

# Cell salvage and the NICE guidelines

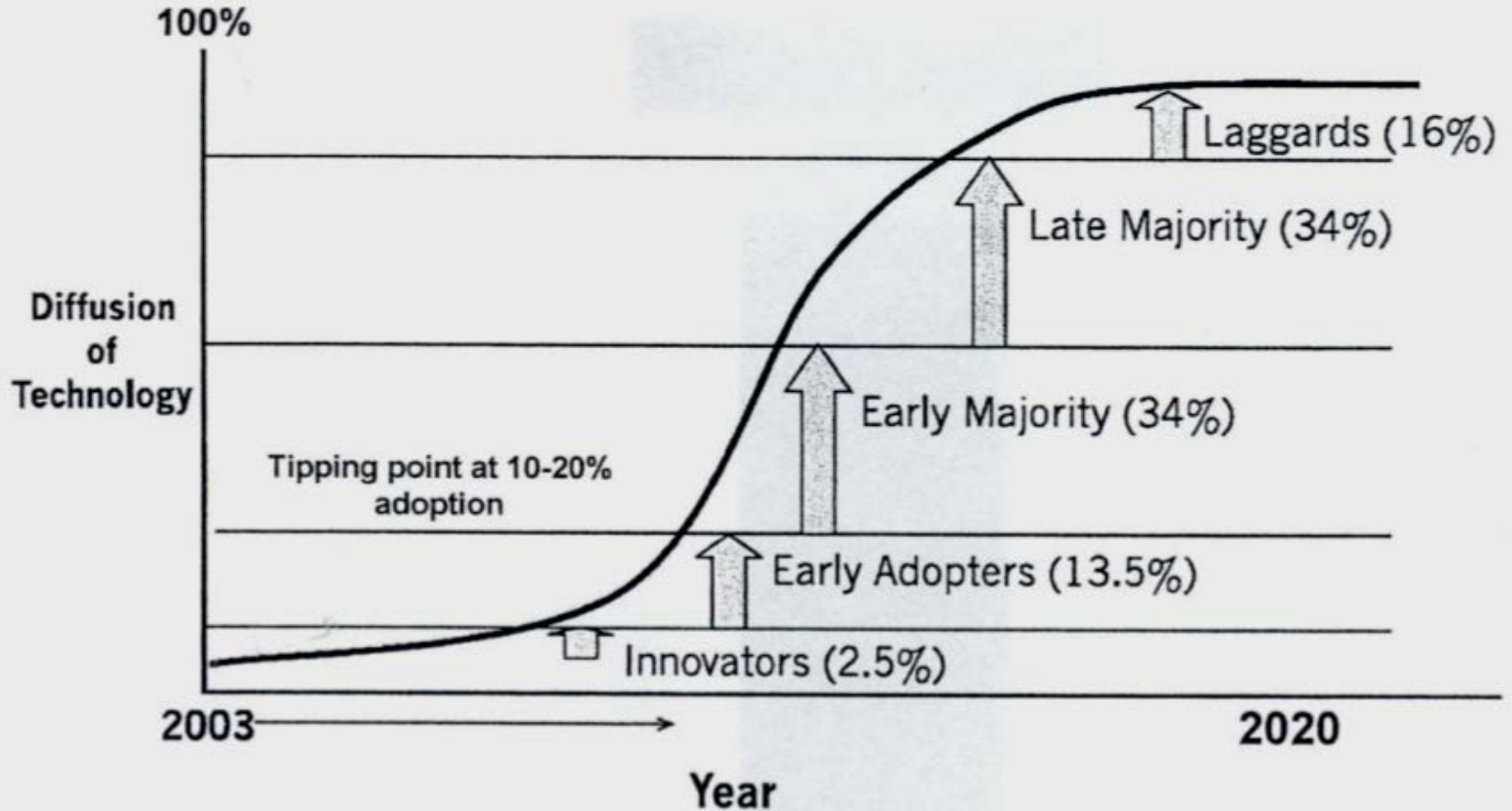
**Dr. Dafydd Thomas**

**Director of Cardiac ITU**

**Welsh Blood Service**

**Past President BBTS + NATA**

**Chair SHOT Steering Group**

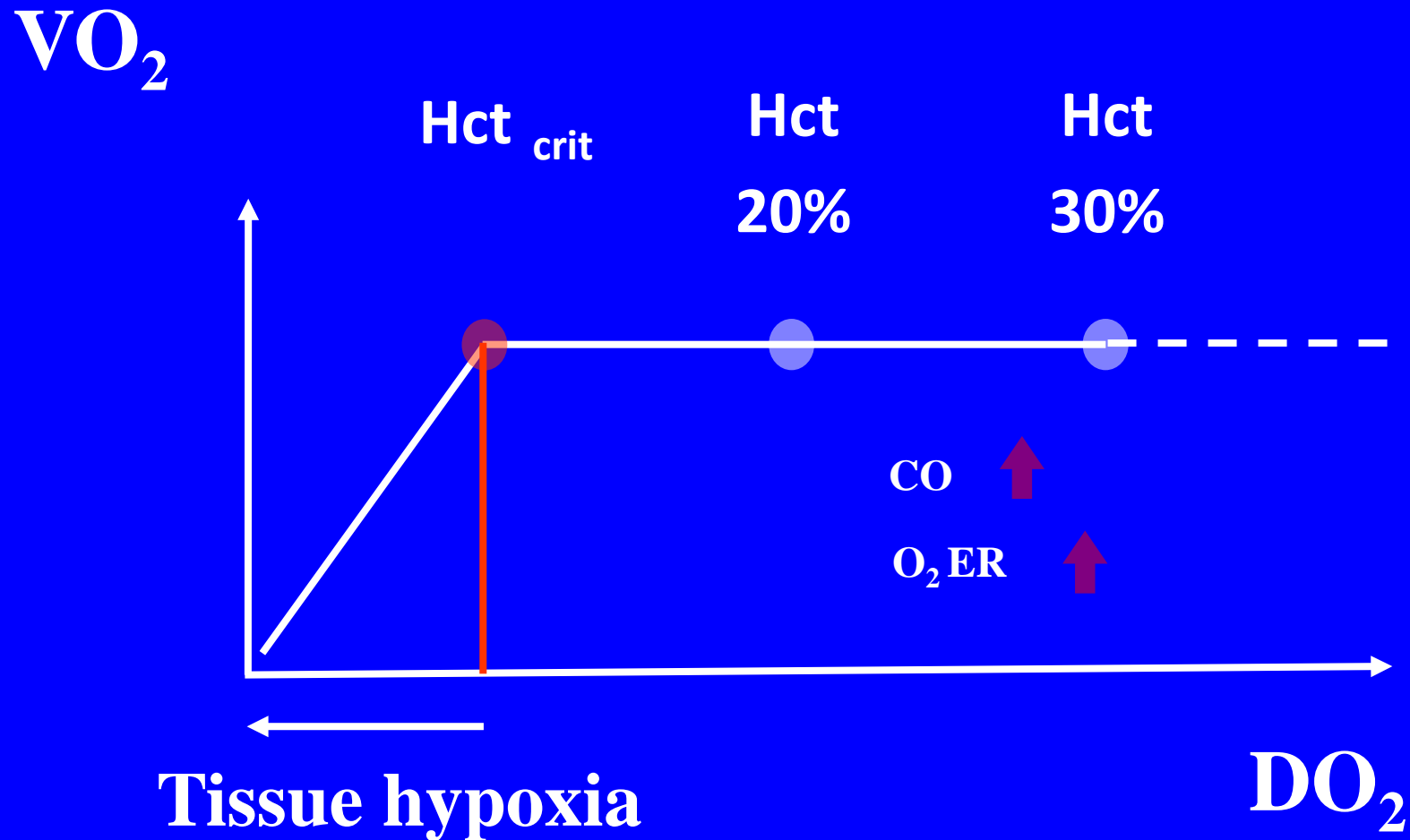


## Hub Wollersheim NATA (Linz)

# Safety issues

I have always tried to use alternatives to transfusion whenever safe to do so

# Limits of Intentional Hemodilution



# Safety issues

I have always tried to use alternatives to transfusion whenever safe to do so

BUT

The alternatives need to be under the same scrutiny as we give to conventional transfusion

# Safety issues

“Anything that can go wrong  
will go wrong”

Captain Edward A. Murphy 1949

*Murphy's law*

# Wrong blood to the wrong patient



- Two people, one name
- One is a consultant anaesthetist, the other is the only gay in Llandewi Breffi
- Do you know which is which?

# Nice Guidelines

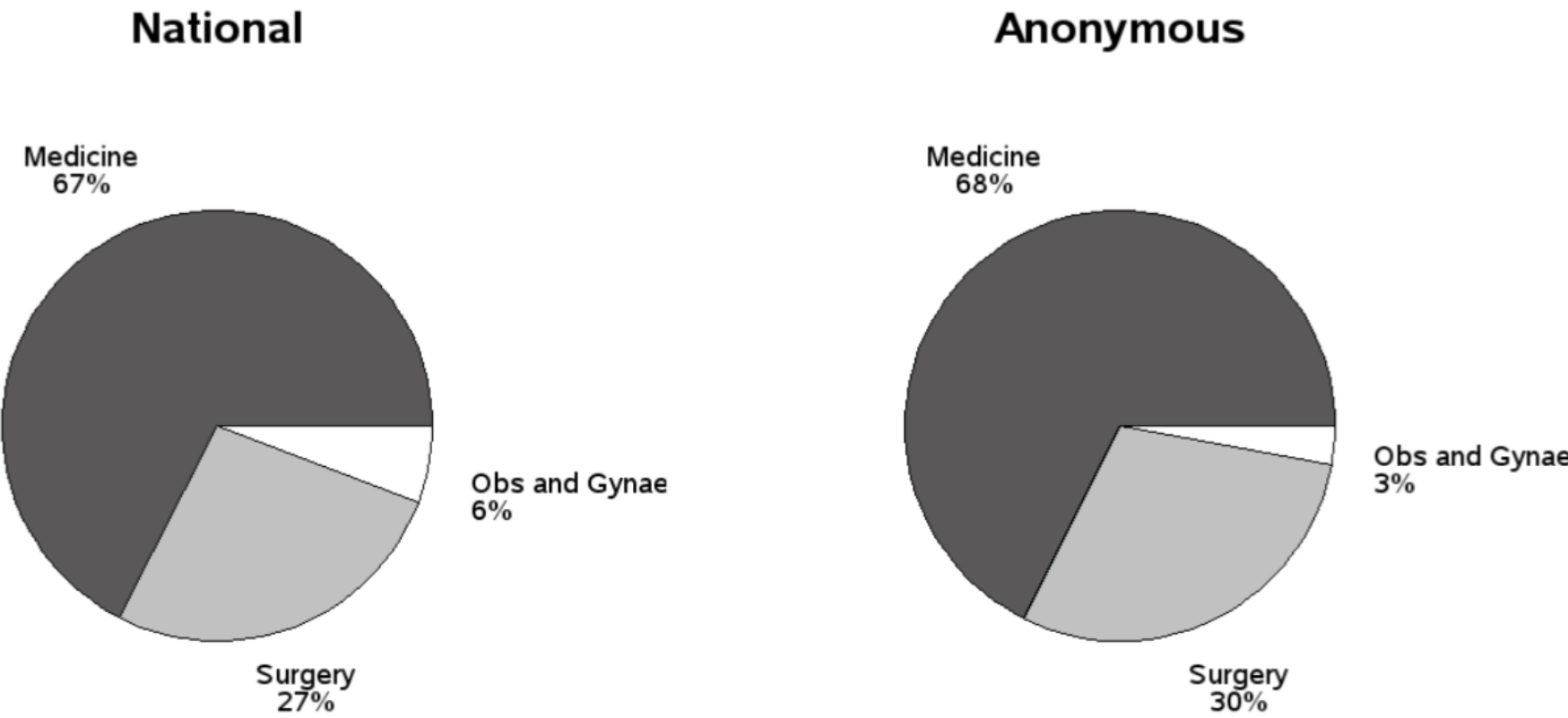
- Rules of engagement
  - Scope of work – separate Trauma and Massive haemorrhage group
  - Evidence base
  - Economic modeling
  - Reliance on GDG (Guidance Development Group)
  - Mature approach



# Nice Guidelines

- Rules of engagement
  - Meetings took place over an 18 month period
  - Primary aim to produce guidance for cost-effective treatment
  - Against a background of changing practice

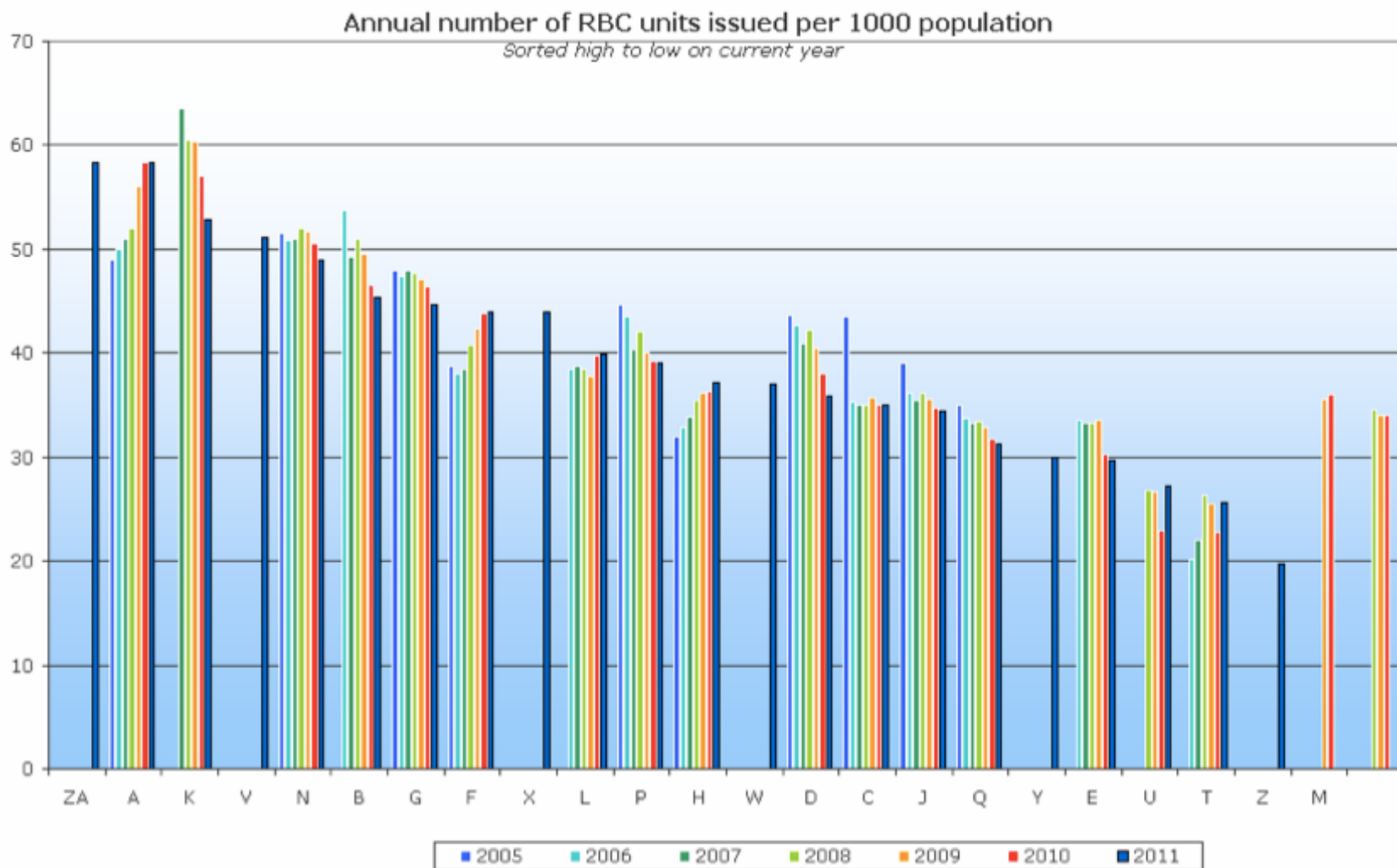
**Figure 2 Broad group of indications for red cells transfused**



# Nice Guidelines

- Rules of engagement
  - 25% decrease in use of red cells

# Red Cell units issued per 1,000 population



Comments: Wide range (20 - >50), Demand mostly stable or in slight decline

# Nice Guidelines

- Rules of engagement
  - Meetings took place over an 18 month period
  - Primary aim to produce guidance for cost-effective treatment
  - Against a background of changing practice
  - Higher use of red cells compared with many countries
  - Inappropriate use of components and increase the use of alternatives

**Table 2 Number (%) of red cell units transfused, by cycle and specialty**

Specialty	National				Anonymous			
	Cycle 1		Cycle 2		Cycle 1		Cycle 2	
	N	%	N	%	N	%	N	%
Cardiothoracic Surgery	1352	(6.2)	1404	(5.7)	12	(2.7)	9	(2.2)
ENT	98	(0.5)	96	(0.4)	.	.	1	(0.2)
Gastrointestinal Surgery	839	(3.9)	925	(3.8)	9	(2.0)	12	(3.0)
Neurosurgery including head injury	126	(0.6)	153	(0.6)	12	(2.7)	7	(1.7)
Trauma	1046	(4.8)	1147	(4.7)	22	(4.9)	26	(6.4)
Urology	454	(2.1)	488	(2.0)	11	(2.4)	.	.
Solid Organ Transplant	220	(1.0)	266	(1.1)	9	(2.0)	5	(1.2)
Vascular Surgery	533	(2.5)	558	(2.3)	24	(5.3)	4	(1.0)
Orthopaedics	975	(4.5)	836	(3.4)	47	(10.4)	25	(6.2)
Plastic Surgery	103	(0.5)	104	(0.4)	9	(2.0)	2	(0.5)
Other Surgery	245	(1.1)	350	(1.4)	2	(0.4)	5	(1.2)
Obs & Gynae	1294	(6.0)	1396	(5.7)	19	(4.2)	6	(1.5)
Neonatal/Fetal	247	(1.1)	307	(1.3)	8	(1.8)	2	(0.5)
GI Bleed	2769	(12.8)	2608	(10.7)	60	(13.3)	34	(8.4)
Non-haematological anaemia	5607	(25.9)	7029	(28.8)	89	(19.7)	157	(38.8)
Haematological	5769	(26.6)	6747	(27.6)	119	(26.3)	110	(27.2)
Not reported	6	(0.0)	14	(0.1)	.	.	.	.
<b>TOTAL units</b>	<b>21683</b>	<b>(100.0)</b>	<b>24428</b>	<b>(100.0)</b>	<b>452</b>	<b>(100.0)</b>	<b>405</b>	<b>(100.0)</b>

# Nice Guidelines

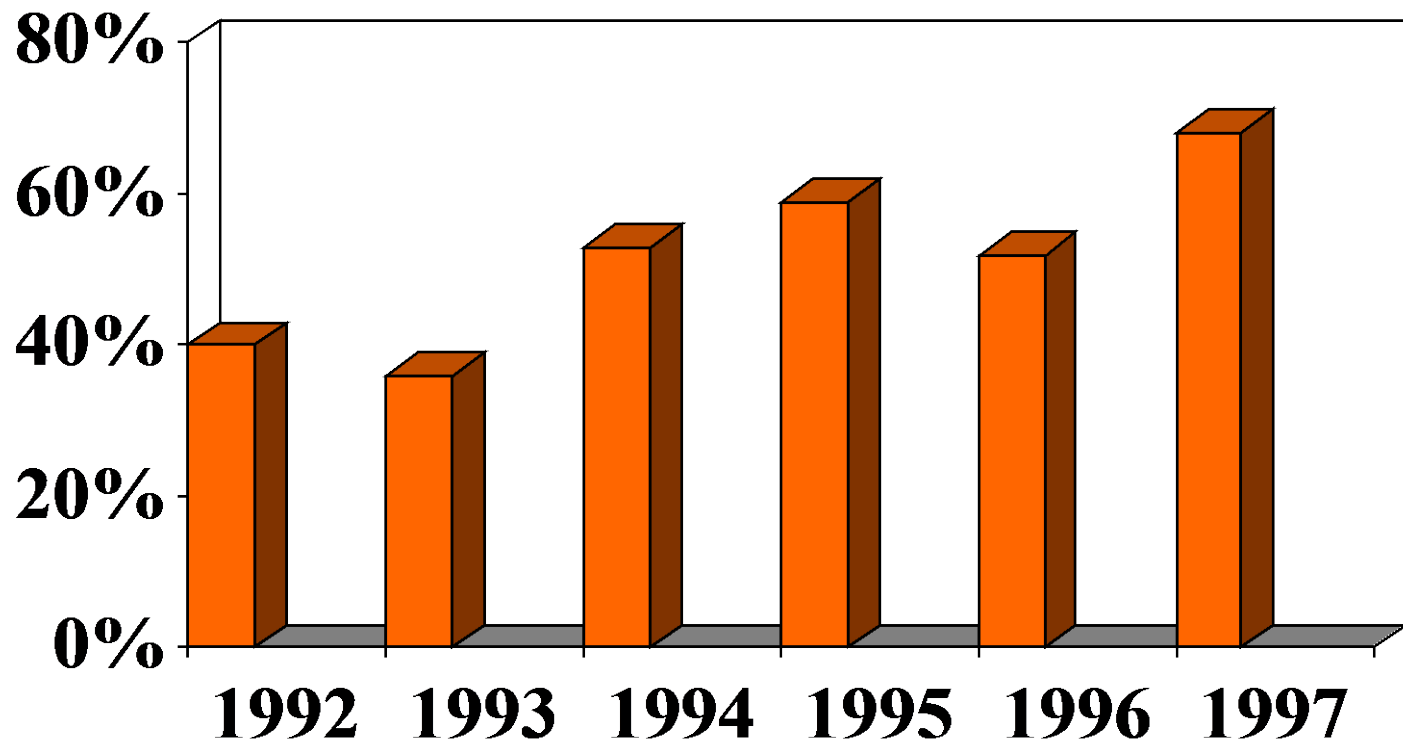
- Rules of engagement
  - 25% decrease in use of red cells
  - Estimated 20% of blood used deemed to be inappropriate according to NCA 2013

# Nice Guidelines

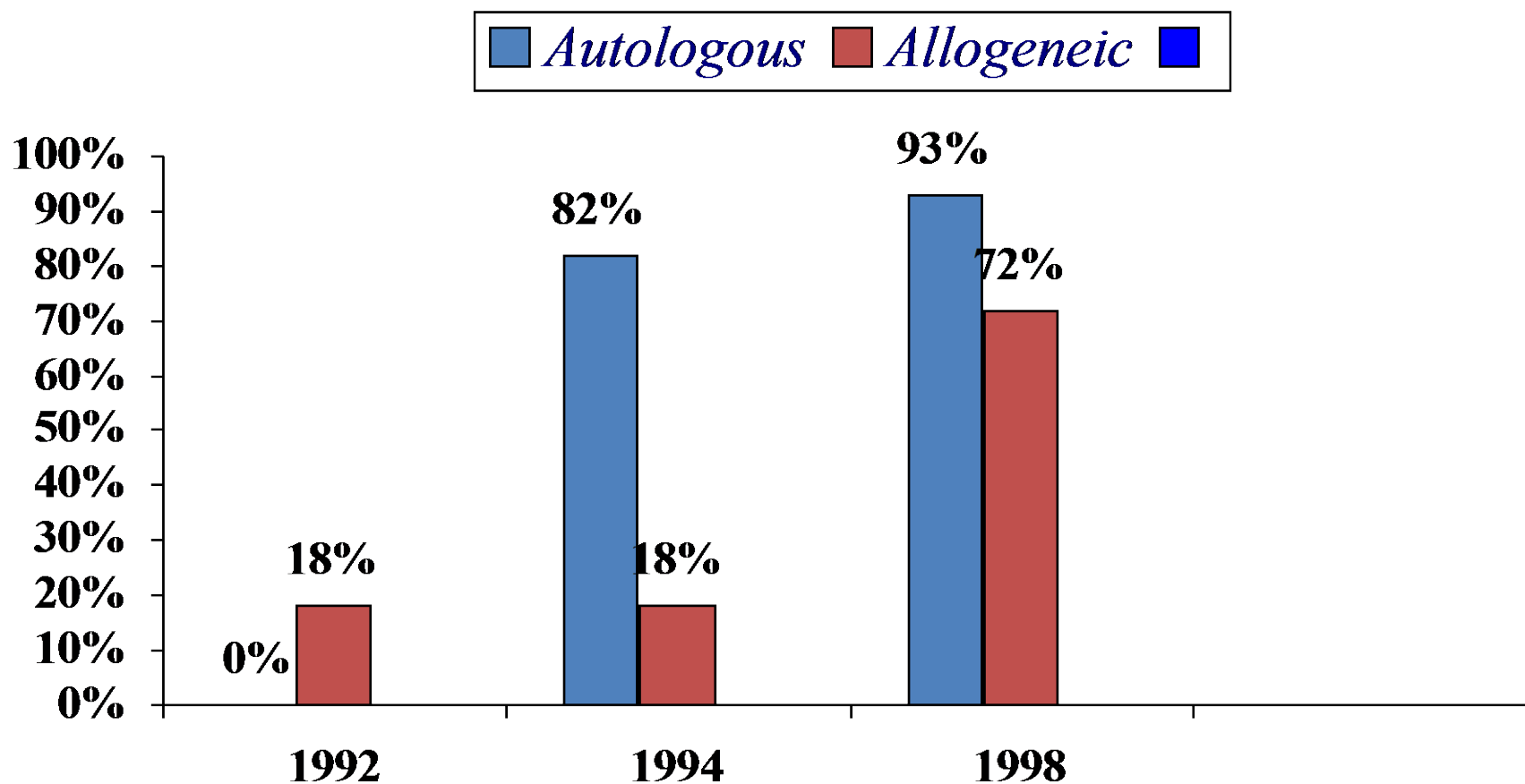
- Rules of engagement
  - 25% decrease in use of red cells
  - Estimated 20% of blood used deemed to be inappropriate according to NCA 2013
  - A need to be even handed and fair when assessing effectiveness and cost
  - Using CURRENT evidence from 2003 (therefore excluding all studies before 2003!)



## AAA's avoiding allogeneic transfusion



# Avoidance of allogeneic blood



# Knee Replacement Surgery

## Need for homologous Tx

**7% in autologous group**

**28% in homologous group**

**( $p = 0.001$ )**

*Thomas et al Autologous blood transfusion in total knee replacement surgery BJA 86 (5): May (2001)*

# Mechanical methods of reducing blood transfusion in cardiac surgery: randomised controlled trial

- RCT
- 252 (263) Adults Aged 18-80 yrs
  - Elective CABG

84 patients in each group

IOCS

26

0.68 units

IOCS + ANH

ns

Control

46

1.07 units

# Intraoperative blood salvage in abdominal trauma

**September 1992 - July 1997**

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**22 patients**

**Total amount of blood salvaged 57,641ml**

**Mean blood salvaged per patient 2,402 ml**

**Unit equivalent (1 unit = 250 ml) mean 9.61**

**Hughes LG, Thomas DW, Wareham K et al. Anaesthesia March 2001**

# Nice Guidelines

- Rules of engagement
  - Level of evidence stated in all recommendations
  - Erythropoietin
  - IV Iron
  - Cell Salvage and Tranexamic Acid

# Nice Guidelines

- Rules of engagement
  - Level of evidence stated in all recommendations
  - Erythropoietin
  - IV Iron
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**All based on very low to low quality evidence from RCT's and original, cost-effectiveness analysis and the experience and opinion of GDG.**

# Nice Guidelines

- Rules of engagement
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# England beat Australia 44-40 in final Test to complete series whitewash

By James Standley  
BBC Sport

🕒 25 June 2016 | [Rugby Union](#)

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Billy Vunipola scored the third of England's four tries in Sydney

**Australia (18) 40**

**Tries:** Foley, Haylett-Petty, Hooper, Folau, Naiyaravoro **Cons:** Foley 3 **Pens:** Foley 3

**England (17) 44**

**Tries:** Cole, Brown, B Vunipola, George **Cons:** Farrell 3 **Pens:** Farrell 6

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### Wales reach Euro 2016 semi-finals - reaction

Wales 3-1 Belgium match highlights BBC Sport 3:29

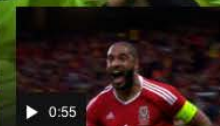
2 Jul 2016

HIGHLIGHTS: Wales 3-1 Belgium



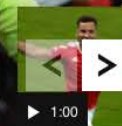
Don't be afraid to dream - Wales boss Coleman

BBC Sport



Wales equalise through Ashley Williams header

BBC Sport



Hal Robson-Kanu put Wales in the Belgium

BBC Sport

#### Summary

- Wales beat Belgium 3-1 to reach Euro 2016 semi-final
- Ashley Williams, Hal Robson-Kanu and Sam Vokes the Wales goalscorers
- Portugal next up on Wednesday for a place in the final
- 'Amazing performance, amazing result' - Prime Minister David Cameron
- GET INVOLVED #bbceuro2016

#### Live reporting

By Jamie Lillywhite

Get involved

14:30  
2 Jul



#### Vote

Can Wales win Euro 2016?

We are sorry; this vote is now closed. Here are the results:

**YES**

74%

**NO**

26%

# PBM

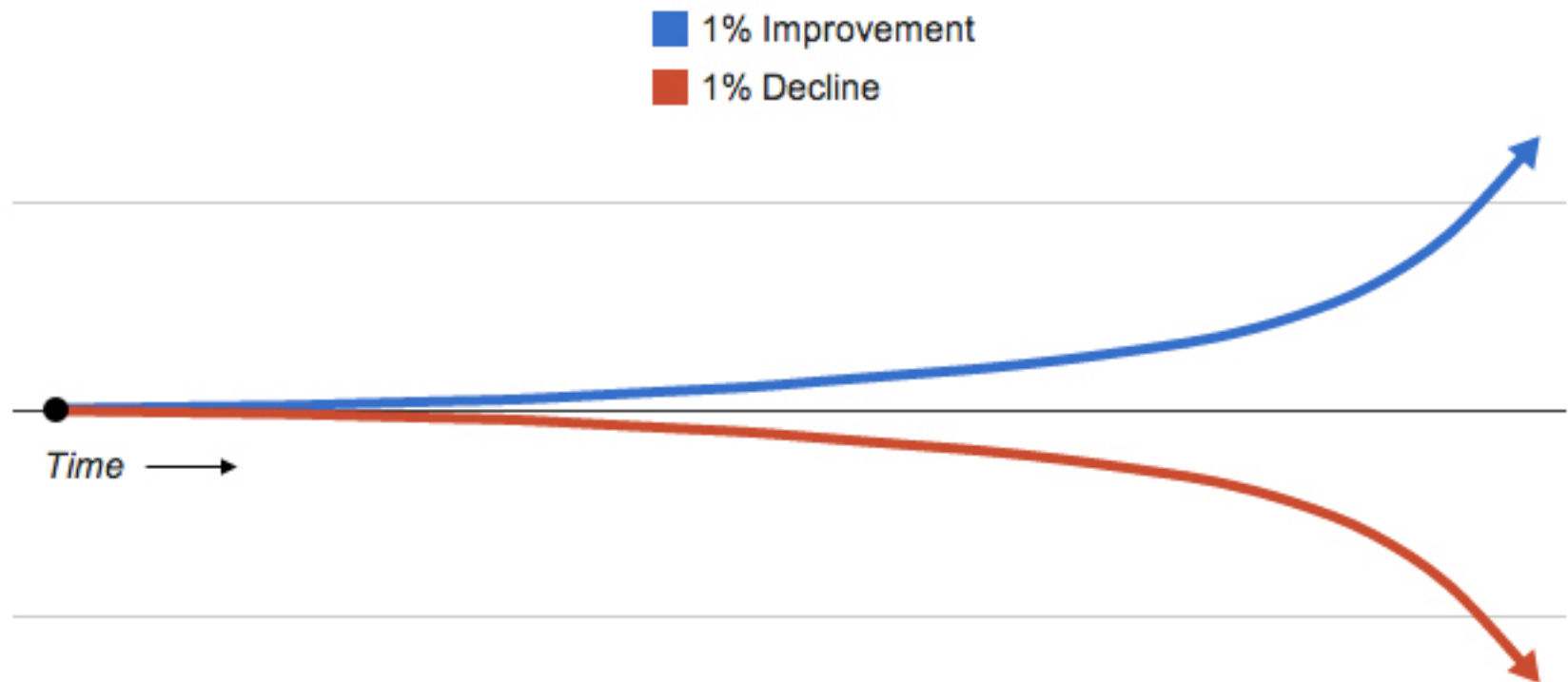


In 2010, Dave Brailsford faced a tough job. No British cyclist had ever won the Tour de France, but as the new General Manager and Performance Director for Team Sky (Great Britain's professional cycling team), that's what Brailsford was asked to do. His approach was simple: Brailsford believed in a concept that he referred to as the "aggregation of marginal gains."

lifehacker



# Aggregation of Marginal Gains



Inspiration for this image came from a [graphic](#) in The Slight Edge by Jeff Olson.

# Putting NICE guidance into practice

- Costing Statement
- Prices from NHS Supply Chain Catalogue
- In the cost economic argument have to allow for Staff time – 3 hours!
- Unrealistic estimate?
- Multi-tasking expected

# Putting NICE guidance into practice

Local audit essential to justify use

Availability – utility of safe care.

Meaningless when such low evidence

No-one on the GDG disagreed with the principle that cell salvage is useful in high blood loss or unexpected haemorrhage cases.



## All Wales Intra-Operative Cell Salvage Data Collection Form

This form should be completed for every surgical case where blood has been collected with the intention of intra-operative cell salvage EVEN if the blood collected is not processed.

<b>1. Trust</b>	<b>Hospital</b>	<b>Code No.</b>
<b>2. Patient Details</b> (stickers on all copies please)		
Hospital number		<b>3. Procedure details</b>
Surname		
Forename		
Gender <input type="checkbox"/> Male <input type="checkbox"/> Female		
Address		
		Name of procedure
		Date of operation     /     /     /
		<input type="checkbox"/> In hours <input type="checkbox"/> Emergency
		<input type="checkbox"/> Out of hours <input type="checkbox"/> Elective
		<input type="checkbox"/> Malignancy <input type="checkbox"/> Infected fields
		<input type="checkbox"/> Obstetrics <input type="checkbox"/> Trauma
		Surgeon
		Anaesthetist
D.O.B.		Cell Salvage Operator

<b>4. Cell Saver Equipment Used</b>			
<input type="checkbox"/> Cobe/Dideco	<input type="checkbox"/> Haemonetics	<input type="checkbox"/> CATS	<input type="checkbox"/> Other
<b>Anti-coag used</b>	<input type="checkbox"/> Heparin	<input type="checkbox"/> Citrate	<input type="checkbox"/> Other
<b>Blood filter used</b>	<input type="checkbox"/> 40µ filter	<input type="checkbox"/> Leucodepletion filter	

<b>5. Reason why collection set was used but the blood was not processed</b>	
<input type="checkbox"/> Inadequate volume collection	<input type="checkbox"/> Training purposes <input type="checkbox"/> Technical problem
<b>Equipment used</b> (unprocessed cases only)	
<input type="checkbox"/> Collection reservoir	Lot No.
<input type="checkbox"/> Whole set	Lot No.

<b>6. Blood Volume Details</b>			
Total volume processed (ml)		Time collection started	
Volume packed RBC produced (ml)		Time processing started	
Volume packed RBC transfused (ml)		Time transfusion started	
Volume of anticoagulant used (ml)		Number bank RBC units given	
Estimated total blood loss (ml)		Number bank FFP units given	
		Number bank platelet units given	
<b>Why were additional components given</b>			

<b>7. Comments / Problems / Critical incidents</b> (please use another sheet if required)

# Welsh Blood Service Cell Salvage Database

We are aware that many operations particularly the orthopaedic procedures for joint replacement do not always save enough blood to warrant processing and reinfusion.

Local audit will tell you which cases to cell salvage

If not justified – unnecessary expense

# Historic perspective

- Surgery has moved on
- Tolerance of anaemia has changed

# Historic publications

- Surgery has moved on
- Tolerance of anaemia has changed – not by patients but by us!

# Historic understanding

- Surgery has moved on
- Tolerance of anaemia has changed – not by patients but by us!
- Knee replacement much more commonplace
- ERAS drink clear fluid
- Avoidance of opiates
- LA and tranexamic acid
- No drains

# Nice guidance

- Dis-investment in cell salvage
- Truro experience
- Targeted use
- Utility category for cell salvage



## The use of blood components and their alternatives 2016

Published by  
The Association of Anaesthetists of Great Britain & Ireland

July 2016

# Guidelines

## AAGBI guidelines: the use of blood components and their alternatives 2016

A. A. Klein,<sup>1</sup> P. Arnold,<sup>2</sup> R. M. Bingham,<sup>3</sup> K. Brohi,<sup>4</sup> R. Clark,<sup>5</sup>  
R. Collis,<sup>6</sup> R. Gill,<sup>7</sup> W. McSparran,<sup>8</sup> P. Moor,<sup>9</sup> R. Rao Baikady,<sup>10</sup>  
T. Richards,<sup>11</sup> S. Shinde,<sup>12</sup> S. Stanworth<sup>13</sup> and T. S. Walsh<sup>14</sup>



This guideline was originally published in *Anaesthesia*. If you wish to refer to this guideline, please use the following reference:

Association of Anaesthetists of Great Britain and Ireland. AAGBI guidelines: the use of blood components and their alternatives 2016 *Anaesthesia* 2016; 71: 829-842.

This guideline can be viewed online via the following URL:  
<http://onlinelibrary.wiley.com/doi/10.1111/anae.13489/full>

- 4 Red blood cells should be transfused one unit at a time, and the patient's Hb should be checked before each unit transfused, unless there is ongoing bleeding or a large deficit that needs correcting.
- 5 The use of intra-operative cell salvage and tranexamic acid administration should be considered in all non-obstetric patients where blood loss > 500 ml is possible and in traumatic and obstetric major haemorrhage.
- 6 Blood components should be prescribed for small children by volume rather than number of units.
- 7 Every institution should have a massive transfusion protocol which is regularly audited and reviewed.

# More evidence?

# Update the guidelines!