Chapter 7
Survival and causes of death of UK adult patients on Renal Replacement Therapy in 2007: national and centre-specific analyses

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Key Words
Cause of death · Comorbidity · Dialysis · ESRD · ESRF · Haemodialysis · Outcome · Peritoneal dialysis · Renal Replacement Therapy · Survival · Transplant · Vintage

Abstract
Introduction: These analyses examine survival from the start of renal replacement therapy (RRT), based on the total incident UK dialysis population reported to the Registry, including the 21% who started on PD and the 5% who received a pre-emptive transplant. Survival of prevalent patients and changes in survival between 1997–2006 are reported. The article includes a discussion on the technical definition for the date of start of both PD and HD. ***Methods:*** Survival was calculated for both incident and prevalent patients on RRT and compared between the UK countries after adjustment for age. Survival of incident patients (starting during 2006) was calculated with and without a 90 day RRT start cut off. Survival of incident patients is shown with and without censoring at transplantation. Both the Kaplan–Meier and Cox adjusted models were used to calculate survival. Causes of death were analysed for both groups. Relative risk of death was calculated compared with the general UK population. ***Results:*** The 2006 unadjusted 1 year after 90 day survival for patients starting RRT was 86%. In incident 18–64 year olds the unadjusted 1 year survival had risen from 85.9% in 1997 to 91.5% in 2006 and for those aged $\geqslant$65 it had risen from 63.8% to 72.9%. The age adjusted survival of prevalent dialysis patients rose from 85% in 2000 to 89% in 2007. Diabetic patient survival rose from 76.6% in 2000 to 84.0% in 2007. The relative risk of death on RRT compared with the general population was 30 at age 30 years compared with 3 at age 80 years. In the prevalent RRT dialysis population, cardiovascular disease accounted for 34% of deaths, infection 20% and treatment withdrawal 14%. ***Conclusions:*** Incident and prevalent patient survival on RRT in all the UK countries for all age ranges and also for patients with diabetes continued to improve. The relative risk of death on RRT compared with the general population has fallen since 2001. Death rates on dialysis in the UK

remained lower than when compared with a similar aged population on dialysis in the USA.

This year some analyses on causes of death are included within this chapter.

Introduction

The analyses presented in this chapter examine survival both from the start of renal replacement therapy (RRT) and of prevalent patients. They encompass the outcomes from the total incident UK dialysis population reported to the UK Renal Registry (UKRR), including the 21% who started on peritoneal dialysis and also the 5% who received a pre-emptive transplant. These results therefore show a true reflection of the whole UK RRT population. Additionally, 1st year UK survival data included patients who had died within the first 90 days of starting RRT, a period excluded from most other countries' registry data.

The term Established Renal Failure (ERF) used throughout this chapter is synonymous with the terms of End Stage Renal Failure (ESRF) and End Stage Renal Disease (ESRD) which are in more widespread international usage. Within the UK, patient groups have disliked the term 'End Stage' which formerly reflected the inevitable outcome of this disease.

In the UKRR 2006 Report, with the agreement of all UK clinical directors, centre anonymity for survival analyses was removed. It is again stressed that these are raw data which require very cautious interpretation. The UKRR can adjust for the effects of the different age distributions of patients in different centres, but lacks sufficient data from many participating centres to enable adjustment for comorbidity and ethnic origin, which have been shown to have a major impact on outcome (e.g. better survival is expected in centres with a higher proportion of Black and South Asian patients). With this lack of information on case mix, it is difficult to interpret any apparent difference in survival between centres. Using data only from those centres with greater than 85% complete data returns on comorbidity, an analysis has been undertaken to highlight the impact of changes in estimates of survival rates by centre after adjusting for age, primary renal diagnosis and comorbidity. It is hoped this will encourage all centres to allocate the resources to return the comorbidity data.

Despite the uncertainty about any apparent differences in outcome for centres which appear to be outliers, the UKRR will follow the clinical governance procedures as set out in chapter 2.

Methods

The unadjusted survival probabilities (with 95% confidence intervals) were calculated using the Kaplan–Meier method, in which the probability of surviving more than a given time can be estimated for members of a cohort of patients, without accounting for the characteristics of the members of that cohort. Where centres are small, or the survival probabilities are greater than 90%, the confidence intervals are only approximate.

In order to estimate the difference in survival of different subgroups of patients within the cohort, a stratified proportional hazards model (Cox) was used where appropriate. The results from the Cox model were interpreted using a hazard ratio. When comparing two groups, the hazard ratio is the ratio of the estimated hazards for group A relative to group B, where the hazard is the risk of dying at time t given that the individual has survived until this time. The underlying assumption of a proportional hazards model is that this ratio remains constant throughout the period under consideration. Whenever used, the proportional hazards model was tested for validity.

To allow comparisons between centres with differing age distributions, survival analyses were statistically adjusted for age and reported as survival adjusted to age 60. This age was chosen because it was approximately the average age of patients starting RRT 10 years ago at the start of the Registry's data collection. The average age of patients commencing RRT in the UK in 2006 was approximately 65 years, but the Registry has maintained age adjustment to 60 years for comparability with previous years' analyses. All analyses were undertaken using SAS v 9.1.3.

Definition of the date renal replacement therapy started

The incident survival figures quoted in this chapter are from the first day of renal replacement therapy. When a patient starts RRT with a pre-emptive transplant there is an easily definable date. Ongoing UKRR analyses of electronic data extracted for the immediate month prior to the start date of RRT provided by the clinician have highlighted inconsistencies in the definition of this first date when patients start either on haemodialysis or peritoneal dialysis. This concern will not be unique to the UK but will be common to analyses from all renal registries and to any comparison between published studies reported from different centres.

The variability in the date decided as the start of PD is attributable to the lack of an agreed national or international definition. Clinical staff may use the date the PD catheter was inserted, the date of the first dialysis exchange, the date training started or the date of discharge home on daily PD. This variability between centres may lead to a small lead time survival bias, but is a critical date when analysing the influence of biochemical variables in the period prior to starting PD on longer term outcomes.

The UK Renal Association PD Working Group has now agreed a preliminary clinical definition:

The date of start of peritoneal dialysis is defined as the date of first PD fluid exchange given with the intention of causing solute or fluid clearance

This contrasts with an exchange solely for confirming or maintaining catheter patency. In general, exchanges which are part of PD training should be considered as the start of PD. However, if it is not planned that the patient starts therapy at that time, several exchanges as part of training need not necessarily be considered the start of dialysis.

A similar problem has also been highlighted with the biochemistry data of patients starting haemodialysis. Investigation of patient level data from renal clinical IT systems has shown that some patients have had several episodes of haemodialysis (sometimes even a week or more apart) in the weeks prior to that defined in the IT system as the start date of RRT. This may only have been for fluid overload, but has resulted in significant sustained improvements in the patients' biochemistry.

In addition to this varying clinical definition of day 0, there is international variability on when patient data are collected by national registries, with some countries (often for financial reimbursement reasons) defining the 90th day after starting RRT as day 0 or others collecting data only on those who have survived 90 days and reporting as zero the number of patients dying within the first 90 days. In the UK all patients starting RRT are included from the date of the first RRT treatment (a date currently defined by the clinician) unless they recover renal function within 90 days. However, this has relied on clinicians retrospectively assigning the date of first RRT in patients who present acutely but do not recover, and it has become clear that this is not a uniform practice, with other clinicians recording the date on which the patient first started outpatient dialysis, or the date on which it was decided to plan for long-term RRT. The UK data therefore include some patients who develop acute irreversible renal failure in the context of an acute illness for instance and were recorded by the clinician as being in irreversible established renal failure. However, other such patients may not be managed by nephrologists or may be categorised as 'acute renal failure' on the timeline screen which the extraction software uses to flag a patient's data for extraction and submission to the UKRR. These variations have highlighted the need for clearer instructions to UK nephrologists on how to classify such patients.

Due to this variability between countries, in many instances in this chapter survival from day 90 onwards is also reported as this allows comparison with many other registries, including the US, which mainly record data from day 90 onwards. Although the USRDS 2008 data is now reporting on survival data from day 0, their initial reporting of a lower rate of death which then increases throughout the first 90 day period probably indicates the variable reporting of patients who do not survive this period. This distinction is important, as there is a much higher death rate in the first 90 days which would distort any international comparisons.

Methodology for incident patient survival

The incident survival cohort was **NOT** censored at the time of transplantation and therefore included the 5% who received a pre-emptive transplant. Censoring excluded the healthier patient cohort. An additional reason for not censoring was to facilitate comparison between centres. Centres with a high proportion of patients of South Asian origin are likely to have a healthier dialysis population, because South Asian patients are less likely to undergo early transplantation.

The take-on population in any specific year included patients who recovered from established renal failure (ERF) after 90 days from the start of RRT, but excluded those that recovered within 90 days. Patients newly transferred into a centre who were already on RRT were excluded from the take-on population for that centre and were counted at the centre on which they started RRT. Patients restarting dialysis after a failed transplant were also excluded (unless they started RRT in that current year).

For patients who recovered renal function for >90 days and then went back into ERF, the length of time on RRT was calculated from the day on which the patient restarted RRT. If recovery was for less than 90 days, the start of renal replacement therapy was calculated from the date of the first episode and the recovery period ignored.

The one year incident survival for patients in 2006 was calculated for those who had all been followed for 1 full year through 2006 and 2007 (e.g. patients starting RRT on 1st December 2006 were followed through to 30th November 2007). The 2007 incident patients were excluded from this year's incident survival analysis as they had not been followed for a sufficient length of time.

For analysis of 1 year after 90 day survival, patients who started RRT in October through December 2006, were not included in the cohort, as 1st quarter 2008 data on these patients were not yet available.

It is important to note that in the 1 year after 90 day survival analyses in the 2005 UKRR Report and all reports prior to 2005, the previous year's patient cohort was used to calculate the 1 year after 90 day survival (e.g. this year the alternative would have been to use the 2005 rather than 2006 cohort) starting in October. A comparison of these two methods has shown no difference between them for any but the smallest centres (which will have wide 95% confidence intervals), so for simplicity of understanding the cohort and using a common cohort across analyses, the UKRR will now use the previous year's data (2006 cohort).

To help identify any centre differences in survival from the small centres (where confidence intervals are large), an analysis of 1 year after 90 day survival using a rolling 4 year combined incident cohort from 2003 to 2006 was also undertaken. For those centres which had joined the UKRR in the previous 1–3 years, the available data were included.

The death rate per 100 patient years was calculated by counting the number of deaths and dividing by the person years exposed. This included all patients, including those who died within the first 3 months of therapy. The person years at risk were calculated by adding up, for each patient, the number of days at risk (until they died or transferred out) and dividing by 365.

Adjustment of 1 year after 90 day survival for the effect of comorbidity was undertaken using a rolling 5 year combined incident cohort from 2002 to 2006. For the 5 years combined, 8 centres had returned >85% of comorbidity data for patients. Adjustment was first performed to a mean age of 60 years, then to the average primary diagnosis mix for all the eight centres. The individual centre data were then further adjusted for average comorbidity mix present at these centres.

The survival hazard function was calculated as the probability of dying in a short time interval considering survival to that interval.

Methodology for prevalent patient survival

All patients who had been established on RRT for at least 90 days on 1 January 2007 were included in this analysis. The patients in the transplant cohort had all been established with a transplant for at least 6 months.

As discussed in previous reports, comparison of survival of prevalent dialysis patients between centres is complex. Survival of prevalent dialysis patients can be studied with or without censoring at transplant. When a patient is censored at transplantation, the patient is considered as alive up to the point of transplantation, but the patient's status post-transplant is not considered. Therefore a death following transplantation is not taken into account in calculating the survival figure. This censoring could cause apparent differences in survival between those renal centres with a high transplant rate and those with a low transplant rate, especially in younger patients where the transplant rate is highest. The differences are likely to be small due to the low post-transplantation mortality rate and the relatively small proportion of patients being transplanted in a given year compared to the whole dialysis population (usually less than 7% of the total dialysis population). To estimate the potential differences, the results for individual renal centres were compared with and without censoring at transplant. Overall there was a 0.2% higher survival using the uncensored data. With such small differences only the uncensored results have been quoted throughout the prevalent analyses.

Methodology of causes of death

Cause of death were sent in by renal centres as an EDTA-ERA registry code (appendix G). These have been grouped into the following categories:

Cardiac disease
Cerebrovascular disease
Infection
Malignancy
Treatment withdrawal
Other
Uncertain

Some centres had high data returns to the UKRR regarding cause of death, whilst others returned no information.

Adult patients aged 18 years and over, from England, Wales, Scotland and Northern Ireland, were included in the analyses on cause of death. The incident patient analysis included all patients starting RRT in the years 2002–2006. Previously, data analysis was limited to centres with a high rate of return for cause of death. When this was compared with an analysis of all the cause of death data on the database, the percentages in corresponding EDTA categories remained unchanged so the latter data were therefore included.

Analysis of prevalent patients included all those aged over 18 years and receiving RRT on 1/1/2007. The death rate was calculated for the UK general population (data from ONS http://www.statistics.gov.uk/statbase/Product.asp?vlnk=14409) by age band and compared with the same age band for prevalent patients on RRT on 1/1/2007.

Results of incident (new RRT) patient survival

The 2006 cohort included 6,311 patients who were starting RRT (table 7.1).

Comparison with audit standards

The current 2007 4th UK Renal Standards document [1] does not set any standards for audit of patient survival. This is in contrast to the 2002 3rd UK Renal Standards document [2] (http://www.renal.org/standards/standards.html) which concluded that:

It is hard to set survival standards at present because these should be age, gender and co-morbidity adjusted and this is not yet possible from Registry data. The last Standards document (2nd – 1998)

Table 7.1. Summary of the exclusions from the incident cohorts

	Cohort year				
	2006	2005	2004	2003	2002
All incident patients	6,322	6,060	5,411	4,755	4,284
Exclusion category (1)	−1	−1	−4	−3	−2
Exclusion category (2)	−6	−5	−2	−5	−1
Exclusion category (3)	−4	−10	−14	−11	−19
Remaining incident cohort	6,311	6,044	5,391	4,736	4,262
Died within 90 days of start	−460	−475	−484	−449	−428
Lost within 90 days of start	−29	−15	−30	−15	−12
Centres not contributing to UKRR	−25	−13	−16	−23	−18
Cohort at 1yr after 90 days	5,797	5,541	4,861	4,249	3,804
Deaths at one year after 90 days	786	821	777	653	680

(1) patient had 2nd start in same year: if recovery <90d, used 1st start date, if recovery ⩾90d used 2nd start date
(2) recovery <90d: used 1st start date in previous year(s) which is not in this cohort – delete from current cohort
(3) recovery ⩾90d: should use 2nd start date in next year(s) which is not in this cohort – delete from current cohort

Table 7.2. One-year patient survival (from day 0–365), patients aged 18–54, 2006 cohort

First treatment	Standard primary renal disease	All primary renal diseases except diabetes
All Dialysis %	95.7	94.8
95% CI	*94.1–96.8*	*93.4–95.8*
HD %	93.9	93.2
95% CI	*91.8–95.5*	*91.4–94.6*
PD %	99.1	98.5
95% CI	*97.1–99.7*	*96.7–99.3*

recommended at least 90% one year survival for patients aged 18–55 years with standard primary renal disease. This may have been too low as the rate in participating centres in the Registry was 97%, though numbers were small.

The 3rd Renal Standards document defines standard primary renal disease using the EDTA-ERA diagnosis codes (including only codes 0–49) (appendix G); this excludes patients with renal disease due to diabetes and other systemic diseases. It is more widespread practice to simply exclude patients with diabetes, so these analyses were also included in this report to allow comparison with reports from other registries. The results are shown in table 7.2 and are similar to the previous year.

Between country

Two years incident data have been combined to increase the size of the patient cohort, so that any differences between the 4 UK countries are more likely to be identified (table 7.3). These data have not been adjusted for differences in primary renal diagnosis, ethnicity or comorbidity, nor for differences in life expectancy in the general populations of the four countries. There was no significant difference in 90 day survival between UK countries ($p = 0.8$), although the 1 year after 90 day survival differed significantly ($p = <0.0001$, Chi Squared). The greater prevalence of cardiovascular disease in Wales and Scotland compared with England may account for these differences.

Table 7.4. One-year after day 90 survival by first established treatment modality (adjusted to age 60)

Year	Adjusted 1 year after 90 days % *95% CI* HD	PD
2006	87.2	94.1
	86.0–88.3	*92.8–95.5*
2005	85.8	93.2
	84.6–87.1	*91.8–94.6*
2004	85.5	90.4
	84.2–86.8	*88.7–92.1*
2003	85.0	92.3
	84.1–86.9	*90.7–93.9*
2002	83.9	90.2
	82.3–85.4	*88.3–92.1*

Modality

The age-adjusted one year survival estimates on HD and PD were 87.2% and 94.1% respectively which both showed a trend in improvement in survival from 2002 (table 7.4). There appeared to be better one year survival on PD compared with HD after age adjustment, similar to findings from the USRDS and Australasian (ANZDATA) registries. However, a straightforward comparison of the modalities in this way is misleading, given that in general, PD is used in younger patients and those with less severe comorbidity.

Age

Tables 7.5 to 7.10 show survival of all patients and those above and below 65 years of age, for up to eight years after initiation of renal replacement therapy. The UK is showing an improvement in both short and longer term survival on RRT for patients aged both under and over 65 years. As to be expected there was also a steep age related decline in survival over all time periods (see also figures 7.1 and 7.2).

If the survival data in tables 7.8 to 7.10 are calculated from day 90 (1 year after day 90 survival, 2 year after day 90 survival, etc) the survival in all cases increased by an

Table 7.3. Incident patient percentage survival across the UK countries, combined 2 year cohort (2005–2006), adjusted to age 60

	England	N Ireland	Scotland	Wales	UK
% 90 day	95.0	94.9	94.3	94.1	94.9
95% CI	*94.5–95.5*	*93.2–96.6*	*93.2–95.5*	*92.7–95.4*	*94.4–95.3*
% 1 year after 90 days	89.0	90.8	85.2	86.6	88.6
95% CI	*88.3–89.7*	*88.3–93.3*	*83.2–87.2*	*84.4–88.9*	*87.9–89.2*

Table 7.5. Unadjusted 90 day survival of new patients, 2006 cohort, by age

Age	KM* survival (%)	KM 95% CI	N
18–64	97.2	96.6–97.7	3,165
⩾65	88.1	87.0–89.2	3,145
All ages	92.7	92.0–93.3	6,310

* KM Kaplan–Meier.

Table 7.6. Unadjusted 1 year after day 90 survival of new patients, 2006 cohort, by age

Age	KM survival (%)	KM 95% CI	N
18–64	92.4	91.4–93.3	3,044
⩾65	79.0	77.4–80.5	2,753
All ages	86.0	85.1–86.9	5,797

additional 3–4% across both age bands. These are the results most comparable to the figures quoted by the USRDS from the USA [3] and most other national registries, see chapter 14.

There was a curvilinear increase in death rate per 1,000 patient years with age, shown in figure 7.2 for the period one year after 90 days. There were no differences between the UK countries.

The effect of censoring age related survival at the time of transplantation

The KM long term survival curves published in all reports prior to last year were censored at the time of transplantation. This was not made clear in the description of methodology and although not incorrect, will make the longer term outcomes of younger patients (who are more likely to have undergone transplantation) appear worse than is actually the case. This is because only those younger patients remaining on dialysis (who may have more comorbidity than those transplanted) will have been included in the censored survival analysis. To demonstrate this difference in outcome between these two methods, figure 7.3a is

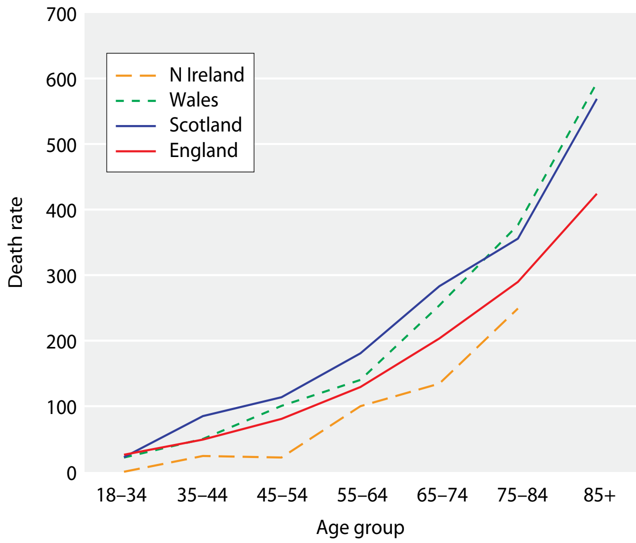

Fig. 7.2. One year after 90 days death rate per 1,000 patients years by UK country and age group for incident patients, 2003–2006 cohort

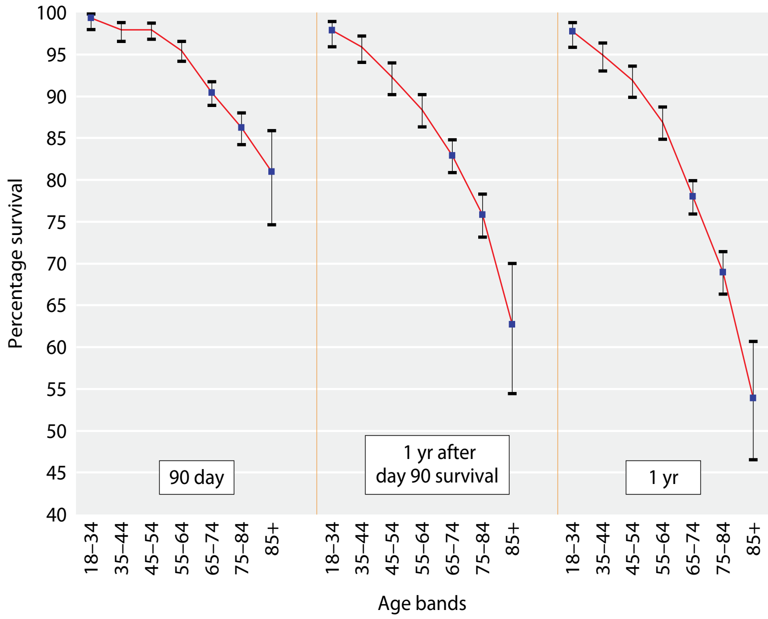

Fig. 7.1. Unadjusted survival of all incident patients 2006 by age band

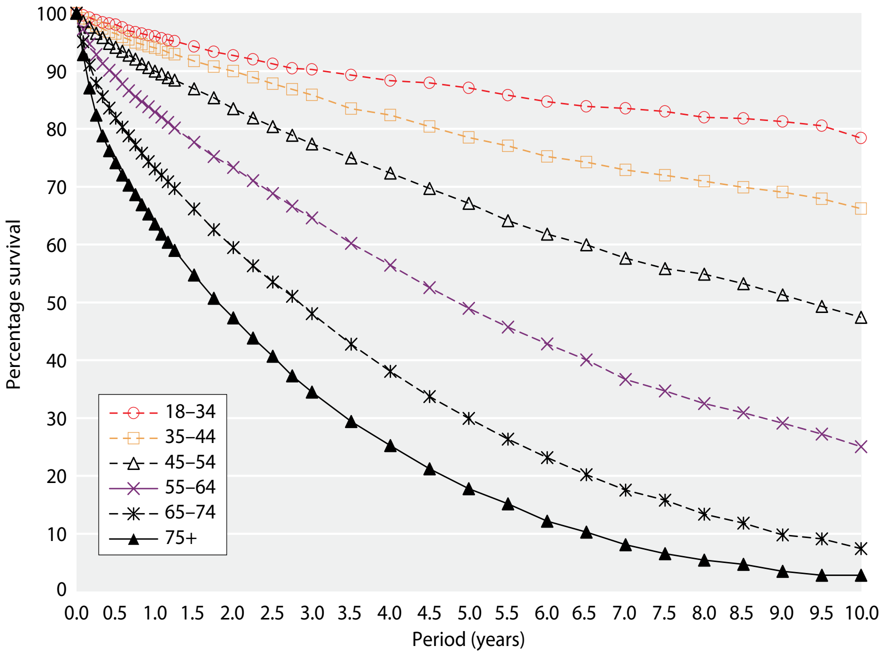

Fig. 7.3a. Kaplan–Meier 9-year survival of incident patients 1997–2006 cohort (from day 0), without censoring at transplantation

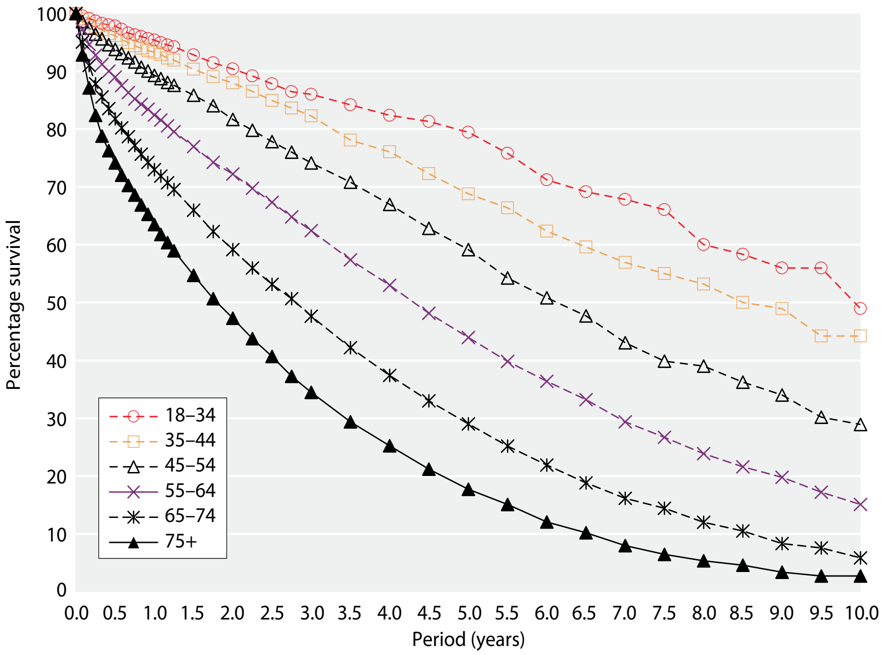

Fig. 7.3b. Kaplan–Meier 9-year survival of incident patients 1997–2006 cohort (from day 0), with censoring at transplantation

shown below without censoring for transplantation and figure 7.3b with censoring. In future reports it is planned to reproduce only the single figure of the longer term age related survival which is uncensored at the time of transplantation.

From figure 7.3a (uncensored), it can be seen that the 50% survival for a patient starting RRT in the UK aged 50, 60 and 70 years is 9.5 years, 5 years and 3 years respectively.

The change in hazard of death by age, during the first 12 month period

Figure 7.4 shows the monthly hazard of death from the 1st day of starting RRT by age, which falls during the first 3–4 months. For patients aged over 55, the hazard of death was 60% lower in those patients who survived beyond 4 months. This same large reduction in hazard of death was not seen in the younger aged patients and will therefore affect proportionality in any

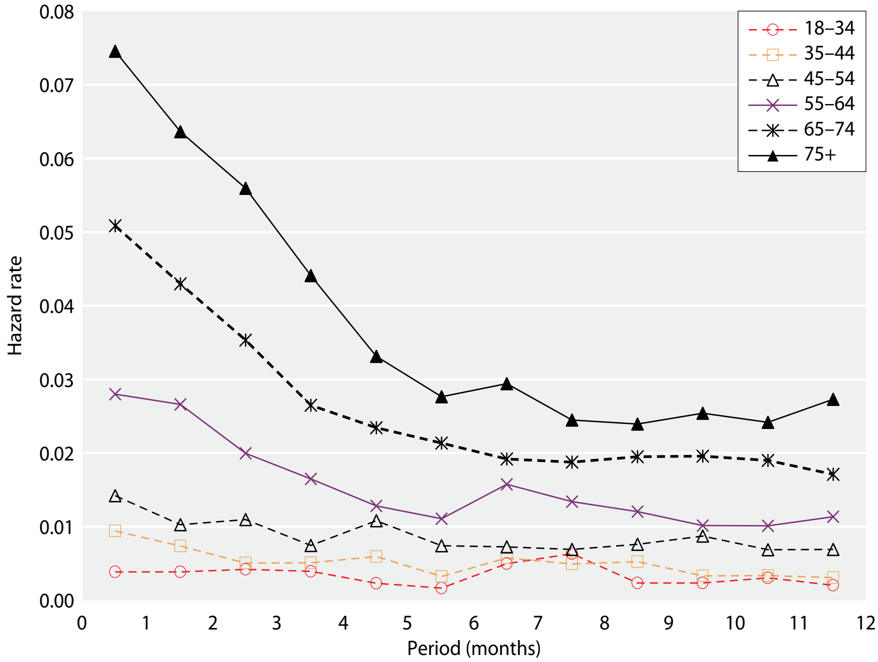

Fig. 7.4. First year monthly hazard of death, by age band 1997–2006 cohort

Cox model analysis that uses data starting from day zero and combines these different aged cohorts.

The USRDS in contrast reports a rising mortality in the first 3 month period [3] probably reflecting under-reporting to the USRDS of patients that start on RRT who do not survive the first 90 days.

The hazard of death per each 10 year increase in patient age (unadjusted for primary renal disease) is shown in table 7.7.

Changes in survival from 1997–2006

The 1st year death rate per 1,000 patient years is shown in figure 7.5. These death rates are not directly comparable with those produced by the USRDS Registry, as the UK data included the first 90 day period where the death rates will be much greater. The death rate for patients aged over 65 years was unchanged from last year at 326 per 1,000 patient years, compared with a fall in the under 65 year age group from 110 per 1,000 patient years in 2005 to 89 per 1,000 patient years in 2006.

The unadjusted KM survival analyses (tables 7.8 and 7.9, figures 7.6 and 7.7) and annual death rates appear to be showing a large improvement in 1 to 7 year survival across the time periods for both the under and over 65s. This has happened even though the average age of patients starting RRT has risen by 5 years during this period. Survival amongst patients aged under 65 years at start of RRT has improved from 86% to 91.5%. As

Table 7.7. Increase in proportional hazard of death for each 10 year increase in age, at 90 days and for 1 year thereafter, 2006 cohort

Interval	Hazard of death for 10 year age increase	95% CI
First 90 days	1.78	1.65–1.94
1 year after first 90 days	1.61	1.52–1.71

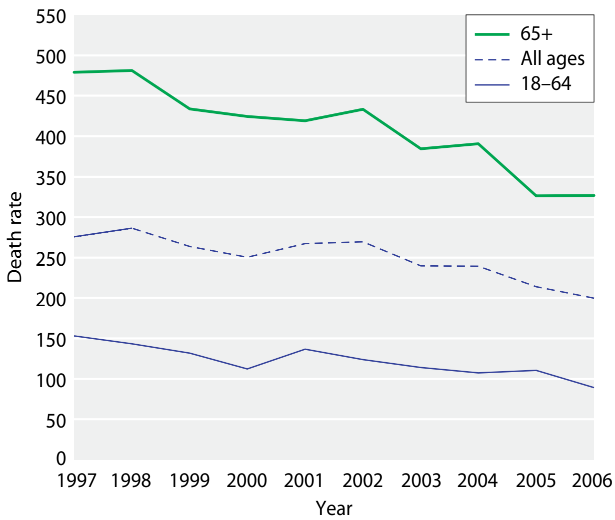

Fig. 7.5. One-year incident death rate per 1,000 patient years for all age groups

Table 7.8. Unadjusted KM survival of incident patients 1997–2006 cohort for patients aged 18–64

Cohort	1 year	2 year	3 year	4 year	5 year	6 year	7 year	8 year	9 year	10 year	95% CI for latest year	N
2006	91.5										90.5–92.4	3,147
2005	89.6	83.7									82.3–85.0	2,939
2004	89.9	83.9	77.6								75.9–79.1	2,626
2003	89.3	82.2	76.6	71.1							69.2–73.0	2,284
2002	88.5	81.4	75.5	70.0	64.9						62.7–66.9	2,008
2001	87.4	79.8	74.0	68.3	63.5	58.5					56.2–60.8	1,786
2000	89.5	81.9	75.1	70.3	64.9	59.8	55.6				53.0–58.0	1,535
1999	87.7	81.6	74.2	68.2	62.9	58.8	54.6	50.9			48.2–53.6	1,316
1998	86.8	79.4	72.7	67.7	61.4	56.4	52.2	49.5	46.4		43.5–49.2	1,239
1997	85.9	78.4	71.1	65.5	60.4	55.5	51.8	49.3	47.1	42.6	39.0–46.1	762

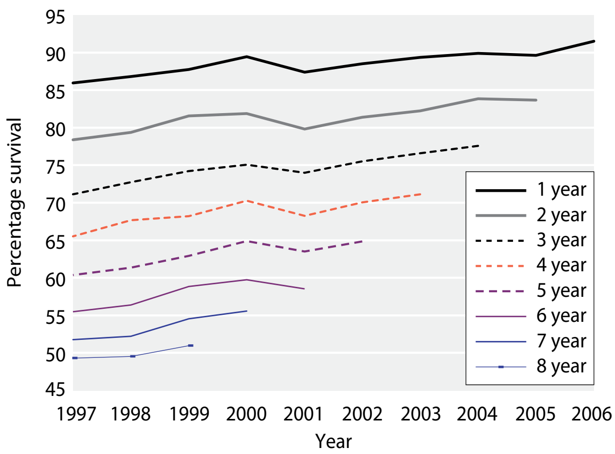

Fig. 7.6. Change in KM long term survival by year of starting RRT; for incident patients aged 18–64 years

survival rates were already high in these patients, the overall survival improvement was only 5%. The reduction in the death rate (= relative survival improvement) in figure 7.5 shows that this equates to a 42% relative improvement over this 10 year period (= 4% annual improvement in the reduction in death rate).

Similarly for patients aged over 65 years there has been a 9% improvement in 1st year survival, which translates into a similar 32% relative reduction in death rate over this 10 year period.

A confounding factor may be the fact that additional renal centres have joined the UKRR over these intervening years. If they had better survival relative to existing centres, this would appear as a time trend. However separate analysis of survival in the earlier versus later centres has shown this not to be the case.

As these are observational data it is difficult to attribute this reduction in risk of death to any specific improvement in care. During this period mean haemoglobin in HD patients has shown annual improvement rising from 10.2 g/dl in 1998 to 11.8 g/dl in 2007. Other improvements in phosphate and calcium control have been restricted to the last 4 years. This recent improvement contrasts with dialysis dose where the main improvements were in the first 4 years.

Table 7.9. Unadjusted KM survival of incident patients 1997–2006 cohort for patients aged ⩾65

Cohort	1 year	2 year	3 year	4 year	5 year	6 year	7 year	8 year	9 year	10 year	95% CI for latest year	N
2006	72.9										71.3–74.4	3,144
2005	72.9	58.7									57.0–60.5	3,076
2004	68.7	54.8	43.3								41.4–45.1	2,724
2003	69.1	53.8	42.3	32.3							30.4–34.2	2,363
2002	65.9	51.4	40.9	32.7	25.3						23.5–27.2	2,169
2001	67.0	51.9	39.4	30.3	22.8	17.0					15.3–18.7	1,846
2000	66.7	53.2	40.0	29.1	22.5	17.8	13.7				12.0–15.6	1,493
1999	66.3	50.6	38.4	28.7	21.5	15.3	10.9	8.5			7.0–10.1	1,257
1998	63.7	46.5	36.2	27.5	20.4	14.4	10.3	7.1	5.0		3.8–6.4	1,125
1997	63.8	45.7	33.0	23.8	16.4	11.7	8.0	6.4	4.6	3.9	2.5–5.7	575

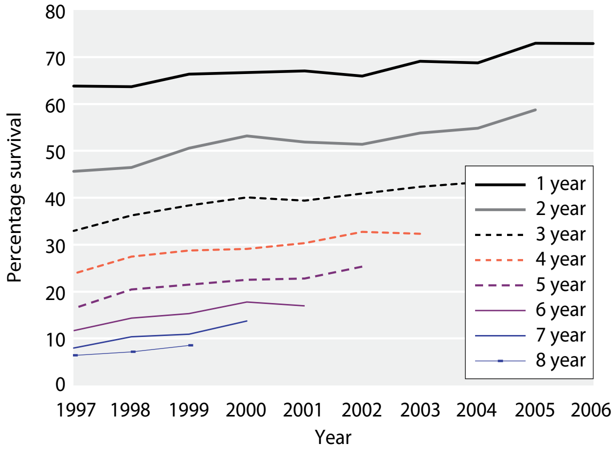

Fig. 7.7. Change in KM long term survival by year starting RRT; for incident patients aged ⩾65 years

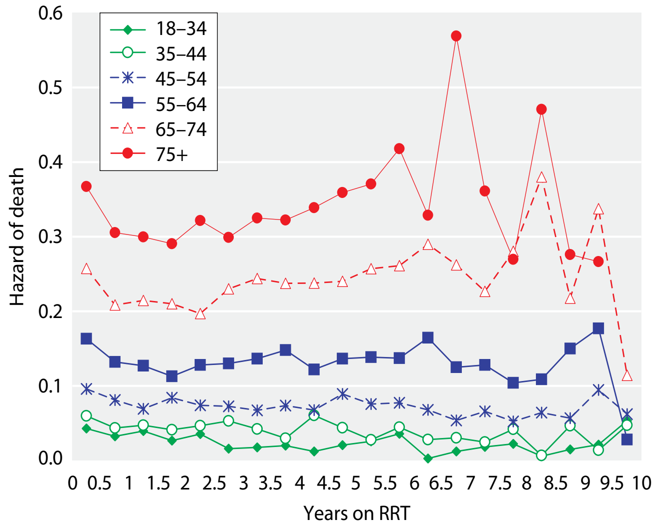

Fig. 7.8. Six monthly hazard of death, by vintage and age band, 1997–2006 incident cohort after day 90

Change in survival on renal replacement therapy by vintage

RRT patients in the UK continued to show no evidence of a worsening prognosis with time on RRT (vintage), even with the follow up period now increased to 10 years. Figure 7.8 demonstrates this clearly for patients aged under 65 years. For those patients aged 65 years and over, no vintage effect was seen within the first 7 years (after adjusting for the increasing age of the patient), though with the decreasing numbers remaining alive beyond 7 years the numbers become too small to draw any further conclusions. This lack of a 'vintage' effect was partly related to the effect of having a survivor cohort who were healthier than those patients who died early after starting RRT, which was then also partly offset by increasing comorbidity with time in the survivor cohort.

Figures 7.9 and 7.10 show these data for the non-diabetic and diabetic patients respectively with a suggestion of worsening prognosis in older diabetic patients.

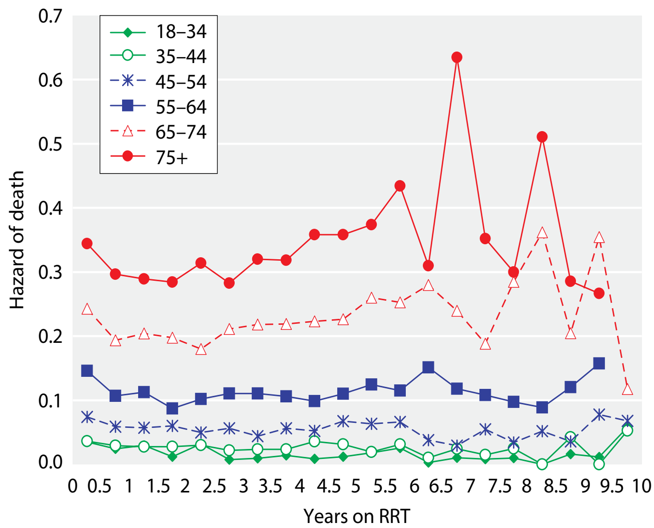

Fig. 7.9. Six monthly hazard of death, by vintage and age band, 1997–2006 non-diabetic incident cohort after day 90

Table 7.10. Unadjusted KM survival of incident patients 1997–2006 cohort for patients of all ages

Cohort	1 year	2 year	3 year	4 year	5 year	6 year	7 year	8 year	9 year	10 year	95% CI for latest year	N
2006	82.2										81.2–83.1	6,291
2005	81.1	70.9									69.7–72.0	6,015
2004	79.2	69.1	60.1								58.7–61.4	5,350
2003	79.2	67.9	59.2	51.4							49.9–52.9	4,647
2002	76.9	65.9	57.6	50.6	44.2						42.7–45.8	4,177
2001	77.2	65.8	56.5	49.0	42.9	37.4					35.8–39.0	3,632
2000	78.4	67.9	58.0	50.3	44.2	39.2	35.0				33.3–36.7	3,028
1999	77.4	66.7	56.9	49.2	42.8	37.7	33.3	30.2			28.4–32.0	2,573
1998	75.9	63.9	55.5	48.7	42.1	36.5	32.4	29.4	26.6		24.8–28.5	2,364
1997	76.6	64.6	55.0	47.9	41.7	36.9	33.2	31.0	28.9	26.0	23.6–28.4	1,337

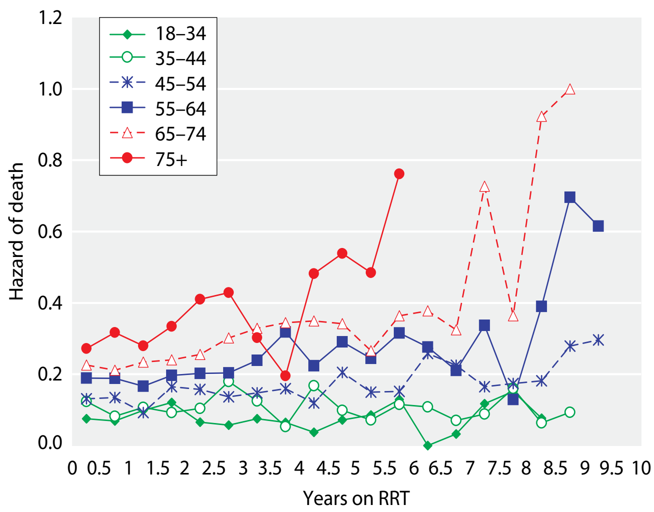

Fig. 7.10. Six monthly hazard of death, by vintage and age band, 1997–2006 diabetic incident cohort after day 90

Previously the USRDS has shown a worsening prognosis between being on RRT 1 year, 2–5 years and >5 years. In the latest USRDS Report [3] this difference in prognosis with time on RRT appears to have narrowed.

Time trend changes in incident patient survival, 1999–2006

The time trend changes are shown in figure 7.11.

Analysis of centre variability in 1 year after 90 days survival

The one year after 90 day survival for the 2006 incident cohort is shown in figure 7.12 for each renal centre. The tables for these data and for 90 day survival are given in appendix 1 at the end of this chapter (tables 7.24 and 7.25). The age adjusted individual centre survival for each of the last 8 years can also be found in appendix 1, table 7.26.

In the analysis of 2006 survival data, some of the smaller centres had wide confidence intervals (figure 7.12). This can be addressed by including a larger cohort, which will also assess sustained performance and as in previous reports has shown this as a rolling 4 year cohort, with the data in this report for the 4 year period 2003 to 2006. These data are presented as a funnel plot in figure 7.13. For any size of incident cohort (x-axis) one can identify whether any given survival rate (y-axis) falls within plus or minus 2 standard deviations (SDs) from the national mean (solid lines, 95% limits) or 3 standard deviations (dotted lines, 99.9% limits). Table 7.11 allows centres to be identified on this graph by finding the number of patients treated by the centre and then looking up this number on the x-axis.

There are 4 centres that fall between 2 and 3 standard deviations below average (Airdrie, Plymouth, Swansea and Glasgow) and 4 centres between 2 and 3 SDs above average (Kilmarnock, London Royal Free, London Guys and London St Bartholomew's). These data have not been adjusted for any patient related factor except age (i.e. not comorbidity, primary renal disease or ethnicity). The 3 London centres within the upper 2–3 SDs may reflect their higher ethnic minority mix with better survival, although this pattern is not seen in London Kings or other non-London centres with a high ethnic minority mix. These data have not been censored at transplantation, so the effect of differing centre rates of transplantation was not taken into account.

The analysis of Swansea data after adjustment for comorbidity (figure 7.14) indicates that patients at this centre had a higher comorbid burden when compared with other centres.

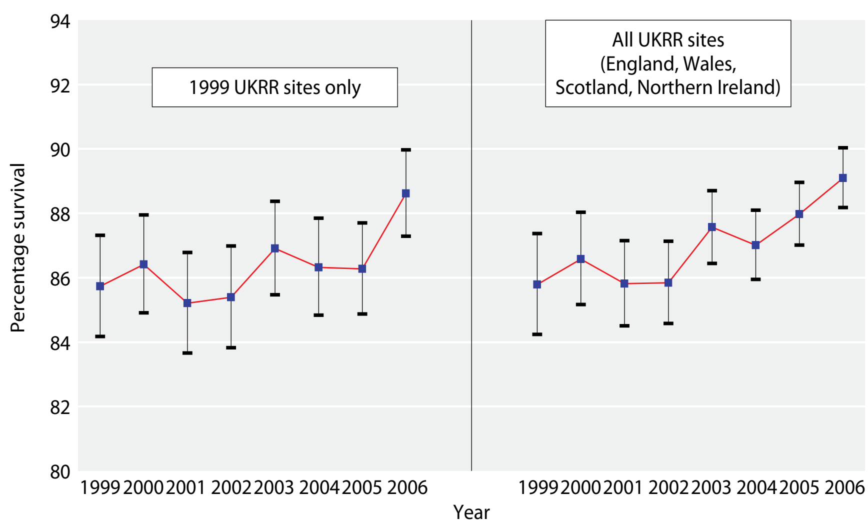

Fig. 7.11. Change in one-year after 90 day adjusted (age 60) survival, 1999–2006
Showing 95% confidence intervals

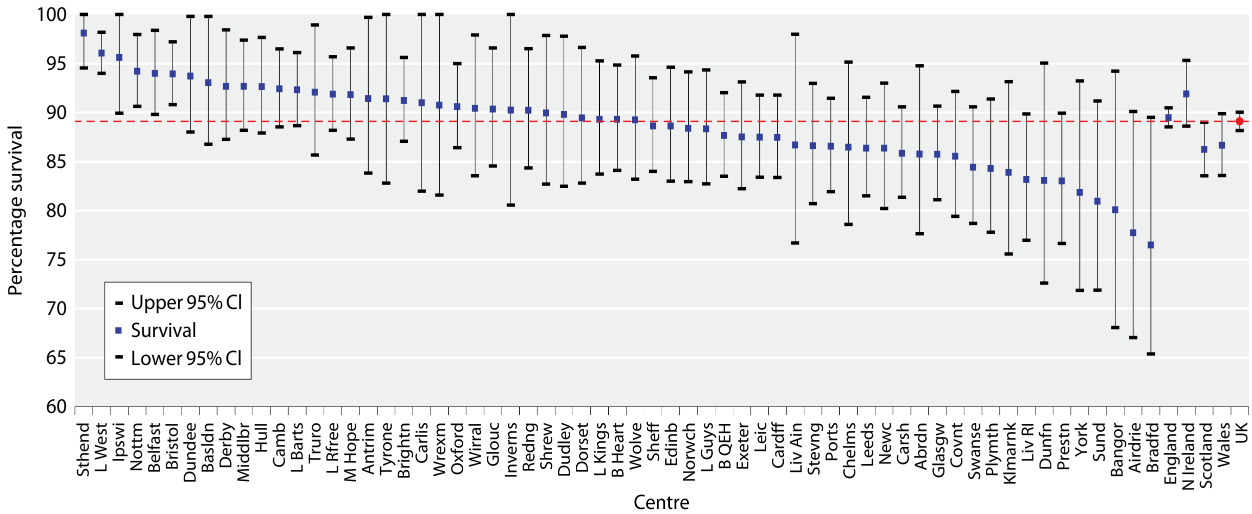

Fig. 7.12. Survival one-year after 90 days, adjusted to age 60, 2006 cohort
Showing 95% confidence intervals

Table 7.11. Adjusted 1 year after 90 day survival 2003–2006

Centre	Incident pts N	1 year after 90 day survival %
Ulster	26	87.7
Tyrone	40	93.4
Newry	42	87.5
Clwyd	63	86.9
Liv Ain	70	88.4
D & Gall	70	86.0
Antrim	73	89.1
Bangor	107	83.3
Wrexm	108	88.6
Carlis	110	84.6
Chelms	121	84.2
Dunfn	127	82.8
Inverns	129	86.6
Shrew	130	89.2
Sthend	140	92.4
Ipswi	152	91.0
Basldn	155	92.4
Dudley	155	89.5
Klmarnk	159	86.6
York	165	83.2
Airdrie	183	79.1
Truro	189	90.9
Belfast	195	91.9
Sund	200	83.0
Glouc	202	88.9
Dorset	207	87.4
Wirral	207	88.5
Abrdn	216	85.0
Bradfd	219	83.5
Dundee	223	87.9
Redng	235	90.1
Derby	237	88.3
Plymth	238	82.4
Norwch	267	88.5
Covnt	308	85.1
Wolve	316	86.6
L Rfree	326	92.3
Brightn	330	87.7
Middlbr	346	86.1
Edinb	364	84.6
Hull	365	89.0
Swanse	370	83.1
B Heart	371	87.3
Stevng	373	87.5
Exeter	384	86.4
Prestn	384	86.6
Newc	389	84.9
Nottm	439	87.8
L Kings	441	88.3
Camb	449	90.6
L Guys	449	91.2
M Hope	463	88.7
Liv RI	464	85.9
L Barts	525	91.0
Ports	533	86.4
B QEH	548	88.8
Sheff	601	90.0
Leeds	603	88.2
Bristol	606	88.2
Oxford	617	88.8
Carsh	655	88.7
Cardff	683	87.8
Glasgw	719	84.4
Leic	758	87.6
L West	1,063	94.2

One centre (London West) appears to be an extreme outlier with much better than expected survival. Even after the survival data were re-analysed for the 2006 cohort alone, this centre remained outside the 3 SD limit, with better than expected survival. Removing this centre from the funnel plot (because it is a statistical outlier) and from the calculation of the lower SDs does not alter the number of centres falling below 2 SDs. Reasons for this are actively being investigated, in cooperation with the London West centre. It is unlikely that this may solely be accounted for by ethnic mix as the second year patient survival (survival of RRT patients between month 13 and month 24) is within 2 SDs of expected. Preliminary investigations suggest that there has been over-estimation of the denominator as a result of incorrect inclusion of patients from other centres (predominantly transplant recipients) in the numbers of incident patients. The UKRR identified some under-reporting of deaths (via the use of the NHS tracing service), although these deaths were included in the current survival calculation. Under-reporting of incident RRT patients may also play a potential role, although current investigations show this is not causing a significant underestimation of deaths.

There are known regional differences in the life expectancy of the general population within the UK. Table 7.12 shows differences in life expectancy between the UK countries [4, 5]. The UKRR is investigating ways to adjust centre survival for the differences in the underlying population.

Analysis of the impact of adjustment for comorbidity on the 1 year after 90 day survival

Comorbidity returns to the UKRR have remained static (chapter 6). With the de-anonymisation of centre names, it is essential to show what the importance is of adjusting patient survival for comorbidity. Figure 7.14 shows the effect of adjusting for comorbidity. Using the combined incident cohort from 2002–2006, 8 centres had returned comorbidity data for more than 85% of patients. Adjustment was first performed to age 60, then to the average primary diagnosis mix for all the 8 centres. Further adjustment was then made to the average diversity of comorbidity present at these centres.

This shows how survival changes with adjustment highlighting the importance of improving the quality of comorbidity returns to the Renal Registry.

Table 7.12. Life expectancy 2004–2006 in UK countries (source ONS)

	At birth		At age 65	
Country	Male	Female	Male	Female
England	77.2	81.5	17.1	19.9
Wales	76.6	80.9	16.7	19.5
Scotland	74.6	79.6	15.8	18.6
N Ireland	76.1	81.0	16.6	19.5
UK	**76.9**	**81.3**	**16.9**	**19.7**

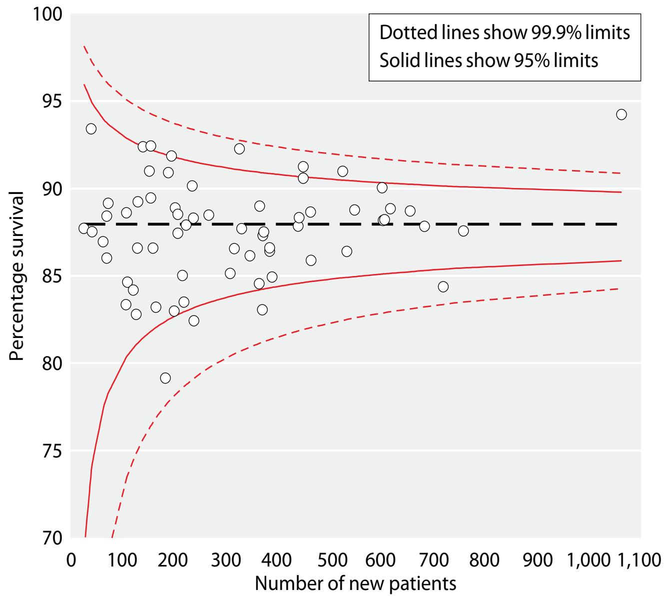

Fig. 7.13. Funnel plot for age adjusted 1 year after 90 days survival, 2003–2006 cohort
(patients who died within the first 90 days have been excluded)

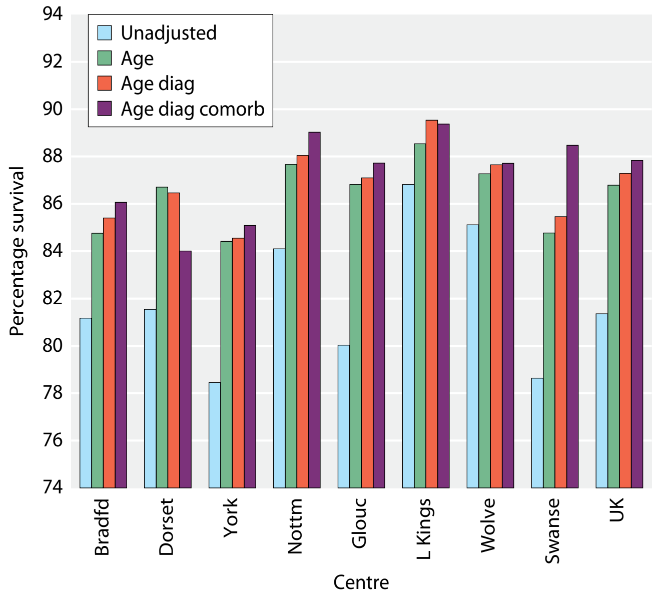

Fig. 7.14. Change in 1 year after 90 day survival after adjustment for age, diagnosis and comorbidity 2002–2006

Results of prevalent patient survival analyses

Table 7.13 shows the one year survival on dialysis, after censoring at the time of transplantation.

In tables 7.14 and 7.15 the 2007 one year death rate is shown for dialysis and transplanted patients respectively. The median age of prevalent patients in Northern Ireland and Wales was older than those in England.

Figure 7.15 shows the one year survival of prevalent dialysis patients in different age groups on 1/1/2007.

One year survival of prevalent dialysis patients by centre

The age adjusted one year survival of dialysis patients in each centre is shown in table 7.13 and is illustrated in figures 7.16 and 7.17, dividing the data into those patients aged <65 years and those 65 years and over. Figure 7.18 shows the age adjusted data (60 years) and in figure 7.19 as a funnel plot. The solid lines show the 2 standard deviation limit (95% limits) and the dotted

Table 7.14. One-year death rate per 1,000 dialysis patient years in 2007 by country

	England	N Ireland	Scotland	Wales
Death rate	153	154	161	173
95% CI	147–160	126–186	143–181	149–200
Median age	63.6	65.7	63.4	65.7

Table 7.13. Prevalent 1 year KM* survival of dialysis patients in 2007, censoring at transplantation (adjusted for age 60)

Centre	Adjusted 1 year survival	Lower 95% CI	Upper 95% CI
Abrdn	89.6	86.0	93.4
Airdrie	78.3	72.4	84.7
Antrim	85.4	80.8	90.4
B Heart	87.6	84.7	90.6
B QEH	88.6	86.6	90.6
Bangor	80.7	74.2	87.8
Basldn	91.4	87.5	95.5
Belfast	90.9	88.0	93.9
Bradfd	83.2	78.3	88.4
Brightn	87.7	84.9	90.6
Bristol	89.3	87.0	91.7
Camb	88.3	85.5	91.1
Cardff	88.8	86.6	91.2
Carlis	87.0	81.1	93.3
Carsh	89.0	86.8	91.2
Chelms	85.6	80.4	91.2
Clwyd	91.1	85.4	97.1
Covnt	86.9	83.6	90.3
D & Gall	90.5	84.6	96.9
Derby	87.5	83.9	91.2
Derry	86.4	76.9	96.9
Dorset	86.9	82.7	91.3
Dudley	86.7	82.0	91.7
Dundee	84.5	80.1	89.1
Dunfn	89.2	84.6	94.2
Edinb	88.7	85.5	92.0
Exeter	87.3	84.2	90.4
Glasgw	88.8	86.6	91.0
Glouc	87.8	83.9	91.9
Hull	89.9	87.0	92.8
Inverns	94.2	90.4	98.2
Ipswi	85.2	79.9	90.8
Klmarnk	87.1	82.6	91.9
L Barts	89.1	86.9	91.4
L Guys	90.9	88.5	93.3
L Kings	84.6	81.2	88.1
L Rfree	90.5	88.4	92.6
L West	92.8	91.5	94.1
Leeds	88.8	86.5	91.2
Leic	89.9	87.9	91.9
Liv Ain	90.9	85.4	96.7
Liv RI	85.8	82.9	88.8
M Hope	88.6	85.6	91.6
M RI	85.0	81.7	88.4
Middlbr	86.7	83.1	90.5
Newc	87.2	83.7	90.9
Newry	86.7	80.9	93.0
Norwch	86.5	83.2	89.9
Nottm	89.5	87.0	92.2
Oxford	87.8	85.3	90.3
Plymth	83.6	78.9	88.5
Ports	89.6	87.0	92.2
Prestn	90.8	88.3	93.5
Redng	89.7	86.4	93.1
Sheff	88.4	86.1	90.8
Shrew	89.4	85.2	93.8
Stevng	89.7	87.2	92.2
Sthend	85.8	80.8	91.1
Stoke	84.4	80.8	88.3
Sund	82.4	76.9	88.3
Swanse	88.4	85.5	91.4
Truro	88.8	85.0	92.8
Tyrone	93.3	89.1	97.6
Ulster	89.0	82.5	96.0
Wirral	87.8	83.7	92.1
Wolve	87.8	84.5	91.1
Wrexm	88.8	83.9	94.0
York	88.0	83.4	93.0
England	**88.6**	**88.1**	**89.1**
N Ireland	**89.2**	**87.2**	**91.2**
Scotland	**88.0**	**86.6**	**89.3**
Wales	**88.2**	**86.5**	**89.8**
UK	**88.5**	**88.1**	**89.0**

* Kaplan Meier

Table 7.15. One-year survival of prevalent RRT patients in UK by modality (unadjusted unless stated otherwise)

Patient group	Patients	Deaths	KM* survival	KM 95% CI
Transplant patients 2007				
Censored at dialysis	17,545	395	97.7	97.5–97.9
Not censored at dialysis	17,545	433	97.5	97.3–97.7
Dialysis patients 2007				
All	22,115	3,046	85.7	85.2–86.1
All adjusted age = 60	22,115	3,046	88.5	88.1–89.0
2 year survival – dialysis patients 2006				
All 1/1/2006 (2 year)	19,937	5,109	72.5	71.9–73.2
Dialysis patients 2007				
All age <65	11,693	913	91.7	91.1–92.2
All age 65+	10,422	2,133	79.3	78.5–80.1
Non-diabetic <55	5,841	265	95.1	94.5–95.6
Non-diabetic 55–64	3,280	323	89.7	88.6–90.7
Non-diabetic 65–74	4,075	632	84.3	83.1–85.3
Non-diabetic 75+	4,076	1,004	75.2	73.9–76.5
Non-diabetic <65	9,121	588	93.1	92.5–93.6
Diabetic <65	2,020	264	86.2	84.6–87.7
Non-diabetic 65+	8,151	1,636	79.7	78.8–80.6
Diabetic 65+	1,753	376	78.4	76.3–80.2

* KM = Kaplan–Meier survival
Cohorts of patients alive 1/1/2007 unless indicated otherwise

lines the limits for 3 standard deviations (99.9% limits). With over 60 centres included, it would be expected by chance that 3 centres would fall outside the 95% (1 in 20) confidence intervals. Figure 7.19 shows 4 centres between the 2–3 SD interval, with 1 clearly below (Airdrie), 2 marginally below (London Kings and Manchester RI) and 1 above 2 SDs (Inverness). Similarly to the incident survival, one centre (London West) was demonstrating a survival that was beyond 3 SDs better than expected. Reasons for this are being investigated.

The 2007, one year death rate in prevalent dialysis patients by age band

The death rates on dialysis by age band are shown in figure 7.20. The younger patients are a selected higher risk group, as transplanted patients have been excluded. For a 10 year increase in age in the younger patients, the death rate increased by about 20 per 1,000 patient years compared with an increase of 100 per 1,000 patient years in the older age group. When compared with data from the USRDS report 2007 (the analysis was not

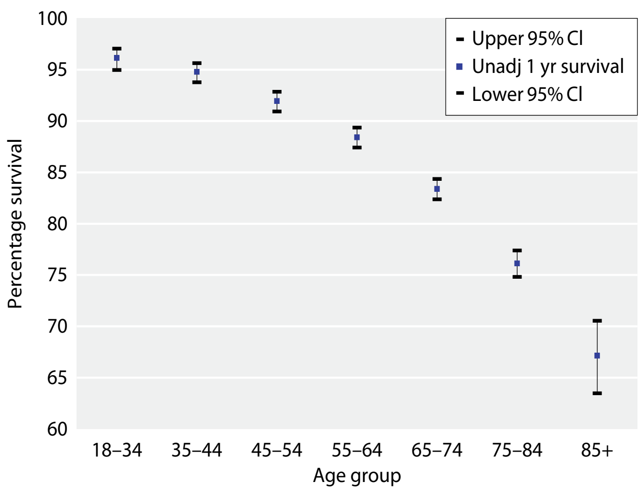

Fig. 7.15. One year survival of prevalent dialysis patients in different age groups – 2007

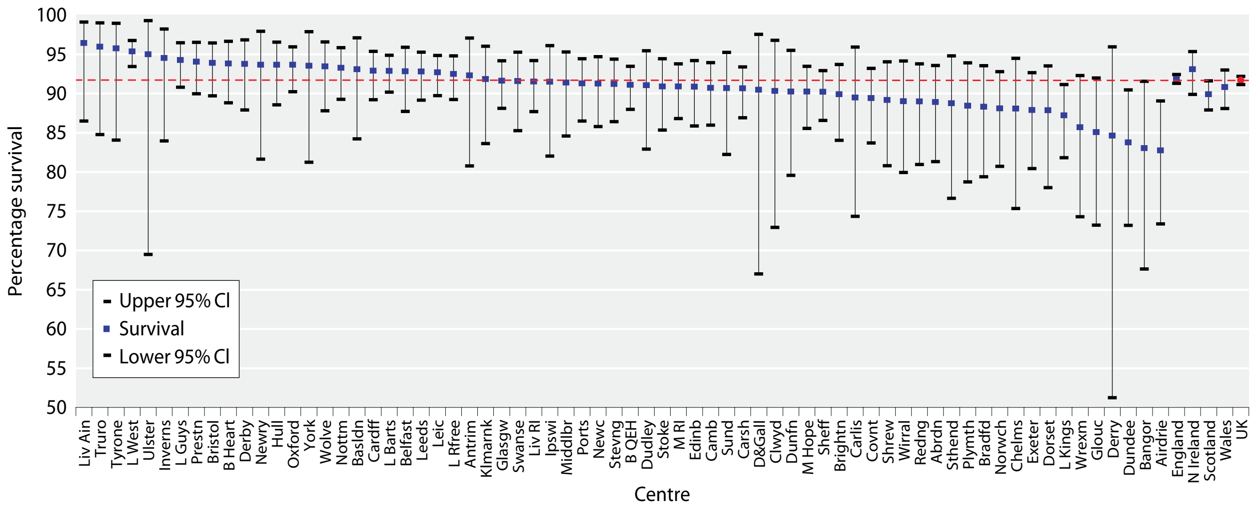

Fig. 7.16. One year survival of prevalent dialysis patients aged under 65 in each centre

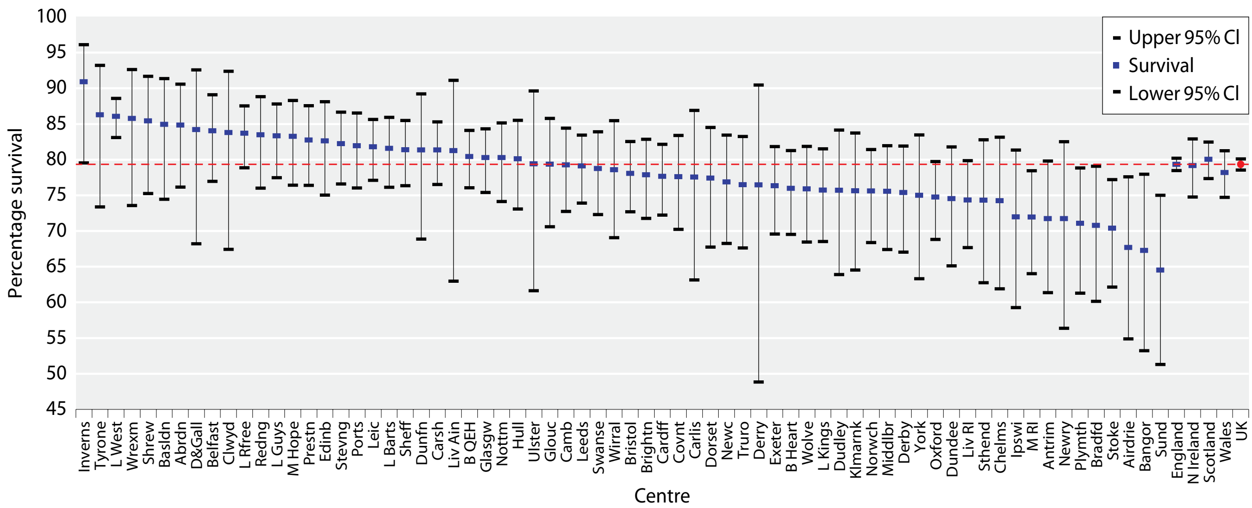

Fig. 7.17. One year survival of prevalent dialysis patients aged 65 and over in each centre

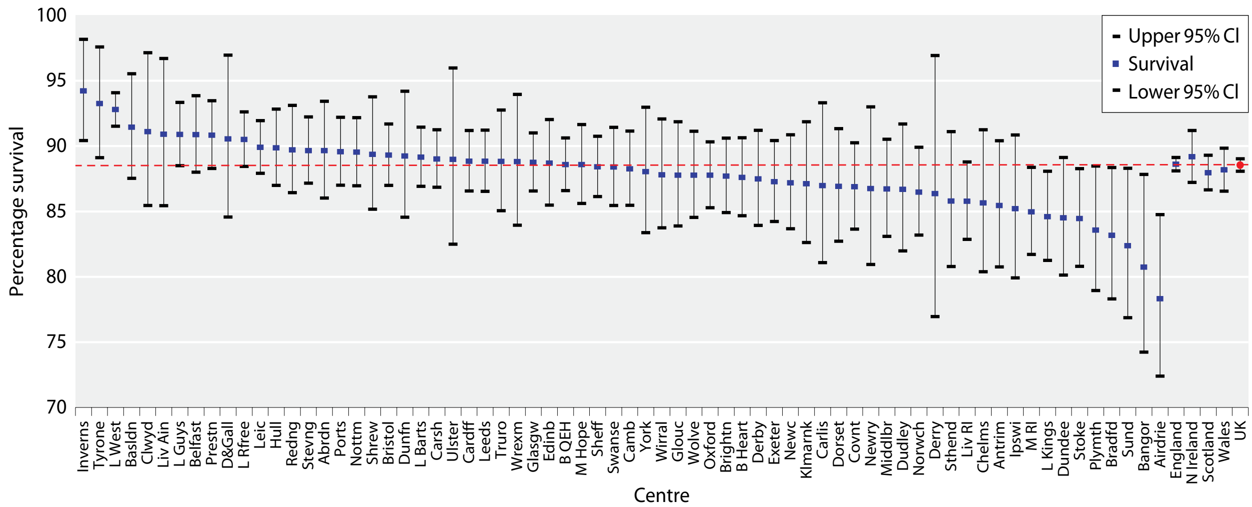

Fig. 7.18. One year survival of prevalent dialysis patients in each centre adjusted to age 60

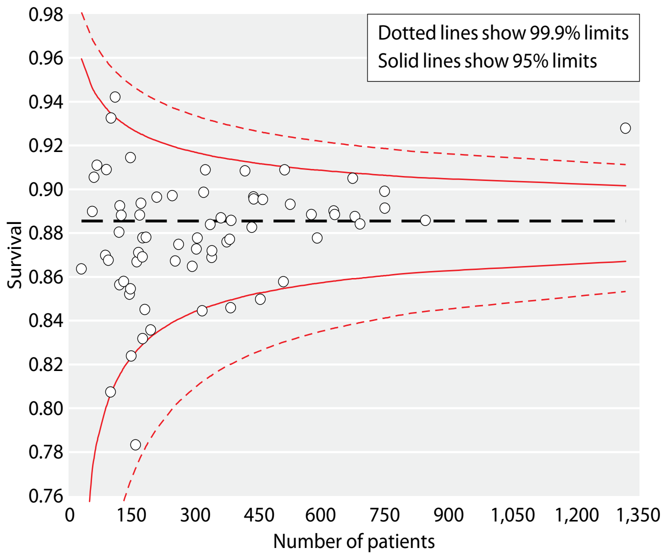

Fig. 7.19. Funnel plot of one year survival of prevalent dialysis patients in each centre adjusted to age 60

repeated in the 2008 USRDS Report), the death rates for UK dialysis patients were lower than dialysis patients in the USA across all age bands (figure 6.12 USRDS) [6].

One year survival of prevalent dialysis patients by UK country from 1997–2007

All UK countries are showing a continued improvement in the age adjusted survival on dialysis (figure 7.21). The change in prevalent survival by centre over the years 2000 to 2006 is shown in this chapter appendix 1, table 7.27.

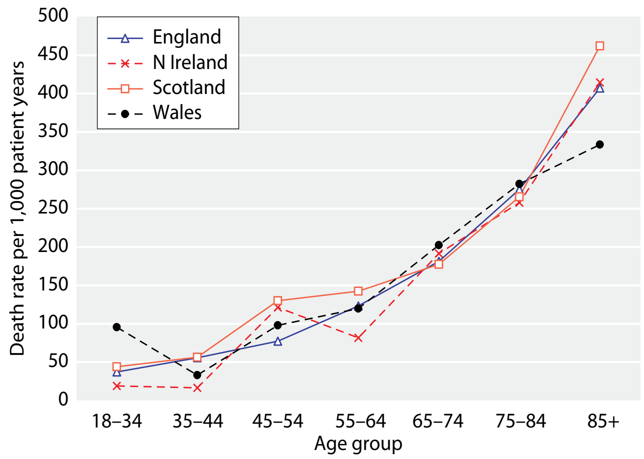

Fig. 7.20. Death rate per 1,000 patient years by UK country and age group for prevalent dialysis patients

One year survival of prevalent dialysis patients with a primary diagnosis of diabetes from 2000–2007

The UK has shown a continued improvement in the age adjusted one year survival of prevalent patients whose primary renal diagnosis was diabetes (table 7.16).

Death rate on RRT compared with the UK general population

The death rate compared to the general population is shown in table 7.17. Figure 7.22 shows that the relative risk with RRT decreased with age from 30 at age 30 to 3 at age 80 although it still remained higher than that of the general population. With the reduction in rates

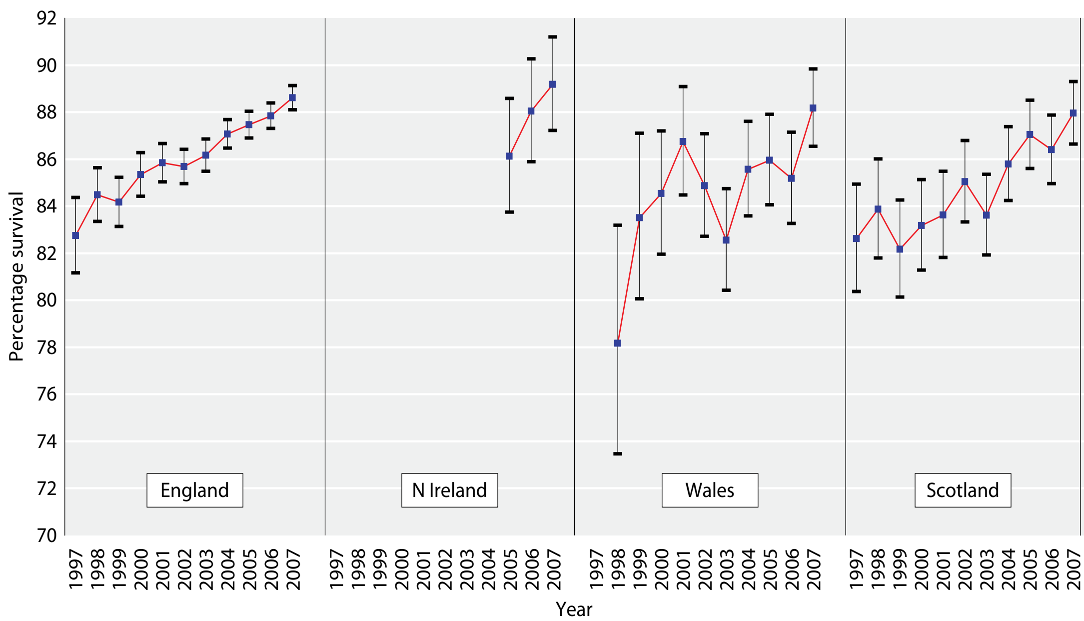

Fig. 7.21. Serial 1 year survival for prevalent dialysis patients by UK country from 1997–2007 adjusted to age 60
Showing 95% confidence intervals

Table 7.16. Serial 1 year survival of prevalent dialysis patients with a primary diagnosis of diabetes from 2000–2007

Year	2000	2001	2002	2003	2004	2005	2006	2007
1 year survival	76.6	77.2	78.4	77.8	80.6	82.3	81.4	84.0

Table 7.17. Death rate by age for all prevalent RRT patients on 01/01/2007, compared with the general population and with previous analyses in the 1998–2001 cohort

Age group	UK population mid 2006 (thousands)	UK deaths	Death rate per 1,000 population	Expected number of deaths	UKRR deaths	UKRR deaths per 1,000 prev RRT pts	Observed: expected ratio 2002–2006	Observed: expected ratio 1998–2001
20–24	4,024	2,002	0.5	0	9	10.7	21.5	41.1
25–29	3,856	2,263	0.6	1	22	17.7	30.1	41.8
30–34	4,040	3,053	0.8	1	28	15.4	20.4	31.2
35–39	4,599	4,834	1.1	3	56	20.3	19.3	26.0
40–44	4,663	7,085	1.5	6	101	27.9	18.3	22.6
45–49	4,151	9,864	2.4	9	145	38.1	16.0	19.0
50–54	3,683	14,017	3.8	14	202	54.1	14.2	12.8
55–59	3,910	22,654	5.8	24	257	62.8	10.8	10.1
60–64	3,240	30,213	9.3	38	393	97.6	10.5	10.4
65–69	2,691	39,904	14.8	56	489	129.5	8.7	7.9
70–74	2,338	56,705	24.3	83	589	172.6	7.1	7.2
75–79	1,959	81,497	41.6	110	644	243.6	5.9	5.3
80–84	1,456	103,912	71.3	104	480	329.0	4.6	4.0
85+	1,243	187,545	150.9	84	245	440.1	2.9	3.0
Total	**45,853**	**565,548**	**12.3**	**532**	**3,660**	**96.8**	**6.9**	**7.7**

of death on RRT over the last 10 years this relative risk of death compared with the general population has fallen since the previous analysis in the 2003 Registry Report which compared UKRR mortality data 1998–2001 to national data from 2000.

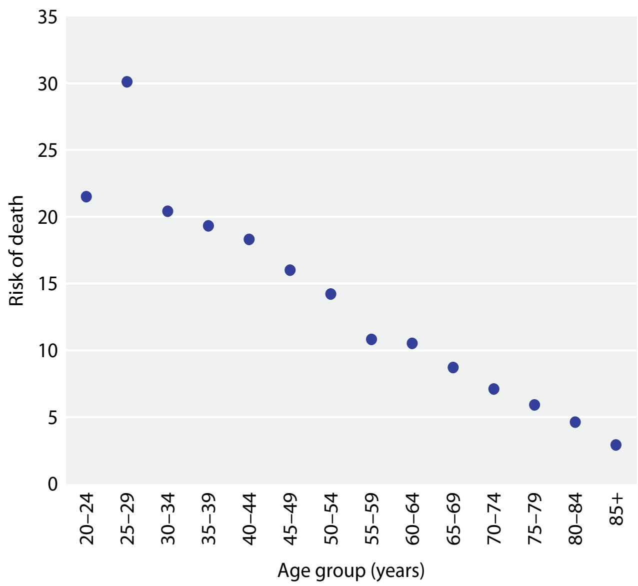

Fig. 7.22. Relative risk of death in all prevalent RRT patients compared with the UK general population in 2007

Results of analyses on causes of death

Data completeness

The data completeness is shown in table 7.18. Overall it is less than 50% and has fallen in recent years.

Table 7.18. Data completeness of EDTA causes of death by centre by year of start

Centre	2000	2001	2002	2003	2004	2005	2006	Total
Abrdn	24.4	26.7	26.5	10.7	4.0	0.0	0.0	15.7
Airdrie	34.1	31.1	28.9	28.1	42.3	33.3	37.5	32.9
Antrim						12.5	0.0	9.5
B Heart	75.8	82.8	79.5	67.3	72.9	84.8	91.9	78.3
B QEH					49.4	1.9	2.5	23.8
Bangor			50.0	12.5	55.0	50.0	42.1	43.3
Basldn				47.6	65.0	37.5	66.7	55.2
Belfast						26.3	10.5	21.1
Bradfd		78.9	87.5	90.9	82.8	92.6	94.7	87.3
Brightn					3.4	4.3	6.7	4.5
Bristol	49.5	49.5	65.8	71.4	76.5	54.9	61.3	60.5
Camb	0.0	0.0	0.0	0.0	0.0	0.0	8.1	1.2
Cardff	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.2
Carlis	33.3	30.0	64.7	61.9	78.6	81.8	100.0	56.5
Carsh	3.8	2.5	0.0	0.0	0.0	0.0	0.0	1.0
Chelms					46.4	95.0	92.9	72.6
Clwyd	0.0	0.0	6.7	0.0	0.0	0.0	40.0	6.0
Covnt	22.6	9.9	16.3	2.7	0.0	0.0	0.0	9.2
D & Gall	92.3	72.2	90.9	81.8	72.7	91.7	83.3	82.9
Derby	36.4	38.9		50.0	67.9	90.5	81.3	56.0
Dorset				22.2	65.2	80.0	66.7	51.1
Dudley	33.3	5.6	33.3	0.0	0.0	0.0	0.0	11.7
Dundee	78.1	70.6	57.8	54.3	55.9	29.7	0.0	53.7
Dunfn	80.0	84.0	78.9	58.3	69.2	61.1	44.4	72.5
Edinb	75.8	57.9	51.1	38.3	45.5	36.4	48.1	52.4
Exeter	29.5	27.0	23.1	29.1	20.4	13.7	10.7	22.9
Glasgw	51.0	56.6	54.6	50.0	44.1	50.7	57.4	51.9
Glouc	52.9	74.1	53.3	46.9	56.0	47.1	21.4	52.5
Hull	72.6	75.0	78.0	61.5	77.4	75.0	73.3	73.7
Inverns	11.1	0.0	0.0	0.0	0.0	9.1	0.0	2.9
Ipswi			28.6	27.8	30.0	21.1	57.1	29.4
Klmarnk	0.0	5.3	16.7	5.9	0.0	11.8	0.0	5.7
L Barts					77.8	84.4	72.4	78.2
L Guys	0.0	6.5	0.0	0.0	0.0	0.0	0.0	1.1
L Kings			59.1	69.8	75.5	80.0	85.7	71.0
L Rfree								0.0
L West			63.2	61.3	52.4	13.8	4.0	47.2
Leeds	50.0	63.5	58.2	55.4	60.0	57.4	51.1	56.8
Leic	71.4	77.5	83.5	83.9	83.3	78.6	72.1	78.4
Liv Ain	0.0	0.0	0.0	0.0	0.0	44.4	75.0	58.8
Liv RI	0.0	77.7	71.4	71.4	67.9	68.8	70.7	72.4
M Hope			0.0	0.0	0.0	0.0	5.6	0.6
Middlbr	78.7	80.4	72.3	60.3	56.3	66.7	45.0	68.3
Newc			43.4	19.5	36.5	50.0	48.1	38.8
Newry						37.5	0.0	27.3
Norwch					28.9	16.4	22.9	21.9
Nottm	93.6	97.3	96.2	94.9	98.0	91.4	84.0	94.4
Oxford	9.2	6.0	4.9	3.2	5.3	4.2	0.0	5.2
Plymth	40.4	37.0	49.0	54.5	37.8	42.3	42.9	43.7
Ports		27.7	21.3	19.7	17.0	8.3	19.1	20.0
Prestn	72.6	74.4	68.4	68.9	58.6	60.0	55.6	68.1
Redng	69.2	58.3	75.0	87.5	100.0	70.8	100.0	76.9
Sheff	56.8	48.2	55.1	31.4	0.0	0.0	0.0	34.3
Shrew					54.2	46.2	36.4	47.9
Stevng	23.9	40.3	72.9	40.7	37.9	48.4	48.3	43.0
Sthend	40.6	33.3	20.0	33.3	15.8	13.3	0.0	27.1
Sund	46.9	58.3	62.2	50.0	47.8	72.4	68.4	57.9

Table 7.18. Continued

Centre	2000	2001	2002	2003	2004	2005	2006	Total
Swanse	83.0	87.7	92.1	96.1	89.8	92.5	97.0	91.0
Truro		45.5	39.5	37.5	0.0	0.0	0.0	27.8
Tyrone						50.0	71.4	58.8
Ulster						75.0	75.0	75.0
Wirral			53.6	75.0	64.5	63.6	55.6	63.6
Wolve	92.9	92.0	86.8	87.2	75.0	50.0	50.0	79.9
Wrexm	7.9	0.0	6.3	0.0	0.0	0.0	25.0	3.9
York	34.4	45.8	57.1	64.5	60.9	52.6	50.0	52.4
England	**49.5**	**49.9**	**50.5**	**45.8**	**45.8**	**42.3**	**40.1**	**46.6**
N Ireland						**30.3**	**26.3**	**28.9**
Scotland	**51.5**	**48.7**	**47.0**	**39.5**	**39.8**	**37.6**	**36.4**	**44.0**
Wales	**26.0**	**33.0**	**36.2**	**36.8**	**32.4**	**32.0**	**38.7**	**33.5**
UK	**47.7**	**48.3**	**48.7**	**44.2**	**44.0**	**40.4**	**39.2**	**45.0**

Blank cells, data not available for that year

Interpretation of patterns of cause of death must be cautious as it is not known whether non-return is associated with cause. Some centres (e.g. Nottingham) consistently achieved a very high rate of data return for cause of death, because a process is in place to make sure that these data are entered. Several centres that were reporting these data in previous years appear to have discontinued collection.

Causes of death in incident RRT patients

Causes of death within the first 90 days

Treatment withdrawal and infection (table 7.19) were slightly more common as a cause of death within the first 90 days within the patient group aged >65 years when compared with the younger age group.

Causes of death within one year after 90 days

Treatment withdrawal as a cause of death (table 7.20) again was more common in the older age group. Cardiac disease accounted for 25% of all deaths and overall cardiovascular disease for 31%. Infection was still an important cause of nearly 1 in 5 deaths.

Causes of death in prevalent RRT patients in 2007

Causes of death in prevalent RRT patients in 2007 by modality and age

Table 7.21 and figures 7.23 and 7.24 show the frequency of the causes of death for both prevalent dialysis and transplant patients. A comparison has been made with data available from the 2007 ANZDATA Registry report (tables 7.22 and 7.23). The Australian Registry

Table 7.19. Cause of death by age in the first 90 days for incident patients, 2000–2006

	All age groups		<65 years		≥65 years	
Cause of death	Number of deaths	%	Number of deaths	%	Number of deaths	%
Cardiac disease	399	29	97	31	302	28
Cerebrovascular disease	70	5	17	5	53	5
Infection	252	18	43	14	209	19
Malignancy	112	8	28	9	84	8
Treatment withdrawal	205	15	31	10	174	16
Other	135	10	30	10	105	10
Uncertain	216	16	64	21	152	14
Total	**1,389**		**310**		**1,079**	
No cause of death data	1,594		349		1,245	

Table 7.20. Cause of death by age in 1 year after 90 days for incident patients, 2000–2006

	All age groups		<65 years		⩾65 years	
Cause of death	Number of deaths	%	Number of deaths	%	Number of deaths	%
Cardiac disease	534	25	165	27	369	24
Cerebrovascular disease	137	6	36	6	101	7
Infection	400	19	114	19	286	19
Malignancy	213	10	79	13	134	9
Treatment withdrawal	344	16	51	8	293	19
Other	373	17	109	18	264	17
Uncertain	153	7	56	9	97	6
Total	**2,154**		**610**		**1,544**	
No cause of death data	2,578		730		1,848	

Table 7.21. Cause of death by age in prevalent RRT patients by modality on 1/1/2007

	All modalities		Dialysis		Transplant	
Cause of death	Number of deaths	%	Number of deaths	%	Number of deaths	%
Cardiac disease	316	23	294	24	22	16
Cerebrovascular disease	67	5	57	5	10	7
Infection	252	18	223	18	29	21
Malignancy	118	9	89	7	29	21
Treatment withdrawal	179	13	173	14	6	4
Other	119	9	104	8	15	11
Uncertain	314	23	287	23	27	20
Total	**1,365**		**1,227**		**138**	
No cause of death data	2,296		1,948		348	

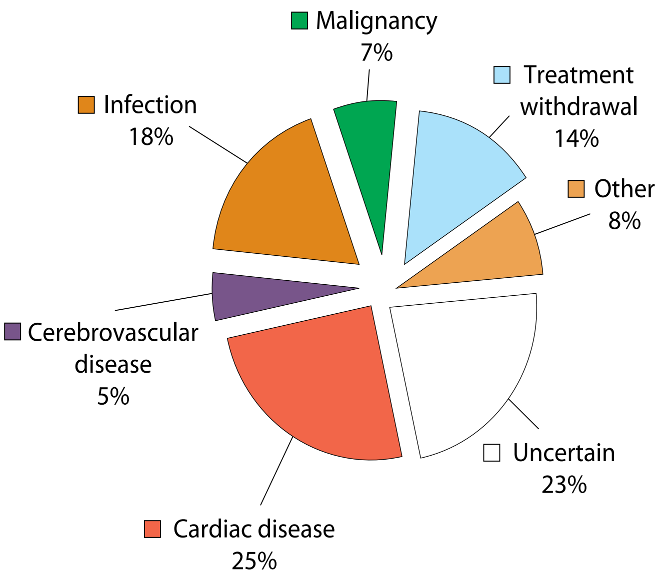

Fig. 7.23. Frequency of causes of death for prevalent dialysis patients in 2007

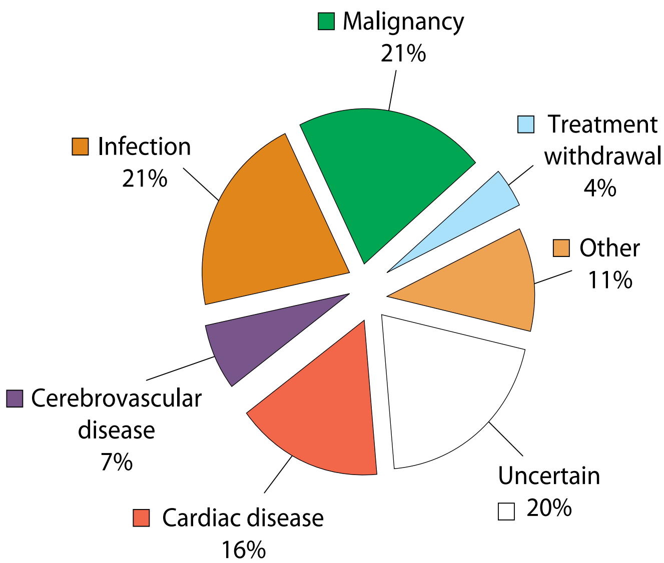

Fig. 7.24. Frequency of causes of death for prevalent transplant patients in 2007

appears to have many fewer cases of 'uncertain' causes of death and infections in both transplant and dialysis patients, this may account for fewer causes of death although this may be due to their difference in classification into the category of 'treatment withdrawal'.

Figure 7.25 contrasts the differences in frequency of these causes, between the 2 modalities within the UK. These data are neither age adjusted nor adjusted for differences in the comorbidity between the 2 groups. As expected, cardiac disease as a cause of death was less common in the transplanted patients as these were a pre-selected low risk group of patients. Treatment withdrawal still occurred in the transplanted group, in patients who chose not to restart dialysis when their renal transplant failed.

In Table 7.22, there were no differences in the causes of death between transplanted patients aged <55 or ⩾55 years. Table 7.23 shows these data for dialysis patients.

Conflict of interest: none

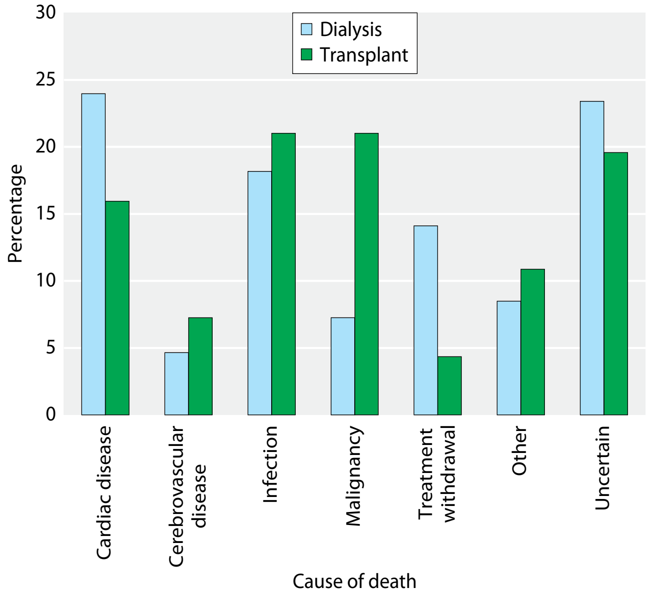

Fig. 7.25. Cause of death by modality for all prevalent patients on 01/01/2007

Table 7.22. Cause of death in prevalent transplanted patients on 1/1/2007 by age

Cause of death in transplanted patients	All age groups		<55 years		⩾55 years		ANZdata*
	Number of deaths	%	Number of deaths	%	Number of deaths	%	%
Cardiac disease	22	16	6	17	16	16	30
Cerebrovascular disease	10	7	1	3	9	9	7
Infection	29	21	7	19	22	22	15
Malignancy	29	21	8	22	21	21	32
Treatment withdrawal	6	4	2	6	4	4	1
Other	15	11	6	17	9	9	15
Uncertain	27	20	6	17	21	21	0
Total	**138**		**36**		**102**		
No cause of death data	348		100		248		

* ANZDATA Registry Report 2007

Table 7.23. Cause of death in prevalent dialysis patients on 1/1/2007 by age

Cause of death in dialysis patients	All age groups		<65 years		⩾65 years		ANZdata*
	Number of deaths	%	Number of deaths	%	Number of deaths	%	%
Cardiac disease	294	24	99	28	195	22	35
Cerebrovascular disease	57	5	14	4	43	5	9
Infection	223	18	61	17	162	19	10
Malignancy	89	7	24	7	65	7	7
Treatment withdrawal	173	14	35	10	138	15	34
Other	104	8	47	13	57	7	5
Uncertain	287	23	79	22	208	24	1
Total	**1,227**		**359**		**868**		
No cause of death data	1,948		583		1,365		

* ANZDATA Registry Report 2007

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4. General Register Office for Scotland; 2005 Annual Review; Chapter 1 http://www.gro-scotland.gov.uk/statistics/library/annrep/rgs-annual-review-2005/chapter-1/chapter-1-demographic-overview-deaths/deaths-part-1.html#variationsinmortalitylevelswithinscotland
5. Office for National Statistics http://www.statistics.gov.uk
6. US Renal Data System, USRDS 2007 Annual Report Volume 1, Chapter 6 www.usdrs.org/atlas.htm

Appendix 1: Survival tables

Table 7.24. One-year after 90-day incident survival by centre for 2006 unadjusted and adjusted to age 60

Centre	Unadjusted 1yr after 90d survival	Adjusted 1yr after 90d survival	Adjusted 1yr after 90d 95% CI
Abrdn	81.1	85.8	77.6–94.8
Airdrie	79.1	77.7	67.0–90.1
Antrim	86.1	91.4	83.8–99.7
B Heart	84.5	89.3	84.1–94.8
B QEH	83.5	87.7	83.5–92.0
Bangor	73.6	80.1	68.0–94.2
Basldn	89.9	93.0	86.7–99.8
Belfast	92.1	94.0	89.8–98.4
Bradfd	73.1	76.5	65.4–89.5
Brightn	87.0	91.2	87.1–95.6
Bristol	91.9	93.9	90.8–97.2
Camb	90.6	92.4	88.5–96.5
Cardff	83.7	87.5	83.4–91.8
Carlis	88.5	91.0	82.0–100
Carsh	79.7	85.8	81.3–90.6
Chelms	78.6	86.5	78.6–95.1
Covnt	82.1	85.5	79.4–92.2
Derby	90.2	92.7	87.2–98.4
Dorset	84.6	89.5	82.8–96.6
Dudley	85.0	89.8	82.5–97.8
Dundee	91.3	93.7	88.0–99.8
Dunfn	80.0	83.1	72.6–95.0
Edinb	86.5	88.6	83.0–94.6
Exeter	81.5	87.5	82.2–93.1
Glasgw	82.1	85.7	81.1–90.6
Glouc	85.7	90.4	84.5–96.6
Hull	91.3	92.7	87.9–97.7
Inverns	87.6	90.2	80.6–100
Ipswi	94.0	95.6	89.9–100
Klmarnk	77.9	83.9	75.6–93.1
L Barts	91.5	92.3	88.6–96.1
L Guys	87.9	88.3	82.7–94.3
L Kings	87.5	89.3	83.7–95.3
L Rfree	91.0	91.9	88.2–95.7
L West	95.3	96.1	94.0–98.2
Leeds	83.6	86.4	81.5–91.5
Leic	84.9	87.5	83.4–91.8
Liv Ain	84.8	86.7	76.7–98.0
Liv RI	81.9	83.2	77.0–89.9
M Hope	90.6	91.8	87.3–96.6
Middlbr	90.5	92.7	88.2–97.4
Newc	84.9	86.4	80.2–93.0
Norwch	82.9	88.4	83.0–94.1
Nottm	92.1	94.2	90.6–97.9
Oxford	88.7	90.6	86.4–95.0
Plymth	78.7	84.3	77.8–91.4
Ports	82.4	86.5	81.9–91.4
Prestn	78.5	83.0	76.6–89.9
Redng	86.5	90.2	84.4–96.5
Sheff	86.6	88.6	84.0–93.5
Shrew	87.8	90.0	82.7–97.9
Stevng	84.1	86.6	80.7–93.0
Sthend	97.6	98.1	94.5–100
Sund	76.0	80.9	71.9–91.2
Swanse	76.7	84.4	78.7–90.6
Truro	88.0	92.1	85.7–98.9
Tyrone	87.5	91.4	82.8–100
Wirral	88.2	90.4	83.5–97.9
Wolve	86.2	89.3	83.2–95.8
Wrexm	87.6	90.7	81.6–100
York	77.0	81.8	71.8–93.2
England	**86.6**	**89.5**	**88.5–90.5**
N Ireland	**88.6**	**91.9**	**88.6–95.3**
Scotland	**82.8**	**86.2**	**83.5–89.0**
Wales	**81.7**	**86.7**	**83.6–89.9**
UK	**86.0**	**89.1**	**88.2–90.0**

Table 7.25. Ninety day incident survival by centre for 2006 unadjusted and adjusted to age 60

Centre	Unadjusted 90d survival	Adjusted 90d survival	Adjusted 90d 95% CI
Abrdn	90.6	94.1	89.3–99.2
Airdrie	96.4	96.9	92.7–100
Antrim	96.9	98.4	95.4–100
B Heart	86.0	91.8	87.9–95.8
B QEH	95.1	97.0	95.1–99.0
Bangor	75.0	83.6	74.8–93.4
Basldn	95.7	97.1	93.3–100
Belfast	94.5	96.5	93.8–99.3
Bradfd	85.7	89.3	82.1–97.1
Brightn	92.4	95.6	92.9–98.3
Bristol	93.1	95.8	93.5–98.2
Camb	86.7	90.7	86.9–94.6
Cardff	92.8	95.5	93.2–97.8
Carlis	96.3	97.4	92.5–100
Carsh	93.4	96.3	94.2–98.4
Chelms	91.8	95.9	92.1–99.9
Covnt	94.2	96.1	93.1–99.2
Derby	88.4	92.7	88.0–97.7
Dorset	100.0	–	–
Dudley	90.9	94.9	90.2–99.9
Dundee	86.5	91.4	85.6–97.7
Dunfn	94.6	96.3	91.4–100
Edinb	91.3	93.8	89.9–97.8
Exeter	94.3	96.9	94.5–99.4
Glasgw	88.9	92.6	89.6–95.8
Glouc	94.5	96.9	93.9–99.9
Hull	94.8	96.3	93.2–99.5
Inverns	96.2	97.6	93.2–100
Ipswi	92.6	95.3	90.4–100
Klmarnk	94.6	96.8	93.4–100
L Barts	96.2	97.0	94.9–99.2
L Guys	98.5	98.8	97.1–100
L Kings	95.5	96.6	93.7–99.6
L Rfree	96.2	97.1	95.1–99.1
L West	98.2	98.7	97.5–99.8
Leeds	92.2	94.5	91.7–97.4
Leic	89.3	92.5	89.7–95.4
Liv Ain	91.2	93.3	86.4–100
Liv RI	89.3	91.8	87.9–95.9
M Hope	96.1	97.1	94.6–99.6
Middlbr	93.3	95.5	92.4–98.8
Newc	91.7	93.5	89.4–97.7
Norwch	82.6	90.5	86.4–94.8
Nottm	89.5	93.6	90.4–97.0
Oxford	95.5	97.0	94.8–99.2
Plymth	93.4	96.3	93.4–99.3
Ports	90.2	93.7	90.8–96.7
Prestn	96.7	97.7	95.6–100
Redng	94.8	96.8	93.8–99.9
Sheff	94.6	96.2	93.8–98.7
Shrew	92.6	94.4	89.3–99.8
Stevng	90.7	93.1	89.2–97.1
Sthend	93.5	95.4	90.5–100
Sund	87.5	91.9	86.3–97.8
Swanse	92.0	95.9	93.3–98.6
Truro	94.0	96.6	93.0–100
Tyrone	97.0	98.2	94.8–100
Wirral	96.4	97.6	94.5–100
Wolve	88.4	92.2	87.7–97.0
Wrexm	100.0	–	–
York	89.4	93.1	87.5–99.1
England	**92.9**	**95.3**	**94.6–96.0**
N Ireland	**95.0**	**97.0**	**95.2–98.9**
Scotland	**91.2**	**94.2**	**92.6–95.8**
Wales	**90.8**	**94.6**	**92.9–96.4**
UK	**92.7**	**95.2**	**94.6–95.8**

Table 7.26. One year after 90-day incident survival by centre for incident cohort years 1999–2006 adjusted to age 60

Centre	1999	2000	2001	2002	2003	2004	2005	2006
Abrdn	81.8	79.8	92.4	87.9	82.9	89.8	80.1	85.8
Airdrie	74.8	81.6	84.8	78.4	80.0	85.6	72.3	77.7
Antrim							87.2	91.4
B Heart	86.6	82.7	85.1	87.8	86.3	88.0	86.1	89.3
B QEH						88.2	90.7	87.7
Bangor				82.2	86.9	84.0	83.4	80.1
Basldn					91.8	95.1	89.7	93.0
Belfast							90.0	94.0
Bradfd			93.1	85.2	83.9	85.5	85.6	76.5
Brightn						87.9	83.0	91.2
Bristol	85.7	86.3	85.8	88.4	87.3	87.5	83.3	93.9
Camb			90.7	82.0	89.4	87.9	91.2	92.4
Cardff	88.3	88.7	83.6	82.7	89.6	86.3	88.5	87.5
Carlis	–	79.4	–	88.4	78.3	86.5	82.8	91.0
Carsh	86.2	85.9	75.8	85.7	90.6	86.3	91.9	85.8
Chelms						81.7	84.5	86.5
Clwyd				–	–	–	81.7	–

Table 7.26. Continued

Centre	1999	2000	2001	2002	2003	2004	2005	2006
Covnt	78.9	82.6	87.8	90.6	82.4	85.3	87.2	85.5
D & Gall	–	–	74.6	78.1	85.5	–	–	–
Derby		88.2	85.1		83.6	86.7	89.3	92.7
Derry							–	–
Dorset					86.0	91.1	81.4	89.5
Dudley	89.8	86.2	90.2	89.3	88.8	85.6	97.0	89.8
Dundee	89.6	77.6	86.8	83.9	89.6	84.1	86.1	93.7
Dunfn	80.0	72.2	70.3	86.8	85.7	87.8	77.1	83.1
Edinb	84.9	80.4	80.5	82.5	83.2	79.9	86.0	88.6
Exeter	87.2	86.3	86.2	87.0	86.1	86.8	85.5	87.5
Glasgw	85.2	84.7	79.9	84.6	85.0	81.6	85.0	85.7
Glouc	88.3	95.0	82.1	81.2	84.3	86.7	94.6	90.4
Hull	88.2	86.3	90.0	85.0	87.9	86.3	89.3	92.7
Inverns	–	84.1	91.7	83.6	88.0	83.4	85.4	90.2
Ipswi				98.3	93.7	90.9	85.7	95.6
Klmarnk	90.5	91.5	88.3	87.3	85.3	83.9	93.7	83.9
L Barts						87.4	92.9	92.3
L Guys		89.3	88.4	85.1	95.6	88.0	92.7	88.3
L Kings				88.0	86.2	88.7	89.0	89.3
L Rfree							92.8	91.9
L West				92.9	95.0	92.5	93.7	96.1
Leeds	81.8	91.1	89.2	85.4	87.9	90.0	88.6	86.4
Leic	85.6	84.5	87.2	87.6	91.5	85.5	85.6	87.5
Liv Ain						–	87.5	86.7
Liv RI			87.9	85.2	83.5	83.6	92.5	83.2
M Hope					88.1	82.7	92.2	91.8
Middlbr	81.0	89.1	84.1	79.0	82.4	85.1	83.2	92.7
Newc				87.1	87.3	83.2	83.6	86.4
Newry							87.1	–
Norwch						86.0	90.1	88.4
Nottm	86.9	90.0	89.3	87.1	86.4	83.7	86.2	94.2
Oxford	94.4	90.4	86.5	89.1	87.9	90.5	86.6	90.6
Plymth	82.5	86.3	73.5	81.9	81.6	80.9	81.9	84.3
Ports			87.1	86.2	88.2	87.9	83.7	86.5
Prestn	87.7	87.3	86.9	87.2	86.4	84.4	91.5	83.0
Redng		77.7	83.6	91.7	89.9	93.1	88.2	90.2
Sheff	85.0	95.0	93.8	84.0	90.1	89.4	92.2	88.6
Shrew						87.9	90.3	90.0
Stevng	87.1	90.4	81.4	87.5	94.8	87.7	78.7	86.6
Sthend	88.6	82.5	82.5	87.4	90.7	88.7	92.3	98.1
Sund	80.5	84.8	83.9	69.5	81.0	87.5	82.4	80.9
Swanse		86.4	85.2	82.8	81.4	83.0	84.3	84.4
Truro			91.5	83.8	88.6	93.3	87.8	92.1
Tyrone							–	–
Ulster							–	–
Wirral				77.1	95.0	82.9	87.6	90.4
Wolve	86.5	87.3	76.7	87.0	83.0	87.8	86.2	89.3
Wrexm	81.7	84.7	83.0	93.2	82.0	91.8	91.2	90.7
York		83.8	86.7	82.1	77.0	89.2	84.9	81.8
England	**85.8**	**87.7**	**86.5**	**86.4**	**88.2**	**87.6**	**88.5**	**89.5**
N Ireland							**89.8**	**91.9**
Scotland	**85.3**	**82.0**	**82.7**	**83.8**	**85.2**	**83.8**	**84.2**	**86.2**
Wales	**87.1**	**87.4**	**84.2**	**84.3**	**85.9**	**85.7**	**86.5**	**86.7**
UK	**85.8**	**86.6**	**85.8**	**85.9**	**87.6**	**87.1**	**88.0**	**89.1**

– Centres with <20 patients are excluded for that year
Blank cells, data not available for that year

Table 7.27. One year prevalent survival by centre for prevalent cohort years 2000–2007 adjusted to age 60

	1 year survival by centre and year							
Centre	2000	2001	2002	2003	2004	2005	2006	2007
Abrdn	85.8	89.3	87.2	80.4	85.3	87.4	86.7	89.6
Airdrie	77.3	76.8	81.2	83.6	84.3	82.6	79.4	78.3
Antrim						83.4	91.9	85.4
B Heart	86.6	87.4	87.6	87.5	86.8	87.9	86.4	87.6
B QEH					89.0	89.0	88.7	88.6
Bangor			86.0	81.6	89.8	86.6	90.4	80.7
Basldn				81.5	88.0	90.7	90.2	91.4
Belfast						86.4	87.3	90.9
Bradfd		79.9	88.0	82.7	87.9	86.1	82.2	83.2
Brightn					86.7	84.3	88.0	87.7
Bristol	87.3	86.1	87.8	88.9	87.0	87.7	87.9	89.3
Camb		86.1	86.7	86.9	87.6	87.8	88.8	88.3
Cardff	85.2	85.7	85.9	81.1	84.5	84.4	84.4	88.8
Carlis	82.8	88.9	80.6	83.1	82.5	85.0	84.4	87.0
Carsh	83.7	83.9	83.2	85.4	88.4	86.5	89.3	89.0
Chelms					86.4	81.6	85.1	85.6
Clwyd			88.1	89.0	75.8	82.2	79.9	91.1
Covnt	87.2	85.7	85.1	87.7	88.7	89.4	85.4	86.9
D & Gall	87.2	83.8	84.6	86.3	83.1	91.3	82.0	90.5
Derby	88.8	89.6		86.5	88.8	88.4	89.2	87.5
Derry								86.4
Dorset				90.0	87.8	90.2	85.9	86.9
Dudley	85.4	83.3	83.2	84.8	86.7	86.3	87.5	86.7
Dundee	76.7	85.7	84.9	84.0	85.4	87.8	87.6	84.5
Dunfn	76.2	78.5	82.1	83.5	88.9	91.0	87.9	89.2
Edinb	83.7	82.5	84.8	83.8	86.3	86.4	87.1	88.7
Exeter	86.0	84.9	87.2	86.3	85.8	83.8	90.7	87.3
Glasgw	86.2	83.4	85.9	83.8	85.6	87.5	86.5	88.8
Glouc	89.0	79.1	83.6	81.7	89.0	88.3	90.9	87.8
Hull	81.0	86.8	87.2	85.3	85.6	84.7	85.3	89.9
Inverns	80.8	88.8	88.3	87.4	87.3	86.9	86.2	94.2
Ipswi			81.7	84.8	90.4	85.9	84.8	85.2
Klmarnk	80.2	85.2	82.5	82.0	86.9	84.5	91.3	87.1
L Barts					83.8	85.6	88.2	89.1
L Guys	86.2	86.7	86.3	88.8	88.7	89.2	87.9	90.9
L Kings			81.0	77.6	81.5	86.5	88.8	84.6
L Rfree						90.1	90.5	90.5
L West			89.9	91.4	91.1	91.6	91.6	92.8
Leeds	83.4	85.4	87.4	86.1	85.5	88.8	89.2	88.8
Leic	83.2	84.7	84.1	83.8	85.2	87.2	84.5	89.9
Liv Ain		92.5	90.5	90.5	86.6	96.8	86.3	90.9
Liv RI		81.4	82.4	85.2	86.4	84.5	88.9	85.8
M Hope				84.8	82.0	84.1	85.9	88.6
M RI								85.0
Middlbr	84.0	84.0	84.2	84.4	83.0	85.9	85.3	86.7
Newc			83.9	81.7	81.8	86.9	84.9	87.2
Newry						85.9	87.9	86.7
Norwch					86.3	86.9	89.4	86.5
Nottm	85.1	87.0	82.6	85.1	86.3	85.2	83.4	89.5
Oxford	87.7	88.4	85.5	86.8	88.3	87.7	88.3	87.8
Plymth	85.0	87.5	77.2	85.5	87.1	88.1	84.0	83.6
Ports		83.7	80.9	81.5	89.0	85.6	84.9	89.6
Prestn	85.7	87.1	86.3	84.7	85.9	85.5	86.7	90.8
Redng	83.7	77.6	85.0	83.0	89.4	86.8	88.8	89.7

Table 7.27. Continued

Centre	1 year survival by centre and year							
	2000	2001	2002	2003	2004	2005	2006	2007
Sheff	84.1	88.1	90.5	91.0	87.8	87.1	89.2	88.4
Shrew					85.0	87.1	86.1	89.4
Stevng	89.6	90.5	86.5	88.3	89.4	88.7	89.4	89.7
Sthend	85.2	88.6	88.7	86.9	88.9	86.3	83.5	85.8
Stoke								84.4
Sund	76.7	79.3	77.6	75.4	82.7	86.4	78.8	82.4
Swanse	84.2	87.7	80.9	82.4	87.9	89.3	85.9	88.4
Truro		88.8	82.3	90.2	89.9	85.7	91.8	88.8
Tyrone						89.1	83.6	93.3
Ulster						85.8	91.3	89.0
Wirral			92.9	84.8	87.4	89.1	89.1	87.8
Wolve	84.2	90.1	86.6	83.5	86.3	87.8	89.7	87.8
Wrexm	83.4	87.8	87.0	85.6	86.0	84.4	85.1	88.8
York	87.1	79.0	84.7	81.6	82.7	88.3	83.0	88.0
England	**85.3**	**85.8**	**85.7**	**86.2**	**87.1**	**87.5**	**87.8**	**88.6**
N Ireland						**86.1**	**88.0**	**89.2**
Scotland	**83.2**	**83.6**	**85.0**	**83.6**	**85.8**	**87.0**	**86.4**	**88.0**
Wales	**84.5**	**86.7**	**84.9**	**82.6**	**85.6**	**86.0**	**85.2**	**88.2**
UK	**84.9**	**85.6**	**85.5**	**85.6**	**86.9**	**87.3**	**87.6**	**88.5**

Blank cells, data not available for that year