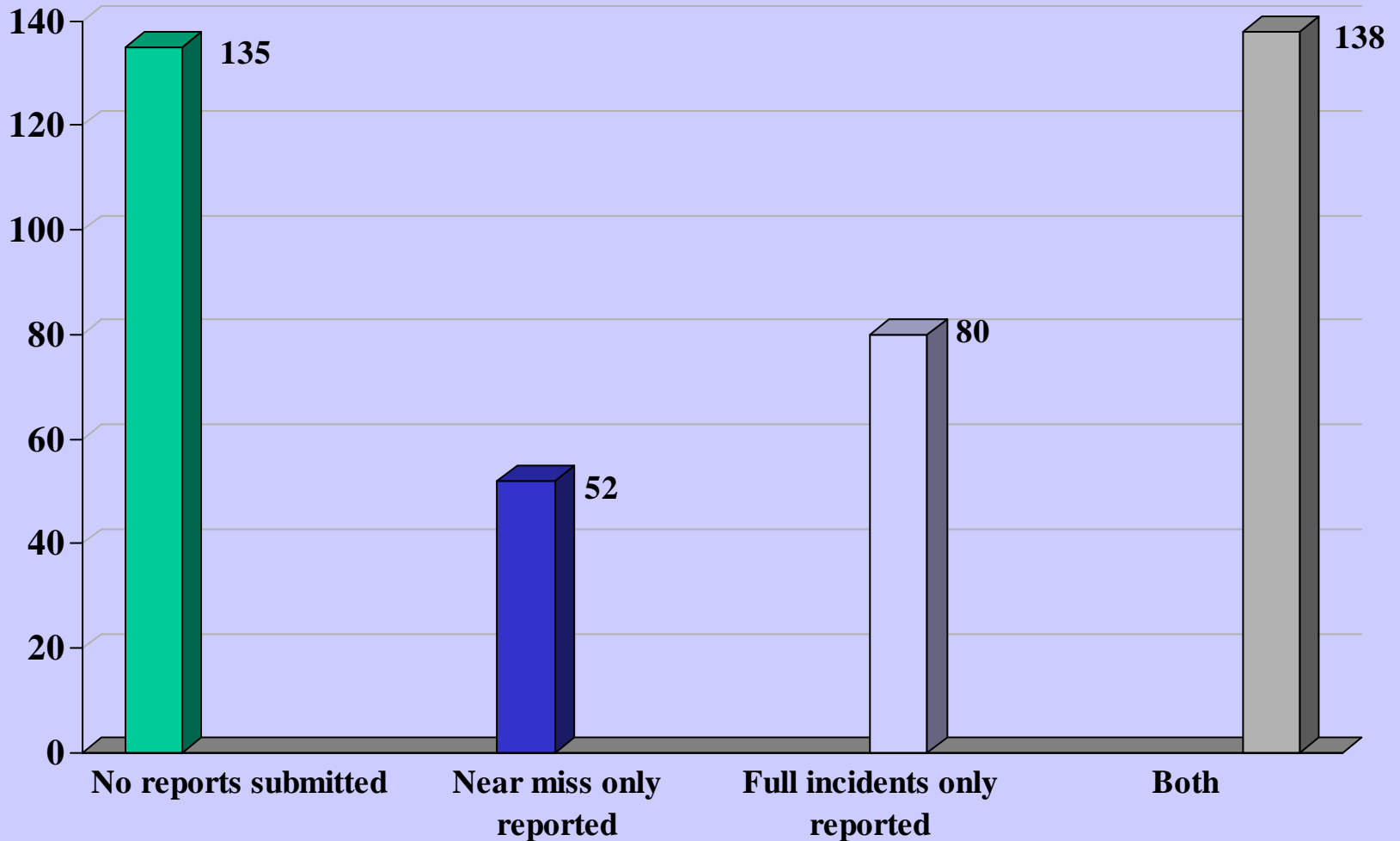
In 2004;

- **218/405 (54%)** of hospitals reported incidents (in which a blood component was transfused)
- When “near miss” events are included, the figure rises to **270/405 (67%)**

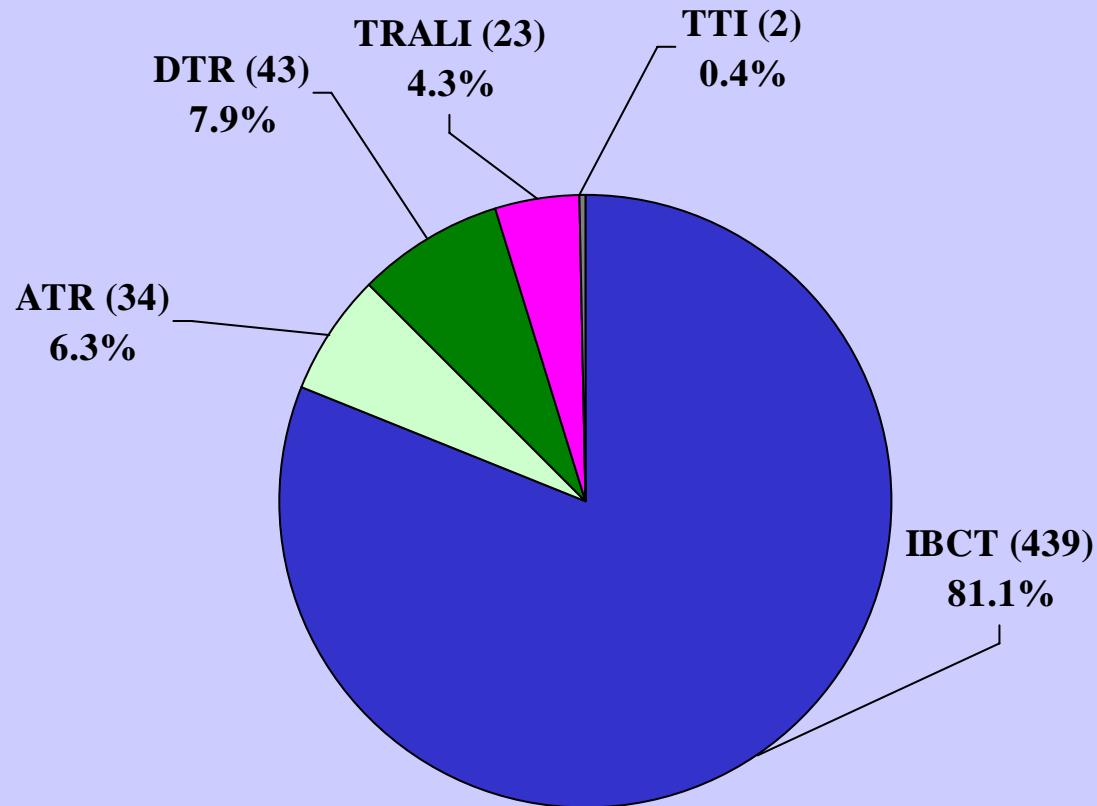
Numbers of incidents reported by individual hospitals (excludes “near miss” events)



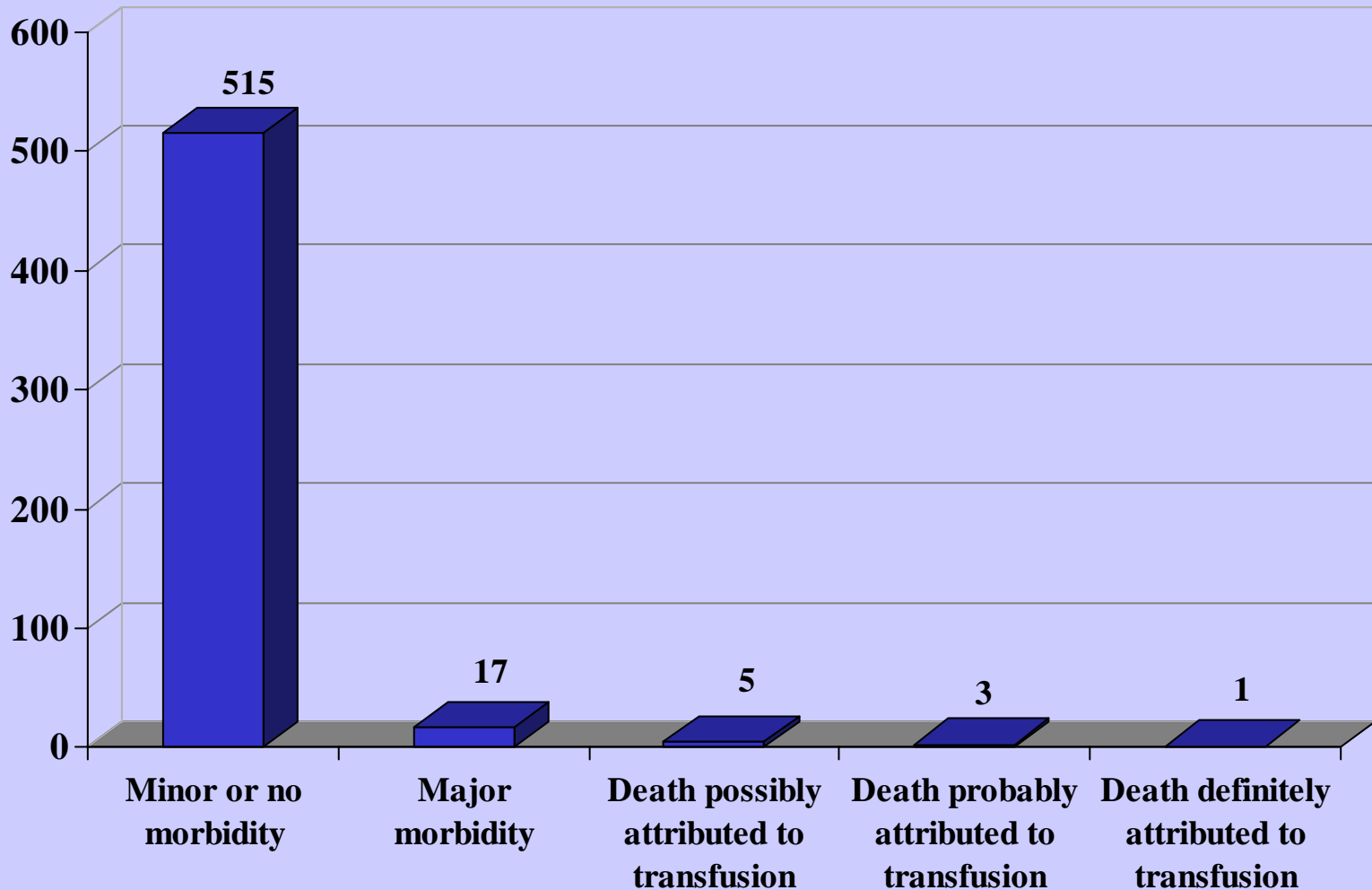
Breakdown of hospital reporting



Summary of completed questionnaires (2004)



Transfusion related mortality/morbidity according to the type of hazard reported in 541 completed questionnaires (2004)



Transfusion related mortality/morbidity according to the type of hazard reported in 541 completed questionnaires (2004)

	Total	IBCT	ATR	DTR	TRALI	TTI
Death definitely attributed to transfusion	1	1	0	0	0	0
Death probably attributed to transfusion	3	1	1	0	1	0
Death possibly attributed to transfusion	5	2	1	0	2	0
<i>Sub total 1</i>	9	4	2	0	3	0

Transfusion related mortality/morbidity according to the type of hazard reported in 541 completed questionnaires (2004)

	Total	IBCT	ATR	DTR	TRALI	TTI
Major morbidity	17	7	1	5	4	0
Minor or no morbidity	515	428	31	38	16	2
<i>Sub total 2</i>	<i>532</i>	<i>435</i>	<i>32</i>	<i>43</i>	<i>20</i>	<i>2</i>
<i>TOTAL</i>	<i>541</i>	<i>439</i>	<i>34</i>	<i>43</i>	<i>23</i>	<i>2</i>

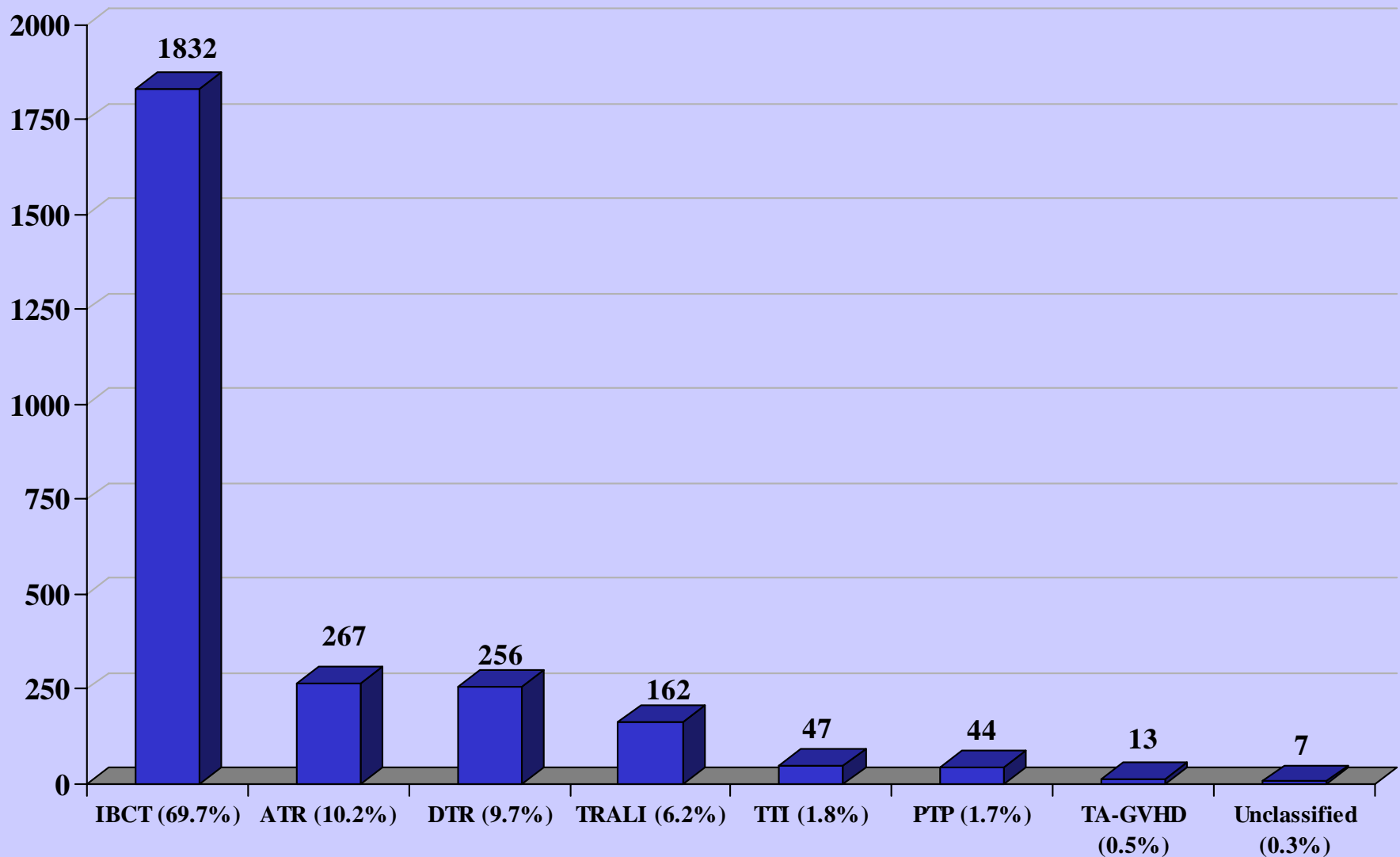
Major morbidity was defined as the presence of one or more of the following;

- Intensive care admission and / or ventilation
- Dialysis and / or renal dysfunction
- Major haemorrhage from transfusion-induced coagulopathy
- Intravascular haemolysis
- Potential RhD sensitisation in a female of child-bearing potential
- Persistent viral infection
- Acute symptomatic confirmed infection (viral, bacterial or protozoal)

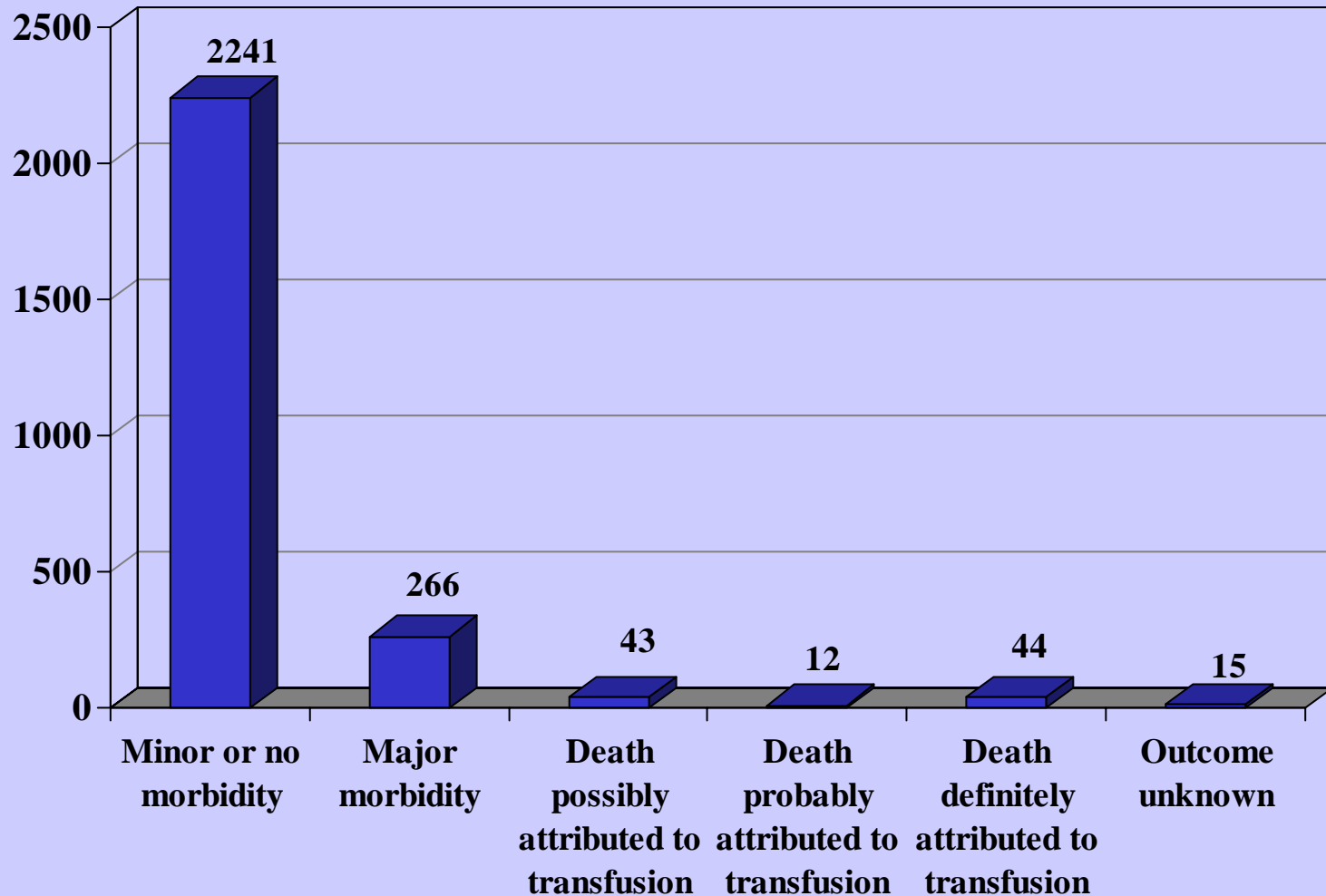
Cumulative data

1996-2004

Questionnaires analysed 1996 - 2004 (n=2628)



Cumulative mortality/morbidity figures 1996 -2004 excluding unclassified incidents (n=2621)



Mortality/morbidity data for IBCT cases

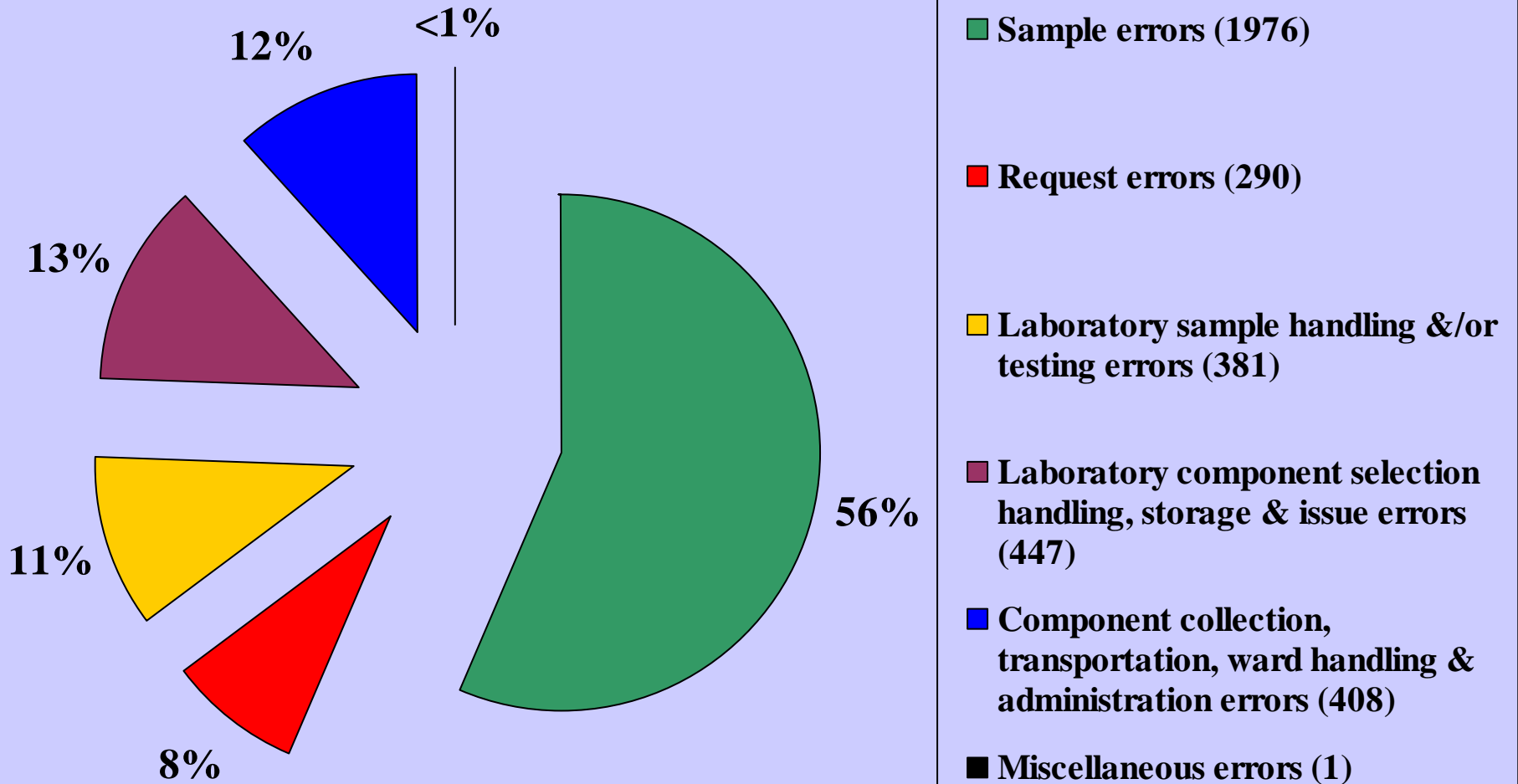
1996 - 2004 (n=1832)

Category

	No. of cases
Death definitely attributed to transfusion	6
Death probably attributed to transfusion*	3
Death possibly attributed to transfusion	11
Major morbidity	92
Minor or no morbidity	1709
Unknown outcome	11
Total	1832

* Category introduced 1999/2000

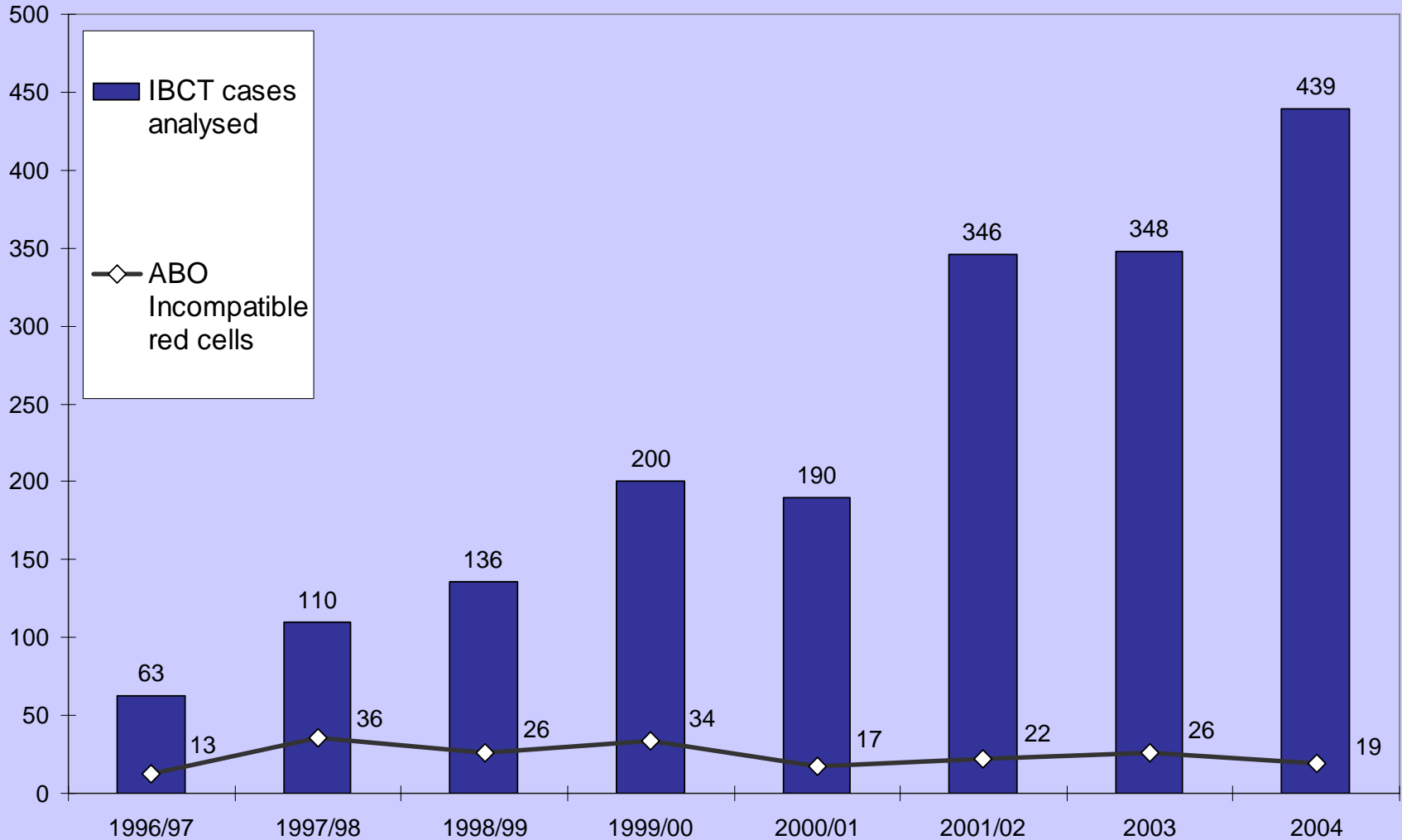
“Near miss” events 1997/98 - 2004 (n=3503)



Incorrect blood component transfused (IBCT)

All reported episodes where a patient was transfused with a blood component or plasma product which did not meet the appropriate requirements or which was intended for another patient

ABO incompatible red cell transfusions since 1996



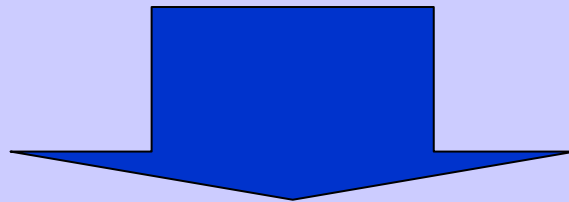
Cases reported

460 completed questionnaires received

Of these;

21 were withdrawn by the analyst

(**11** 'right blood to right patient' incidents, **10** did not meet IBCT criteria)



439 valid IBCT cases

Mortality & morbidity - ABO incompatibility

- **2** patients died following ABO incompatible red cell transfusion
~ **1** likely & **1** possibly related to transfusion
- **5** patients suffered haemolytic transfusion reactions with major morbidity due to ABO incompatibility
- **1** recipient of an ABO mismatched bone marrow transplant received platelets of their historic group resulting in a haemolytic reaction
- **2** patients had mild haemolytic reactions following ABO incompatible red cell transfusions
- **11** patients received ABO incompatible red cells but suffered no morbidity

Learning points₍₁₎

- The final identity check when taking a blood sample or administering blood **MUST** be done at the patient's bedside against a wristband or equivalent form of identification. No other form of checking is acceptable under any circumstances
- The final patient identity check at the bedside must never be omitted, however urgent the clinical situation
- Mistakes can happen even in areas where there is 'one-to-one' care

Learning points₍₂₎

- Manual methods of ABO group determination are not robust & are particularly unsafe in urgent situations
- BCSH guidelines for pre-transfusion testing should be adhered to
- A table of FFP compatibility should be included in laboratory procedures for components

Learning points⁽³⁾

- Discrepant ABO grouping results must be fully investigated & resolved, taking into account relevant clinical information, before blood is issued
- Consideration should be given to the introduction of a patient held booklet (similar to the anticoagulant booklet) with details of protocols following BMT & other special requirements
- Laboratory IT systems should be updated with new rules when special requirements are introduced (e.g. methylene blue (MB) FFP for patients under 16) & used to flag special requirements

Learning points⁽⁴⁾

- The same standards should apply to pre-transfusion testing in & outside of laboratory ‘core hours’
- Laboratory procedures should be consistent with current guidelines
- Maternal results must always be checked before issuing blood for a neonate
- Recommended best practice (included in forthcoming BCSH guideline on Specification & Use of IT Systems in Blood Transfusion Practice) is that all electronic issue procedures should be controlled by computer algorithms to validate appropriateness of actions

Learning points⁽⁵⁾

- Correct procedures must be followed for patient sampling
- A decision to transfuse must be based on clinical assessment as well as laboratory results - look at the patient!
- Blood components must not be given without prescription
- Blood should only be prescribed by a doctor who has undergone training in blood transfusion & has been assessed as competent
- Diagnostic laboratories must carry out checks to identify large changes in parameters ('delta checks') & should not issue unvalidated reports

Learning points₍₆₎

- Nurses giving blood must be familiar with blood components & the indications for their use
- Transfusion laboratory staff should be empowered to challenge inappropriate requests. This will require agreed protocols & training
- Named individuals should be given responsibility for checking of satellite refrigerators & for removal of expired units
- ‘Emergency O D negative’ blood should be rotated back into main stock before it nears expiry

Learning points⁽⁷⁾

- Correct patient identification is crucial in preventing ‘wrong blood’ incidents. Every patient must have an id wristband or equivalent containing their surname, first name, date of birth & unique id number. For unidentified patients there must be a policy in place stating the minimum identification data set
- All staff should receive training & demonstrate competency in positive identification procedures

Recommendations⁽¹⁾

- Training & competency testing of all staff involved in the transfusion process must emphasise the importance of positive patient identification, with particular attention paid to critical care situations
- **Action: Hospital Transfusion Committees**

Recommendations⁽²⁾

- All newly qualified doctors must receive education in blood transfusion as recommended by the CMO for England. A web-based education package (www.learnbloodtransfusion.org) is included in the FY1 curriculum in Scotland & should be implemented throughout the UK
- **Action: CMO's NBTC, PMETB**

Recommendations⁽³⁾

- Pending the availability of an effective IT solution, hospitals should take steps to implement robust methods to ensure that the patient's transfusion history including special requirements is kept up to date & accessible to the transfusion laboratory at all times. A patient held booklet is one possible solution
- **Action: CMO's NBTC, RTC/HTC network**

Recommendations⁽⁴⁾

- The EU Directive requires that hospital transfusion laboratories implement a quality system. Elements of this include ensuring adequate staffing levels, systematic & documented training, validation of methods & change control. This presents an opportunity to drive improvements in practice & must be fully supported, resourced & monitored

→ **Action: Trust CEOs**

Immune complications of transfusion 2004

Acute transfusion reactions

Delayed transfusion reactions

Transfusion-related acute lung injury

Acute transfusion reactions

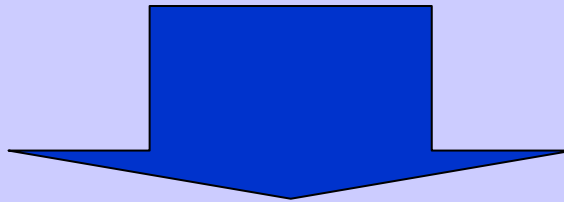
Acute transfusion reactions are defined in this report as those occurring at any time up to 24 hours following a transfusion of blood or components, excluding cases of acute reactions due to incorrect component being transfused

Cases reported

47 completed questionnaires submitted for analysis

Of these;

11 febrile non-haemolytic reactions and **1** drug reaction were withdrawn by the analyst and **1** case was reclassified as TRALI



34 valid acute transfusion reactions

Outcomes and imputability

- **1** patient died following an acute unclassifiable reaction to red cells ~ death possibly related to transfusion
- **1** patient died following platelet transfusion, probably from acute pulmonary oedema ~ death probably related to transfusion
- **1** patient had an acute anaphylactic reaction causing major morbidity (respiratory arrest requiring ventilation) following FFP ~ death definitely related to transfusion

Components implicated & types of reaction (n=34)

Reaction type	Red cells	FFP	Platelets	Red cells, FFP &	Totals
Acute haemolytic	4	0	0	0	4
Anaphylactic*	0	5 (1 MB-FFP)	3	1	9
Allergic**	6	9	3	0	18
Hypocalcaemia	0	1 (MB-FFP)	0	0	1
Probable acute pulmonary oedema	0	0	1	0	1
Unclassifiable	1	0	0	0	1
Total	11	15	7***	1	34
Incidence of reports per 1000,000 components issued	0.4	4.0	5.8	-	1.0

* anaphylactic/anaphylactoid (hypotension with 1 or more of: rash, dyspnoea, angioedema)

** allergic (1 or more of: rash, dyspnoea or angioedema **without** hypotension)

*** 5 were from buffy coat pools, 2 apheresis

Time interval between reaction & medical examination

Time before seen by a doctor	Patients
< 15 mnutes	21
< 30 minutes	7
< 60 minutes	2
Unknown	4
Total	34
<hr/>	
Haematologist involved	22
<hr/>	
Case review	
Reported to HTC	27
Reported to hospital laboratory	31
Reported to blood centre	17

Recommendations⁽¹⁾

- In the continued absence of a published national guideline for investigation of acute transfusion reactions, SHOT is developing, in collaboration with the BCSH Transfusion Taskforce, a minimum standard for investigation.
 - **Action: SHOT, BCSH TTF, HTTs investigating ATRs**

Recommendations⁽²⁾

- In the event of a patient death during or immediately following blood transfusion, the possibility of an acute transfusion reaction must be considered & investigated.
- **Action: HTCs for inclusion in transfusion policies**

Delayed transfusion reactions

Delayed transfusion reactions are defined in this report as those occurring more than 24 hours following a transfusion of blood or blood components. In practice, these are usually delayed haemolytic reactions due to the development of red cell alloantibodies.

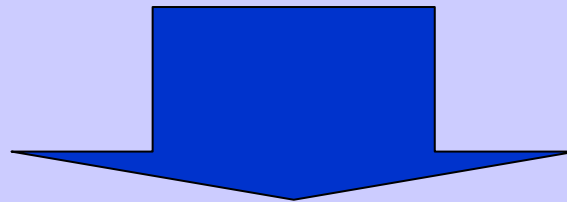
Simple serological reactions (antibody development without a positive DAT or evidence of haemolysis) are excluded.

Cases reported

44 completed questionnaires submitted for analysis

Of these;

1 case was reclassified as IBCT



43 valid delayed transfusion reactions
(42 x Haemolytic, 1 x Non-haemolytic)

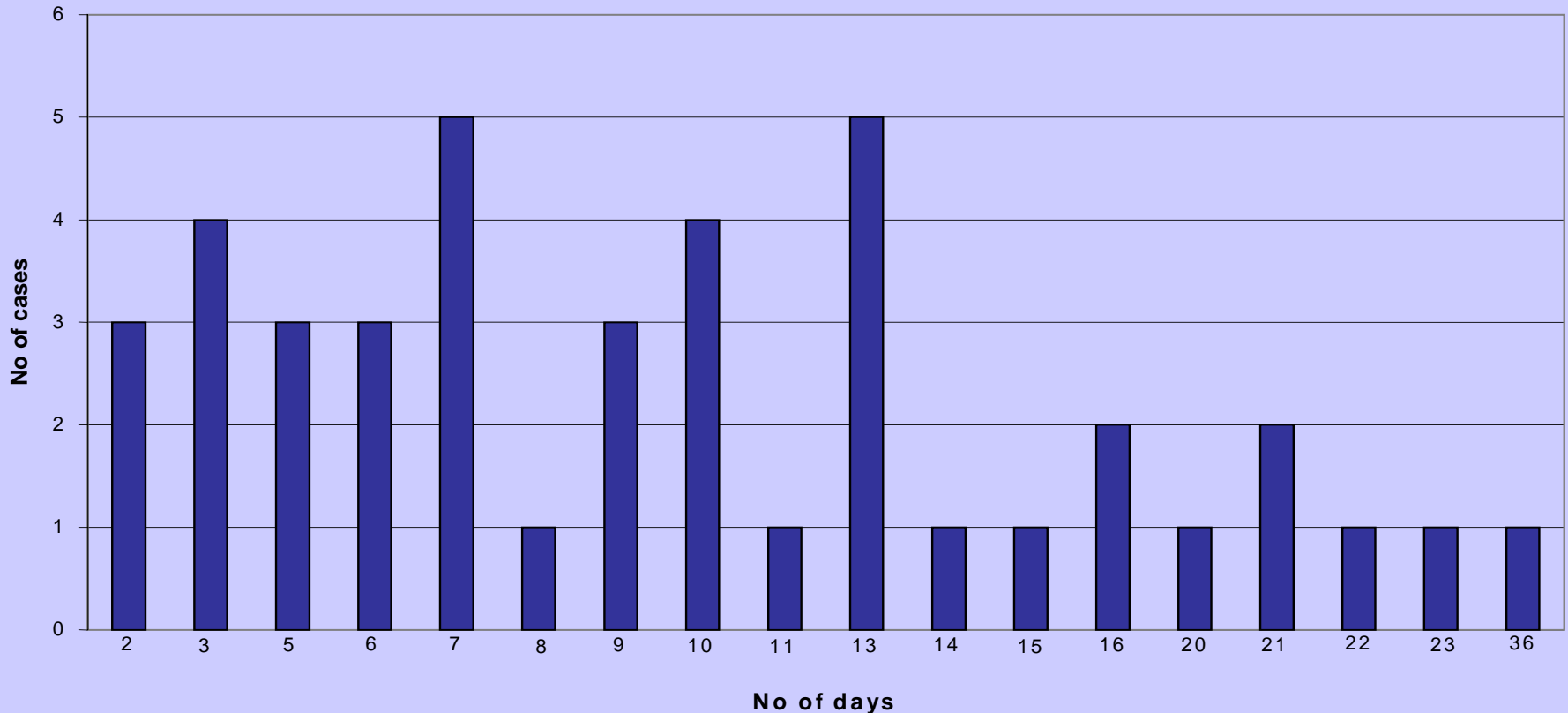
Outcomes and imputability

- **5** patients died ~ death not related to transfusion
- **14** patients were asymptomatic with a positive DAT only
- **23** patients had evidence of increased red cell destruction without renal impairment
- **5** patients had increased red cell destruction & renal impairment

Of these;

1 patient died unrelated to transfusion & the other **4** did not suffer any long term morbidity

Time relationship to transfusion



The interval in days between the implicated transfusion & signs or symptoms of a DHTR are shown. The intervals given are necessarily those when the signs or symptoms were first noted. However, it is likely that some extravascular haemolysis was ongoing during or shortly after the transfusion in those cases where the causative antibody was retrospectively detectable in the pretransfusion sample, or when the reaction was clinically noted within 48 hours of the transfusion.

New specificities by blood group system

Antibody specificity by blood group system	Number of cases	Sole <i>new</i> antibody
Kidd		
Jka	19	14
Jkb	6	1
Rh		
Cw	1	0
E	9	3
c	4	1 (with anti-E)
D	2	0
C	3	0
Ce	1	1
Kell		
k	1	1
Duffy		
Fya	7	4
Fyb	1	1
MNSs		
S	1	0
M (37deg.C)	1	0
Other		
Lua	1	0

IAT technology used for antibody screening

IAT screening technology	Number of cases	By automation
Biovue	14	14 (100%)
Diamed	24	16 (67%)
Solid phase	3	3 (100%)
Diamed/Solid phase	1	No answer

Recommendations⁽¹⁾

- Investigation of a suspected DHTR should include retesting of the pre-transfusion sample (where still available) by different or more sensitive techniques. This may involve referral to a reference centre.

→ **Action: Hospital blood transfusion laboratories**

- Automated systems or changes to IAT technology should be validated using a range of weak antibodies to ensure appropriate sensitivity

→ **Action: Hospital blood transfusion laboratories**

Recommendations⁽²⁾

- Consideration should be given to issuing antibody cards or similar information to all patients with clinically significant red cell antibodies. These should be accompanied by patient information leaflets, explaining the significance of the antibody and impressing that the card should be shown in the event of a hospital admission or being crossmatched for surgery. Laboratories should be informed when patients carrying antibody cards are admitted.

→ **Action: The CMO's NBTC and its counterparts in Scotland, Wales and Northern Ireland**

Recommendations⁽³⁾

- There is a need for a review, co-ordinated by a professional national body, of how long specimens should be kept post-transfusion. The review needs to consider the relative risks and benefits of storing specimens beyond the time that they are suitable for use in further crossmatching tests.

→ **Action: BBTS and BCSH**

Transfusion related acute lung injury

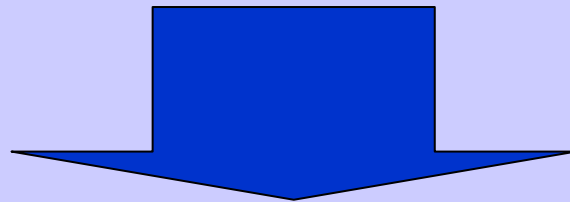
Transfusion related acute lung injury was defined in this report as acute dyspnoea with hypoxia & bilateral pulmonary infiltrates occurring during or in the 24 hours after transfusion, with no other apparent cause.

Cases reported

27 completed questionnaires submitted for analysis

Of these;

3 cases were withdrawn by the analyst & **1** case by the National Medical Co-ordinator



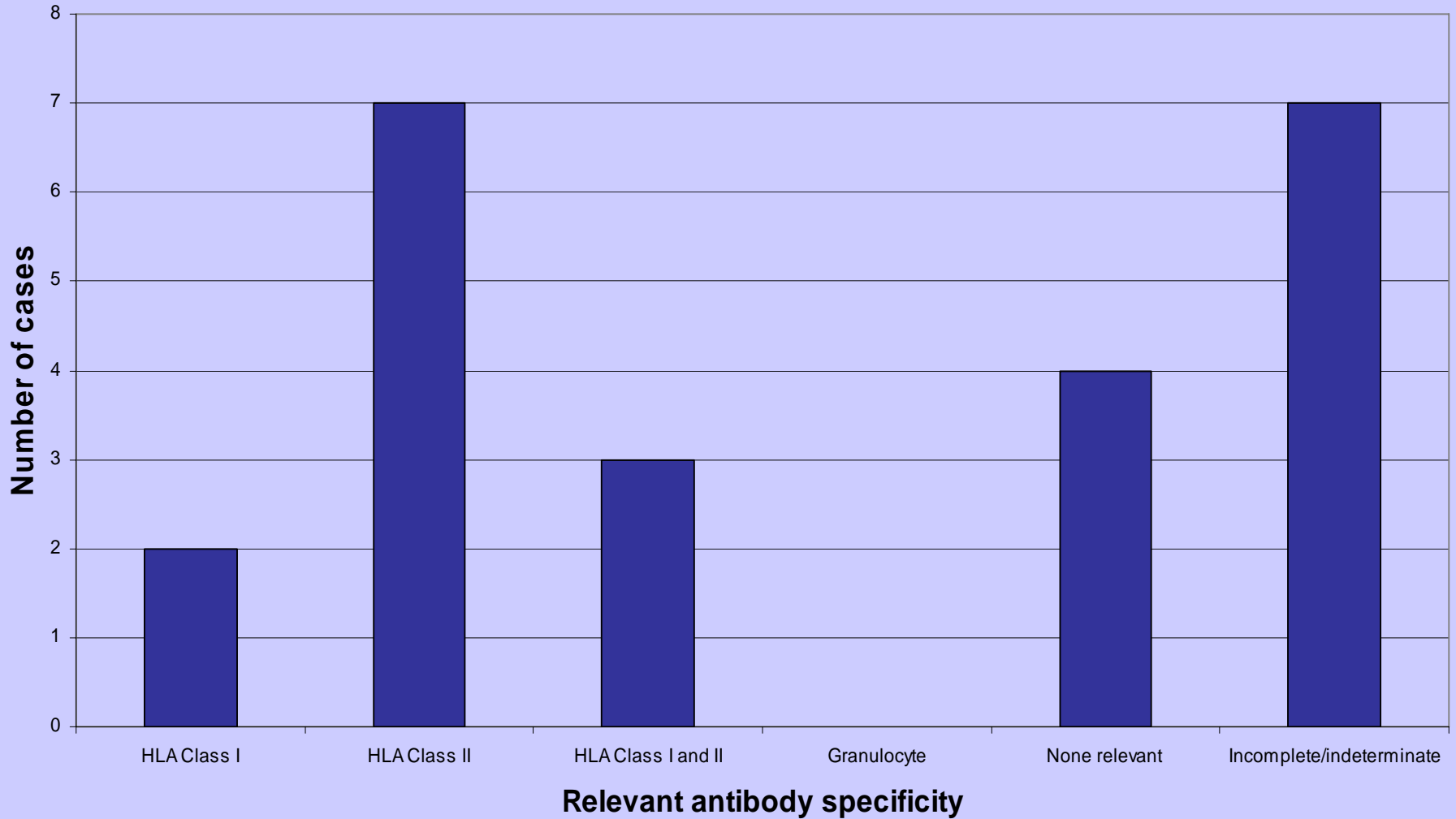
23 cases analysed

Classification of cases

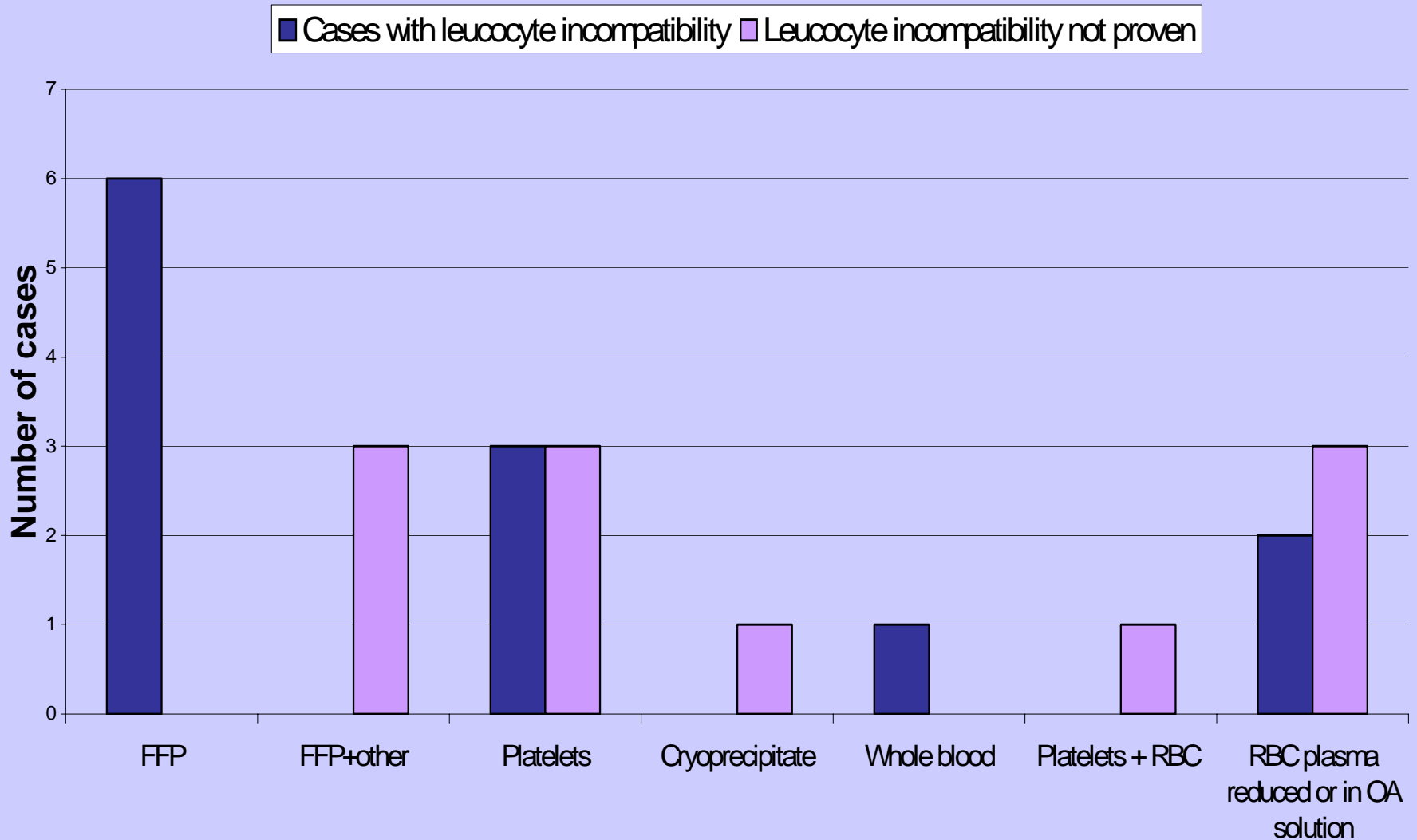
Of the **23** cases:

- 10** HIGHLY LIKELY - convincing clinical picture & positive serology
- 3** PROBABLE - either: a less convincing history & positive serology; or a good history & less convincing or absent serology
- 4** POSSIBLE - either the clinical picture or serology was compatible with TRALI, but other causes could not be excluded
- 6** UNLIKELY - clinical picture & serology were not supportive of the diagnosis

Implicated donor antibodies



Analysis of components implicated in TRALI



3 year comparison of case numbers

Reporting year	2004	2003	2001-2 (15 months)
TRALI cases analysed	23	36	33
Highly likely	10	20	13
Probable	3	2	5
Possible	4	6	14
Unlikely	6	8	1

Recommendations⁽¹⁾

- Every effort must be made to avoid unnecessary transfusion of plasma rich blood components including FFP and platelets
→ **Action: Clinicians administering blood transfusion**
- FFP continues to be associated with risks of reactions including TRALI & should only be used when clinically indicated in accordance with BCSH guidelines. Guidelines for the management of high INRs due to warfarin therapy should also be followed
→ **Action: Clinicians administering blood transfusion**

Recommendations⁽²⁾

- Transfusion of whole blood should be discouraged
→ **Action: Hospital Transfusion Teams**

- Hospital staff should continue to be aware of TRALI & report possible cases to the local Blood Centre to facilitate investigation. Continued education of all relevant staff about this condition is needed
→ **Action: Hospital Transfusion Teams; clinicians administering blood transfusion**

Recommendations⁽³⁾

- Cases should be evaluated early by the consultant(s) involved. A team approach including the haematologist & chest physician and/or ICU consultant is recommended. There should be early liaison with the local Blood Centre
 - **Action: Clinicians administering blood transfusion plus haematologists, chest physicians and ICU consultants**

Recommendations⁽⁴⁾

- Serological investigation of suspected TRALI cases must include tests for antibodies to HLA Class II, HLA Class I & granulocyte specific antigens
→ **Action: UK Blood Services**
- UK Blood Services should continue to consider strategies to minimise the risk of TRALI from apheresis platelets
→ **Action: UK Blood Services**

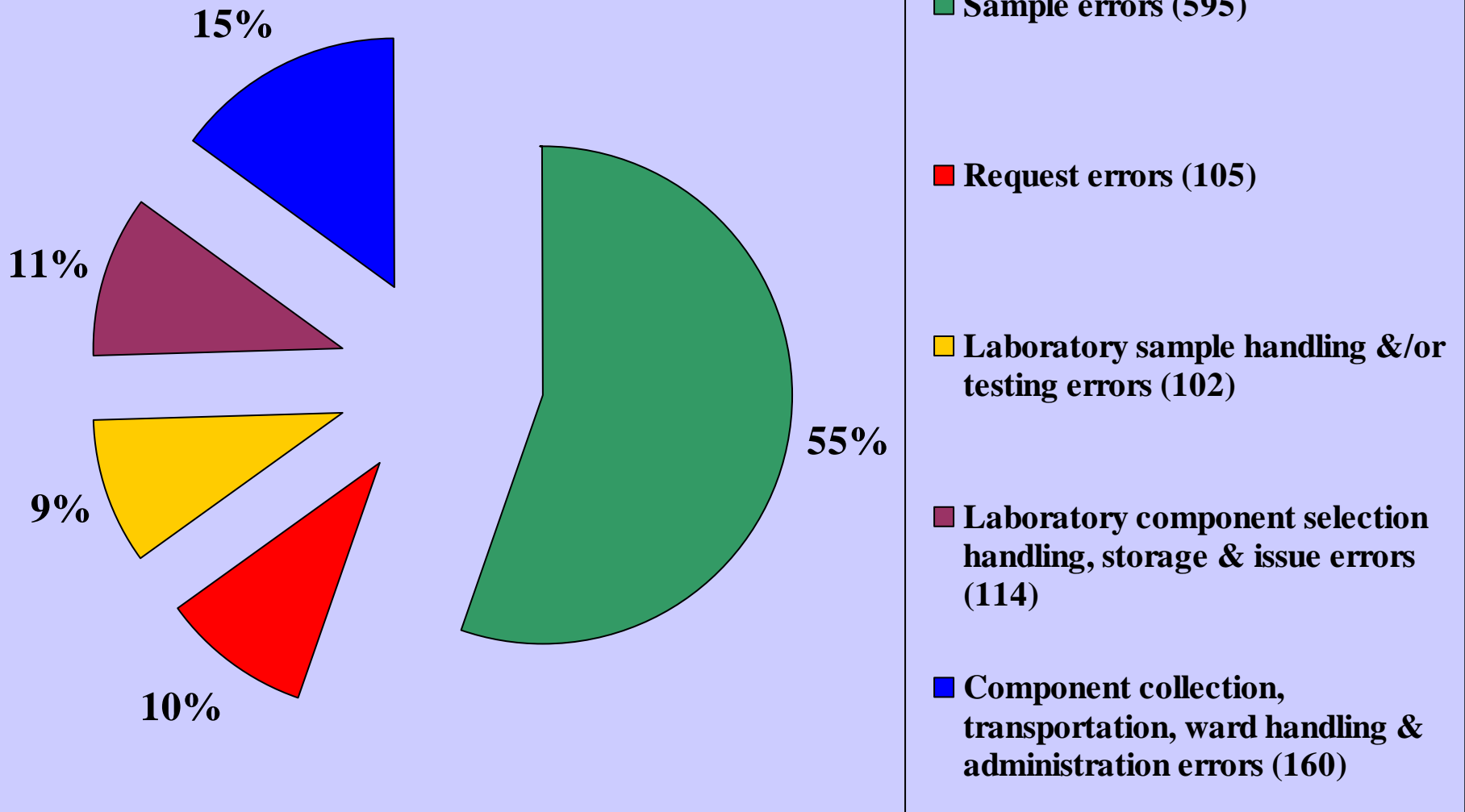
“Near miss” events

Any error which, if undetected, could result in the determination of a wrong blood group, or issue, collection or administration of an incorrect, inappropriate or unsuitable component, but which was recognised before transfusion took place

Types of “Near miss” events

- Sample errors
- Request errors
- Laboratory sample handling &/or testing errors
- Laboratory component selection, handling, storage & issue errors
- Component collection, transportation, ward handling & administration errors

Categories & proportions of “Near miss” events (n=1076)



Recommendations⁽¹⁾

- All hospitals are encouraged to report “near miss” events as required by HSC 2002/009 (BBT2) in order to further identify local weaknesses in the transfusion process. All instances of ‘wrong blood in tube’ must be fully investigated
→ **Action: Hospital transfusion teams**

- Training & education in blood sampling, including the practical aspects of venepuncture & positive patient ID, should be included in the curriculum for medical & nursing students
→ **Action: CMO’s NBTC & counterparts, Undergraduate Deans of Schools of Nursing & Medicine**

Recommendations⁽²⁾

- All staff involved in the pre-transfusion sampling, testing & issue of blood must be deemed competent having undergone appropriate training, which must be documented
→ **Action: Trust CEOs through risk management structures**
- Robust systems for noting patients' special requirements should be developed together with a policy of empowering patients to be more aware of their special needs
→ **Action: Clinicians, Hospital transfusion Committees, Hospital Transfusion Teams**

Recommendations⁽³⁾

- Hospital transfusion laboratories should develop & adhere to policies for the timely clearing of satellite refrigerators, required by the Blood Safety & Quality Regulations 2005
→ **Action: Hospital transfusion laboratories**

- Ward staff at all levels must be trained in appropriate storage of blood components once they have been collected from the blood bank
→ **Action: Ward managers, Hospital Transfusion Teams**

Transfusion transmitted infections

Episodes which if, following investigation:

- The recipient had evidence of infection post-transfusion, and there was no evidence of infection prior to transfusion and no evidence of an alternative source of infection

And, either

- At least one component received by the infected recipient was donated by a donor who had evidence of the same transmissible infection,

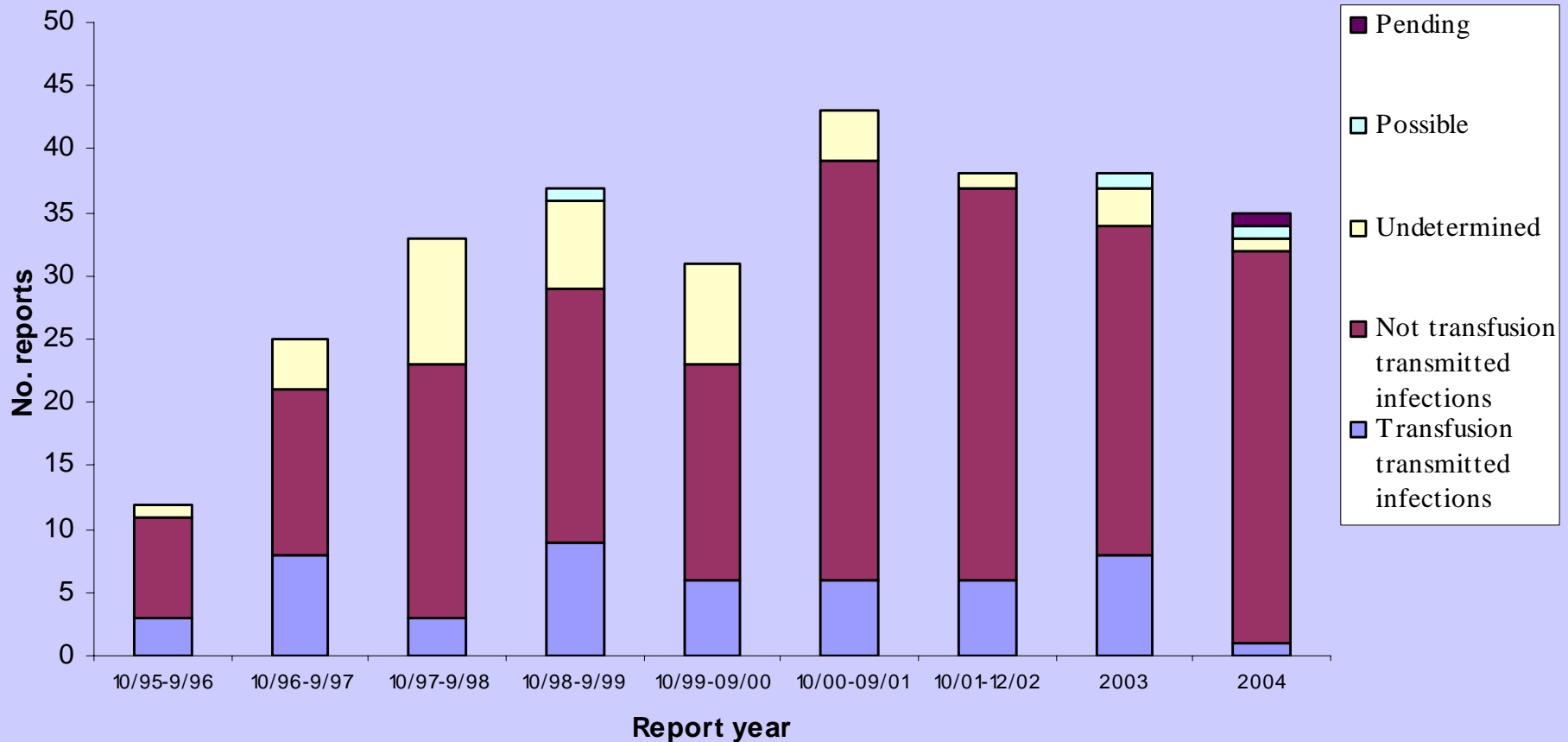
Or

- At least one component received by the infected recipient was shown to contain the agent of infection

Transfusion transmitted infections 2004

- **34** cases of suspected transfusion transmitted infections referred to NBS/HPA Centre for Infection Surveillance
- **Only 1 report of hepatitis E was determined to be a TTI according to the definition**
- Of the **33** remaining reports, in **31** transfusion was not implicated as the source of infection. These were;
 - **14** x bacteraemia
 - **1** x hepatitis A
 - **10** x hepatitis B
 - **5** x hepatitis C
 - **1** x HIV
 - 1** x hepatitis C in which recipient was transfused with 143 units during 1993 ~ neither confirmed nor refuted as a TTI
 - 1** x HHV8 is pending complete investigation

Reports of possible TTI's in the UK (England & Wales), by year of report to 31/12/2004 (Scotland included from 10/98)



Cumulative total of reports of TTI's reported (01/10/1995-31/12/04) by year of transfusion & infection

Year of transfusion	Pre 1997	1997	1998	1999	2000	2001	2002	2003	2004	Total	Deaths ^a
Infection											
HAV	1(1)	-	-	-	1(1)	-	-	-	-	2	-
HBV	3(3) ^b	1(1)	1(1)	2(3)	1(1)	-	1(1)	1(1)	-	10	-
HCV	1(1)	1(1)	-	-	-	-	-	-	-	2	-
HIV ^c	1(3)	-	-	-	-	-	1(1)	-	-	2	-
HEV									1(1)	1	-
HTLV I	2(2)	-	-	-	-	-	-	-	-	2	-
Bacteria	2(2)	3(3)	4(4) ^{2a}	4(4) ^a	7(7) ^{3a}	5(5)	1(1)	3(3) ^a		29	7
Malaria	-	1(1) ^a	-	-	-	-	-	1(1)	-	2	1
vCJD	1(1)	-	-	-	-	-	-	-	-	1	-
Possible prion transmission	-	-	-	1(1)	-	-	-	-	-	1	-
Total^d	11(13)^b	6(6)^a	5(5)^{ax2}	7(7)^a	9(9)	5(5)	3(3)	5(5)	1(1)	52	8

NB:

- a Infection implicated in the death of a recipient
- 2a Infection implicated in the deaths of 2 recipients
- 3a Infection implicated in the deaths of 3 recipients
- b One household member who was caring for the recipient has been diagnosed with acute HBV
- c One additional investigation failed to confirm or refute transfusion transmitted HIV during the early 1990s. The patient had received multiple transfusions, & had no other risk factors, transfusion with HIV infectious blood was concluded to be the probable, although unproven, source of infection.

Recommendations⁽¹⁾

- Efforts to prevent bacterial contamination of blood components should continue. These include;
 - Continuation of diversion of the first 20-30 mL of the donation (likely to contain any organisms entering the collection needle from the venepuncture site)
 - Careful attention to adequate cleansing of donors' arms
 - Adherence to BCSH guidelines (1999) with regard to the visual inspection of blood components for any irregular appearance immediately prior to transfusion
- **Action: UK Blood Services, hospital transfusion laboratories, staff undertaking pre-transfusion bedside checking**

Recommendations⁽²⁾

- Hospitals should consult guidelines & the blood service about the investigation of transfusion reactions suspected to be due to bacteria. Attention should be paid to the sampling & storage of implicated units or their residues

→ **Action: Hospital Transfusion Teams**

- Hospitals should continue to report & investigate all possible incidents of post-transfusion infection appropriately & adequately

→ **Action: Hospital Transfusion Teams**

- UK Blood Service collection teams should ensure donor selection guidelines are adhered to at all times in order to prevent transmission of blood borne infections

→ **Action: UK Transfusion Services**

General Recommendations

General recommendations⁽¹⁾

1. Active participation in SHOT must continue
→ **Action: Trust CEOs through HTC's and risk management structures, consultant haematologists, hospital staff involved in the blood transfusion process**
2. An open learning & improvement culture must continue to be developed in which SHOT reporting is a key element
→ **Action: Trust CEOs through risk management structures, staff involved in the blood transfusion process**

General recommendations⁽²⁾

3. Resources must be made available in Trusts to ensure that appropriate & effective remedial action is taken following transfusion errors
→ **Action: SHAs, PCTs, Trust CEOs through HTC's & risk management structures**
4. Hospital transfusion teams must be established & supported
→ **Action: Trust CEOs through HTC's**
5. Hospital transfusion laboratory staffing must be sufficient for safe transfusion practice
→ **Action: Trust CEOs, clinical directors of pathology, professional & accrediting bodies**

General recommendations⁽³⁾

6. Education & training is of key importance for safe & effective blood transfusion practice
 - i) Blood transfusion must be included in the curriculum for student nurses, medical undergraduates & newly qualified doctors
 - **Action: General Medical Council, Deans of Schools of Nursing & Medical Schools, Postgraduate Medical Education & Training Board, Nursing & Midwifery Council**
 - ii) Blood transfusion should also be included in the curriculum of specialist trainees, particularly anaesthetists & critical care nurses
 - **Action: Medical Royal Colleges, Universities**

General recommendations⁽⁴⁾

6. continued

iii) The disproportionate number of errors in paediatric patients reflects lack of knowledge by clinical & laboratory staff of their transfusion requirements

→ **Action: Royal College of Paediatrics & Child Health, Royal College of Nursing, Staff in paediatric units & transfusion laboratories**

iv) An ongoing programme of education & training in blood transfusion is essential for hospital staff, including consultants & BMSs, involved in the transfusion process & will require additional resource

→ **Action: Local, regional & national transfusion committee network, NPSA/SHOT/NBTC initiative, Trust CEO's**

v) SHOT reportable incidents should be a standing agenda item for regional BMS forums & SPOT meetings. An important role of the RTC is to support translation of guidelines into local practice

→ **Action: RTCs & user groups**

General recommendations⁽⁵⁾

7. Mechanisms must be put in place for appropriate & timely communication of information regarding special transfusion requirements
→ **Action: CMO's NBTC in England & its counterparts in devolved administrations to make recommendations on suitable mechanisms for implementation by Trust CEOs through HTC's, HTT's**

8. Appropriate use of blood components must be strenuously promoted & evaluated. This must include monitoring for serious adverse effects of alternatives to transfusion
→ **Action: CMO's NBTC & counterparts to develop action plans, Trust CEOs through HTC's, clinicians administering blood transfusion, hospital transfusion teams**

General recommendations⁽⁶⁾

9. Information technology as an aid to transfusion safety should be assessed & developed at national level. A co-ordinated approach is essential
→ **Action: NPSA/SHOT/NBTC initiative, CMO's NBTC IT Working Group, Connecting for Health**

10. Further national initiatives are needed to drive forward blood safety issues in hospital transfusion laboratories
→ **Action: CMO's NBTC in England & its counterparts in Scotland, Wales & Northern Ireland to develop action plans in collaboration with relevant professional bodies**

General recommendations⁽⁷⁾

- 11.** There is a need for a national body, with relevant expertise & resource, to advise government on priorities for improvements in transfusion safety
→ **Action: Department of Health**