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National Comparative Audit of red cell transfusion in Medical Patients – Part Two

Dr. Kate Pendry, Project Clinical Lead
John Grant-Casey, Project Manager

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Part One

- 9216 cases from 181 sites (90% NHS sites)
- One weeks' data on all medical red cell transfusion (excluding ITU and A&E, patients aged >18, 1 in 3 haematology/ oncology cases) from week of choice between September and November 2011
- Data gathered from notes and laboratory information
- Data collected using web-based audit tool

Potentially avoidable transfusion

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1. Definition of reversible anaemia

Iron deficiency = Ferritin ≤15 mcg/l (female) or ≤ 20 mcg/l (male) **or** Iron studies suggestive of TSAT ≤20% or TIBC ≥ 85 micromol/l **or** MCV ≤ 78fl (in those without haematinic results)

B12 deficiency = B12 ≤ 150 ng/l (pg/ml)

Folate deficiency = Serum folate ≤ 2mcg/l (ng/ml) **or** Red cell folate ≤ 80 mcg/l (ng/ml)

Autoimmune haemolytic anaemia = Either diagnosis of 'haemolysis – acquired autoimmune' or Direct Antiglobulin Test 'Positive' or grade 1 and above

Renal Anaemia = patients with calculated eGFR of ≤ 30mls/min (Chronic Kidney Disease stage 4 to 5) without bleeding and without acute renal failure

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2. Unnecessary transfusion

Transfusion of patients with potentially reversible anaemia

Transfusion above pre-Tx Hb trigger

Patients with bleeding and Hb >100 g/L
Patients with radiotherapy and Hb >110 g/L
Patients with thalassaemia and Hb >95 g/L
Patients with bone marrow failure or with chemotherapy and >65 years old and Hb >90 g/L
Patients with bone marrow failure or with chemotherapy and ≤65 years old and Hb >80g/L
Patients >65 years old and Hb >80 g/L
Patients with comorbidity (at any age) and Hb >80 g/ L
Patients ≤ 65 years with no comorbidity, no bone marrow failure and no chemotherapy, and Hb > 70g/L
Defining bone marrow failure: Haematological diagnosis such as leukaemia, myeloma, lymphoma, myelodysplasia, aplastic anaemia

3. Over transfusion

Transfusion to more than 20g/l above threshold pre-Tx Hb

Results

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Overall, 53% of cases fell outside the algorithm set by the audit group in Part One

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Part Two methods

- Took a random selection of 3138 cases suggestive of avoidable transfusion from Part One
- Information collected by paper proforma by mainly F1/F2 doctors. (Maximum of 20 cases per site)
- Each case was then discussed and reviewed by independent consultant who assessed whether transfusion was appropriate

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Part Two results

- Data returned on 1592 (51%) cases
  - **773 cases of possible reversible anaemia (43% of eligible cases)**
  - **808 cases transfused above trigger Hb set (32% of eligible cases)**
  - **439 cases 'overtransfused' (18% of eligible cases)**

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Reversible anaemia

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Reversible anaemia

- 552 cases of possible iron deficiency anaemia
- 48 cases of B12 & 64 cases of folate deficiency
- 49 cases possible AIHA
- 65 cases of possible renal anaemia

Of the 747 cases, 527 (71%) had a documented reason for transfusion in the case notes

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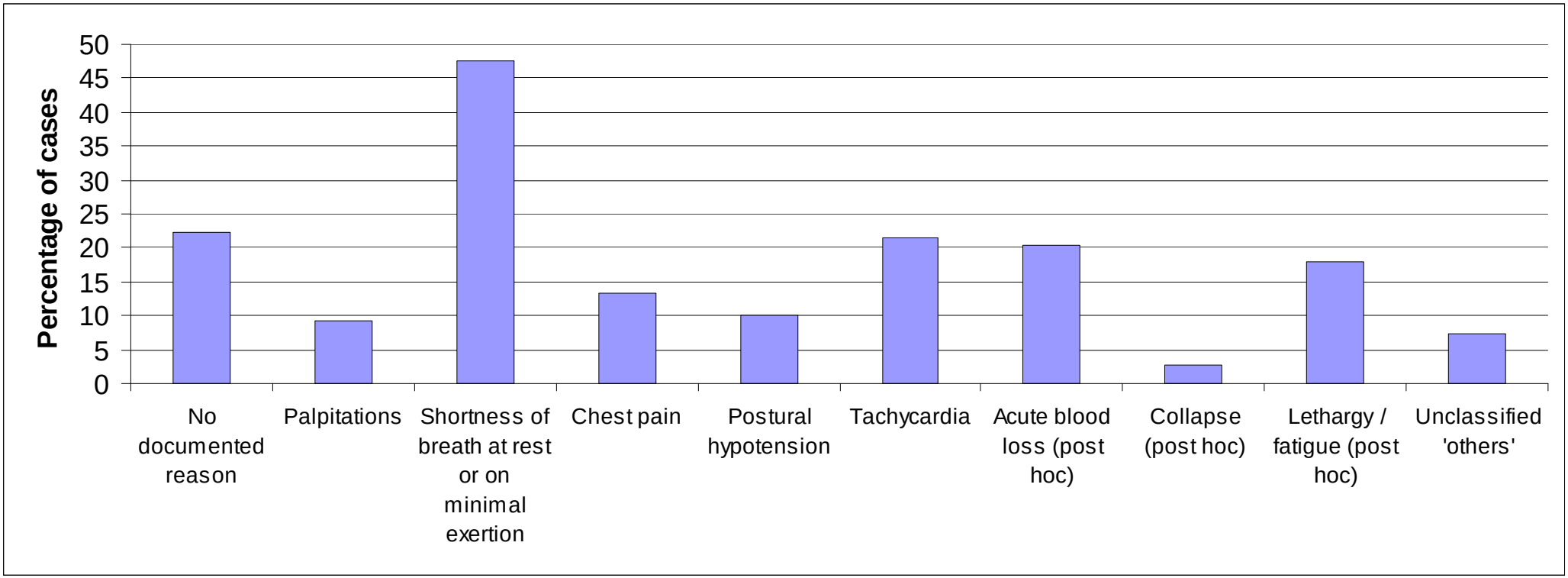
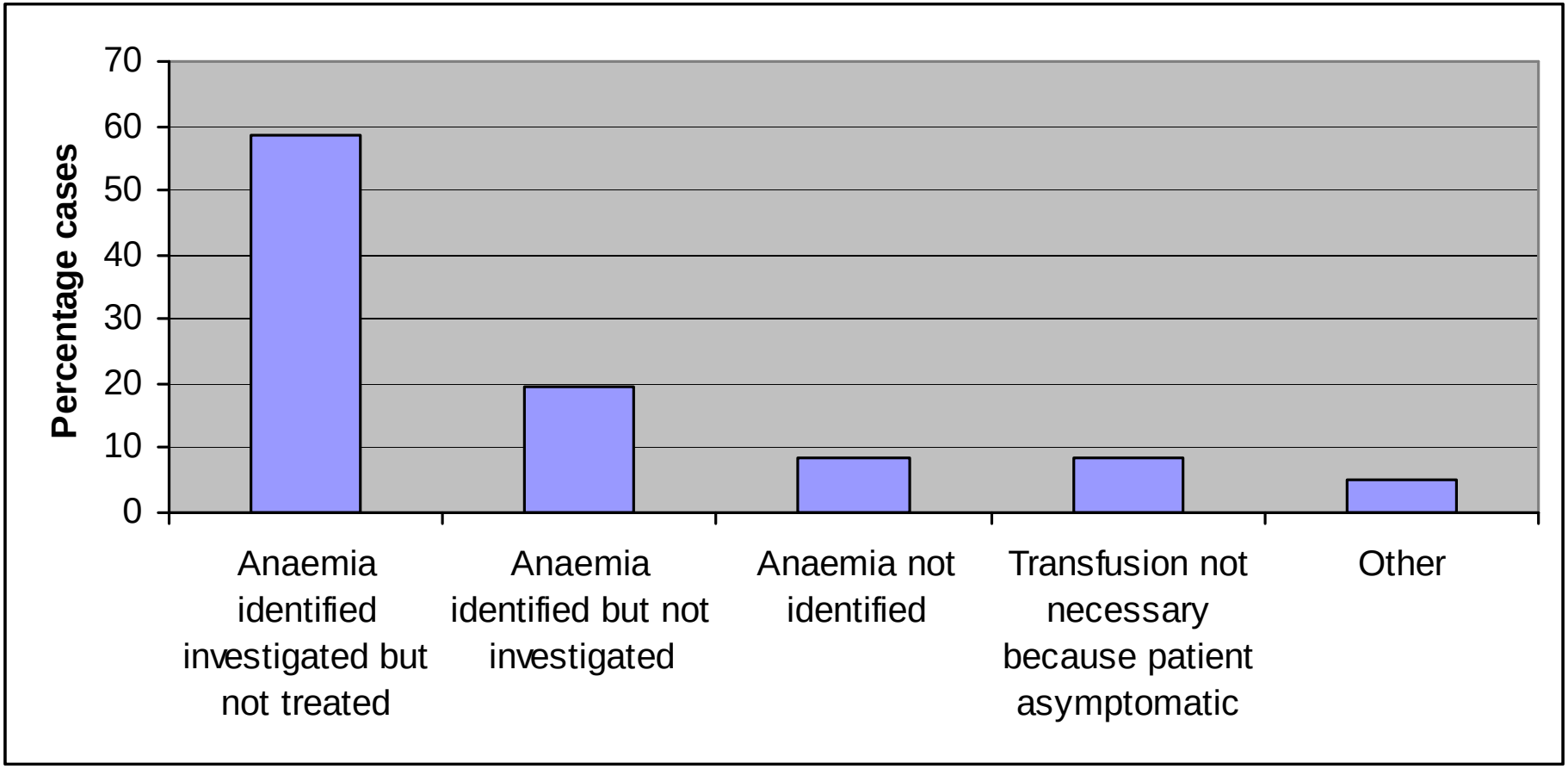


Consultant supervisors concluded that transfusion could have been avoided in 187 cases (25%)



Reasons why transfusions could have been avoided

Time from anaemia being noted to audited transfusion episode

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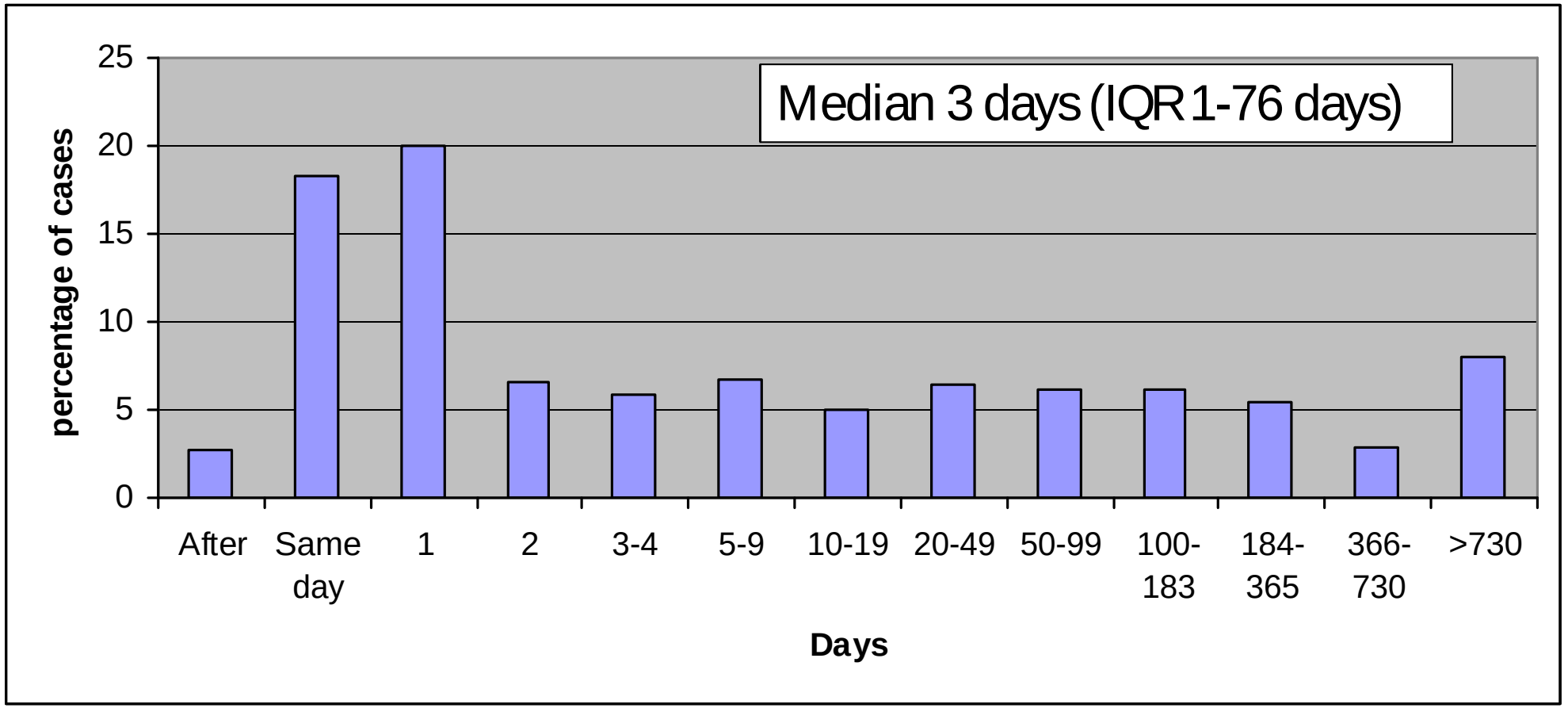

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Reversible anaemia

- Of the 372 cases of documented iron deficiency
  - 252 received oral iron
  - 20 received IV iron
- 120 (25%) of patients with iron deficiency were not treated with iron therapy
- Of the 252 on oral iron, 32 were intolerant or non-compliant with therapy and of these, 8 were treated with IV iron

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Transfusion above Hb threshold

Out of 808 cases, 438 (54%) had a documented reason for transfusion

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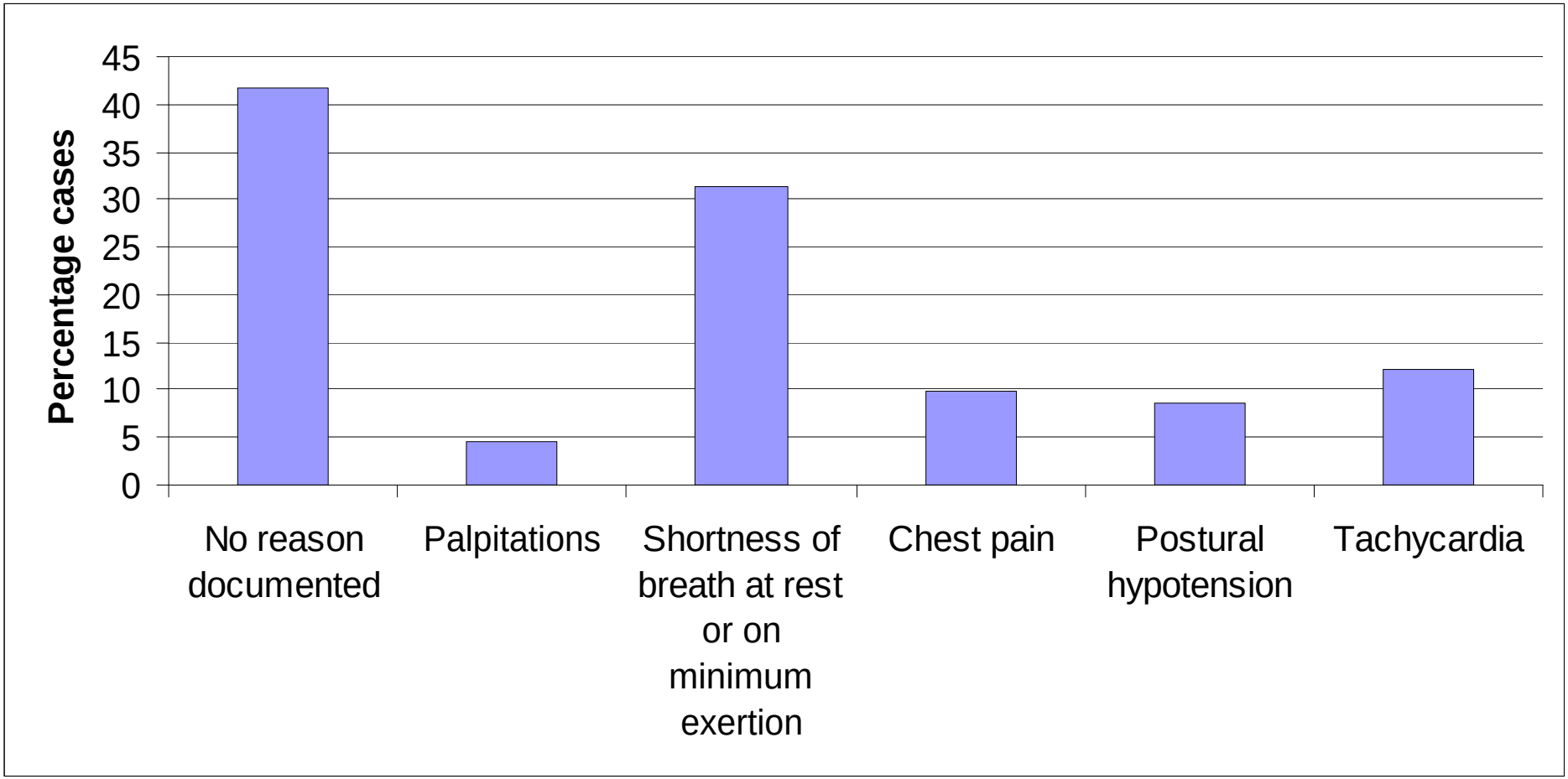

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Transfusion above Hb threshold

- 808 cases were audited
- The local consultant reviewers felt that 220 (27%) of these transfusions could have been avoided
- 438 cases had a documented reason for transfusion, and of these 365 (83%) were thought to be appropriately transfused
- 338 cases did not have a documented reason, but auditors concluded that 156 (46%) were appropriately transfused

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Over-transfused Patients

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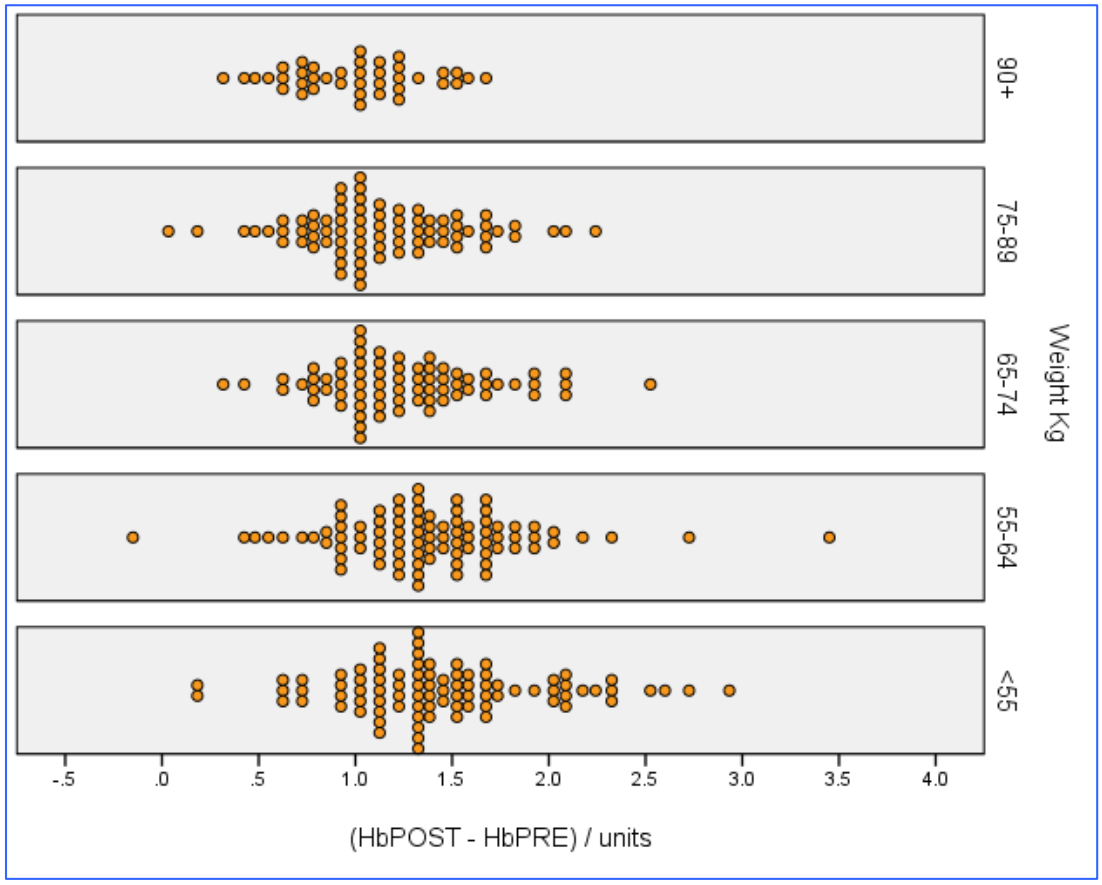
Over Transfused Patients

There was a correlation between body weight and increase in Hb ($P < 0.001$) suggesting that the number of units transfused should be tailored to body weight rather than always prescribing '2 units'

Pattern of Hb increments/ unit by ranges of body weight



Weight	Median increment	IQR increment	No of cases
<55	1.40	1.10-1.65	87
55-64	1.35	1.10-1.65	85
65-74	1.23	1.00-1.45	71
75-89	1.05	0.90-1.40	75
90+	1.00	0.70-1.20	39
Overall median	1.25	1.00-1.55	
75+	1.05	0.80-1.35	114

Extrapolating the figures from Part Two

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- Approx 13% of medical patients in Part one received inappropriate transfusions:
  - 5% in patients with reversible anaemia
  - 8% in patients transfused above appropriate threshold

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Case History 1

- A 46 year old female with fatigue, headaches and palpitations
- Pre Hb 55g/L, MCV 56.8, WBC 8.5, platelets 379, ferritin 3.
- The anaemia was first noted in primary care 1 day before transfusion. Investigations were undertaken as an inpatient
- Oral iron was commenced in the day of transfusion
- It was noted in the notes:' patient reluctant to have blood transfusion'
- The decision to transfuse was made by a consultant
- She was transfused 4 units of red cells and post transfusion Hb was 101g/L

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Case History 2

- 88year old female weight 36kg
- Pre transfusion Hb 69g/L, MCV 69.2, MCH 20.4, plts 238, WBC 6.7, creatinine 87
- Ferritin not done
- No symptoms documented
- No comorbidities or medications
- Cause of anaemia not documented
- No oral iron given Transfused 3 units red cells
- Post transfusion Hb 157g/L

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Discussion

- Why are patients with reversible anaemia being transfused?
  - Inadequate recognition, investigation and treatment of anaemia
  - Significant symptoms / signs of anaemia according to the consultant reviewers. But are fatigue and shortness of breath on exertion sufficient to justify a transfusion in a patient with reversible anaemia?

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Discussion

- Why are patients being transfused above the thresholds set in the audit?
  - The majority of cases (73%) selected for part 2 were considered appropriate by the auditors
  - Significant symptoms / signs of anaemia according to the consultant reviewers

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Discussion

- Why were patients being 'overtransfused'?
  - The main reason was the use of a 'standard' prescription of 2 units in many cases which led to a higher increment than required particularly in patients of lower body weight.

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Discussion

- Unnecessary and overtransfusion may result in patient harm and is a waste of a precious resource.
- There is growing evidence that a more restrictive approach to transfusion is neutral or beneficial compared to a liberal approach in many clinical circumstances
- This audit demonstrates that a restrictive approach is not currently applied to the majority of medical patients.

Next steps

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- There are opportunities to work with several national initiatives to improve practice:
  - The implementation of Patient Blood Management (PBM), which is a multi-disciplinary, evidence-based approach to optimising the care of individual patients who might need blood transfusion. This initiative is being led by National Blood Transfusion Committee (NBTC) and NHSBT
  - NICE has commissioned Transfusion Guidelines which will also make recommendations on the appropriate use of blood (including Hb triggers and targets) and transfusion alternatives
  - SaBTO has recommended that patients should give valid consent to receive a transfusion which includes having the risks and benefits of transfusion explained and being offered alternatives to transfusion where relevant

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Next steps

- Results of the audit will be used to raise awareness of the recommendations for transfusion management of patients under the care of physicians.
- Tools will be developed to support the recognition, investigation and management of anaemia and to develop simple guidelines to support transfusion decision-making

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Recommendations

- **Recommendation 1**

  Patients with medical conditions for example with low grade chronic bleeding, malabsorption syndromes, and chronic renal impairment should be checked for anaemia.
- **Recommendation 2**

  Anaemia should be investigated for an underlying cause.
- **Recommendation 3**

  Patients should receive appropriate and timely treatment for anaemia to avoid unnecessary transfusion. For example, parenteral iron should be considered for treatment of iron deficiency anaemia if it is not possible to use oral iron

Recommendations

- **Recommendation 4**

  Patients should give valid consent to receive a transfusion which includes having the risks and benefits of transfusion explained and being offered alternatives to transfusion where relevant
- **Recommendation 5**

  The decision to transfuse must take into account the laboratory findings, the patient's symptoms and signs and the underlying cause for the anaemia. The decision must be fully documented in the patient notes with the justification for the use of transfusion rather than alternatives and the expected outcome of the transfusion.

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Recommendations

- **Recommendation 6**

  Clinicians must be made aware that the expected increment following transfusion of a unit of red cells is dependent upon the patient's weight. In medical patients with anaemia, there should be clinical reassessment after each unit transfused and a re-check of the Hb.

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Acknowledgments

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