

# Chapter 12: Some Measures of Care of Renal Transplant Patients

## Summary

- The number of patients waiting on the active transplant list on 31 December 2004 was 5,299 (90 per million population), a 3% rise from 5,156 in 2003. The total number of renal transplants performed in the UK in 2004, was 1,905 which is equivalent to 32 transplants per million population.
- Much of the post renal transplantation follow-up is done in the original referring non-transplant renal unit, starting at varying intervals from the date of original post-transplant discharge up to one or more years later. Interpretation of results by transplant centre is then difficult as this pattern of care transfers much of the responsibility for outcomes on to the referring renal centre.
- Patients from ethnic minorities are listed for transplantation proportionately to their representation on dialysis, but wait significantly longer to receive a transplant.
- There is no significant variation between centres in attained haemoglobin when post transplant eGFR is  $>30$ , but when eGFR is  $<30$  some renal units fail to maintain adequate haemoglobin in many patients.
- The collaboration between the UKRR and UKT is complementary, providing a unique database which will enable better understanding of renal transplant related activity, processes and outcomes. Chapter 5 and the work reported in this chapter are a small beginning in exploring the potential of this collaboration.

## Introduction

This transplant chapter is produced in collaboration with UK Transplant (UKT) to assess key indicators of quality of care and outcome amongst renal transplant recipients and define trends in such variables in the UK. It includes

data from the UK Renal Registry (RR), and from UK Transplant databases. The databases are very different: UKT has detailed data related to the episode of transplantation, tissue matching, etc, the RR has more detailed data on the whole renal patient pathway and sequential variables such as blood pressure, serum creatinine, cholesterol, etc. The collaboration between the RR and UKT is thus complementary, providing a unique database which will enable better understanding of not only renal transplant related activity, but also outcomes post transplantation in the UK. This chapter is a small beginning in exploring the potential of this collaboration.

As in previous years, the number preceding the centre name in the figures indicates the percentage of missing data for that centre.

## Overview

There was no change in the number of transplanting centres in the UK in 2004. There remained 14 centres outside of London performing renal transplantation in England – Birmingham, Bristol, Cambridge, Coventry, Leeds, Leicester, Liverpool, Manchester, Newcastle, Nottingham, Oxford, Plymouth, Portsmouth and Sheffield, with one Welsh centre – Cardiff, although patients from North Wales are transplanted in Liverpool. In London, the eight transplant centres have amalgamated to create five centres: St Helier (Carshalton) with St George's, Guy's Hospital in South Thames, the Middlesex with the Royal Free Hospital (combined in April 2005), Hammersmith with St Mary's (combined in October 2005), and the Royal London Hospital in North Thames. There are transplant centres in Belfast for Northern Ireland, and Edinburgh and Glasgow for Scotland.

There has been no change in the number or constituents of transplant centres in any of the alliances: North Thames (Hammersmith/St Mary's, The Royal London, Royal Free/Middlesex), South Thames (St Helier/St

George's & Guy's Hospital), North of England (Leeds, Liverpool, Manchester & Newcastle), Trent (Leicester, Nottingham, Sheffield), South West & Wales (Bristol, Cardiff, Oxford, Plymouth, Portsmouth) and Scotland (Edinburgh & Glasgow). Belfast, Birmingham, Cambridge and Coventry continue to be separate stand-alone centres independent of any alliance.

Information on number of patients on the waiting list, cadaveric and living kidney donor numbers from 1995–2004 is available from the UKT website ([http://www.uktransplant.org.uk/ukt/statistics/calendar\\_year\\_statistics/kidney/kidney.jsp](http://www.uktransplant.org.uk/ukt/statistics/calendar_year_statistics/kidney/kidney.jsp)).

The proportion of all patients requiring renal replacement therapy provided by transplantation stands at 45% in 2004. During 2004, 2.2% of all prevalent renal transplant grafts failed, the same as last year, and the annual death rate in prevalent patients with renal transplant was 2.2%, or 2.4% if patients with failed grafts returning to dialysis are included.

## The waiting list and number of transplants performed

The number of patients waiting on the active transplant list on 31 December 2004 was 5,299

**Table 12.1: Kidney transplants performed in the UK, 1 January 2003–31 December 2004**

Organ	2003	2004	% change
Heartbeating kidney <sup>1</sup>	1,134	1,211	7
Non-heartbeating kidney	112	147	31
Living donor kidney	451	463	3
Kidney and heart	1	0	–
Kidney and liver	8	15	–
Kidney and pancreas	42	69	64
<b>Total kidney transplants</b>	<b>1,748</b>	<b>1,905</b>	<b>9</b>

<sup>1</sup>Includes en bloc kidney transplants (4 in 2003, 3 in 2004) and double kidney transplants (6 in 2003, 5 in 2004).

– Percentage not reported when fewer than 10 transplants in either year.

(90 per million population), a 3% rise from 5,156 in 2003. The total number of renal transplants performed in the UK in 2004, including those transplanted in combination with other organ transplants, was 1,905 which is equivalent to 32 transplants per million population (Table 12.1).

In 2004 there was no significant change in median age (45.8 years) or gender distribution (M:F 1.72) amongst incident transplant patients in comparison to previous years.

Centre specific renal transplant activity and patients on the active waiting list for 2003 and 2004 are shown in Table 12.2.

**Table 12.2: Cadaveric and living donor kidney transplants in the UK, 1 January 2003–31 December 2004, by transplant centre/alliance**

Centre	2003					2004				
	HB*	NHB**	Living	Total	Waiting list	HB*	NHB**	Living	Total	Waiting list
Belfast	40	0	5	<b>45</b>	204	49	0	9	<b>58</b>	206
Birmingham	91	0	19	<b>110</b>	452	87	0	32	<b>119</b>	457
Bristol	76	12	35	<b>123</b>	230	62	15	27	<b>104</b>	243
Cambridge	46	15	13	<b>74</b>	240	54	21	12	<b>87</b>	233
Cardiff	71	0	13	<b>84</b>	211	70	2	15	<b>87</b>	197
Coventry	5	0	14	<b>19</b>	114	17	0	19	<b>36</b>	91
Edinburgh	46	0	15	<b>61</b>	192	40	0	16	<b>56</b>	234
Glasgow	59	0	25	<b>84</b>	241	54	0	14	<b>68</b>	237
Great Ormond St	11	0	16	<b>27</b>	17	14	0	14	<b>28</b>	25
Leeds	97	12	28	<b>137</b>	340	113	25	31	<b>169</b>	331
Leicester	15	3	28	<b>46</b>	163	31	0	24	<b>55</b>	224
Liverpool	63	0	18	<b>81</b>	215	52	0	20	<b>72</b>	207
Manchester	103	0	29	<b>132</b>	479	125	8	27	<b>160</b>	505
Newcastle	71	17	18	<b>106</b>	166	61	23	16	<b>100</b>	194
<b>North Thames</b>	<b>120</b>	<b>13</b>	<b>53</b>	<b>186</b>	<b>701</b>	<b>134</b>	<b>18</b>	<b>68</b>	<b>220</b>	<b>709</b>
St Mary's	32	4	23	<b>59</b>		30	5	29	<b>64</b>	
Royal Free	21	2	8	<b>31</b>		20	2	14	<b>36</b>	
Middlesex	11	1	1	<b>13</b>		13	3	4	<b>20</b>	
Royal London	39	4	15	<b>58</b>		42	2	18	<b>62</b>	
Hammersmith	17	2	6	<b>25</b>		29	6	3	<b>38</b>	
Nottingham	20	0	14	<b>34</b>	164	31	0	16	<b>47</b>	158
Oxford	50	20	14	<b>84</b>	169	52	9	17	<b>78</b>	186
Plymouth	27	0	13	<b>30</b>	93	36	0	3	<b>39</b>	109
Portsmouth	30	0	13	<b>43</b>	123	44	2	9	<b>55</b>	107
Sheffield	37	0	6	<b>43</b>	262	36	0	5	<b>41</b>	237
<b>South Thames</b>	<b>107</b>	<b>20</b>	<b>70</b>	<b>197</b>	<b>380</b>	<b>133</b>	<b>24</b>	<b>63</b>	<b>220</b>	<b>409</b>
Guy's	63	6	42	<b>111</b>		79	12	50	<b>141</b>	
King's College	2	0	0	<b>2</b>		5	0	0	<b>5</b>	
St George's	42	14	28	<b>84</b>		49	12	13	<b>74</b>	
Private hospitals	0	0	2	<b>2</b>		0	0	6	<b>6</b>	
<b>TOTAL</b>	<b>1,185</b>	<b>112</b>	<b>461</b>	<b>1,748</b>	<b>5,156</b>	<b>1,295</b>	<b>147</b>	<b>463</b>	<b>1,905</b>	<b>5,299</b>

\*Heart beating.

\*\*Non-heart beating.

## Patient and graft survival

Data on patient and graft survival in each transplant centre of cadaveric first kidney transplants performed 1999–2003 were provided by UKT (Table 12.3).

## Ethnicity and transplantation

The RR routinely collects ethnicity data for RRT patients from contributing centres, however ethnicity reporting continues to be poor. The proportions of the various ethnic groups

amongst prevalent dialysis patients and transplant patients were compared with the proportions on the renal transplant waiting list in Table 12.4. These results suggest that patients from ethnic minorities are listed for transplantation proportionately to their representation on dialysis, but wait significantly longer to receive a transplant. There is further information on this and the role of social deprivation in Chapter 5.

UKT figures show that donors from ethnic minorities comprise 3.4% of all deceased donors in 2004, a lower figure than the

**Table 12.3: One-year transplant and patient survival for cadaveric<sup>1</sup> donor first kidney transplants in adult patients, 1 January 1999–31 December 2003**

Kidney transplant centre	No of transplants	Risk-adjusted patient survival		Risk-adjusted transplant survival	
		Survival estimate (%)	95% CI	Survival estimate (%)	95% CI
Addenbrooke's Hospital, Cambridge	213	96	81–100	89	75–100
Belfast City Hospital, Belfast	149	97	81–100	87	72–100
Churchill Hospital, Oxford	254	93	81–100	89	78–100
Derriford Hospital, Plymouth	137	92	75–100	82	67–99
Freeman Hospital, Newcastle	349	94	83–100	86	76–97
Guy's Hospital, London	300	96	84–100	91	79–100
Hammersmith Hospital, London	111	93	74–100	89	71–100
Leicester General Hospital, Leicester	142	93	75–100	85	69–100
Manchester Royal Infirmary, Manchester	403	96	86–100	90	80–100
Northern General Hospital, Sheffield	138	97	80–100	89	73–100
Nottingham City Hospital, Nottingham	99	93	73–100	83	65–100
Queen Alexandra Hospital, Portsmouth	141	96	80–100	88	73–100
Queen Elizabeth Hospital, Birmingham	346	95	83–100	86	75–98
Royal Infirmary of Edinburgh, Edinburgh <sup>2</sup>	205	97	83–100	89	76–100
Royal Liverpool University, Liverpool	218	96	81–100	86	73–100
Southmead Hospital, Bristol	212	94	81–100	91	78–100
St George's Hospital, London <sup>3</sup>	262	96	84–100	92	81–100
St James's University Hospital, Leeds	329	95	84–100	85	75–96
St Mary's Hospital, London	126	98	80–100	94	77–100
The Royal Free Hospital, London <sup>4</sup>	69	92	67–100	88	65–100
The Royal London Hospital, London	192	95	80–100	88	74–100
University Hospital of Wales, Cardiff	236	97	83–100	91	78–100
Walsgrave Hospital, Coventry	77	96	73–100	91	69–100
Western Infirmary, Glasgow	224	94	81–100	85	73–99

<sup>1</sup>Heartbeating and non-heartbeating donor transplants included.

<sup>2</sup>Includes transplants carried out by Dundee and Aberdeen at a time before Edinburgh took over all their transplant activity from November 1999 and December 2003, respectively.

<sup>3</sup>Includes transplants carried out by Brighton and Carshalton at a time before St George's took over all their transplant activity from July 1996 and November 2003, respectively.

<sup>4</sup>As of April 2005, all kidney transplant activity ceased at Middlesex following gradual handover to the Royal Free from 2003. Data for the Middlesex are not presented.

**Table 12.4: Ethnic distribution of prevalent patients and the transplant waiting list\*, and median waiting times to transplant for patients registered on the waiting list\*\***

Ethnicity	Dialysis patients %	Transplant patients %	% waiting for transplant	N waiting for transplant	Median waiting time (days)*	95% CI
White	82	88	84	4,628	719	680–758
Asian	9	6	10	571	1,368	1,131–1,605
Black	5	3	5	255	1,419	1,165–1,673
Other	4	3	1	83	1,043	689–1,397
<b>Total</b>				<b>5,537</b>	<b>798</b>	<b>761–835</b>
Not reported				107		

\*31.12.2004.

\*\*Those registered 1998–2000.

proportion of ethnic minorities in the general population of England and Wales (12.5%). However UKT have also surveyed deaths on intensive care units and there appears to be a smaller representation of ethnic minorities dying on intensive care units (6.3%), and therefore fewer are able to become donors. The reason for the low representation on intensive care units needs to be investigated. New organ allocation rules, which come into effect from April 2006, have been devised to some extent with a view to improving access to transplantation for ethnic minorities and decreasing their waiting time on the transplant list.

the 49 renal centres in England and Wales contributing to the RR in 2004, 17 of which perform renal transplantation; demographic data are available from Scotland. During 2004, 1,265 (66%) of the 1,905 renal transplants were performed or followed up in renal units contributing data to the Registry. Several large transplant centres did not contribute data for 2004, including Manchester Royal Infirmary, St Mary's Hospital, and St George's Hospital. It is anticipated that the Registry will have full participation of all units within 2 years.

### Post transplant follow up

From the renal registry information it is apparent that where transplant units transplant for other renal units, much of the post renal transplantation follow up is being done in the original referring non-transplant renal unit, starting at varying intervals from the date of original post-transplant discharge up to one or more years later. Interpretation of results by transplant centre is then difficult as this pattern of care transfers much of the responsibility for outcomes on to the referring renal centre.

### Established transplant function

Transplant function of prevalent patients continues to be assessed by the most recent serum creatinine available within the last six months of 2004 and by estimated GFR using the abbreviated MDRD equation. The median eGFR of prevalent patients is shown in Figure 12.1. This type of analysis may well be influenced by follow-up patterns, and interpretation is difficult. It is noticeable that the centres with the highest median eGFRs are largely the transplant centres. It is probable that patients with failing grafts are sent back to the referring renal units for preparation for dialysis.

### Post transplant variables

Data on demographic and post-transplant clinical variables are available for analysis from

The percentages of prevalent transplant patients with eGFR >60 ml/min and >30 ml/min being followed up in each centre are represented in Figures 12.2 and 12.3.

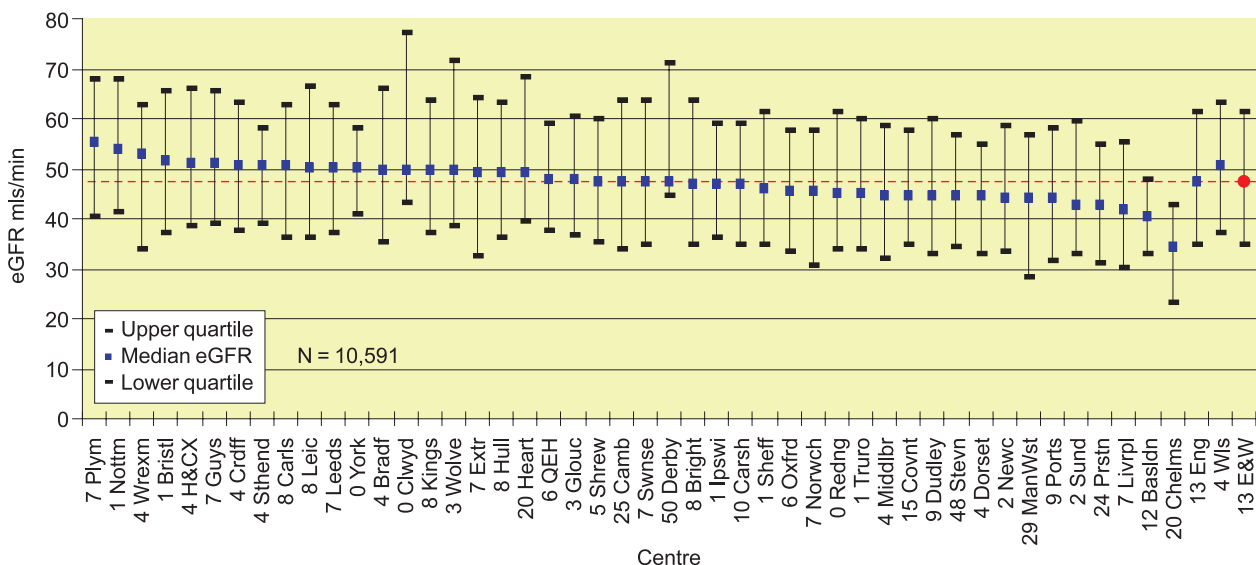


Figure 12.1: Median eGFR of prevalent transplant patients by centre

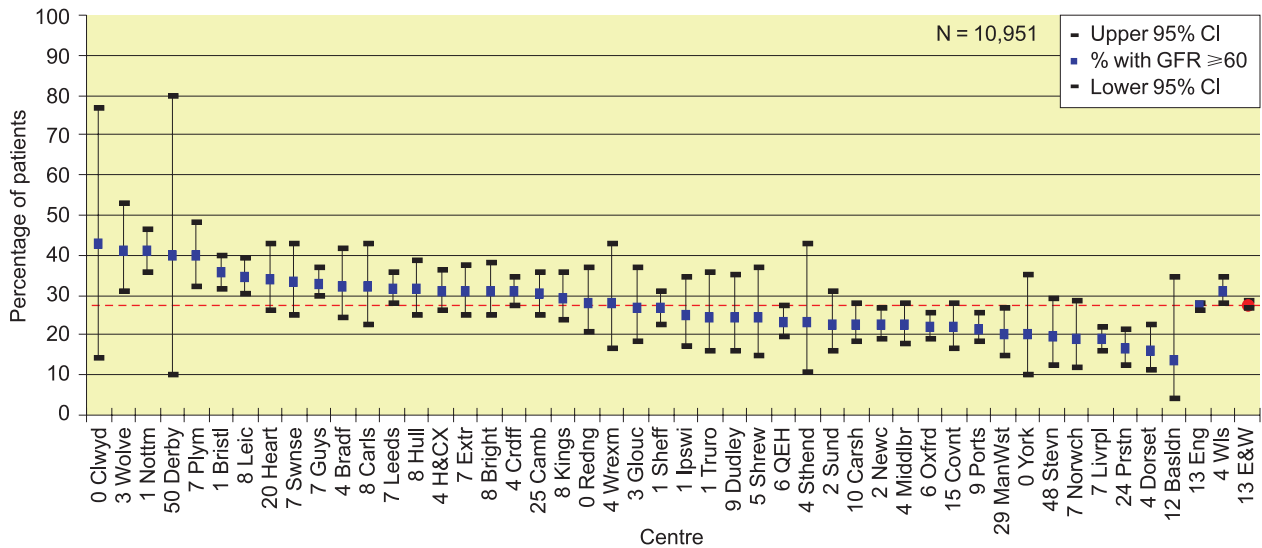


Figure 12.2: Percentage of transplant patients with eGFR  $\geq$  60 mls/min

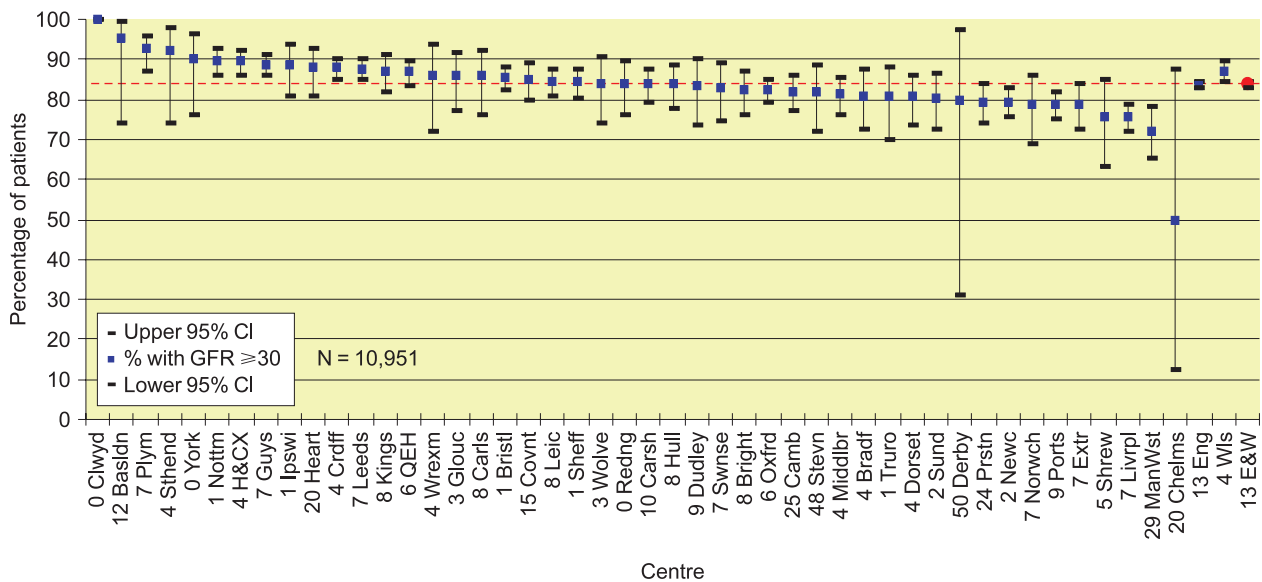


Figure 12.3: Percentage of transplant patients with eGFR  $\geq$  30 mls/min

### Haemoglobin in transplanted patients

Haemoglobin values within the last quarter of 2004 for prevalent transplant patients at the end of 2004 who had been transplanted at least 6 months earlier were available for analysis. Percentage completeness of returns from renal units varied from 67–100%. Time post transplantation, duration and intensity of anti-proliferative anti-rejection therapy use and EPO usage are key variables that affect post-transplantation Hb. It is probably because of the interplay of these factors that there is no relationship between median transplant eGFR in a centre and median Hb (Figure 12.4).

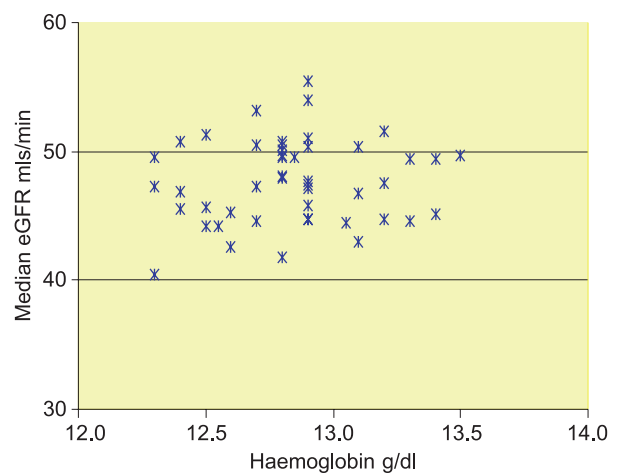


Figure 12.4: Median eGFR and median haemoglobin in transplant patients by centre



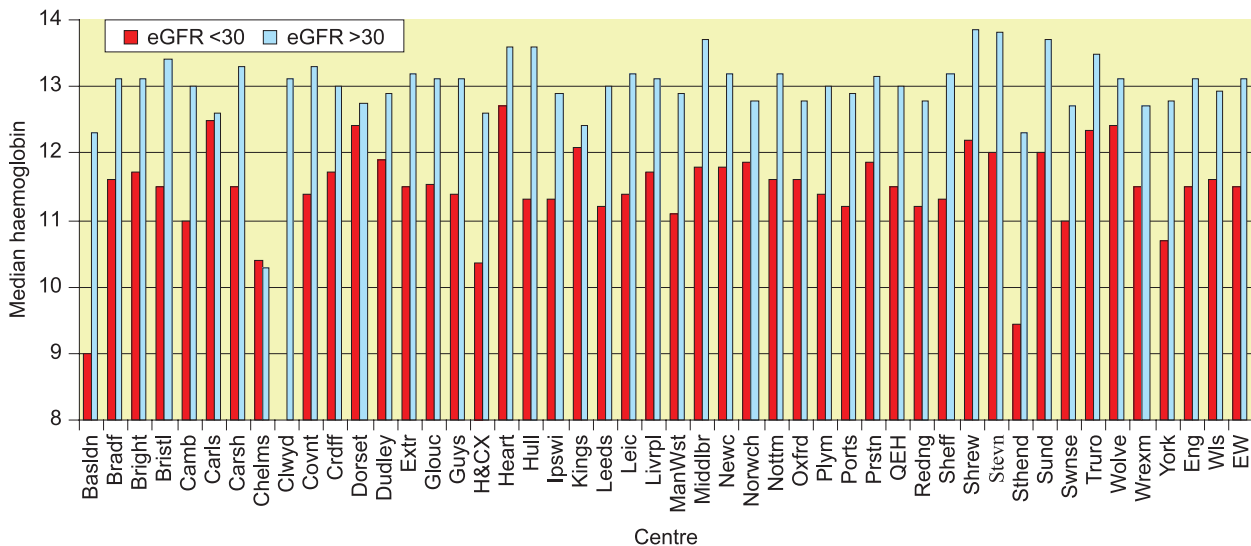


Figure 12.5: Median haemoglobin >6 months after transplant by eGFR

However, although as shown in Figure 12.5 there is no significant variation in Hb between centres when post transplant eGFR is >30, there is some discrepancy in Hb levels when eGFR is <30, with some renal units failing to maintain adequate levels.

However, cardiovascular risk for transplant and dialysis patients is high and therefore an inference is made that elevated serum cholesterol is an additional risk factor for cardiovascular disease in kidney transplant patients. Again there is lack of consensus as to whether total cholesterol or total cholesterol/HDL cholesterol ratio are measured to define cardiovascular risk in these patients.

### Serum cholesterol

This analysis of serum cholesterol includes transplant patients whose kidney allograft has been functioning for at least one year. There are no national or international accepted guidelines for a minimum recommended cholesterol level in prevalent renal transplant patients.

Returns on serum cholesterol continue to improve with 72% of patients from contributing centres having data compared to 67.6% in 2003. The median cholesterol value amongst prevalent transplant patients >1yr post transplant is depicted in Figure 12.6.

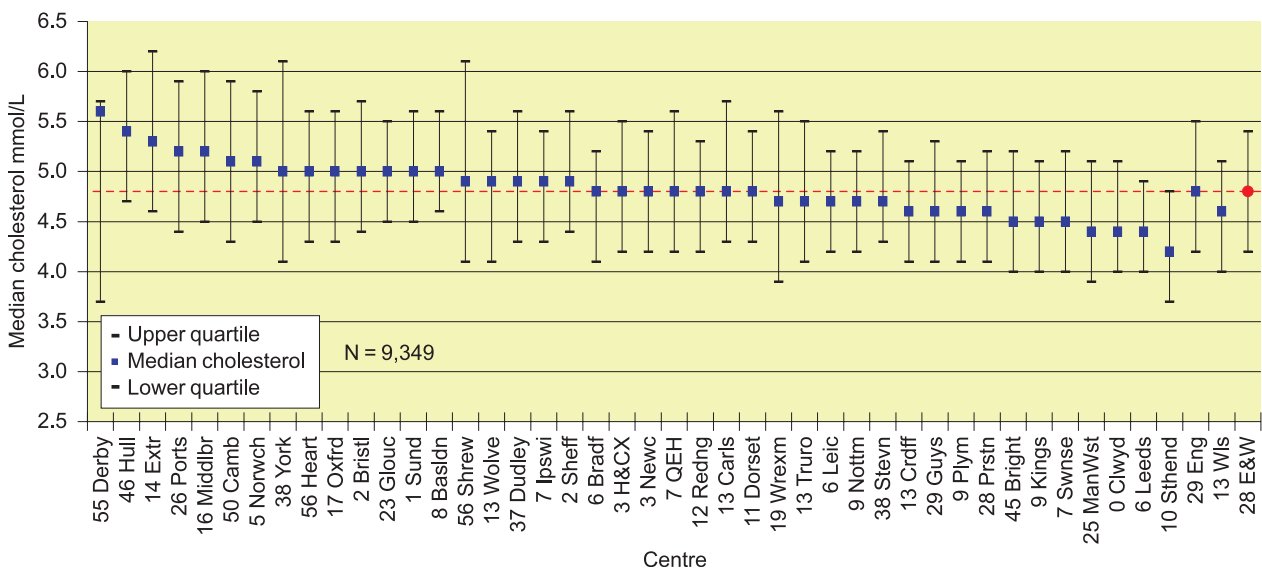


Figure 12.6: Median serum cholesterol: established transplant patients

## **Conclusion**

As indicated in the introduction to this chapter the collaboration between the UKRR and UKT is complementary, providing a unique database

which will enable better understanding of renal transplant related activity, processes and outcomes. Chapter 5 and the work reported in this chapter are a small beginning in exploring the potential of this collaboration.