

Chapter 14: Performance Against Renal Association Standards

Summary

- Chi squared testing showed that the percentage of patients achieving the recommended Standard for all the following variables differed significantly between centres for both modalities of dialysis. The variables tested were: haemoglobin, dialysis adequacy, serum ferritin, calcium, phosphate, bicarbonate and intact parathyroid hormone, and blood pressure.

Introduction

The Standards Committee of the Renal Association has identified a number of laboratory and clinical variables that may relate to quality of care or outcomes, and has recommended minimum Standards or target ranges that should be achieved in established dialysis patients. A revised document was published in autumn 2002, but the Standards current in 2001 were from the 1997 document, the second edition; these are shown in Table 14.1.

Standard	Haemodialysis	Peritoneal dialysis
Haemoglobin	≥10g/dL in >85% of patients	≥10g/dL in >85% of patients
Calcium	Local normal range	Local normal range
Phosphate	1.2–1.7 mmol/L	1.1–1.6 mmol/L
Albumin	Local normal range	70% of patients in the local normal range
Bicarbonate	Local normal range	Lower local normal to upper local normal +3mmol/L
Parathyroid hormone	2–3× local normal range	2–3× local normal range
Systolic blood pressure	≤160 mmHg aged over 60 ≤140 mmHg aged under 60	≤160 mmHg aged over 60 ≤140 mmHg aged under 60
Diastolic blood pressure	≤90 mmHg	≤90 mmHg
Dialysis adequacy	Urea reduction ratio ≥65% or Kt/V ≥1.2	CrCl Kt/V CAPD: >50l/week 1.7 APD >65l/week 2.0

Table 14.1: Renal Association Standards

This year, because of previously mentioned problems with albumin measurement and correction of calcium, these results have not been included here, although they will be released in the Internet publication. The parathyroid hormone (PTH) results from laboratories using different assays have been adjusted to a common range, the upper limit complying with the Standard being less than 23 pmol/L.

Data are included from the last quarter of 2001. Patients were excluded if they had not been on renal replacement therapy (RRT) for at least 3 months or if they had transferred unit or changed dialysis modality in the 3 month period prior to data sampling. This ensured that the results for a unit reflected stable treatment patterns and were not adversely affected by new patients whom the unit had not had chance to treat effectively.

The problems of comparing biochemical variables such as albumin, calcium and bicarbonate identified in the previous reports still apply; comparative data must be interpreted with caution. The achievement of Standards defined around the local laboratory reference range is dependent on the source of derivation for the reference range. Biochemical data have been harmonised as described previously; the harmonisation constants for an individual laboratory change year on year and are monitored. The urea reduction ratio (URR) may be influenced by post-dialysis sampling techniques. This is discussed in detail in Chapter 7, further information being provided in Appendix D.

Overview of presentation

Results have been ranked in order of performance purely for clarity of presentation, otherwise the figures would be difficult to read. The significance of the ranking order is discussed below.

In the following section, many figures use a common modified box-plot format, data being presented separately for haemodialysis (HD) and peritoneal dialysis (PD). The figures showing the percentage of patients reaching the Renal Association Standard include the 95% confidence interval calculated for this figure. Where medians are displayed, the 25th and 75th centiles for the unit are included. Data completeness is indicated by the ‘percentage missing’ figure below the unit code letter. These methods are the best way the Registry has found to convey the underlying data for the larger number of centres.

Haemoglobin

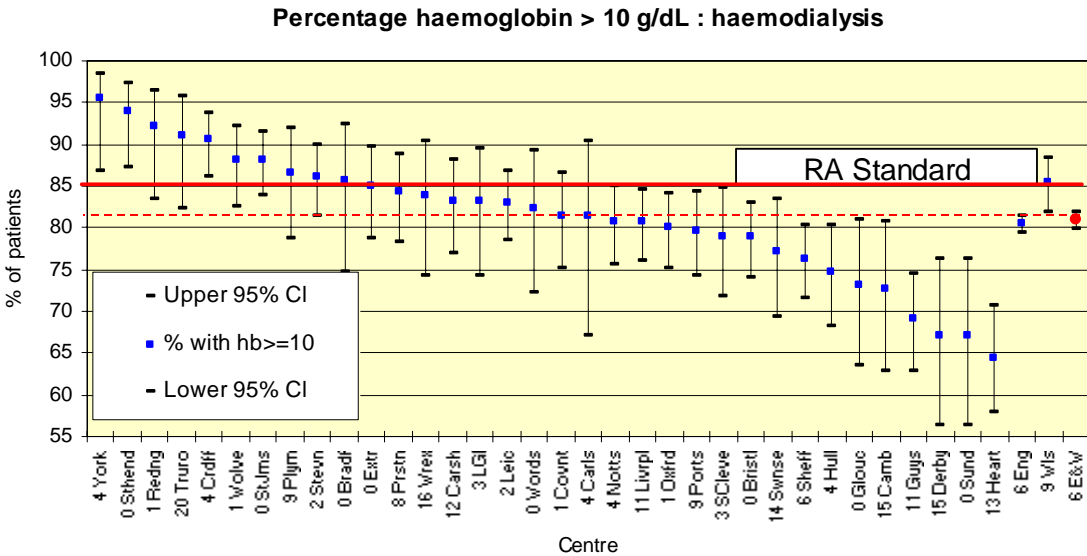


Figure 14.1: % of HD patients achieving the Renal Association Hb Standard by centre

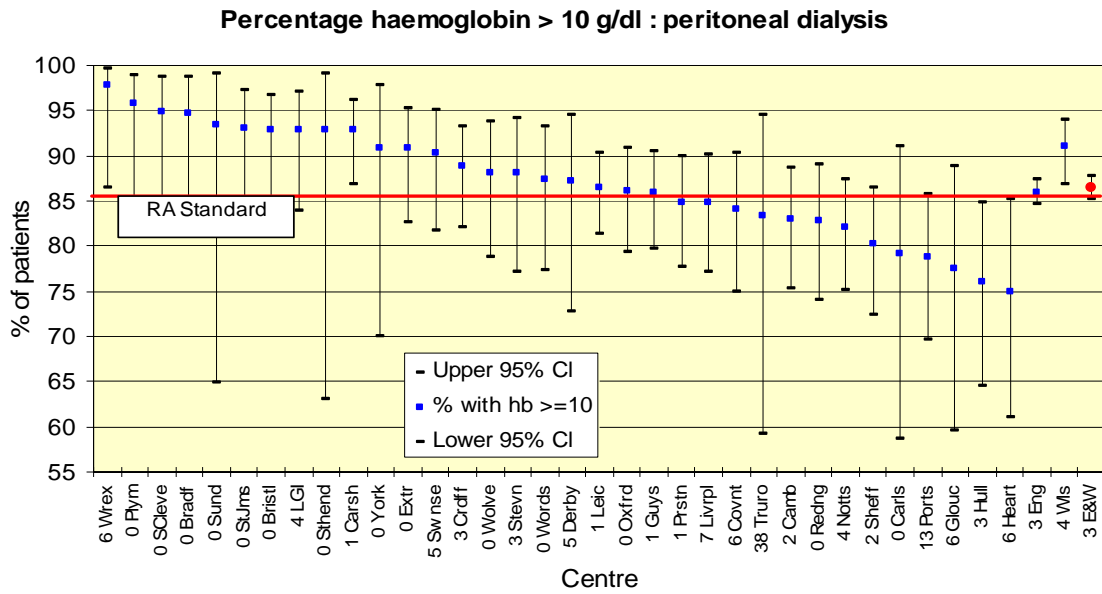


Figure 14.2: % of PD patients achieving the Renal Association Hb Standard by centre

Serum bicarbonate

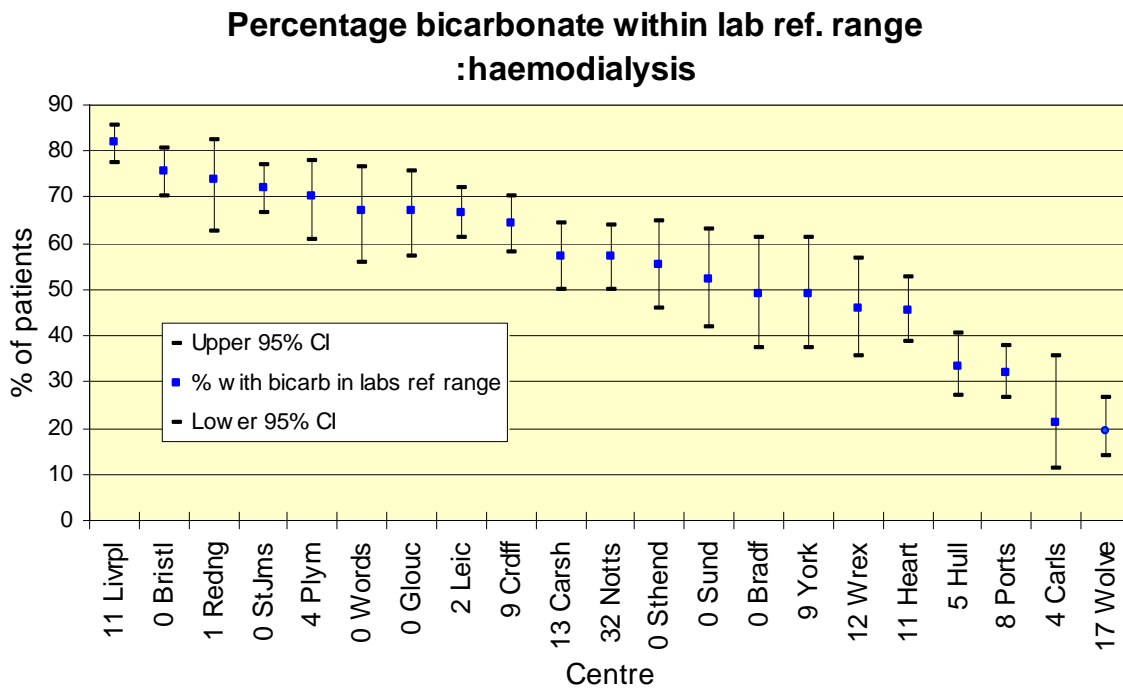


Figure 14.3: % bicarbonate in the laboratory reference range for HD by centre

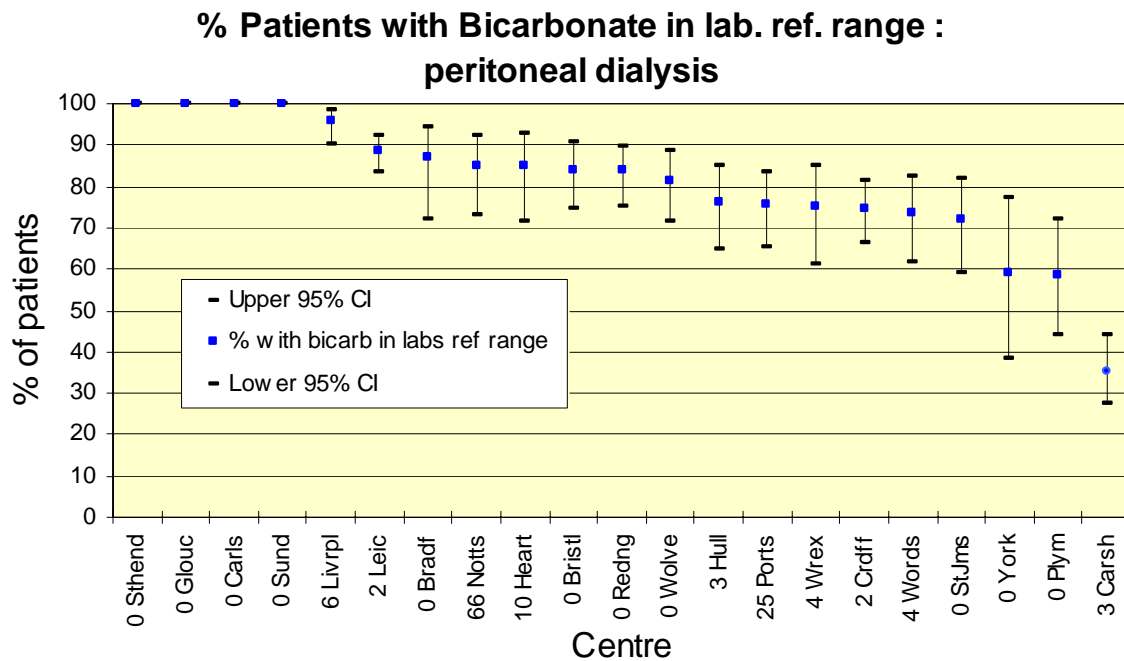


Figure 14.4: % bicarbonate in the laboratory reference range for PD by centre

Serum phosphate

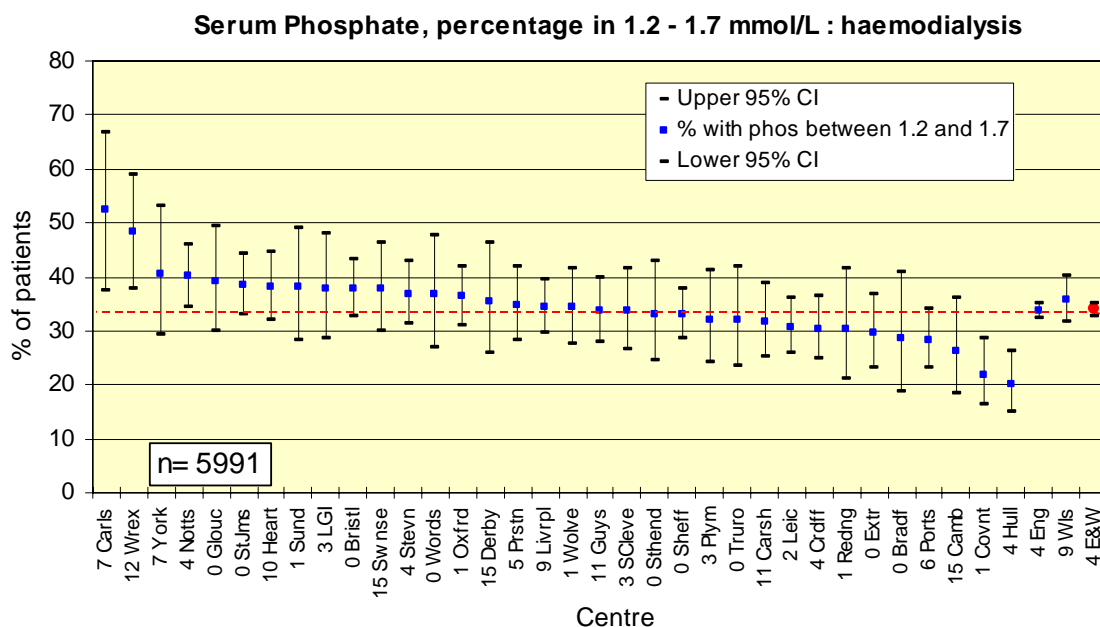


Figure 14.5: % serum phosphate in the range 1.2-1.7 mmol/L for HD by centre

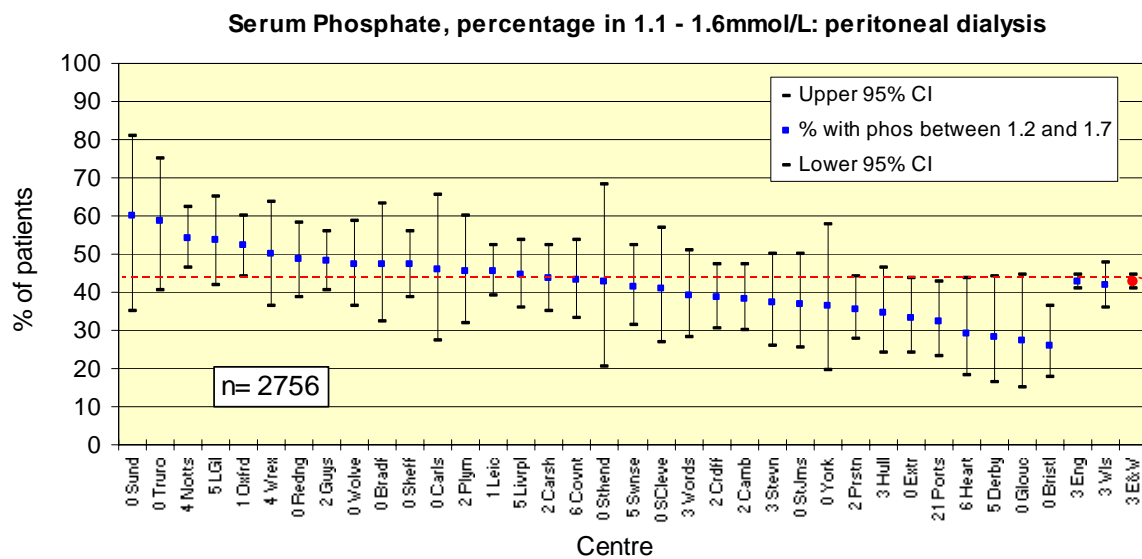


Figure 14.6: % with serum phosphate 1.1–1.6 mmol/L for PD in each centre

Intact parathyroid hormone

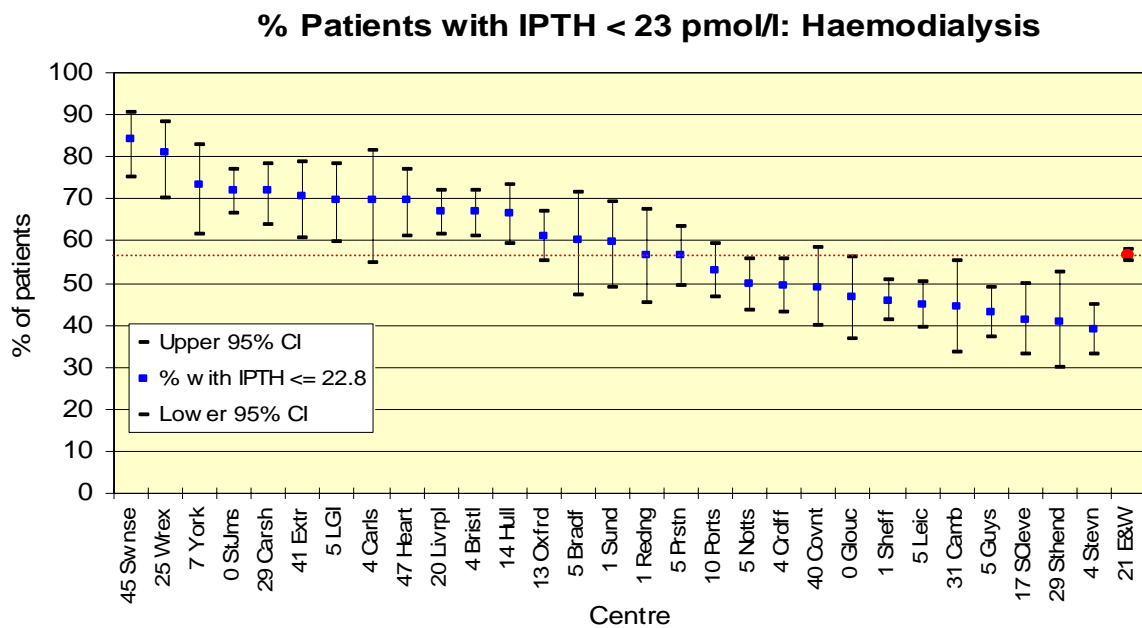


Figure 14.7: % of patients with iPTH in three times the laboratory range on HD by centre

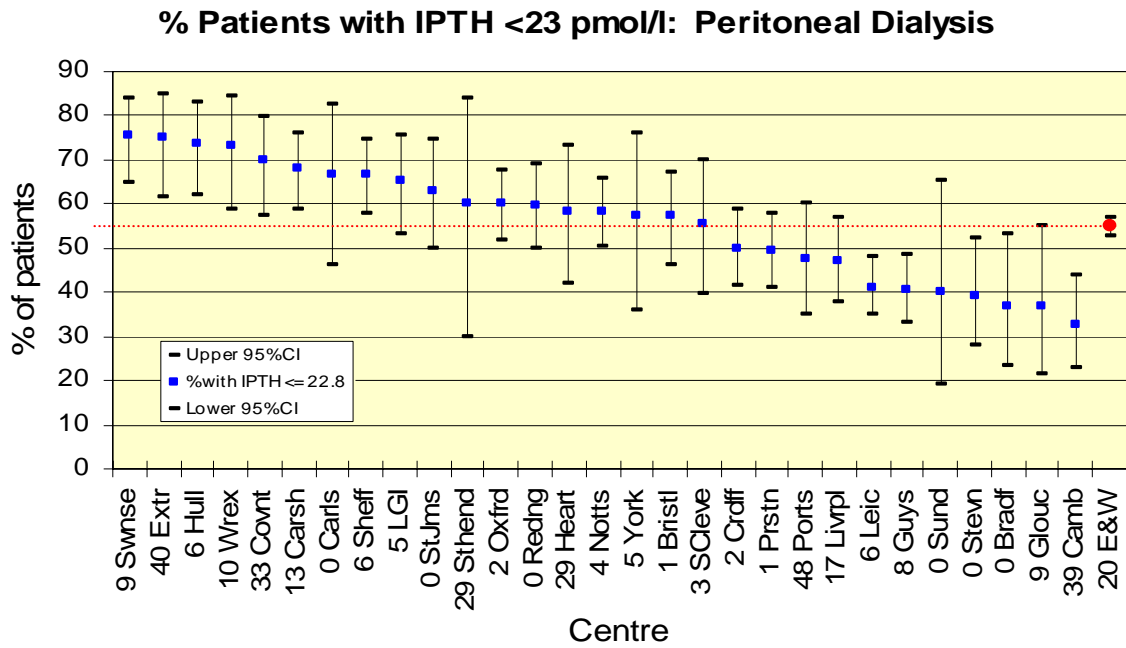


Figure 14.8: % of patients with iPTH in three times the laboratory range on PD by centre

Dialysis adequacy

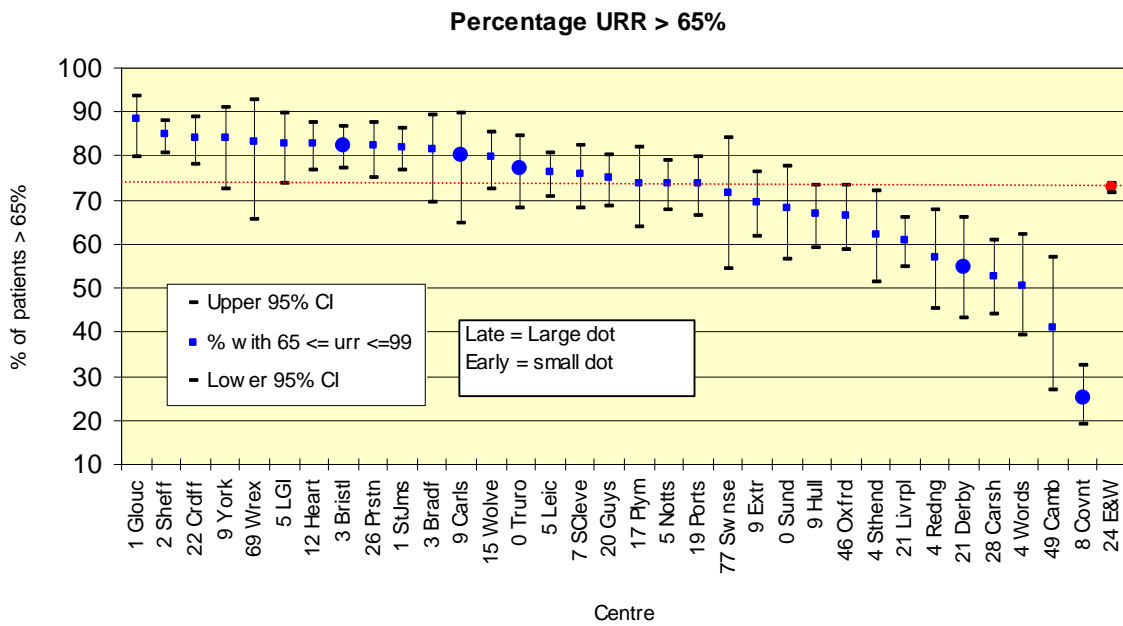


Figure 14.9: % of patients with URR over 65% in each centre

Blood Pressure

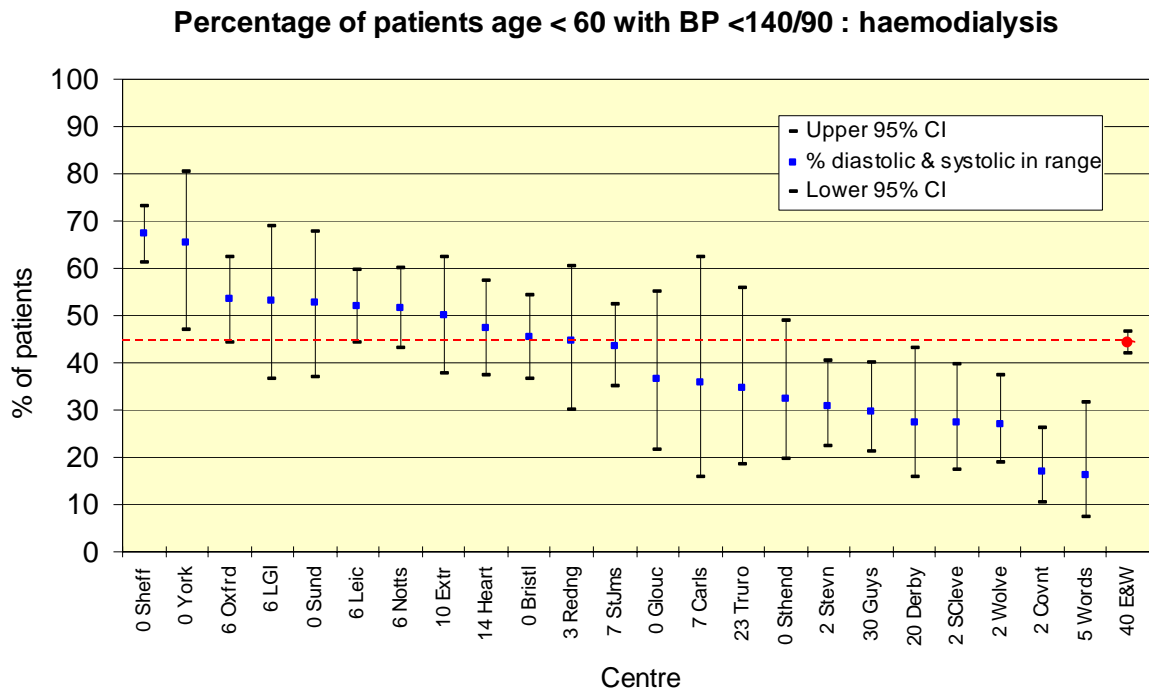


Figure 14.10: % of patients aged less than 60 on HD with BP in the RA Standard range

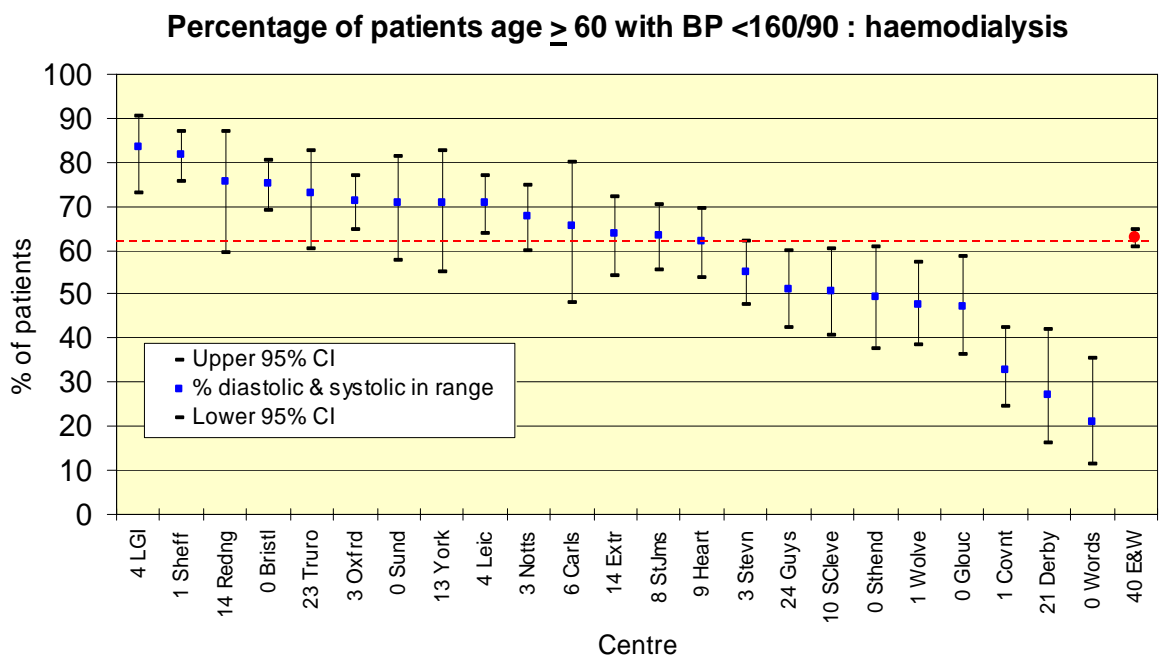


Figure 14.11: Percentage patients aged over 60 on HD with BP in the RA Standard range

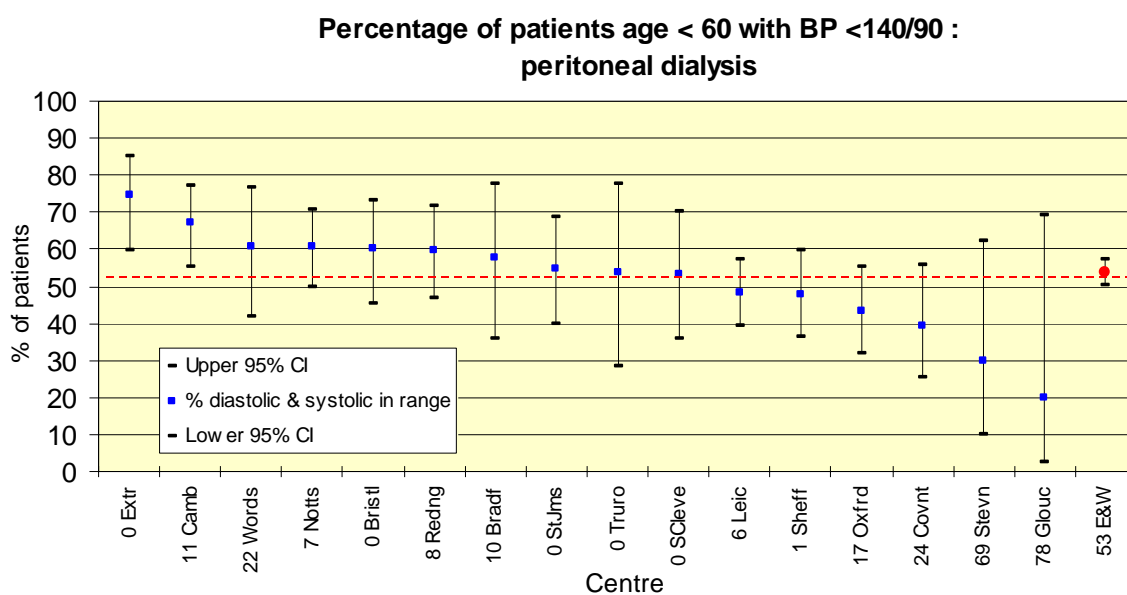


Figure 14.12: Percentage patients aged <60 on PD with BP in the RA Standard range

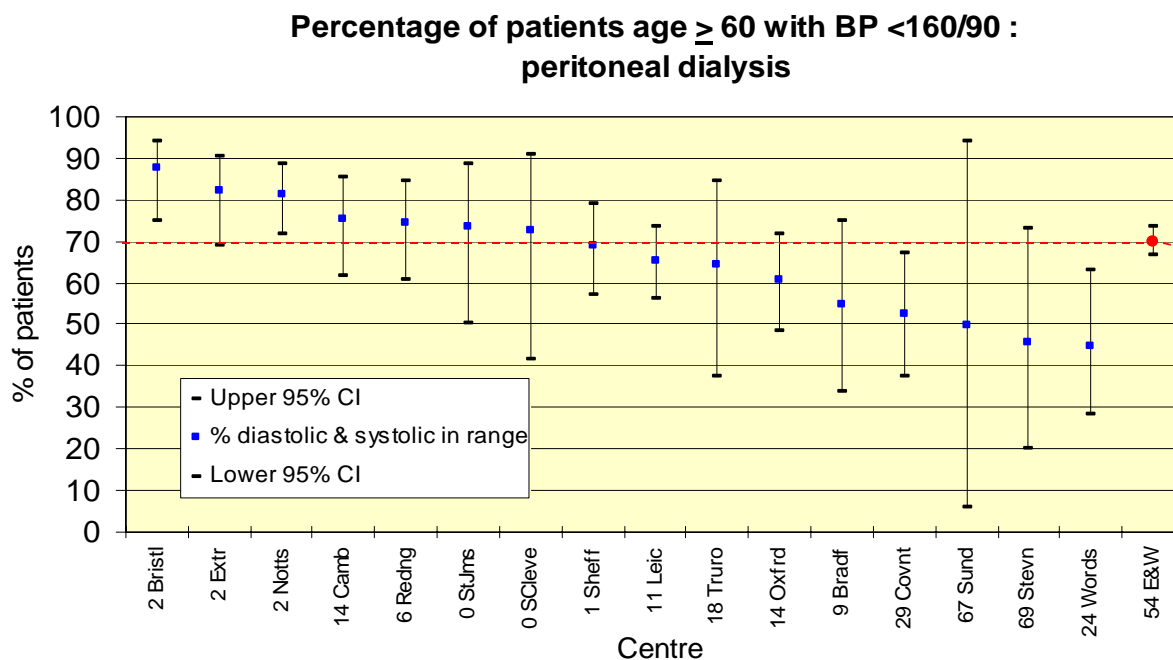


Figure 14.13: Percentage of patients aged over 60 on PD with BP in the RA Standard range

Statistical analysis

Methodology

Chi squared tests were used to see whether the percentage of patients with data in a given range varied significantly between centres. Degrees of freedom are equal to the number of centres with over 50% completeness minus 1.

Results

Haemoglobin

A chi squared test was used to determine whether the percentage of patients with a haemoglobin level of 10 g/dL or more differed between centres.

For patients on HD, the percentage of patients with a haemoglobin of 10 g/dL or more was found to differ significantly between centres ($\chi^2=178$, d.f.=33, $p<0.001$).

For patients on PD, the percentage of patients with a haemoglobin of 10 g/dL or more was found to differ significantly between centres ($\chi^2=63.45$ d.f.=33, $p<0.001$).

Ferritin

A chi squared test was used to determine whether the percentage of patients with a ferritin level of 100 mcg/L or more differed between centres.

For patients on PD, the percentage of patients with a ferritin of 100 mcg/L or over was found to differ significantly between centres ($\chi^2=169$, d.f.=32, $p<0.001$).

Bicarbonate

A chi squared test was used to determine whether the percentage of patients with bicarbonate values within the Standard varied between centres. For this analysis, patients were categorised as having a bicarbonate within the Standard or not having a bicarbonate within the Standard (regardless of whether the patient's bicarbonate level was below or above the Standard). It should be noted that the Standards are different for HD and PD.

For patients on HD, the percentage of patients with a bicarbonate within the Standard differed significantly between centres ($\chi^2=466.8$, d.f.=20, $p<0.001$).

For patients on PD, the percentage of patients with a bicarbonate reading within the Standard differed significantly between centres ($\chi^2=310.5$, d.f.=20, $p<0.001$).

Phosphate

For patients on HD, a chi squared test was used to determine whether the percentage of patients with a phosphate concentration of 1.70 mmol/L or less differed between centres. For patients on PD, a chi squared test was used to determine whether the percentage of patients with a phosphate of 1.60 mmol/L or less differed between centres. Note that the analysis considered laboratory-harmonised phosphate.

For patients on HD, the percentage of patients with a phosphate reading of 1.70 mmol/L or less differed significantly between centres ($\chi^2=196.7$, d.f.=33, $p<0.001$).

For patients on PD, the percentage of patients with a phosphate level of 1.60 mmol/L or less differed significantly between centres ($\chi^2=108.7$, d.f.=33, $p<0.001$).

PTH

A chi squared test was used to determine whether the percentage of patients with a PTH of 22.8 pmol/L or below differed between centres. The analysis considered laboratory-harmonised PTH.

For patients on HD, the percentage of patients with a PTH value of 22.8 pmol/L or less differed significantly between centres ($\chi^2=142.8$, d.f.=17, $p<0.001$).

For patients on PD, the percentage of patients with a PTH of 22.8 pmol/L or less differed significantly between centres ($\chi^2=60.0$, d.f.=17, $p<0.001$).

URR

A chi squared test was used to determine whether the percentage of patients with a URR of 65% or more differed between centres. This analysis only included the English and Welsh units.

The percentage of patients with a URR of 65% or above was found to vary significantly between centres ($\chi^2=408.7$, d.f.=33, $p<0.001$).

Blood Pressure

A chi-squared test was used to determine whether the percentage of patients with both systolic and diastolic blood pressure within range differed between centres. Note that the analysis for transplant patients excluded patients who had a transplant in 1999.

For patients on HD, aged 60 or more, the percentage of patients reaching the Standard for both systolic and diastolic blood pressure differed significantly between centres ($X^2 = 218.9$, d.f. = 26, $p<0.001$).

For patients on HD, aged under 60, the percentage of patients reaching the Standard for both systolic and diastolic blood pressure differed significantly between centres ($X^2 = 156.5$, d.f. = 28, $p<0.001$).

For patients on PD, aged 60 or more, the percentage of patients reaching the Standard for both systolic and diastolic blood pressure differed significantly between centres ($X^2 = 49.9$, d.f. = 25, $p=0.002$).

For patients on PD, aged under 60, the percentage of patients reaching the Standard for both systolic and diastolic blood pressure differed significantly between centres ($X^2 = 75.6$, d.f. = 25, $p<0.001$).