SERIOUS HAZARDS OF TRANSFUSION SHOT

SHOT – the hidden data

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This talk.....

- 10 years on transfusion in the UK
- Key influences of SHOT
- Basic SHOT data
- Trends in main SHOT categories
- IBCT categories and trends
- Future

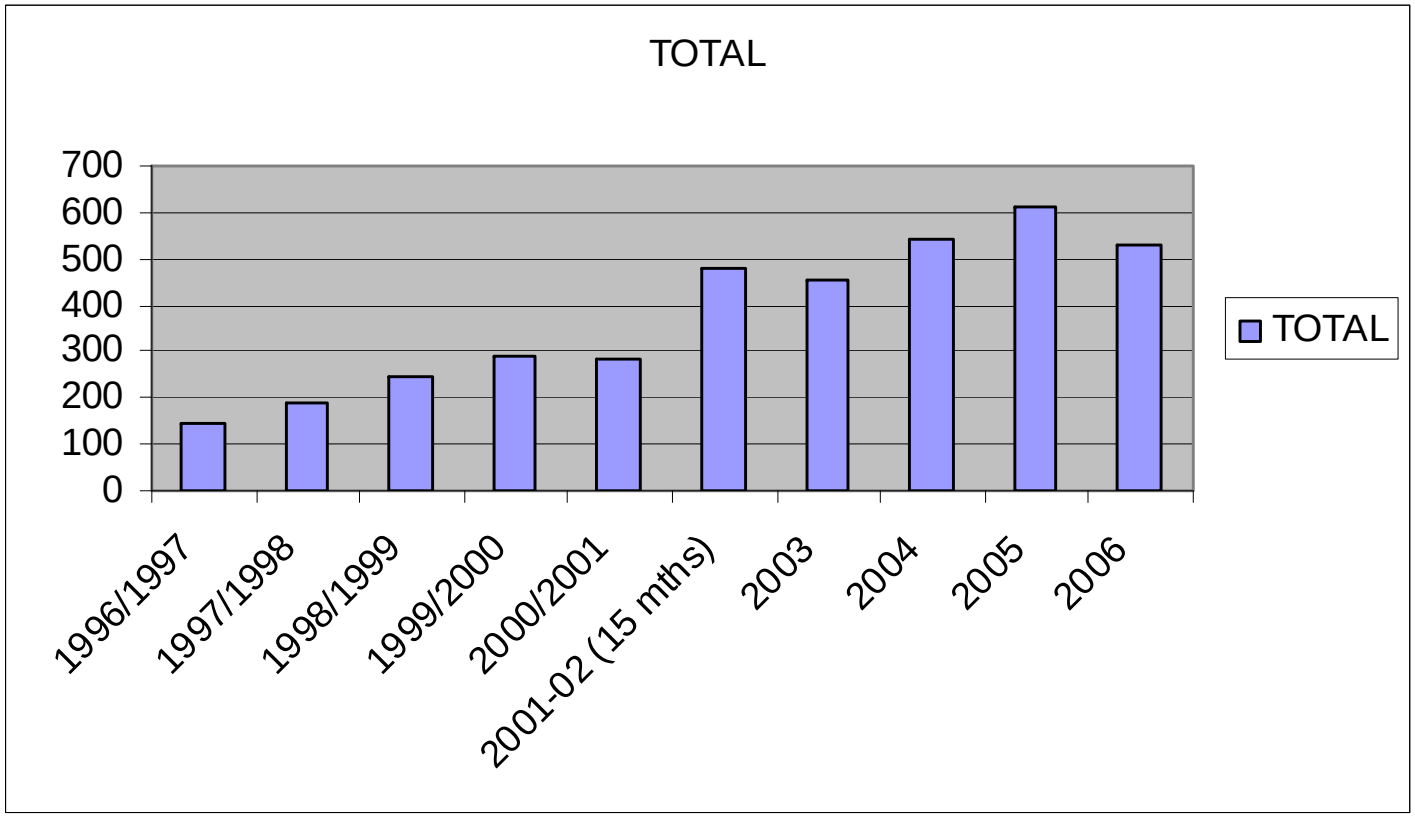
SHOT

- Early 1990s – issues around transfusion safety growing
- Working group set up in 1994
- SHOT report first published for 1996-1997 data
- Increasing number of reports each year
- Evolution of new categories reflecting reports
- Tenth report published 2007

UK blood transfusion events	YEAR	SHOT related events
Testing for HCV on UK blood donors	**1992**	
HCV transmissions in Ireland from Anti-D	**1994**	Working party on blood transfusion safety set up
	1996	**SHOT reporting commences**
Better Blood Transfusion initiative - HTC, SHOT	**1998**	Recommends National investment in transfusion IT
Universal leucodepletion of components in UK	**1999**	
USA plasma for fractionated products		
Hepatitis C ruling	**2001**	Recommends more dedicated Transfusion Consultants, TPs
NBTC formed, and RTC network		
Blood Stocks Management Scheme		
HTLV-1 testing	**2002**	Recommends transfusion should only be prescribed by authorised clinicians
Better Blood Transfusion II - Appropriate Use, HTTs		**Diversion first 20mls of donation**
National Comparative Audit of bedside transfusion	**2003**	Peak incidence of TRALI
1st case report of vCJD transmission by transfusion		**Policy of male donors of FFP commenced**

UK blood transfusion events	YEAR	SHOT related events
Blood Conservation Strategy Document via DoH	**2004**	SHOT/NPSA/NBTC workshop aimed at reducing ABO incompatible transfusion
USA MB plasma for all children born after 1/1/96		
CMOs report contains chapter on blood transfusion		
2nd case report of vCJD transmission by transfusion		
Exclusion of previously transfused blood donors		
Emergency Blood Management Plan		
USA MB treated plasma for all children under 16	**2005**	Reduction in cases of TRALI reported
November - BSQR become law in UK		
Reduction in UK blood usage 15% in last 5 years		
Scottish E-learning package from EUB group		
3rd case report of vCJD transmission by transfusion	**2006**	Decrease in SHOT reports sent
NPSA SPN 14 - Right Blood Right Patient		SHOT in Children produced
		100% male donors FFP WBS, SNBTS, NIBTS, 86% NBS
		ABO incompatible transfusion at all time low
Better Blood Transfusion III -	**2007**	SHOT in Obstetrics produced
4th case report of vCJD transmission by transfusion		Launch of National Transfusion Laboratory Collaborative
First year of mandatory reporting AE to EU	**2008**	SHOT working closely with Competent Authority, MHRA

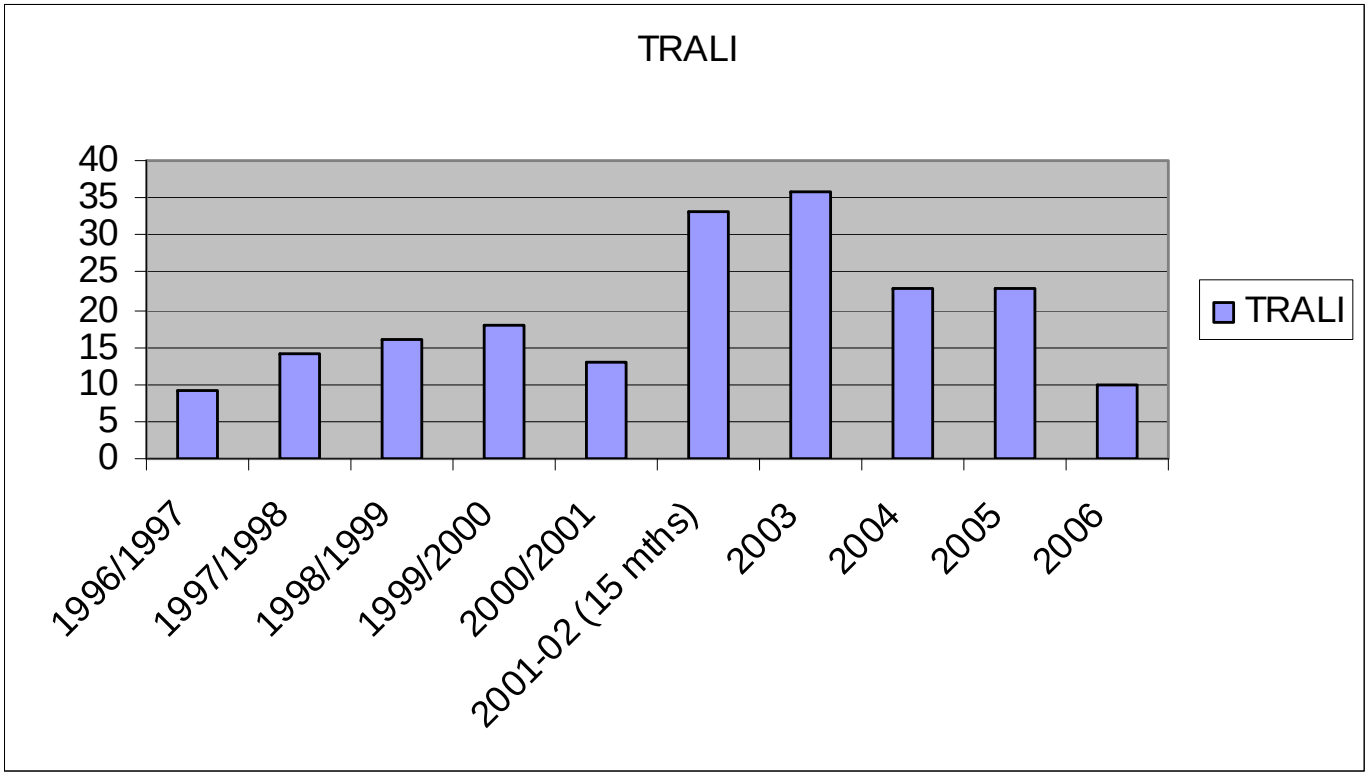
Total number of reports to SHOT



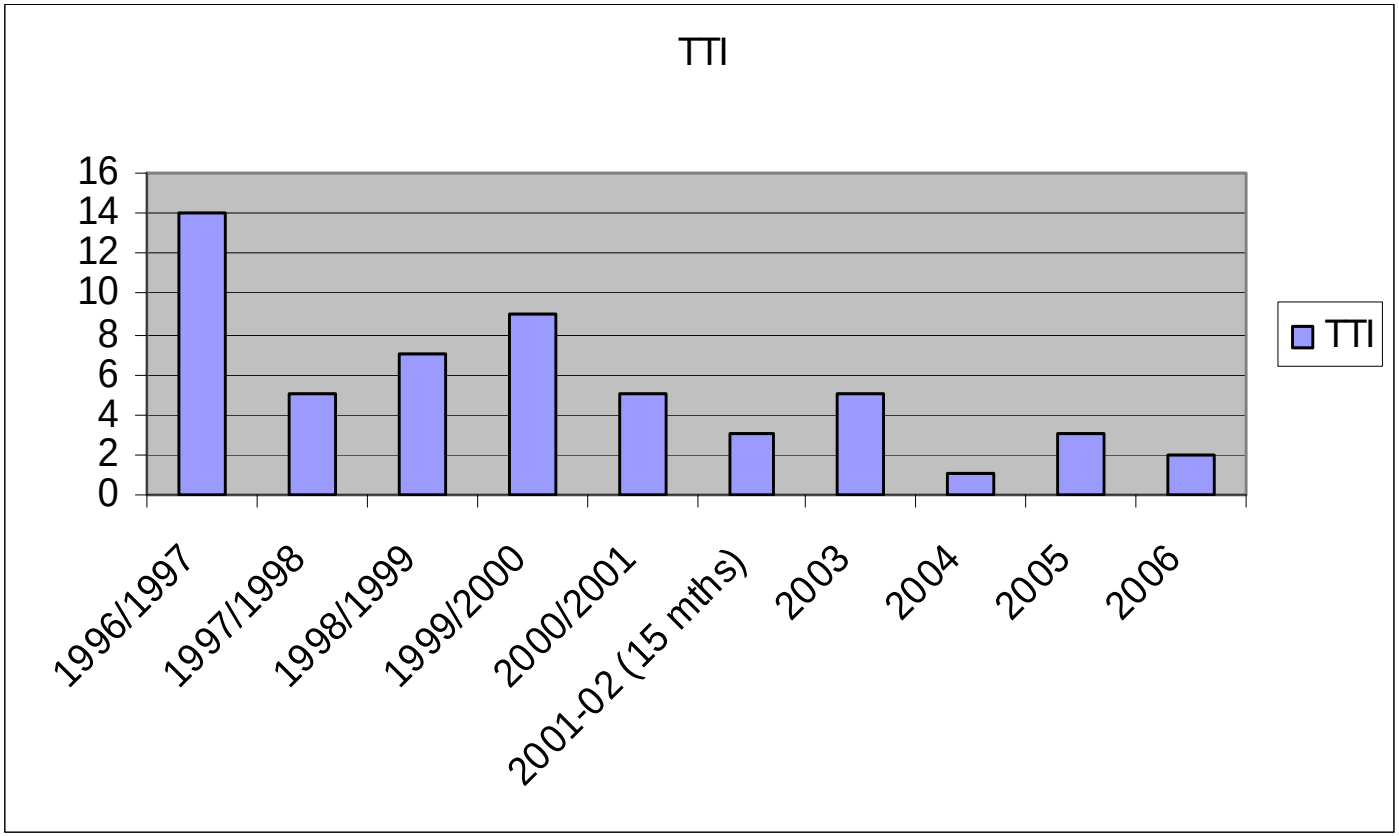
Main SHOT categories

TRALI

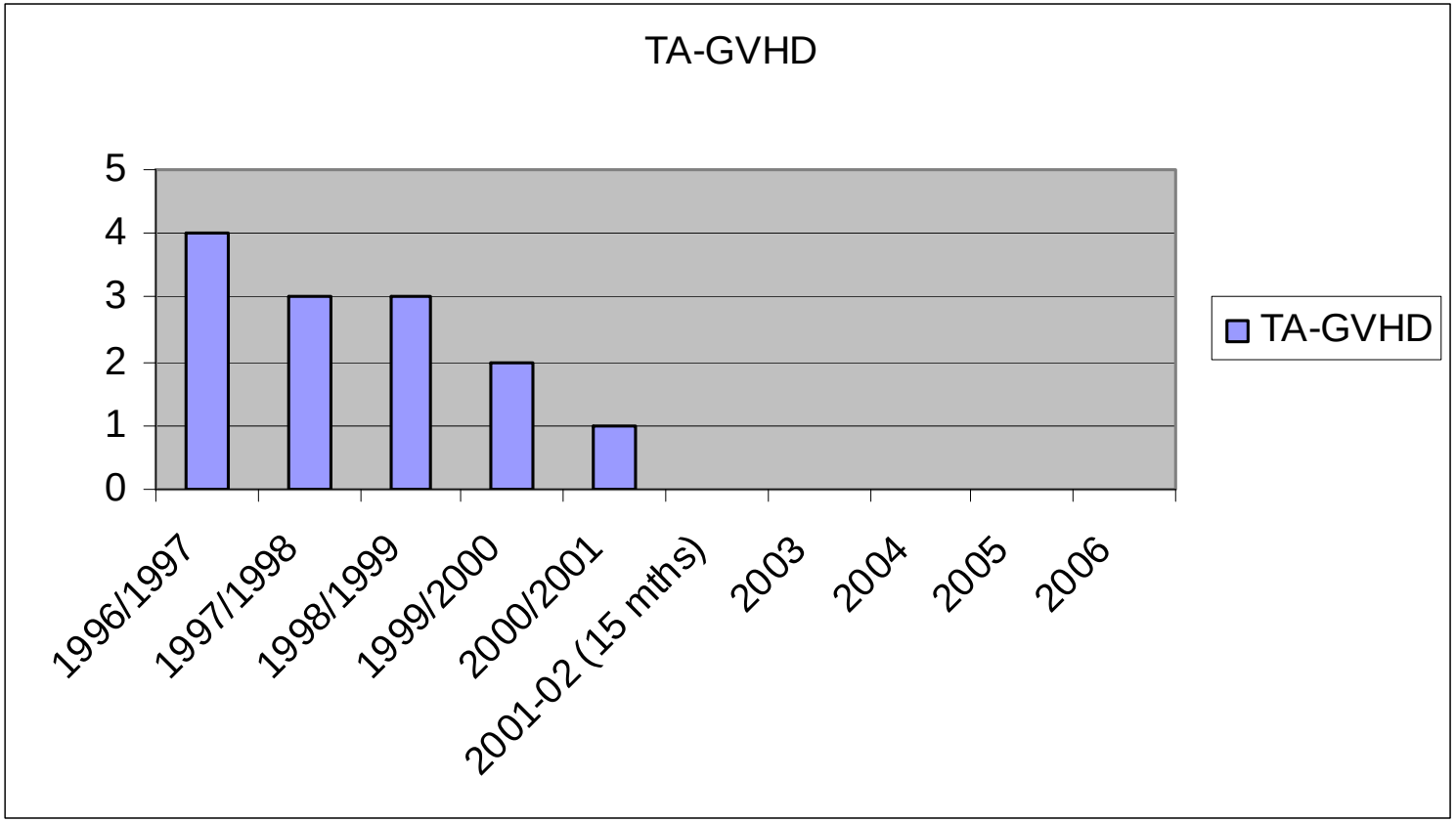
Transfusion Related Acute Lung Injury



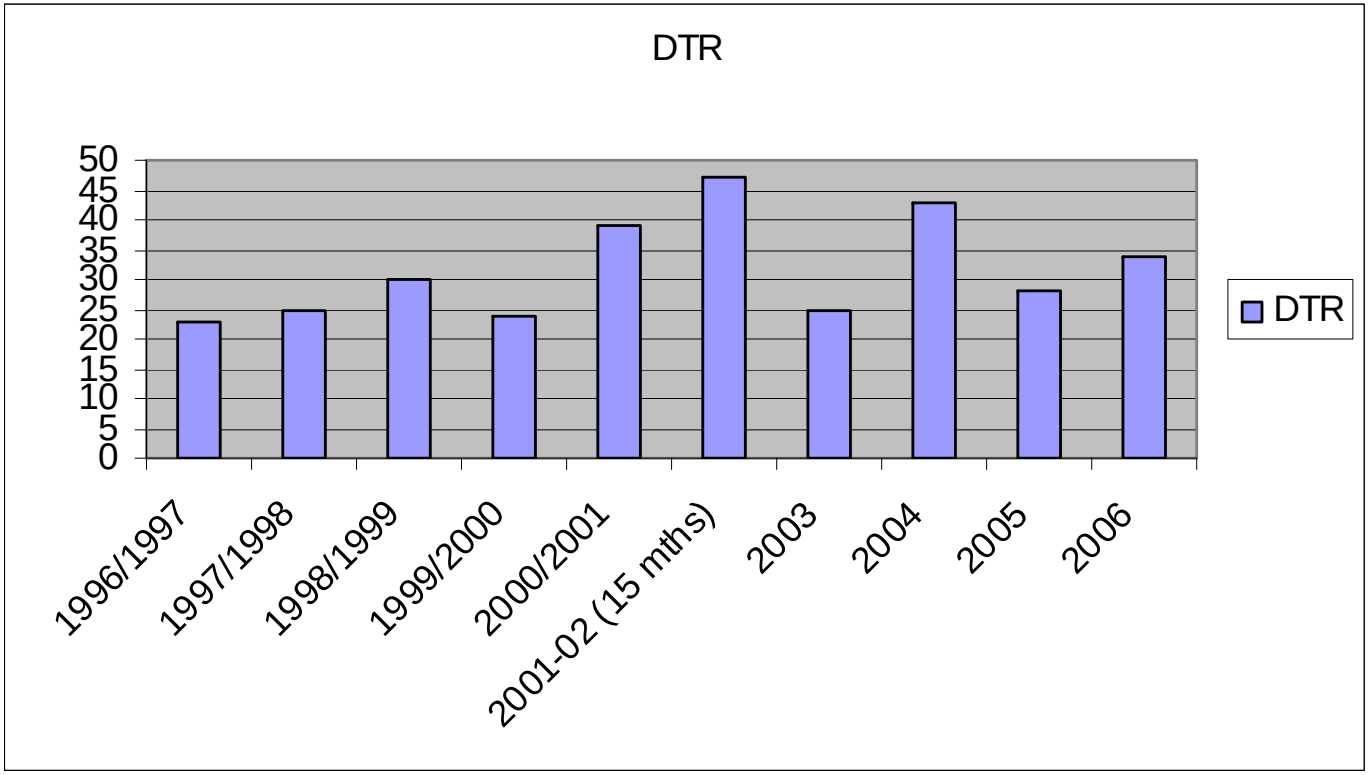
Transfusion Transmitted Infection



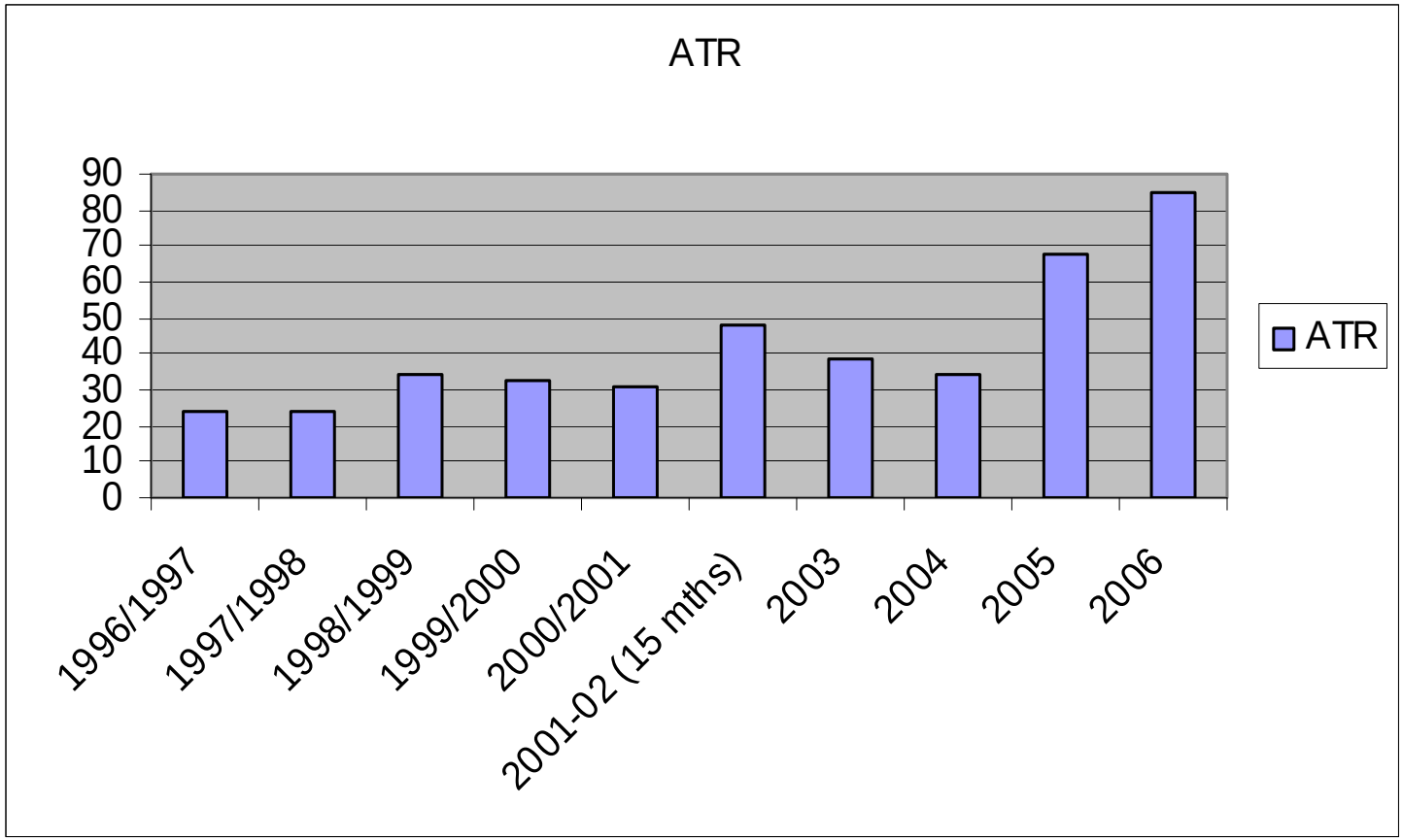
TA - GvHD


TA-GVHD
5
4
3
2
1
0
1996/1997
1997/1998
1998/1999
1999/2000
2000/2001
2001-02 (15 mths)
2003
2004
2005
2006
TA-GVHD

Delayed Transfusion Reaction/HTR



Acute Transfusion Reaction

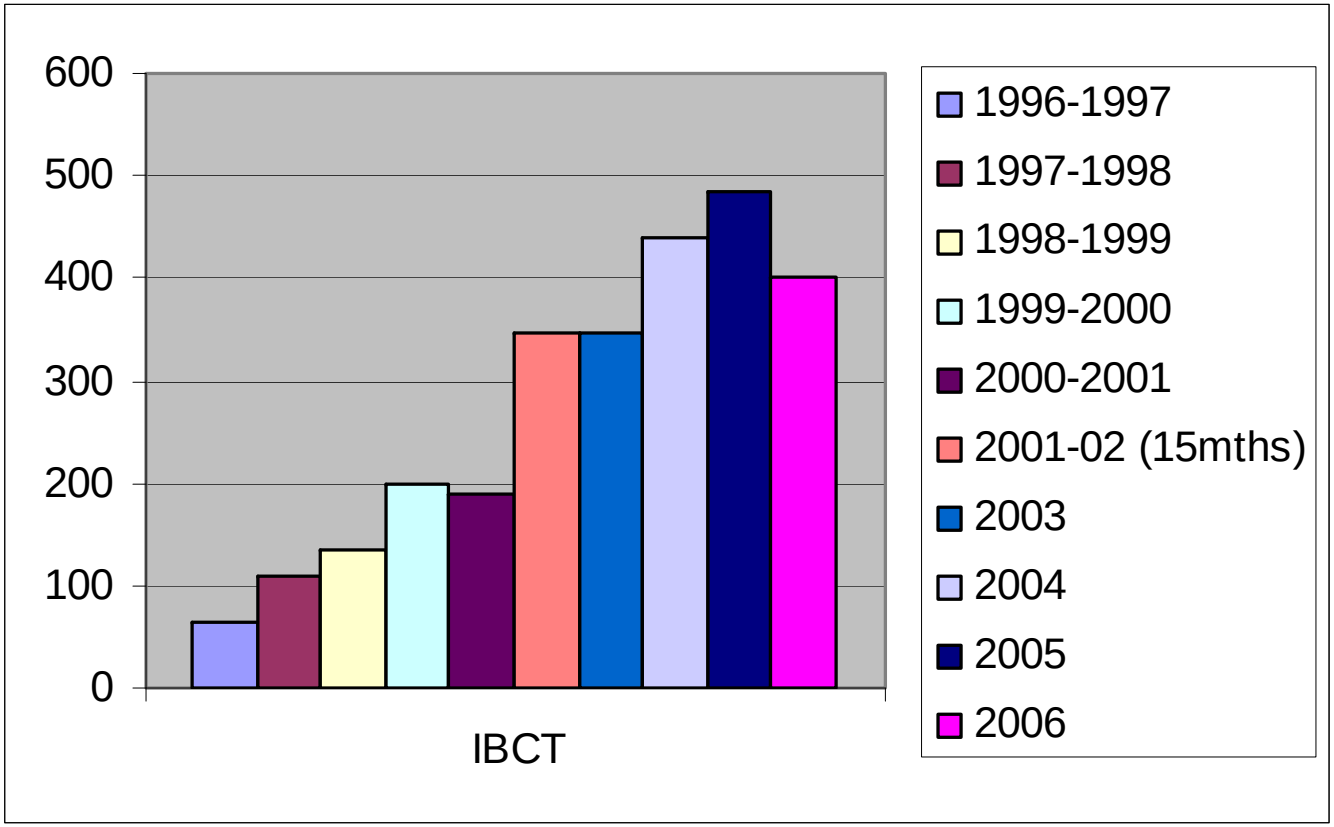


Summary

- TRALI – incidence has dropped following introduction of male only plasma starting 2003
- TTI incidence has dropped with improved sensitivity of screening tests, more stringent donor exclusions and diversion of first 20mls blood in 2002
- TA-GvHD has decreased since leucodepletion (N.B. one case since in 2001)
- DTR – no change probably
- ATR increasing since BSQR in 2005? Other causes

IBCT
and
Sub categories of ICBT

IBCT


600
500
400
300
200
100
0
IBCT
1996-1997
1997-1998
1998-1999
1999-2000
2000-2001
2001-02 (15mths)
2003
2004
2005
2006

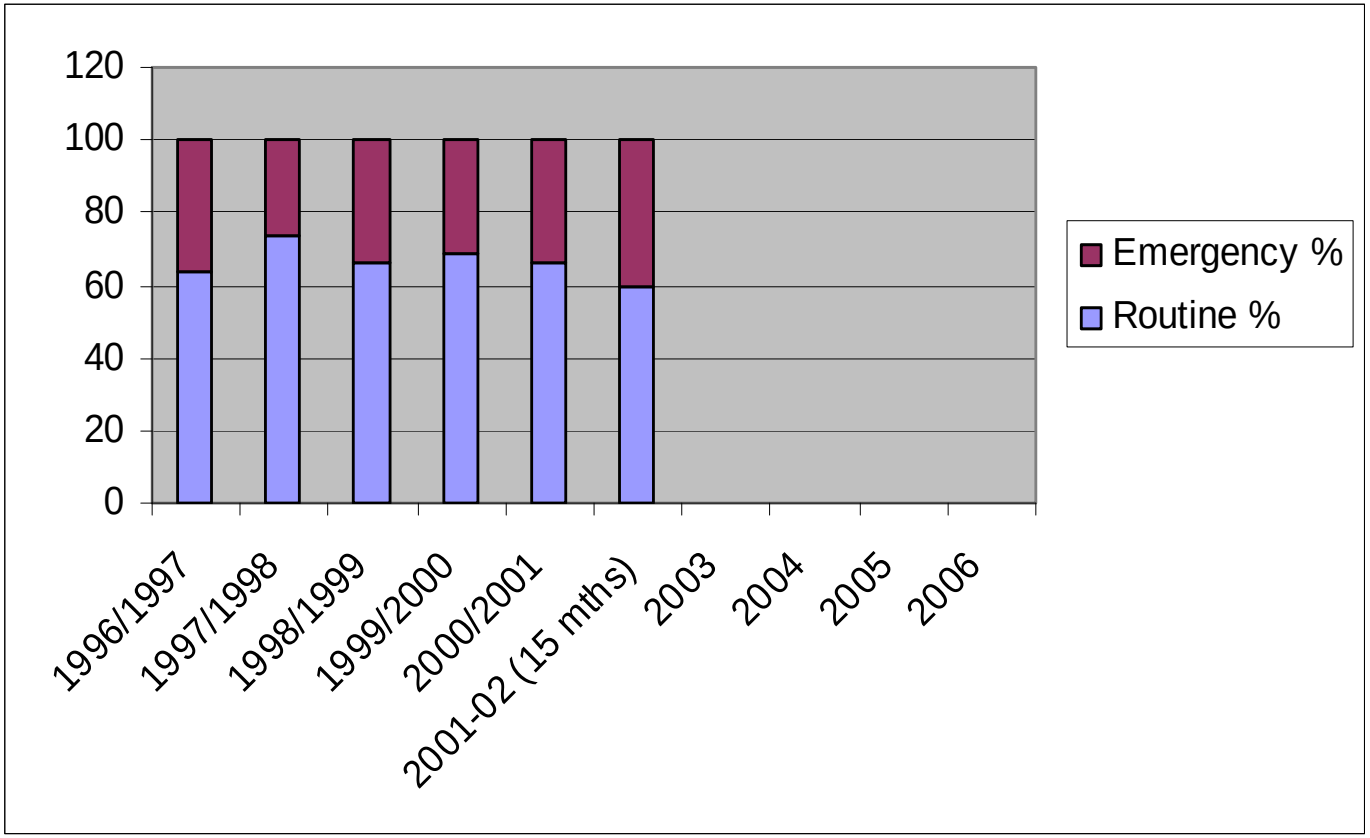
Types of IBCT event 1996-7

- Errors fell into 3 categories (63 reports)
  - Requesting blood and/or sampling the patient (8)
  - Laboratory errors – grouping, cross-matching and labelling (21)
  - Collection of blood from storage site (usually blood bank) and administration (34). The majority of errors (54%) were attributed to the wrong unit being withdrawn from an blood bank refrigerator to take to the clinical unit, or the bedside pre-transfusion checks

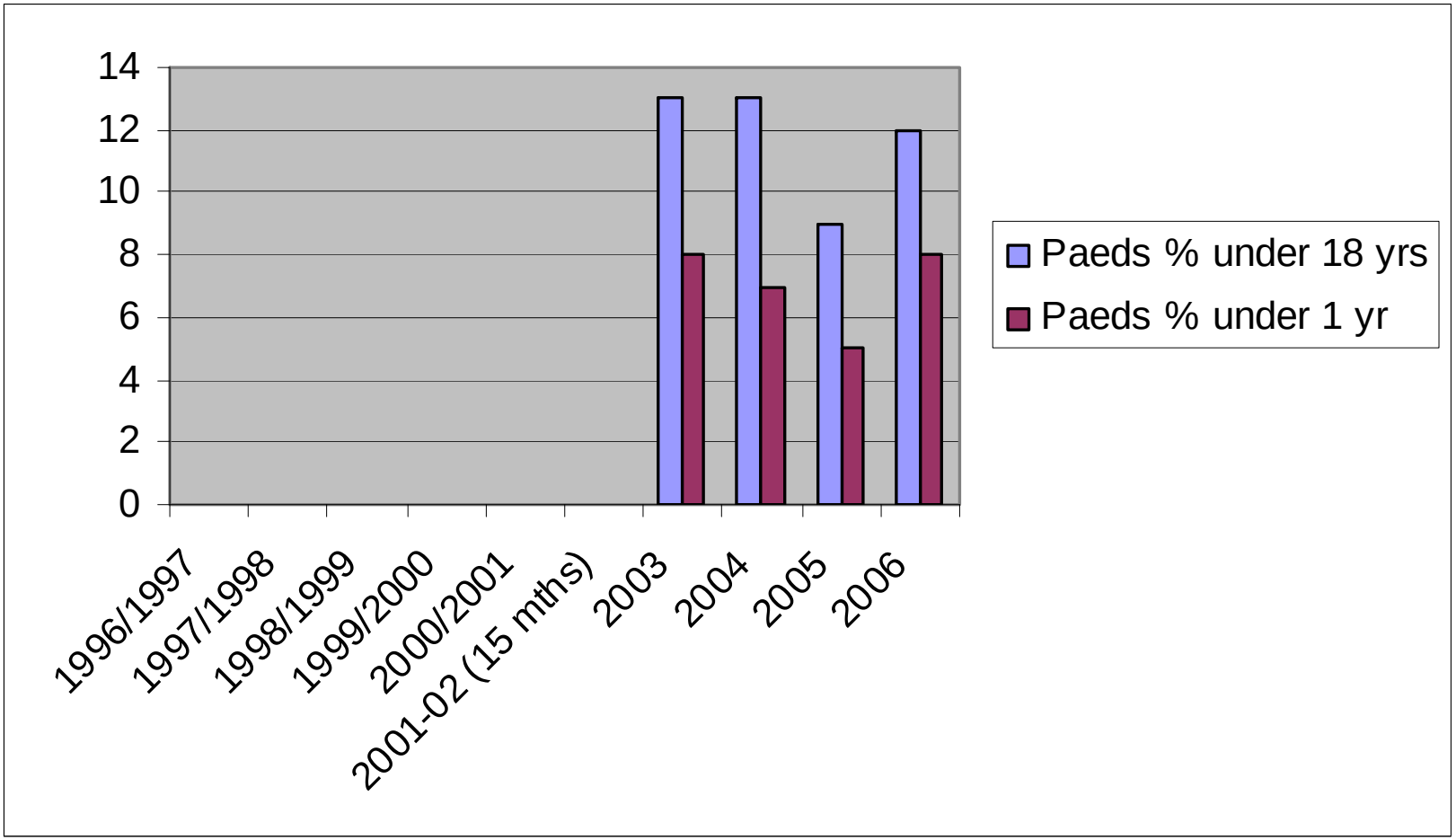
Types of IBCT event 2006

Type of event	Number (%)
'Wrong blood' events where a patient received a blood component intended for a different patient or of an incorrect group	54 (14%)
Other pre-transfusion testing errors (excluding erroneous Hb)	28 (7%)
Blood of the incorrect group given to recipients of ABO or D mismatched PBSC, bone marrow or solid organ transplant	8 (2%)
Transfusion of blood of inappropriate specification or that did not meet the patient's special requirements	108 (27%)
Inappropriate or unnecessary transfusions	51 (13%)
'Unsafe' transfusion where there were handling or storage errors	74 (19%)
Events relating to administration of anti-D immunoglobulin	77 (19%)
Total	400

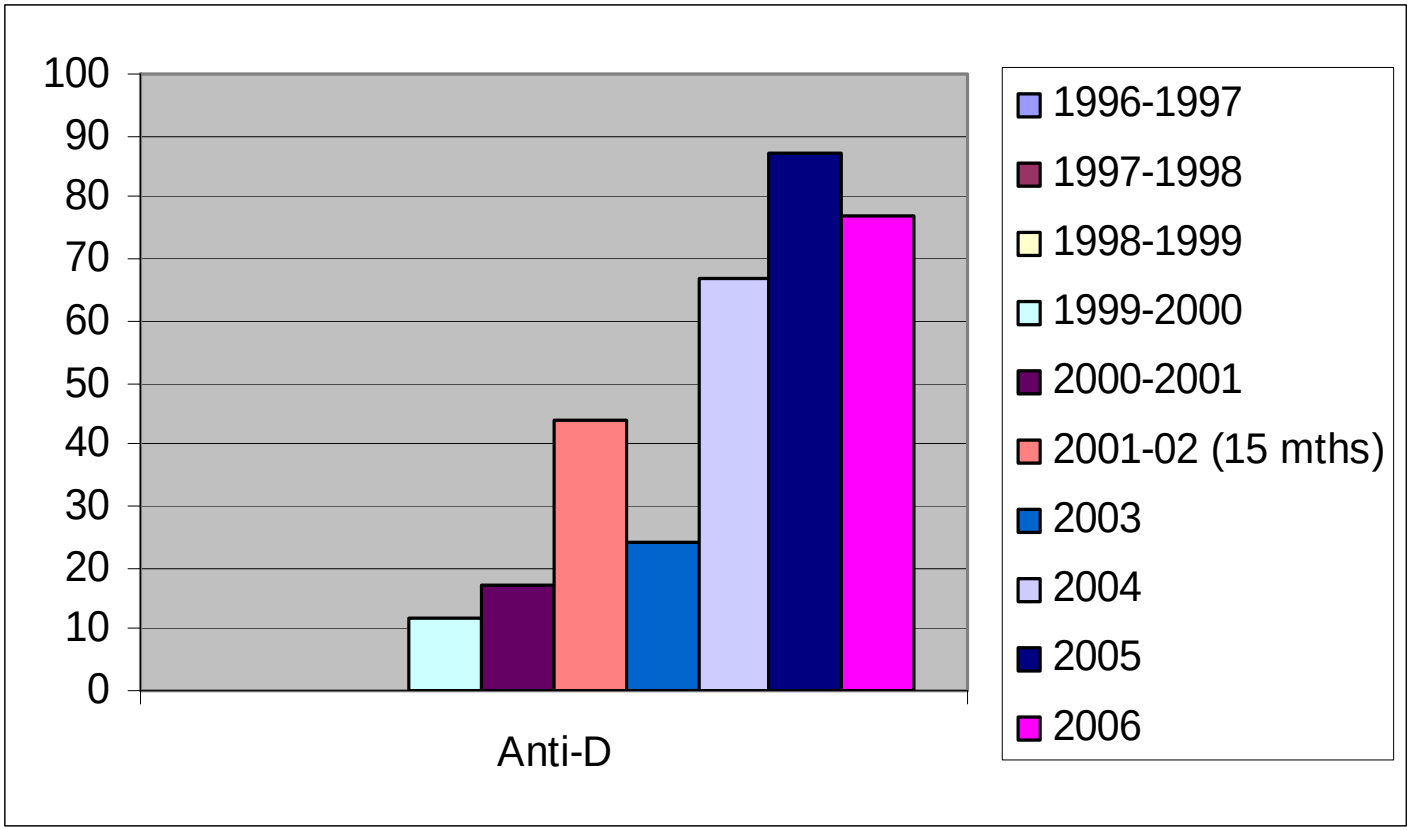
Routine vs emergency



Paediatric cases IBCT

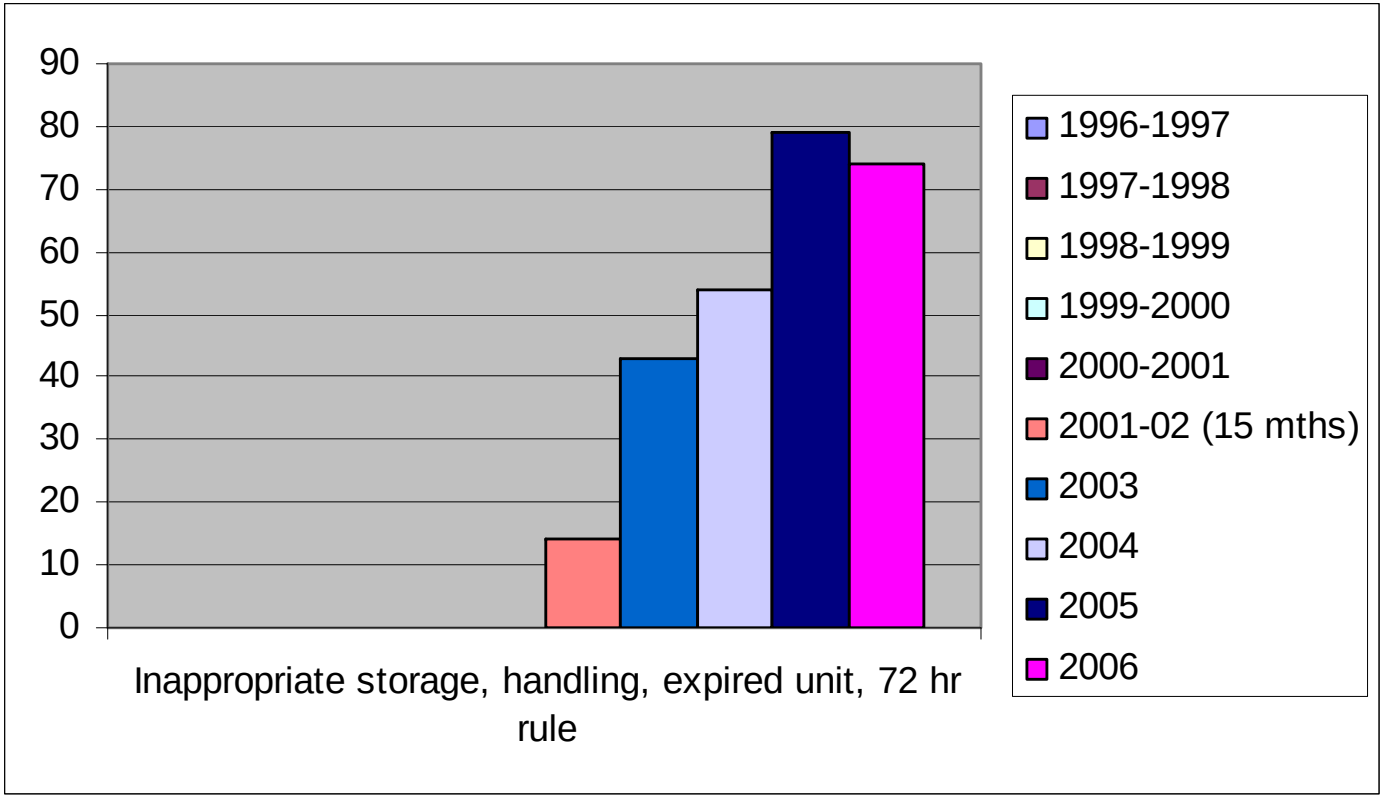


Anti-D


100
90
80
70
60
50
40
30
20
10
0
Anti-D
1996-1997
1997-1998
1998-1999
1999-2000
2000-2001
2001-02 (15 mths)
2003
2004
2005
2006

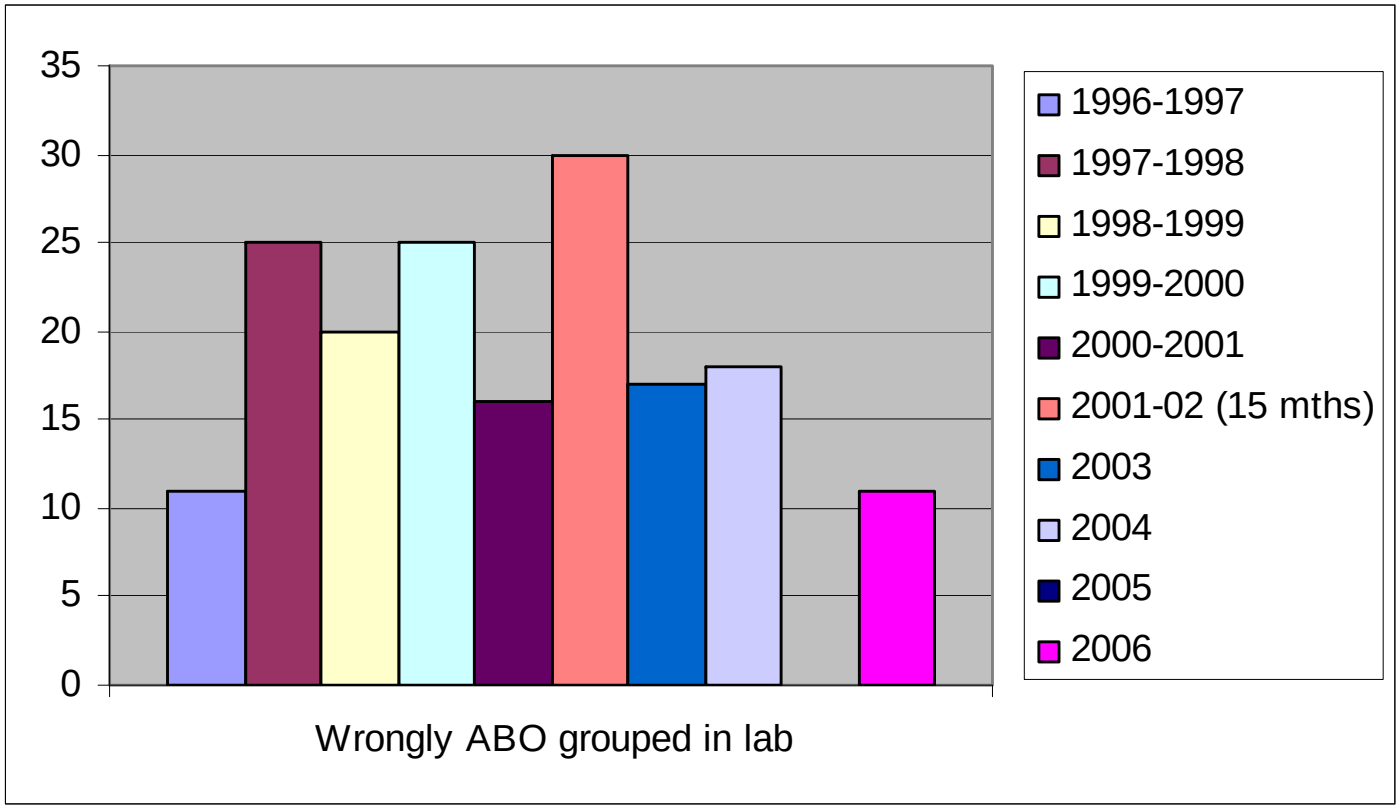
- SHOT has not until last 2 years said that it is collecting these cases – more being sent
- Some are ‘IBCT’ – but is a product, not a component
- Uncovered a profound lack of understanding among junior obstetric doctors and midwives regarding anti-D prophylaxis
- Disproportional weight put on possible risks and side effects of anti-D
- Feeling that it is part of the ‘medicalisation’ of childbirth
- Has been one IUD from HDN and another severe morbidity
- Major education issue

"Unsafe" transfusions



- Increasing especially since Blood Safety and Quality Regulations came into force
- Includes
  - Transfusion of expired products
  - Extended period out of controlled temperature storage (commonly red cells > 4hours)
  - Use of sample for XM > 72 hours old
  - Storage in non controlled fridges or transport boxes
- Lower risk group
- Training issues

Wrongly grouped by lab

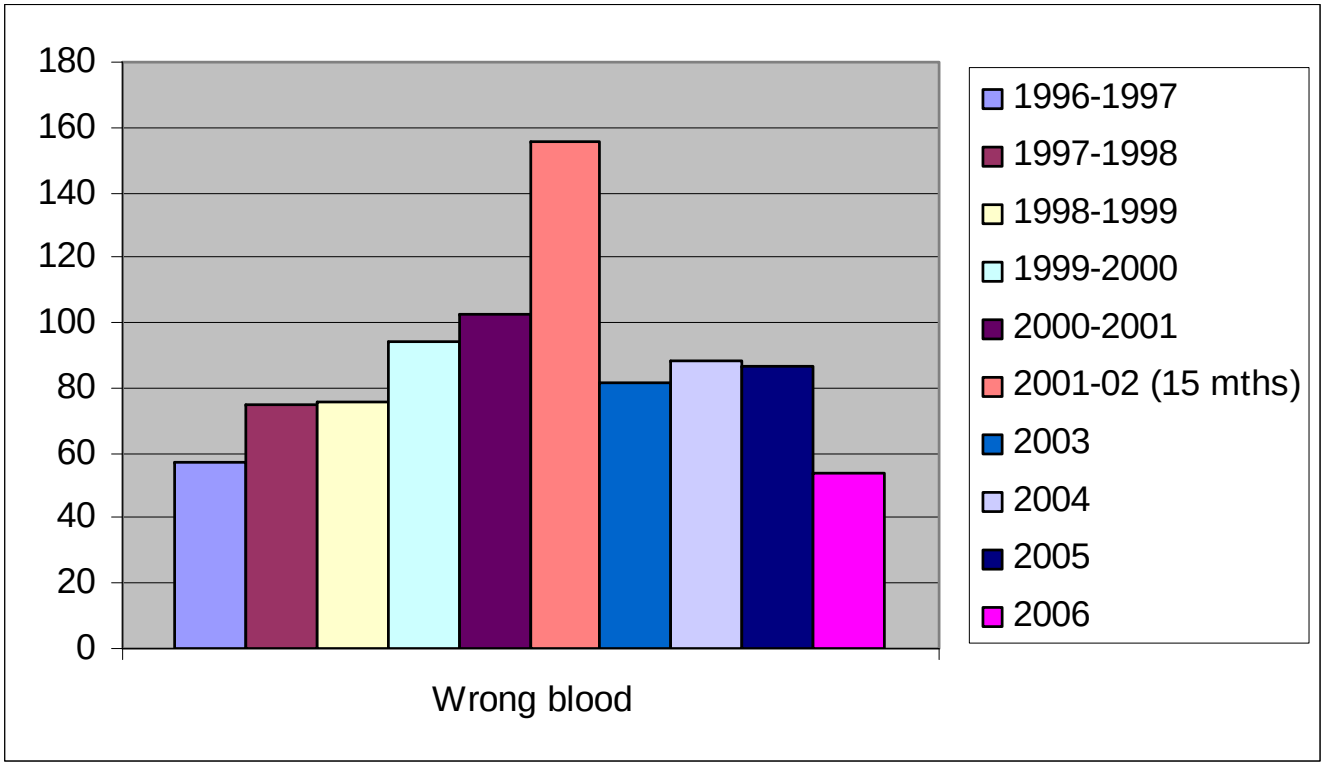


Lab grouping errors

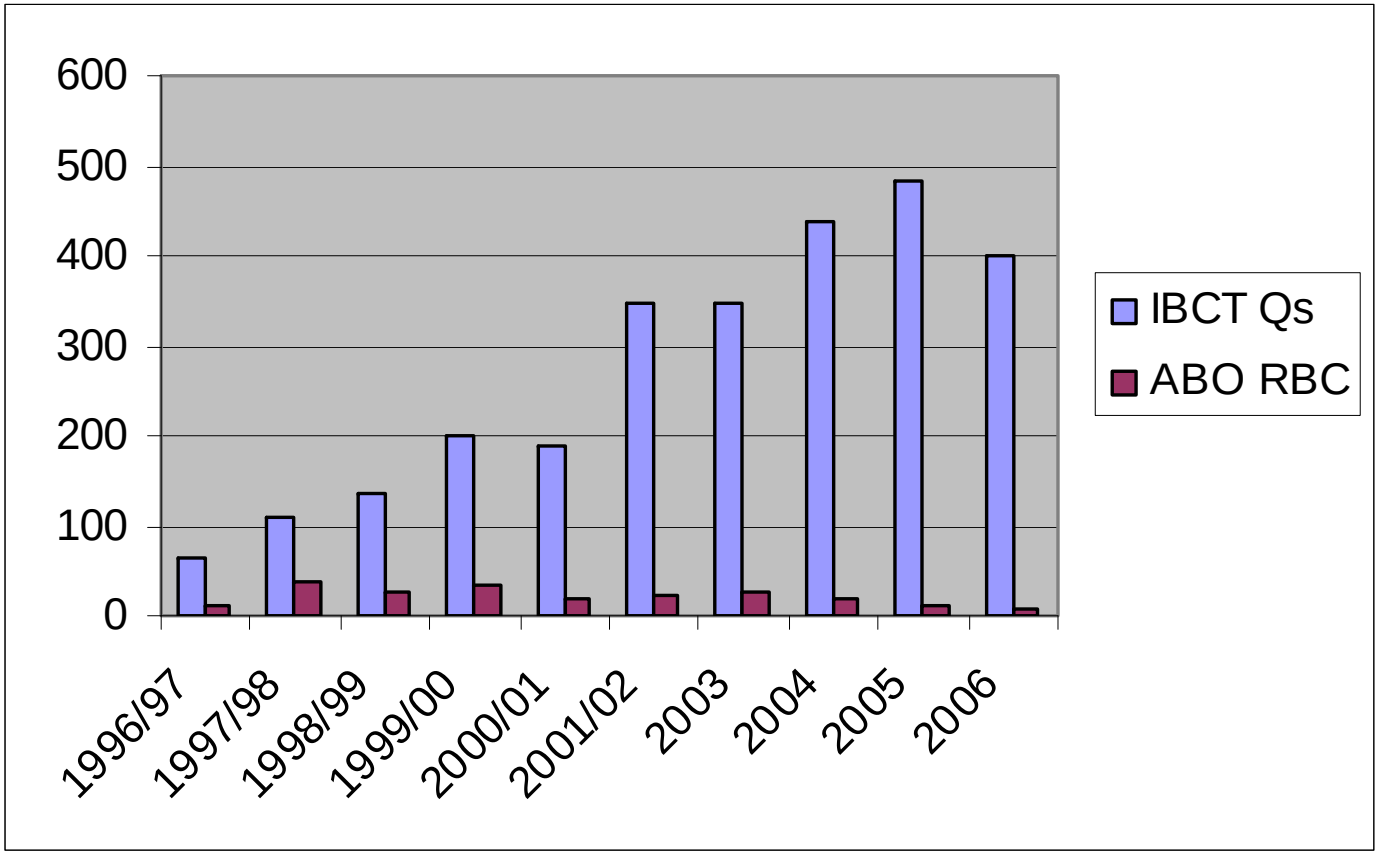
- Transposed samples
- Wrong result from test
- Incorrect interpretation of result
- Transcription error of results
- More with manual than automated methods
- **Only** where no historical group available
- These would be avoided by double grouping policy
- And can add in wrong blood in tube phlebotomy errors
- Not getting any worse – possibly improving with more and more fully automated labs
- National Transfusion Laboratory Collaborative

Wrong blood

Patient received a transfusion of the wrong group or intended for another patient



ABO incompatibility



Total wrong blood

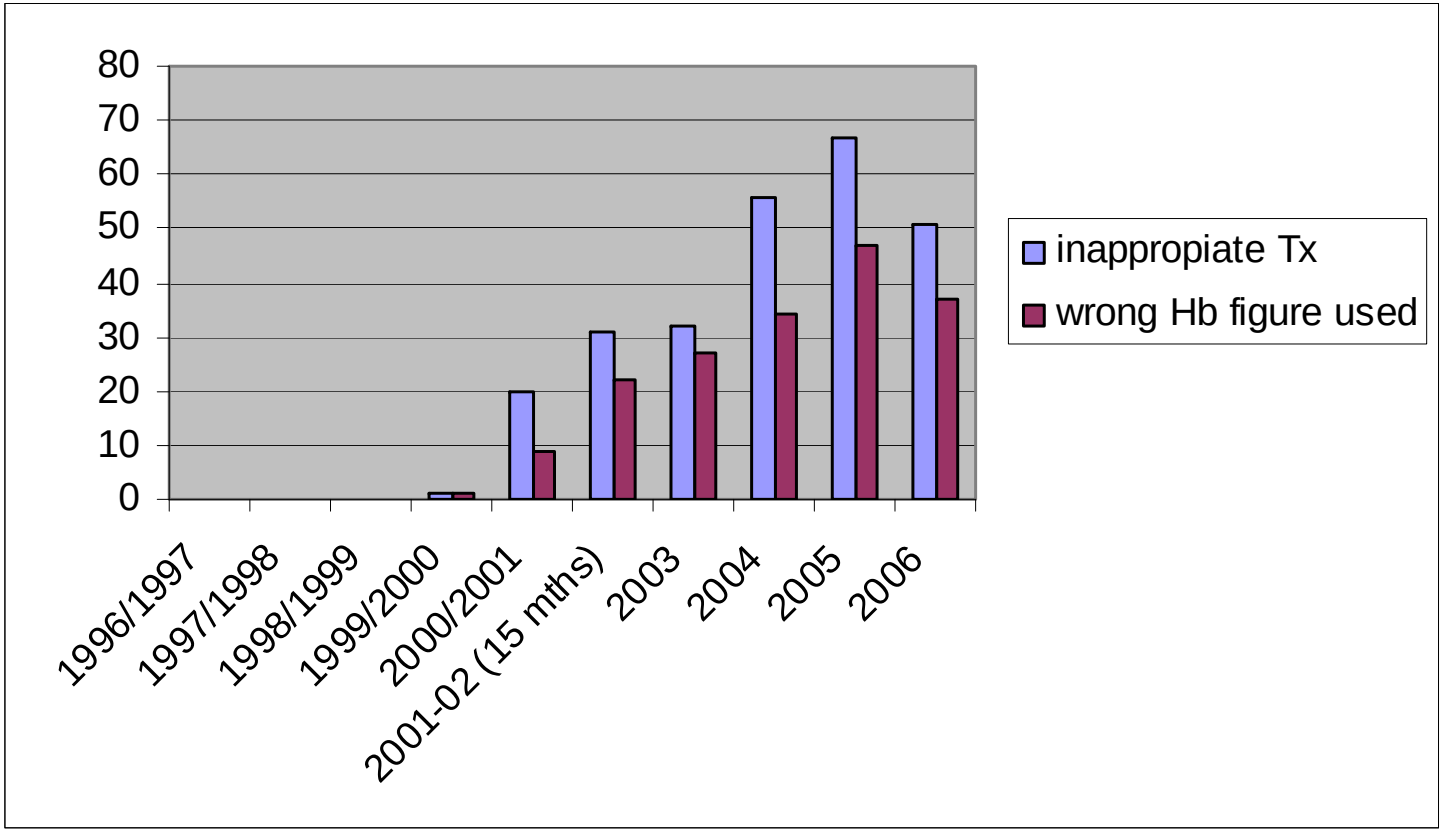
- NOT increased – increase in “IBCT” is for other reasons
- ABO incompatibles actually decreased
- Initiatives which have impacted on this
  - BBT and role of hospital transfusion practitioners
  - NPSA SPN 14 ‘Right Blood Right Patient’
  - National Comparative Audit results

National Comparative Audit

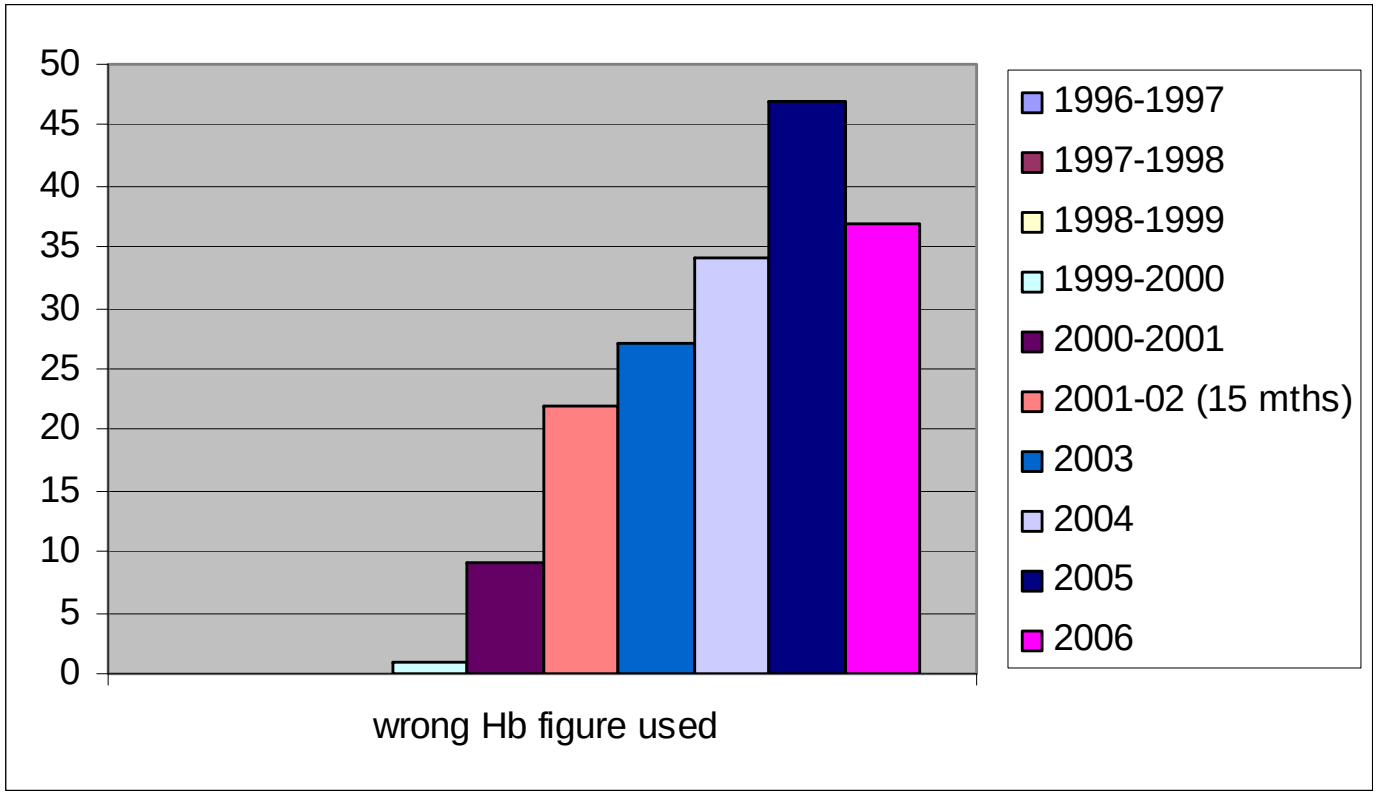
- First in 2003 – bedside transfusion practice
- This audit repeated in 2005, due again starting September 2008
- Primary elective unilateral hip replacement reported July 2007
- Use of platelets against National guidelines - reported March 2007
- Blood use in GI bleeding reported December 2007
- Audit of overnight transfusion – reported January 2008
- Two region pilot audit of appropriate use of red cells – running Nov 2007 – Feb 2008
- Appropriate use of FFP against National guidelines – next audit starting April 2008

www.transfusionguidelines.org

Inappropriate transfusion



Wrong Hb figure used



Inappropriate or unnecessary transfusion - 1

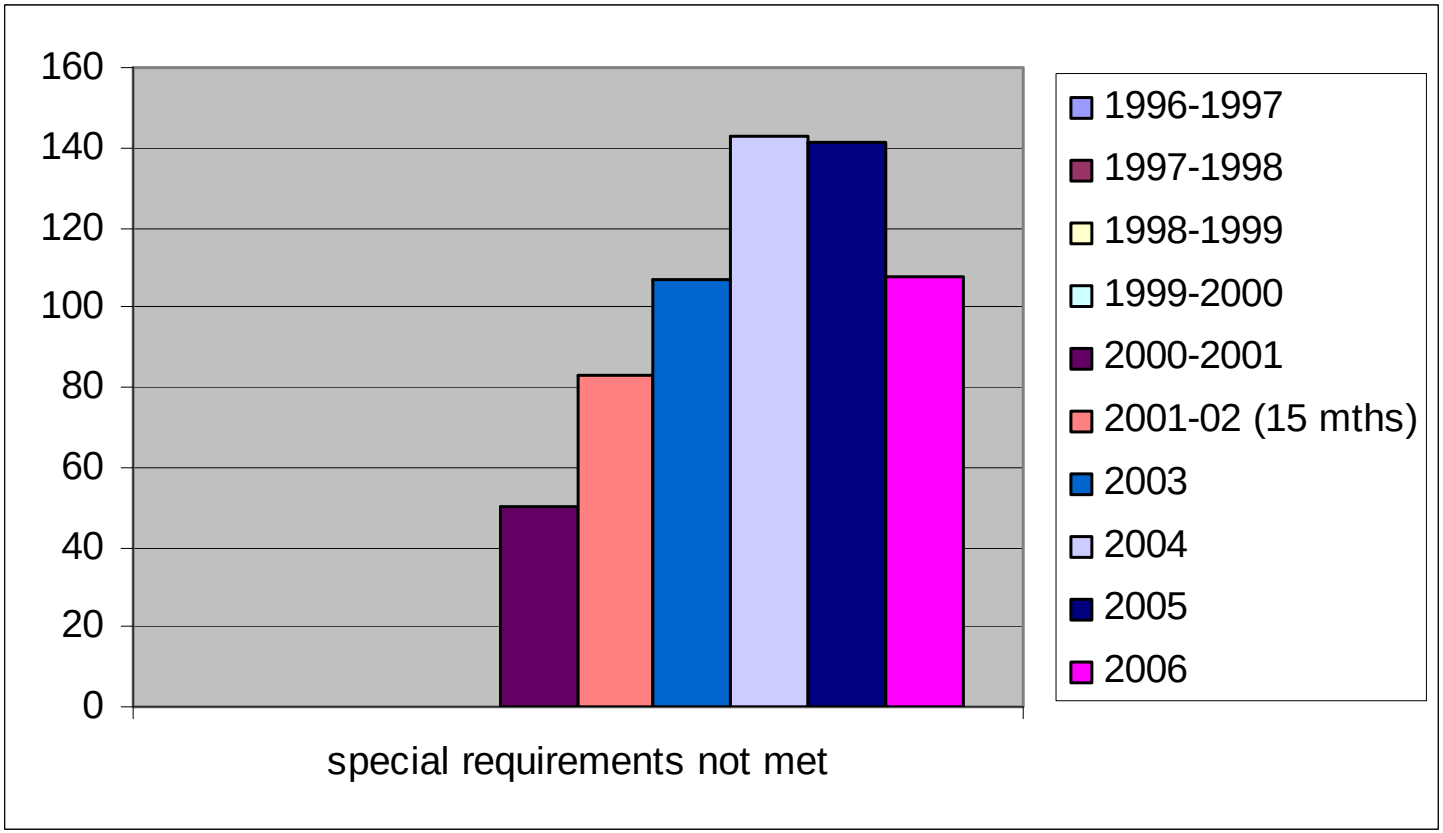
Wrong Hb

- Phlebotomy error
  - wrong patient
  - drip arm
  - technique – slow, settling in syringe etc
- Transfusion laboratory error
  - Analyser
    - main lab
    - point of care testing including blood gas machine
  - Staff
    - transposition of samples
    - transcription error of results
- Clinical error
  - Misreading of figures off computer or printed result
  - Transcription error
  - Telephoned result taken down wrong including reversal of WCC and Hb figures

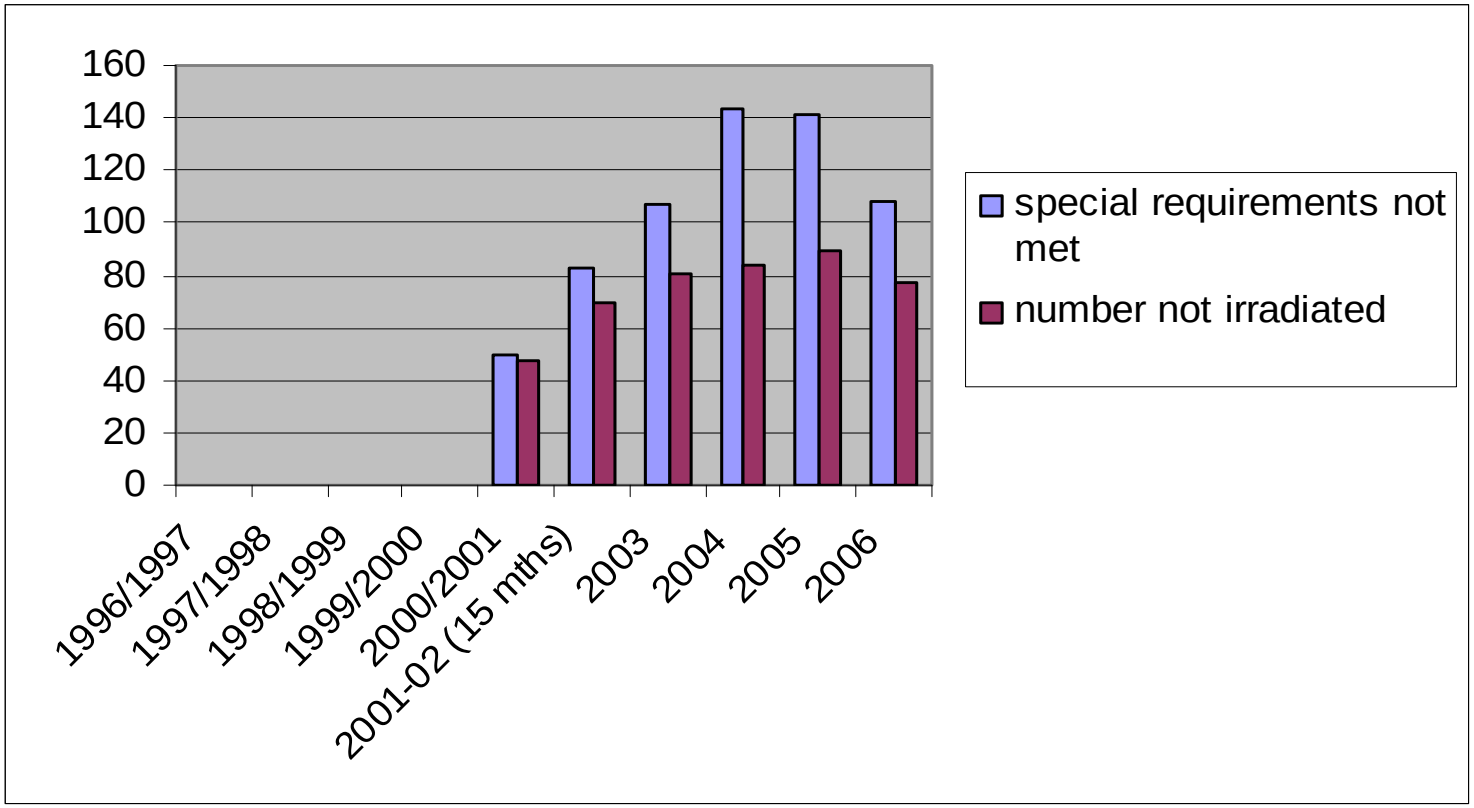
Inappropriate or unnecessary transfusion - 2

- Prescription error – all relate to over transfusion
  - Inadequate handover between doctors shifts
  - Illegible notes or prescriptions
  - Incorrect dose prescribed
  - Incorrect rate prescribed
  - Verbal prescription only
  - Hb not checked prior to prescribing
  - Protocol for transfusion triggers ignored
  - Lack of knowledge of indications for transfusion

Special requirements



Irradiation requirement



- Appropriate Use initiatives, especially Better Blood Transfusion may have made reporters more aware
- SHOT has never specifically requested such reports
- Are now major contributer to mortality and morbidity

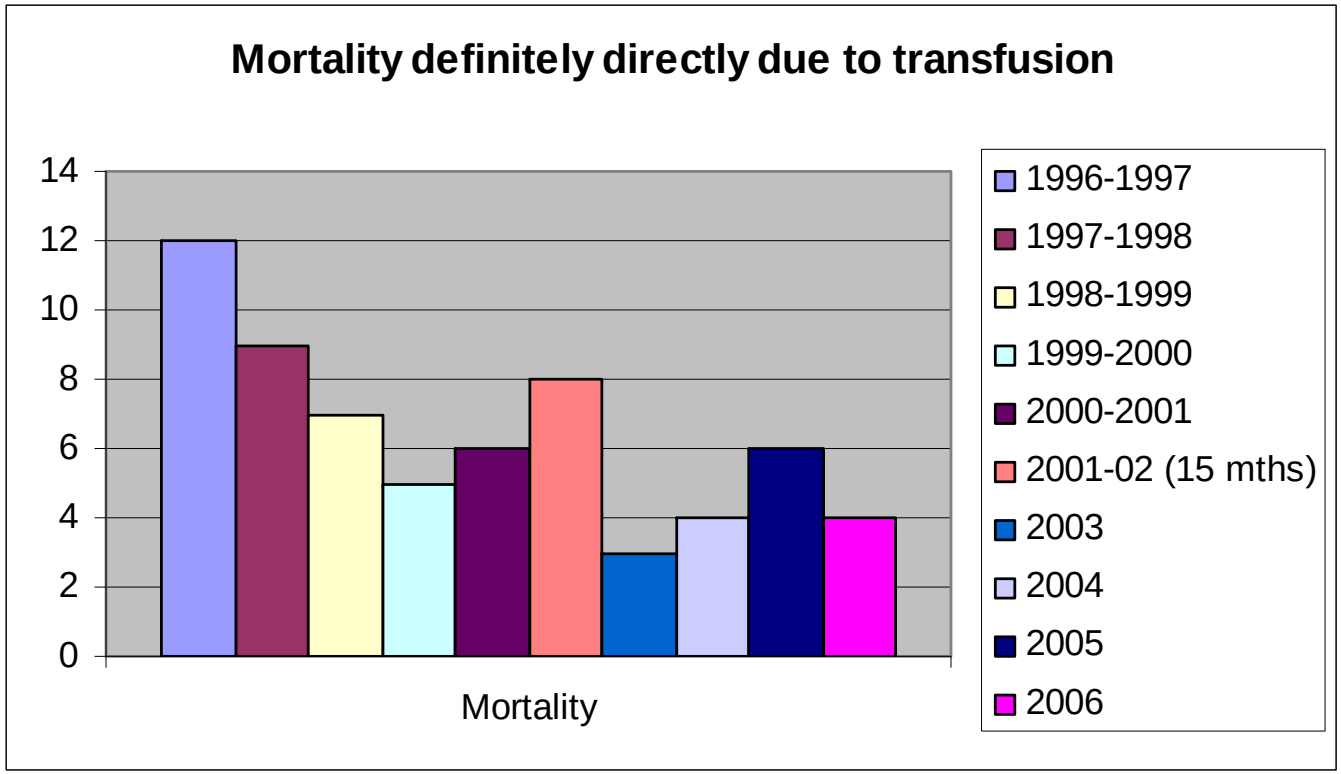
Optimal use?

- Start by avoiding unnecessary use
- Improving appropriateness of prescribing
- Optimal use comes later….

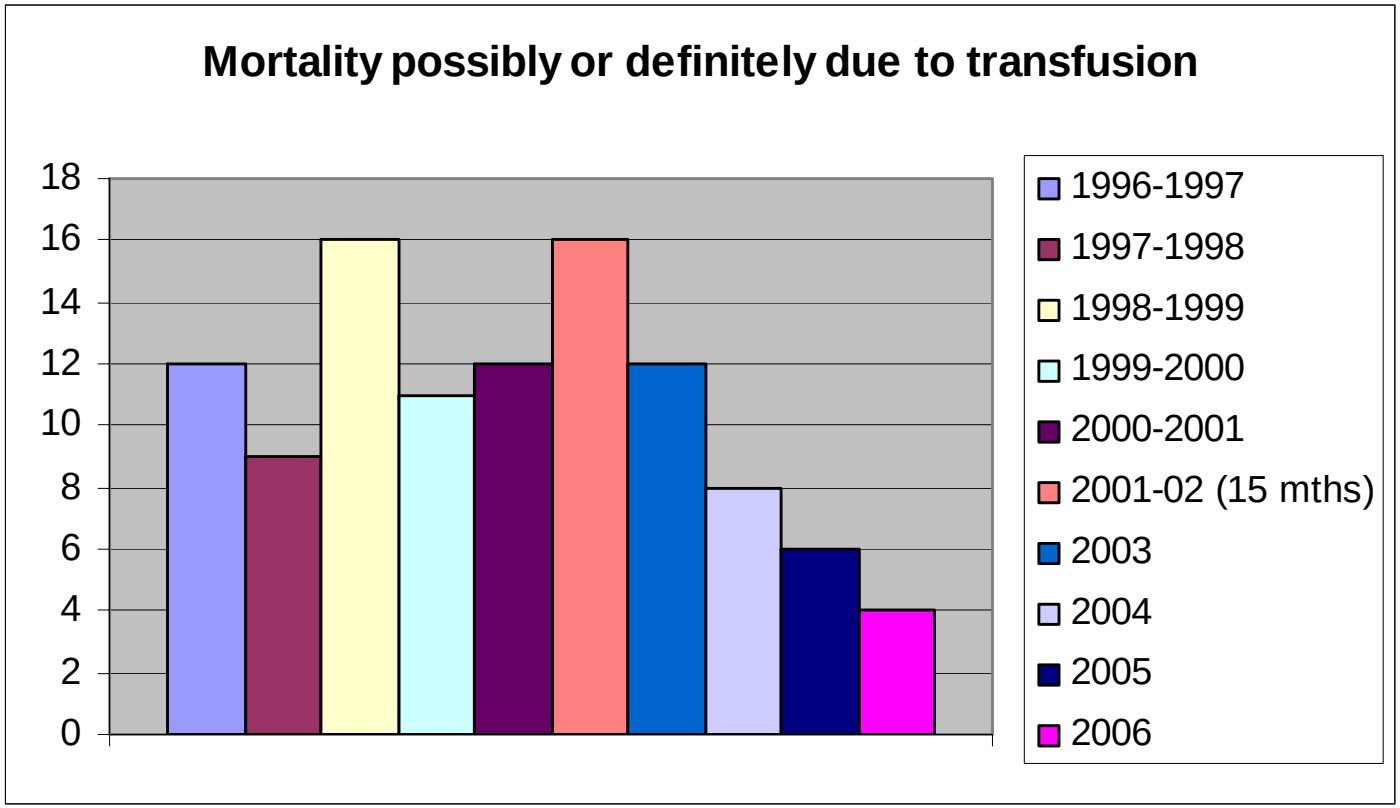
EDUCATION of doctors

- Transfusion is a basic medical intervention and integral to almost all hospital based medical specialities
- ALL doctors need to have basic grounding in this
- Needs to be part of curriculum of medical students and specialty training of doctors in all disciplines
- There is no replacement for knowledge
- Is not a matter of training and competency assessing
- POE may prevent some errors but does not address the problem

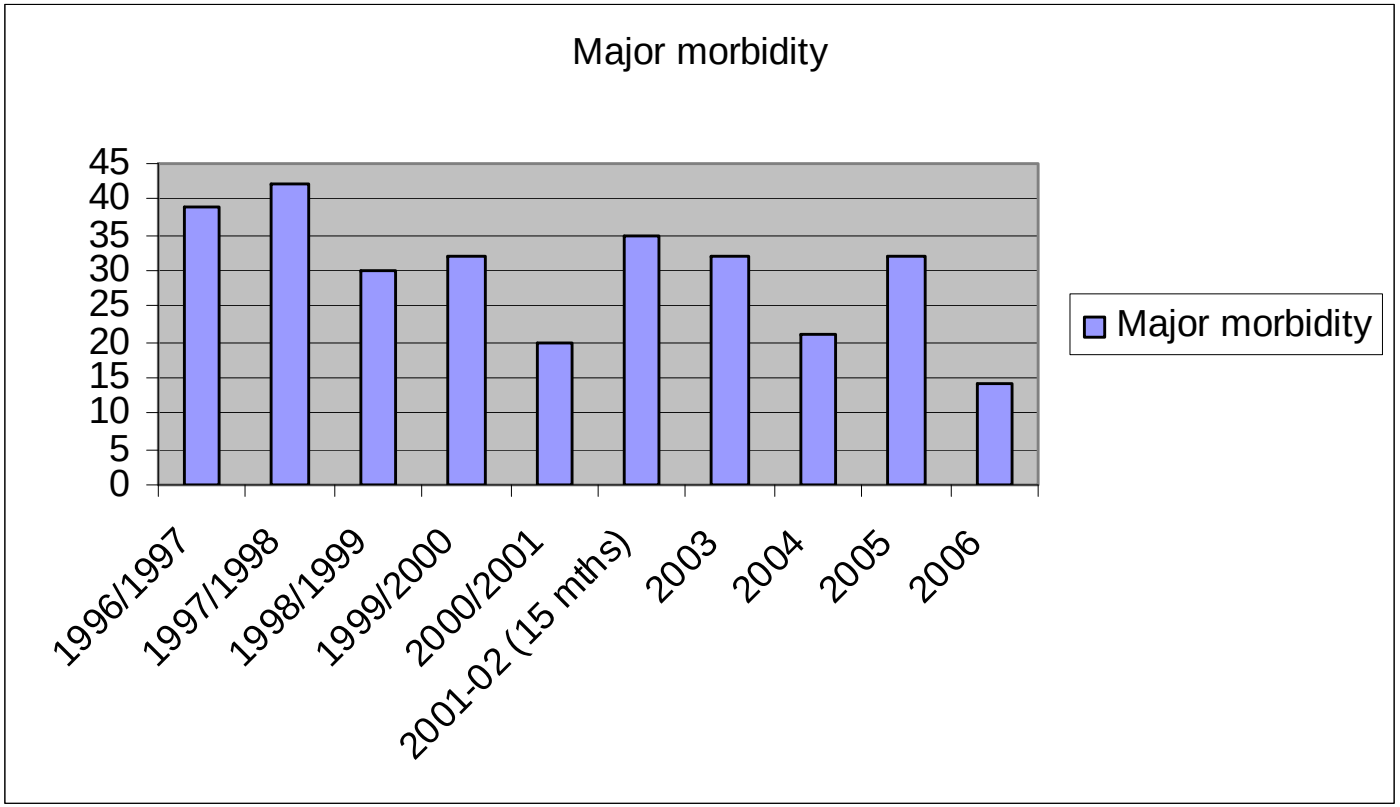
Mortality


Mortality definitely directly due to transfusion
14
12
10
8
6
4
2
0
Mortality
1996-1997
1997-1998
1998-1999
1999-2000
2000-2001
2001-02 (15 mths)
2003
2004
2005
2006

Mortality-2


Mortality possibly or definitely due to transfusion
18
16
14
12
10
8
6
4
2
0
1996-1997
1997-1998
1998-1999
1999-2000
2000-2001
2001-02 (15 mths)
2003
2004
2005
2006

Major morbidity



Summary for IBCT....

No change

- Ratio of routine to emergency cases
  - 60 – 62%
- Percentage of paediatric cases
  - 10 – 12%

Going down

- ABO incompatibility
- Blood wrongly grouped in transfusion laboratory
- Wrong blood given - either grouped wrongly or intended for another patient
- Mortality
- Major morbidity

Going up

- Anti-D related cases
- Special requirements not met
  - Irradiated products not given when required
- “Unsafe” transfusion – storage, handling, transfusion of expired component etc
- Inappropriate and unnecessary transfusion
  - Wrong Hb figure used

Case 1 (2006)

- A pre-term infant aged 12 months had a pre-operative platelet count of 48x109/L. ‘1 pool of platelets’ was prescribed and did not specify the volume. Verbal instruction from the doctor was ‘15 ml/kg’. The nurses misheard this as ‘50 ml/kg’ and administered 300 ml of platelets over 30 minutes. The infant suffered a cardio-respiratory arrest and died on PICU two days later.

Case 2 (2006)

- An 80 year old woman with a fractured neck of femur and had a post operative Hb level reported as 3.9 g/dl. The pre-operative Hb had been 9.5 g/dl and there had been little blood loss. Eight hours following surgery the patient was restless, hypotensive and tachycardic. A junior doctor diagnosed hypovolaemia and prescribed six units of red cells which were given within sixteen hours. The post-transfusion Hb was 18.2 g/dl and the patient died from cardiac failure. It was later realised that the blood sample with an Hb of 3.9 g/dl was taken from a drip arm.

Future initiatives in UK

- Repeat of NCA for bedside blood component administration
- Engage with Royal Colleges regarding junior doctors in training
- Raising of midwifery issues via NBTC and RCOG
- Session on anti D at next SHOT meeting
- National Transfusion Laboratory Collaborative
- NPSA initiatives regarding patient ID