Summary of ANNUAL REPORT 1999 – 2000

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on behalf of the SHOT Steering Group

Key Observations and Recommendations

◊ Of the 426 hospitals eligible to participate, 155 (36.4%) submitted initial reports during the reporting year, an increase of 5.8% over the previous year and an overall increase of 14.3% since the scheme began. A further 150 hospitals sent "Nil to report" cards indicating that they had seen no incidents during the reporting year. Overall participation is only 72% (305/426) this year compared with 77.8% last year. This apparent decrease in participation may be misleading, however, given that response to the "Nil to report" exercise this year was comparatively poor. Only 246 hospitals (57.7% of those eligible) had returned their cards by the time this report went to press and two of these did not give information about participation.

"Wrong Blood" incidents

◊ A total of 291 initial reports was received this year, an increase of 15.5% over the 253 received last year and an overall increase of 72% since the scheme began. Once again the largest category remains "incorrect blood component transfused" with 201 reports this year, an increase of 39.6% over last year (144 reports). This year IBCT incidents contributed 69.1% of the total compared to 57.3% last year and 58.9% over the four reporting years 1996-2000. A total of 287 completed reports were analysed this year, including 18 outstanding from last year. 22 reports, for which no questionnaires were returned by the closing date, will be included in next year's analysis.

◊ **In line with Health Service Circular 19981224 "Better Blood Transfusion" systems of Clinical Governance within Trusts should ensure a commitment to SHOT reporting and to changes in practice resulting from SHOT observations and recommendations. It is now time to implement participation in SHOT reporting as a standard for clinical blood transfusion laboratories.**

◊ There were 39 cases of ABO incompatibility, a somewhat lower proportion than last year and the cumulative four year period (19.5% compared to 24% and 26.5% respectively) which resulted in 2 deaths, one definitely and one probably related to the transfusion and a further 8 cases of major morbidity from the effects of intravascular haemolysis. Over the four years there have been 8 deaths (5 definitely related to transfusion, 1 probably and 2 possibly related) and 54 cases of major morbidity from ABO incompatibility and other red cell incompatibility. Four additional cases of major morbidity this year were attributable to RhD incompatible transfusions, with this cause contributing 16 cases of potential RhD sensitisation over four years of reporting. These figures mask a somewhat larger number of ABO/RhD compatible and RhD incompatible transfusions given in error which did not result in ill-effects.

◊ This is the fourth consecutive year in which the single most important cause resulting in mis-transfusion was failure of some aspect of the bedside checking procedure immediately prior to administering the transfusion. Contributory factors were similar to those reported previously, for example confusion over patients with the same or similar names, checking remote from the patient's bedside, interruption between completion of the checking procedure and administration of the transfusion and failure to note discrepancies between compatibility and donation labels where a preceding laboratory labelling error had occurred. Unusual circumstances clearly contributed to a small proportion of these incidents but in the majority, no clear explanation for the failures was apparent. Missing wristbands or other formal means of patient identification contributed to bedside errors in 10 instances.

◊ Multiple errors continue to contribute to bedside administration errors in 47% of cases indicating that problems still exist at all levels in the transfusion chain.

◊ As in previous years, the withdrawal of the wrong component from its storage location in the hospital preceded a bedside administration error in a significant proportion of cases and there was a notable absence of formal checking procedures at this point in two thirds, contravening recently published BCSH guidelines.

◊ Failure to request irradiated components for patients at known risk of TA-GVHD, notably those being treated with purine analogues, patients with Hodgkin's Disease and those who had received or were due to receive stem cell transplants occurred in 26 cases and in 1 patient, who survived, a diagnosis of TA-GVHD could not be excluded.

◊ Phlebotomy errors are a small but important cause of ABO incompatibility which will not be detectable at laboratory level if the patient has not been previously grouped or if the laboratory historical record has not been consulted. Sampling errors resulting in mis-transfusion are not confined to blood grouping/crossmatch samples. Erroneous haemoglobin results from wrong samples may lead to unnecessary transfusions.

◊ Laboratory errors, comprising 26.8% of the total, included technical errors, sample transposition and labelling mistakes, in addition to a variety of other procedural errors and selection/issue of inappropriate components. Almost half of these errors occurred out of hours although the available data cannot be used to interpret the significance of this finding.

◊ Unnecessary transfusions were noted on a number of occasions and included anti D immunoglobulin administered unnecessarily in 12 patients for a variety of reasons which included mis-prescribing, sampling error, mis-grouping in the laboratory, misinterpretation of a verbal report and mis-identification at the bedside. Additional examples of unnecessary blood component administration occurred as a result of erroneous haemoglobin results and bedside identification errors.

◊ There were a variety of errors in requesting, selection, issue and administration of blood components. These included failure to appreciate the criteria for irradiation and anti D immunoglobulin administration, the significance of pre-existing red cell antibodies, the correct use of emergency group O red cells and occasionally the issue of the wrong component altogether. Together these suggest a basic lack of knowledge and understanding of transfusion issues amongst individuals responsible for different steps in the transfusion process.

"WRONG BLOOD INCIDENTS ARE WITHOUT EXCEPTION AVOIDABLE ERRORS"

◊ **It is essential that every hospital becomes familiar with and puts into practice existing guidelines in the field of blood transfusion to minimise the possibility of human error.**
BCSH guidelines have been published on how to achieve this. They were reproduced in last year's SHOT report and have since been widely distributed to hospitals but as yet there is little evidence that they are having an effect on reducing the number of "wrong blood" incidents.

◊ **Hospitals must ensure that ALL staff handling blood and blood components receive correct training and regular review/retraining**

◊ **Existing procedures should be re-examined for flaws which could lead to systems errors and thus inevitable human errors**

◊ **Hospital Transfusion Committees should be managerially empowered to play a key role in ensuring the safety of the transfusion process.**

THE BEDSIDE CHECK IS THE FINAL OPPORTUNITY TO PREVENT A MIS-TRANSFUSION

◊ **Every hospital must have a formal policy for the bedside check which must be rigidly enforced at all times.**
This must ensure that blood components are correctly allocated and identified and be capable of detecting preceding compatibility labelling discrepancies and relevant previous transfusion information such as previous group and antibody screening reports. The dangers of staff becoming distracted, even after correct checking, must be recognised and environmental deficiencies which contribute to this should be corrected.

◊ **Every patient should be uniquely identified using a wristband or equivalent**
Retaining wristbands or their equivalent in the operating theatre situation is essential and a formal means of identification should be pursued for all patients in theatre and A+E departments. Reliance should not be placed on familiarity with the patient in the outpatient setting and there should be no exception to the wearing of wristbands.

USE OF INFORMATION TECHNOLOGY AT THE BEDSIDE WILL PREVENT HUMAN ERROR

◊ **Computerised systems are available to ensure safe transfusion at the bedside. Pilot studies have been conducted at a few sites in the U.K. These systems now merit further study and development.**
Their potential value beyond the transfusion setting, for example in reducing drug administration errors, should be explored as this will improve their cost effectiveness.

PREVENTION OF ERRORS IN EARLIER STEPS OF THE TRANSFUSION PROCESS

◊ The bedside check, even when computerised, will not detect all errors at earlier steps of the transfusion process so equal importance must be afforded to these other vital steps.

◊ **Individuals responsible for the prescription and request of blood components must be familiar with their correct use and with the special requirements of their patients.**
These should conform with BCSH and other guidelines and special requirements should be flagged on the clinical and laboratory records. A new BCSH guideline on the clinical use of red cells is in press and a pre-publication version is reproduced, with permission, in Appendix 11 of the full report.

◊ **Individuals responsible for taking samples for transfusion testing must at all times follow strict procedures to avoid confusion between patients.**
The same degree of care should be afforded to the taking of other blood samples as incorrect results from these may lead to unnecessary blood transfusion.

◊ **Blood banks must continue to be vigilant in reviewing procedures, systems and training to prevent sample handling and technical errors.**

◊ **Telephoned requests for blood components must be formally recorded and incorporate all relevant information including special requirements.**
Great care must be exercised when acting on verbal results.

◊ **Every hospital should ensure that standards are set for correct collection of blood components from hospital storage sites; this should incorporate formal identification procedures.**
Staff carrying out this important function must be aware of the key role they play in ensuring the safety of the transfusion process and must receive appropriate training in this procedure. Computerised systems exist to improve the safety of this process and can be linked to bedside identification systems for both blood sampling and administration of blood components. These merit further evaluation.

SETTING "WRONG BLOOD" INCIDENTS IN CONTEXT

◊ **Basic "epidemiological" research is needed into the timing and location of transfusions in the hospital setting.**

The confidential and anonymised nature of the SHOT scheme makes it difficult to place errors in the overall context of transfusion activity in the UK, apart from very broad estimates of the incidence of hazards as a proportion of total blood components issued. The lack of denominator data makes meaningful interpretation of, for example, out-of-hours errors impossible. With the increasing sophistication of blood bank information technology, it is now possible to collect such data and this could be of value in designing improved systems to increase the safety of the blood transfusion process.

Immune complications of transfusion

◊ Reports of acute transfusion reactions have remained at the same level as last year (34) with delayed haemolytic transfusion reactions slightly down (from 31 to 28). Cases of transfusion related acute lung injury have increased a little (from 16 to 19) whilst there were fewer cases of post-transfusion purpura (5 reported this year and 10 last year). This is the first year in which no cases of transfusion-associated graft-versus-host disease have been reported. As has been the case in each of the previous three years, immune complications do not generally reflect poor practice and cannot be predicted in a particular individual.

◊ Fresh frozen plasma and platelets are both "over-represented" in the acute transfusion reaction group, compared to red cells which are administered much more frequently. It is possible that patients are experiencing life-threatening reactions to components which perhaps they did not require. This makes it particularly important that patients receive these components in accordance with national guidelines although it is not the purpose of SHOT to attempt to assess the appropriateness of transfusions. Acute reactions are under-investigated and it is generally unclear why they have occurred. Some may, in fact, have been due to bacterially-infected components or episodes of transfusion-related acute lung injury. Kidd antibodies, undetectable by current methods, remain the major cause of delayed haemolytic transfusion reactions.

◊ Of the 18 new cases of TRALI analysed in this report, there was major morbidity in 12 and death possibly as a result of the transfusion in 6, although in 3 cases the diagnosis of TRALI was in doubt. Transfusions of red cells as well as platelets and FFP were implicated. 57 cases over 4 years, with major morbidity in 43, death definitely attributable to the transfusion in 4 and possibly attributable in 10 makes TRALI the second most common cause of major morbidity/death exceeded only by ABO incompatibility. The difficulty in making a clinical diagnosis of TRALI is highlighted in this report and was hampered by inconsistent investigation.

◊ The small number of cases of PTP this year (5) is probably within year-to year statistical variation. There were no new findings this year, compared to last, with the exception of a single case of refractoriness to platelets due to anti HPA 1b which responded to a combination of HPA selected platelets and intravenous immunoglobulin. The diagnosis of PTP in this case overlapped with that of refractoriness and resulting intracerebral haemorrhage.

◊ No new definite cases of TA-GVHD were reported this year although it is too early to suggest that universal leucodepletion may be a contributory factor to this apparent reduction. Of the 12 cases of TA-GVHD reported since 1996, none occurred because of failure to provide irradiated components for a patient whose diagnosis falls within current BCSH guidelines or because of failure of the irradiation process. 5 of the 12 cases arose in patients with B cell malignancy raising the question as to whether such patients should have gamma irradiated components. In view of the partial protection probably provided by leucocyte depletion, however, it would be reasonable to await further SHOT data over the next 2 years to see whether the absence of new cases of TA-GVHD is maintained. However, there are still a number of episodes each year when irradiation is accidentally omitted, usually because of a failure to request irradiated components and TA-GVHD could not be excluded in one of these cases.

◊ **Clinicians involved in transfusion should be aware that FFP and platelets carry a relatively high risk of inducing a severe adverse event and should be familiar with national guidelines relating to their correct use.**
Relevant points from these guidelines could usefully be included in hospital transfusion guidelines or transfusion laboratory handbooks in order to improve accessibility and compliance.

◊ **A guideline on the appropriate investigation of acute transfusion reactions is required and is currently in preparation.**
Symptoms and signs of acute reactions to FFP and platelets may overlap with TRALI or even bacterial contamination incidents, neither of which can be confirmed without proper investigation.

◊ **Laboratories should ensure that any antibodies which may be masked by a detected antibody(ies) have been excluded by the use of additional panels and techniques (e.g. enzyme-treated cells).**
Development of screening techniques in order to improve the detection of extremely low levels of Kidd antibodies should be considered by serologists and manufacturers of screening systems.

◊ **In patients dependent on platelet transfusion, HPA antibodies may be a cause of refractoriness to random donor platelets.**
Investigation of refractory patients should include a search for HPA antibodies if there are poor responses to HLA selected platelets.

◊ **Patients at risk of TA-GVHD who are receiving shared care between a transplant/oncology centre and their referring hospital should carry a card to indicate their need for irradiated components. (See Appendix 10 of the full report).**

◊ **Full reporting of TA-GVHD continues to be important and investigation of suspected cases should be discussed with the nearest UK Blood Service Histocompatibility and Immunogenetics laboratory.**

◊ **The question of gamma irradiation of blood components for patients with B lymphoid malignancies should be kept under review.**

Transfusion-transmitted infections

Transfusion-transmitted infections are rare, contributing only 1.4% of total transfusion incidents reported this year. Only 4 confirmed cases were recognised during this period all of which were cases of bacterial contamination, with one death as a result of *Enterobacter aerogenes* contamination of platelets. Following investigation of a further 22 incidents of suspected post-transfusion infection, of completed cases, 47% were shown not to be caused by transfusion and in 32% the investigation was inconclusive. Additionally, in Scotland during this year, one confirmed case (a hepatitis B virus transmission from a donor in the early incubation period of acute infection with two infected recipients) was recognised, two incidents were shown not to be caused by transfusion, and one investigation is pending completion. In addition there were 14 cases of post-transfusion reactions suspected, but not confirmed, to be due to bacterial contamination.

◊ The cumulative total of bacterial contamination incidents over the period 1995-2000 is 15 cases, with 5 fatalities, making this by far the largest cause of reported transfusion-transmitted infections and of infection-related deaths in this category. The majority of incidents involved platelets (12/15 cases), generally at least 3 days old, although complete information is lacking. Bacterial contamination incidents have continued to be reported following the implementation of universal leucodepletion.

◊ **Hospitals should consult guidelines and the blood service about the investigation of suspected cases of bacterial contamination of blood components, including the sampling and storage of implicated units.**
The quality of investigation of such reactions is variable. A NBS guidance document entitled *Bacteriological investigation of adverse reactions associated with transfusion* has been agreed in consultation with the PHLS and the Association of Medical Microbiologists (AMM) and has been distributed to blood centres (see Appendix 9 in the full report).

◊ **Consideration of strategies to prevent transfusion transmitted bacterial infections should be given appropriate priority.**
These include optimising donor arm cleansing procedures and the bacterial testing of blood components, particularly platelets.

◊ **Clinicians should continue to report all cases of suspected post-transfusion infections to their local blood centre.**
Numbers of cases are small and national collation of data needs to continue over several years before a picture of the extent and nature of the infectious complications of transfusion can emerge.

Learning from “near miss” events

◊ “Near miss”, “close calls” or sentinel (“warning”) event reporting schemes are embedded in industries such as aviation, nuclear power and petrochemical processing but are relatively new to the health care setting. The SHOT scheme is still in its infancy with respect to learning from “near miss” data. Collection of this data began on a small scale last year and continued on the same scale this year with a total of 302 near miss reports over the two years, 1998-2000. With approximately 54%

(162/302) being sampling errors, failure to follow correct phlebotomy protocols remains the major cause of "near miss" events. The expansion of near miss reporting to include all hospitals from 1 October 2000 should provide valuable additional data to assist hospitals in designing safer systems to reduce the possibility of human error.

Priority setting in blood safety

◊ The SHOT scheme has become established as a robust mechanism for the reporting of transfusion hazards. The information gained has been used to make recommendations which will improve the safety of the transfusion process and many of these can be carried out at local level. However, some of the proposals require policy decisions to be taken centrally and as yet the UK lacks a single strategic framework for blood safety which incorporates all relevant expertise, can evaluate conflicting priorities and advise on the implementation of those changes which will be most effective in increasing blood safety.

◊ **There remains a need for an overarching approach to decision making in relation to blood safety. A national unified body, with relevant expertise, could prioritise new developments in this field.**

What is SHOT?

The Serious Hazards of Transfusion (SHOT) Scheme was launched in November 1996, and aims to collect data on serious sequelae of transfusion of blood components, as listed below. Through the participating bodies, the information will contribute to:

a) improving the safety of the transfusion process
b) informing policy within Transfusion Services
c) improving standards of hospital transfusion practice
d) aiding production of clinical guidelines for the use of blood components.

Cases included - The scheme aims to capture data on major complications of transfusion:

Non-infectious

◊ Incorrect blood component transfused (*even if no harm arises*)
◊ Acute or delayed transfusion reactions
◊ Transfusion-associated graft-versus-host-disease
◊ Transfusion-related acute lung injury
◊ Post-transfusion purpura
◊ Autologous pre-deposit incidents

Infectious

◊ Bacterial contamination
◊ Post transfusion viral infection
◊ Other post-transfusion infection e.g. malaria

System for Reporting

Cases are reported in the first instance to the hospital haematologist responsible for transfusion. Non-infectious hazards are then reported confidentially to the National Co-ordinator on a simple report form. This is followed up with a detailed questionnaire. Meaningful data depend on questionnaires being fully completed. Staff may write to the SHOT office under separate cover.
Suspected cases of transfusion-transmitted infection are reported by haematologists through supplying Blood Centres to the Public Health Laboratory Communicable Disease Surveillance Centre. Local Blood Centre involvement is **ESSENTIAL** to ensure rapid withdrawal of other potentially infected components.

Confidentiality

Data are stored in a password-protected database in a secure location. Once all the information has been gathered about an event and entered onto the database without patient, staff or hospital identifiers, all reporting forms and other paper records which contain any identifiers are shredded. The questionnaires (which have any possible identifiers removed) are kept in a secure container until data analysis for the report is complete after which they are shredded.
SHOT does not provide details of individual cases, or any form of summarised data to any outside person or organisation, other than that provided in the report.

Limitations of the SHOT system

Reporting to the SHOT scheme is voluntary. We acknowledge that many incidents may go unrecognised or unreported, and that the reports analysed cannot provide a full picture of transfusion hazards.

Organisation

SHOT is affiliated to the Royal College of Pathologists. The operational aspects of the scheme are the responsibility of a Standing Working Group, which is accountable to the Steering Group. Two National Co-ordinators (E M Love and K Soldan) together with an assistant (H Jones) are responsible for receiving and collating reports.

Standing Working Group

Dr L M Williamson (Chair), Dr E M Love (Secretary), H Jones, D Asher, C Atterbury, Dr H Cohen, Dr D Gozzard, Dr D Norfolk, J Revill, K Soldan, Dr A Todd

Steering Group

Ownership of the scheme and data generated from it resides with the Steering Group, which has representation from the following Royal Colleges and professional bodies:

British Blood Transfusion Society	*Dr JAJ Barbara*
British Society for Haematology	*Dr Kelsey*
	Dr H Cohen (Chair)
Institute of Biomedical Science	*Mr JA Revill (Secretary)*
	Mr B McArdle
Institute of Health Care Management	*Mr I R Cumming*
Public Health Laboratory Service/Communicable Disease Surveillance Centre	*Dr M Ramsay*
Royal College of Anaesthetists	*Dr AJ Mortimer*
Royal College of Nursing	*Ms C Atterbury*
	Mrs. S Scott
Royal College of Nursing Midwifery Society	*Ms. P. Edkins*
Royal College of Obstetricians and Gynaecologists	*Mr DL Economides*
Royal College of Pathologists	*Prof M Contreras*
Royal College of Paediatrics and Child Health	*Dr B Gibson*
Royal College of Physicians	*Dr CG Taylor*
Royal College of Surgeons	*Prof JSP Lumley*
UK Transfusion Services	*Dr DBL McClelland*

Overview of results for this report

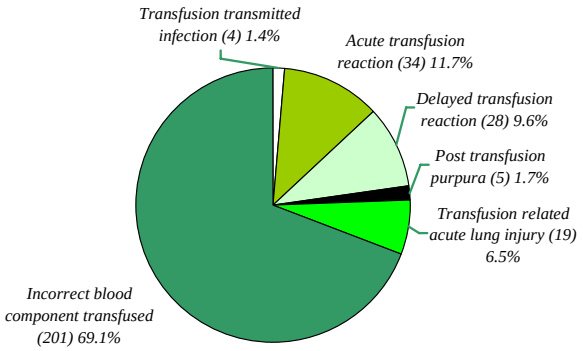
The numbers of reports in each category received since the first SHOT annual report are shown below

	1996/97	1997/1998	1998/1999	1999/2000
IBCT	81	110	144	201
ATR	27	28	34	34
DTR	27	24	31	28
PTP	11	11	10	5
TA-GVHD	4	4	4	0
TRALI	11	16	16	19
TTI	8	4	7	4
Unclassified *			7	0
TOTAL	**169**	**197**	**253**	**291**

IBCT: Incorrect blood component transfused
ATR: Acute transfusion reaction
DTR: Delayed transfusion reaction
PTP: Post-transfusion purpura
TA-GVHD: Transfusion associated graft-versus-host-disease
TRALI: Transfusion-related acute lung injury
TTI: Transfusion transmitted infection

* 7 reports which were reported in 1998/99 and which did not fit into existing categories at that time

Overview of 291 cases for which initial report forms were received



Transfusion related mortality/morbidity according to the type of hazard reported in completed questionnaires (n=287)

	Total	IBCT	ATR	DTR	PTP	TA-GVHD	TRALI	TTI
Death definitely attributed to transfusion	**4**	1	0	0	0	2*	0	1
Death probably attributed to transfusion	**1**	1	0	0	0	0	0	0
Death possibly attributed to transfusion	**6**	0	0	0	0	0	6	0
Death due to underlying condition	**23**	18	2	2	1	0	0	0
Major morbidity	**32**	13	0	1	3	0	12	3
Minor or no morbidity	**221**	167	31	21	2	0	0	0
Totals	**287**	**200**	**33**	**24**	**6**	**2**	**18**	**4**

* outstanding from the previous year

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)

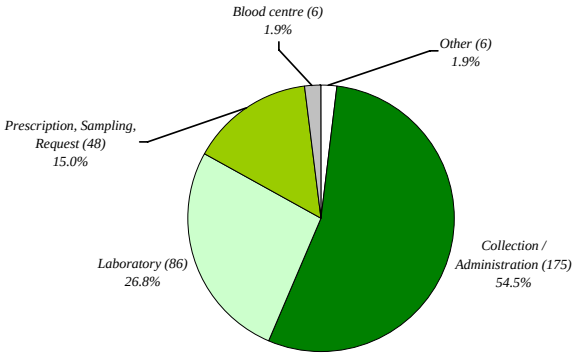
Incorrect Blood Component Transfused

As in all three previous years this category represents the highest number of reports (201 or 69.1% of 291 new reports) and an increase of 39.6% over the previous year. Patient outcome of 200 fully analysed cases is presented in the table below.

Outcome	Number of incidents
Death definitely related to transfusion	1
Death probably related to transfusion	1
Death unrelated to transfusion	18
Major morbidity	13
Minor or no morbidity	167

◊ Once again we make no apology for pointing out the complexity of the transfusion process the aim of which must always be to ensure that the right patient receives the right transfusion at the right time. Involving, as it does, many individuals and crossing several professional boundaries with different line management accountability, it is hardly surprising, although not excusable, that errors occur from time to time unless the process is very tightly controlled. The following analysis of 321 errors occurring in 200 cases illustrates how events may combine to result in a "wrong blood" incident.

◊ In all 3 previous years it has been consistently noted that multiple errors have been implicated in many "wrong blood" incidents. This year is no exception and detailed analysis of 200 completed questionnaires has demonstrated their value in highlighting 94 cases (47%) where multiple errors in the transfusion chain culminated in a "wrong blood" transfusion. This year a total of 321 errors was noted in 200 cases with 16 cases involving 3 errors, in 4 cases 4 errors were made and in 1 case there was a total of 5 errors. The distribution of errors is shown below.



Errors in prescription, requesting of blood components and patient sampling

◊ There were 2 errors relating to mis-prescribing which occurred in 2 cases. One of these cases is possibly a less commonly recognised cause of unnecessary blood transfusion arising as a result of a falsely low haemoglobin (Hb) result.

◊ In 32 cases there was failure to request the appropriate product. As was shown in last year's report, once again the most common error was failure to request irradiated components for patients at risk, as defined in BCSH guidelines, notably 16 patients being treated with purine analogues, 4 patients with Hodgkin's disease, 3 patients who had received a bone marrow transplant and 3 due for stem cell harvests.

◊ Seven cases involved the taking of samples from the wrong patient. 5 of these cases involved mis-identification at the time of sampling.

◊ There were 7 errors of labelling which involved incorrect details on sample and/or request in 6 cases. One case involved a complex series of four errors resulting in a major ABO incompatible transfusion.

Hospital blood bank errors

◊ 4 errors involved transposition of samples. 3 resulted in group O RhD positive patients receiving O RhD positive red cells crossmatched using a wrong sample, one of which was serum from a group AB patient. The fourth error, involving two patients with the same name, resulted in major ABO incompatibility with the patient dying from unrelated causes.

◊ 5 errors fell into the category of failure to consult/act on the historical record.

◊ In 31 cases there were 31 errors of grouping, screening and crossmatching which resulted in 7 RhD negative patients receiving RhD positive red cells including 2 females of child bearing potential placed at risk of RhD sensitisation. 7 errors resulted in major ABO incompatible transfusions.

◊ 5 errors occurred in the labelling of blood components 4 of which involved placing the label for the intended patient on to the wrong unit. Fortunately all these units were ABO and RhD compatible with the patients who received them.

◊ In total 12 errors were made in the selection / issue of a component. On 3 occasions date expired units were issued by the blood bank and there were 2 cases in which laboratory staff failed to issue CMV negative products despite computer warnings.

◊ One incident resulted because of a failure to clear a satellite refrigerator. This error resulted in the transfusion of a unit of red cells with an expiry date 3 days earlier. Prior to this incident the hospital policy was to check satellite refrigerators twice weekly but this has since been changed to daily.

◊ 4 cases of failure to irradiate a blood component occurred despite the need for this being detailed on request form and/or there being a warning flag set in the laboratory computer.

Errors in the collection and administration of blood components

◊ There were 175 errors in the collection and administration of blood components occurring in 113 case reports, comprising 54.5% of all errors.

◊ As in previous years, collection of an incorrect component from its storage site in the hospital remains a significant cause of error. There were 46 incidents in this category and, as in the past, errors were not restricted to specific groups or grades of staff and occurred irrespective of formal checking procedures at the time of collection.

◊ 87 incidents relating to failure of some aspect of the bedside checking procedure contributed 27% of errors reported in all categories. There were preceding errors in 56 cases; 45 involved collection from the storage site and 11 were errors in the laboratory.

◊ There were 68 bedside mis-identification episodes. Contributory factors included confusion over two patients with the same or similar names (including newborn twins), failure to adequately distinguish between "unknown" trauma victims, checking remote from the patient's bedside and swapping of units of red cells left on bedside lockers even although correct checks had been carried out.

◊ In addition, 18 other bedside administrative errors occurred. The common factor in all cases was inadequate checking at the bedside.

◊ These "wrong blood" incidents resulted in 25 cases of major ABO incompatibility in which there was 1 death definitely related, 1 death possibly related to the transfusion and 6 cases of major morbidity, 2 of which also involved RhD incompatibility.

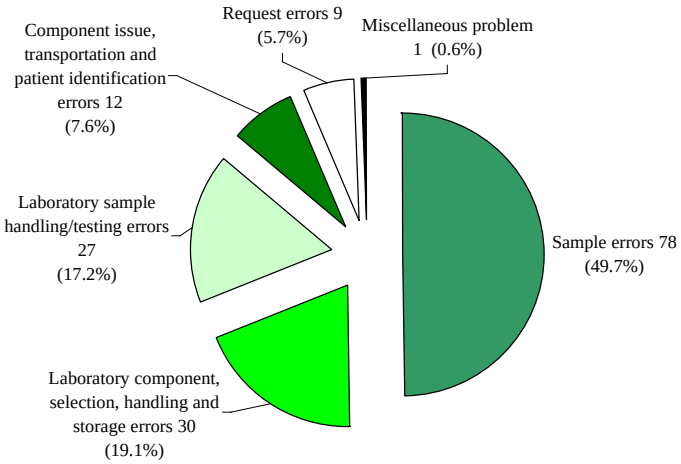
◊ In 14 cases wristbands were missing although in 4 cases this omission was not considered to have contributed to the mis-transfusion. Analysis of the circumstances revealed that 5 involved outpatients and 4 occurred in theatre (3) or the A+E (1) department together comprising 64% of instances.

◊ Although over a year has passed since publication of the BCSH guideline "The administration of blood and blood components and the management of the transfused patient", the number of reports falling into the category of incorrect blood component transfused has risen by 39.6%. The major increase has been in the area of collection from the hospital storage site/bedside administration but an increase in inappropriate requests was also noted. The figures point to significant problems in ensuring the safety of the blood transfusion process, particularly at the point of administration at the bedside. As was stated in last year's report:

◊ **"Wrong blood incidents are without exception avoidable errors and the bedside check is the final opportunity to prevent a mis-transfusion."**

Near Miss Events

Whilst continuation of the "Near Miss" project, reported last year, was not an official part of the SHOT scheme in this reporting year, 157 reports were submitted from 22 hospitals. Reports fell into the following categories:



◊ Approximately 50% of the total "Near Miss" reports involved sample errors and highlight the need for increasing awareness, particularly amongst medical staff, of following secure protocols when performing phlebotomy. Samples should be labelled at the bedside, checking the patient wrist band and asking the patient, where possible, to iterate their personal details.

◊ The 9 errors in the request process involved 7 cases where incorrect patient identification was provided to the laboratory, 4 of which were telephone requests, and 2 errors resulting from the use of addressograph labels.

◊ Laboratory errors were caused by erroneous results attributed to poor technique or procedural failure in 10/27 reports, 7 by incorrect result interpretation and 6 by transcription errors. A clerical error of a wrong ABO blood group was noted on one report from a blood centre. On 3 occasions samples were transposed or wrong bar code labels applied within the laboratory.

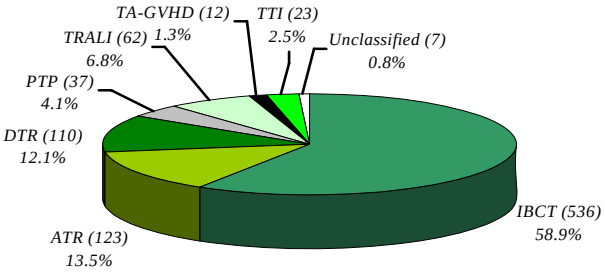
◊ An avoidable failure by the laboratory to provide for the special needs of the patient occurred in 12 instances, an incorrect or out of date component was issued in 10 and problems with incorrect storage was reported on 8 occasions.

◊ Blood components were collected for the wrong patient on 10 occasions but detected by the bedside check before transfusion and 2 problems with transportation of red cells were identified.

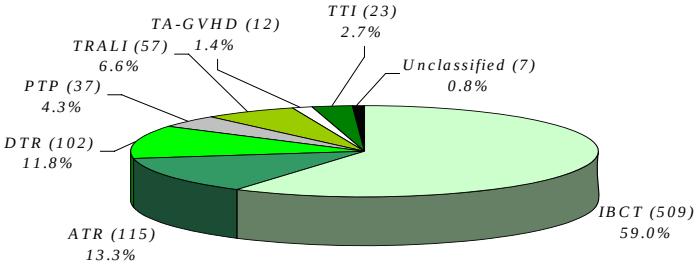
Overall results from 4 years of SHOT reporting

This year for the first time we are presenting an overview of cumulative totals from 1996 to the current year. This practice will continue in subsequent years.

Initial report forms received (n=910)



Questionnaires analysed (n=862)



Overall mortality / morbidity figures by fully analysed questionnaires 1996/97 - 1999/00 (n=862)

	Total	IBCT	ATR	DTR	PTP	TA-GVHD	TRALI	TTI	UC[1]
Minor or no morbidity	602	406	96	71	24	0	0	0	5
Major morbidity	143	54	3	18	8	0	43	17	0
Death definitely attributed to transfusion	32	5	1	4	1	12	4	5	0
Death probably attributed to transfusion [2]	1	1	0	0	0	0	0	0	0
Death possibly attributed to transfusion [3]	15	2	2	0	1	0	10	0	0
Death unrelated to transfusion	60	37	10	9	3	0	0	1	0
Outcome unknown	9	4	3	0	0	0	0	0	2
Totals	**862**	**509**	**115**	**102**	**37**	**12**	**57**	**23**	**7**

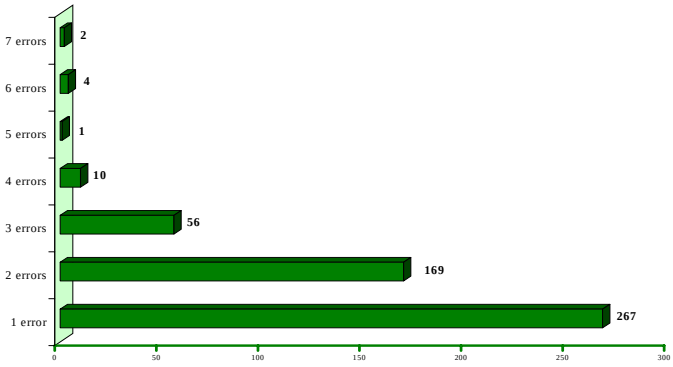
[1] *UC = unclassified incidents from 1998/99 report*

[2] *This category included for the first time this year*

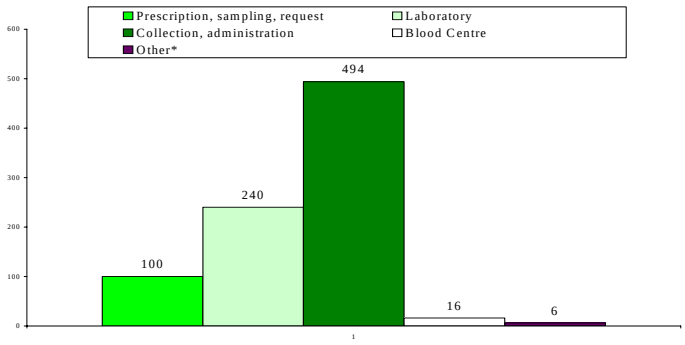
[3] *This category not included in the first two years*

IBCT cases 1996/97 - 1999/00

Multiple errors in IBCT cases (n=509 cases, 856 errors)



Distribution of errors in IBCT (n=509 cases, 856 errors)



This summary has been sent to hospital haematologists, blood bank managers, and NHS Trust Chief Executives. Copies of the full report (price £25) are available from the SHOT office. Please make cheques payable to NBS Northern Zone - SHOT. National Health Service employees are invited to apply to the SHOT office for a free copy of the report.

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