



Dr Kenneth Goldsmith

Director of IBGRL 1966-1975

To err is human – the evolution of transfusion safety in hospitals

Dr Derek Norfolk

Transfusion in 2012 is (relatively) safe

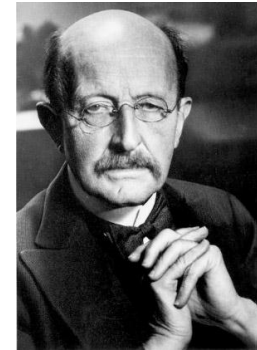
How did we get here and where are we going?

- *“Every system is perfectly designed to achieve exactly the results it gets. Most of our systems in health care evolved over many years, rather than being designed to achieve particular objectives.”*
- *“A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die and a new generation grows up.”*

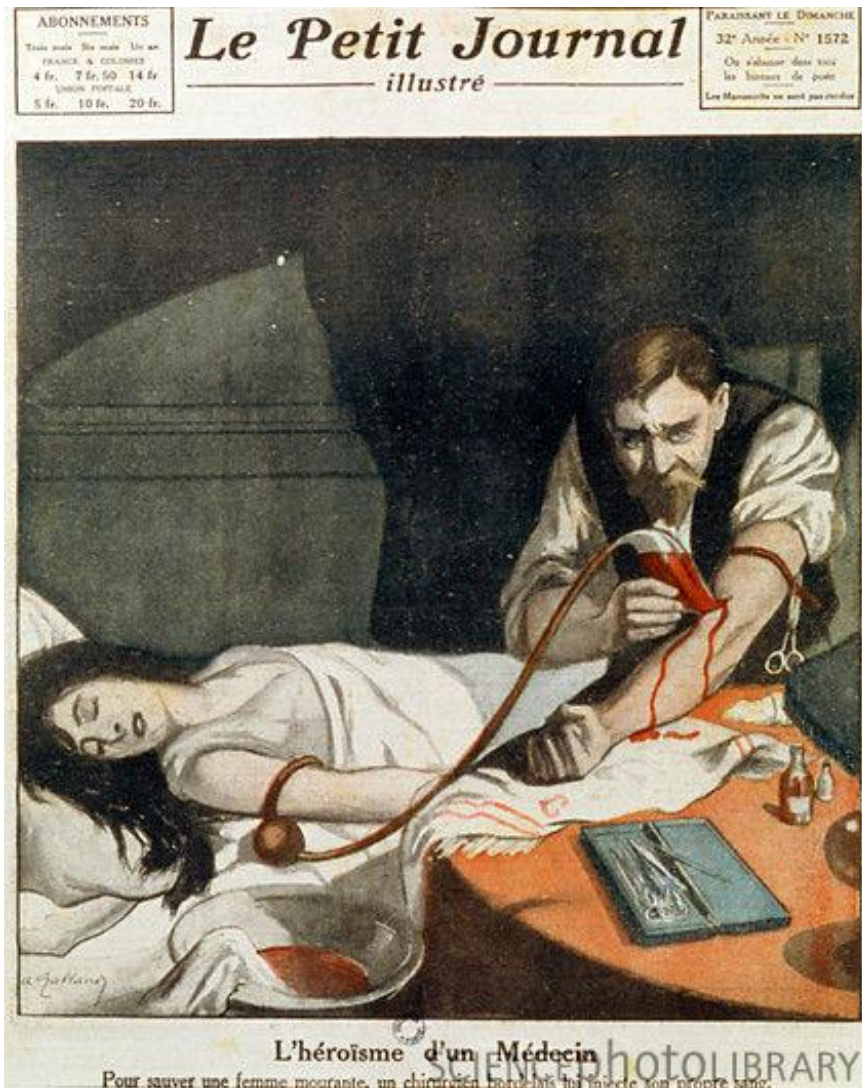
Don Berwick
Director of US
Institute of
Healthcare Improvement



Max Planck
Physicist



The heroism of a doctor Paris 1872 (should this read “*heroine*”?)



- Before Landsteiner's discovery of ABO groups in 1901 (and for some time after) transfusion was dominated by the risk of fatal haemolytic reactions (1/3 of random transfusions are ABO incompatible).
- Obstetrical Society of London 1873 *Enquiry into the Merits of Blood Transfusion*:
“Because of its inherent dangers, it should only be used as a last resort”

The Post-War *Golden Age* of Transfusion

(Frank Boulton 2010)

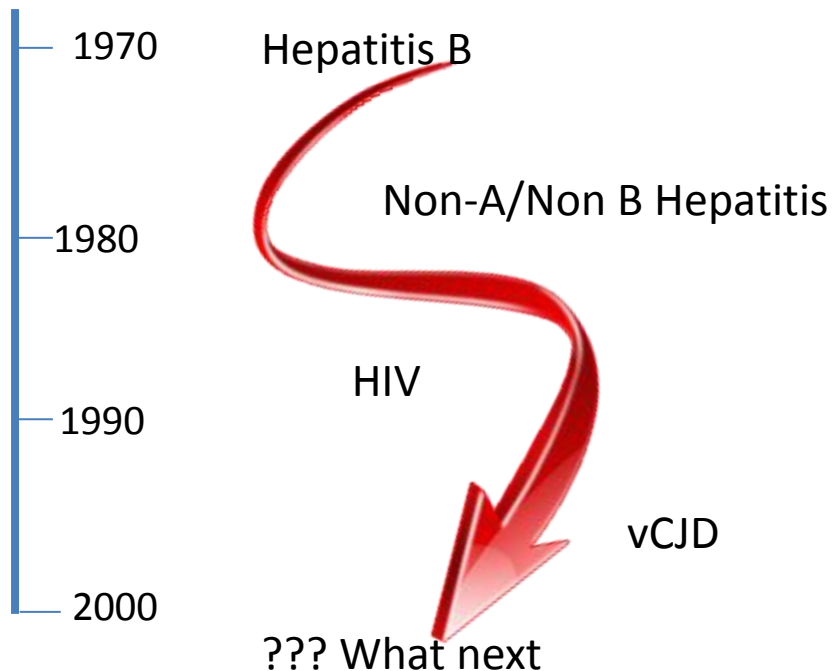
- 40 years of progress in science and technology (much of it stimulated by conflict)
 - anticoagulation and storage
 - transfusion serology
- Plasma fractionation (first cases of *serum hepatitis*!)
- Volunteer donor panels
- War time organisation transferred to new NHS
- Safe, readily available blood (in bottles) underpins many new medical and surgical procedures



and then

The spectre of Transfusion Transmitted Infection

rising public, media and professional concern



Transfusion resources increasingly focused on ensuring “clean blood” by better donor selection and (more expensive) testing.
But what happened after blood *left* the Transfusion Centre?

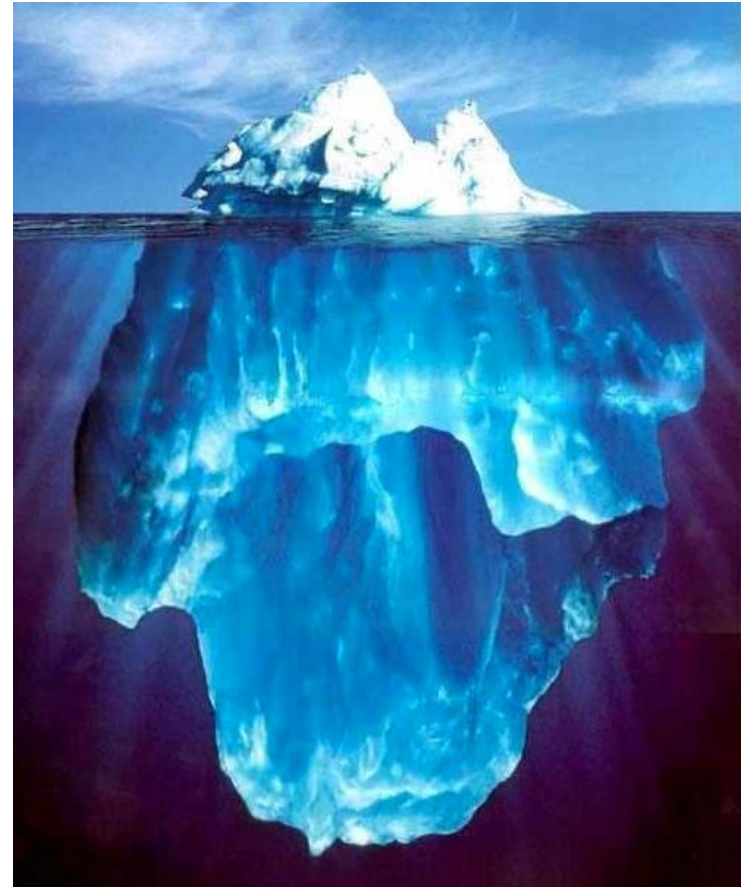
A sick process?

- 1992 – Dr Brian McClelland sent an anonymised questionnaire to 400 haematology departments asking for data on serious transfusion errors in 1990 and 1991
- 245 replies (126 from memory as no records)
- 111 *wrong blood* incidents recalled by 79 labs with 6 deaths and 12 major morbidity (ABO incompatibility)
 - 6 lab errors
 - 23 *wrong blood in tube* (WBIT)
 - 82 bedside administration errors
- 20 labs recalled 100 *near miss* incidents due to WBIT picked up in Blood Bank (not part of questionnaire)

McClelland and Phillips survey 1992

- ***Recommendations:***
- *Proposed a national reporting system for critical transfusion incidents and near misses*
- *All hospitals should establish clear and coordinated managerial responsibility for the transfusion process*
- *All transfusion labs should have a process for recording transfusion errors and corrective actions*
- *Pilot projects should be set up to identify cost-effective ways of improving safety of clinical transfusion process*

Only 1/3 of responding labs reported *any* errors!

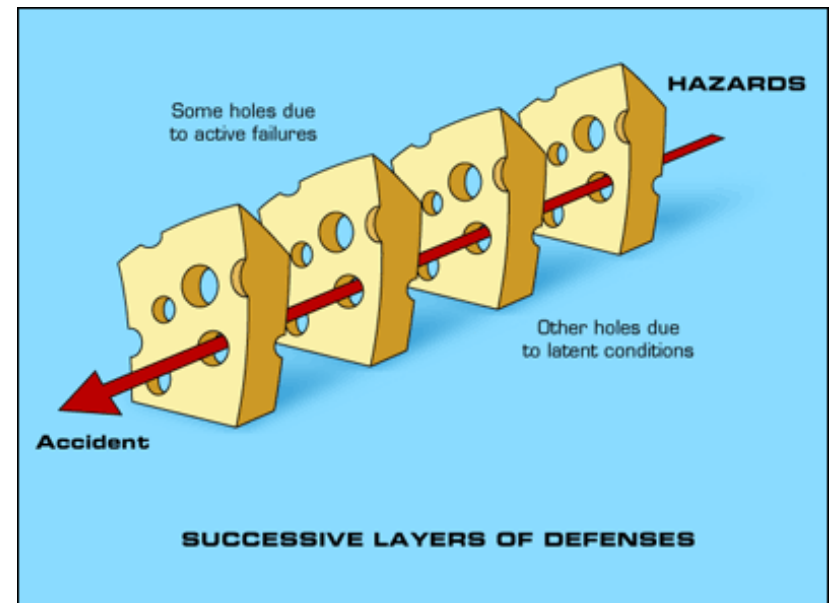


and much else was
happening in the '90s

Getting to the *root causes* of errors

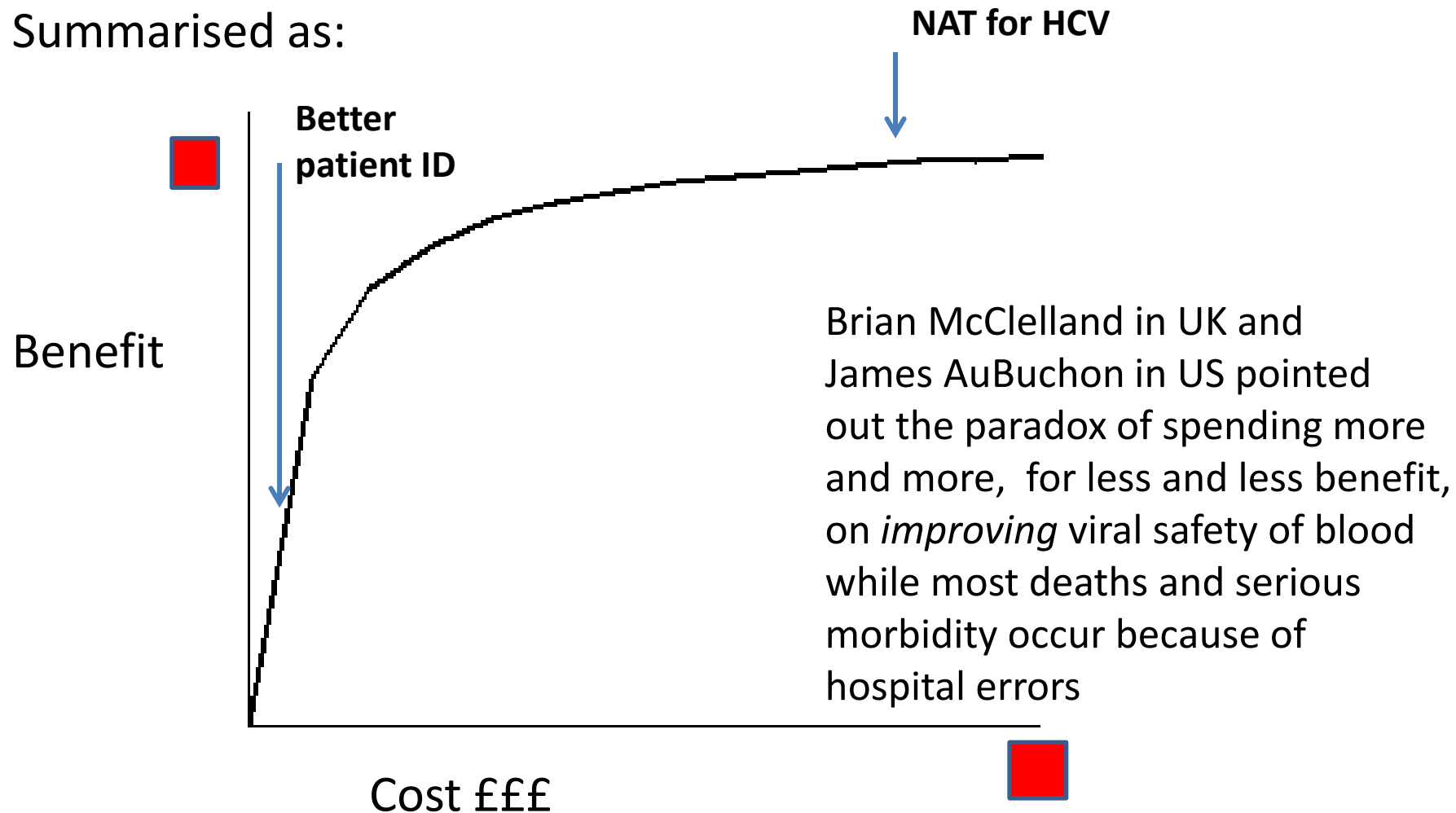
- Prof James Reason :
human, cultural and systems factors
Latent and Active errors
Root cause analysis
- McClelland: *Treating a sick process (1998)*
 - process mapping shows getting blood to patients is highly complex
 - incidents result from multiple errors
 - better to focus on *Why it went wrong?* rather than *What went wrong?*

- **Reason's 4 levels of failure:**
Organisational influences (eg blame culture)
Unsafe supervision
Preconditions (eg distraction)
Unsafe acts



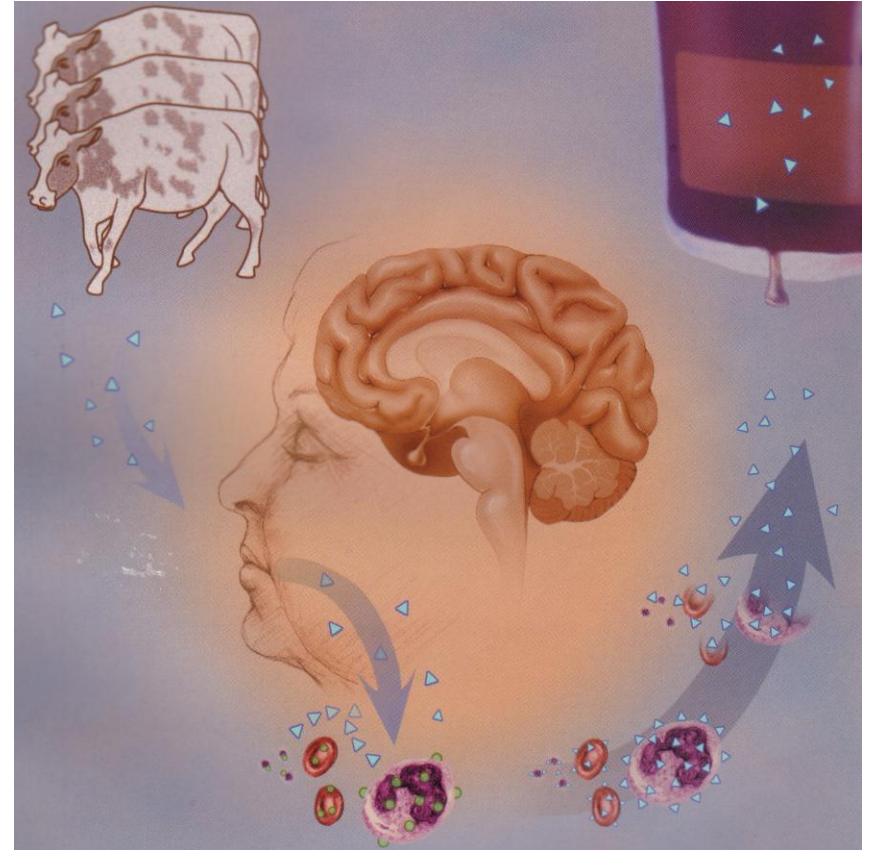
Transfusion Safety: realigning efforts with risks

Summarised as:



Other key drivers for change

- Increasing demand for blood
- Large variation in use
- Spiralling cost
 - leucodepletion
 - NAT
- Potential impact of vCJD
- Committed individuals with vision and drive



My life flashing before my eyes



- 1994 – SHOT Working Group set up
First SHOT Report published March 1998
- 1995 – new English/N Wales NBS sets up 3 “Zones”
- Nov 1995 – National Blood User Group (NBUG – Chair Ted Gordon-Smith) and 3 ZBUGs set up to monitor NBS performance and report to Health Minister
- Dec 1998 – *Better Blood Transfusion 1 (HSC 1998/224)*
- 1999 – NBS abolishes Zones and ZBUGs disbanded; proposal for new “overarching” National Transfusion Committee for England (recommended by WHO and SHOT)
- Dec 2001 – National Blood Transfusion Committee and RTCs established (similar initiatives throughout UK)
– national transfusion audits established

Haemovigilance

SERIOUS HAZARDS OF TRANSFUSION

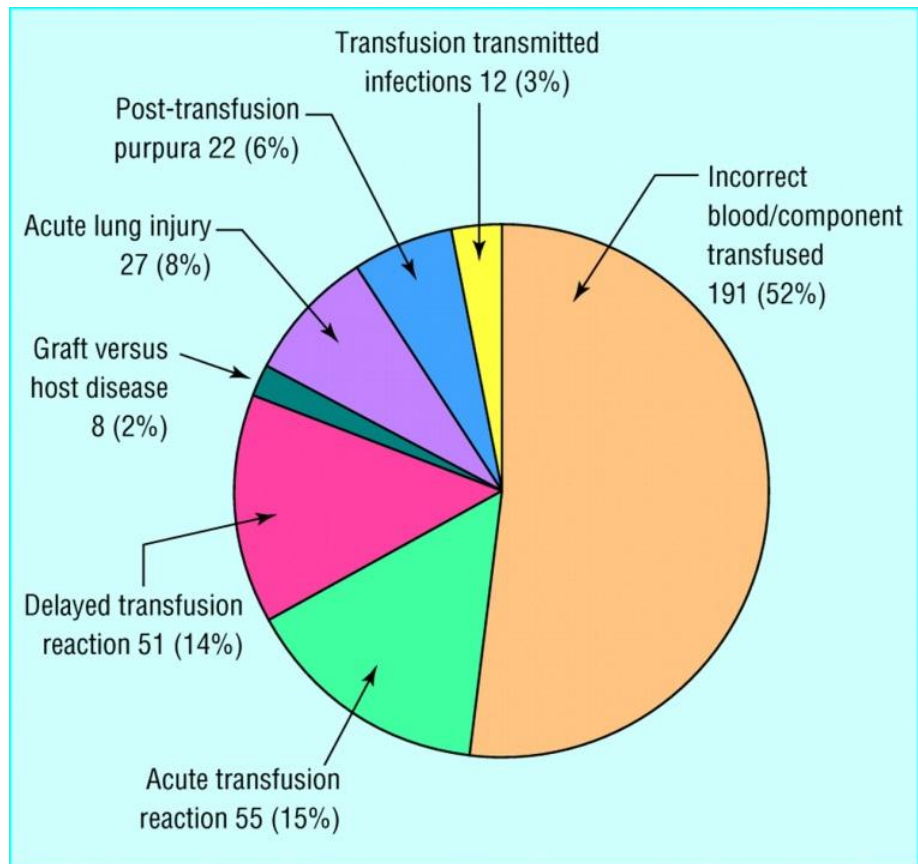
SHOT

- Voluntary reporting and professionally led
- Initially all UK and Ireland
- Supported by the MDs of the national transfusion services and RCPATH
- Liz Love (National Coordinator), Hannah Cohen (Chair), Lorna Williamson and Brian McClelland were among the prime movers
- First Reporting Year 1996/97
- Founding Aims:
 - *Inform Transfusion Service policies*
 - *Improve standards of hospital practice*
 - *underpin clinical guidelines & educate users*
- First Report:
 - “More stringent budgets lead blood bank managers towards multi-skilled or less qualified staffincreased pressure on clinical staffemployment of temporary ward staff...”*
 - (what’s new?)*

***Real* risks of transfusion were soon established**

First 2 years of SHOT

- 424 eligible hospitals
 - 94 reported in Year 1
 - 112 in Year 2
- 164 “*Nil to Report*” in Year 2 (!)
- 22 deaths (3 from ABO) and 81 major morbidity
- IBCT clearly major risk
 - 1 to 7 errors per case
 - 32% collection errors
 - bedside check failed in 80 cases



341 incidents analysed

Better Blood Transfusion



Better Blood Transfusion (1)

HSC 1998/224

- Crucial support from Sir Liam Donaldson and other CMOs and key figures in the UK transfusion services
- Preceded by seminar on *Evidence-based blood transfusion* July 1998
- First steps towards safer and more effective *clinical* transfusion in UK
- **Key Actions for hospitals:**
 - Establish (properly resourced) HTC's
 - Develop transfusion protocols and training
 - Participate in SHOT
 - Promote cell salvage
 - Also recommended regional/national User Groups and exploration of *new technologies* for ID

What was the impact of BBT1?

- National audit in 2000/2001 showed patchy progress – more HTCs but few protocols, training or audits
- *“To deliver and implement ‘Better Blood Transfusion’ there needs to be a heightened profile of blood transfusion practice within Trusts”*

Dr Angela Robinson
NBS Medical Director

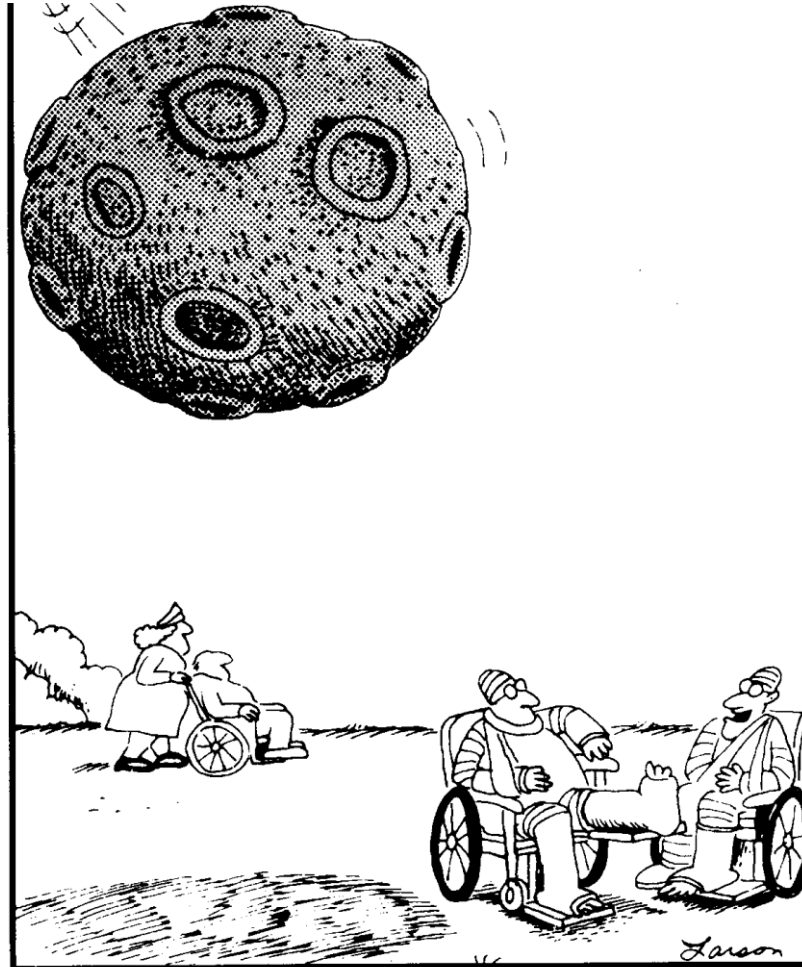


More initiatives followed

- 2002 *BBT 2 – Appropriate use of blood*
 - Hospital Transfusion Teams and appointment of TPs
 - focus on improving patient and sample ID
- 2005 Blood Safety & Quality Regulations
- 2006 NPSA SPN 14 – *Right Patient, Right Blood*
 - Competency Assessment for all relevant staff
 - don't use compatibility report in bedside check
 - risk assess new methods of improving ID
- 2007 *BBT 3 – Safe & appropriate use of blood*
 - avoid unnecessary transfusion (including obstetrics)
 - develop the evidence base
 - patient and public engagement
- 2011 *Patient Blood Management* – integrated, evidence based approach with excellent IT



So, how safe is hospital transfusion in 2012?



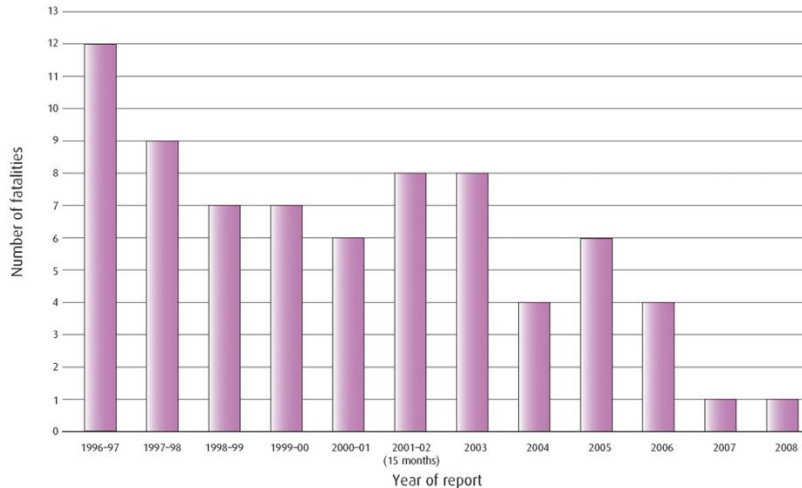
**"You're kidding! ... I was struck twice
by lightning too!"**

What can SHOT tell us?

Decline in mortality definitely related to transfusion 1996-2008

Falling mortality

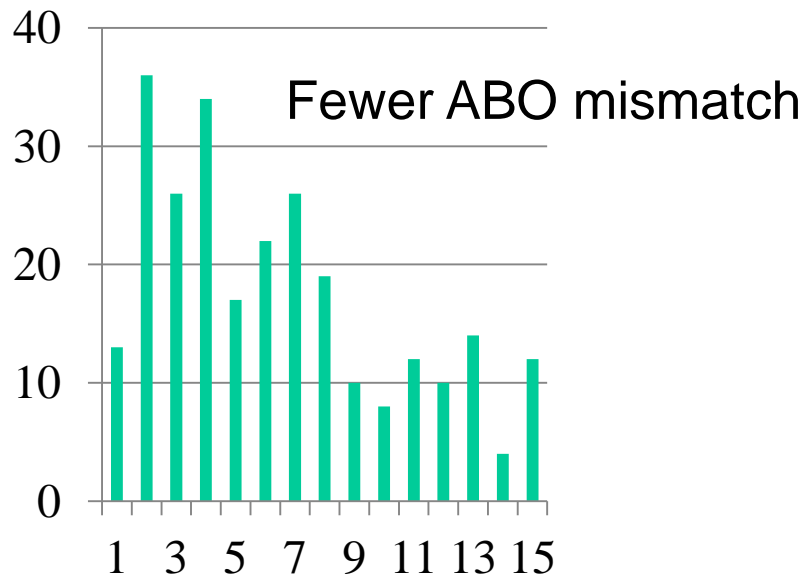
NB The 'year' 2001-2002 was a 15 month period



NHS participation 98%
Reports increased from 169 in 1996 to 3038 in 2011
No TA-GvHD since 2001
No TTI in 2010 or 2011

BUT

- 50% of reported events are due to human error (often failed ID by *competent* staff)
- 100 “near miss” sample mistakes for every wrong blood incident
- 55% of *preventable* IBCT in 2011 originated in the laboratory (including 7 ABO errors)
- Many inappropriate & unnecessary transfusions due to poor medical knowledge



Could transfusion become less safe?

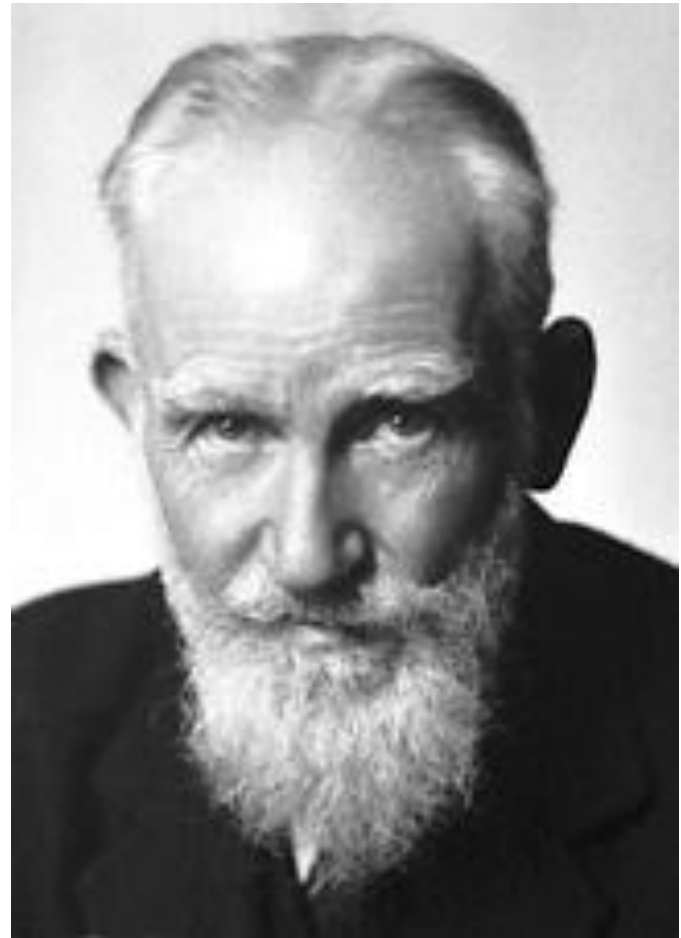
- *Constant NHS reorganisation and fragmentation*
 - competition rather than integrated care
 - loss of organisational memory
 - “transfusion is safe” so lower priority (eg ? remove from CNST standards)
- *Less money/more work*
 - redeployment of TPs
 - deskilling of laboratory staff
 - centralisation of transfusion services without investment in technology (eg remote issue)
 - job insecurity and stress impairs performance (and health) of staff in labs and on wards
 - medical shift work, poor handover, shorter training
- *We know you run a good service, but the future’s “just good enough”*



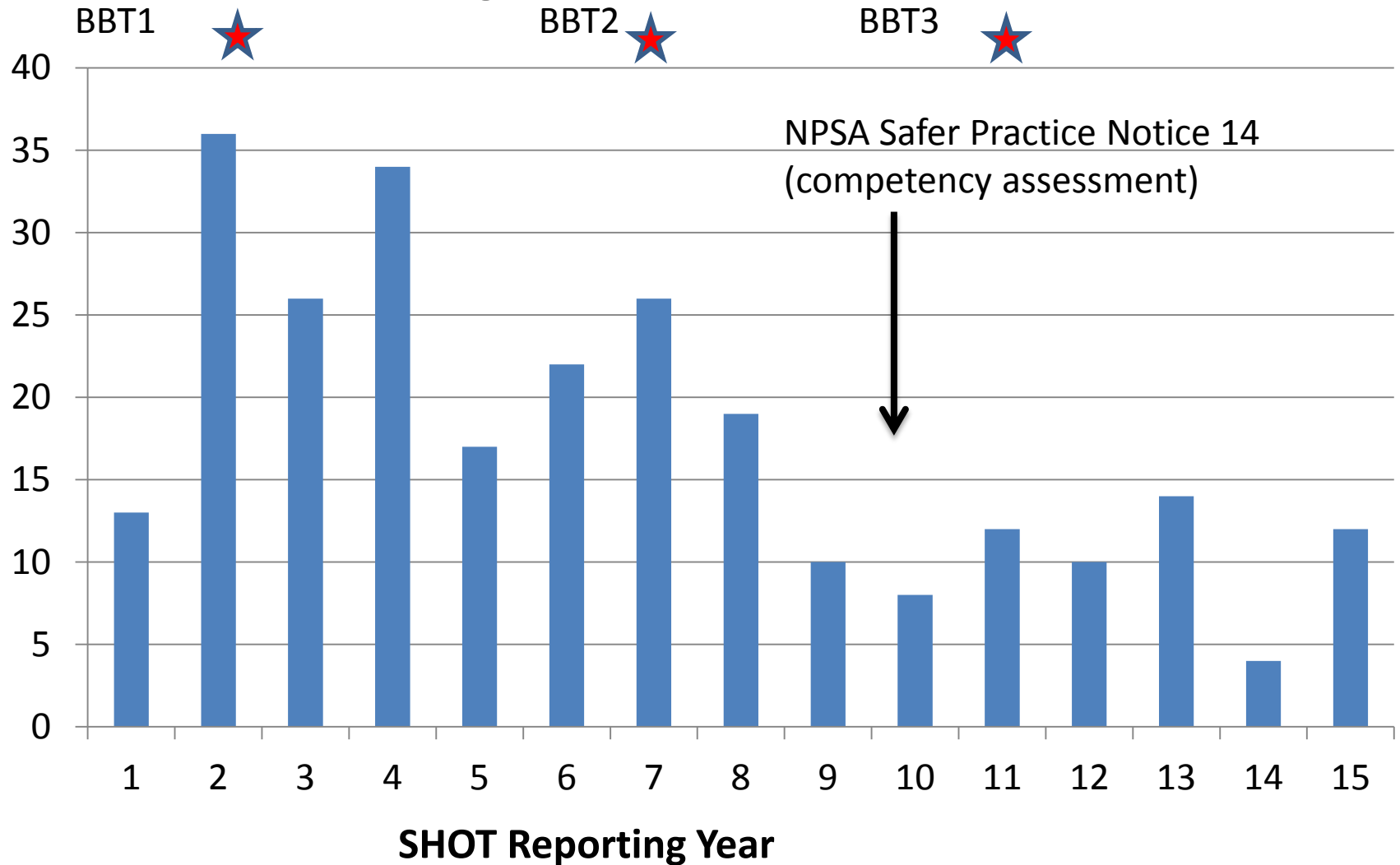
Has competency assessment (as practised in NHS) worked?

- *“When a man teaches something he does not know to somebody else who has no aptitude for it, and gives him a certificate of proficiency, the latter has completed the education of a gentleman.”*

George Bernard Shaw
'Maxims for Revolutionists',
in *Man and Superman* (1905)



ABO incompatible transfusions reported to SHOT

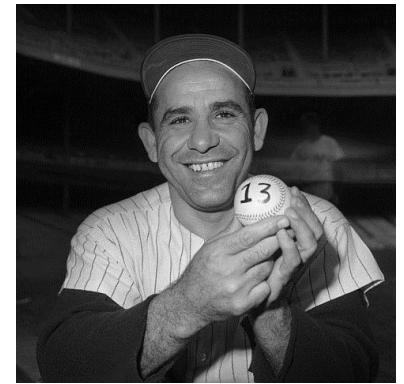


Beyond competency assessment

“monkey see, monkey do”

- *“Checking competencies can provide spurious evidence of competence”* (RC Anaesth 2010)
- *“The competence approach to learning is one of the root causes of mediocrity”* (Tooke Report 2008)
- 70% of staff responsible for errors in the 2011 SHOT Report had been competency assessed
- NBTC, NPSA and SHOT all now agree that ***better basic knowledge of transfusion medicine*** (and serology for laboratory staff) *must* underpin assessment
- Meanwhile, SHOT recommends use of *Transfusion Checklists* (proven to improve safety in aviation and surgery)

Where do we go next?



- *“It’s tough to make predictions, especially about the future”*

Attributed to Yogi Berra
(New York Yankees
baseball star)

– also alleged to have
said:

*“I really didn’t say
everything I said”*

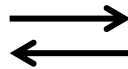
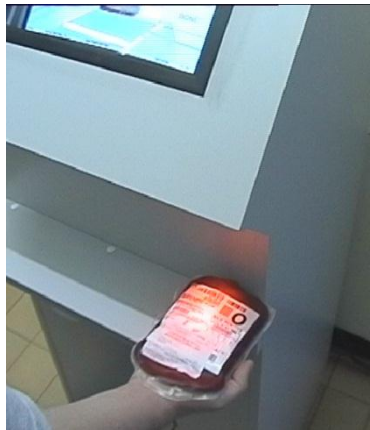
- *“Computer-based systems, employing technology for positive identification, **will soon** control the clinical transfusion process from vein to vein”*

Derek Norfolk
SHOT Report
1999/2000

IT to improve transfusion safety

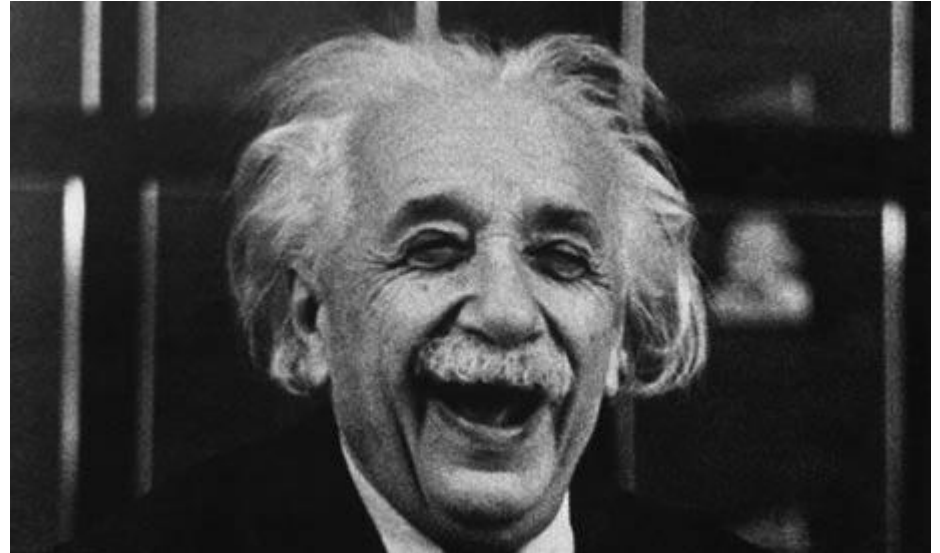
Bar code and RFID technology

- **Blood Tracking**
(safe collection)
- Piloted in Leeds in 2001
(Modernisation of Pathology)
- Effective and (generally) high user compliance
- Now widely used in NHS
(nearly 50% of hospitals in 2011)
- **Bedside electronic ID**
- Pioneered in Oxford
(Government Computing Innovation Award 2007)
- Massive potential (and savings), especially if rolled out to drugs and other ID critical areas
- Only used in 16% of hospitals in 2011 - **but got to be the future**



How do we improve clinical transfusion and reduce inappropriate use?

- Move from *one size fits all* to individualised care
- Know what *is* appropriate
 - improve the evidence base (now mostly *expert opinion*)
- Learn how to engage with and influence clinicians
 - clinical credibility
 - cultural change
 - *effective* interventions



The definition of insanity is doing the same thing over and over and expecting different results

Albert Einstein

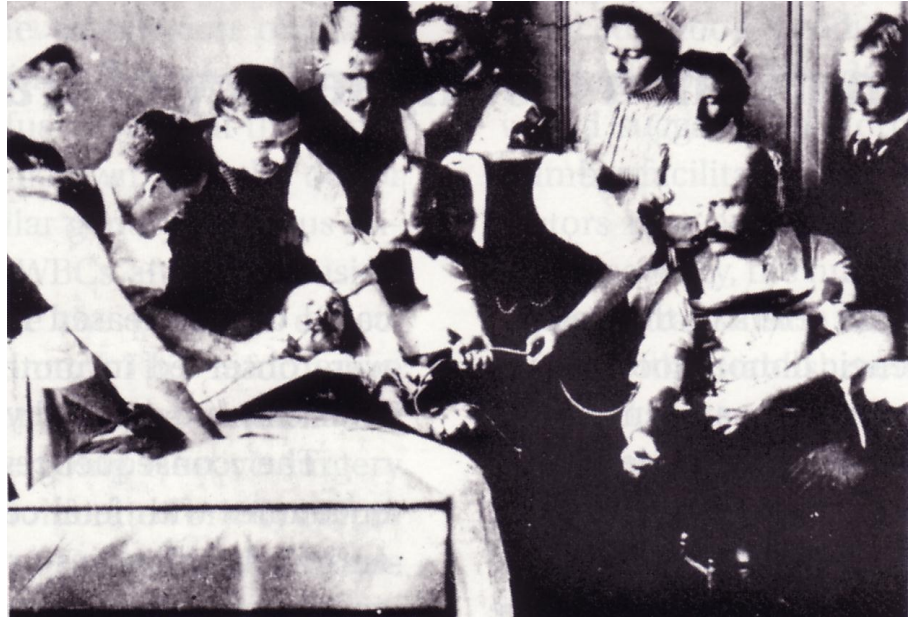
Patient-centred transfusion

- Care tailored to the individual is the future of medicine (eg drug dosing based on genetic make up and monitoring)
- Focused on outcomes that matter to the patient, rather than the doctor (or researcher!)
- Failure to recognise there is no single *universal transfusion trigger* reduced our credibility with clinicians in the past
- Will include new technologies to assess tissue oxygenation (red cells), clinically relevant tests of haemostatic function (platelets, FFP, fibrinogen) and use of patient-reported QoL measures to plan the optimum transfusion interval and dose in MDS



Building the evidence base for clinical transfusion

- Identify the gaps in our knowledge
 - challenge received wisdom (*Eminence Based Medicine*)
 - systematic reviews
- High quality, multidisciplinary clinical research (including RCTs!) focused on patient centred outcomes
- Exploit the myriad opportunities for clinical transfusion research and enthuse young clinicians



Are nine checkers better than one?
(staffing ratios were better in 1876)

Changing clinical practice

- is really difficult

- What we do now has limited impact
 - guidelines sit in drawers
 - audits produce little change in practice
 - we often *preach to the converted*
 - “one off” interventions quickly peter out



“Faced with the choice of changing one’s mind and proving that there is no need to do so, almost everybody gets busy on the proof”

JK Galbraith (Economist)

So, what can we do better?

- Develop guidelines (and research projects) *with* blood-using clinicians and disseminate them through specialist networks and modern IT
- Catch 'em young – before career-long patterns of behaviour are established
- Work with psychologists and social scientists to apply research on human behaviour and identify pragmatic, cost effective interventions that can be tested in the field
- Learn lessons from other disciplines
 - recruit charismatic *opinion leaders* (Pharma)
 - *Pay for Performance* (but risk of gaming and perverse incentives)

Of course, it's all been done before ...

- “Success in changing behaviour is based on 12 principles centred on:
 - *Clear guidelines*
 - *precommitment*
 - *positive reinforcement*”
- Perhaps we need *FFP Anonymous*? (although it's recognised that the programme often fails in the most hardened cases)

Alcoholics Anonymous



In conclusion



- Hospital transfusion is now remarkably safe considering its organisational complexity and the human factors involved
- Our success with patient and sample ID, multidisciplinary team working, rigorous laboratory standards and application of evidence are paradigms for other areas of clinical practice
- There may be trouble ahead – organisational, financial, technological – and the next transfusion-transmitted disease is waiting to ambush us
- **But** – we should be very proud of our achievements and the future is sure to be exciting (and interesting!)



*“Many of us talk in our sleep.
The distinctive achievement of lecturers
is to talk in other people’s sleep.”*

Raymond Tallis

Physician and philosopher