Chapter 13: Performance Against Renal Association Standards

Introduction

The Standards Committee of the Renal Association have identified a number of laboratory and clinical variables which may relate to quality of care or outcomes and have recommended minimum standards or target ranges which should be achieved in established dialysis patients These are shown in table 13.1.

Standard	Haemodialysis	Peritoneal dialysis
Haemoglobin	$\geq$10g/dl in >85% of patients	$\geq$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	2–3x local normal range	2–3x local normal range
Systolic BP	$\leq$160 mmHg aged over 60 $\leq$140 mmHg aged under 60	$\leq$160 mmHg aged over 60 $\leq$140 mmHg aged under 60
Diastolic BP	$\leq$90 mmHg	$\leq$90 mmHg
Adequacy	URR $\geq$65% or KT/V $\geq$1.2	CC>50l/week or KT/V.1.7 for CAPD (65l/week and 2.0 for APD

Table 13.1 Renal Association Standards

Data are included for the last quarter of 1999. Patients were excluded if they had not been on renal replacement therapy for at least three months or if they had transferred unit or changed dialysis modality in the three month period prior to data sampling. This ensures that the results for a unit reflect stable treatment patterns and are not adversely affected by new patients which the unit has not had chance to treat effectively.

The problems of comparing biochemical variables such as albumin, calcium and bicarbonate identified in the 1998 and 1999 report still apply; and comparative data must be interpreted with caution. 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 ratios may be influenced by post-dialysis sampling techniques; this is discussed again this year in detail in chapter 6.

Results have been ranked in order of performance purely for clarity of presentation, otherwise the figures would be difficult to read. The ranking does not necessarily imply significant differences in the performance of different units and the significance of the ranking order has not been tested.. The figures which show a percentage of patients reaching a 'target' also include the 95% confidence interval for that percentage. This provides an estimate in the

potential variation around this figure in repeated measurement and provides an indication of the overlap between centres. Some of the results are also shown as bar charts divided into bands. The numbers immediately under each centre on the figures are the percentage of missing data from that centre for patients on that treatment modality. These methods are the best way the Registry has found to convey the underlying data for the larger number of centres.

Overview of presentation

In the following section the figures use a common modified box-plot format with data presented separately for haemodialysis and peritoneal dialysis. 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. Figures showing the percentage within a range (as defined by the Renal Association Standard or a Renal Registry defined range) also include the 95% confidence interval calculated for this figure. Data completeness is indicated by the percentage missing figure below the unit code letter.
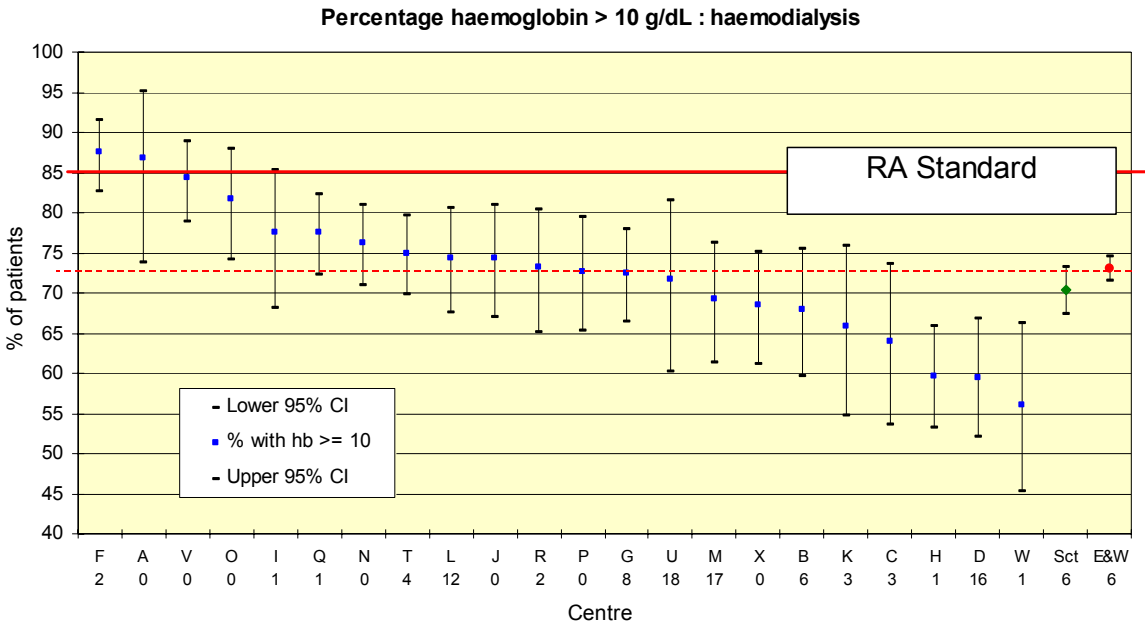
Haemoglobin

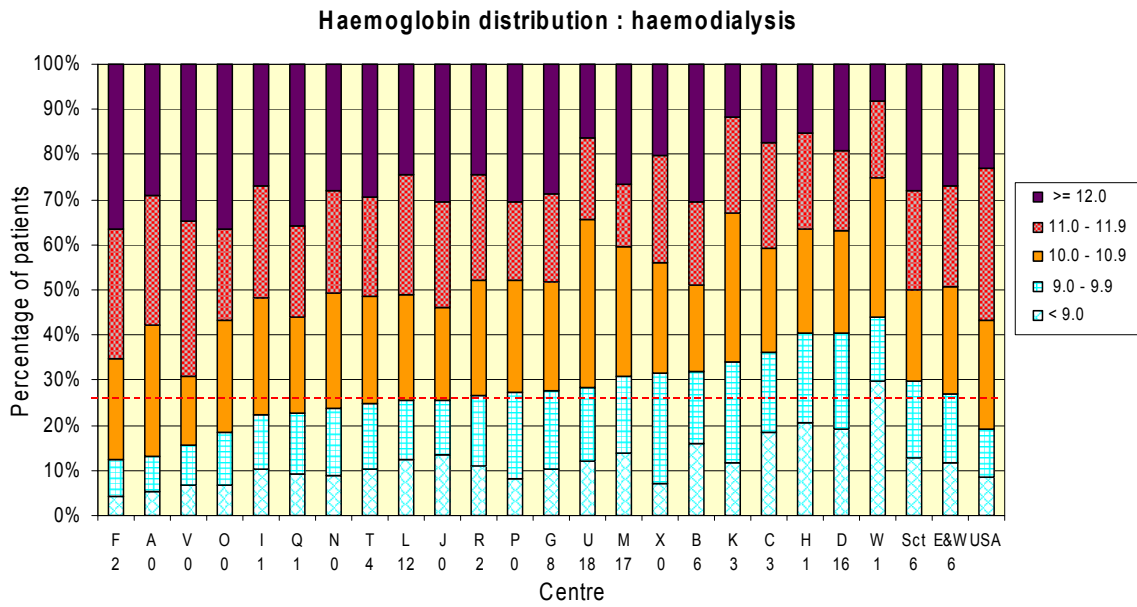**Figure 13.1 Haemoglobin Percentage of HD patients achieving the RA Standard**

Haemoglobin distribution : haemodialysis

Figure 13.2 Haemoglobin for patients on HD by 1g/dl bands

Percentage haemoglobin > 10 g/dL : peritoneal dialysis
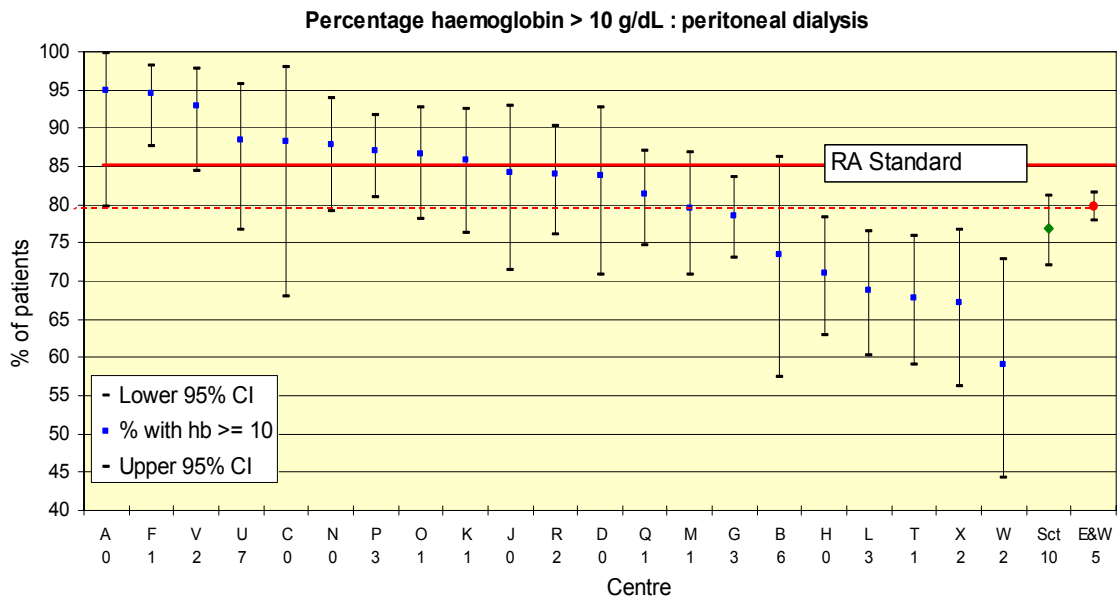
Figure 13.3 Percentage of PD patients by centre achieving the RA Standard
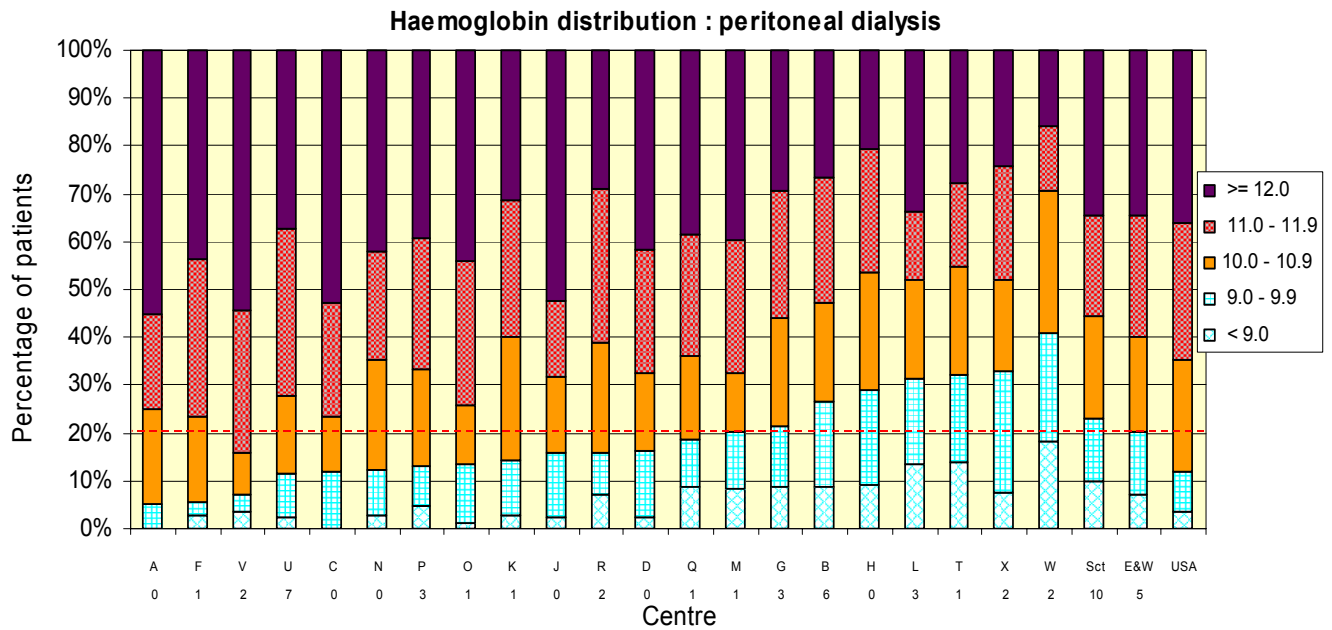
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Haemoglobin distribution : peritoneal dialysis

Figure 13.4 Distribution of haemoglobin for patients on PD by 1g/dl bands

Serum Albumin

Albumin, percentage in labs ref range : haemodialysis
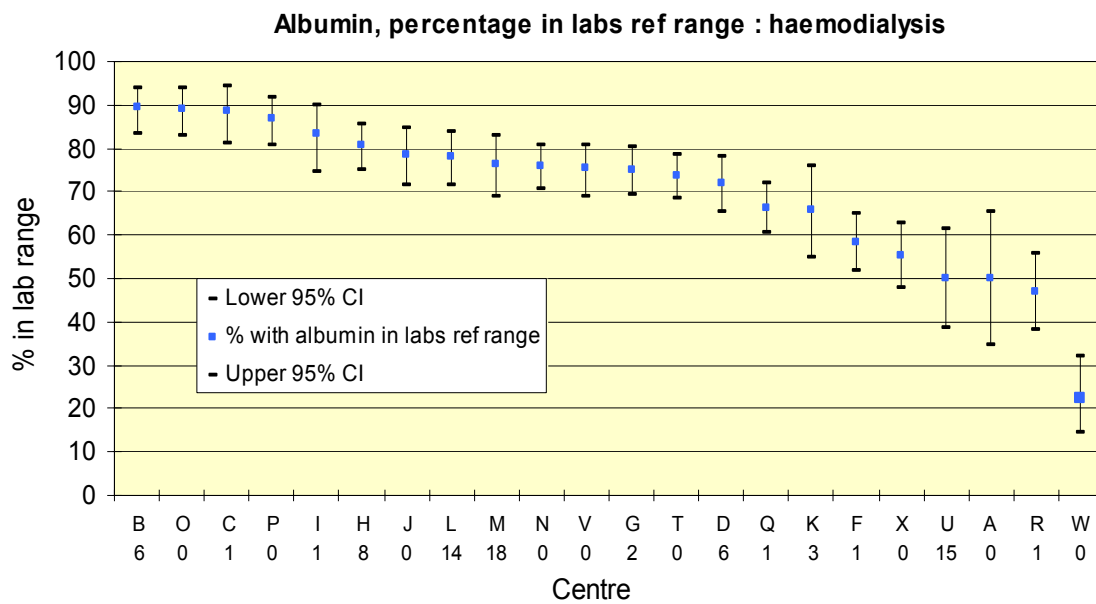

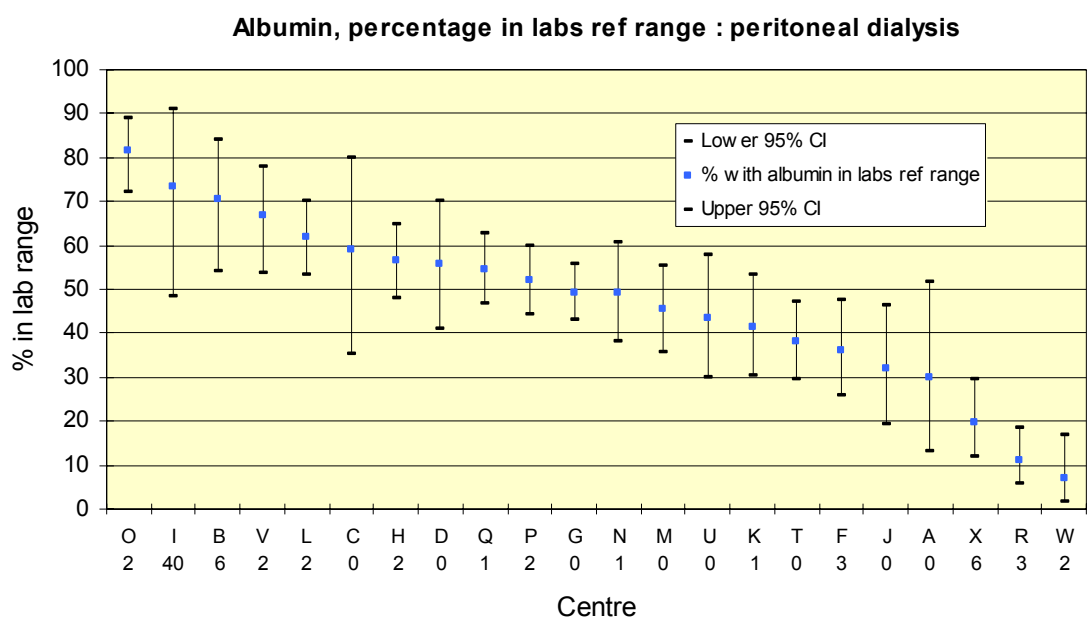**Figure 13.5 Percentage albumin in lab reference range for haemodialysis**

Figure 13.6 Percentage albumin in lab reference range for peritoneal dialysis
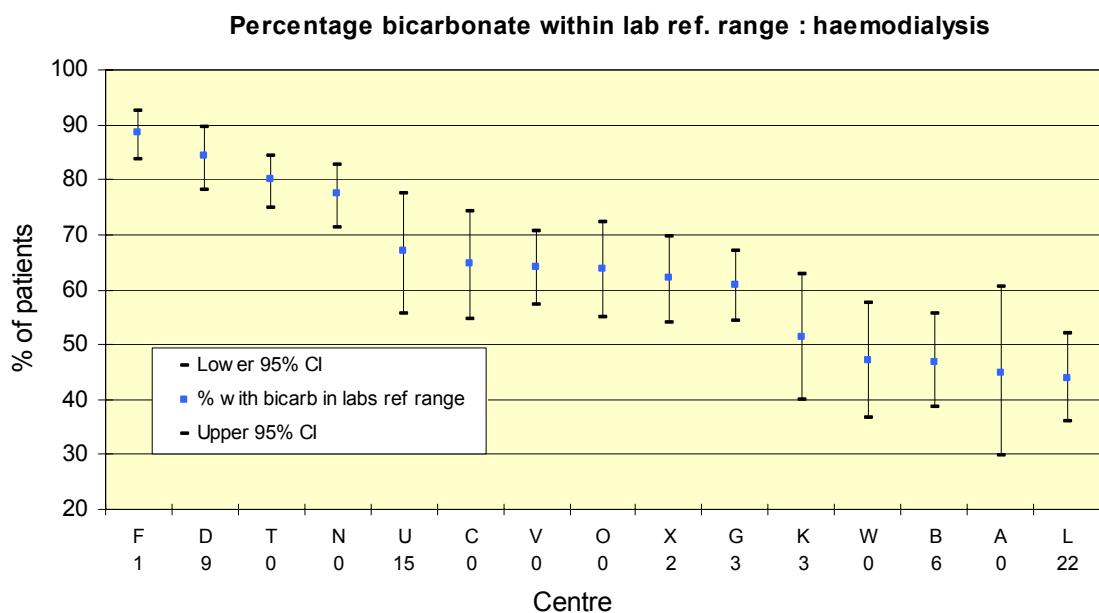
Serum Bicarbonate

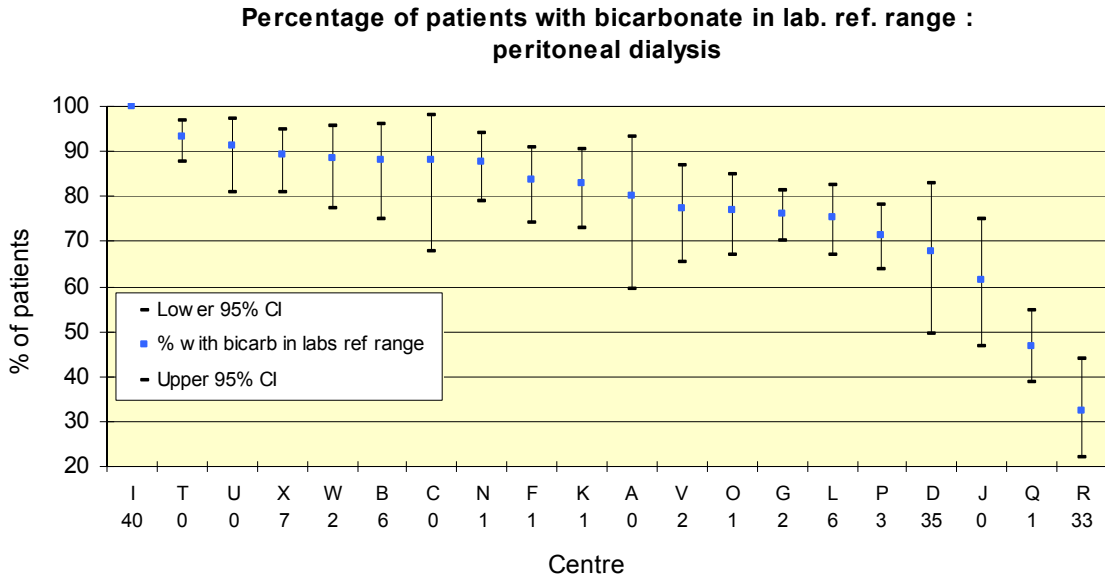**Figure 13.7 Percentage bicarbonate in lab reference range for haemodialysis**

**Percentage of patients with bicarbonate in lab. ref. range :
peritoneal dialysis**

Figure 13.8 Percentage bicarbonate in lab reference range for peritoneal dialysis

Serum Calcium

**Percentage corrected calcium between 2.25 -2.65 mmol/L :
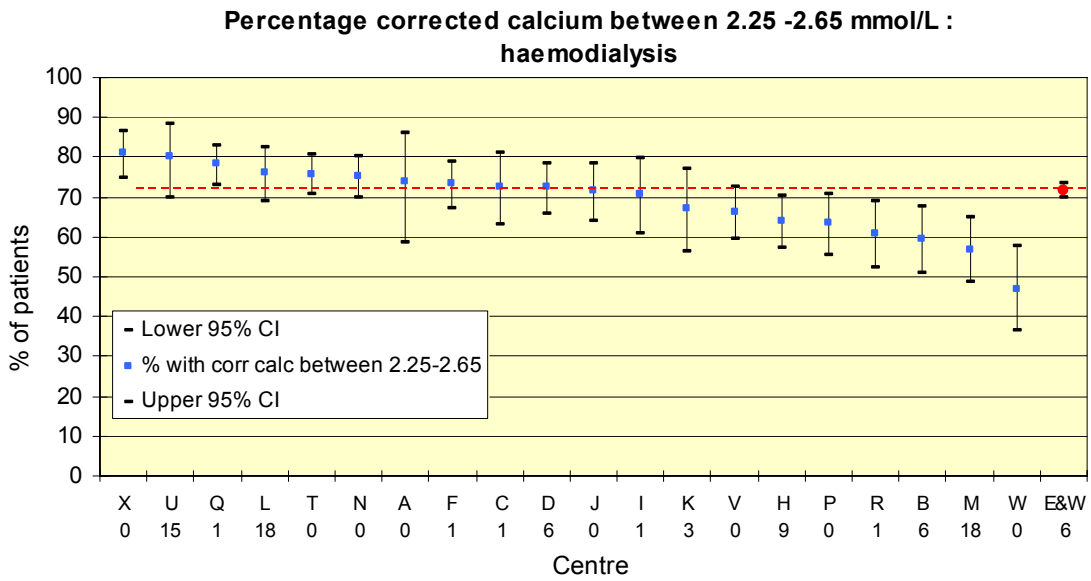haemodialysis**

Figure 13.9 Percentage corrected calcium in 2.25-2.65 for haemodialysis
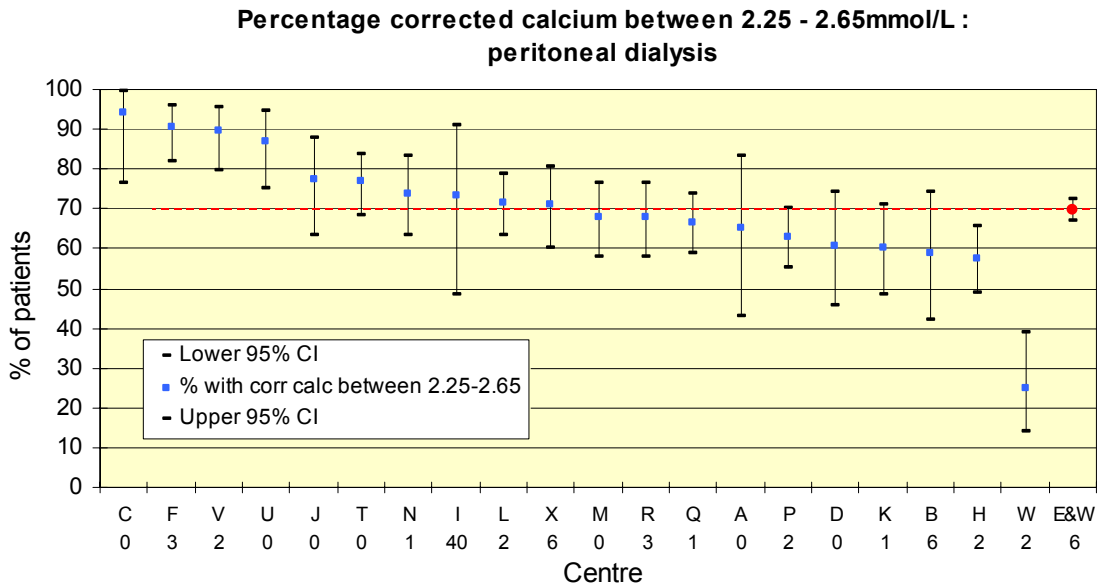
Figure 13.10 Percentage corrected calcium in 2.25-2.65 for peritoneal dialysis
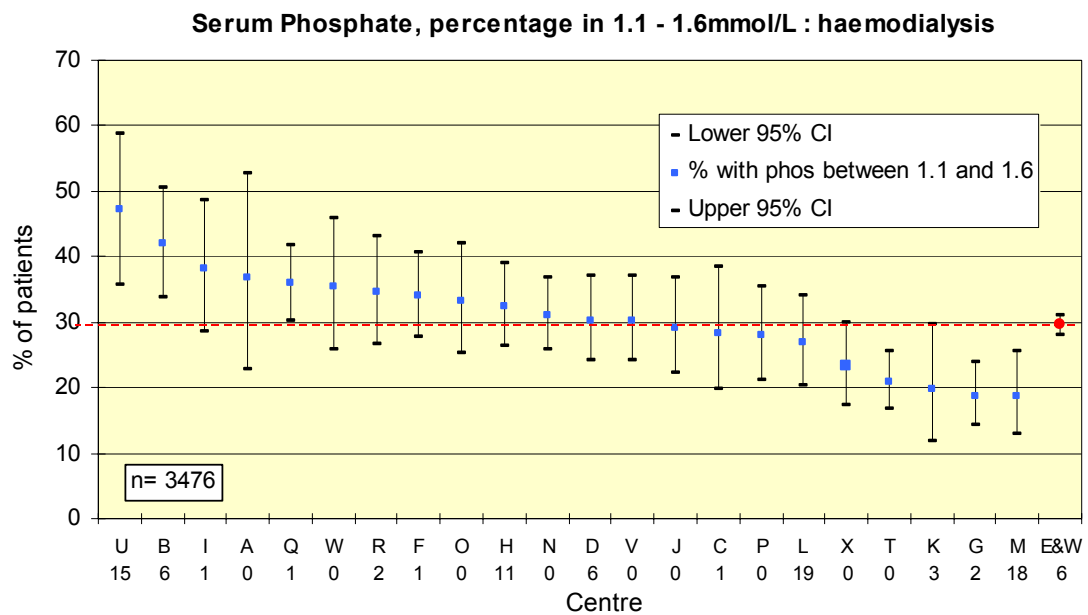
Serum Phosphate

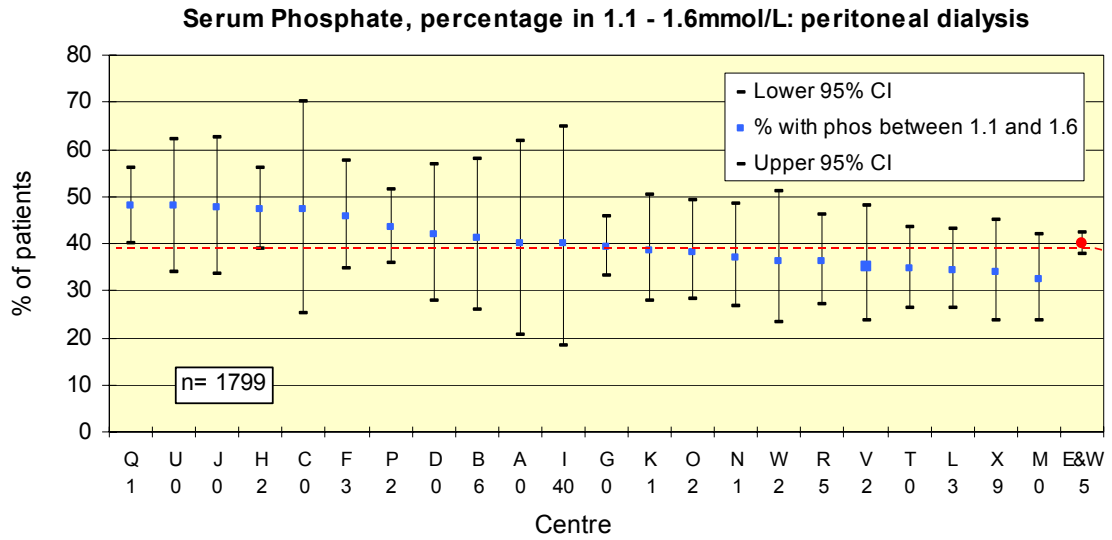Figure 13.11 Percentage serum phosphate in range 1.1-1.6 for haemodialysis

Figure 13.12 Percentage serum phosphate in range 1.1-1.6 for peritoneal dialysis
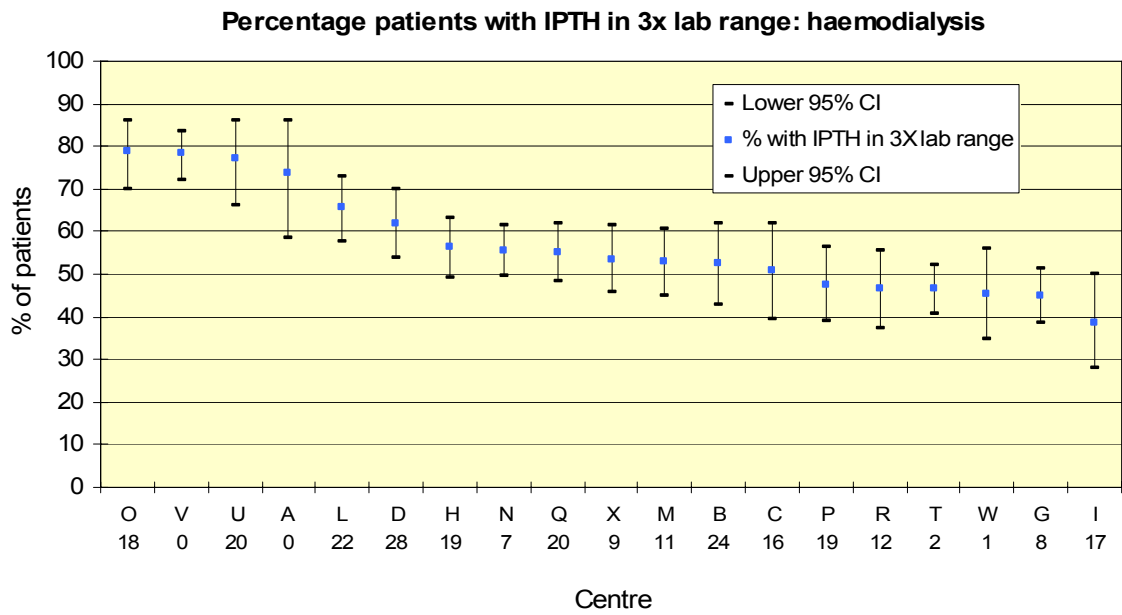
Intact parathyroid hormone

Figure 13.13 Percentage patients with iPTH in 3x lab range on haemodialysis
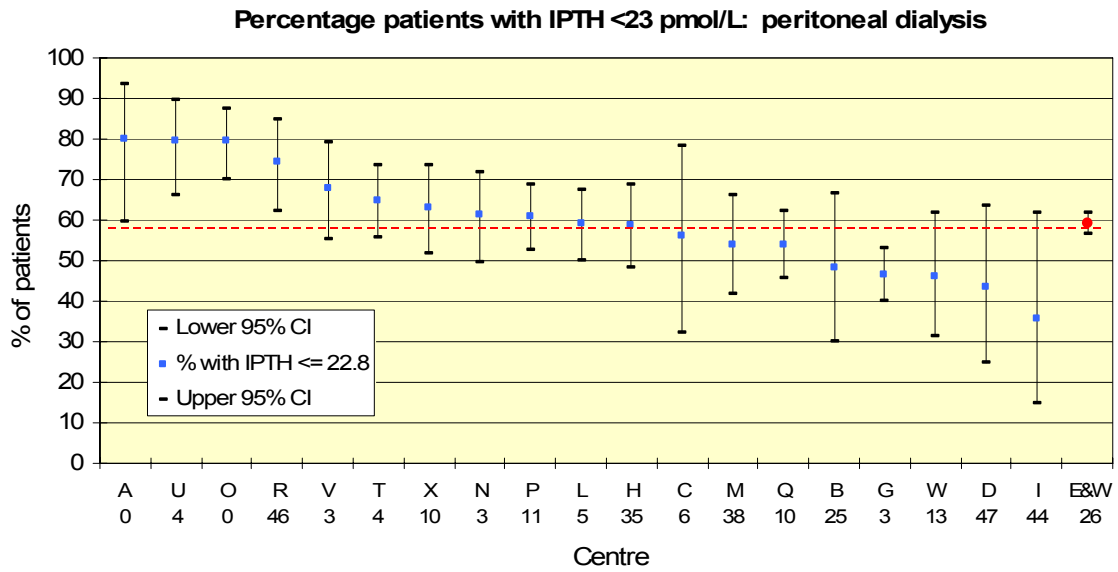
Percentage patients with IPTH <23 pmol/L: peritoneal dialysis

Figure 13.14 Percentage patients with iPTH in 3x lab range on peritoneal dialysis

Blood Pressure

Percentage of patients age < 60 with BP <140/90 : haemodialysis
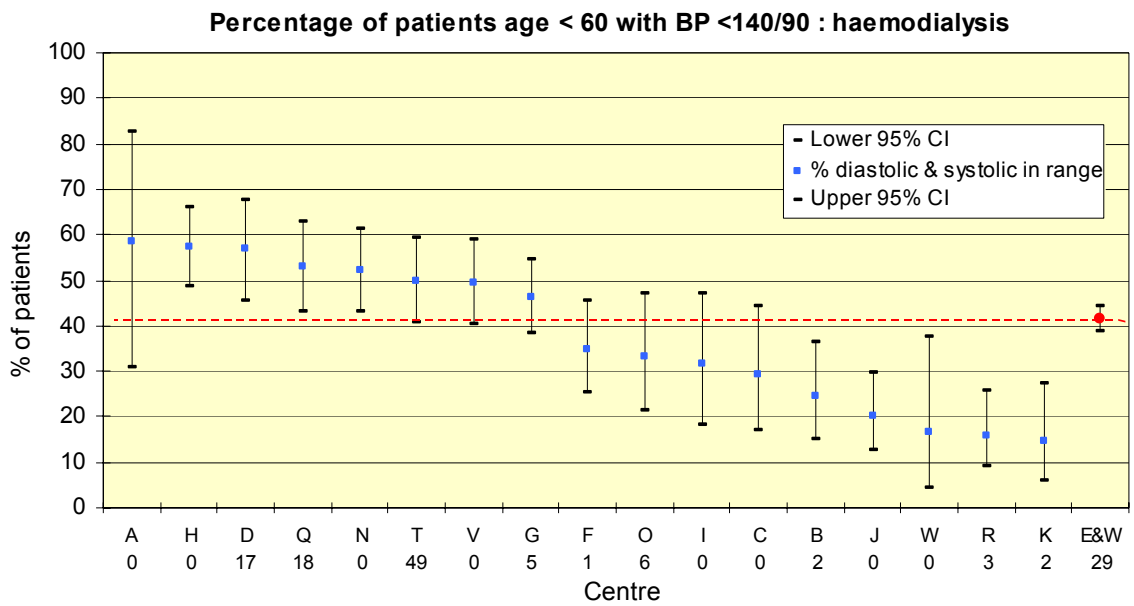
Figure 13.15 Percentage haemodialysis patients age < 60 with BP in RA Standard range

Percentage of patients age ≥ 60 with BP <160/90 : haemodialysis
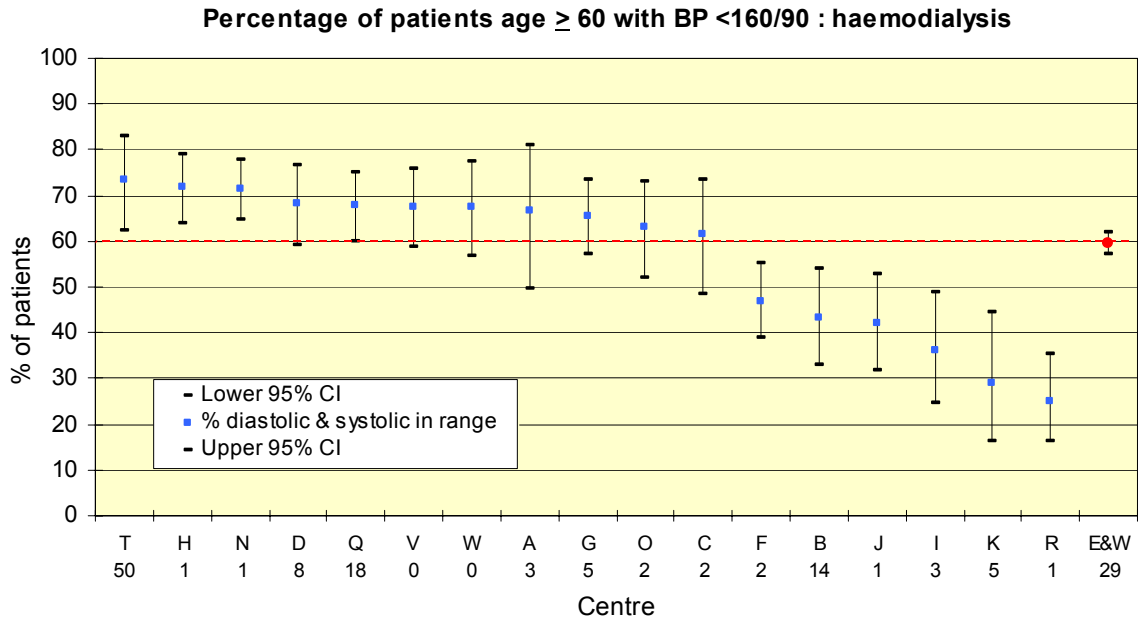
Figure 13.16 Percentage patients age > 60 with BP in RA Standard on haemodialysis

Percentage of patients age < 60 with BP <140/90 : peritoneal dialysis
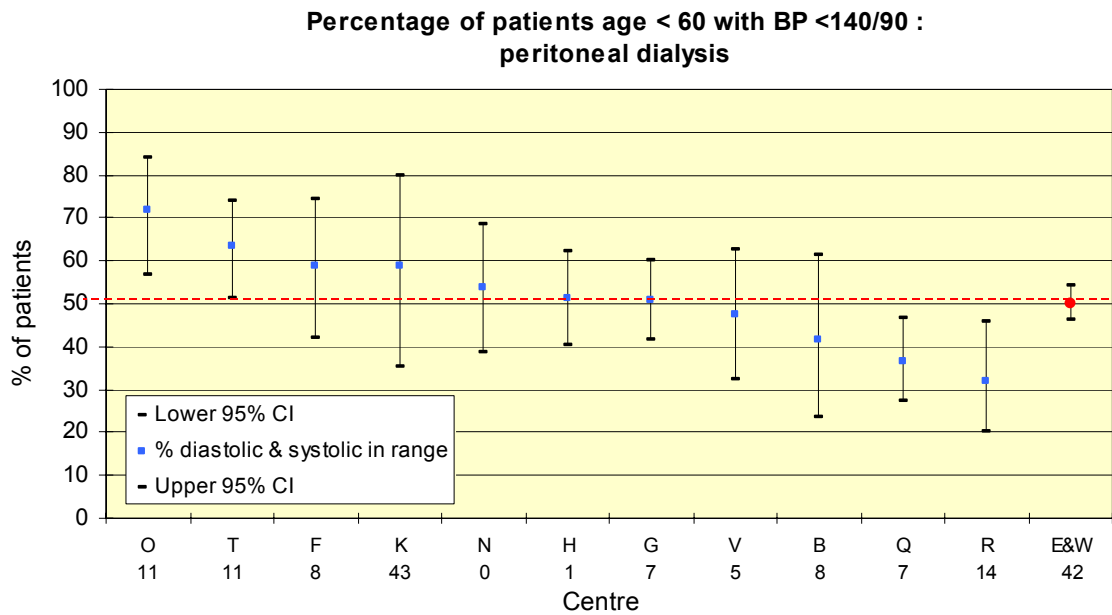
Figure 13.17 Percentage pts age < 60 with BP in RA Standard on peritoneal dialysis

Percentage of patients age ≥ 60 with BP <160/90 : peritoneal dialysis

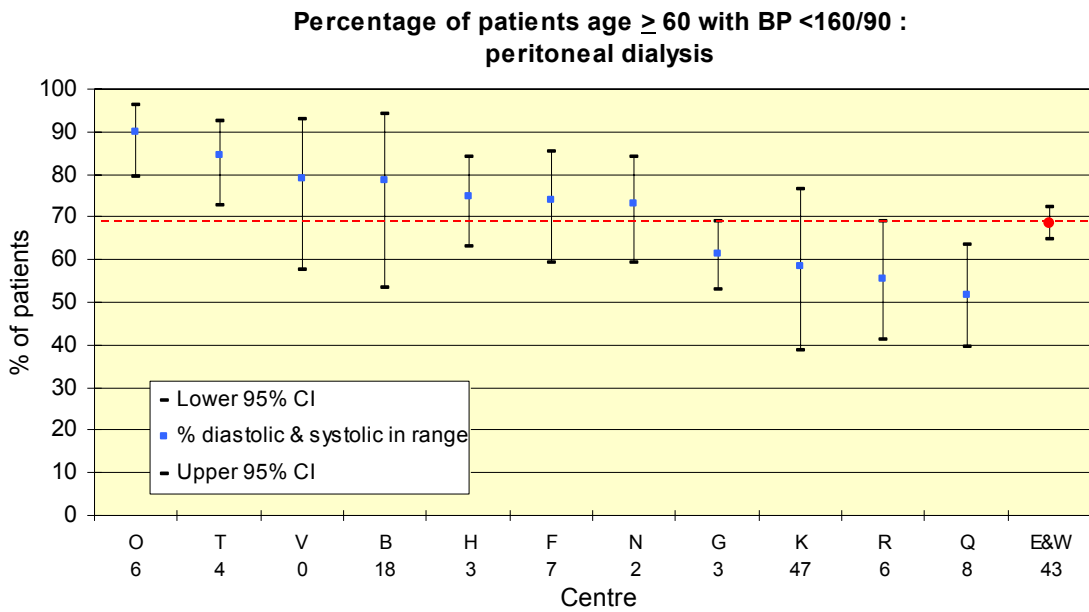**Figure 13.18 Percentage pts age > 60 with BP in RA Standard on peritoneal dialysis**

Dialysis Adequacy
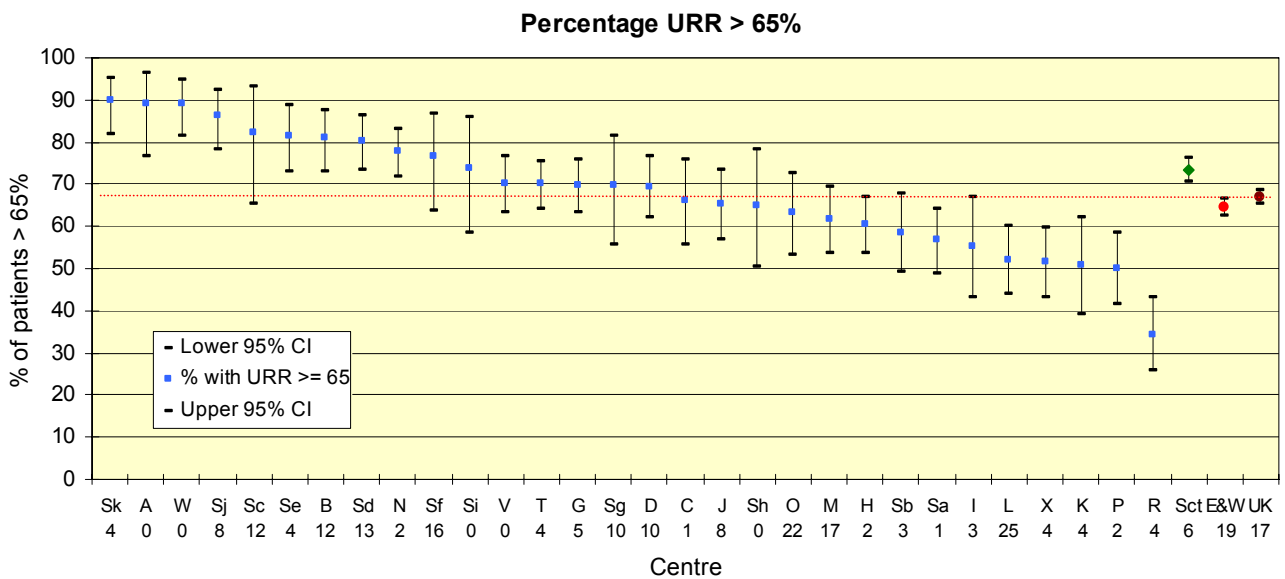

Percentage URR > 65%

Figure 13.19 Percentage URR > 65%

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.

Haemoglobin.

A chi-squared test was used to determine whether the percentage of patients with haemoglobin $\geq$10g/dl differed between centres.

For patients on HD, the percentage of patients with haemoglobin $\geq$10g/dl was found to differ significantly between centres (X^2 = 108.4, d.f. = 21, p<0.001).

For patients on PD, the percentage of patients with haemoglobin $\geq$10g/dl was found to differ significantly between centres (X^2 = 81.9, d.f. = 20, p<0.001).

Ferritin

A chi-squared test was used to determine whether the percentage of patients with ferritin $\geq$100 mcg/L differed between centres.

For patients on HD, the percentage of patients with ferritin $\geq$100 was found to differ significantly between centres (X^2 = 292.2, d.f. = 21, p<0.001).

For patients on PD, the percentage of patients with ferritin $\geq$100 was found to differ significantly between centres (X^2 =81.3, d.f. = 22, p<0.001).

Albumin

A chi-squared test was used to determine whether the percentage of patients with albumin below and greater than or equal to the labs lower reference range limit differed between centres. Note that centres using the BCP method to measure albumin have been included in the analysis since the labs reference range has been used in the analysis.

For patients on HD, the percentage of patients with albumin greater than or equal to the labs lower reference range limit differed significantly between centres (X^2 = 305.9, d.f. = 20, p<0.001).

For patients on PD, the percentage of patients with albumin greater than or equal to the labs lower reference range limit differed significantly between centres (X^2 = 200.4, d.f. = 21, p<0.001).

Bicarbonate

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

For patients on HD, the percentage of patients with bicarbonate within the Standard differed significantly between centres ($X^2 = 305.9$, d.f. = 21, p<0.001).

For patients on PD, the percentage of patients with bicarbonate within the Standard differed significantly between centres ($X^2 = 195.8$, d.f. = 19, p<0.001).

Phosphate

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

For patients on HD, the percentage of patients with phosphate ≤ 1.70 mmol/L differed significantly between centres ($X^2 = 129.8$, d.f. = 21, p<0.001). [Note this does not fit in with text in the Report for phosphate.]

For patients on PD, the percentage of patients with phosphate ≤ 1.60 mmol/L differed significantly between centres ($X^2 = 46.3$, d.f. = 21, p<0.001). [Note this does not fit in with text in the Report for phosphate.]

PTH

A chi-squared test was used to determine whether the percentage of patients with PTH ≤ 22.8 pmol/L differed between centres. Note that the analysis considered lab harmonised PTH.

For patients on HD, the percentage of patients with PTH ≤ 22.8 pmol/L differed significantly between centres ($X^2 = 239.5$, d.f. = 18, p<0.001).

For patients on PD, the percentage of patients with PTH ≤ 22.8 pmol/L differed significantly between centres ($X^2 = 88.8$, d.f. = 18, p<0.001).

URR

A chi-squared test was used to determine whether the percentage of patients with URR $\geq 65\%$ differed between centres. This analysis only included the English and Welsh Units.

The percentage of patients with URR $\geq 65\%$ was found to vary significantly between centres ($X^2 = 242.9$, d.f. = 29, 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 ($X^2 = 135.5$, d.f. = 16, 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 ($X^2 = 105.6$, d.f. = 16, 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 ($X^2 = 37.1$, d.f. = 10, p=0.005).

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 ($X^2 = 28.0$, d.f. = 10, p<0.001).