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# UK Renal Registry 14th Annual Report: Appendix E Methodology for Estimating Catchment Populations of Renal Centres in England for Dialysis Patients

## Introduction

Providing accurate centre-level incidence and prevalence rates for patients receiving renal replacement therapy (RRT) in the UK was limited until the 13th Annual Report by the difficulty in estimating the catchment population from which the RRT population is derived. One reason for this is that the geographical boundaries separating renal centres are relatively arbitrary and dependent upon a number of factors including referral practice, patient choice and patient movement. Previously incidence and prevalence rates had been calculated at Local Authority/Primary Care Trust/Health Board level where denominator data were available, but not at renal centre level.

UK Renal Registry (UKRR) Annual Reports prior to the 13th suggested an estimate of the size of the catchment populations. These were extrapolated figures originally derived from data in the 1992 National Renal Survey undertaken by Paul Roderick.

The purpose of this document is to present an estimate of the dialysis catchment population for all renal centres in England. The document also contains a methodological description and discussion of the limitations of this estimate. These catchment population estimates were used in the 13th Annual Report (chapter 1: UK RRT Incidence in 2009: national and centre-specific analyses) to calculate RRT incidence rates by renal centre, rather than only by Primary Care Trust/HB. From the 14th Annual Report both incidence and

prevalence rates are given by renal centre as well as by Primary Care Trust/HB.

## Methods

The UK Renal Registry database of the prevalent dialysis population on 31st December 2007 was used to estimate the size of each renal centre's catchment population. This used the postcode and dialysis centre for each individual dialysis patient.

An area was drawn around the geographical location of each dialysis patient, producing an overlapping polygonal area. The shape and size of this area was based upon the location of other dialysis patients surrounding them. Using these areas for individual patients, the total catchment area for each renal centre was merged and the Office for National Statistics (ONS) census-area statistics (CAS) wards overlaid upon the renal centre catchment area. Each CAS-ward was then assigned to the corresponding renal centre. If more than one renal centre catchment area corresponded to a CAS-ward, then only a percentage of the ward was assigned to each centre, proportionate to the area covered.

The ONS publishes the number of people living in each ward, based upon the April 2001 Census. This information is available on the ONS website. We used this information to calculate the number of people living in the census ward allocated to each renal centre. If only a

proportion of a ward was allocated to a centre, we attributed the same proportion of the population to that centre's denominator.

The ONS annually estimates the increase in the UK population at national and Local Authority level. When the work detailed here was being done the latest update available was to June 2008. The ONS also updates the population estimates at CAS-ward level. The latest update available at CAS-ward level was to June 2007. This information was not available on the ONS website but was provided by direct communication and permission granted to use for this analysis. It was necessary to use the ONS data at the CAS-ward level, therefore the June 2007 data were used for the latest UKRR analysis.

The allocation of catchment ward to renal centre was only undertaken for England and therefore estimated catchment populations for renal centres in Scotland, Wales and Northern Ireland have not been calculated.

This allocation exercise was performed before Colchester became a separate renal centre.

## Results

The estimated dialysis catchment populations for renal centres in England are shown in Table E.1. The table shows both calculations: first from the ONS Census from April 2001 and second from the updated ONS estimates of CAS-ward populations at June 2007.

## Discussion

These results show the updated estimates for the size of the catchment areas for each of the renal centres in England. This analysis was the first time that the UK Renal Registry has been able to accurately estimate the catchment population for each English centre.

There are some limitations to these results. The first is that the ward allocated to each renal centre was based upon dialysis patients only. Therefore it is possible that

**Table E.1.** Estimated dialysis catchment populations of English renal centres based upon firstly 2001 and secondly mid-2007 ONS CAS-ward population estimates (rounded to nearest 1,000)

Centre	2001 estimate	Mid-2007 estimate	Centre	2001 estimate	Mid-2007 estimate
B Heart	704,000	725,000	Leeds	1,574,000	1,647,000
B QEH	1,585,000	1,624,000	Leic	2,180,000	2,318,000
Basldn	396,000	408,000	Liv Ain	295,000	290,000
Bradfd	546,000	579,000	Liv RI	1,198,000	1,199,000
Brightn	1,161,000	1,195,000	M Hope	1,403,000	1,420,000
Bristol	1,472,000	1,571,000	M RI	1,398,000	1,469,000
Camb*	1,181,000	1,266,000	Middlbr	981,000	1,012,000
Carlis	307,000	314,000	Newc	1,086,000	1,106,000
Carsh	1,852,000	1,916,000	Norwch	755,000	793,000
Chelms*	445,000	466,000	Nottm	1,091,000	1,138,000
Covnt	839,000	870,000	Oxford	1,598,000	1,680,000
Derby	611,000	647,000	Plymth	456,000	476,000
Donc**	210,000	214,000	Ports	1,926,000	2,003,000
Dorset	710,000	725,000	Prestn	1,475,000	1,512,000
Dudley	411,000	415,000	Redng	782,000	805,000
Exeter	969,000	1,028,000	Sheff*	1,451,000	1,489,000
Glouc	558,000	575,000	Shrew	382,000	391,000
Hull	945,000	987,000	Stevng	1,047,000	1,088,000
Ipswi*	523,000	562,000	Sthend	309,000	316,000
Kent	1,112,000	1,163,000	Stoke	880,000	897,000
L Barts	1,608,000	1,680,000	Sund	585,000	589,000
L Guys	1,102,000	1,154,000	Truro	390,000	412,000
L Kings	932,000	970,000	Wirral	520,000	521,000
L Rfree	1,412,000	1,504,000	Wolve	606,000	606,000
L St G	553,000	585,000	York	478,000	505,000
L West	2,113,000	2,227,000	<b>England</b>	<b>49,104,000</b>	<b>51,050,000</b>

\* some reduction required after the opening of Colchester renal centre and the expansion of Doncaster

\*\* population may be too low as centre has expanded

non-dialysis patients may come from a different catchment population. This is more likely where a renal centre provides specialist services and especially likely for patients undergoing renal transplantation. The catchment population for renal transplant patients will depend largely upon the distribution of workload between the referral centre and the transplanting centre for pre-transplant work-up, donor nephrectomy work-up and post-transplant care (including if and when care is returned to the referring centre).

These estimates were performed before Colchester became a separate renal centre. Therefore it is likely that the catchment populations of the neighbouring renal centres; Chelmsford, Ipswich, Cambridge, are somewhat too high. It is thought that the catchment population of Colchester may be in the region of 200,000 people.

Despite these limitations, this is the most valid methodology to date to estimate the size of the catchment populations for renal centres in England.

The results of this analysis allow the UKRR to calculate estimates of the incidence and prevalence rates of renal replacement therapy at renal centre level, rather than only at PCT/HB level.

These results also provide other opportunities for study of the catchment populations. The ONS provides data on gender, age and ethnicity of the population at ward level. It should be possible to use this information to consider centre differences in the demographics of patients commencing or receiving RRT with adjustment for the catchment population characteristics.

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