National Comparative Audit of Blood Transfusion

NHS Blood and Transplant

The Faculty of Intensive Care Medicine

Royal College of Physicians

The Royal College of Anaesthetists

RCS ADVANCING SURGICAL STANDARDS

2015 Audit of Patient Blood Management in adults undergoing elective, scheduled surgery

Hospital Name

FULL FINDINGS REPORT

- Our hospital participated in the 2015 audit of Patient Blood Management in adults undergoing elective, scheduled surgery.
- Findings from this audit can help us evaluate the quality of our clinical staff's transfusion practice.
- This report **provides full findings on how our hospital performed in relation to the audit standards and other hospitals nationally**.
- If you would like a summary of the key findings only, please refer to the '***Key Findings***' report.
- If you would like to read additional detail, please refer to the '***Supplementary Information***' report.

Contents

Who should we send this report to?

It is recommended that copies of this feedback report may be sent to the following:

- Trust Chief Executive Hospital Transfusion Committee and/or
- Medical Director Patient Blood Management Committee
- Head of Nursing Members of the clinical audit project team
- Relevant Divisional Directors Clinical Audit Department
- Divisional Clinical Effectiveness Leads

Although we recognise that members of the Hospital Transfusion Committee / Patient Blood Management Committee are a key group responsible for implementing change in response to feedback, you may wish to

specifically engage with more senior hospital staff in the governance/managerial chain. Senior management support will naturally be important in ensuring sufficient resources are available to implement change.

Local lead for this audit in your hospital: Name, Job Title, **name.surname@trust.nhs.net**

Section 1 Why is this audit important?

Background

Patient Blood Management (PBM) is evidence-based medicine as applied to transfusion practice, including the treatment and management of pre-operative anaemia, the management of haemostasis and blood conservation. Although effective PBM can lead to more appropriate use of the limited donated blood supply, transfusion avoidance is not the primary goal. Instead, **PBM involves the application of current best evidence to optimise the care and outcomes of all patients who may require transfusion during the course of their care**.[1]

PBM offers the potential for a "win-win" of patient outcome improvements, cost savings, as well as the public health benefit of reduced demand on donors:[2]

- Transfusion is a life-saving intervention in certain situations where no alternative exists, e.g. exsanguination or marrow failure. However, in most clinical settings, red cell transfusions are administered to patients without active bleeding. Findings from a broad range of randomised controlled trials, including hip fracture surgery, have indicated no evidence of benefit for policies of liberal transfusions (or even in some reports, signals of harm to patients when outcomes are compared to patients receiving restrictive use of blood).[3] **Choosing transfusion as first-line option for treating presumed tissue oxygen deficit in surgical practice may therefore be inappropriate**.
- The donated blood supply is limited and vulnerable to demographic changes as well as the impact of infective pandemics.[4-5] Though the surgical use of blood has decreased over time,[6] **more can and should be done to limit demand on donors**.
- Transfusion is more costly than commonly appreciated,[7] and therefore **minimising use of blood** or **consistent use of alternative management strategies** would be **attractive on financial grounds**.[8-9]
- Transfusion, pre-operative anaemia and acute peri-operative anaemia all carry risk to patients.[10] PBM offers clinicians the opportunity to **prevent their patients getting into situations where decisions must be made as to which of these risks is greater**.

Despite many national[11-12] and international[13-14] recommendations being published in favour of **PBM implementation, evidence suggests variability in uptake across the UK**. A national survey of organisational arrangements indicated that only the minority of Trusts had adequate time in medical and nursing job plans for PBM, and that many Trusts did not have mechanisms for the reliable use of transfusion alternatives where appropriate.[12]

References

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Purpose

This audit was undertaken to document and understand clinical staff's current use of red cell transfusion and PBM approaches in adults undergoing elective, scheduled surgery in relation to eleven audit standards developed by the audit group. The audit is important at a number of levels:

- It **provides national comparative data on PBM practice across the UK**. Surgical blood use has decreased over time as a proportion of total blood use, but no national data is available on the breadth of PBM adoption across the country.
- For hospitals and individual clinicians, it **provides data on how patients are managed along the surgical pathway**. It is nowadays common for multiple clinicians to have input into one patient's care – aggregating data from multiple times (from referral to pre-assessment to surgery and post-operatively) **may inform pathway design and help target improvement programmes**.

PBM measures

The following table illustrates the PBM measures that are appropriate to the index operations. PBM measures are the standard of care for each procedure and ideally all aspects of PBM should have been attempted unless contraindicated or optional.

Table 1: PBM measures appropriate to index operations

Timing of transfusion	**Procedure**								
	Primary unilateral / bilateral total hip	Primary unilateral / bilateral and revision total knee replacement	Unilateral revision hip replacement	Surgery for #NOF	Colorectal resection for any indication	Open arterial surgery	□ Primary coronary artery bypass graft	Urological surgery:	Simple or complex hysterectomy
							□ Valve replacement	Cystectomy	

	replacement						+/- CABG		
								Nephrectomy	
Pre operative	A	A	A	C	A	A	A	A	A
	B	B	B		B	B	B	B	B
Intra operative	A	A	A	D	A	A	A	A	A
	D	D	D		D	D	E	D	D
	G		F			F	F	G	G
Post operative	A	A	A	D	A	A	A	A	A
	D	D	D		D	D	E	D	D
	G	H	F			F	F	G	G
	H		H				H		

PBM Measures Key

A. Pre-operative anaemia optimisation
B. Pre-operative management of patient son anticoagulants and antiplatelet agents
C. Pre-operative management of patients on oral anticoagulants
D. Tranexamic acid
E. Tranexamic acid/aprotinin
F. Intra-operative cell salvage
G. Optional: Intra-operative cell salvage
H. Optional: Post-operative cell salvage

Section 2 Who did we audit?

- This section provides **information on the baseline characteristics of our audited patients, including type of surgery, and key intervals of timing along the surgical pathway**.
- **Characteristics from the national sample of audited patients are presented for comparison purposes**. All of this information can be useful when interpreting our performance in this audit.
- If you would like more detailed information on the clinical and demographic characteristics of our audited patients please refer to the ***'Supplementary Information Report'***, section '***What are the characteristics of the patients audited?'***

How many patients did we audit?

Our hospital audited **23 adult surgical patients** who received a transfusion on one or more occasions between 14 days before surgery and up to 7 days post-operatively.

What was the type of surgical procedure audited?

In our hospital, the most common type of surgical procedure was: Arthroplasty for fractured neck of femur, in **83% (19/23)** of adult patients (Table 2).

Table 2: Type of surgical procedure audited

	Our Hospital % N	National % N
Arthroplasty for fractured neck of femur	**(83%) 19**	27% (1044)
Primary unilateral total hip replacement	**(0%) 0**	16% (610)
Primary bilateral total hip replacement	**(0%) 0**	1% (30)
Primary unilateral total knee replacement	**(0%) 0**	9% (341)
Primary bilateral total knee replacement	**(0%) 0**	1% (27)
Unilateral revision hip replacement	**(0%) 0**	7% (258)
Unilateral revision knee replacement	**(0%) 0**	2% (67)
Valve replacement +/− CABG	**(0%) 0**	11% (423)
Primary coronary artery bypass graft	**(0%) 0**	3% (116)
Open arterial surgery	**(0%) 0**	4% (157)
Colorectal resection for any indication	**(4%) 1**	8% (300)
Simple or complex hysterectomy	**(9%) 2**	9% (342)
Nephrectomy	**(0%) 0**	3% (130)
Cystectomy	**(0%) 0**	1% (37)
Not known	**(4%) 1**	0% (15)
Total	**23**	100% (3897)

Section 2 Who did we audit?

In our hospital, what was the time interval between decision to operate, the pre-operative assessment and actual surgery?

- This **provides information on our elective pre-operative surgical pathways and helps to identify areas to target** where discrepancies between the audit standards and our current practice are identified.
- If you would like more detailed information on the timings for different surgical procedures please refer to the '***Supplementary Information***' report.

Table 3: Time interval between decision to operate, the pre-operative assessment and actual surgery

	Our Hospital	National
Patients who had a listing date*	**100% (4/4)**	69% (2679/3897)
Median (IQR) time from listing to surgery in elective patients*	**43 days (1-140), n=4**	42 days (13-93), n=2675
Patients who had a pre-operative assessment visit*	**50% (2/4)**	87% (2446/2818)
Median (IQR) time from pre-operative assessment to surgery*	**25 days (22-28), n=2**	19 days (8-48), n=2420
Patients who had a pre-operative assessment 28 days + before surgery*	**0% (0/2)**	37% (893/2420)

*Excluding patients with fractured neck of femur

Pre-operative anaemia optimisation

PBM standard 1: ***Clinical staff*** *must ensure that patients listed for* ***elective major blood loss surgery*** *have an* ***Hb measured at least 14 days pre-operatively*** *and* ***act upon results****

**Anaemia is defined as Hb of less than 130g/L in men less than 120g/L in women*

A pre-operative Hb was taken at least 14 days pre-operatively by clinical staff in **67% (2/3)** of patients listed for elective major blood loss surgery compared to in 49% (1386/2838) nationally (patients with fractured neck of femur were excluded).

In relation to pre-operative anaemia optimisation, clinical staff managed patients listed for elective major blood loss surgery appropriately in **67% (2/3)** of cases compared to in 46% (1305/2836) nationally

- Those with anaemia who have had iron deficiency identified and treated
- Those without anaemia, or those with non-iron deficiency anaemia are not expected to be optimised but meet the standard

How do we compare with other hospitals?

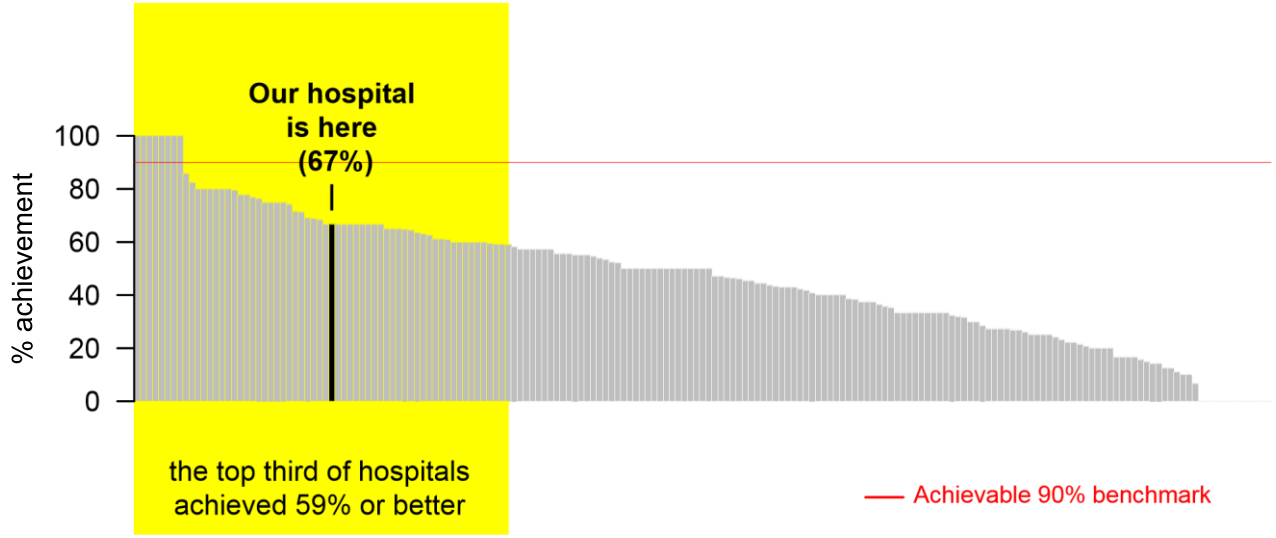


Figure 1: PBM standard 1 hospital comparison. Each chart shows our performance in comparison with the other participating hospitals. The red line illustrates an achievable benchmark of 90%, recognising that a standard of 100% would not be universally attainable.

Why is this standard important?

- The investigation and management of anaemia takes time. Timely Hb testing is thus necessary if patients are not to be:
- Postponed unnecessarily, at best causing them inconvenience, often distress and sometimes harm OR inappropriately transfused.

- When pre-operative anaemia is discovered during surgical work-up, it should not be seen as simply an abnormal laboratory value. Instead, it should be viewed as:
- A marker of potential undiagnosed serious disease, for example gastrointestinal cancer or renal failure.
- A modifiable risk factor for poor surgical outcome.
- A risk factor to discuss with the patient during the consent process

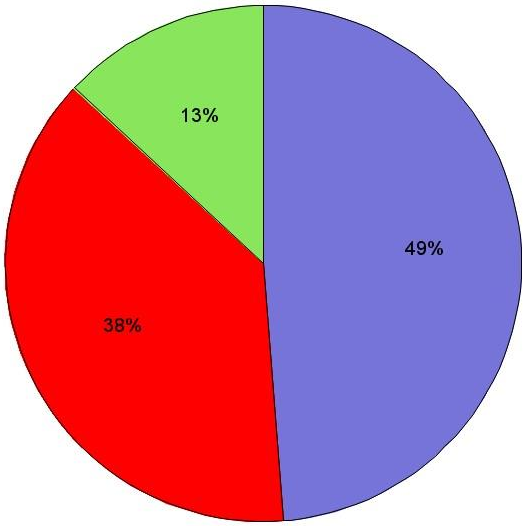
- Simply proceeding with planned surgery in the face of anaemia is therefore poor medicine.

- On the other hand, if anaemia is only detected close to the time of planned surgery, clinicians caring for the patient peri-operatively are in the invidious situation of having to choose between poor options: proceeding despite the above considerations, or cancelling surgery with its associated waste of resources and burden of morbidity to patients.

- Not detecting anaemia in a timely fashion and/or not managing it appropriately is thus a systemic failure.

Who should we target?

- Figures 2 and table 3 represent the groups of clinical staff responsible for reviewing the preoperative assessment investigations in our hospital. They should be targeted for PBM standards 1,3 & 5



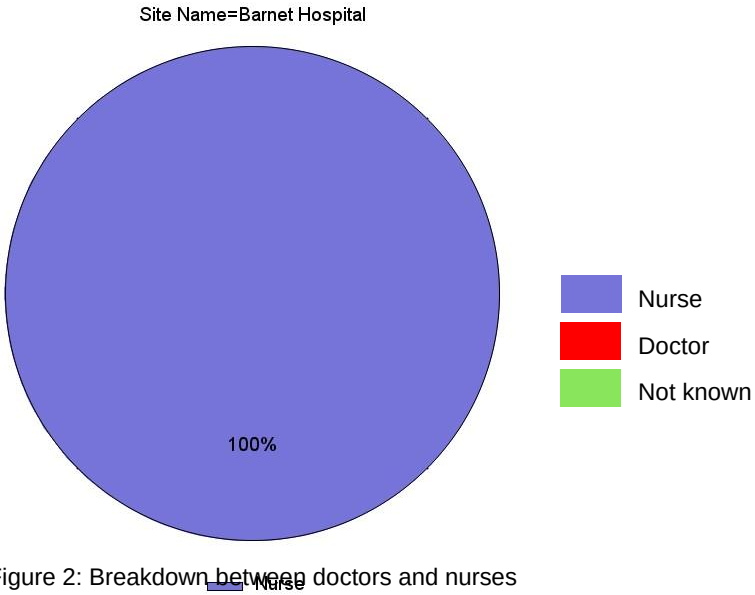


Figure 2: Breakdown between doctors and nurses in our hospital

Figure 3: Breakdown between doctors and nurses nationally

	Anaesthetics N	Other specialty N	Specialty not known N
Consultant	0	0	0
Other grade	0	0	0
Speciality not known	0	0	0

Table 4: Grade and specialty of doctor in our hospital

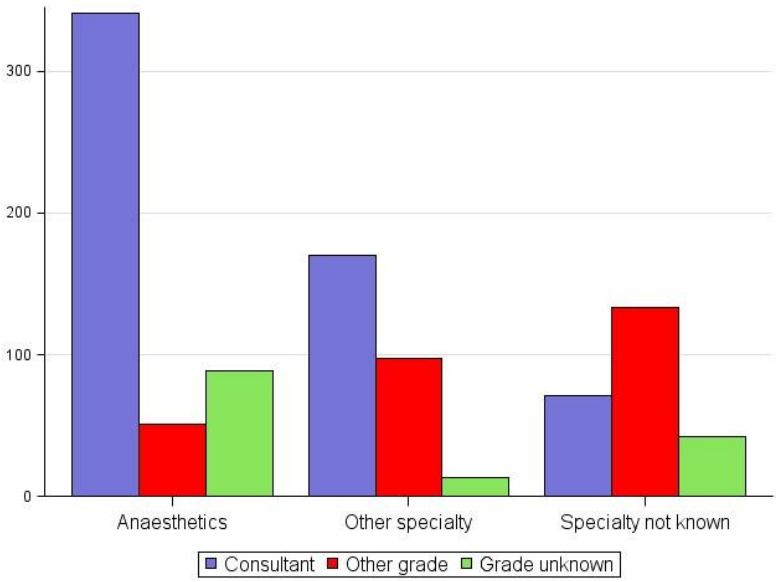


Figure 4: Grade and specialty of doctor nationally

- We should **aim to disseminate feedback to these groups** and to **target these groups for change** where discrepancies between the audit standards and our current practice are identified.

What should we do next? Recommendations:

The following recommendations are in line with the British Committee for Standards in Haematology Guidelines on the Identification and Management of Pre-Operative Anaemia.[10]

For our Hospital	For clinical staff responsible for pre-operative management	For the Hospital Transfusion / Patient Blood Management Committee

• Well done. We showed a high level of achievement in this standard. We are performing within the top third of hospitals nationally. This demonstrates strong support for PBM within our hospital. However, there is room to further improve our practice. • We should prepare an action plan that will recognise and build upon our existing good practice to further improve the service that we provide.	• Clinical staff should ensure that **patients are counselled about the relationship between anaemia, morbidity and mortality**, and should be given the **opportunity to defer nonurgent surgery until anaemia** is **investigated** and **treated**. • Clinical staff should **ensure** that **anaemia screening occurs between** the **referral** for **surgery** and **decision to proceed** in order to **allow investigation** and **correction** if appropriate. • Even where surgery is urgent, clinical staff should still **use whatever time is available before operation for anaemia investigation** and **treatment** initiation.	• The Committee should **ensure** that healthcare **pathways** are **structured** to **enable anaemia screening** and **investigation/ correction before surgery**. • The Committee should **work with Commissioners** to **formalise integrated pathways and funding** for the **referral of patients** found to be **anaemic** during surgical workup, if the nature of the anaemia suggests that unexpected significant underlying disease is possible. • The Committee should work with clinicians to **continue monitoring practice in relation to this standard**, by conducting further **local audits** of the number of patients undergoing surgery with anaemia, and **feeding back this information to clinical teams**.

Pre-operative transfusion indicated

PBM standard 2: ***Clinical staff*** *should only* ***prescribe a pre-operative transfusion*** *in* ***patients*** *undergoing* ***elected major blood loss surgery*** *if the* ***Hb is less than the defined Hb threshold for transfusion (70g/L in patients without acute coronary ischaemia or 80g/L in patients with acute coronary ischaemia)***

- A pre-operative transfusion was prescribed by clinical staff in **9% (2/23)** of our patients compared to 7% (279/3793) nationally.
- The pre-operative transfusion was prescribed when the Hb was less than the defined Hb threshold for transfusion in **0% (0/2)** of our patients compared to 12% (28/242) nationally (patients with fractured neck of femur excluded).

How do we compare with other hospitals?

- Only 28 patients met this standard across all hospitals audited. **The majority of cases did not meet this standard because they were prescribed a pre-operative transfusion when the Hb was more than the defined threshold for transfusion**.
- In our patients, the median (IQR) Hb prior to transfusion was **98 days (71-124), n=2**, compared to 82 days (76-89), n=267 nationally.
- Figure 5 shows the distribution of results for pre-transfusion Hb in pre-operative patients nationally. **This suggests that many patients are being transfused above the recommended threshold**.

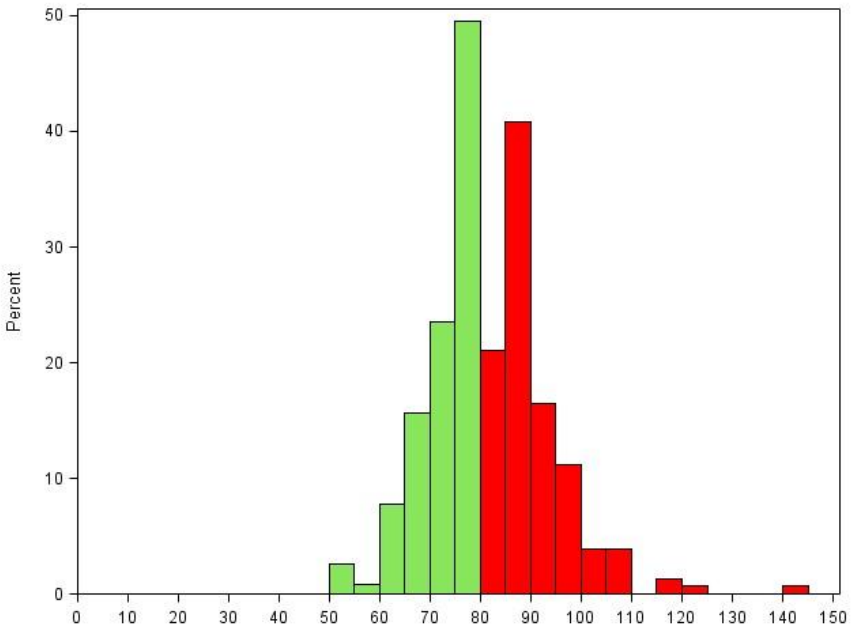


Figure 5: Pre-transfusion Hb in pre-operative patients nationally

Why is this standard important?

- There is an increasing body of evidence from large randomised controlled trials that there is no benefit for transfusing at higher haemoglobin thresholds (liberal practice), and some evidence of harm.[15]
- The use of a restrictive transfusion strategy is therefore recommended. This reduces unnecessary transfusion of red cells, improving outcomes for patients and also reducing costs.
- A higher transfusion threshold of 80g/L is suggested for patients with acute coronary syndrome, given uncertainty about the levels of evidence for this subgroup.

Who should we target?

- Table 5 shows who was involved in the decision to transfuse pre-operatively in our hospital. They should be targeted for standards 1,3 & 4.
- Figure 6 shows breakdown of specialities and grade of doctor nationally (NB there was only 1 nurse in the whole dataset).

	Anaesthetics N	Other specialty N	Specialty not known N
Consultant	0	0	0
Senior Trainee	0	0	0
Junior Trainee	0	0	0
Grade not known	0	0	0

Table 5: Grade and specialty of doctor in our hospital

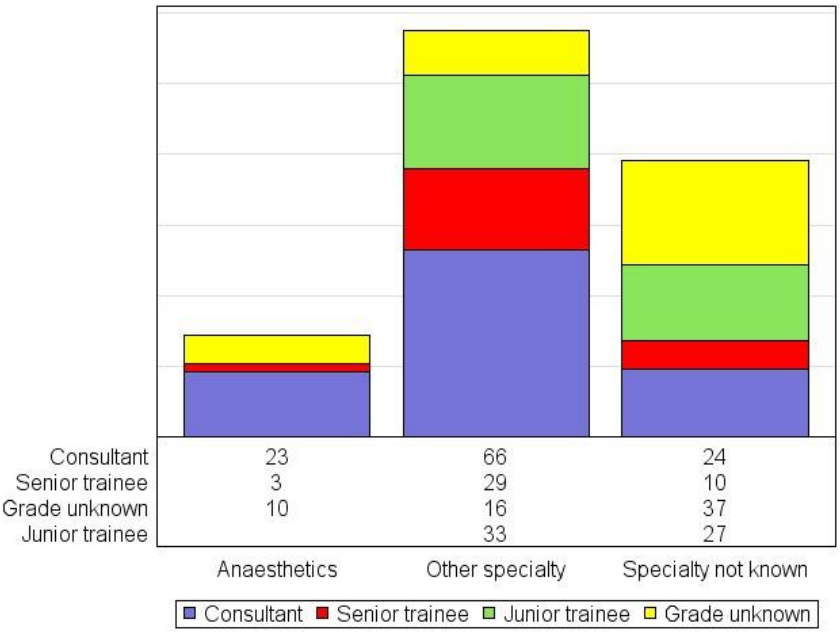


Figure 6: Grade and specialty of doctor nationally

For our Hospital	For clinical staff responsible for pre-operative management	For the Hospital Transfusion / Patient Blood Management Committee

What should we do next? Recommendations:

• Along with most other hospitals, **our performance for this standard was lower than expected**. In order to improve the care we provide to our patients, we **should prioritise this standard** when planning our response to feedback. • We should formulate an action plan to **improve performance towards** a more feasible **shortterm goal**, such as 50% working towards 100%.	• Clinical staff should **ensure** that **anaemia screening takes place when referral for surgery is first made** in order to **allow investigation** and **correction** if appropriate. • Even where surgery is urgent, clinical staff should still **use whatever time is available before operation** for **anaemia investigation** and **treatment** initiation. • Clinical staff should ensure that **patients are counselled** about the **relationship** between **anaemia**, **morbidity** and **mortality**, and should be given the **opportunity** to **defer nonurgent surgery** until **anaemia** is **investigated** and **treated** rather than having a blood transfusion to correct the anaemia. • Clinical staff who prescribe blood should be made **aware** of the **findings** from randomised controlled **trials** which compare different strategies of red cell transfusions for patient outcomes and **which indicate a lack of evidence to support any benefit from liberal use of red cells**. • Clinical staff should **only prescribe** a blood **transfusion in stable non-bleeding patients** who have a **pre-transfusion Hb** of **less** than **70g/L**, or less than **80g/L** in those with **acute coronary syndrome**.	• The Committee should ensure that **healthcare pathways** are **structured** to **enable anaemia screening** and **investigation / correction** before surgery. • The Committee should have a **policy** in place to **ensure** that **guidelines promote** that **stable non-bleeding patients are not transfused** with a pretransfusion **Hb** of **more** than **70g/L** or more than **80g/L** in those with acute **coronary syndrome**.

Pre-operative transfusion indicated only if pre-operative anaemia optimisation has been attempted

PBM standard 3: ***Clinical staff*** *should* ***only prescribe a pre-operative transfusion*** *in* ***patients*** *undergoing* ***elective major blood loss surgery*** *if the* ***Hb*** *is less than the* ***defined Hb threshold for transfusion*** ***and*** ***pre-operative anaemia optimisation has been attempted***

- The pre-operative transfusion was prescribed when the Hb was less than the defined Hb threshold for transfusion in **0% (0/0)** of our patients in whom pre-operative anaemia optimisation had been attempted compared to 2% (3/132) nationally. *(Patients with fractured neck of femur were excluded from this standard)*.

How do we compare with other hospitals?

- Only 3 patients met the standards across all across all hospitals audited. **The majority of cases failed this standard because they were transfused without an attempt to investigate or correct the anaemia and/or they were transfused above the defined Hb threshold**.

Why is this standard important?

- Transfusion should not be seen as an alternative to good practice as outlined in PBM standard 1 where pre-operative anaemia is proactively managed.
- Transfusion should only be considered in patients where the anaemia is not correctable and the Hb is below the defined threshold.
- There is no evidence from a broad randomised trial literature that liberal use of red cell transfusions is a superior policy for patients
- It thus indicates failed care processes if clinicians have to resort to transfusion because opportunities for investigation and evidence-based anaemia treatment have been missed.

PBM Standard 3

For our Hospital	For clinical staff responsible for pre-operative management	For the Hospital Transfusion / Patient Blood Management Committee

What should we do next? Recommendations:

• Along with most other hospitals, **our performance for this standard was lower than expected**. In order to improve the care we provide to our patients, we **should prioritise this standard** when planning our response to feedback. • We should formulate an action plan to **improve performance towards** a more feasible **shortterm goal**, such as 50% working towards 100%.	• Clinical staff should **ensure** that **anaemia screening takes place when referral for surgery is first made** in order to **allow investigation** and **correction** if appropriate. • Even where surgery is urgent, clinical staff should still **use whatever time is available before operation** for **anaemia investigation** and **treatment** initiation. • Clinical staff should ensure that **patients are counselled** about the **relationship** between **anaemia**, **morbidity** and **mortality**, and should be given the **opportunity** to **defer nonurgent surgery** until **anaemia** is **investigated** and **treated** rather than having a blood transfusion to correct the anaemia. • Clinical staff who prescribe blood should be made **aware** of the **findings** from randomised controlled **trials** which compare different strategies of red cell transfusions for patient outcomes and **which indicate a lack of evidence to support any benefit from liberal use of red cells**. • Clinical staff should **only prescribe** a blood **transfusion in stable non-bleeding patients** who have a **pre-transfusion Hb** of **less** than **70g/L**, or less than **80g/L** in those with **acute coronary syndrome**.	• The Committee should ensure that **healthcare pathways** are **structured** to **enable anaemia screening** and **investigation / correction** before surgery. • The Committee should have a **policy** in place to **ensure** that **guidelines promote** that **stable non-bleeding patients are not transfused** with a pretransfusion **Hb** of **more** than **70g/L** or more than **80g/L** in those with acute **coronary syndrome**.

PBM Standard 4

Pre-operative transfusion – single unit approach

PBM standard 4: *For **patients** receiving a **pre-operative transfusion**, **clinical staff** should **prescribe one unit of red cells at a time** and **re-check Hb before prescribing a further unit***

- The single unit transfusion approach was followed by clinical staff in **0% (0/2)** of our preoperative patients, compared to 28% (71/253) nationally.

How do we compare with other hospitals?

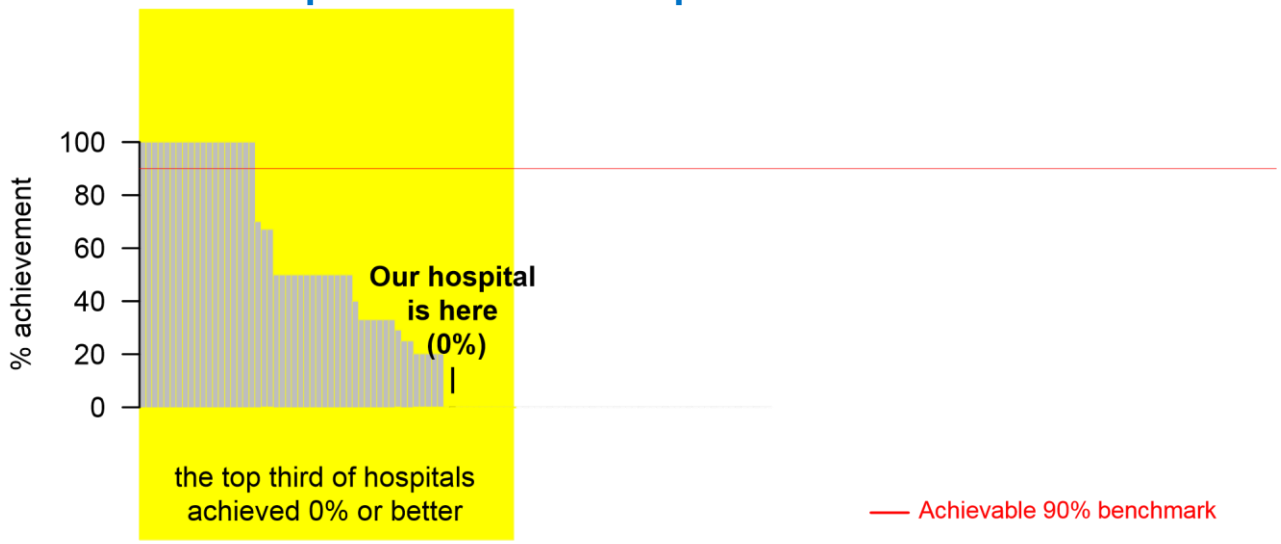


Figure 7: PBM standard 4 hospital comparison

- Nationally 80% (221/277) of patients who were transfused preoperatively received **2 or more units** of blood. In our hospital this figure was **100% (2/2)**.

Why is this standard important?

- A key component of PBM is to avoid the unnecessary transfusion or over-transfusion of blood.
  Good PBM requires all decisions to transfuse to be based upon a recent Hb.
- By checking a patient's Hb after the first unit, it will become evident that in many instances, the second unit is not required.
- Reducing number of units transfused reduces all aspects of transfusion related risk.
- Re-checking Hb after the first unit is likely to save time, effort and money.
- Also reduces risk of cancellation and urgent correction of low Hb at time of surgery.

PBM Standard 4

What should we do next? Recommendations:

For our Hospital	For clinical staff making the decision to transfuse	For the Hospital Transfusion / Patient Blood Management team
• Along with two thirds of other hospitals, our performance for this standard was lower than expected. In order to improve the care we provide to our patients, we should prioritise this standard when planning our response to feedback. • We should formulate an action plan to improve performance towards a more feasible shortterm goal, such as 50% working towards 100%.	Staff should **recheck Hb after** the **first unit** has been transfused to **see if second** unit can be **avoided**.	• If more than one unit transfusions are being requested for routine pre-operative patients, the laboratory staff should be encouraged to **challenge the request before issuing the blood, with the support of the Hospital Transfusion / PBM team**. This also **strengthens team working** rather than clinicians and lab staff working in “silos”. • The Hospital Transfusion / PBM team should **work with clinicians to continue to monitor practice in relation to this standard by conducting further local audits** of the proportions of patients receiving single or more than one unit transfusions, and **feeding back these findings to clinical teams**.

PBM Standard 5

Pre-operative anticoagulant and antiplatelet management

PBM standard 5:

- *For **patients** undergoing **elective major blood loss surgery** who are taking **oral anticoagulants and/or antiplatelet agents**, **clinical staff** must **stop** the **oral anticoagulant** and/or **antiplatelet agent(s)** at least **5 days** pre-operatively (unless there are good reasons to continue) and **document the management plan** in the case notes*
- *For patients with **fractured neck of femur** taking **warfarin**, **clinical staff** should aim **for an INR of less than 1.5** on the day before or the day of surgery*

- The algorithm used to assess compliance includes both elements of the standard and is therefore reported as a composite standard in the chart below.

- At our hospital, **13% (3/23)** of patients were on oral anticoagulants or antiplatelet agents preoperatively, compared to 18% (710/3890) nationally.
- Clinical staff stopped oral anticoagulation at least 5 days pre-operatively in **100% (3/3)** of our patients compared to 87% (315/361) nationally.
- Clinical staff stopped antiplatelet agents at least 5 days pre-operatively (or continued the therapy with documented good reason) in in **0% (0/0)** of our patients compared to 77% (279/363) nationally.
- The INR was less than 1.5 on the day of or the day before surgery in **50% (1/2)** of our patients undergoing surgery for fractured neck of femur compared to 70% (214/306) nationally.
- The algorithm used to assess compliance includes both elements of the standard and is therefore reported as a composite standard in the chart below. At our hospital **0% (0/2)** met this composite standard, compared to 63% (340/541) nationally.

How do we compare with other hospitals?

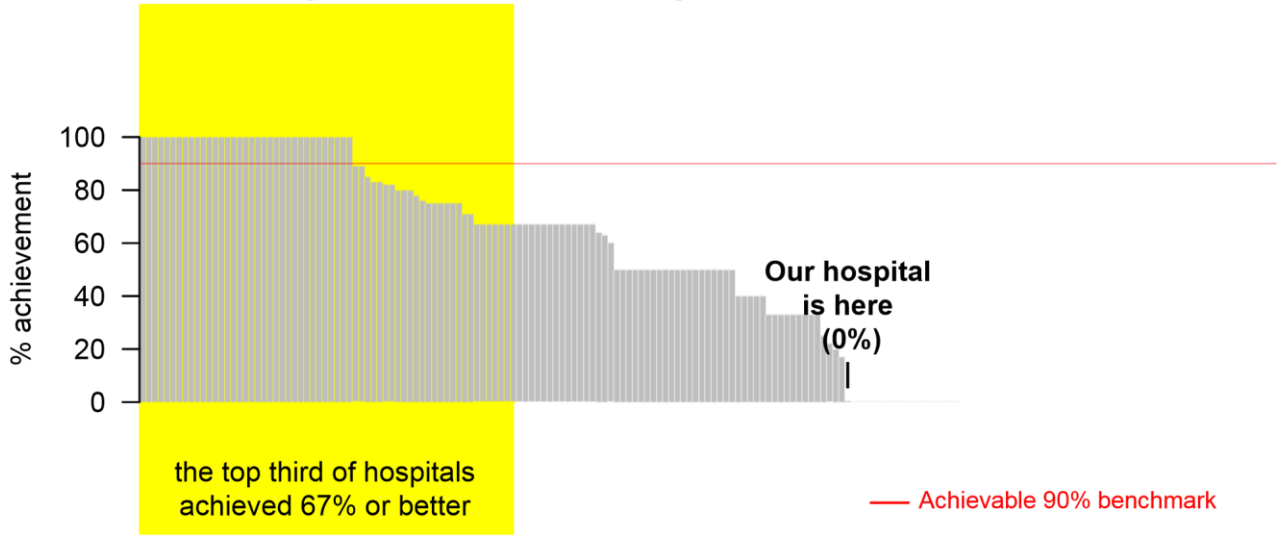


Figure 8: PBM standard 5 hospital comparison

Why is this standard important?

- Patients who do not have their oral anticoagulation or anti platelet medications withheld for at least 5 days before major elective surgery are likely to be at increased risk of bleeding during surgery (does not include aspirin).
- To reduce the risk of bleeding, patients with fractured neck of femur on warfarin should have their anticoagulation actively managed so that their INR is 1.5 or less on the day before or the day of surgery.
- The risk of bleeding versus the risk of thrombosis should be considered for each patient and an individualised management plan should be developed.

What should we do next? Recommendations:

For our Hospital	For clinical staff responsible for pre-operative management	For the hospital thrombosis committee (or equivalent)
• Our performance for this standard was lower than two thirds of the other hospitals nationally. In order to improve the care we provide to our patients, we should prioritise this standard when planning our response to feedback. • We should formulate an action plan to improve performance towards a more feasible shortterm goal, such as the national median (i.e. 50%).	Clinical staff should **prepare an individual management plan** for **each patient undergoing major surgery** who is on **oral anticoagulation** or **antiplatelet therapy** and this should be **documented** in the case notes. For patients with **fractured neck of femur, surgery should not be delayed**.	• The Committee should **prepare** clear **guidelines** for the **perioperative** management of **anticoagulation** and **antiplatelet agents** and ensure that **systems** are in place **to deliver this** standard of care. • The Committee should **regularly audit the management of patients on anticoagulation** or **anti-platelet therapy** to **ensure** that the **guidelines** are being **followed**.

How did our hospital perform? PBM Standard 6 & 7

Patient Blood Management in patients who have received an intra-operative transfusion

Clinical staff *should attempt* ***at least one*** **(PBM standard 6)** ***or all*** **(PBM standard 7)** ***appropriate patient blood management measures*** *in patients who receive a* ***transfusion*** *during* ***major blood loss surgery***

- Clinical staff prescribed intra-operative transfusion in **4% (1/23)** of our patients undergoing major blood loss surgery, compared to 25% (982/3851) nationally
- Of those patients who received an intra-operative blood transfusion, clinical staff attempted **at least one** appropriate PBM in **0% (0/0)** of our patients undergoing major blood loss surgery, compared to 83% (661/795) nationally
- Of those patients who received an intra-operative blood transfusion, clinical staff attempted **all** appropriate PBM in **0% (0/1)** of our patients undergoing major blood loss surgery, compared to 16% (133/808) nationally

How do we compare with other hospitals?

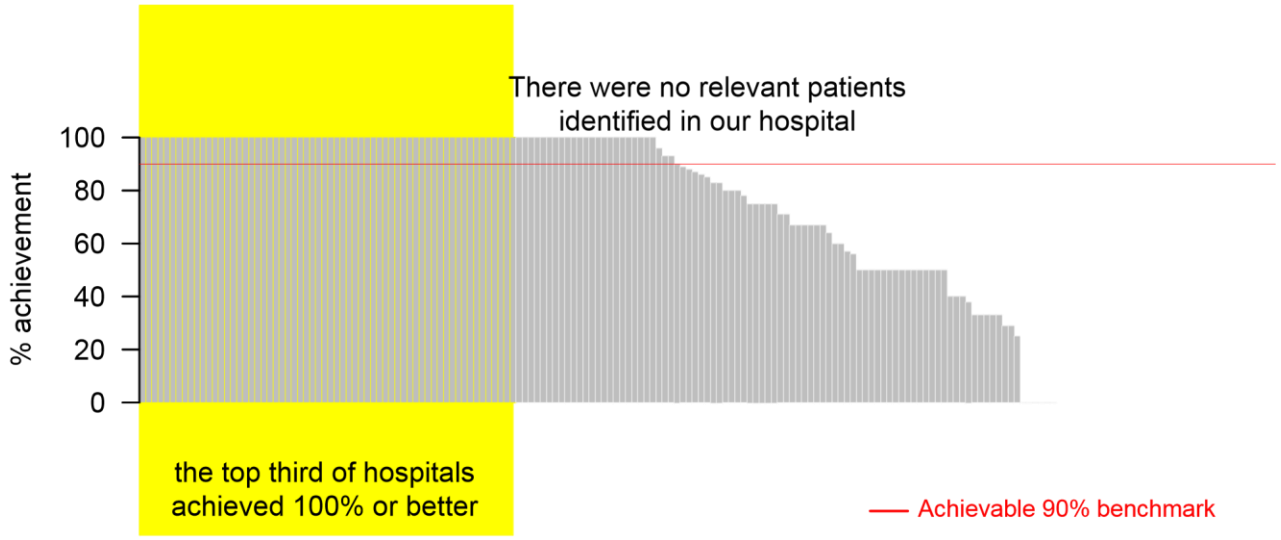


Figure 9: PBM standard 6 hospital comparison

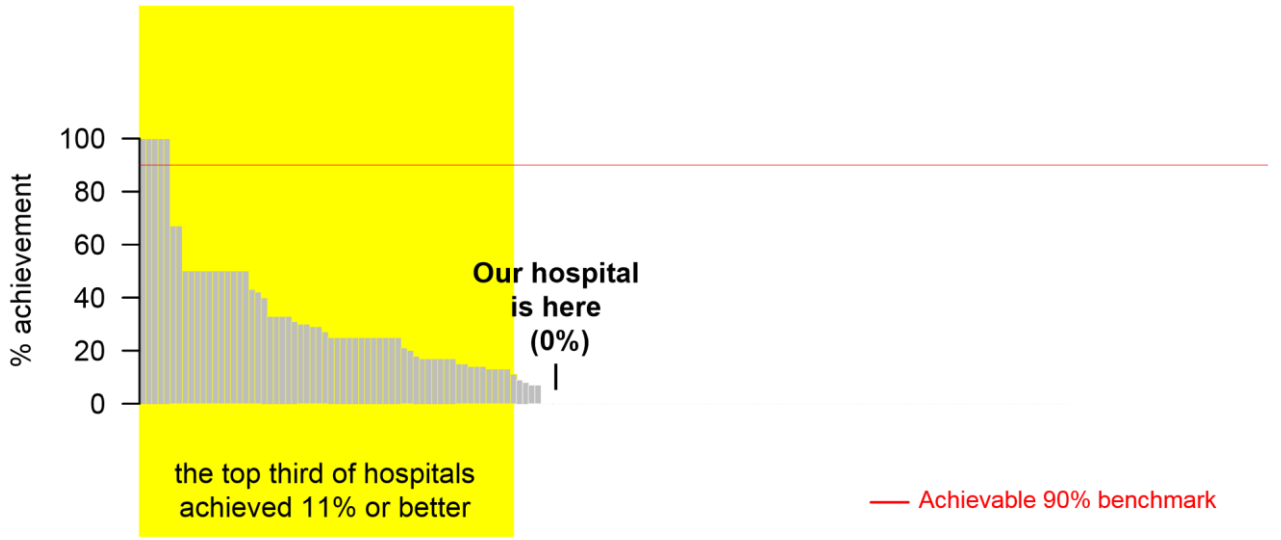


Figure 10: PBM standard 7 hospital comparison

Why is this standard important?

- The over-arching purpose of PBM is to improve outcomes for patients.
- The components of PBM as described in Table 1 combine to minimise the need for blood transfusion.
- PBM can lead to reduced complications, hospital stay and the cost of treating complications.
- PBM Standard 6 relates to at least one PBM intervention being implemented. This is an easy standard to comply with and really corresponds to the basics of good peri-operative practice.
- PBM standard 7 is the most stringent. It reflects the very best practice, where hospitals have processes in place to ensure that every possible PBM intervention has been implemented to the benefit of patients.
- Hospitals should not be satisfied with high achievement in standard 6, but rather, should strive to increase their achievement for standard 7 which represents best PBM practice.

What should we do next? Recommendations:

For our Hospital	For theatre teams	For the Hospital Transfusion / Patient Blood Management team

For PBM Standard 6: • Locally, we identified no patients relevant to this standard. We should continue to monitor our performance and follow relevant recommendations for clinical staff and teams. □ **For PBM Standard 7:** • Along with two thirds of other hospitals, our performance for this standard was lower than expected. In order to improve the care we provide to our patients, we should prioritise this standard when planning our response to feedback. • We should formulate an action plan to improve performance towards a more feasible shortterm goal, such as 50% working towards 100%.	• The theatre team, anaesthetists and surgeons should **ensure that the PBM measures** (presented in Table 1) and as identified by the Hospital Transfusion / Patient Blood Management Committee **are implemented as appropriate**. • Where available, **peer data should be applied to compare individual surgeons** and **encourage participation in PBM**.	• The Committee should **ensure that local guidelines exist regarding the use of PBM measures** (as outlined in Table 1), including **clear recommendations** on the **individuals or teams responsible for implementing these measures**. • The Committee should **ensure** that the **use of tranexamic acid is the standard of care for surgical patients** expected to have moderate or more significant blood loss unless contraindicated. • The Committee should **identify the need for intra-operative cell salvage and resource appropriately**; this would normally be used in relevant high blood loss procedures in association with tranexamic acid.

Post-operative transfusion indicated

PBM standard 8: *In **patients** who **do not have active post-operative bleeding**, **clinical staff** should only **prescribe a transfusion** if the **Hb is less than the defined Hb threshold or** for transfusion (70g/L in patients without acute coronary ischaemia 80g/L in patients with acute coronary ischaemia)*

- At least one post-operative transfusion was prescribed by clinical staff in **78% (18/23)** of our patients compared to 74% (2878/3874) nationally and the analysis has been undertaken on the first post-operative transfusion episode
- The post-operative transfusion was prescribed by clinical staff for documented active bleeding or when the Hb was less than the defined Hb threshold for transfusion in **22% (4/18)** of our patients compared to 24% (669/2757) nationally.

How do we compare with other hospitals?

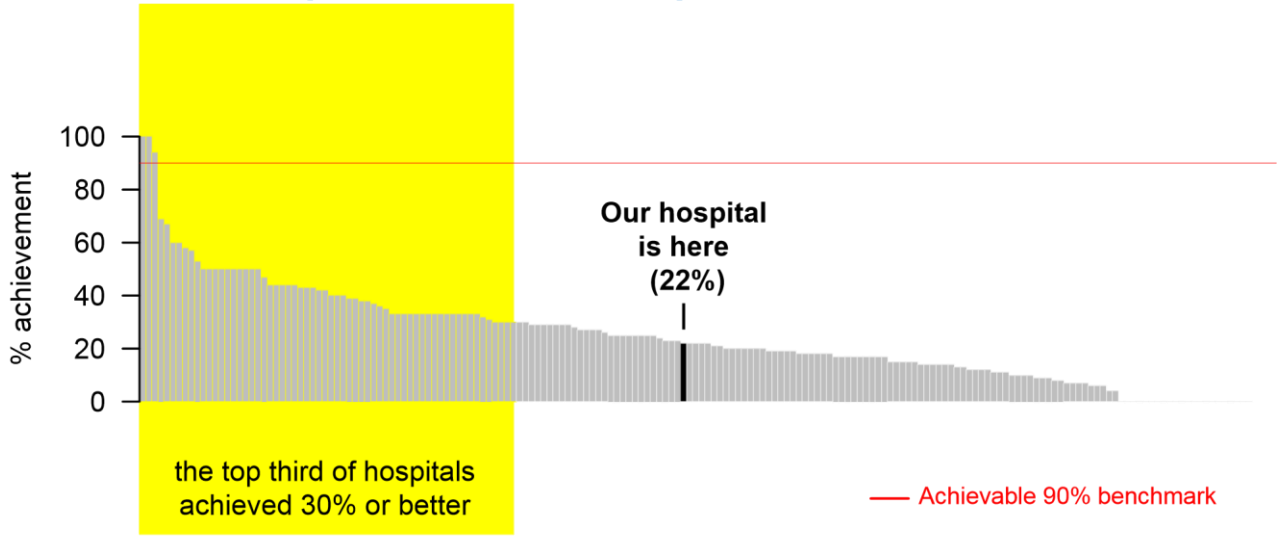


Figure 11: PBM standard 8 hospital comparison

- Table 6 shows the number of transfusion episodes nationally in the first 7 post-operative days. 80% of patients (2307/2878) were transfused on just one occasion.

Table 6: Number of transfusion episodes nationally in first 7 post-operative days

Transfusion	74% (2878/3874)
How many episodes*	
One	80% (2307/2878)
Two	13% (360/2878)
Three	2% (62/2878)
Four	<1% (10/2878)
Five	<0.1% (2/2878)
Not known	5% (137/2878)

* A transfusion episode = any red cells transfused within a 24 hour period

- In our patients, the median (IQR) Hb prior to transfusion was **78 days (73-80), n=18** , compared to 79 days (74-85), n=2717 nationally.
- Figure 12 shows the distribution of Hb results prior to the first post-operative transfusion episode nationally. This suggests that many patients are being transfused above the recommended threshold.

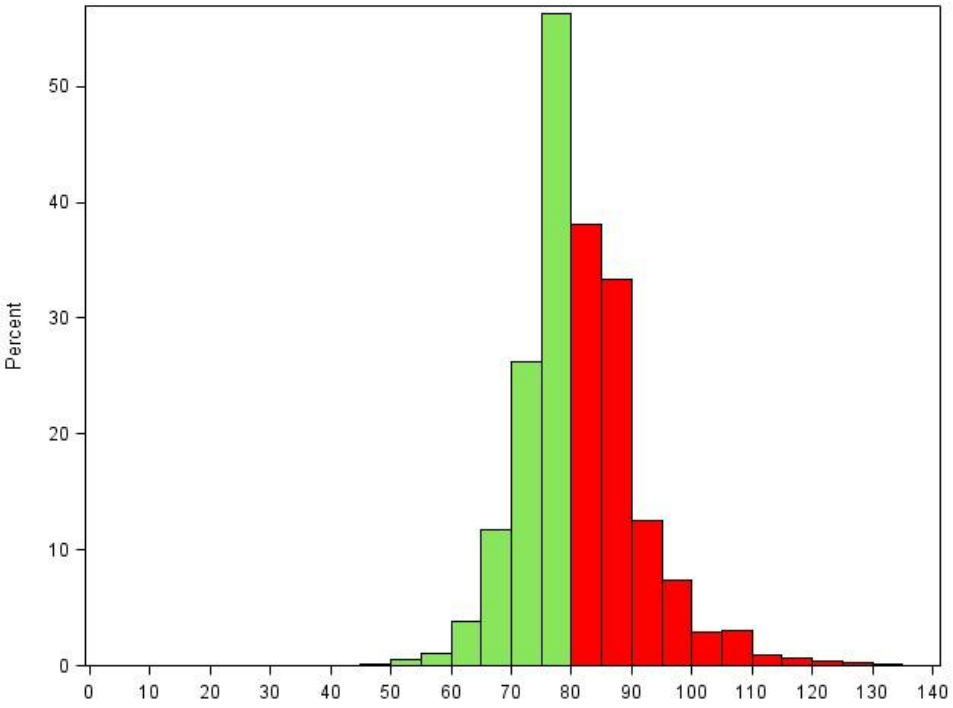


Figure 12: Distribution of Hb results prior to the first post-operative transfusion episode nationally

- Table 7 shows the reasons for the first post-operative transfusion nationally.

Table 7: Reasons for first post-operative transfusion nationally

Active bleeding*	9% (256/2868)
An hb <70 g/L without acute coronary syndrome	11% (304/2868)
An hb < 80 g/L with acute coronary syndrome	5% (134/2868)
Other**	74% (2115/2868)
Low BP or other hemodynamic reason	19% (394/2115)
Hb drop	59% (1242/2115)
Blood loss – any volume recorded	5% (107/2115)
Not known	18% (372/2115)
Not known	2% (59/2868)

* Active post-operative bleeding is defined as bleeding causing systolic Hb <90mmHg, and or heart rate >110bpm, and or return to theatre because of bleeding and or activation of major haemorrhage pathway.

** These categories were formed from free-text stated by auditors

Why is this standard important?

- There is an increasing body of evidence from large randomised controlled trials, that there is no benefit for transfusing at higher haemoglobin thresholds (liberal practice), and some evidence of harm.[15]
- The use of a restrictive transfusion strategy is therefore recommended. This reduces unnecessary transfusion of red cells, improving outcomes for patients and also reducing costs.
- A higher transfusion threshold of 80g/L is recommended for those with acute coronary syndrome, given uncertainty about the levels of evidence for this subgroup.

Who do we target?

- Table 8 shows which clinical staff were involved in the decision to transfuse post-operatively. These staff should also be targeted for standard 9.
- Figure 13 shows the breakdown of specialities and grade of staff nationally.

	Anaesthetics N	Other specialty N	Specialty not known N
Consultant	0	6	0
Senior trainee	0	3	0
Junior trainee	1	2	0
Speciality not known	0	0	6

Table 8: Grade and specialty of doctor in our hospital

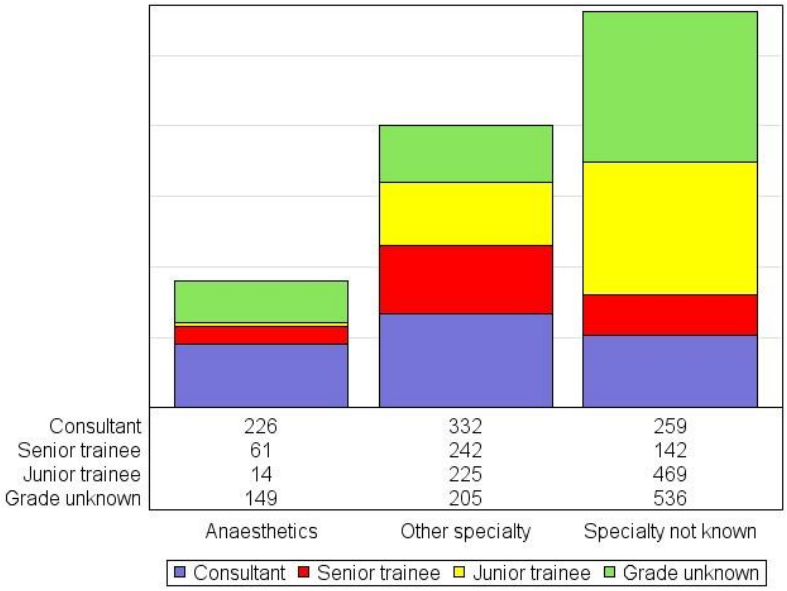


Figure 13: Grade and specialty of doctor nationally

What should we do next? Recommendations:

For our Hospital	For clinical staff making the decision to transfuse	For the Hospital Transfusion / Patient Blood Management team

• Our performance for this standard was in the mid-range when compared with other hospitals nationally, but there is still room for further improvement. • We should formulate an action plan to continue to improve our practice towards achieving this standard.	• Clinical staff should **only prescribe** a **red cell transfusion** in **stable nonbleeding patients** who have a **pre-transfusion Hb** of **less** than **70g/L** or less than **80g/L** in those with **acute coronary syndrome**. • Clinical staff should **record** the **reason** for **transfusion** in the patient's case notes and **record a justification** for transfusion **if** the transfusion was **prescribed for** a patient with **a Hb higher** than the agreed thresholds.	• If a stable non-bleeding patient has a pre-transfusion Hb greater than 80g/L, the transfusion laboratory staff should **query the request prior to issuing blood, with support from Hospital Transfusion / PBM team to do so**. • The team should **work with clinicians to conduct further audits** of the proportions of **patients receiving transfusion outside recommendations**. • The team should consider how best to **work with clinical trainers** to **ensure** that **induction** and **ongoing education programmes** for clinical staff **include randomised trial findings** which compare the patient outcomes of different red cell transfusion strategies. • For hospitals with access to electronic order comms systems, the team should consider how best to **work with** the **IT** department to **design** a **system of decision support** at the time of ordering that **supports best practice**.

Post-operative transfusion – single unit approach

PBM standard 9: *For **patients** receiving a **post-operative transfusion**, **clinical staff** should **prescribe one unit of red cells at a time** and re-check **Hb before prescribing a further unit (unless the patient has active bleeding)***

- For the first post-operative transfusion episode, the single unit transfusion approach was followed by clinical staff in **13% (2/16)** of our post-operative patients compared to 38% (920/2414) nationally (patients with active bleeding were excluded).

How do we compare with other hospitals?

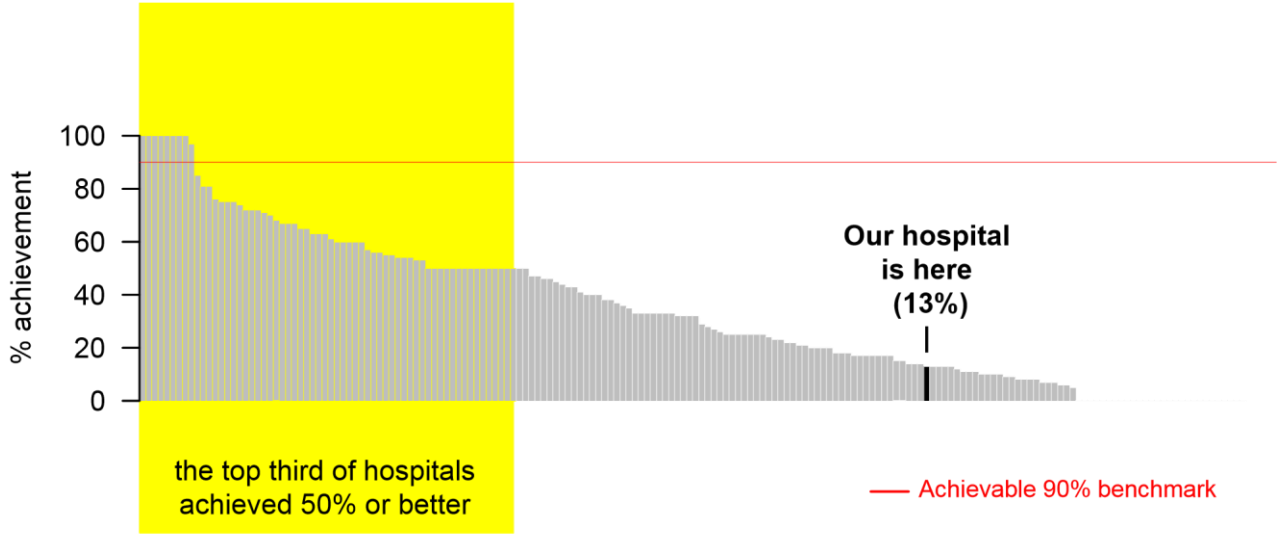


Figure 14: PBM standard 9 hospital comparison

- Nationally 69% (1950/2842) of patients who were transfused post-operatively received **2 or more units** of blood. In our hospital this figure was **89% (16/18)**.

Why is this standard important?

- A key component of PBM is to avoid the unnecessary transfusion or over-transfusion of blood.
  - Good PBM requires all decisions to transfuse to be based upon a recent Hb.
- By checking a patient's Hb after the first unit, it will become evident that in many instances, the second unit is not required.
- Reducing number of units transfused reduces all aspects of transfusion related risk.
- Re-checking Hb after the first unit is likely to save time, effort and money.

What should we do next? Recommendations:

For our Hospital	For clinical staff making the decision to transfuse	For the Hospital Transfusion / Patient Blood Management team

• Our performance for this standard was lower than two thirds of the other hospitals nationally. In order to improve the care we provide to our patients, we should prioritise this standard when planning our response to feedback. • We should formulate an action plan to improve performance towards a more feasible shortterm goal, such as the national median (i.e. 31%).	□ Staff should **recheck Hb after** the **first unit** has been transfused to **see if second** unit can be **avoided**.	• If more than one unit transfusions are being requested for routine pre-operative patients, the laboratory staff should be encouraged to **challenge the request before issuing the blood, with the support of the Hospital Transfusion / PBM team**. This also **strengthens team working** rather than clinicians and lab staff working in "silos". • The Hospital Transfusion / PBM team should **work with clinicians to continue to monitor practice in relation to this standard** by conducting further **local audits** of the proportions of **patients receiving single or more than one unit transfusions**, and **feeding back these findings to clinical teams**.

How did our hospital perform? PBM Standard 10 & 11

Patient Blood Management in patients who have received a postoperative transfusion

Clinical staff *should attempt* ***at least one*** **(PBM standard 10)** ***or all*** **(PBM standard 11)** ***appropriate patient blood management measures*** *in patients who receive a* ***transfusion*** *during* ***major blood loss surgery***

- Clinical staff prescribed post-operative transfusion in **78% (18/23)** of our patients undergoing major blood loss surgery compared to 74% (2878/3874) nationally.
- In our patients undergoing major blood loss surgery who received post-operative blood transfusion, clinical staff attempted at **least one** appropriate PBM measure in **50% (2/4)**, compared to 85% (1714/2026) nationally.
- In our patients undergoing major blood loss surgery who received a post-operative blood transfusion, clinical staff attempted **all** appropriate PBM measures in **0% (0/4)**, compared to 8% (1714/2085) nationally.

How do we compare with other hospitals?

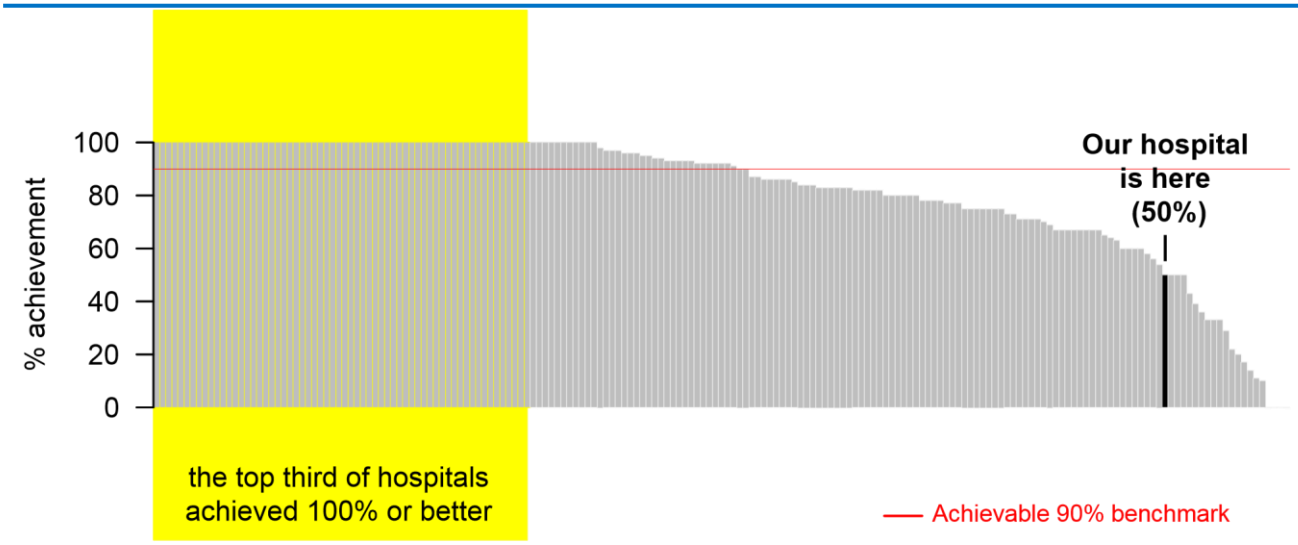


Figure 15: PBM standard 10 hospital comparison

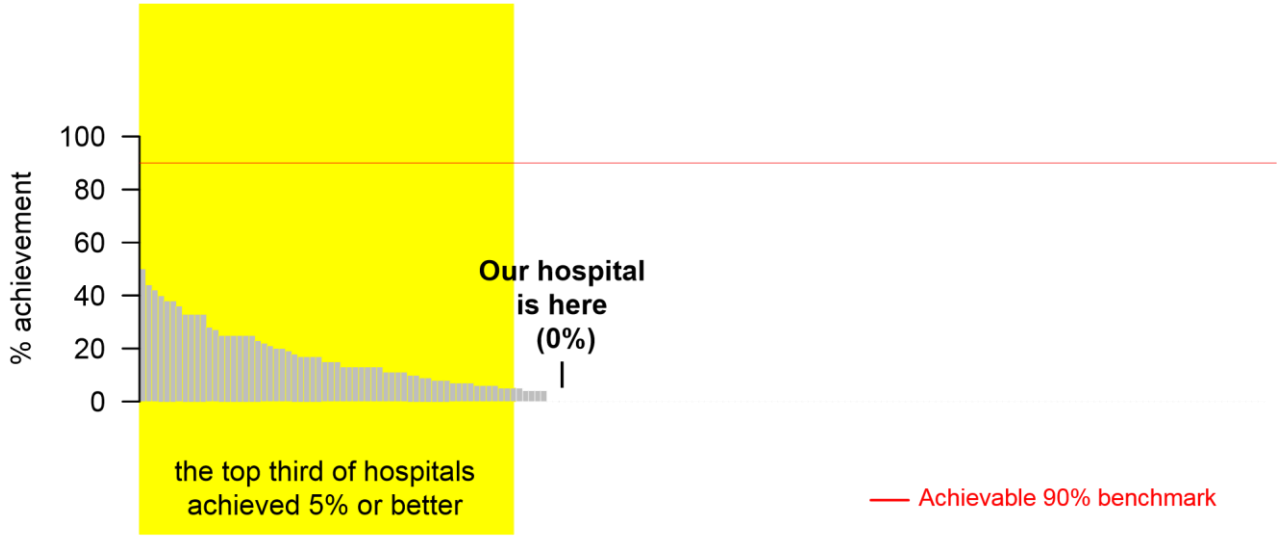


Figure 16: PBM standard 11 hospital comparison

Why is this standard important?

- The over-arching purpose of PBM is to improve outcomes for patients.
- The components of PBM as described in Table 1 combine to minimise the need for blood transfusion.
- PBM can lead to reduced complications, hospital stay and the cost of treating complications.
- PBM Standard 10 relates to at least one PBM intervention being implemented. This is an easy standard to comply with and really corresponds to the basics of good peri-operative practice.
- PBM standard 11 is the most stringent. It reflects the very best practice, where hospitals have processes in place to ensure that every possible PBM intervention has been implemented to the benefit of patients. (Standard 11 is the final common pathway for PBM).
- Hospitals should not be satisfied with high achievement in standard 10, but rather, should strive to increase their achievement for standard 11 which represents best PBM practice.

What should we do next? Recommendations:

For our Hospital	For theatre teams	For the Hospital Transfusion / Patient Blood Management team

For PBM Standard 10: • Our performance for this standard was lower than two thirds of the other hospitals nationally. In order to improve the care we provide to our patients, we should prioritise this standard when planning our response to feedback. • We should formulate an action plan to improve performance towards a more feasible shortterm goal, such as the national median (i.e. 92%). **For PBM Standard 11:** • Along with most other hospitals, our performance for this standard was lower than expected. • We should formulate an action plan to improve performance towards a more feasible shortterm goal, such as 50% working towards 100%.	• The theatre team, anaesthetists and surgeons should **ensure that the PBM measures** (presented in Table 1) and as identified by the Hospital Transfusion / Patient Blood Management Committee are **implemented as appropriate**. • Where available, **peer data should be applied to compare individual surgeons** and **encourage participation in PBM**.	• The Committee should **ensure that local guidelines exist regarding the use of PBM measures** (as outlined in Table 1), including **clear recommendations** on the **individuals or teams responsible for implementing these measures**. • The Committee should **ensure that the use of tranexamic acid is the standard of care for surgical patients** expected to have moderate or more significant blood loss unless contraindicated. • The Committee should **identify the need for intra-operative cell salvage and resource appropriately**; this would normally be used in relevant high blood loss procedures in association with tranexamic acid.

Section 4: What are the key priorities?

With the completion of the audit, the writing group discussed a number of key messages. It was recognised that this audit has applied a large number of PBM standards, although a number are interrelated and may represent more 'incremental' standards.

Recognising the need to facilitate the implementation of PBM across many hospitals with different levels of current engagement with PBM, and the desire to maximise impact on reducing patient risk, the audit writing team agreed **three top priorities**:

1. **Pre-operative anaemia detection and management**: Pathways for (elective) surgery should ensure effective processes exist for the recognition of anaemia, which is

followed up and acted upon within a timely period, to allow effective management and investigation.

2. **Post-operative transfusions**: Restrictive use of red cells to only transfuse once the Hb falls below 70g/l should be considered the default indication (unless patients have acute coronary ischaemia).
3. **Broader use of tranexamic acid**: There is accumulating evidence that tranexamic acid is safe and effective to reduce blood loss and minimise transfusion requirements in elective surgery; it is likely to be highly cost-effective.

In the case of all three key priorities, this audit clearly demonstrates considerable opportunities to improve practice, and hence patient outcomes, at many hospitals.

These priorities should be underpinned by local guidelines and educational programmes targeted at those health care professionals responsible for the care of patients in the surgical pathway and reinforced by continuous quality improvement audits overseen by the Hospital Transfusion / Patient Blood Management Committee. The workplan will be supported by the NICE Transfusion guidelines to be published in November 2015 and in development at the time of preparing this report.[16]

Section 5: What should we do next? Action Plan

There is evidence that making a specific action plan can facilitate responding to feedback efficiently

- An action plan outlines **what** needs to be done, by **whom**, **where** and **when**.
- We recommend that you pick **two or three recommendations** from the findings report that are important for your hospital to address
- You may find it useful to **complete some or all of this action planning template** when planning your hospital's response to the feedback from this audit

Key Action(s) to be taken	Co-ordinator for Action	Target of Action	Location for Action	Timescale for Action	Indicator of Outcome for Action
I.e. **WHAT** needs to be done to **address** this recommendation in our hospital?	I.e. **WHO** will be responsible for this action?	I.e. **WHOM** is the action going to affect?	I.e. **WHERE** will this action take place or be discussed?	I.e. **WHEN** will this action be completed mm/yyyy)?	I.e. **HOW** will the outcome of the action be monitored to ensure it has achieved the desired effect?

Name of individual(s) completing the action plan: Signature: Date:

Name of individual(s) completing the action plan: Signature: Date:

Recommendation from Audit Report	Our **selected recommendations(s)** to address				