



2021 National Comparative Audit of NICE Quality Standard QS138

National Comparative Audit of Blood Transfusion

February 2022



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PILOT SITES

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MEMBERS OF THE PROJECT GROUP

Joint Clinical Audit Leads

Prof Mike Murphy, Consultant Haematologist and Oxford University Hospitals NHS Foundation Trust
Dr. James Uprichard, Consultant Haematologist, St. George's University Hospitals NHS Foundation Trust

Medical

Dr. Jon Cort, Consultant in Anaesthetics & Chair East Midlands RTC
Dr. Lise Estcourt, Medical Director, NCABT
Dr. Youssef Sorour, Consultant Haematologist, Barnsley Hospital NHS Foundation Trust

Nursing

Wendy McSporran, Advanced Transfusion Practitioner, Royal Marsden NHS Foundation Trust
Louise Sherliker, National Lead PBM Team, NHSBT

Scientific

Anna Capps-Jenner, Head of Blood Transfusion, Ealing Hospital
Anwen Davies, PBM Practitioner, NHSBT
Jeyakumar Visuvanathan (Jey), Site Manager Haem and Blood Transfusion, Harefield Hospital, Part of GSTT

Patient Representative

Graham Donald

Audit

John Grant-Casey, Programme Manager, NCABT
Paul Davies, Senior Clinical Audit Facilitator, NCABT

FOR CORRESPONDENCE, PLEASE CONTACT

John Grant-Casey, Programme Manager, Freepost NCABT

Email john.grant-casey@nhsbt.nhs.uk

Tel: +44 (0)7720 275388

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Summary

The audit found evidence of significant compliance with elements of the four NICE Quality Statements for Blood Transfusion, but with some way to go to achieve uniformly good practice:

Key findings

- 665/1131 (59%) of the patients who were known to have iron deficiency anaemia prior to being admitted for surgery were treated with iron before surgery.
- 1079/1599 (67.5%) patients undergoing surgery with expected moderate blood loss received tranexamic acid.
- 893/1534 (58%) patients receiving elective red blood cell transfusions had both their Hb checked and a clinical re-assessment after a unit of red cells was transfused.
- 1032/1622 (64%) of transfused patients had evidence of receiving written or verbal information about the risks, benefits and alternatives to transfusion.
- Only 422/1622 (26%) received both written and verbal information

Recommendations

- Hospitals should examine their procedures for implementing the NICE Quality Statements for Blood Transfusion. They should explore the barriers to their implementation and work to overcome them.
- Hospitals should take advantage of regular repeats of this audit to monitor effectiveness of interventions.
- See Appendix B for a list of resources

Background

Patient Blood Management (PBM) is a multidisciplinary, evidence-based approach to optimising the care of patients who might need a blood transfusion. The deployment of PBM initiatives reduces inappropriate transfusion, which improves patient safety, reduces hospital costs and helps to ensure the availability of blood components when there is no alternative. Audit of PBM practice is vital to help us to understand the quality of care and to indicate where corrective measures are needed.

The Transfusion 2024 plan outlines four key areas for clinical and laboratory transfusion practice for safe patient care across the NHS for the next 5 years. The strategy for PBM includes the development of a self-assessment tool for use by hospitals to allow assessment of compliance with the NICE Quality Standard, progress with implementation of PBM and benchmarking between hospitals. This audit should be an initial step in the pathway towards external accreditation in PBM.

Aims of the audit

- Provide the opportunity to evaluate local evidence of compliance with the four quality statements in the NICE Quality Standard for Blood Transfusion
- Provide data to hospital teams to allow their understanding of what steps they can take to implement PBM and to measure their effectiveness in improving patient care
- Allow the transfusion community, e.g. the NBTC to benchmark the progress of PBM and its effect on improving patient outcomes

Audit Standards

The standards for this audit were adapted from those issued in NICE QS138:

Quality Statement 1: People with iron deficiency anaemia are treated with iron supplementation before surgery.

Quality Statement 2: Adults who are having surgery and expected to have moderate blood loss receive tranexamic acid.

Quality Statement 3: People are clinically reassessed and have their haemoglobin levels checked after each unit of red blood cells they receive, unless they are bleeding or are on a chronic transfusion programme.

Quality Statement 4: People who have had a transfusion are given verbal and written information about blood transfusion.

Methodology

All NHS Trusts in the UK were invited to take part in the audit. Trusts were allowed to enrol as whole Trusts or as hospitals within a Trust, so we used the term “sites” to describe those who contributed data. Each participating site was issued with a stationery pack that contains four data collection forms, with ten copies of each, allowing them to audit up to 40 patients. The audit standards were derived from the statements in the NICE Quality Standard QS138. The audit was divided into four sections, A, B, C & D, and a patient’s record could be used for more than one section. Data were collected on cases seen during October, November and December 2021, on transfusions that occurred during August to December 2021. This audit was conducted in parallel with a survey of how effectively sites are configured to deliver effective PBM. There will be a separate report on the PBM survey.

Participation in the audit

153 sites contributed data on 4679 patients. For Section A there were data on 1131 patients, 1599 for Section B, 1534 for Section C and 1622 for Section D.

SECTION A - Adults with iron deficiency anaemia are offered iron supplementation before surgery

Quality Statement 1: People with iron deficiency anaemia are offered iron supplementation before surgery.

Background

The first pillar of PBM is the detection and management of anaemia and iron deficiency ⁽¹⁾. It is estimated that 40% of patients requiring major surgery are anaemic and in a large multicentre study 62% of patients presented with an absolute iron deficiency ^(2, 3). The rationale for identifying and treating anaemia preoperatively includes:

- Identification of the underlying cause of anaemia which may be unrecognised without further investigations
- Reduction in the likelihood of transfusion and thus reduction in the pressure on the blood stocks
- Reduction in patients' exposure to adverse effects of anaemia and/or transfusion ⁽⁴⁾.

Studies have shown that patients in the surgical setting treated with iron had an increase in haemoglobin concentration (Hb) and subsequently had a decrease in red cell transfusion ⁽⁵⁾. NICE (2015) recommends correction of iron deficiency anaemia with oral iron in the first instance, despite the known issues of tolerance and compliance. There is evidence for its positive effect on decreasing length of hospital stay and for its cost effectiveness in comparison to intravenous iron ⁽⁵⁾.

In cases where oral iron is unlikely to be effective, due to factors such as malabsorption and limited time to surgery, then intravenous iron is recommended ⁽⁵⁾.

Although the reasons for not commencing iron are not known from this audit, SHOT has suggested that education is still required for medical and nursing staff to provide appropriate management of haematinic deficiency. ⁽⁶⁾

Table 1. Investigating and treating iron deficiency anaemia

N = 1131	National	
	N	%
A1. Was iron therapy started before surgery?		
Yes	665	58.8
No	466	41.2
A2 . How many weeks prior to surgery was iron therapy started?		
<i>Don't know</i>	97	14.6
<i>Less than 1 week</i>	76	11.4
<i>2 weeks</i>	126	18.9
<i>4 weeks</i>	129	19.4
<i>8 weeks</i>	83	12.5
<i>12 weeks</i>	35	5.3
<i>More than 12 weeks</i>	118	17.7
<i>Not Stated</i>	1	0.2
A3. Was the iron therapy		
<i>Oral</i>	261	39.2
<i>IV</i>	398	59.8
<i>Not stated</i>	6	0.9
A4. Why was the patient on IV therapy?*		
<i>Intolerance to oral iron now or in the past</i>	40	10.1
<i>Too short a time for oral iron to be effective before surgery</i>	265	66.6
<i>Other</i>	99	24.9
<i>Not stated</i>	1	0.3
* Please note that reasons given do not add up to "IV" iron therapy as patients could be on IV therapy for a combination of reasons.		

The data in Table 1 shows that 665/1131 (59%) of the patients who were known to have iron deficiency anaemia prior to being admitted for surgery were treated with iron before surgery. The precise reasons for not treating the remainder of the patients were not captured in this audit and could be many. Sites should examine the procedures in place for the pre-operative identification and management of iron deficiency anaemia.

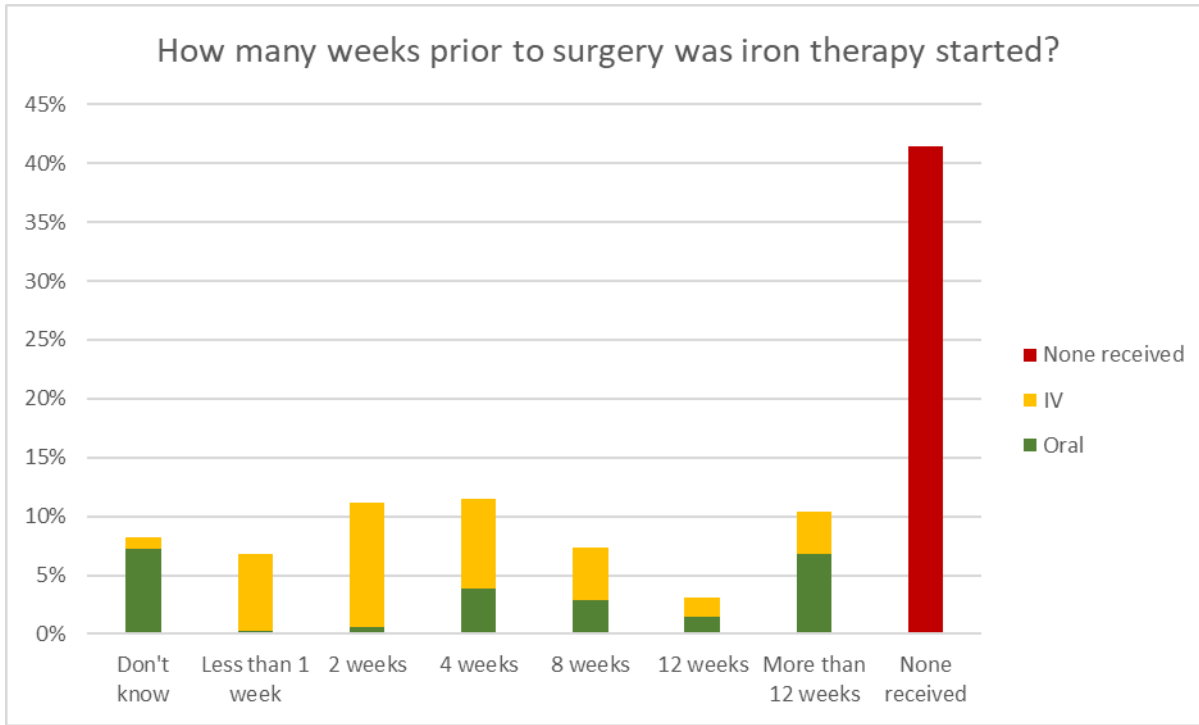


Figure One: How soon before surgery iron was started, calculated only for those patients where a timescale was given

64% of the patients treated with iron for iron deficiency anaemia received iron (either oral or intravenous) within 4 weeks of surgery; 4 weeks is too short a time for iron therapy to have its maximum effect.

SECTION B - Adults who are having surgery and expected to have moderate blood loss are given tranexamic acid

Background

Tranexamic acid is an antifibrinolytic agent which binds to plasminogen, reducing its conversion to plasmin and therefore preventing fibrin degradation ⁽⁷⁾. It has been shown to be beneficial in several settings including reduction in:

- The risk of death due to bleeding in women with post-partum haemorrhage ⁽⁸⁾.
- The risk of death from bleeding in trauma patients ⁽⁹⁾
- Head injury related death in patients with acute traumatic brain injury ⁽¹⁰⁾
- The risk of transfusion and reoperation for haemorrhage in cardiac surgery ⁽¹¹⁾.

On the basis of data supporting its use in minimising blood loss, NICE recommend the use of tranexamic acid in primary joint replacement surgery ⁽¹²⁾ as well as in patients undergoing other operations with expected moderate blood loss (greater than 500 ml) ⁽⁵⁾.

Table 2. Tranexamic Acid use

N = 1599	National	
	N	%
B1. Patient was given tranexamic acid	1079	67.5%

The audit found that 1079/1599 (67.5%) eligible surgical patients were given tranexamic acid, while potentially all were eligible to receive it. Sites should examine their procedures for the use of tranexamic acid in patients undergoing surgery with anticipated moderate blood loss.

SECTION C - People are clinically reassessed and have their haemoglobin levels checked after each unit of red blood cells they receive, unless they are bleeding or are on a chronic transfusion programme.

Optimising decision making for patients who may need blood transfusion is a central focus of PBM initiatives ⁽¹³⁾, involving a finely balanced approach that considers potential benefit versus risk of transfusion, and alternative treatments. Transfusion of each unit of blood should be an independent clinical decision.

Transfusion in the UK overall is deemed extremely safe with approximately 2.1 million blood components issued in the UK during 2020. The risk of associated death was 1 in 53,193 components issued and the risk of serious harm 1 in 15,142 components issued. However, Transfusion Associated Circulatory Overload (TACO) is consistently cited as the highest accountable reason for major morbidity and mortality associated with transfusion, with 149 cases reported to in 2020 alone (deaths 18, major morbidity 25), and cumulative data from 2011-20 showing an overall risk of TACO of 1 in 25,313 blood components issued ⁽⁶⁾. It is widely considered that a unit of blood increases haemoglobin levels by around 10g/L. This however only applies to patients of average weight (70Kg) ⁽¹⁴⁾ and therefore should not be used as a reliable measure to calculate appropriate red cell dosage. A single unit approach is recommended by NICE ^(5,16) where only one unit of red cells is authorised at a time, with a clinical re-assessment and a haemoglobin re-check carried out following the transfusion of each unit of blood. This approach is also recommended by SHOT to mitigate risks of TACO, particularly for older patients (>50 years) and those of lower body weight (<50 Kg) who are at higher risk of overload ⁽⁶⁾.

A clinical re-assessment should include checking if symptoms of anaemia have been alleviated, reviewing vital signs, and being alert to any new symptoms which may have been caused by the transfusion. A re-check of Hb allows understanding of the level of increment gained, in line with recommended restrictive thresholds when correcting anaemia, as outlined by the NBTC indication codes ⁽¹⁷⁾.

Re-assessment following transfusion informs whether the procedure has had the desired outcome, affording an opportunity to re-evaluate if further treatment is needed, again re-considering the benefit versus risks and available alternatives, and supporting optimal decision making.

Table 3. Assessing the patient following the transfusion of a unit of red blood cells

N = 1534	National	
	N	%
C1. Hb checked after unit was given	1071	69.8%
C2. Patient clinically assessed after unit was given	1000	65.2%
People are clinically reassessed and have their haemoglobin levels checked after each unit of red blood cells	893	58.2%

Table 3a – Patients assessed and had Hb check

		Clinically assessed	
		Yes	No
HB checked	Yes	58.3% (893/1531*)	11.4% (175/1531*)
	No	7.0% (107/1531*)	23.3% (356/1531*)

*does not include patients where no response was given for C1 or C2

The audit found that whilst a single unit approach was taken in 893/1531 (58.3%) cases, in 356/1531 (23.3%) red cell unit transfusions there was no evidence that a re-check of Hb or a clinical assessment had been carried out following the transfusion.

SECTION D - Patients who have had a transfusion are given verbal and written information about blood transfusion

Background

SaBTO (*The Advisory Committee on the Safety of Blood, Tissues and Organs*) is the independent advisory committee that advises ministers on the safety of blood, tissues and organs. In 2011, it made recommendations on patient consent for blood transfusion⁽¹⁸⁾. In 2014, 164 hospitals participated in the *National Comparative Audit of Consent for Blood Transfusion*⁽¹⁹⁾; evidence for documentation of transfusion was found in only 47% of cases.

The landmark decision following the *Montgomery v Lanarkshire Health Board* [2015] case at the Supreme Court was that clinicians have a duty to involve patients in treatment decisions, informing patients of the risks, benefits and alternatives. “The doctor is... under a duty to take reasonable care to ensure that the patient is aware of any material risks involved in any recommended treatment, and of any reasonable alternative or variant treatments. The test of materiality is whether, in the circumstances of the particular case, a reasonable person in the patient’s position would be likely to attach significance to the risk, or the doctor is or should reasonably be aware that the particular patient would be likely to attach significance to it”⁽²⁰⁾

In view of these new data, SaBTO decided that the recommendations needed to be reviewed and revised to enhance standards for the provision of information about blood transfusion and for obtaining informed patient consent and to clarify good practice. These were published in December 2020^(21, 22), and were summarised in a publication in the journal *Clinical Medicine*⁽¹⁷⁾.

Other guidance, guidelines and recommendations on providing information to patients about transfusion include:-

- 2015 National Institute for Care and Health Excellence (NICE) *Blood Transfusion guideline*⁽⁵⁾
- 2016 NICE *Blood Transfusion Quality Standard on Patient Information*⁽¹⁶⁾;
- 2015 *Choosing Wisely recommendations for blood transfusion*⁽²³⁾;
- 2015/16 James Lind Alliance *Priority Setting Partnership in Blood Donation and Blood Transfusion*⁽²⁴⁾.

The UK Blood Services patient information leaflet ‘*Receiving a Blood Transfusion*’⁽²⁵⁾ is a useful resource for both patients and healthcare staff. However, only 19,150 hard copies of the leaflet were

provided to hospitals in 2021 up to 16th December 2021, and there were 2,269 downloads. These data indicate that the leaflet is not used routinely; in 2020, NHSBT issued 1,286,287 units of red cells, 145,101 units of fresh frozen plasma and 230,792 units of platelets (data from SHOT Annual Report, 2020) ⁽²⁶⁾.

Table 4. Provision of information about risks, benefits & alternatives in transfused patients

N = 1622	National	
	N	%
Patient was given NO information	590	36.4%
Patient was given ONLY VERBAL information	569	35.1%
Patient was given ONLY WRITTEN information	41	2.5%
Patient was given WRITTEN AND VERBAL information	422	26.0%

The audit found that there was absence of any documentation that any written or verbal information was provided to 36% of transfused patients, and fewer than 30% of patients received any written information. Sites should examine their procedures for providing written and verbal information to patients who may need transfusion and this should include facilitating online access to patients to find accurate materials.

DISCUSSION

The NICE Quality Standard 138 was published five years ago. While it is encouraging to see some uptake of the guidance, as evidenced by the data in this report, there is nevertheless a long way to go to ensure full compliance and that transfusion practice is optimised for the benefit of patients.

The audit shows a solid foundation for good practice, but achieving more should not be onerous, costly nor time-consuming, and what is now needed is for hospitals to understand what barriers may exist to improving practice and revise their procedures to implement the four Quality Statements for blood transfusion.

One of the factors that possibly influenced the number of cases that sites could audit was the postponement of elective surgery associated with the COVID-19 pandemic. However, the audits we conduct are of a pragmatic nature and we report on the data available and the practice at the time.

Our next steps are to devise a scoring system for compliance with each of the 4 Quality Statements, and survey a sample of hospitals to find out what has enabled them to perform well or from doing better. We can then share the learning points with hospitals, and determine, as we repeat the audit, if improvement is being achieved.

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PATIENT AUDIT FORM

SECTION A - Adults with iron deficiency anaemia are offered iron supplementation before surgery

A1. Was iron therapy started before surgery? Yes No

If yes, continue below. If no, you have completed SECTION A

A2 . How many weeks prior to surgery was iron therapy started?

Tick a box that is the most closest to the actual number of weeks

Patient already on iron therapy on admission

Less than 1 week

2 weeks

4 weeks

8 weeks

12 weeks

More than 12 weeks

A3. Was the iron therapy Oral? *You have completed the questions*

IV? *Now answer question A4*

A4. Why was the patient on IV therapy?

Intolerance to oral iron now or in the past

Too short a time for oral iron to be effective before surgery

Other

END

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PATIENT AUDIT FORM

SECTION B - Adults who are having surgery and expected to have moderate blood loss are offered tranexamic acid

B1. Is there evidence that the patient was given Tranexamic Acid at any time in the peri-operative period?

Yes No

END

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PATIENT AUDIT FORM

SECTION C – Patients receiving red blood cells are clinically reassessed and have their haemoglobin levels checked after each unit of red blood cells they receive, unless they are bleeding or are on a chronic transfusion programme

C1. Is there evidence that the patient's Hb was checked after the unit of red cells was transfused?

Yes No

C2. Is there evidence that the patient was clinically re-assessed after the unit of red cells was transfused?

Yes No

END

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PATIENT AUDIT FORM

SECTION D - Patients who have had a transfusion were given verbal and written information about blood transfusion

D1. Is there evidence that the patient was given *VERBAL* information about the risks, benefits and alternatives to transfusion?

Yes No

D2. Is there evidence that the patient was given *WRITTEN* information about the risks, benefits and alternatives to transfusion?

Yes No

D3. Is there evidence that the patient was given *BOTH VERBAL and WRITTEN* information about the risks, benefits and alternatives to transfusion?

Yes No

END

Appendix B – List of resources

Resources that cover all the NICE quality statements audited

PBM toolkit information for clinicians <https://hospital.blood.co.uk/pbm-toolkit/>

Blood Assist App: blood component administration, available for mobile download on android and IOS, web-based version also available here <https://www.bloodassist.co.uk/terms>

QS1 – Iron supplementation pre surgery

Education for teams

eLearning: available on eLfh; ESR (certificates provides) or on the [Hospital & Sciences website](#) (no certificate provided):

Anaemia - the only introduction you need

Anaemia in primary care patients

Anaemia in hospital patients

Coming soon – Anaemia of inflammation and chronic disease modules

Business planning

Commissioning for Quality and Innovation (CQUIN): 2022/23 – See CCG6: Anaemia screening and treatment for all patients undergoing major elective surgery

<https://www.england.nhs.uk/publication/combined-ccg-icb-and-pss-commissioning-for-quality-and-innovation-cquin-guidance/>

Commissioning for Quality and Innovation (CQUIN) scheme for 2022/23 Annex: Indicator specifications – See CCG6: Anaemia screening and treatment for all patients undergoing major elective surgery

<https://www.england.nhs.uk/publication/combined-ccg-icb-and-pss-commissioning-for-quality-and-innovation-cquin-indicator-specification/>

Toolkits & further information

Obstetric anaemia toolkit <https://hospital.blood.co.uk/patient-services/patient-blood-management/obstetric-anaemia-toolkit/>

Pre op Anaemia: Guidance; toolkits; Information for patients (Anaemia, Iron in your diet); Quality Improvement; Blooducation; Research

<https://hospital.blood.co.uk/patient-services/patient-blood-management/pre-operative-anaemia/>

QS2 – Tranexamic acid

Joint Surgery guidance

NICE Joint replacement (primary): hip, knee and shoulder NICE guideline NG157, June 2020:
1.4 Tranexamic acid to minimise blood loss

Full evidence base for Tranexamic acid ; research studies, financial analysis, benefits are available in full NICE NG24 guidance section 6, P75, [NICE Guideline Template](#)

QS3 – Reassessment after red cell transfusion

Implementation examples

Single Unit transfusion resources <https://hospital.blood.co.uk/patient-services/patient-blood-management/single-unit-blood-transfusions/>

Guidance for when to transfuse

NBTC indication codes <https://hospital.blood.co.uk/the-update/revised-nbtc-indication-codes-for-transfusion-are-now-available/>

Blood components: Indication codes App, available for mobile download on android and IOS, web-based version also available here <https://www.bloodcomponents.org.uk/terms>

Information specific to implementing one unit transfusions to reduce TACO risk

NCA 2017 Audit of transfusion-associated circulatory overload <https://hospital.blood.co.uk/audits/national-comparative-audit/>

SHOT TACO resources <https://www.shotuk.org/resources/current-resources/data-drawers/transfusion-associated-circulatory-overload-taco-data-drawer/>

QS4 – Verbal & Written Information for patients

Consent for transfusion resources: SaBTO recommendations 2020; Montgomery v Lanarkshire Health Board; Sticker pads; Information for clinical staff; Patient Information leaflets; Teaching resources <https://hospital.blood.co.uk/patient-services/patient-blood-management/consent-for-transfusion/>

Appendix C – List of participating sites

Addenbrooke's Hospital
Aintree University Hospital
Airedale NHS Foundation Trust
Alder Hey Children's NHS Foundation Trust
Ashford and St Peters Hospitals NHS Foundation Trust
Barking Havering and Redbridge University Hospitals NHS Trust
Barnet Hospital
Barnsley Hospital NHS Foundation Trust
Bedford Hospital NHS Trust
Birmingham Heartlands Hospital
Birmingham Women's and Children's NHS Foundation Trust
Blackpool Teaching Hospitals NHS Foundation Trust
Bolton NHS Foundation Trust
Bradford Teaching Hospitals NHS Foundation Trust
Bristol Royal Infirmary
Broomfield Hospital
Buckinghamshire Healthcare NHS Trust
Calderdale and Huddersfield NHS Foundation Trust
Charing Cross Hospital
Chelsea & Westminster Hospital
Chesterfield Royal Hospital NHS Foundation Trust
City Hospital Campus
Colchester Hospital
Conquest Hospital
Countess of Chester Hospital NHS Foundation Trust
County Durham and Darlington NHS Foundation Trust
Croydon Health Services NHS Trust
Dartford and Gravesham NHS Trust
Diana Princess of Wales Hospital
Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust
East and North Hertfordshire NHS Trust
East Cheshire NHS Trust

East Lancashire Hospitals NHS Trust
Eastbourne Hospital
Epsom and St. Helier University Hospitals NHS Trust
Fairfield General Hospital
Frimley Park Hospital
Furness General Hospital
Gateshead Health NHS Foundation Trust
George Eliot Hospital NHS Trust
Glangwili General Hospital
Gloucestershire Hospitals NHS Foundation Trust
Great Ormond Street Hospital For Children NHS Foundation Trust
Great Western Hospitals NHS Foundation Trust
Guy's and St Thomas' NHS Foundation Trust
Hammersmith Hospital
Harefield Hospital
Harrogate and District NHS Foundation Trust
Ipswich Hospital
Isle of Wight Healthcare NHS Trust
James Paget University Hospitals NHS Foundation Trust
Kent & Canterbury Hospital
Kettering General Hospital NHS Foundation Trust
King's College Hospital
Kingston Hospital NHS Foundation Trust
Lancashire Teaching Hospitals NHS Foundation Trust
Lincoln County Hospital
Liverpool Heart and Chest Hospital NHS Foundation Trust
Liverpool Women's NHS Foundation Trust
London North West University Healthcare NHS Trust
Luton and Dunstable University Hospital NHS Foundation Trust
Maidstone and Tunbridge Wells NHS Trust
Manchester Royal Infirmary
Medway NHS Foundation Trust
Mid Cheshire Hospitals NHS Foundation Trust
Milton Keynes University Hospital NHS Foundation Trust

Norfolk and Norwich University Hospitals NHS Foundation Trust
North Bristol NHS Trust
North Cumbria Integrated Care NHS Foundation Trust
North Manchester General Hospital
North Middlesex University Hospital NHS Trust
North Tees and Hartlepool NHS Foundation Trust
North West Anglia NHS Foundation Trust
Northampton General Hospital NHS Trust
Northern Devon Healthcare NHS Trust
Northumbria Healthcare NHS Foundation Trust
Oxford University Hospitals NHS Foundation Trust
Pilgrim Hospital
Poole Hospital NHS Foundation Trust
Portsmouth Hospitals NHS Trust
Prince Philip Hospital
Princess Royal University Hospital Farnborough
Queen Elizabeth Hospital Birmingham
Queen Elizabeth Hospital Greenwich
Queen Elizabeth The Queen Mother Hospital
Queen's Medical Centre
Royal Berkshire NHS Foundation Trust
Royal Brompton Hospital
Royal Cornwall Hospitals NHS Trust
Royal Derby Hospital
Royal Devon and Exeter NHS Foundation Trust
Royal Free Hospital
Royal Lancaster Infirmary
Royal Liverpool University Hospital
Royal National Orthopaedic Hospital NHS Trust
Royal Papworth Hospital NHS Foundation Trust
Royal Surrey County Hospital NHS Foundation Trust
Royal United Hospitals Bath NHS Foundation Trust
Salford Royal NHS Foundation Trust
Salisbury NHS Foundation Trust
Sandwell and West Birmingham Hospitals NHS Trust

Scunthorpe General Hospital
Sheffield Teaching Hospitals NHS Foundation Trust
Somerset NHS Foundation Trust
South Tyneside and Sunderland NHS Foundation Trust
South Tyneside District Hospital
Southport and Ormskirk Hospital NHS Trust
St. Bartholomew's Hospital
St. George's University Hospitals NHS Foundation Trust
St. Helens and Knowsley Teaching Hospitals NHS Trust
St. Mary's Hospital Paddington
St. Richard's Hospital
Stockport NHS Foundation Trust
Surrey and Sussex Healthcare NHS Trust
Tameside and Glossop Integrated Care NHS Foundation Trust
The Christie NHS Foundation Trust
The Clatterbridge Cancer Centre NHS Foundation Trust
The Dudley Group NHS Foundation Trust
The Grange University Hospital
The Hillingdon Hospitals NHS Foundation Trust
The Leeds Teaching Hospitals NHS Trust
The Mid Yorkshire Hospitals NHS Trust
The Newcastle upon Tyne Hospitals NHS Foundation Trust
The Pennine Acute Hospitals NHS Trust
The Queen Elizabeth Hospital Kings Lynn NHS Foundation Trust
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust
The Royal Marsden NHS Foundation Trust
The Royal Wolverhampton NHS Trust
The Shrewsbury and Telford Hospital NHS Trust
Torbay and South Devon NHS Foundation Trust
University College London Hospitals NHS Foundation Trust
University Hospital Lewisham
University Hospital of Wales
University Hospital Southampton NHS Foundation Trust

University Hospitals Coventry and Warwickshire NHS Trust
University Hospitals of North Midlands NHS Trust
University Hospitals Plymouth NHS Trust
Walsall Healthcare NHS Trust
West Middlesex University Hospital
West Suffolk NHS Foundation Trust
Weston General Hospital
Wexham Park Hospital
Whittington Health NHS Trust
William Harvey Hospital
Wirral University Teaching Hospital NHS Foundation Trust
Withybush General Hospital
Worcestershire Acute Hospitals NHS Trust
Worthing Hospital
Wye Valley NHS Trust
Wythenshawe Hospital
Yeovil District Hospital NHS Foundation Trust
York Teaching Hospital NHS Foundation Trust