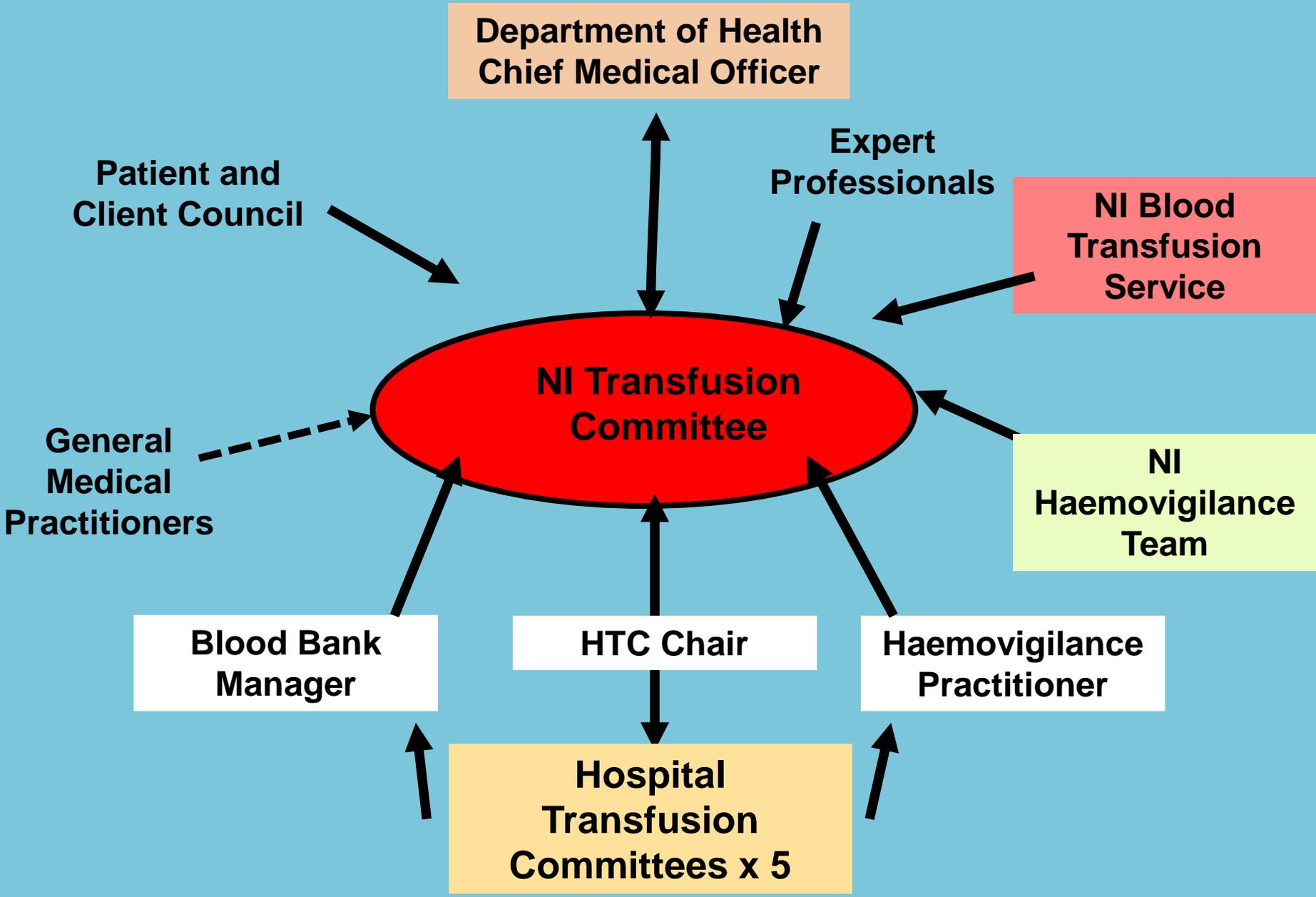


Management of Anaemia reduces Red cell Transfusion in NI

Dr Susan Atkinson
NI Transfusion Committee

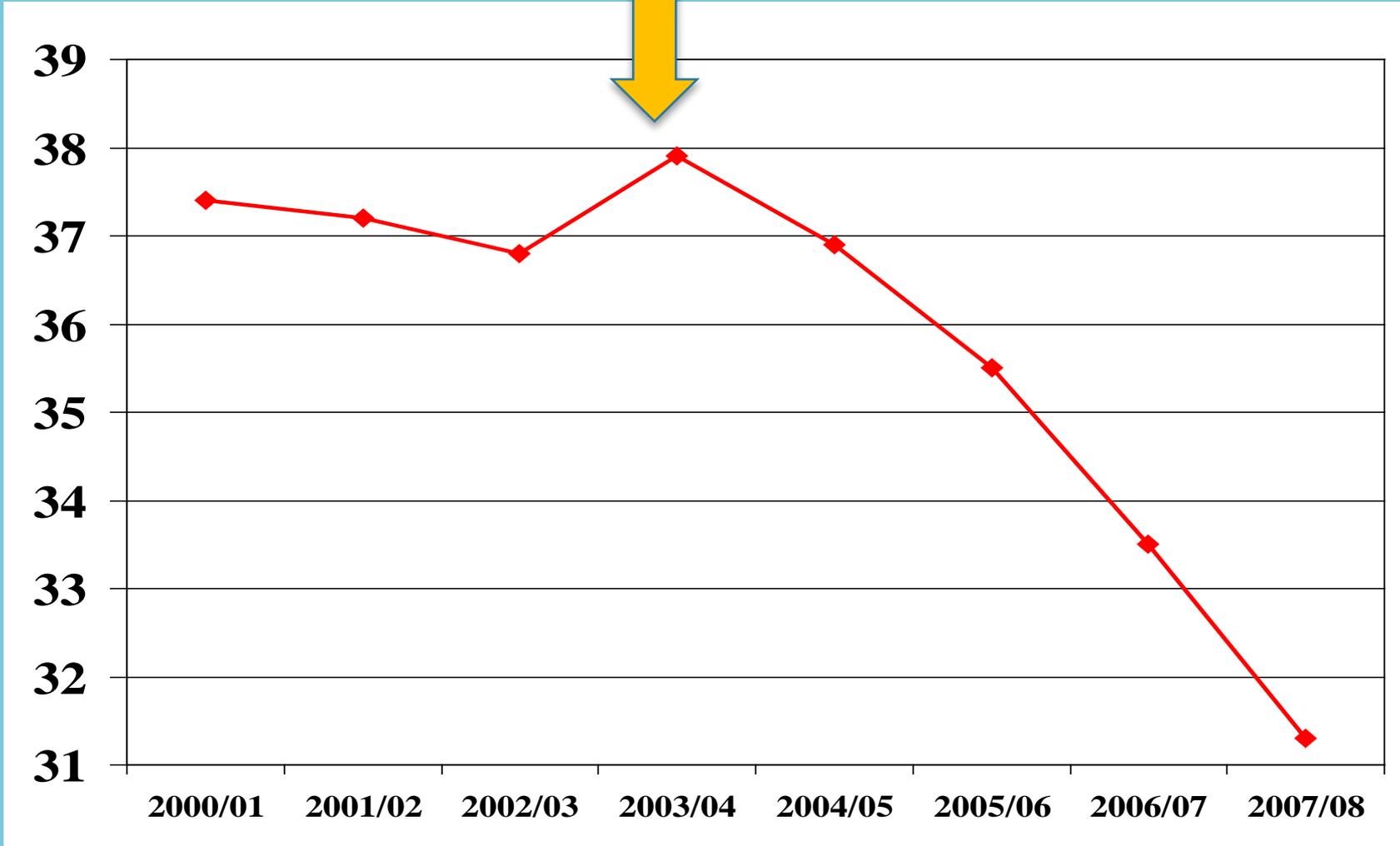


NI Red Cell Issues

2000 – 2008

No. of Units per
1000 population

NITC



Regional Audit of Red Cell Transfusions 2004-2005

Transfusion Triggers

Hb < 7 g/dl: < 65 yr, no CVS disease

Hb < 8 g/dl: > 65 yr, no CVS disease

Hb < 9 g/dl : CVS disease

Hb < 10 g / dl

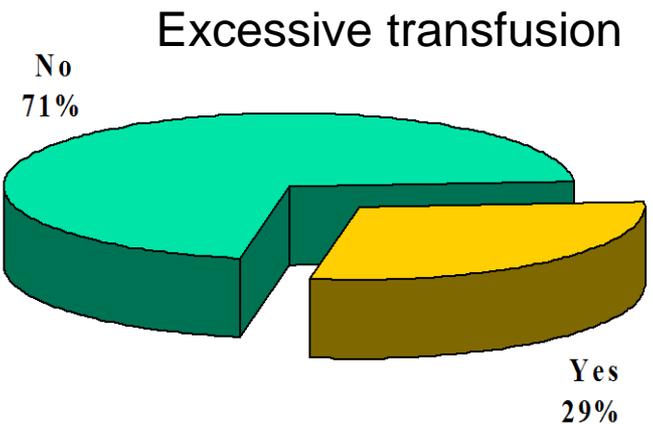
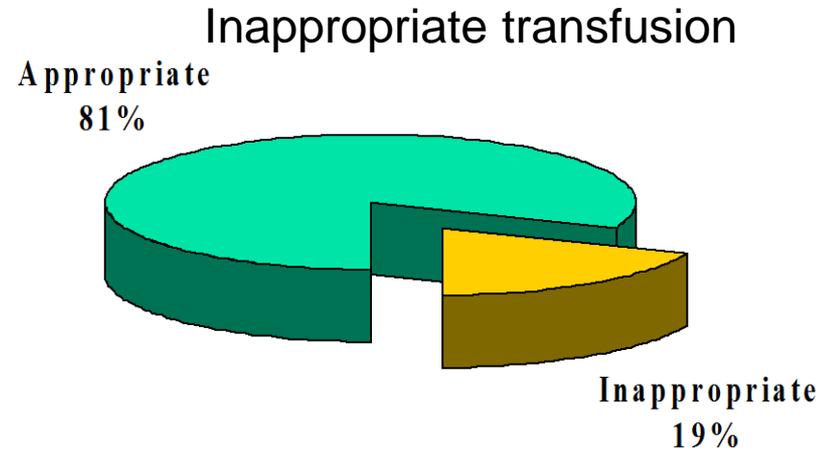
Bone marrow depression

Chemo or radiotherapy

Symptomatic of anaemia

Ongoing bleeding > 500 ml / hr

1220 transfusion episodes



Audit Recommendations Endorsed

DHSSPS 2006

From the Chief Medical Officer
Dr Michael McBride



Department of
**Health, Social Services
and Public Safety**
An Roinn
**Sláinte, Seirbhísí Sóisialta
agus Sábháilteachta Poiblí**

www.dhsspsni.gov.uk

Castle Buildings
Stormont Estate
Belfast BT4 3SQ
Tel: 028 90 520563
Fax: 028 90 520574
Email: michael.mcbride@dhsspsni.gov.uk

Your Ref:
Our Ref:
Date: 17 November 2006

To:

Medical Directors of Trusts – for transmission to all
hospital doctors and doctors in Community
Trusts who may prescribe blood transfusion.
Directors of Nursing of Trusts – for attention of Nursing
and Midwifery staff.

Dear Colleagues

APPROPRIATE USE OF BLOOD IN NORTHERN IRELAND

You may remember that CREST guidelines on the use of blood in Northern Ireland were distributed in 2001. Following this, the Northern Ireland Regional Transfusion Committee undertook a major audit of red cell use in Northern Ireland¹. This was supported by RMAG.

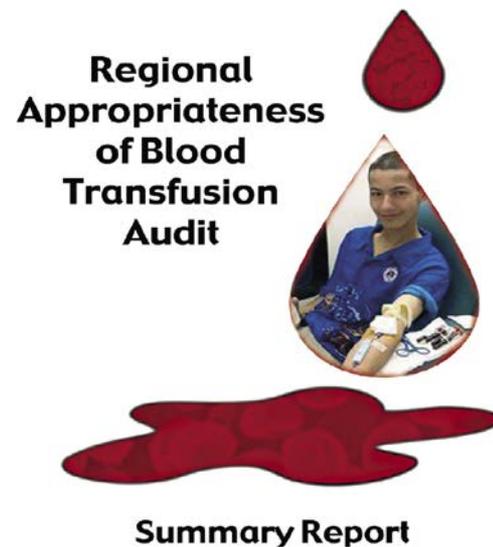
The results of this audit were presented at a Workshop earlier this year. It is fair to say that the results were disappointing, with a considerable proportion of blood use in Northern Ireland being judged inappropriate.

Because of the increased risk that blood transfusion now carries, not least the danger of communicable disease that has not yet been identified, and the fact that every recipient of blood is now automatically barred from ever donating blood, CREST has drawn up new guidelines on blood transfusion in adult patients, and these are currently out for consultation.

However, I wanted to draw your attention to the major points in the new guidelines, as quickly as possible.

Transfusion thresholds:

- **For otherwise healthy patients less than 65 years of age a transfusion trigger of 7g/dl is appropriate.**
- **For otherwise healthy patients over 65 years of age a transfusion trigger of 8g/dl is appropriate.**
- **For otherwise healthy patients with additional risk factors of cardiac and cerebrovascular insufficiency, a higher trigger of 9g/dl is permitted.**



The Northern Ireland Regional Transfusion Committee

Regional Guidance 2009



BETTER USE OF BLOOD IN NORTHERN IRELAND

Guidelines for Blood Transfusion Practice

March 2009

Guidelines for Red Cell Transfusion (Adults)

Wall Chart

- Always diagnose the cause of anaemia
- Treat reversible causes of anaemia

Stable Patients	Transfusion Threshold
< 65 years old with no cardiovascular or cerebrovascular problems.	Usually only consider transfusion when Hb < 7g/dl
> 65 years old with no cardiovascular or cerebrovascular problems.	Usually only consider transfusion when Hb < 8g/dl
Known cardiovascular or cerebrovascular history (previous myocardial infarction, angina, hypertension, heart failure, peripheral vascular disease pulmonary oedema).	Usually only consider transfusion when Hb < 9g/dl

Patients with symptoms due to anaemia Unstable patients bleeding heavily Impaired marrow function	Transfusion Threshold
Symptoms (dyspnoea, angina, palpitations, tachycardia, orthostatic hypotension, syncope) likely to be due to the anaemia.	Consider transfusion when Hb < 10g/dl
<i>Note - Tiredness alone is not an appropriate symptom for transfusion</i>	
Documented/obvious evidence of ongoing significant bleeding at time of transfusion causing symptoms as above or bleeding more than 500ml per hour and not stopping.	Consider transfusion when Hb < 10g/dl
Current or recent (within 3 months) marrow failure or chemotherapy or radiotherapy.	Consider transfusion when Hb < 10g/dl

Patients should only be transfused to a target of 2.0g/dl haemoglobin in excess of the chosen threshold for transfusion above.
Consider patient's estimated blood volume and any ongoing bleeding.



Regional Blood Request Form

NI HOSPITAL TRANSFUSION REQUEST FORM

PLEASE PRINT CLEARLY

HEALTH CARE NUMBER (USE CAPITALS) DATE OF SPECIMEN
 HOSPITAL No. TITLE OF SPECIALIST
 SURNAME PRIVATE
 FIRST NAME
 PATIENT POSTCODE DATE OF BIRTH
 SEX M F **FOR LABORATORY USE ONLY**
 CONSULTANT HOSPITAL WARD/CLINIC
 LABORATORY COMMENTS **STICK CAT 3 HAZARD STICKER HERE**

TRANSFUSION HISTORY & TEST REQUEST

Blood Group (if known) _____ Atypical Antibodies (if known) _____
 Previous transfusions Yes No If Yes: date of most recent transfusion _____
 Previous reactions Yes No
 Previous pregnancies Yes No Anti-D given recently (<12 weeks) Yes No
 Group & Antibody screen (held for 7 days) Direct Antiglobulin Test (Coombs Test) Kleihauer Test
 I confirm that the patient identification details correspond to the details of the patient and the sample tube.
 Within the last 3 years I am certified as competent in core competency in obtaining a venous sample for pre-transfusion testing.
 Sample taken by **PRINT** Signature _____ Date _____
 The above section **MUST BE** signed by the person taking the sample, failure to do so will result in the sample being rejected.

PRODUCT REQUEST

Components	Red Cells	Platelets	FFP	Cryo	Other Product Requests
No. of Units					

SPECIAL REQUIREMENTS

CMV neg (CMV) Irradiated (IRR) Methylene Blue Treated

Required for: Date _____ Time _____ Deliver to _____

INDICATION FOR RED CELL TRANSFUSION

Age < 85 years Hb < 7g/dl	<input type="checkbox"/>
Age > 85 years Hb < 8g/dl	<input type="checkbox"/>
Cardiac / cerebrovascular symptoms Hb < 9g/dl	<input type="checkbox"/>
Significant haemorrhage > 500ml / hour	<input type="checkbox"/>
Bone Marrow failure syndromes Hb < 10g/dl	<input type="checkbox"/>
Patient on Chemo/ Radiotherapy Hb < 10g/dl	<input type="checkbox"/>
Symptomatic of anaemia, Hb < 10g/dl*	<input type="checkbox"/>
Massive Transfusion protocol (Please contact blood bank immediately)	<input type="checkbox"/>

Surgery: state operation / MSBOS below
 FFP, Platelets, Cryo: state reason for request
 Most recent Hb result & date
 _____ g/dl DD / MM / YYY Y

*Dyspnoea, angina, palpitations, tachycardia, orthostatic hypotension and syncope documented and likely to be due to anaemia.

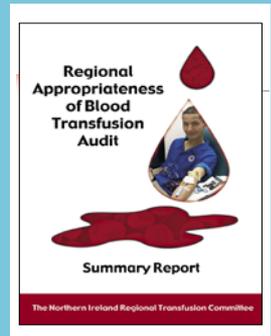
Requested by **PRINT** Signature _____
 Product requests will not be processed unless the above section is completed and signed
 For emergency requests, FFP, Platelets or Cryoprecipitate please telephone / fax blood bank
see front cover for blood bank contact details

- Zero tolerance

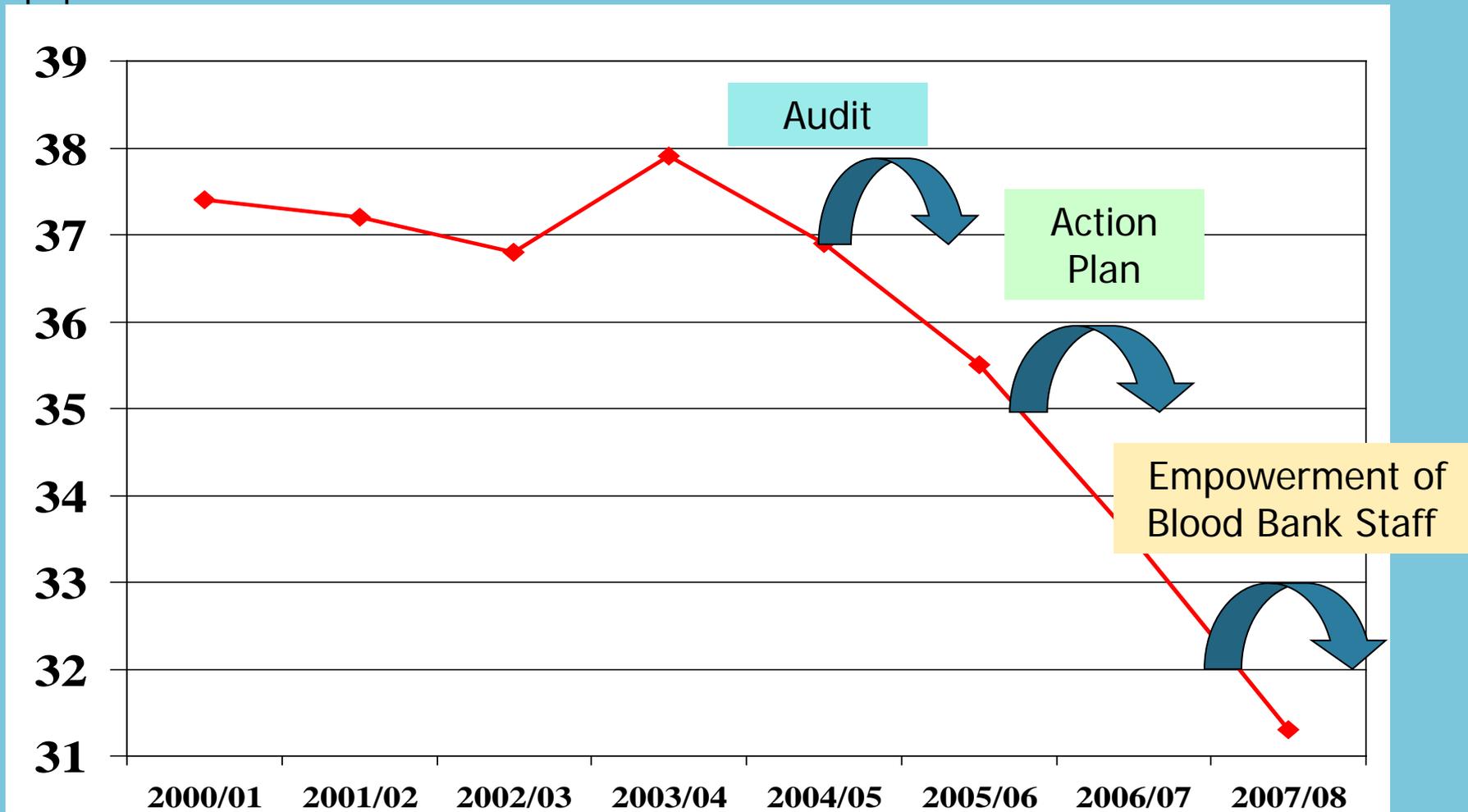
- Indication for transfusion



NI Red Cell Issues 2000 – 2008

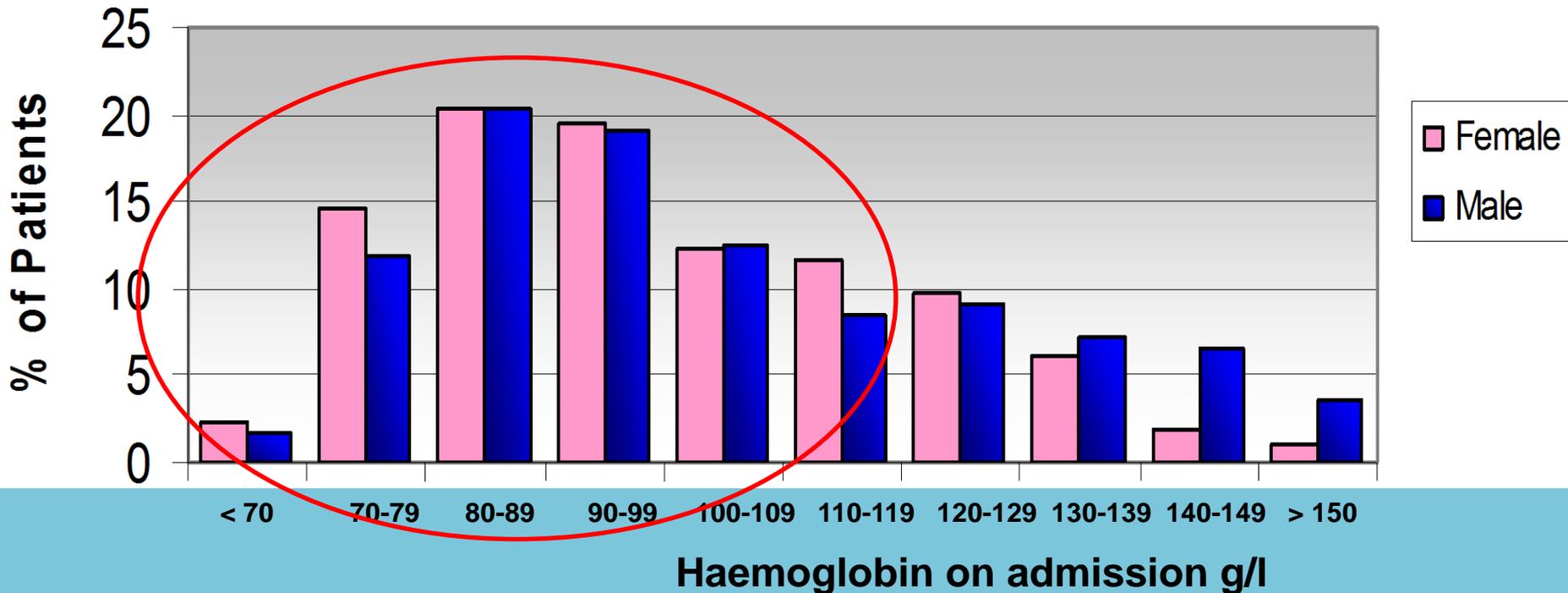


No. of Units per
1000 population



Haemoglobin at time of Hospital Admission

Regional audit 2004 - 2006



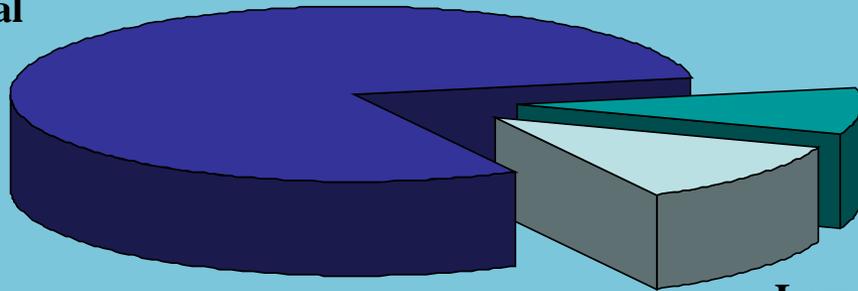
> 85% Anaemic

WHO Definition of anaemia

Adult female < 120 g/l

Adult male < 130 g/l

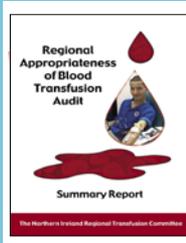
Normal
79%



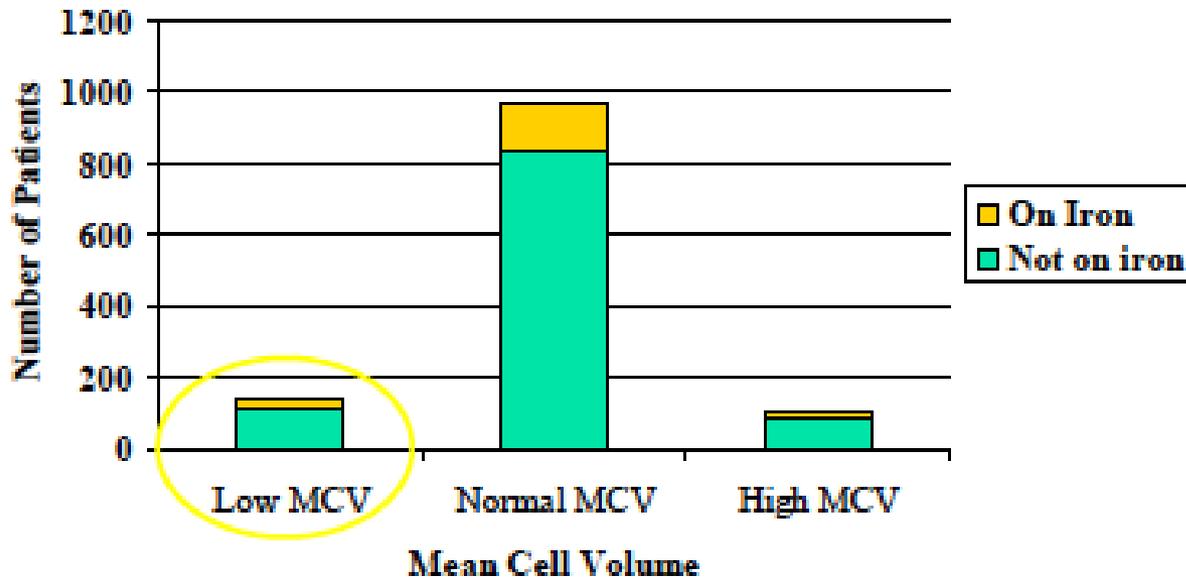
High
9%

Low
12%

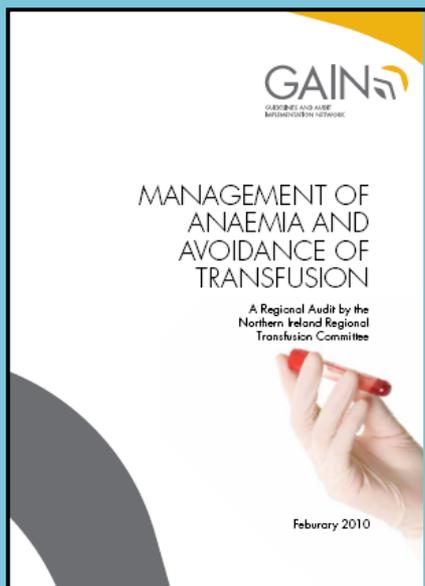
MCV



Iron Therapy



Regional Audit of Anaemic patients



743 anaemic patients, 16 yr and older
Transfused in 2007

Retrospective review of patients' notes laboratory reports, outpatient letters, discharge summaries

Was anaemia identified?

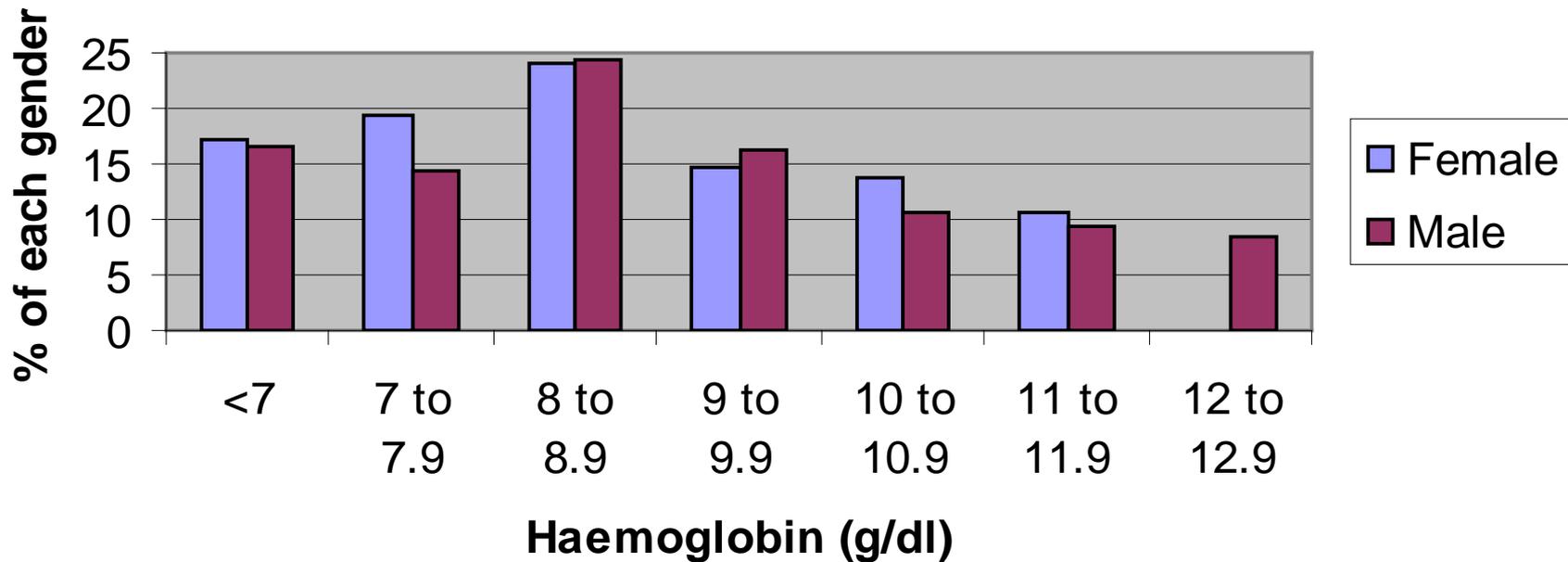
Was anaemia investigated and diagnosed?

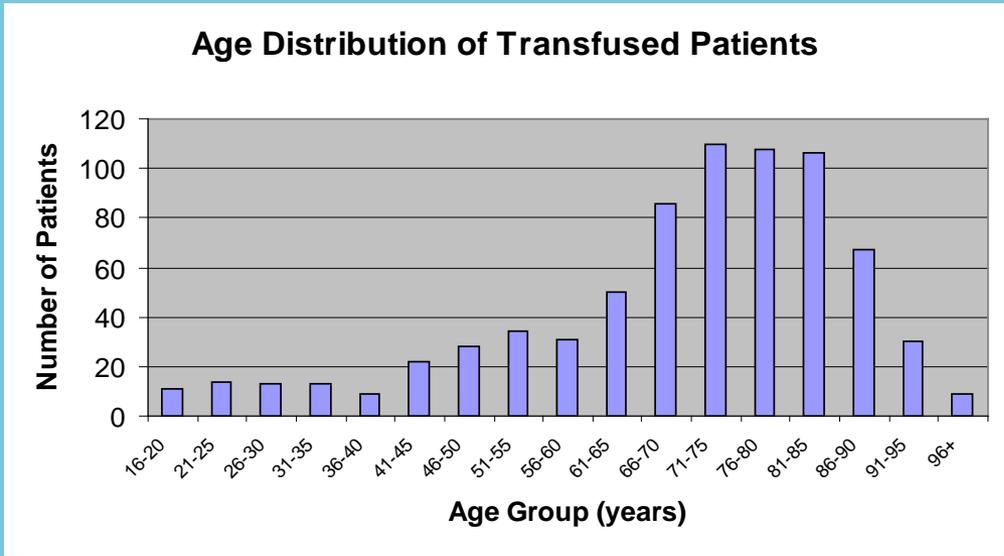
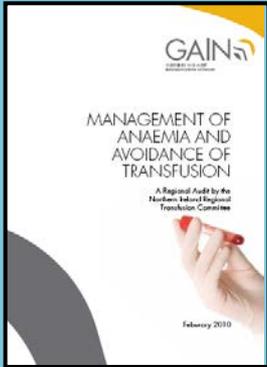
Was anaemia treated appropriately?

Haemoglobin on admission

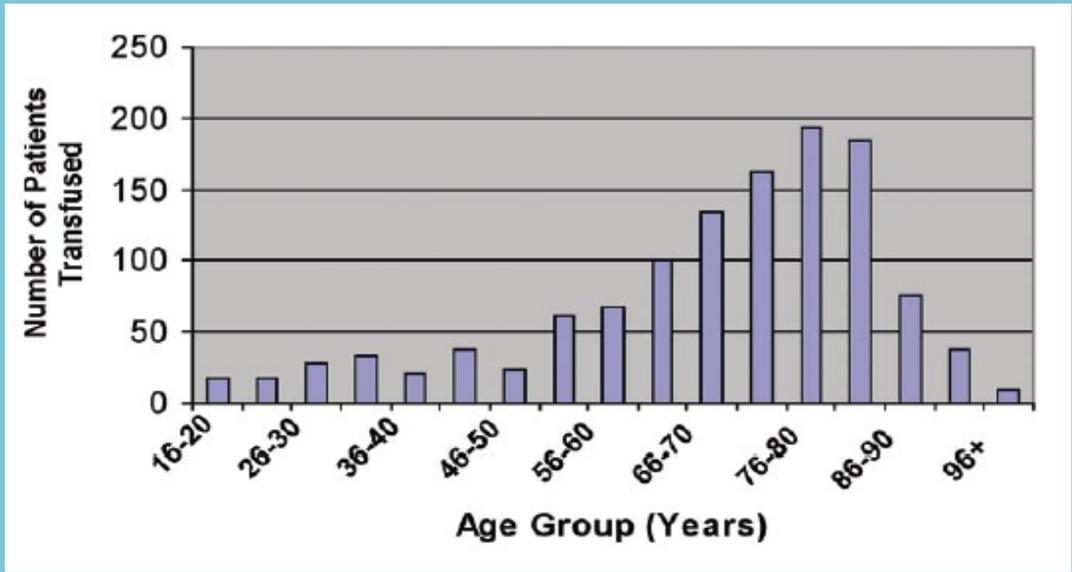
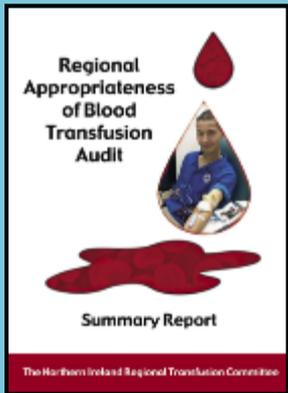


Transfused Patients - Haemoglobin on Hospital Admission by Gender





Mean 69 years
Median 73 years

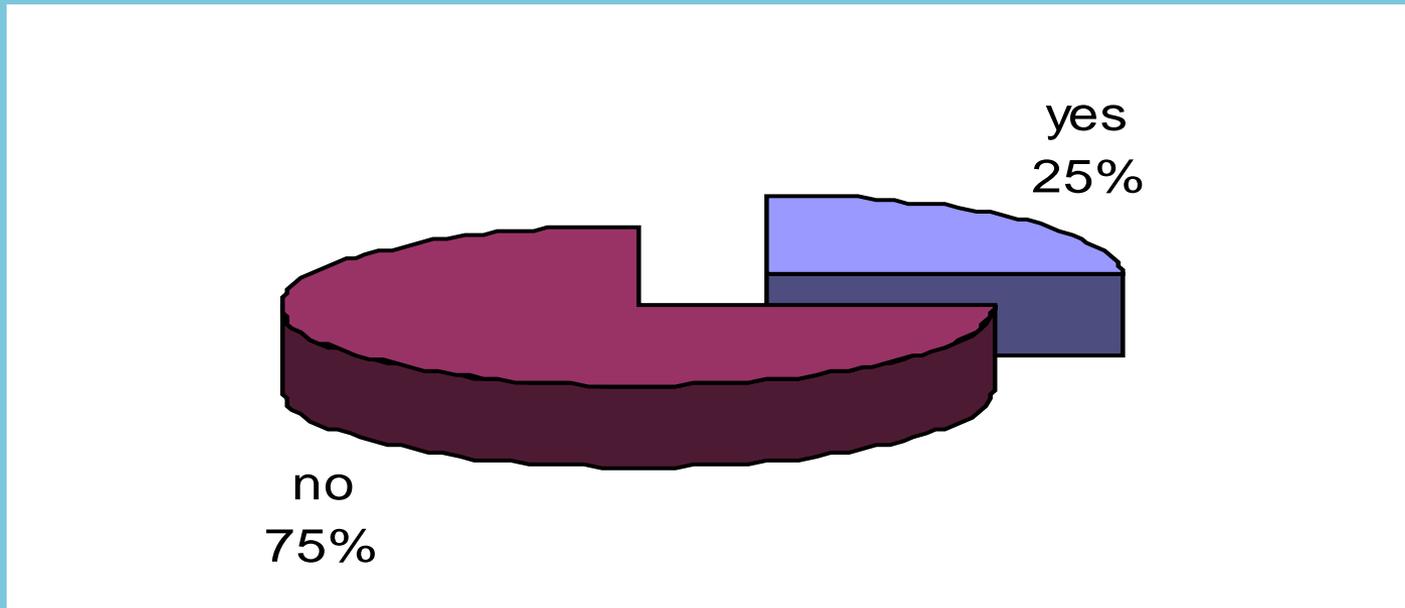


Mean 68 years
Median 72 years

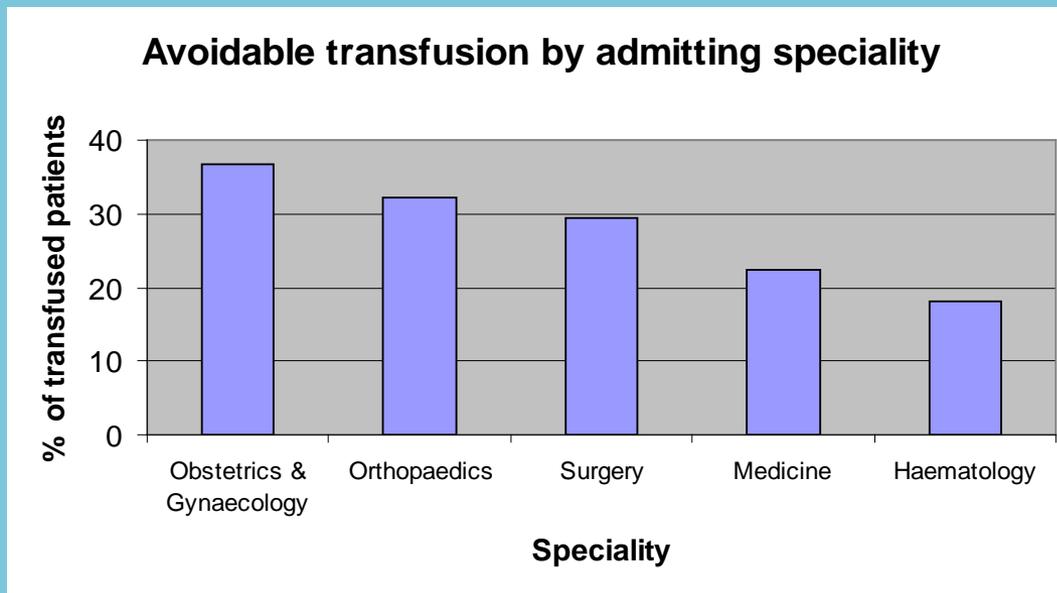
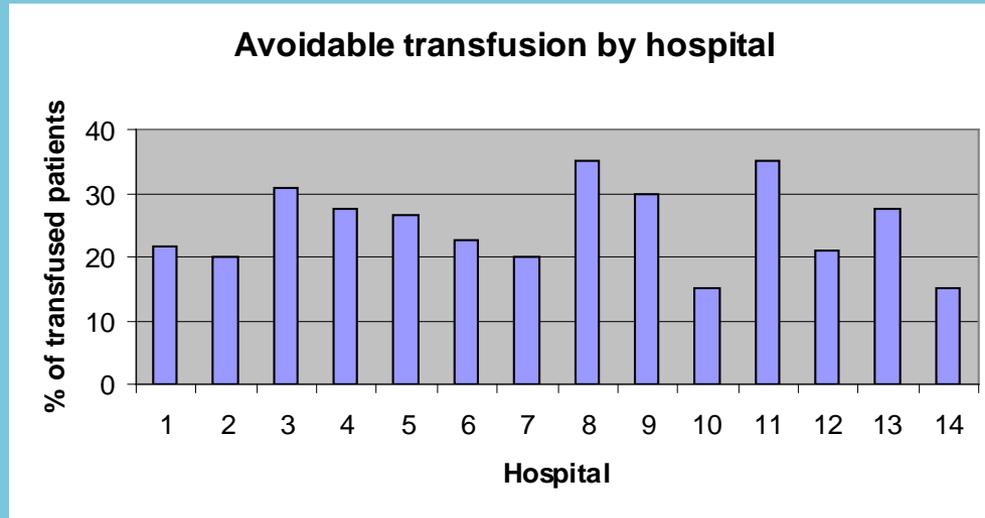
Regional audit of Anaemia

Could transfusion have been avoided?

743 Patients

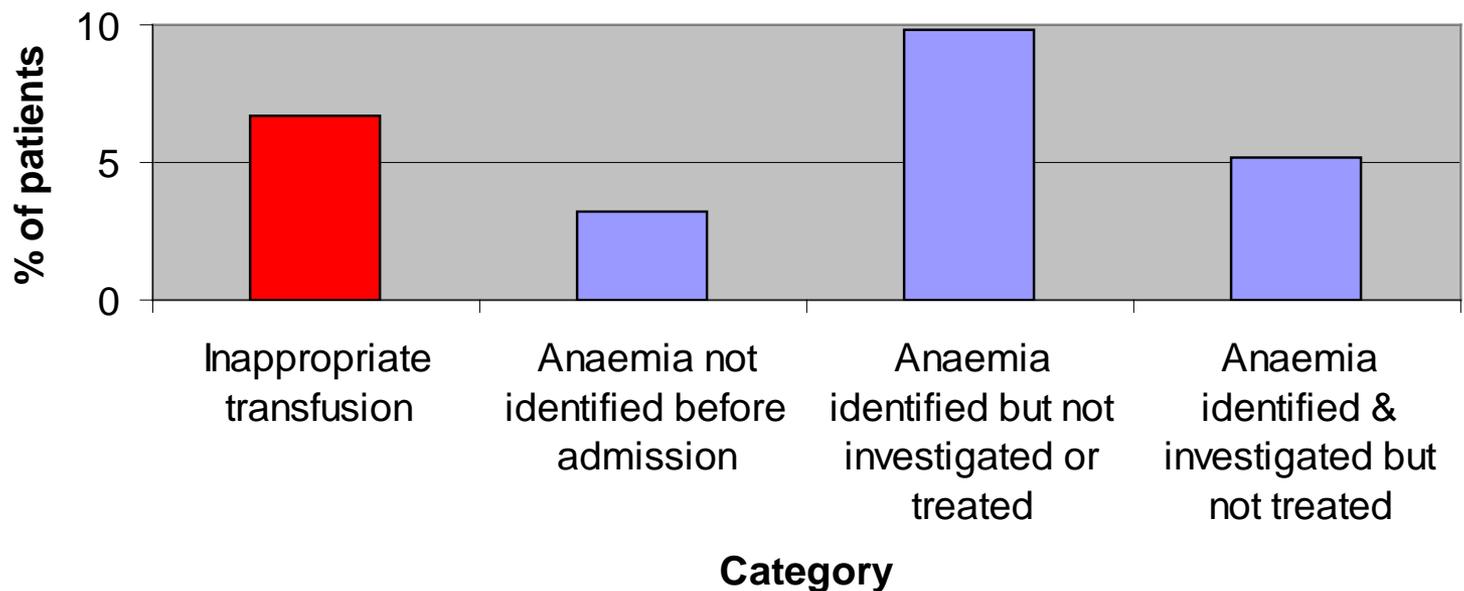
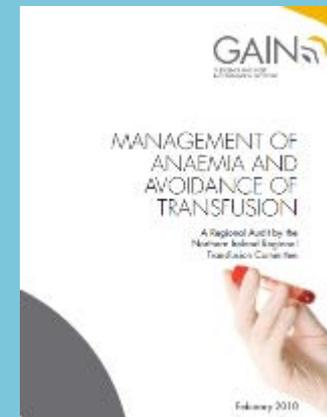
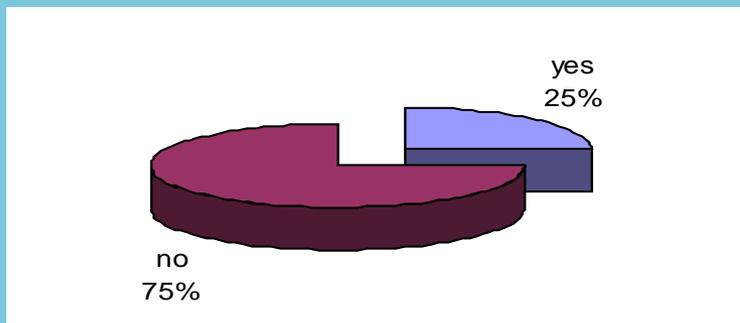


Avoidable Transfusions

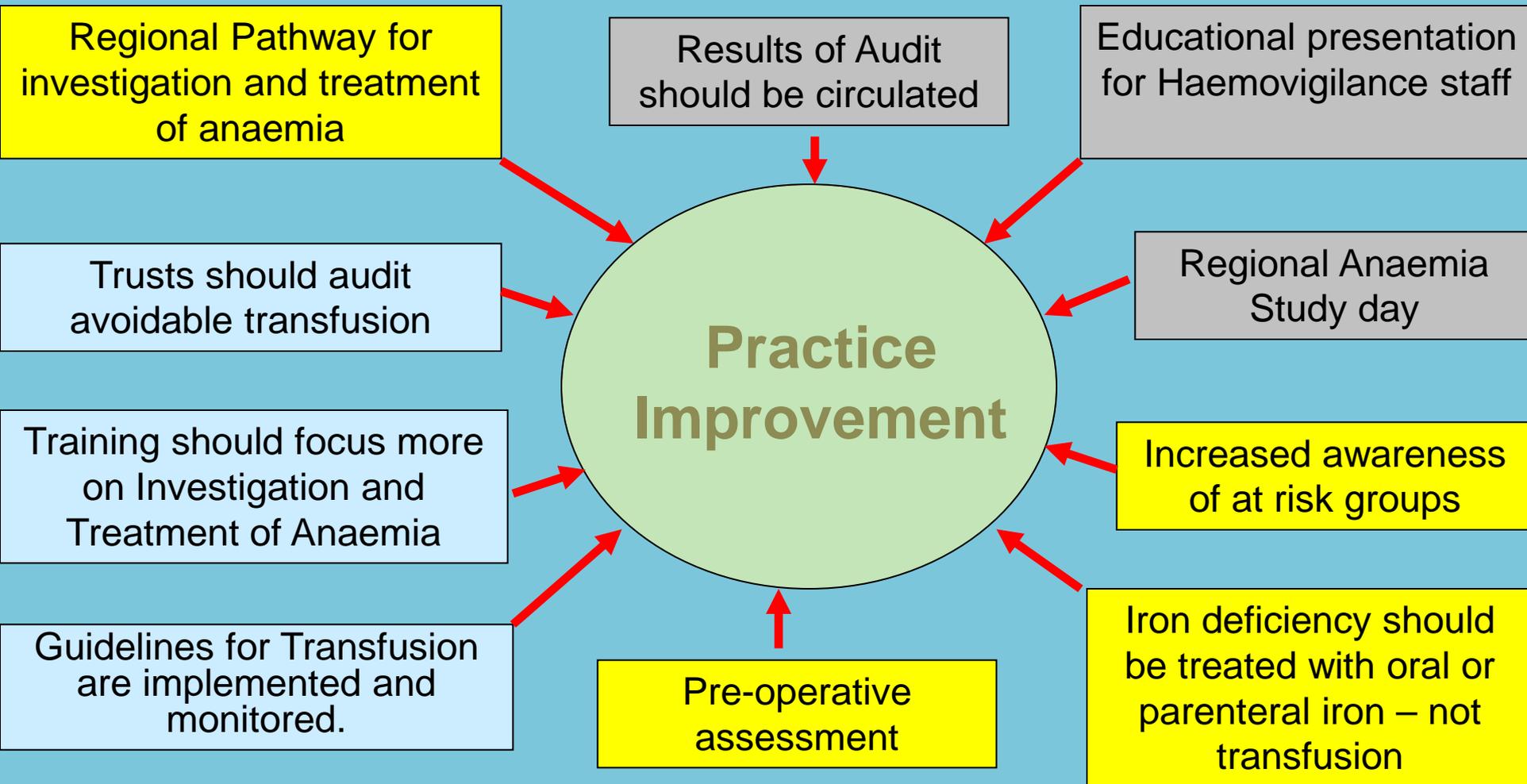


Regional audit of Anaemia

Could transfusion have been avoided?



Action Plan



“Anaemia: Old Problem, New Focus”
**When and How should we treat Anaemia
 In Primary and Hospital Care**

Thursday 25 February 2010 (09.45 – 16.00hr)
 Malone House
 Belfast

TIME	PRESENTATION	SPEAKER
09.45	Anaemia – an old problem: Historic Perspective	Prof M Murphy Cons Haematologist
10.00	Anaemia and the Patient with Ischaemic Heart Disease	Dr H Gilliland Cons Anaesthetist
10.20	Anaemia in Pregnancy	Dr Shubha Allard Cons Haematologist
10.30	Anaemia in the Critical Care Patient	Dr D McAuley Cons Anaesthetist
10.50	Rehabilitation of the Elderly Anaemic Patient	Dr G Heyburn Ortho Geriatrician
11.10	Discussion	
11.15	Coffee	
11.45	What do “Iron studies and other Laboratory tests tell us?	Mr T McFarland Senior Biomedical Officer
12.05	How does the body handle iron?	Dr Nicole Pridge SpB Haematology
12.25	Investigation of Anaemia by the Gastroenterologist	Dr S Johnston Cons Gastroenterologist
12.45	Investigation and management of non iron deficiency anaemia	Dr G Benson Cons Haematologist
13.05	Discussion	
13.10	Lunch	
14.00	Preoperative Optimisation of Haemoglobin and Iron stores	Dr Craig Taylor Cons Haematologist
14.20	Haemoglobin and the Pre-assessment Clinic Experience	Ms Lynn Jones Pre-assessment nurse
14.40	Pre transfusion anaemia – Preventable Transfusion Audit report	Dr D Carson Cons Anaesthetist
15.00	Discussion session: When and how to treat anaemia: scoping exercise for regional guidance	Dr S Atkinson
15.30	Meeting close	

Better Blood Transfusion 3 NI

Improving the safety of blood transfusion

From the Chief Medical Officer
Dr Michael McBride

HSS(MD) 17/2011



Department of
**Health, Social Services
and Public Safety**
www.hssni.gov.uk

For action:
Chief Executive of HSC Trusts for distribution to:

- Medical Directors
- Directors of Nursing
- Chairs of Transfusion Committee
- Hospital Blood Banks
- Consultant Haematologists
- Haemostasis Practitioners

Chief Executive, RQIA for distribution to:

- Independent Hospitals, Hospices and agencies providing blood transfusions

Chief Executive, HSC Board for distribution to:

- Director of Performance Management and Service Improvement

Chief Executive, Public Health Agency for distribution to:

- DPH/Medical Director,
- Director of Nursing

Chief Executive of the NI Blood Transfusion Service
Chair of NI Regional Transfusion Committee

For Information:
Postgraduate Medical Dean, NI Medical and Dental Training Agency
Head of School of Medicine, Dentistry and Biomedical Sciences, QUB
Head of School of Nursing and Midwifery, Queen's University Belfast
Dean of Life and Health Sciences, University of Ulster
Chief Executive, Northern Ireland Practice & Education Council

Our Ref: HSS(MD) 17/2011
Date: 24 August 2011

Centre Buildings
Stormont
BELFAST
BT4 3SQ

Tel: 028 9052 0603
Fax: 028 9052 0674
Email: public.transfusion@hssni.gov.uk

Dear Colleagues

BETTER BLOOD TRANSFUSION 3 NORTHERN IRELAND (BBT3 NI)

Introduction

This Circular and the attached Action Plan (see Annex) replace and build on the requirements of HSS(MD) 8/03 Better Blood Transfusion, and aim to promote safe and appropriate provision and transfusion of blood components and blood products. They take into account the requirements of the Blood Safety and Quality Regulations 2005 - Statutory Instrument 2005/50 and Blood Safety and Quality Amendment 2005 no. 2 (BSQR 2005), HSC (SCSD) 30/2007 which endorsed the NPSA Safer Practice Notice 14: Right Patient, Right Blood 2007 (NPSA SPN 14) and the recommendations in the RQIA Report of Blood Safety Review (2010).

- Circulated to HSC Trusts - Aug 2011
- Interim self assessment - Dec 2011
- Final assessment - Sept 2012



For action:

Chief Executive of HSC Trusts for distribution to:

- Medical Directors
- Directors of Nursing
- Chairs of Transfusion Committees
- Hospital Blood Banks
- Consultant Haematologists
- Haemovigilance Practitioners

Chief Executive, RQA for distribution to:

- Independent Hospitals, Hospices and agencies providing blood transfusions

Chief Executive, HSC Board for distribution to:

- Director of Performance Management and Service Improvement

Castle Buildings

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Fax: 028 9052 0574

Email: michael.mcbride@hse.gov.uk

Our Ref: HSS(MD) 17/2011

Date: 24 August 2011

3. Reduction in Patient Requirement for Components or Products from Donated Blood

- 3.1 Trusts should promote early detection of anaemia. They should develop and implement local policies and procedures for the identification, investigation and treatment of anaemia (See GAIN guidance 2010, Management of Anaemia and Avoidance of Transfusion).
- 3.2 The NIRTC must develop regional guidance for the detection and management of anaemia, including the process of optimisation of haemoglobin prior to scheduled surgery.
- 3.3 Healthcare Staff who work in pre-assessment clinics should liaise with Healthcare Professionals in primary care and hospitals to correct iron deficiency anaemia and optimise haemoglobin and haemostasis prior to scheduled surgical or other invasive procedures.

Management of Anaemia

4 – Step approach

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

STEP 1

Test full blood picture for Haemoglobin (Hb) and mean corpuscular haemoglobin (MCV)

If Hb below normal range follow steps below

STEP 2

MCV low - perform iron studies (including serum ferritin)

MCV normal range - check iron studies, renal function, serum folate and vitamin B12 levels

MCV high - check liver function tests, 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 patient's best interests (e.g. palliative care only)

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:

CRP: C-reactive protein

TIBC: total iron binding capacity

TSAT: transferrin saturation

LFTs: liver function tests

ESA: erythrocyte stimulating factor or recombinant erythropoietin

eGFR: estimated glomerulofiltration rate

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

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)
- CRP

Se ferritin < 30 mcg/l when CRP < 30 mg/l
Se ferritin < 70 mcg/l when CRP > 30 mg/l
TIBC increased

Manage as IRON DEFICIENCY ANAEMIA

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

Go to STEP 3

STEP 3:

- Correct anaemia
- Investigate cause if unknown (unless further investigation not in 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
- NB – oral iron therapy must be suspended for 1 week prior to colonoscopy*

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 iron therapy

If improvement in Hb (10-20 g/l 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

INVEST

NAB

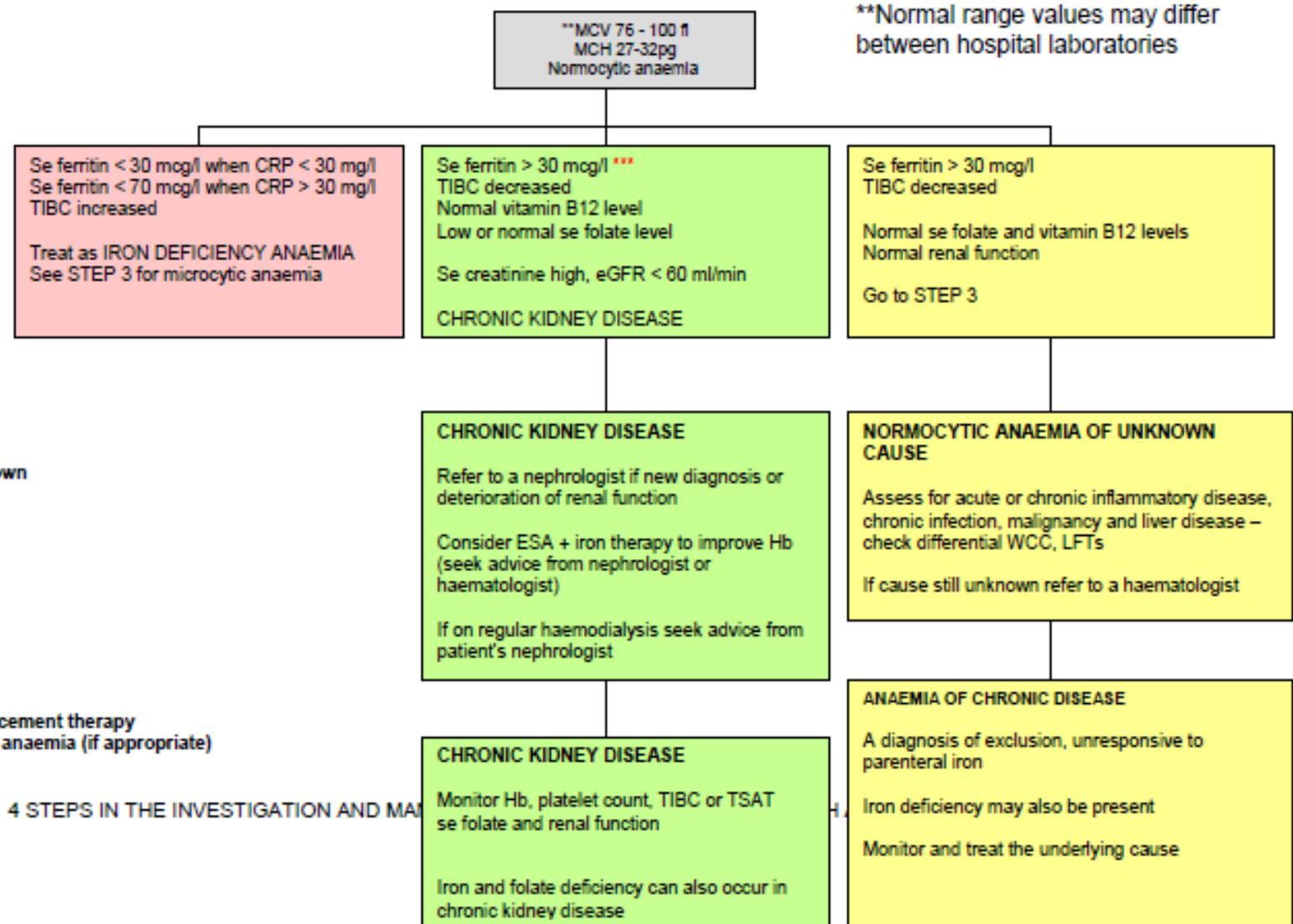
NORMOCYTIC ANAEMIA

- STEP 1**
- Full Blood Picture Test

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

- STEP 3:**
- Correct anaemia
 - Investigate cause if unknown

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



MACROCYTIC ANAEMIA

- STEP 1**
- Full Blood Picture Test

If haemolysis detected in full blood picture test (and confirmed on repeat testing) - refer to a haematologist

MCV > 100 fl or
MCH > 32pg
Macrocytic anaemia

**Normal range values may differ between hospital laboratories

- STEP 2**
- Test se folate, vitamin B12
 - Urea, creatinine, eGFR
 - Liver function tests

Low se folate and / or low vitamin B12 level
FOLATE AND / OR VITAMIN B12 DEFICIENCY

Normal renal function, se folate & B12 levels
Go to STEP 3

- STEP 3:**
- Correct anaemia
 - Investigate cause if unknown

FOLATE DEFICIENCY

a. Start oral folic acid 5 mg daily
If co-existing vitamin B12 deficiency start vitamin B12 injections at same time to avoid neurological complications

b. Consider cause such as - poor diet, liver disease, alcohol misuse, gastro-intestinal surgery, recent pregnancy, chronic inflammatory disease (e.g. Crohn's disease or TB), malignancy and drug therapy (e.g. anticonvulsants)

VITAMIN B12 DEFICIENCY

a. Hydroxocobalamin IM injections: 1 mg alternate days for 2 weeks, then 1 mg every 3 months for life

b. Assess for malabsorption and consider post gastrectomy, terminal ileum disease or resection as causes

MACROCYTIC ANAEMIA OF UNKNOWN CAUSE

Assess for liver disease, alcohol misuse, hypothyroidism and drug causes (e.g. cytotoxic therapy) of anaemia

If myelodysplasia or myeloma suspected or if cause of anaemia still unknown refer to a haematologist

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

FOLATE INDUCED ANAEMIA

Monitor Hb and reticulocyte count after 4 months replacement therapy

Treat cause if identified

VITAMIN B12 DEFICIENCY INDUCED ANAEMIA

Monitor Hb and reticulocyte count

- after 10 days for response
- after 8 weeks to check if Hb has returned to normal range

MACROCYTIC ANAEMIA not due to folate or vitamin B12 deficiency

Monitor Hb

Treat and monitor cause if identified

GUIDANCE ON THE INVESTIGATION

From the Chief Medical Officer
Dr Michael McBride

HSS(MD) 22/2012

Circulation list:

For Action:

Chief Executives of HSC Trusts
Medical Directors of HSC Trusts
(for onward distribution to All Hospital Doctors)
Director of Integrated Care, Health and Social Care Board
All General Practitioners
GP Locums
Family Practitioner Service Leads, HSC Board
(for cascade to GP Out of Hours services)
Directors of Nursing of HSC Trusts
(for cascade to nursing staff)



Department of
**Health, Social Services
and Public Safety**

www.dhsspsni.gov.uk

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Tel: 028 9052 0563
Fax: 028 9052 0574
Email: michael.mcbride@dhsspsni.gov.uk

Your Ref:
Our Ref: HSS(MD) 22/2012
Date: 11 June 2012

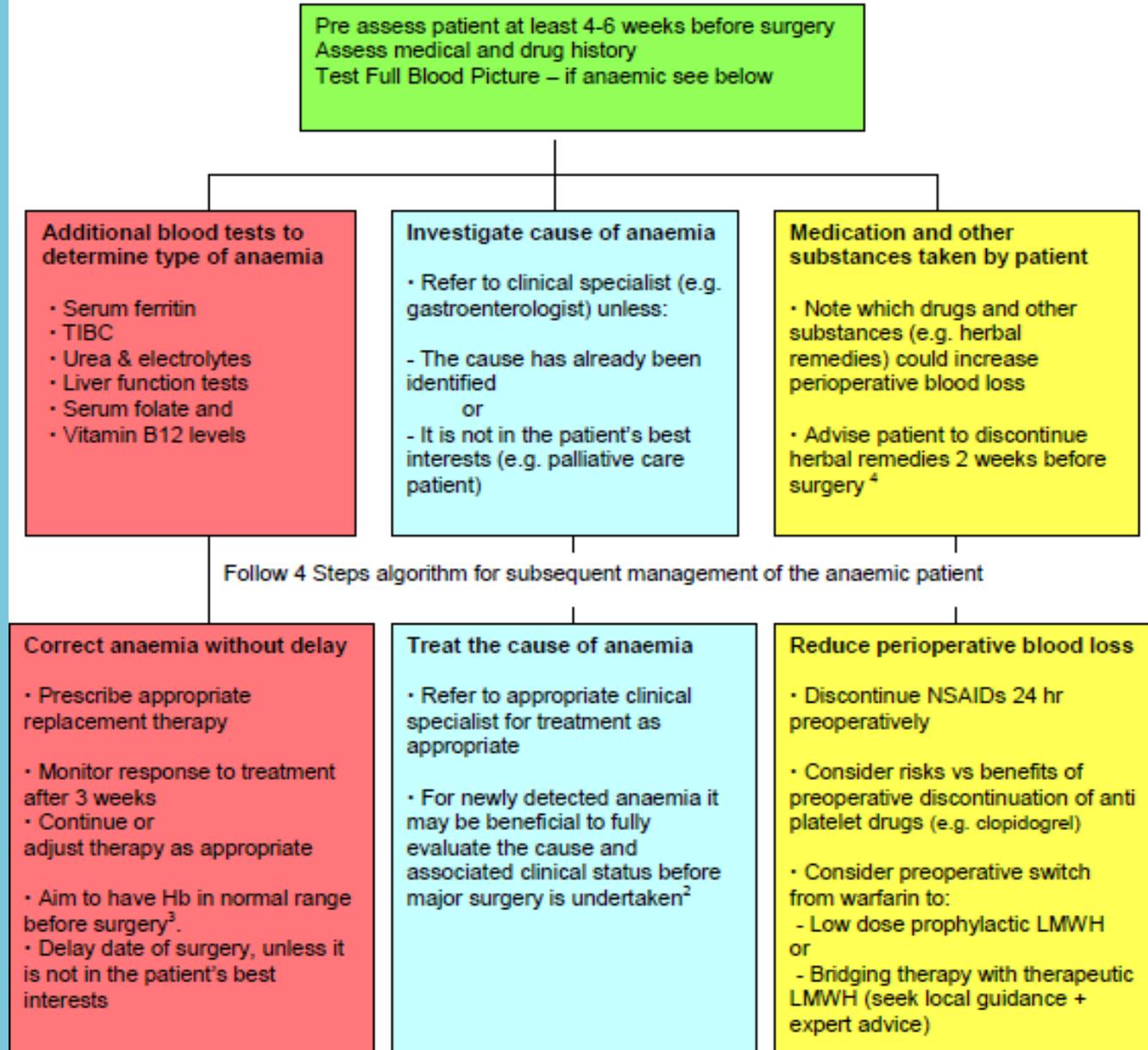
DETECTION, INVESTIGATION AND MANAGEMENT OF ANAEMIA

1. The purpose of this letter is to disseminate two new guidance documents on the detection, investigation and management of anaemia. The documents are:
 - i. **FOUR STEPS IN THE INVESTIGATION AND MANAGEMENT OF THE ADULT PATIENT WITH ANAEMIA**
 - ii. **MANAGEMENT OF THE ANAEMIC ADULT PATIENT PRIOR TO SCHEDULED MAJOR SURGERY**

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 anaemia²: adult male < 130g/l adult female < 120g/l



1st Pillar

Optimise erythropoiesis

Preoperative

- Detect anaemia
- Identify underlying disorder(s) causing anaemia
- Manage disorder(s)
- Refer for further evaluation if necessary
- Treat suboptimal iron stores/iron deficiency/anemia of chronic disease/iron-restricted erythropoiesis
- Treat other haematinic deficiencies
- Note: Anaemia is a contraindication for elective surgery

Intraoperative

- Timing surgery with haematological optimisation

Postoperative

- Stimulate erythropoiesis
- Be aware of drug interactions that can increase anaemia

2nd Pillar

Minimise blood loss & bleeding

- Identify and manage bleeding risk
- Minimising iatrogenic blood loss
- Procedure planning and rehearsal
- Preoperative autologous blood donation (in selected cases or when patient choice)
- Other

- Meticulous haemostasis and surgical techniques
- Blood-sparing surgical techniques
- Anaesthetic blood conserving strategies
- Autologous blood options
- Pharmacological/haemostatic agents

- Vigilant monitoring and management of post-operative bleeding
- Avoid secondary haemorrhage
- Rapid warming / maintain normothermia (unless hypothermia specifically indicated)
- Autologous blood salvage
- Minimising iatrogenic blood loss
- Haemostasis/anticoagulation management
- Prophylaxis of upper GI haemorrhage
- Avoid/treat infections promptly
- Be aware of adverse effects of medication

3rd Pillar

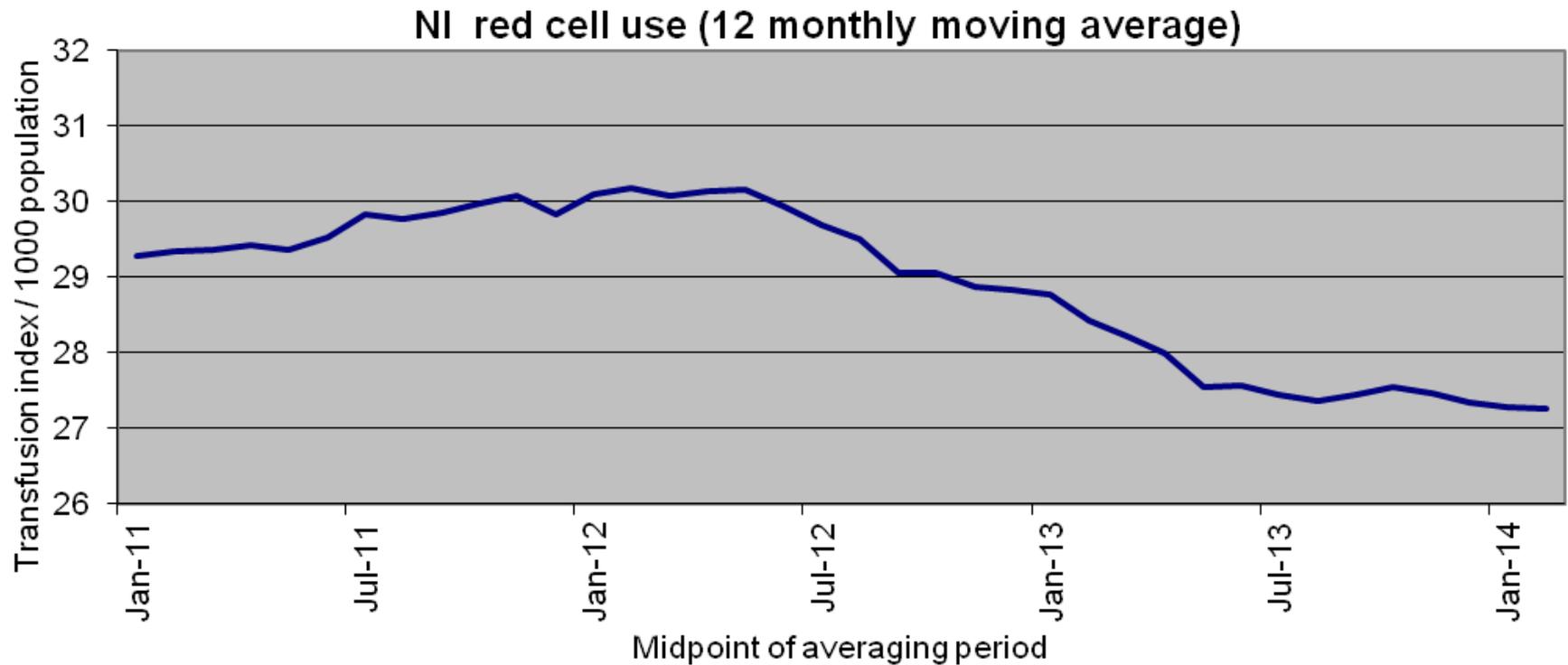
Harness & optimise physiological reserve of anaemia

- Assess/optimize patient's physiological reserve and risk factors
- Compare estimated blood loss with patient-specific tolerable blood loss
- Formulate patient-specific management plan using appropriate blood conservation modalities to minimise blood loss, optimise red cell mass and manage anaemia
- Restrictive transfusion thresholds

- Optimise cardiac output
- Optimise ventilation and oxygenation
- Restrictive transfusion thresholds

- Optimise anaemia reserve
- Maximise oxygen delivery
- Minimise oxygen consumption
- Avoid/treat infections promptly
- Restrictive transfusion thresholds

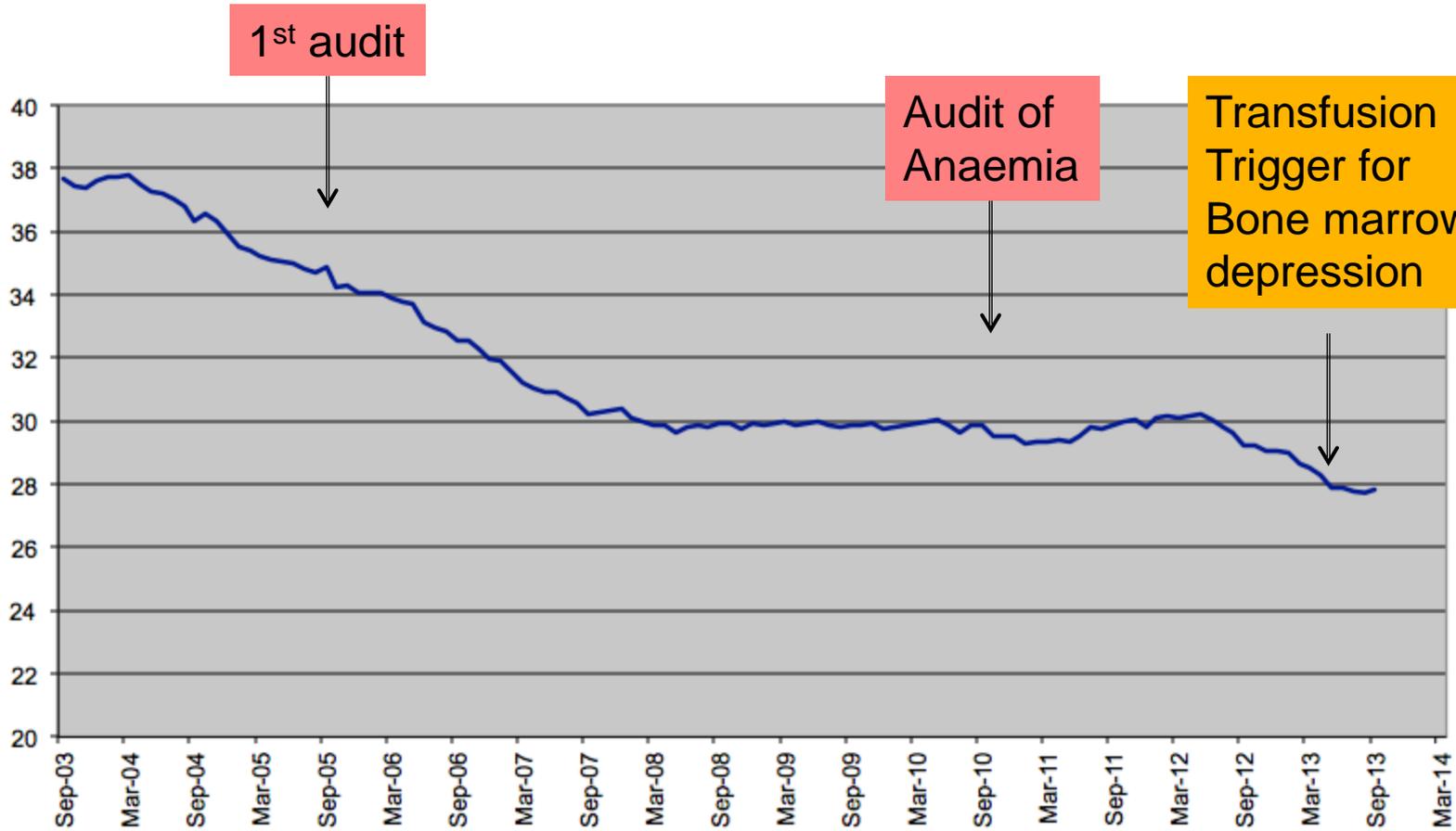
Red Cell Transfusion Index 2011 - 2014



NI Transfusion Index

(12 monthly moving average)

Units transfused / 1000 of population



1st audit

Audit of Anaemia

Transfusion Trigger for Bone marrow depression

Month

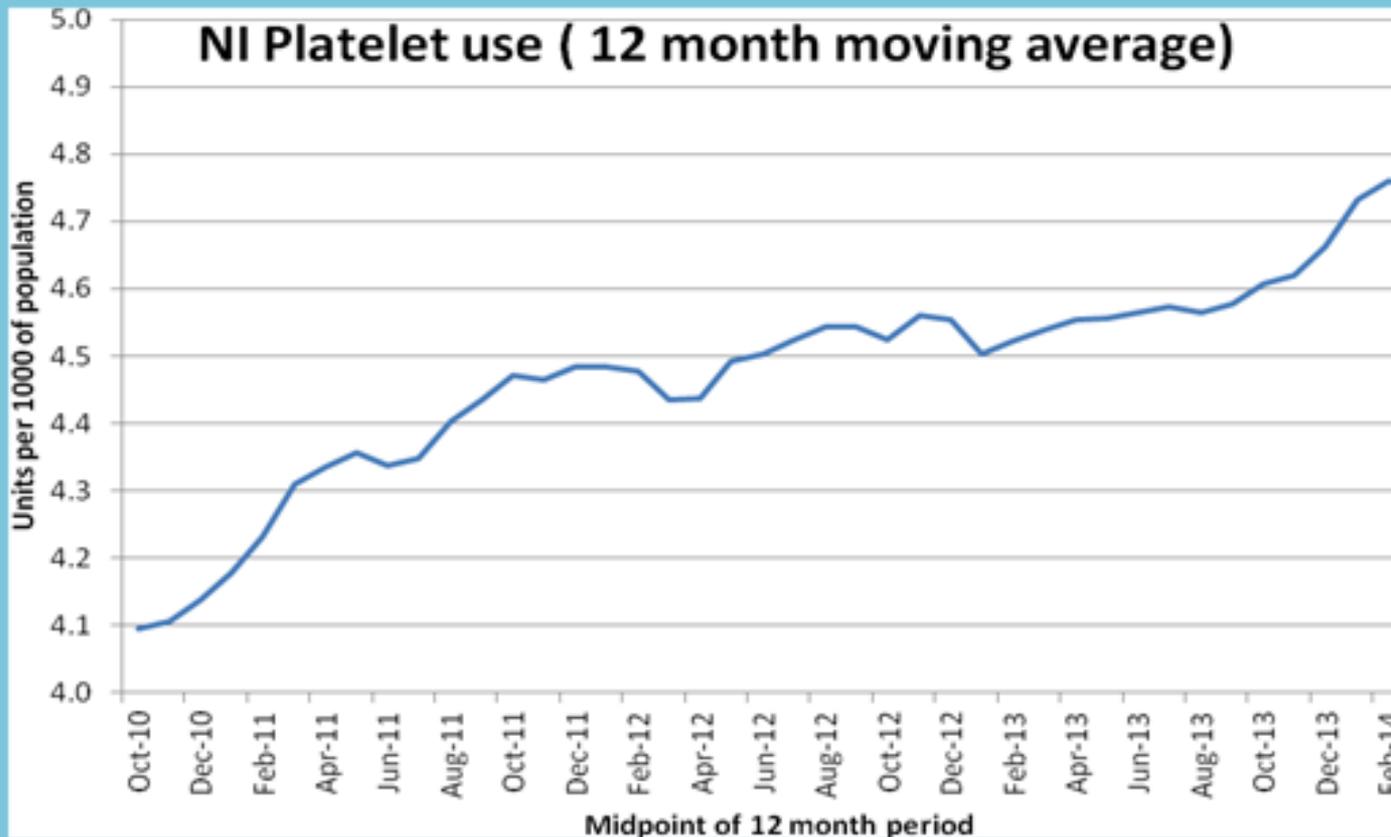
Transfusion triggers for adults

Revised 2014

Patient status	Transfusion threshold
Healthy patient < 65 yr	Hb < 70 g/l
Healthy patient > 65 yr	Hb < 80 g/l
Cardiovascular disease	Hb < 90 g/l
Bone marrow suppression	Hb < 90 g/l
Chemo or Radiotherapy	Hb < 90 g/l
Sig. symptoms / signs of anaemia	Hb < 100 g/l
Active major bleeding	Hb < 100 g/l

Avoid over transfusion: Hb > 20g/l above target threshold

Platelet issues



Summary

- Steady decline in red cell transfusion index last 10 years
- Contributing factors include:
 - Audit process
 - Regional transfusion triggers
 - Regional guidance on management of anaemia
 - Stakeholder involvement
- Endorsement by Department of Health

Acknowledgements

- NITC Members
- Haemovigilance Team, Shirley Murray
- Hospital Transfusion Committees
- Hospital Blood Banks
- CMO, DoH Advisory Committee
- Prof. Mike Murphy