



*Blood and Transplant*

# **2013 National Patient Blood Management Survey**

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## **Patient Blood Management**

*An evidence-based approach to patient care*

### **Rationale**

*Patient Blood Management* (PBM) is an evidence-based, multidisciplinary approach to optimising the care of patients who might need transfusion. It puts the patient at the heart of decisions made about blood transfusion to ensure they receive the best treatment and avoidable, inappropriate use of blood and blood components is reduced. It represents an international initiative in best practice for transfusion medicine.

National, regional and local audits in England consistently show inappropriate use of all blood components; 15-20% of red cells and 20-30% of platelets/plasma. Evidence shows that the implementation of PBM improves patient outcomes by focussing on measures for the avoidance of transfusion and reducing the inappropriate use of blood and therefore can help reduce health-care costs.

### **Why does PBM matter?**

#### **Patient benefit**

PBM improves patient care by reducing inappropriate transfusion and also helps to ensure the availability of blood components for those patients where there are no transfusion alternatives.

#### **Cost to the NHS**

Previous *Better Blood Transfusion* initiatives have been very successful, for example by reducing red cell usage by over 20% over the last ten years. Through sharing data on blood usage, providing examples of best practice and overcoming barriers to change, it should be possible to reduce the current high level of inappropriate use of blood components described above. The NHS will save money by only transfusing blood components to those patients that really need them.

#### **Who needs to be involved?**

PBM needs leadership and support at every level, including national and regional leaders, hospital management, and health professionals.

#### **2013 PBM Survey**

In October 2013 all NHS Trusts in England were surveyed about their readiness for PBM. 144/ 149 (97%) Trusts sent a response and their replies are incorporated into the remainder of this document.

## Preparedness for PBM

Being prepared for PBM includes having policies which support the principles of PBM, as well as procedures on how to implement those policies and having the resources to do so. Resources include medical and nursing staff and laboratory systems capable of facilitating PBM.

## Hospital Transfusion Committees

59/144 (41%) of Hospital Transfusion Committees do not include PBM in their remit or mention the development of a PBM working group.

## Consultant haematologists

140/144 (97%) Trusts have a consultant haematologist assigned to transfusion medicine. However, there is a variation in the number of Programmed Activities (PAs) assigned to transfusion (Table 1).

Table 1 – Consultant haematologists in trusts

Number of Trusts with a consultant haematologist (%)	Number of assigned PAs
51 (46%)	None
18 (16%)	<1
22 (20%)	1
2 (2%)	1.5
8 (7%)	2
4 (3%)	3
3 (3%)	4
2 (2%)	5
2 (2%)	5+

112/140 (80%) sites provided information.

*Comment: 46% of the Trusts that responded to this question did not have a Consultant Haematologist with designated PAs in transfusion medicine. Poor clarity about Consultant Haematologist involvement in transfusion and amount of assigned PAs may be a determining factor. It is disappointing that 28 responding sites did not answer this question.*

### Transfusion Practitioners (TPs)

- All Trusts have at least one Transfusion Practitioner (TP), either full or part-time
- 35 (24%) Trusts do not have a full-time TP and 22 of them have only 1 part-time TP. In those 22 Trusts, the median Whole Time Equivalent (WTE) for the TP is 0.6

### Full time transfusion practitioners

Table 2 – Number of Whole time TPs in Trusts

Number of Whole time TPs	Whole time TPs	
	Number of Trusts	%
0	35	24.3%
1	82	56.9%
2	21	15.6%
3	5	3.5%
4	1	0.7%

### Part time transfusion practitioners

Table 3 – Number and WTE of Part time TPs in Trusts

Number of Part time TPs	Part-time TPs	
	Number of Trusts	%
1	22	62.9%
2	9	25.7%
3	3	8.6%
4	1	2.9%
WTEs		
WTE amount	Number of TPs	
0.1 to 0.4	21	
0.5 to 0.7	40	
0.8 to 0.9	20	

### Proportion of TP time spent on PBM activities

- 110/179 (61%) of TPs spend 30% or less of their contracted time on PBM activities

### *Comment*

- *More time will need to be spent on PBM for its implementation to be successful*

Table 4 - Time TPs spend on PBM Activities

% Time that TPs spend on PBM	
%	Number of TPs*
0-10%	53
11-20%	43
21-30%	14
31-40%	19
41-50%	17
51-60%	17
60% +	16

\* Some Trusts have more than 1 TP, so the denominator is 179

### Supporting staff

Our survey showed that fewer than 50% of Trusts had additional staff, such as a transfusion team administrator, transfusion data analyst, blood transfusion quality manager and IT support, who are required to support the PBM process and that many of those staff in post are less than an 0.5 WTE.

### Blood transfusion laboratory information systems (LIMS)

- A total of 30 different LIMS used for blood transfusion were reported (see Appendix A)
- Effective implementation of PBM requires Trusts to collect data on blood usage for feedback to clinicians
- Few Trusts had LIMS capable of collecting data on the clinical reason for transfusion
- There were numerous comments about the challenges of wanting to extract data from LIMS on where and why blood is being used. These mainly related to the accuracy and quality of the data and/or having pathology IT personnel to search and generate reports
- Trusts may need to consider commissioning replacement LIMS that will provide data to support PBM

*Comment: The diversity of systems is problematic for effective connectivity between these and other hospital information systems. Trusts should be encouraged to only commission LIMS that will communicate with other relevant IT systems and can capture information necessary to demonstrate that PBM is operating and is effective.*

### Using LIMS to facilitate PBM

Trusts need to collect data on blood component usage and feedback these data to clinicians in a timely manner to facilitate PBM. Few Trusts had LIMS capable of collecting data on the clinical reason for transfusion electronically at the time of request (see Table 5).

Table 5 – Trusts using LIMS to facilitate PBM

Using LIMS to facilitate PBM	Number (%) of Trusts recording 'Yes'	Your Trust
Do you use electronic order communications for requesting blood components for transfusion?	35/144 (24%)	Yes
Do you record clinical reason within the blood transfusion laboratory information system?	101/144 (70%)	Yes
If yes, is this a mandatory field?	69/144 (48%)	Yes
If you do record clinical reason, is there a menu driven approach?	50/144 (35%)	Yes
Are the national indication codes for transfusion used as a justification for transfusion?	48/144 (33%)	No
If yes, are they mandatory?	17/144 (12%)	No Data
If used, is this information recorded within the blood transfusion laboratory information system?	28/144 (19%)	No Data
Is the date of transfusion recorded within the blood transfusion laboratory information system?	119/144 (83%)	Yes
Is the time of transfusion recorded within the blood transfusion laboratory information system?	81/144 (56%)	Yes

Many comments were given on 'the main challenges for hospitals that arise with wanting to extract data from LIMS on where and why blood is being used' (so that the information can be feedback to clinical users on a regular basis). They mainly related to the accuracy and quality of these data and/or having pathology IT personnel available to search and generate reports.

### Training staff and educating patients

The survey showed that transfusion training for junior medical staff is neither universal nor complete, as shown in Tables 6 and 7.

Table 6 - Transfusion training at induction/within first month

Is transfusion training taking place at induction / within the first month?	Yes (%)	% Receiving transfusion training at induction / first month?
	<b>n=144</b>	<b>Mode*</b>
Foundation doctors (F1/F2)	<b>126 (88%)</b>	91 - 100%
Core trainees (ST1 and ST2)	<b>103 (72%)</b>	91 - 100%
Speciality Trainees (ST3 and above)	<b>102 (71%)</b>	91 - 100%
Consultants	<b>85 (59%)</b>	91 - 100%
Staff grade doctors (non-training grade)	<b>91 (63%)</b>	91 - 100%
Nurses	<b>116 (81%)</b>	91 - 100%
Midwives	<b>101 (70%)</b>	91 - 100%
Phlebotomists	<b>94 (65%)</b>	91 - 100%
Porters	<b>81 (56%)</b>	91 - 100%
ODPs	<b>105 (73%)</b>	91 - 100%
Others	<b>27 (19%)</b>	91 - 100%

\*Mode represents the most commonly selected option in the range of choices (i.e. 0-10%, 11-20% 21-30%, etc.).

Comment:

Table 6 shows that most Trusts offer training to the majority of clinicians, but it is understood that responsibility for using blood routinely falls on the more junior grades, not all of whom are receiving training.

28 (19%) Trusts did not comment on the training of their F1/F2 doctors and 33 (23%) did not send data on how they trained their Core or Speciality Trainees. This suggests that a substantial proportion of junior doctors may not be receiving transfusion training early, a factor which will influence effective PBM.

A target date should be set by which Trusts can demonstrate that all junior doctors have been given some form of education about how PBM is to be achieved and maintained.

Not all Trusts deliver a training package that fully covers those topics central to PBM (see Table 7).

Table 7 – Transfusion Training Topics

Training	Yes (n-144)	%	Your Trust
Transfusion triggers and targets	<b>115</b>	80%	<b>Yes</b>
Indications for transfusion	<b>122</b>	85%	<b>Yes</b>
Risk and benefits of transfusion	<b>121</b>	84%	<b>Yes</b>
Alternatives to transfusion	<b>109</b>	76%	<b>Yes</b>
Consent for transfusion	<b>122</b>	85%	<b>Yes</b>

## Provision of patient information and documentation of consent

In general fewer than 65% of Trusts provide information about blood transfusion and document consent for the majority of their patients who might need transfusion (Table 8).

Table 8: Information and consent for specialist groups of patients

	Risks, benefits and alternatives are discussed with all patients who might need transfusion	A patient information leaflet is given to all patients who might need transfusion	Documentation of valid consent is found in the notes of all patients who might need transfusion
Medical patients	n = 91 0-10% = 13 (14%) 11-60% = 43 (47%) 60% + = 35 (39%)	n = 97 0-10% = 21 (22%) 11-60% = 44 (45%) 60% + = 32 (33%)	n = 93 0-10% = 28 (30%) 11-60% = 38 (41%) 60% + = 27 (29%)
Surgical patients	n = 92 0-10% = 6 (6%) 11-60% = 37 (40%) 60% + = 49 (54%)	n = 100 0-10% = 14 (14%) 11-60% = 40 (40%) 60% + = 46 (46%)	n = 97 0-10% = 18 (19%) 11-60% = 35 (36%) 60% + = 44 (45%)
Paediatric patients	n = 83 0-10% = 7 (8%) 11-60% = 28 (34%) 60% + = 48 (58%)	n = 89 0-10% = 15 (17%) 11-60% = 30 (34%) 60% + = 44 (49%)	n = 86 0-10% = 19 (21%) 11-60% = 24 (29%) 60% + = 43 (50%)
Obstetric patients	n = 87 0-10% = 8 (9%) 11-60% = 27 (31%) 60% + = 52 (60%)	n = 92 0-10% = 15 (16%) 11-60% = 40 (43%) 60% + = 37 (41%)	n = 91 0-10% = 17 (19%) 11-60% = 38 (42%) 60% + = 36 (39%)
Emergency admissions	n = 85 0-10% = 28 (33%) 11-60% = 40 (47%) 60% + = 17 (20%)	n = 91 0-10% = 50 (55%) 11-60% = 29 (32%) 60% + = 12 (13%)	n = 89 0-10% = 45 (50%) 11-60% = 26 (29%) 60% + = 18 (21%)
Other groups	n = 24 0-10% = 6 (25%) 11-60% = 4 (17%) 60% + = 14 (58%)	n = 30 0-10% = 10 (33%) 11-60% = 8 (27%) 60% + = 12 (40%)	n = 30 0-10% = 12 (40%) 11-60% = 7 (23%) 60% + = 11 (37%)

**(The highest % in each column is highlighted)**

### Policies to support PBM

Policies that embrace the principles of PBM help create the environment and culture that promotes good transfusion practice.

Table 9 – Number of Trusts with policies to support PBM

Policy	Number (%) Trusts with policy	Your Trust
Identify and correct the underlying cause of anaemia before considering transfusion	66/144 (46%)	Has a policy
Minimise the volume and frequency of blood samples to prevent iatrogenic anaemia	31/144 (22%)	Has a policy

*Comment: There is considerable scope for Trusts to create and implement policies in these two areas, which is likely to lead to fewer transfusions and improved patient outcomes.*

### Patient Blood Management Practice

Aside from having the staff, resources, systems and policies in place, the survey sought to determine the extent to which PBM practice is currently in place. A key feature is the provision of information, through monitoring and audit, on blood use.

### Cross-charging blood components to clinical specialties

49/144 (34%) Trusts cross-charge clinical specialties for blood, which is one way of regularly providing data on blood usage to clinical teams.

**Your Trust does cross-charge.**

### **Systems for, and frequency of, reporting blood component usage to individual clinicians or clinical teams**

63/144 (44%) Trusts have a system in place to report blood component use to individual clinicians or clinical teams. The frequency of reporting is shown in Table 10.

Table 10 – Frequency of reporting blood component usage

Frequency of reports	N Trusts reporting
Weekly	0
Monthly	28 (44%)
Quarterly	19 (30%)
Annually	6 (10%)
Other interval	8 (13%)

Reports on blood component usage are produced by a variety of staff.

Table 11 – Staff who produce reports showing blood usage

Who reports?	n Trusts
Finance	13 (15%)
Lab Manager	30 (35%)
Data analyst	7 (8%)
TP	22 (26%)
HTC Chair	0
Other	14 (16%)

### **Audits of blood component usage against your local policies**

Only 77/144 (53%) Trusts undertake local audits of blood usage.

Table 12 - Frequencies of blood usage audits

Frequency of audit	n Trusts
Weekly	1 (1%)
Monthly	8 (10%)
Quarterly	17 (22%)
Annually	24 (31%)
Other interval	27 (35%)

*Comment: There is considerable scope for Trusts to introduce more comprehensive auditing of blood usage if resources were available.*

The subjects of the last 3 audits that hospitals undertook varied widely. The 10 most common ones are listed below but it was not clear if these were local, regional or national audits:

- Massive haemorrhage
- Platelet use and wastage
- FFP use and wastage
- Bedside practice
- Blood use in particular specialties e.g. neonates, cardiac, etc.
- PCC use
- Sample labelling and documentation
- Use of Group O RhD negative red blood cells
- Patient consent
- Time of transfusion

### Optimising patient care

One FBM activity is to optimise the patient's Hb level as a means of avoiding transfusion. As reported earlier, 66/144 (46%) Trusts have a policy for identifying and correcting the underlying cause of anaemia before considering transfusion, but it is not practiced in all specialties, as Table 13 shows:

Table 13 – Number of Trusts with policies for identifying and correcting underlying cause of anaemia before considering transfusion in certain specialties

Specialties where there is a policy for identifying and correcting underlying cause of anaemia before considering transfusion	Number (%) Trusts
Medicine	41/144 (28%)
Elective surgery	59/144 (41%)
Paediatrics	28/144 (19%)
Emergency admissions	28/144 (19%)
Obstetrics & Gynaecology	54/144 (38%)
Other	14/144 (10%)

*Comment: One risk factor for being unnecessarily transfused is being admitted with unidentified and untreated anaemia. In the 2011 Medical Use of Blood audit report 747 patients who had a potentially reversible cause of anaemia were reviewed and in 187 of those patients, transfusion could have been avoided if the anaemia had been managed differently.*

99/144 (69%) Trusts provided arrangements for the timely identification and correction of anaemia before elective surgery, where surgery is likely to be associated with significant blood loss.

**Your Trust provides such arrangements.**

114/144 (79%) Trusts offer intravenous iron therapy as an alternative to transfusion for patients with iron deficiency anaemia and/or functional iron deficiency.

**Your Trust offers IV iron therapy.**

114/144 (79%) Trusts offer IV iron therapy in the following specialties:

Table 14 – Specialties where IV iron therapy offered

Specialties	Number (%) Trusts	Your Trust
Medicine	96/144 (67%)	Yes
Elective surgery	81/144 (56%)	Yes
Paediatrics	18/144 (13%)	No
Emergency admissions	23/144 (16%)	No
Obstetrics & Gynaecology	88/144 (61%)	Yes
Other	23/144 (16%)	No

Comment:

*The limited availability and use of IV iron therapy and the absence of correction of anaemia in some Trusts suggests there is scope for reducing the amount of blood unnecessarily transfused.*

113/144 (78%) Trusts have developed a protocol for the management of abnormal haemostasis in patients with major haemorrhage.

**Your Trust has developed a protocol.**

The use of TEG or RoTEM to guide blood component therapy in patients with haemorrhage is used in only 37/144 (26%) Trusts.

**The use of TEG or RoTEM is undertaken in your Trust.**

The use of TEG or RoTEM is used in the following departments:

Table 15 – Number of Trusts using TEG or ROTEM

Departments where TEG or ROTEM used	Number (%) Trusts	Your Trust
Theatres	34/37 (92%)	Yes
Emergency department	11/37 (30%)	Yes
Obstetric department	8/37 (22%)	No
Critical care	17/37 (46%)	Yes
Laboratory	3/37 (8%)	No
Other	4/37 (11%)	No

The use of anti-fibrinolytics, e.g. tranexamic acid (TA), for major bleeding varies, as Table 16 shows.

Table 16 – Trusts using TA

Departments using TA	n Trusts	Your Trust
Trauma	107/144 (74%)	Yes
Surgical	102/144 (71%)	Yes
Medical	63/144 (44%)	No
Obstetric	87/144 (60%)	Yes
Other	20/144 (14%)	No
Not used	2/144 (1%)	

26% of Trusts are not using tranexamic acid for trauma patients and 29% are not using it for surgical patients.

108/144 (75%) Trusts have developed and implemented a protocol for the management of patients requiring surgery who are taking anticoagulants and anti-platelet drugs that may increase the risk of bleeding.

**Your Trust has developed and implemented such a protocol.**

70/144 (49%) Trusts have developed and implemented a protocol for the management of bleeding in patients taking novel anticoagulants.

**Your Trust has developed and implemented such a protocol.**

### **Indication and triggers for transfusion**

Locally agreed indications and triggers for transfusion that are based on national guidelines, can help promote appropriate use and facilitates audit. Table 17 below shows the number of Trusts who are using some of these systems.

Table 17 – Trusts using indication codes and triggers for transfusion

Indications & Triggers for transfusion	Number (%) of Trusts who do	Your Trust
Does the Trust use locally agreed triggers for transfusion based on national guidelines?	114/144 (79%)	Yes
Does the Trust use the National Blood Transfusion Committee (NBTC) indication codes when requesting blood from the transfusion laboratory?	42/144 (29%)	No
Does the Trust use individual treatment plans for patient requiring regular transfusion?	80/144 (56%)	Yes
Have you implemented a policy for transfusing one unit of red cells at a time in non-bleeding patients and reassessing the patient clinically with a further blood count to determine if further red cell transfusion is needed?	42/144 (29%)	Yes
Have you implemented a policy for transfusing one unit of platelets at a time in non-bleeding patients and reassessing the patient clinically with a further blood count to determine if further platelet transfusion is needed?	72/144 (50%)	Yes

94/ 144 (65%) Trusts have a system and protocols that empower transfusion laboratory staff to question requests that do not conform to these triggers and where an inadequate clinical explanation is given. Table 18 suggests about one third of responding Trusts monitor less than half their requests.

Table 18 – Trusts monitoring transfusion requests that do not conform to these triggers and where an inadequate clinical explanation is given

Proportion of requests monitored	Number (%) Trusts	Your Trust
1 – 10%	7/94 (7%)	70-100%
11 – 20%	4/94 (4%)	
21 – 40%	3/94 (3%)	
41 – 70%	11/94 (12%)	
71 – 100%	58/94 (62%)	
No response	11/94 (12%)	

## **Cell salvage**

Full cell salvage survey data is shown in Appendix B, but the key points are:

### **Intraoperative cell salvage**

- 26/144 (18%) Trusts use it for cardiac surgery; majority in >80% of relevant patients
- 61 (42%) Trusts use it for vascular surgery; majority in >60% of patients
- 80 (56%) Trusts use it for orthopaedic surgery; majority in <60% of patients
- It is most frequently used in Obstetrics & Gynaecology [84 (58%) Trusts], but again majority in <60% of patients

### **Postoperative cell salvage**

- Most commonly used in orthopaedic surgery [55 (38%) Trusts], but over a third of use was in <20% of patients; notable that one Trust used in >80% of relevant liver surgery patients

## **PBM Initiatives to date**

Several examples of successful PBM initiatives to date were given. The 3 most common ones were:

- implementation of cell salvage
- revised policies and procedures for dealing with massive haemorrhage
- recognition and appropriate management of anaemia

Others included: introduction of near patient testing e.g. TEG and ROTEM, single unit RBC and platelet transfusion policies, reducing wastage, appropriate use of PCCs, using indication codes and laboratory staff challenging inappropriate requests, greater patient involvement and revised surgical blood order schedules.

## **PBM Initiatives for the future**

The 3 most common responses to the question on what initiatives hospitals would prioritise for future PBM implementation were:

- recognition and appropriate management of anaemia
- introduction of electronic systems to support and monitor appropriate and safe use
- expansion of the cell salvage service and/ or hours it is available

Other responses included: use of national indication codes, involving patient more in consent process, introduction of near patient testing e.g. TEG and ROTEM, reviewing HTC terms of reference, better use of data to inform clinicians about blood usage, introduction of single unit transfusion and education of medics.

## **Resources required to implement PBM**

There were a variety of responses received to the question on what additional local resources are required for successful implementation of the above patient blood management initiatives. The majority of answers related to needing more resources e.g. money, time and staff (including TPs, experienced lab staff, Consultants with dedicated sessions for transfusion/PBM as well as administrators, quality staff and data analyst support) summarised by one hospital as, 'Human resources, funding and physical infrastructure to deliver an Hb optimisation strategy that is aligned to the patient journey'. Improvements to IT systems was the next highest response followed by more training for clinical staff and for them to commit to PBM. Other common responses included: greater support from Trust management, access to pre-op clinics and closer links with primary care.

The two main local constraints for the successful implementation of patient blood management initiatives were lack of time and money. Several also cited lack of and cuts to staff numbers, both in the clinical and laboratory areas. Transfusion is often not seen as a priority, there is a lack of support from senior Trust management, cumbersome processes to implement change and poor engagement from clinical staff, not helped by the size and complexities of Trusts.

### **How NHS Blood and Transplant can assist Trusts to implement PBM**

There were a wide variety of answers given as to how hospitals felt NHSBT could assist their Trust to implement patient blood management initiatives.

The top 10 answers given (in order) were:

1. Provide further educational tools on PBM (including more mobile websites, publish articles on PBM in journals, produce national templates, business cases, presentations, protocols etc)
1. Produce national PBM guidance / recommendations
2. Share examples of best practice
3. Provide clinical benchmarking data
4. Provide further evidence and requirement for clinical staff to change
5. Engage with senior Trust management to raise the profile and importance of PBM at a high level in Trusts
6. Improve IT links with hospitals
7. Provide examples of successful implementation of PBM initiatives
8. Target information at clinicians, not Hospital Transfusion Team members e.g. via workshops, roadshows, education days, Royal Colleges
9. Highlight role of primary care in PBM to General Practitioners and Clinical Commissioning Groups

### **Conclusion**

This survey has shown that while there is some preparedness for and delivery of PBM, many Trusts do not currently have in place the resources and practices to implement PBM. There are:-

- Too few medical and nursing staff with dedicated time for PBM
- Too few policies incorporating PBM
- IT that does not readily support PBM
- Inadequate investigation and management of anaemia
- Under exploitation of point of care testing
- Under use of alternatives to transfusion such as cell salvage

There is considerable potential to re-orientate patient care away from traditional practices dependent on the use of blood transfusion and towards PBM.

NHS Trusts will not lightly invest the time and money necessary, though, without evidence that there are cost savings, reduced length of stay, reduction in transfusion associated risk and fewer admissions in those with chronic anaemia. There is an opportunity for those Trusts who have so far embraced PBM enthusiastically to share their practice with others and the introduction of "PBM champions" is essential.

## **Appendix A: Blood transfusion laboratory information systems**

Trusts reported using the following blood transfusion laboratory information systems:

Apex

Apex iLab

Bank Manager

Blood Bank Manager

CDS TELEPATH

Cerner Millennium

Cerner Millennium Pathnet

Clinisys Labcentre

CliniSys WinPath

Clinysis

CSC Telepath Mumps

Fordman

iLAB (CSC)

Isoft Telepath

Integrated Pathology System

iLabs Telepath 2000

ISS

Integrated Software Solutions

Labcentre/masterlab

LIMS

Meditec v6

MOLIS

Non-Windows Based Pathnet

Pan Path

Sunquest Misys

System integrated with HISS

TD BLOOD BANK

TDBBS computer system

Technidata Blood Bank

Sanguin

Telepath

Technidata

TM ULTRA

WinPath

## Appendix B: Full Cell salvage data

### Intraoperative cell salvage

	Used, Not used or Not applicable N = 144	If used, estimate for what % of relevant procedures, using the following scale: 1-20%, 21-35%, 36-60%, 61-80%, 80%+
Cardiac surgery	Used = 26 (18%) Trusts Not used = 12 (8%) Trusts n/a = 73 (51%) Trusts No response = 35 (24%)	0-20% = 0 Trusts 21-35% = 0 Trusts 36-60% = 2 Trusts 61-80% = 1 Trust 80% + = 15 Trusts
Vascular surgery	Used = 61 (42%) Trusts Not used = 15 (10%) Trusts n/a = 37 (26%) Trusts No response = 33 (23%)	0-20% = 10 Trusts 21-35% = 0 Trusts 36-60% = 5 Trusts 61-80% = 12 Trusts 80% + = 11 Trusts
Orthopaedic surgery	Used = 80 (56%) Trusts Not used = 30 (21%) Trusts n/a = 7 (5%) Trusts No response = 29 (20%)	0-20% = 25 Trusts 21-35% = 9 Trusts 36-60% = 11 Trusts 61-80% = 0 Trusts 80% + = 6 Trusts
General surgery - adult	Used = 53 (37%) Trusts Not used = 44 (31%) Trusts n/a = 9 (6%) Trusts No response = 40 (28%)	0-20% = 21 Trusts 21-35% = 8 Trusts 36-60% = 2 Trusts 61-80% = 0 Trusts 80% + = 4 Trusts
Obstetrics and gynaecology	Used = 84 (58%) Trusts Not used = 23 (16%) Trusts n/a = 7 (5%) Trusts No response = 32 (22%)	0-20% = 31 Trusts 21-35% = 12 Trusts 36-60% = 8 Trusts 61-80% = 1 Trust 80% + = 6 Trusts

Trauma	Used = 45 (31%) Trusts Not used = 53 (37%) Trusts n/a = 7 (5%) Trusts No response = 41 (28%)	0-20% = 17 Trusts 21-35% = 3 Trusts 36-60% = 3 Trusts 61-80% = 0 Trusts 80% + = 4 Trusts
Urology	Used = 36 (25%) Trusts Not used = 58 (40%) Trusts n/a = 11 (8%) Trusts No response - 41 (28%)	0-20% = 10 Trusts 21-35% = 14 Trusts 36-60% = 0 Trusts 61-80% = 3 Trusts 80% + = 5 Trusts
Liver surgery	Used = 13 (9%) Trusts Not used = 19 (13%) Trusts n/a = 72 (50%) Trusts No response - 42 (29%)	0-20% = 3 Trusts 21-35% = 1 Trust 36-60% = 2 Trusts 61-80% = 0 Trusts 80% + = 4 Trusts
Children's surgery	Used = 14 (10%) Trusts Not used = 46 (32%) Trusts n/a = 40 (28%) Trusts No response = 46 (32%)	0-20% = 3 Trusts 21-35% = 1 Trust 36-60% = 1 Trust 61-80% = 0 Trusts 80% + = 3 Trusts

### Postoperative cell salvage

	Used, Not used or Not applicable N = 146	If used, estimate for what % of relevant procedures, using the following scale: 1-20%, 21-35%, 36-60%, 61-80%, 80%+
Cardiac surgery	Used = 2 (1%) Trusts Not used = 34 (24%) Trusts n/a = 65 (45%) Trusts No response = 45 (31%)	0-20% = 3 Trusts 21-60% = 2 Trusts 60% + No Trusts
Vascular surgery	Used = 2 (1%) Trusts Not used = 59 (40%) Trusts n/a = 41 (28%) Trusts No response = 44 (31%)	0-20% = 1 Trust 21-60% = No Trusts 60% + No Trusts
Orthopaedic surgery	Used = 55 (38%) Trusts Not used = 49 (34%) Trusts n/a = 6 (4%) Trusts No response = 36 (25%)	0-20% = 19 Trusts 21-60% = 12 Trusts 61-80% = 8 Trusts 80% + = 3 Trusts
General surgery - adult	Used = 3 (2%) Trusts Not used = 83 (58%) Trusts n/a = 15 (10%) Trusts No response = 45 (31%)	No Trusts provided data
Obstetrics and gynaecology	Used = 6 (4%) Trusts Not used = 83 (58%) Trusts n/a = 14 (10%) Trusts No response = 43 (30%)	0-20% = 1 Trust 21-60% = No Trusts 60% + No Trusts

Trauma	Used = 5 (3%) Trusts Not used = 80 (56%) Trusts n/a = 15 (10%) Trusts No response = 46 (32%)	0-20% = 1 Trust 21-60% = 1 Trust 60% + No Trusts
Urology	Used = 1 (1%) Trust Not used = 82 (57%) Trusts n/a = 17 (12%) Trusts No response = 46 (32%)	No Trusts provided data
Liver surgery	Used = 2 (1%) Trusts Not used = 42 (29%) Trusts n/a = 57 (40%) Trusts N response = 45 (31%)	0-20% = 0 Trusts 21-60% = 0 Trusts 61-80% = 0 Trusts 80% + = 1 Trust
Children's surgery	Used = 1 (1%) Trust Not used = 56 (39%) Trusts n/a = 43 (30%) Trusts No response = 46 (32%)	0-20% = 1 Trust 21-60% = No Trusts 60% + No Trusts