Identify The Need For Change Using Audit

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Objectives

- Identifying the need
- Developing a formula that works
- How one thing leads to another
- Impact of findings

N.I. Red Cell Guidelines (2001)

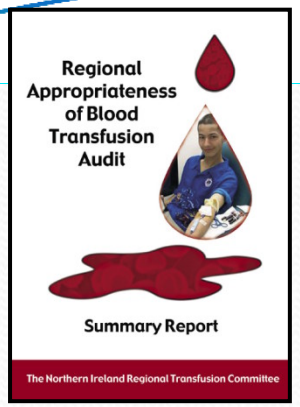
- If Haemoglobin is > 10g/dl - don't transfuse
- If Haemoglobin is <7g /dl – transfuse
- If Haemoglobin is 7-10g /dl – transfuse if symptomatic

N.I. Audit

- Agreement of NITC
- Application for funding to GAIN (*Guidelines and Audit Improvement Network)*
- Development of lead audit group
- External peer reviewer
- Audit standards
- Proforma and pilot
- Training of auditors

Indication for red cell transfusion

Age< 65yrs	Hb < 7 g/dl
Age > 65yrs	Hb < 8g/dl
Cardiac/ cerebrovascular symptoms	Hb < 9 g/dl
Significant haemorrhage	> 500ml/ hr
Bone marrow failure symptoms	Hb< 10g/dl
Patient on chemo/ Radiotherapy	Hb< 10g/dl
Symptomatic of anaemia	Hb < 10g/dL

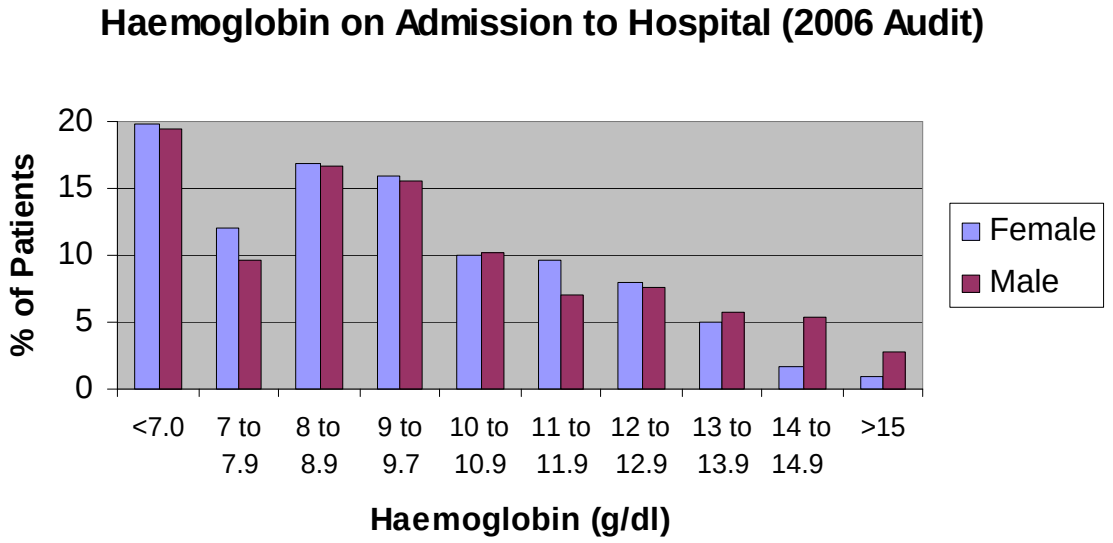


Red Cell Audit 2006

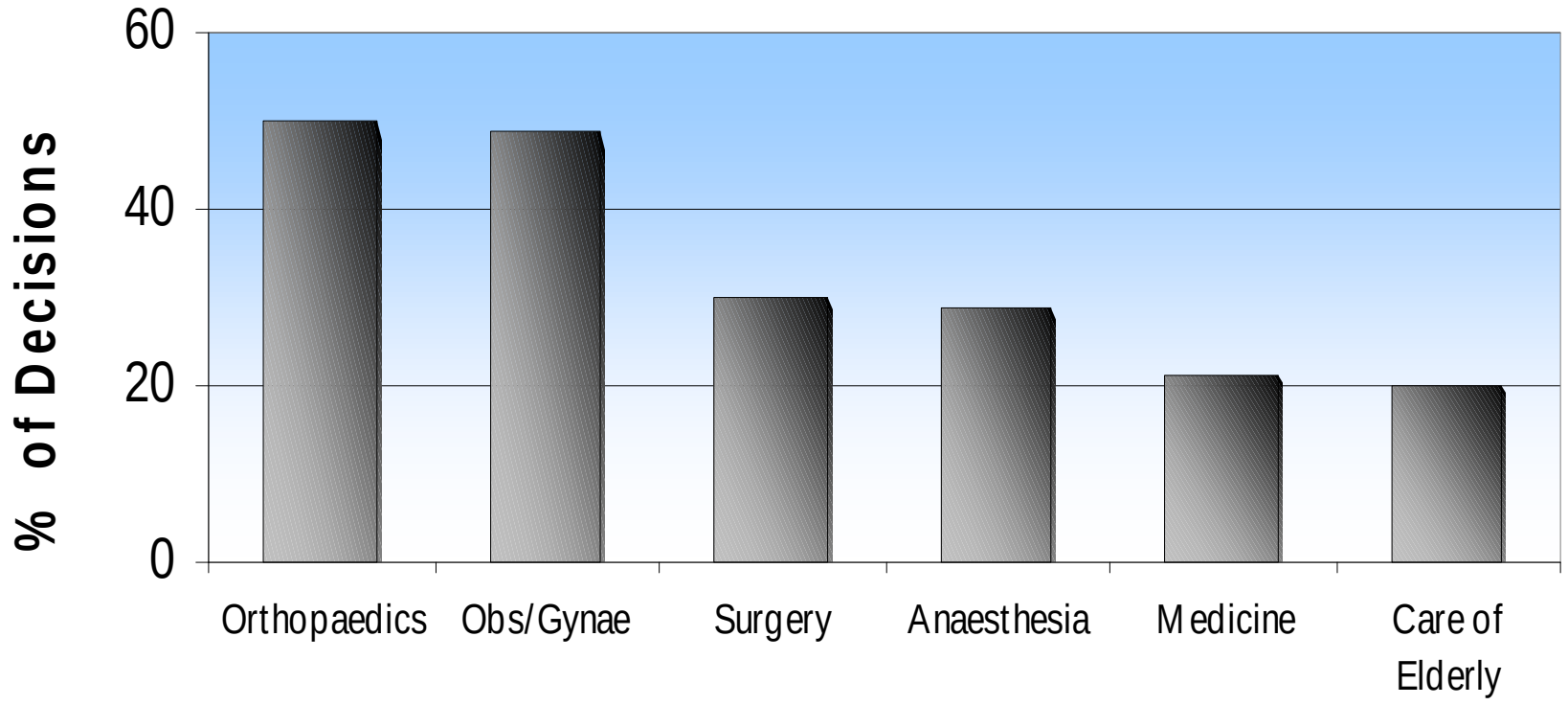
19% of patients had an inappropriate transfusion

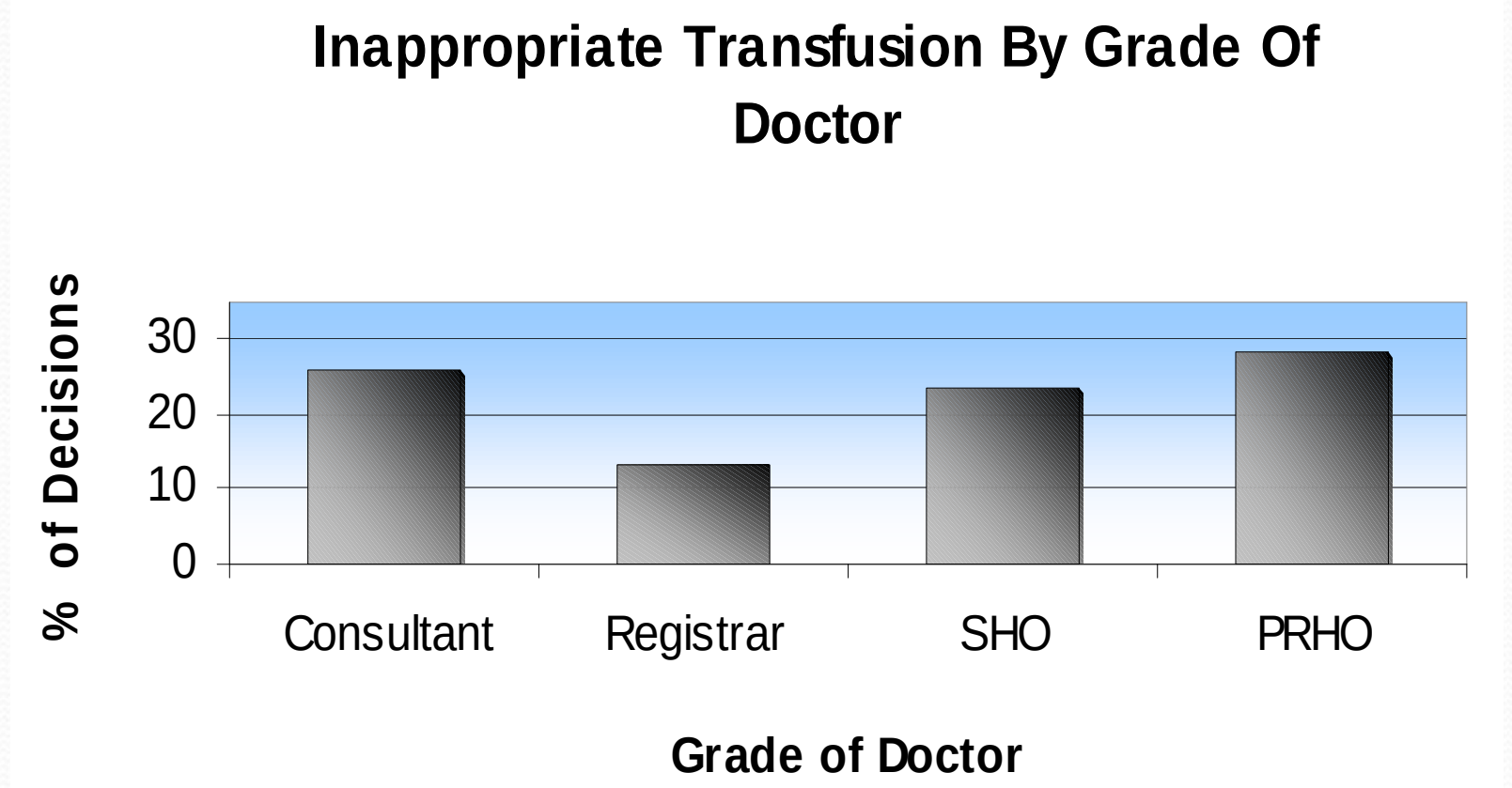
29% of patients were over transfused

85% of transfused patients were admitted to hospital with anaemia

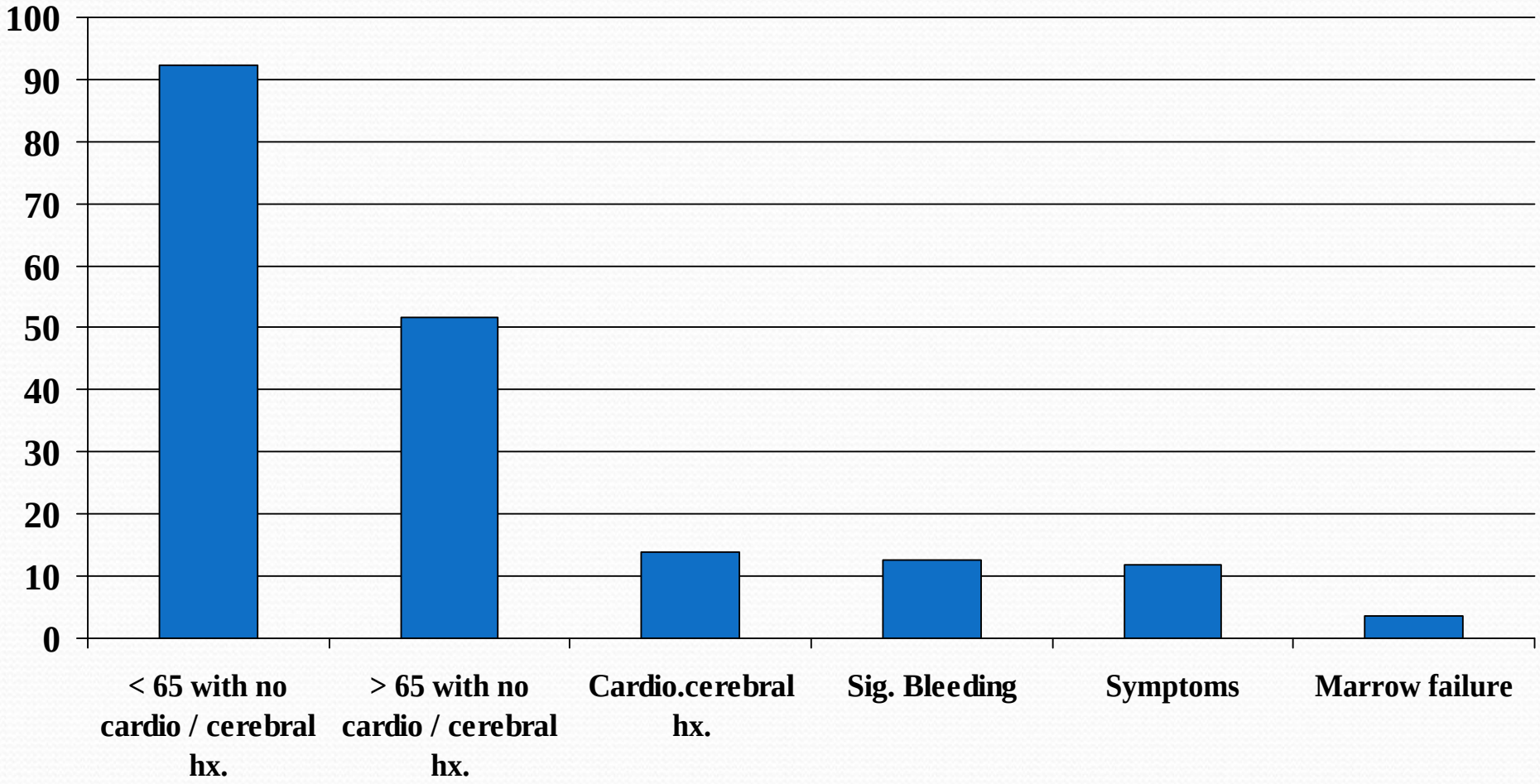


Inappropriate Transfusion By Selected Speciality




Inappropriate Transfusion By Grade Of Doctor
% of Decisions
30
20
10
0
Consultant
Registrar
SHO
PRHO
Grade of Doctor

Inappropriateness of Transfusion by Patient Criteria



Inappropriate Transfusion, Over Transfused

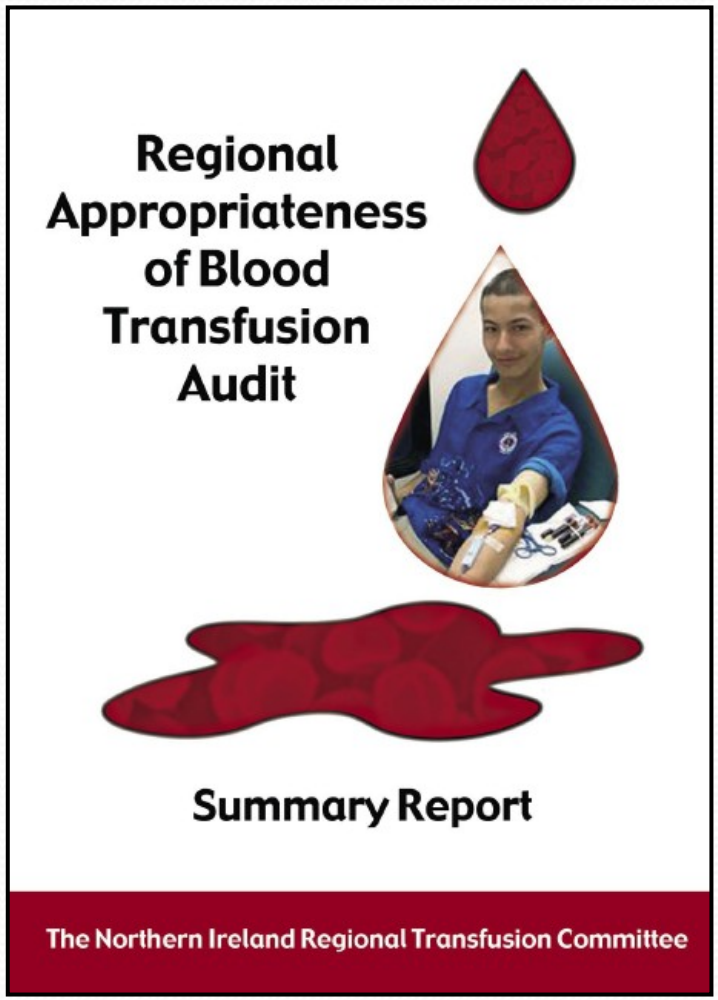
A 59 year old healthy lady was underwent minor bowel surgery with a Hb of 10 g/dl. She had a 2 unit transfusion peri-operatively and had a post operative haemoglobin of 14.5 g/dl.

After no further transfusion she was discharged home 9 days later with a haemoglobin of 13.4 g/dl

Transfusion Threshold 7g/dl → Over transfused above 9g/dl

NIRTC Audit 2006

- Dissemination of results in hardcopy and PDF
- Multi-professional conference



Northern Ireland Regional Transfusion Committee

TRANSFUSION THRESHOLDS

Is your patient a 7, 8, 9 or 10?

- In healthy stable adults under 65 years old without cardiac or cerebrovascular disease. Consider transfusion only when haemoglobin is below 7g/dl
- In older healthy adults without cardiac or cerebrovascular disease who are above 65 transfusion should only be considered when the haemoglobin is below 8g/dl
- In patients with known cardiac or cerebrovascular disease, consideration should be given if the haemoglobin is below 9g/dl and is probably indicated below 8g/dl
- In sustained heavy bleeding (>500ml/hour) without likelihood of stopping, it may be necessary to transfuse when the haemoglobin is below 10g/dl
- *"Tiredness" is not an adequate symptom alone to tranfuse*
- In truly symptomatic patients with either dyspnoea, angina, hypertension, tachycardia, orthostatic hypotension and syncope that is due to anaemia - transfusion is appropriate for haemoglobin levels below 10g/dl

The NIRTC Regional Transfusion Audit of 1220 cases showed an inappropriate transfusion rate of 19% of patients and an overtransfusion rate of 29%

- Overtransfusion (>2g/dl above the threshold level) is common and a single unit in small patients may raise the haemoglobin by 2.5g/dl or more

Advice compatible with NIRTC recommendations 2006, CMO letter 2006 & CREST guidelines 2007

Northern Ireland Regional Transfusion Committee

IS BLOOD TRANSFUSION NECESSARY?

- There is no 'universal' trigger for blood transfusion
- Transfusion given at any haemoglobin level can cause morbidity and mortality

Unnecessary transfusion increases the risk

- Transfusion should not be used to treat iron deficiency anaemia - the treatment of choice here is oral iron or if this is not tolerated or adequate - intravenous iron

CONSENT FOR BLOOD TRANSFUSION

When a decision to transfuse has been taken - it is important to explain the following so that the patient can make an informed choice about receiving the transfusion.

- Explain why the transfusion is being given and the perceived benefit
- Explain that there is no suitable alternative treatment
- Explain that receiving a transfusion unfortunately means the patient can never be a blood donor *(concern over the possible spread of CJD)*
- Discuss minor common problems with transfusion (3-5%) - high temperature, rash, shivering
- Discuss major but less common problems, e.g. incompatible transfusion and major reactions (approximately 1 in 10,000 per unit transfused)

New N.I. Standards

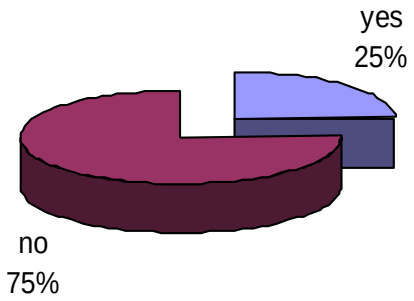
2006 Audit

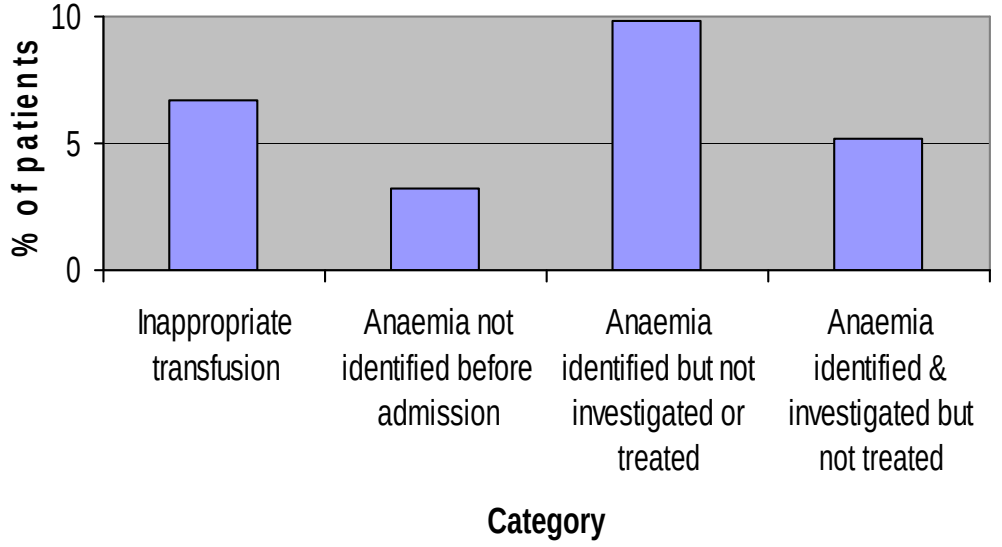
85% of transfused patients were admitted to hospital with anaemia

- Audit not designed to examine whether anaemia was diagnosed, investigated or treated correctly prior to transfusion.
- An application to investigate pre hospital admission anaemia was made to GAIN
- Same approach with modified lead audit group

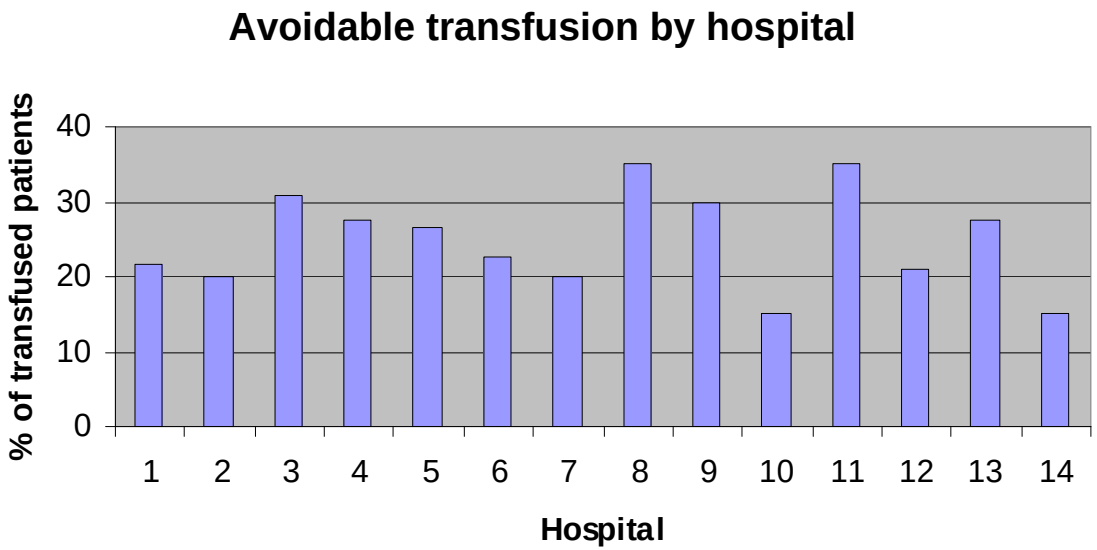
Key Findings

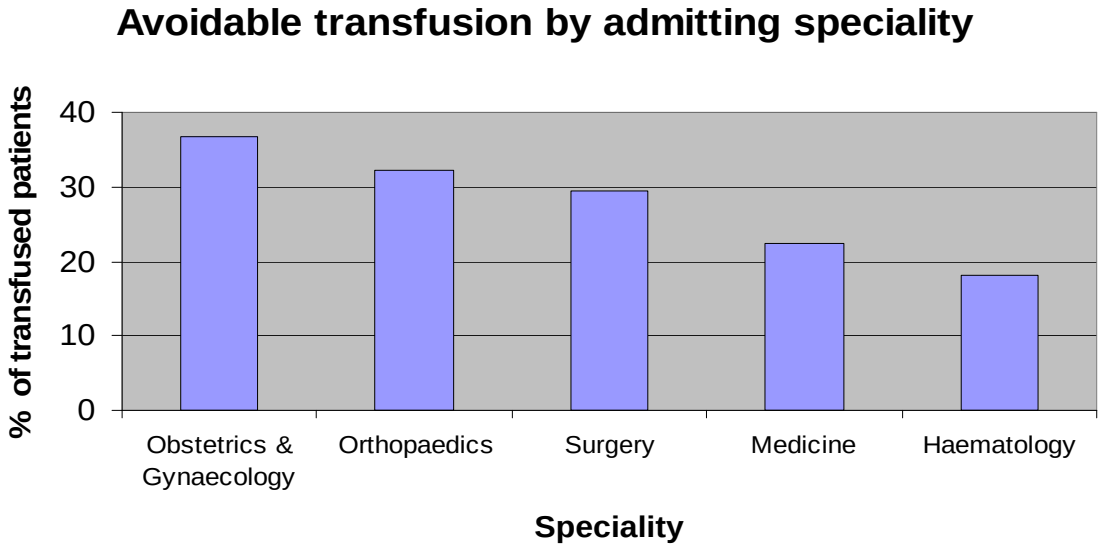
Could transfusion have been avoided?





Key Findings



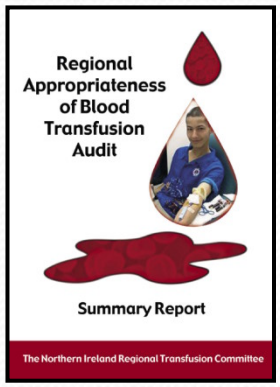


Anaemia identified but not investigated or treated

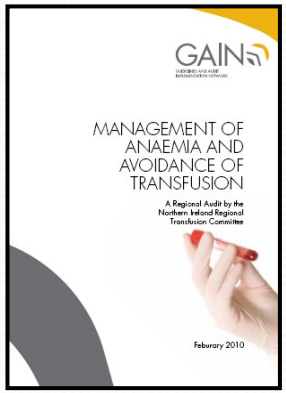
- *A 63 year old man with a cardiac disease was seen at a Urology out patient clinic for haematuria. His haemoglobin was checked and found to be 9.2 g/dl with MCV 75fL. No further investigations were undertaken and no treatment was started for the anaemia.*

- *4 months later the patient was admitted in left ventricular failure with a haemoglobin of 7.8g/dl, MCV 65fL, MCH 19pg and ferritin 12ng/ml – all indicating severe iron deficiency anaemia. The patient was transfused 3 units of red blood cells and his Hb was 10.5g/dl on discharge.*

Over transfusion

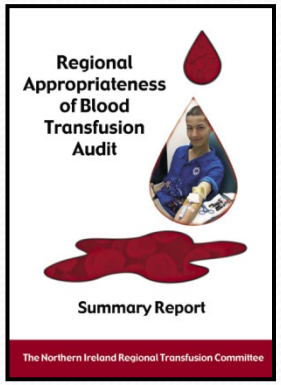


29 %

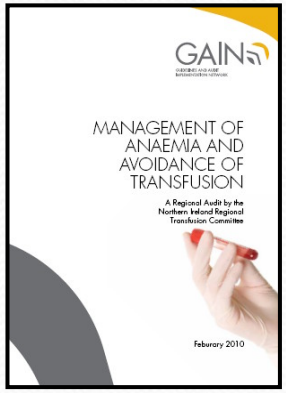


16 %

Inappropriate Transfusion



19%

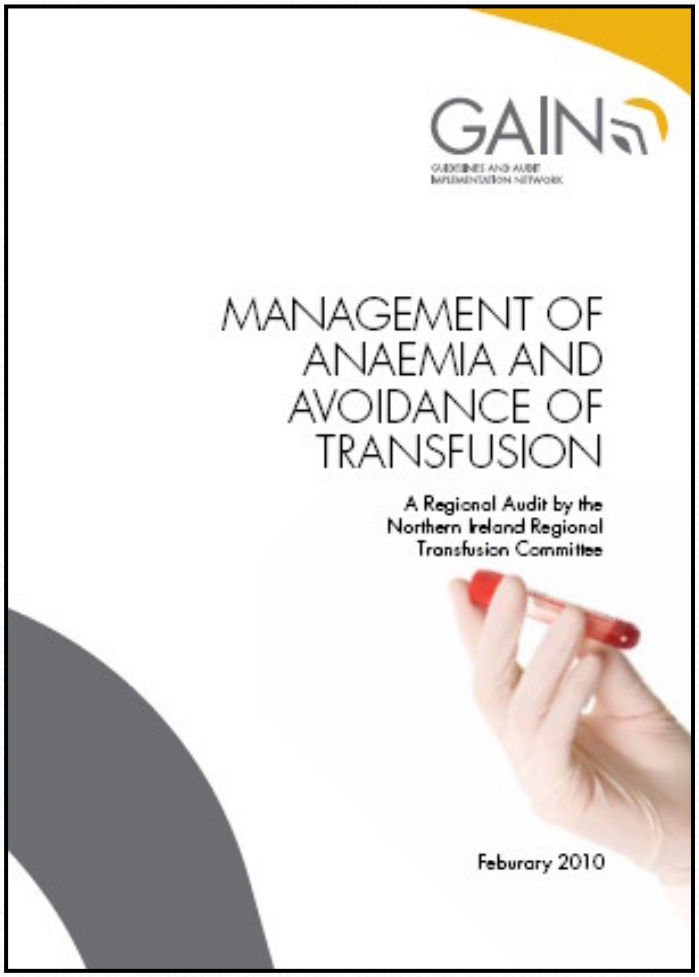


6.7%

Dissemination of Results

- Audit results circulated

- Multi-professional conference



STEPS IN THE INVESTIGATION AND MANAGEMENT OF THE ADULT PATIENT WITH ANAEMIA

STEP 1
Perform FBP test for Hb, MCV and MCH

If patient anaemic as per * WHO Classification of anaemia follow steps below

STEP 2
MCV or MCH low: perform iron studies (including serum ferritin)

MCV & MCH normal range: perform iron studies & renal function tests, serum folate & vitamin B12 levels

MCV or MCH high: perform LFTs, thyroid function, serum folate and vitamin B12 levels

STEP 3
1. Start appropriate corrective therapy for anaemia without delay (e.g. oral iron therapy)

   AND

2. Investigate cause of anaemia unless already known or further investigation is not in the patient's best interests (e.g. palliative care)

STEP 4
1. Monitor response to corrective therapy for anaemia, including rise in Hb

   AND

2. Treat the cause of anaemia (e.g. surgery for carcinoma of bowel)

*** WHO Classification of anaemia**

Haemoglobin: < 13 g/dl in adult male
< 12 g/dl in adult female
< 11 g/dl in pregnancy

Abbreviations used:

FBP: full blood picture

Hb: Haemoglobin

MCV: Mean corpuscular volume

MCH: Mean corpuscular haemoglobin

WCC: white blood cell count

CRP: C-reactive protein

TIBC: total iron binding capacity

TSAT: transferrin saturation

LFTs: liver function tests

ESA: erythrocyte stimulating agent or recombinant erythropoietin

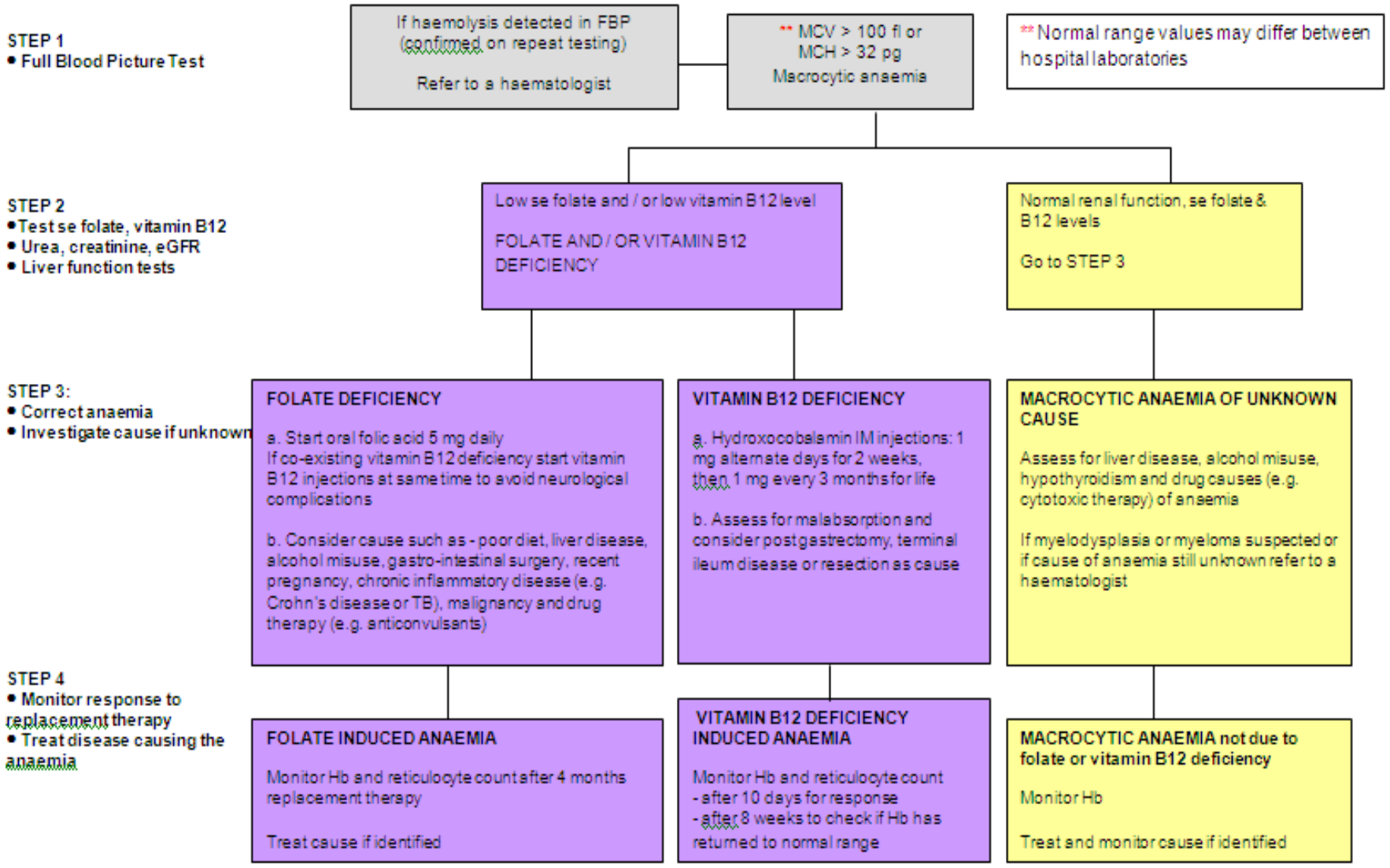
eGFR: estimated glomerulofiltration rate

CKD: chronic kidney disease

Sickle cell disease – perform Sickledextest if positive family history or patient's genetic origin is West Africa

4 STEPS IN THE INVESTIGATION AND MANAGEMENT OF THE ADULT PATIENT WITH ANAEMIA

MACROCYTIC ANAEMIA



4 STEPS IN THE INVESTIGATION AND MANAGEMENT OF THE ADULT PATIENT WITH ANAEMIA

MICROCYTIC ANAEMIA

STEP 1
- **Full Blood Picture Test**

** MCV < 76fl or MCH < 27pg
Microcytic anaemia

** Normal range values may differ between hospital laboratories

STEP 2
- **Iron studies (include se ferritin and TIBC or TSAT)**
- **CRP**

Se ferritin < 30 mcg/l when CRP < 30 mg/l
Se ferritin < 70 mcg/l when CRP > 30 mg/l
TIBC increased or TSAT <20%

Manage as IRON DEFICIENCY ANAEMIA

Se ferritin > 70 mcg/l, CRP normal or increased
TIBC normal or decreased, TSAT > 20%

Go to STEP 3

STEP 3:
- **Correct anaemia**
- **Investigate cause if unknown** (unless further investigation is not in the patient's best interests)

IRON DEFICIENCY ANAEMIA

a) Start oral iron therapy to normalise Hb and replenish iron stores
Start with parenteral iron therapy if:
- History of oral iron intolerance or poor compliance
- Impaired gastrointestinal absorption
- Haemodialysis
- Major surgery must take place in < 3 weeks

b) Review history & examination for source of chronic bleeding
Refer to gastroenterologist if
- Adult male
- Postmenopausal female
- Premenopausal female with gastro-intestinal symptoms or bleeding

Refer to gynaecologist if
- Post menopausal bleeding
- Menorrhagia

MICROCYTIC ANAEMIA NOT DUE TO IRON DEFICIENCY

Assess for acute or chronic inflammatory disease, chronic infection, malignancy and liver disease – check differential WCC, LFTs

If thalassaemia or sideroblastic anaemia suspected or cause of anaemia unknown refer to a haematologist

STEP 4:
- **Monitor response to replacement therapy**
- **Treat disease causing the anaemia**

IRON DEFICIENCY ANAEMIA

Perform FBP after 3 weeks of oral iron therapy
If improvement in Hb (1-2 g/dl increase):
- Check if Hb normalised after 2-4 months iron therapy
- Continue iron therapy for another 3 months to replenish iron stores

If no improvement consider:
- Switch to parenteral iron therapy

ANAEMIA OF CHRONIC DISEASE

A diagnosis of exclusion
Unresponsive to parenteral iron unless iron deficiency also present

Treat and monitor the underlying cause

4 STEPS IN THE INVESTIGATION AND MANAGEMENT OF THE ADULT PATIENT WITH ANAEMIA

NORMOCYTIC ANAEMIA

STEP 1
- Full Blood Picture Test

** MCV 76 - 100 fl
MCH 27-32pg
Normocytic anaemia

** Normal range values may differ between hospital laboratories

STEP 2
- Iron studies (include se ferritin + TIBC or TSAT)
- Se folate and vitamin B12
- Urea, creatinine, eGFR

Se ferritin < 30 mcg/l when CRP < 30 mg/l
Se ferritin < 70 mcg/l when CRP > 30 mg/l
TIBC increased or TSAT < 20%

Treat as IRON DEFICIENCY ANAEMIA
See STEP 3 for microcytic anaemia

Se ferritin > 30 mcg/l ***
TIBC decreased, TSAT > 20%
Normal vitamin B12 level
Low or normal se folate level

Se creatinine high, eGFR < 60 ml/min

CHRONIC KIDNEY DISEASE

Se ferritin > 30 mcg/l
TIBC decreased, TSAT > 20%

Normal se folate and vitamin B12 levels
Normal renal function

Go to STEP 3

STEP 3:
- Correct anaemia
- Investigate cause if unknown

CHRONIC KIDNEY DISEASE

Refer to a nephrologist if new diagnosis or deterioration of renal function

Consider ESA + iron therapy to improve Hb (seek advice from nephrologist or haematologist)

If on regular haemodialysis seek advice from patient's nephrologist

NORMOCYTIC ANAEMIA OF UNKNOWN CAUSE

Assess for acute or chronic inflammatory disease, chronic infection, malignancy and liver disease – check differential WCC, LFTs

If cause still unknown refer to a haematologist

STEP 4
- Monitor response to replacement therapy
- Treat disease causing the anaemia (if appropriate)

CHRONIC KIDNEY DISEASE

Monitor Hb, platelet count, TIBC or TSAT se folate and renal function

Iron and folate deficiency can also occur in chronic kidney disease

ANAEMIA OF CHRONIC DISEASE

A diagnosis of exclusion, unresponsive to parenteral iron

Iron deficiency may also be present

Monitor and treat the underlying cause

MANAGEMENT OF THE ANAEMIC ADULT PATIENT PRIOR TO SCHEDULED MAJOR SURGERY

(Also applicable to other invasive procedures with potential for blood loss)

WHO definition of anaemia[2]: adult male < 13g/dl; adult female < 12g/dl; pregnant female < 11g/dl

Pre assess patient at least 4 - 6 weeks before surgery
Assess medical and drug history
Test Full Blood Picture – if anaemic (see below)

Additional blood tests to determine type of anaemia

- Serum ferritin
- TIBC or TSAT
- Urea & electrolytes
- Liver function tests
- Serum folate and
- Vitamin B12 levels

Investigate cause of anaemia

- Refer to a clinical specialist (e.g. gastroenterologist) unless:

- The cause has already been identified
  or
- It is not in the patient's best interests (e.g. palliative care patient)

Medication and other substances taken by patient

- Note which drugs and other substances (e.g. herbal remedies) could increase perioperative blood loss

- Advise patient to discontinue herbal remedies 2 weeks before surgery [4]

Follow 4 Steps algorithm for subsequent management of the adult patient with anaemia

Correct anaemia without delay

- Prescribe appropriate replacement therapy

- Monitor response to treatment after 3 weeks
- Continue or adjust therapy as appropriate

- Aim to have Hb in normal range before surgery[2].
- Delay date of surgery, unless it is not in the patient's best interests

Treat the cause of anaemia

- Refer to appropriate clinical specialist for treatment as appropriate

- For newly detected anaemia it may be beneficial to fully evaluate the cause and associated clinical status before major surgery is undertaken[2]

Reduce perioperative blood loss

- Discontinue NSAIDs 24 hour preoperatively

- Consider risks vs benefits of preoperative discontinuation of anti platelet drugs (e.g. clopidogrel)

- Consider preoperative switch from warfarin to:
  - Low dose prophylactic LMWH
  or
  - Bridging therapy with therapeutic LMWH (seek local guidance + expert advice)

TIBC = Total Iron Binding Capacity TSAT = transferrin saturation in %
NSAIDs = Non Steroidal Anti-Inflammatory Drugs, e.g. Diclofenac, Ibuprofen
LMWH = Low Molecular Weight Heparin, e.g. Enoxaparin, Fondaparinux

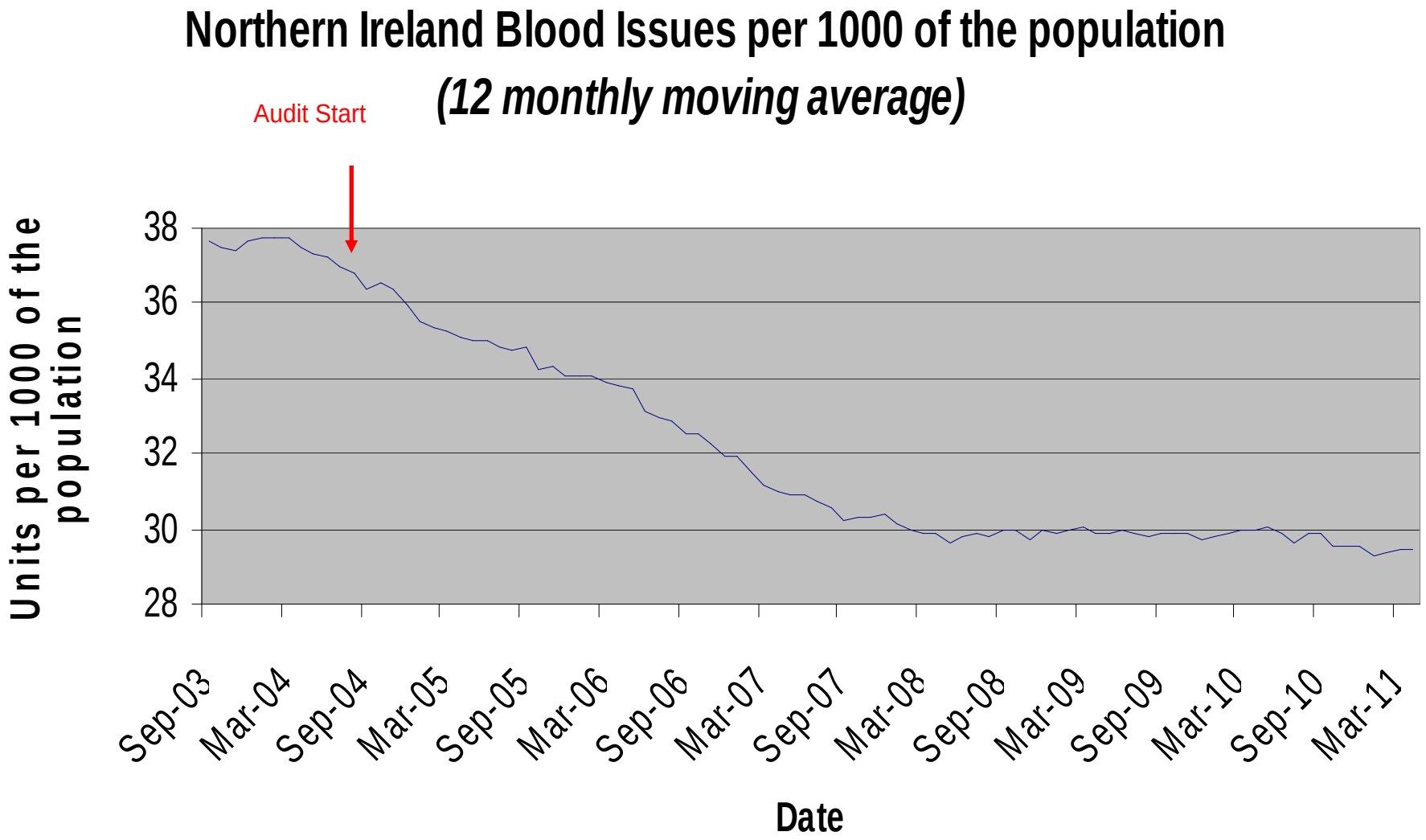
1. Musallam et al. Preoperative anaemia and postoperative outcomes in non-cardiac surgery: a retrospective cohort study. www.thelancet.com October 2011.
2. World Health Organisation. Worldwide Prevalence of Anaemia 1993-2005. WHO, 2008
3. Goodnough et al. Detection, evaluation, and management of preoperative anaemia in the elective orthopaedic surgical patient: NATA guidelines BJA 2011; 106: 13-22
4. Skinner CM and Rangasami. Preoperative use of herbal medicines: a patient survey J BJA 2002; 89: 792-5

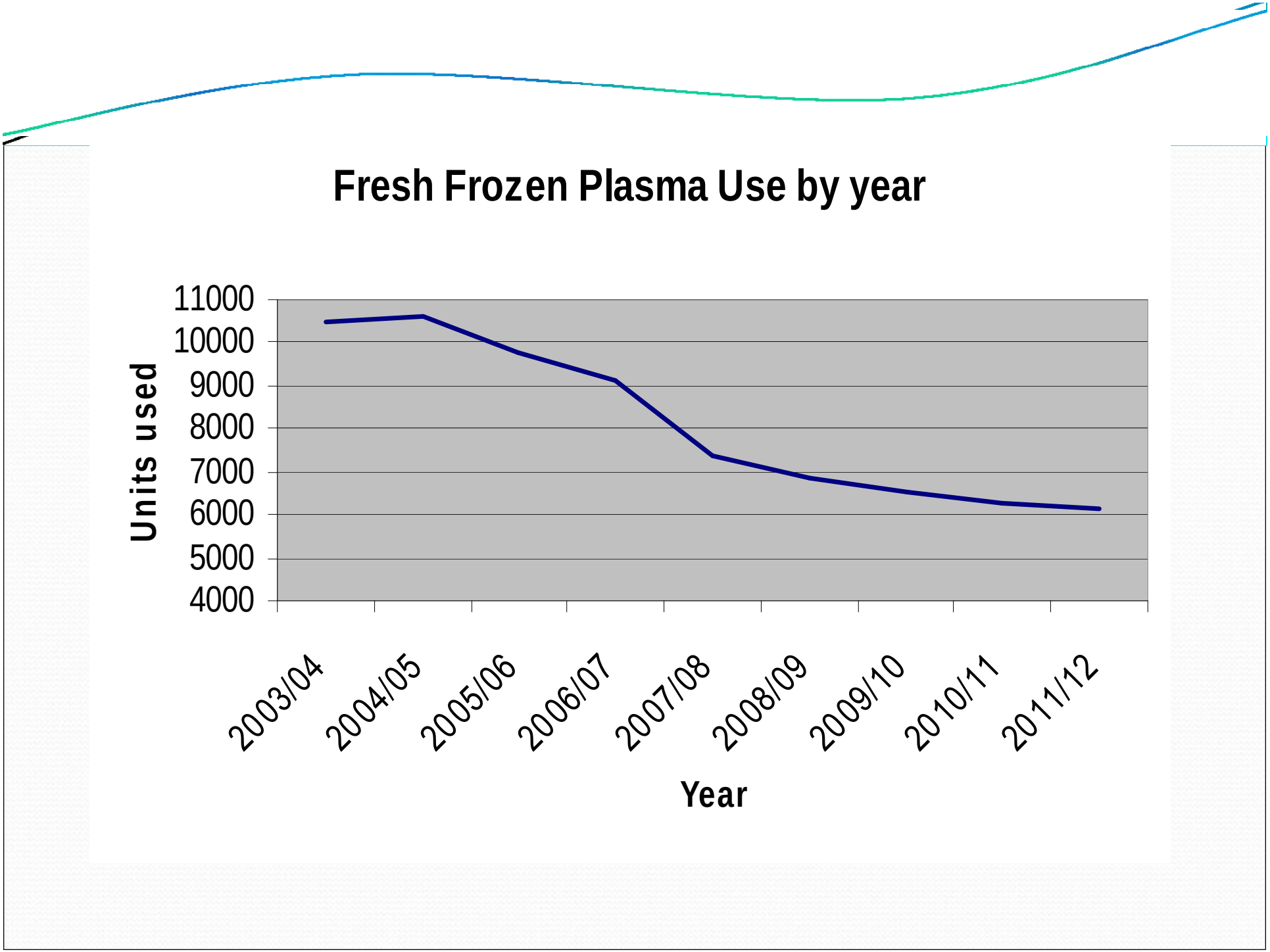
Advantages of Funded Audits

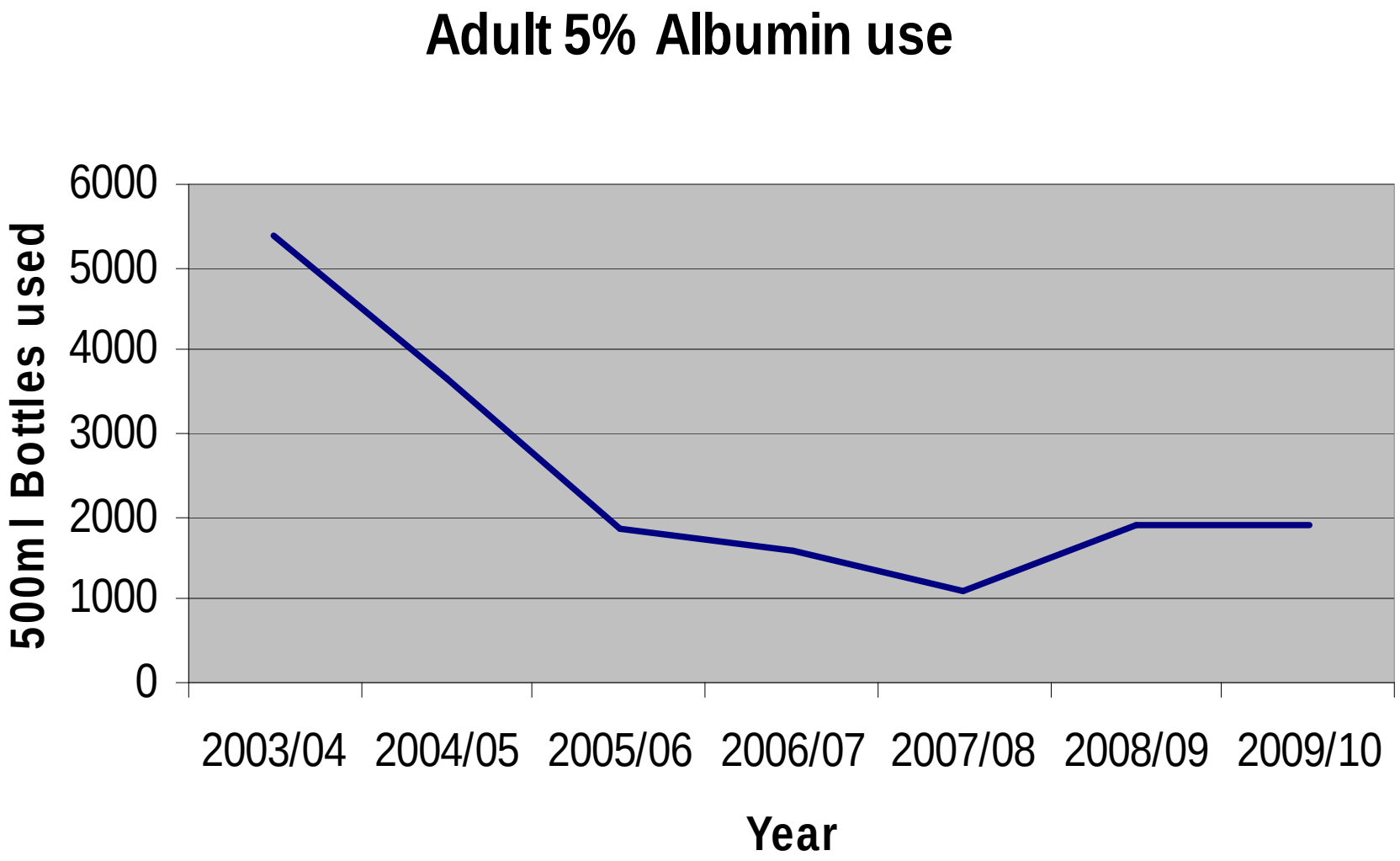
- High quality evidence from own area
- Ownership of result
- Ability to carryout large scale audits
- Option to carryout audit within or outside of NHS hours
- Multi-professional auditors
- Support from commissioners and N.I. Blood Safety Advisory Committee more readily available
- Admin and conference support

Northern Ireland Blood Issues per 1000 of the population

(12 monthly moving average)




Fresh Frozen Plasma Use by year
Units used
11000
10000
9000
8000
7000
6000
5000
4000
2003/04
2004/05
2005/06
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
Year


Adult 5% Albumin use
500ml Bottles used
6000
5000
4000
3000
2000
1000
0
2003/04
2004/05
2005/06
2006/07
2007/08
2008/09
2009/10
Year

Audit Funding to Date

Appropriate use of red cells	£29,918
Pre hospital admission anaemia	£25,000
Appropriate use of IgG	£26,400
Appropriate use of platelets	£18,060
Appropriate use of FFP	£5,000
Appropriate use of Anti D	£28,000

£142,378

Application 13/14 Management of anaemia by pre assessment clinics

Estimated Product and Component Cumulative Savings

- All funded audits plus unfunded 5% Albumin audit. Based on pre-audit trends

£10,000,000 over 7 years