Chapter 6
Survival and Causes of Death of UK Adult Patients on Renal Replacement Therapy in 2009: national and centre-specific analyses

Clare Castledine[a], Retha Steenkamp[a], Terry Feest[a], Charles R V Tomson[b]

[a]UK Renal Registry, Bristol, UK; [b]Southmead Hospital, Bristol, UK

Key Words
Cause of death · Comorbidity · Dialysis · End stage renal disease · Established renal failure · Haemodialysis (HD) · Outcome · Peritoneal dialysis (PD) · Renal replacement therapy (RRT) · Survival · Transplant · Vintage

Summary

- The 2008 unadjusted 1 year after 90 day survival for patients starting RRT was 87.3%.
- In incident patients aged 18–64, the unadjusted 1 year survival has risen from 85.9% in 1997 to 91.9% in 2008.
- In incident patients aged $\geqslant 65$, unadjusted 1 year survival has risen from 64.2% in 1997 to 75.8% in 2008.
- Diabetic prevalent patient one year survival rose from 76.6% in 2000 to 83.6% in 2009.
- RRT patients aged 30–34 had a mortality rate 19 times higher than the age matched general population, whereas RRT patients aged 85+ had a mortality rate 2.4 times higher.
- In the prevalent RRT dialysis population, cardiovascular disease accounted for 24% of deaths, infection 19% and treatment withdrawal 14%; 22% were recorded as uncertain.
- The median life years remaining for a 25–29 year old on RRT was 20 years and for a 75+ year old, 4 years.

Introduction

The analyses presented in this chapter examine (a) survival from the start of renal replacement therapy (RRT); (b) the survival amongst all prevalent RRT patients alive on 1st January 2009 and (c) projected life years remaining for RRT patients. They encompass the outcomes from the total incident UK dialysis population reported to the UK Renal Registry (UKRR), including the 18% who started on peritoneal dialysis and the 6% who received a pre-emptive renal transplant. These results are therefore a true reflection of the outcomes in the whole UK RRT population and are not distorted by focusing solely on the haemodialysis cohort. Additionally, analyses of the 1st year UK survival data include patients who were recorded as having started RRT for established renal failure (as opposed to acute kidney injury) but who had died within the first 90 days of starting RRT, a group excluded from most other countries' registry data.

The term established renal failure (ERF) used throughout this chapter is synonymous with the terms 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'; the term ERF was endorsed by the English National Service Framework for Renal Services, published in 2004.

The prevalent patient group was defined as all patients over 18 years old who had been on RRT for at least 90 days at one of the UK adult renal centres and who were alive on 31st December 2009. This included incident patients in 2009 and patients who had been on treatment for longer but excluded patients who had stopped treatment before this date.

Since 2006, the UK has openly reported and published centre-attributable RRT survival and remains the only country doing so. It is again stressed that these are raw data which continue to require very cautious interpretation. The Registry can adjust for the effects of the different age distributions of patients in different centres and the proportion of patients with diabetes, but lacks sufficient data from many participating centres to enable adjustment for other comorbidities and ethnic origin, which have been shown to have an impact on outcome (for instance, better survival is expected in centres with a higher proportion of Black and South Asian patients). This lack of information on case mix makes interpretation of any apparent difference in survival between centres difficult, although age and comorbidity, especially diabetes, are the major factors associated with survival [1, 2]. 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 of the 2009 UKRR report [3].

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 any adjustment for age or other factors that affect the chances of survival in the 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 gives an estimate of what the survival would have been if all patients in that centre had been aged 60 at the start of RRT. This age was chosen because it was approximately the average age of patients starting RRT 14 years ago at the start of the Registry's data collection. For the last 7 years the average age of patients commencing RRT in the UK has been stable around an age of 65 years, but the Registry has maintained age adjustment to 60 years for comparability with all previous years' analyses. All analyses were undertaken using SAS vs. 9.2.

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 whether with dialysis or a pre-emptive transplant.

In the UKRR all patients starting RRT for ERF are included from the date of the first RRT treatment wherever it took place (a date currently defined by the clinician) if the clinician considered the renal failure irreversible; should a patient recover renal function within 90 days they were then excluded. These UK data therefore include some patients who developed 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. Capture of data on these patients requires accurate coding. Previously, the Registry asked clinicians to re-enter a

code for established renal failure in patients initially coded as having acute renal failure, once it had become clear that there was no recovery of kidney function. However, adherence to this requirement was very variable, with some clinicians entering a code for established renal failure only once a decision had been made to plan for long-term RRT [4]. All UK nephrologists have now been asked to record the date of the first haemodialysis session and to record whether the patient was considered to have acute kidney injury (acute renal failure) or to be in ERF at the time of the first session. For patients initially categorised as 'acute', but who were subsequently categorised as ERF, the UKRR will extract information from the first session of RRT onwards if available and will assign the date of this first session as the date of start of RRT.

Recent UKRR analyses of electronic data extracted for the immediate month prior to the start date of RRT provided by clinicians highlighted additional inconsistencies in the definition of this first date when patients started on peritoneal dialysis, with the date of start reported to the Registry being later than the actual date of start. These findings are described in detail in chapter 13 of the 2009 Report [4]. This concern is unlikely to be unique to the UK, but will be common to analyses from all renal centres and registries.

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 or administrative 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. Some other countries do not include initial urgent/emergency dialysis in intensive care units or acute wards.

Thus as many other national registries do not include reports on patients who do not survive the first 90 days, survival from 90 days onwards is also reported to allow international comparisons. This distinction is important, as there is a much higher death rate in the first 90 days, which would distort any such comparisons.

Methodology for incident patient survival

Patients are considered 'incident' at the time of their first RRT, thus patients re-starting dialysis after a failed transplant were not included.

The incident survival cohort was **NOT** censored at the time of transplantation and therefore included the 6% who received a pre-emptive transplant. Censoring would exclude this 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 and Black origin are likely to have a healthier dialysis population, because South Asian and Black patients are less likely to undergo early transplantation.

The incident ('take-on') population in any specific year excludes those who recovered within 90 days from the start of RRT, but includes patients who recovered from ERF after 90 days. Patients newly transferred into a centre who were already on RRT were excluded from the incident population for that centre and were counted at the centre at which they started RRT.

Some patients recover renal function after more than 90 days but subsequently returned to 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. If recovery was for 90 days or more the length of time on RRT was calculated from the day on which the patient restarted RRT.

The one year incident survival is for patients who started RRT in 2008 and was calculated for 1 full year through 2008 and 2009 (e.g. patients starting RRT on 1st December 2008 were followed through to 30th November 2009). The 2009 incident patients could not be analysed 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 2008 were not included in the cohort, as 1st quarter 2010 data on these patients were not yet available.

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 2005 to 2008 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 1,000 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 were lost to follow-up) 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 2004 to 2008. Eleven centres had returned >85% of comorbidity data for patients in the combined cohort. Adjustment was first performed to a mean age of 60 years, then to the average distribution of primary diagnosis for all the eleven centres. The individual centre data were then further adjusted for average distribution of comorbidity 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

For dialysis patients, all who had been established on RRT for at least 90 days on 1st January 2009 were included in these analyses.

For calculating the survival of transplant patients, those who had been established with a transplant for at least 6 months were included.

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 transplantation. 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. 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. Censoring at transplantation systematically removes younger fitter patients from the survival data. The differences are likely to be small due to the relatively small proportion of patients being transplanted in a given year compared to the whole dialysis population (about 14% of the dialysis population aged under 65 and 1% of the population aged 65 years and over). Only the censored for transplantation results have been quoted throughout the prevalent analyses.

Methodology of causes of death

The ERA-EDTA registry codes for causes of death were used. These have been grouped into the following categories:

- Cardiac disease
- Cerebrovascular disease
- Infection
- Malignancy
- Treatment withdrawal
- Other
- Uncertain

Some centres had high completeness of 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 of cause of death. The incident patient analysis included all patients starting RRT in the years 2000–2008. 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 ERA-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 January 2009. The death rate was calculated for the UK general population (data from the Office of National Statistics) [5] by age band and compared with the same age band for prevalent patients on RRT on 1st January 2009.

Methodology of median life expectancy (life table calculations)

Kaplan Meier survival analyses were used to calculate the hazard of death by age group (18–34, 35–44, 45–54, 55–64, 65–74, 75+) for incident patients starting RRT from 1997 to 2008. The patient cohort inclusion criteria are the same to that of the incident cohort described above. Patients were then followed until death, censoring or end of the study period.

This analysis showed that the hazard of death stabilized after year one with variability increasing again after nine years. Due to this, the average hazard of death for the periods 1 to 9 years was calculated for each age group. Life expectancy was calculated as (1 – hazard of death) which gives the probability of surviving until the next time period. Median life years remaining is then the difference between the age when reaching the 50% probability of survival and the age of starting RRT.

Methodology for comparing mortality in prevalent RRT patients with the mortality in the general population

Data on the UK population in mid-2008 and the number of deaths in 2008 were obtained from the Office of National Statistics for each nation separately and added together [5]. The age-specific UK death rate was calculated as the number of UK deaths/UK population. The age-specific 'expected' rate of deaths in the RRT population was then calculated: years exposed for RRT patients × UK death rate/1,000. The age-specific observed number of RRT deaths was calculated as the actual number of deaths observed in 2009 and the RRT death rate as the actual number of deaths in 2009/years exposed for RRT patients × 1,000. The observed/expected ratio was then calculated.

Results of incident (new RRT) patient survival

The 2008 cohort included 6,767 patients who started RRT, without any periods of renal function recovery lasting more than 90 days.

It is hard to set survival standards at present because these should be age, gender and comorbidity adjusted and this is not yet possible from UKRR data. The current 5th Edition of the Clinical Practice Guidelines [6] does not set any standards for audit of patient survival.

The 3rd Renal Standards document defined standard primary renal disease using the ERA-EDTA diagnosis codes (including only codes 0–49); this excluded 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 are also included in this report to allow comparison with reports from other registries. The results are shown in table 6.1.

Table 6.1. One-year incident dialysis patient survival (from day 0–365), patients aged 18–54, 2008 and 2002 cohort (excludes patients whose first modality was transplantation)

	2008 cohort		2002 cohort	
First treatment	Standard primary renal disease	All primary renal diseases except diabetes	Standard primary renal disease	All primary renal diseases except diabetes
All dialysis %	97.6	96.2	95.4	93.9
95% CI	*96.4–98.4*	*95.1–97.1*	*93.7–97.1*	*92.2–95.5*
HD %	97.0	95.2	93.4	91.6
95% CI	*95.4–98.0*	*93.7–96.4*	*90.7–96.0*	*89.2–94.0*
PD %	99.0	98.8	98.6	97.9
95% CI	*96.9–99.7*	*97.1–99.5*	*71.1–100*	*96.3–99.6*

Table 6.2. Incident patient survival across the UK countries, combined 2 year cohort (2007–2008), adjusted to age 60

	England	N Ireland	Scotland	Wales	UK
Survival at 90 day (%)	95.7	97.4	94.7	95.1	95.6
95% CI	*95.3–96.1*	*96.2–98.6*	*93.5–95.8*	*94.0–96.3*	*95.2–96.0*
Survival 1 year after 90 days (%)	89.6	90.8	85.9	85.8	89.1
95% CI	*88.9–90.3*	*88.3–93.3*	*83.9–87.9*	*83.7–88.1*	*88.4–89.7*

The trend of improving patient survival continued with improvement seen in both those patients with 'standard primary renal disease' and those with all other primary renal diseases (excluding diabetes). For a longer term comparison, the 2002 cohort is also shown.

Comparison of survival between UK countries

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 reliably identified (table 6.2). These data have not been adjusted for differences in primary renal diagnosis, ethnicity, socio-economic status or comorbidity, nor for differences in life expectancy in the general populations of the four countries. There was a significant difference in 90 day survival between the UK countries ($p = 0.03$) and the 1 year after 90 day survival was once again significantly different ($p < 0.0002$) between countries. It is postulated that greater prevalence of cardiovascular disease in Wales and Scotland compared with England may account for these differences.

Modality

It is impossible to obtain truly valid comparisons of survival of patients starting on different modalities, as modality selection is not random. In the UK patients starting peritoneal dialysis as a group were younger and fitter than those starting haemodialysis, and were transplanted more quickly. The age-adjusted one year survival estimates on HD and PD were 88.1% and 93.8% respectively which both show a trend in improvement in survival from 2002 (figure 6.1 and table 6.3).

Table 6.3. One-year after day 90 incident patient survival by first established treatment modality (adjusted to age 60) (excluding patients whose first modality was transplantation)

	Age adjusted 1 year after 90 days % survival *95% CI*	
Year	HD	PD
2008	88.1	93.8
	87.0–89.1	*92.5–95.2*
2007	87.0	94.0
	85.9–88.1	*92.8–95.3*
2006	86.8	94.2
	85.7–88.0	*92.9–95.5*
2005	85.8	93.2
	84.6–87.0	*91.8–94.6*
2004	85.7	90.4
	84.5–87.0	*88.8–92.1*
2003	85.7	92.2
	84.3–87.1	*90.7–93.8*
2002	84.0	90.4
	82.5–85.6	*88.6–92.3*

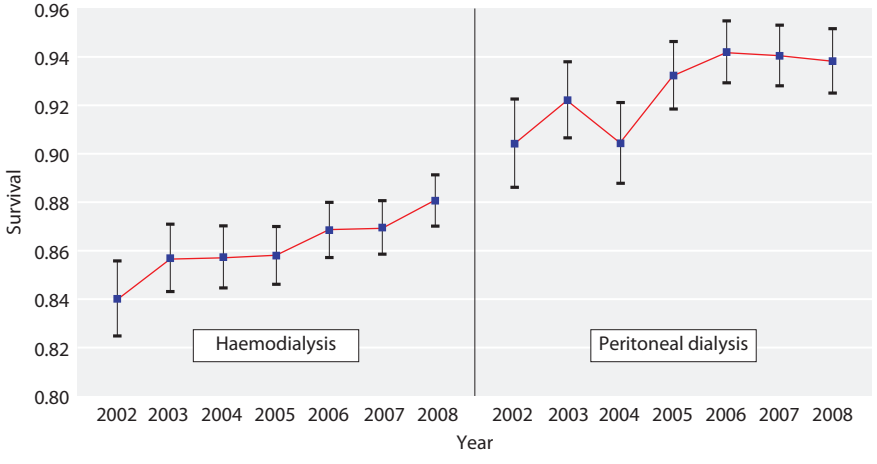

Fig. 6.1. Trend in 1 year after 90 day mortality by first established modality 2002–2008 (adjusted to age 60) (excluding patients whose first modality was transplantation)

Table 6.4. Unadjusted 90 day survival of incident patients, 2008 cohort, by age

Age	KM* survival (%)	KM 95% CI	N
18–64	97.3	*96.7–97.8*	3,519
⩾65	90.1	*89.0–91.1*	3,248
All ages	93.8	*93.2–94.4*	6,767

* KM = Kaplan–Meier

Table 6.5. Unadjusted 1 year after day 90 survival of incident patients, 2008 cohort, by age

Age	KM survival (%)	KM 95% CI	N
18–64	93.2	*92.3–94.0*	3,400
⩾65	80.4	*78.8–81.8*	2,921
All ages	87.3	*86.4–88.1*	6,321

* KM = Kaplan–Meier

Results from the USRDS and Australasian (ANZDATA) registries, after adjustment for comorbidity, are similar.

Age

Tables 6.4 to 6.9 show survival of all patients and those aged 65 and above and those aged below 65 years, for up to twelve years after initiation of renal replacement therapy. In the UK, short term survival remained similar

Table 6.6. Increase in proportional hazard of death for each 10 year increase in age, at 90 days and for 1 year thereafter, 2008 cohort

Interval	Hazard of death for 10 year age increase	*95% CI*
First 90 days	1.78	*1.64–1.93*
1 year after first 90 days	1.58	*1.49–1.67*

Table 6.7. Unadjusted KM survival of incident patients, 1997–2008 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	11 year	12 year	*95% CI for latest year*	N
2008	**91.9**												***90.9–92.8***	**3,519**
2007	92.4	86.5											*85.3–87.6*	3,503
2006	91.4	85.7	80.9										*79.5–82.3*	3,211
2005	89.8	83.9	79.3	75.0									*73.4–76.5*	3,036
2004	89.9	84.1	78.0	72.5	67.9								*66.1–69.7*	2,700
2003	89.6	82.8	77.6	72.5	67.6	63.5							*61.5–65.4*	2,411
2002	88.6	81.8	76.4	71.3	66.6	62.9	59.1						*56.9–61.2*	2,114
2001	87.5	79.9	74.3	68.8	64.1	59.7	56.4	53.2					*50.8–55.4*	1,878
2000	89.6	82.0	75.4	70.6	65.4	60.5	56.5	53.4	51.1				*48.6–53.6*	1,613
1999	87.7	81.7	74.4	68.5	63.7	59.6	55.7	52.7	50.3	48.0			*45.3–50.6*	1,392
1998	86.8	79.5	72.8	67.7	61.7	57.0	53.0	50.5	47.6	46.3	44.1		*41.3–46.8*	1,288
1997	85.9	78.4	71.3	65.8	60.7	56.0	52.7	50.5	48.4	44.3	41.6	40.4	*37.0–43.8*	799

Table 6.8. Unadjusted KM survival of incident patients, 1997–2008 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	11 year	12 year	*95% CI for latest year*	N
2008	**75.8**												***74.2–77.2***	**3,248**
2007	74.9	61.1											*59.4–62.7*	3,211
2006	72.6	59.4	48.5										*46.7–50.2*	3,179
2005	72.9	58.7	46.7	37.7									*36.0–39.5*	3,093
2004	68.7	54.8	43.4	34.5	26.9								*25.2–28.6*	2,736
2003	69.2	53.8	42.4	32.5	24.8	19.5							*17.9–21.2*	2,386
2002	66.1	51.5	40.9	32.6	25.2	19.0	14.7						*13.2–16.2*	2,182
2001	67.2	52.1	39.4	30.4	23.0	17.2	13.1	10.0					*8.7–11.5*	1,866
2000	66.3	53.0	40.3	29.3	22.9	18.3	14.2	10.3	7.9				*6.6–9.4*	1,519
1999	66.2	50.8	38.6	29.0	21.7	15.6	11.3	8.9	7.1	5.8			*4.6–7.2*	1,269
1998	63.8	46.8	36.2	27.4	20.5	14.7	10.6	7.4	5.3	4.0	3.0		*2.1–4.2*	1,149
1997	64.2	46.5	33.5	24.1	16.3	11.5	7.8	6.2	4.5	3.8	2.8	2.1	*1.1–3.5*	590

Table 6.9. Unadjusted KM survival of incident patients, 1997–2008 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	11 year	12 year	*95% CI for latest year*	N
2008	**84.1**												***83.2–85.0***	**6,767**
2007	84.0	74.3											*73.2–75.3*	6,714
2006	82.0	72.6	64.8										*63.6–65.9*	6,390
2005	81.2	71.2	62.8	56.1									*54.9–57.4*	6,129
2004	79.2	69.3	60.6	53.3	47.2								*45.9–48.6*	5,436
2003	79.4	68.4	60.1	52.6	46.4	41.6							*40.2–43.1*	4,797
2002	77.2	66.4	58.3	51.6	45.5	40.5	36.4						*35.0–37.9*	4,296
2001	77.4	66.1	56.9	49.7	43.6	38.5	34.8	31.7					*30.1–33.2*	3,744
2000	78.3	68.0	58.4	50.6	44.9	40.1	36.0	32.5	30.2				*28.6–31.9*	3,132
1999	77.4	66.9	57.3	49.6	43.6	38.6	34.4	31.8	29.6	27.8			*26.1–29.5*	2,661
1998	75.9	64.1	55.6	48.7	42.3	37.1	33.0	30.2	27.6	26.3	24.7		*23.0–26.5*	2,437
1997	76.7	64.9	55.3	48.2	42.0	37.2	33.7	31.8	29.8	27.2	25.2	24.2	*21.9–26.5*	1,389

to last year whilst there continued to be an improvement in longer term survival of patients on RRT. There was a steep decline in survival with advancing age (figures 6.2 and 6.3).

There was a curvilinear increase in death rate per 1,000 patient years with age, shown in figure 6.3 for the period one year after 90 days. There were no significant 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 the previous 3 years were censored at the time of transplantation. This was not made clear in the description of methodology and was misleading as

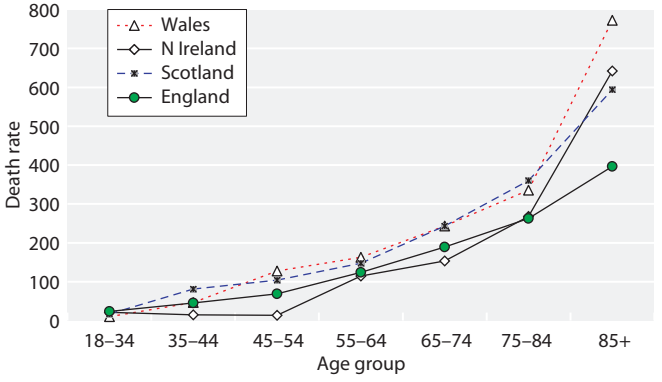

Fig. 6.3. One year after 90 days death rate per 1,000 patients years by UK country and age group for incident patients, 2005–2008 cohort

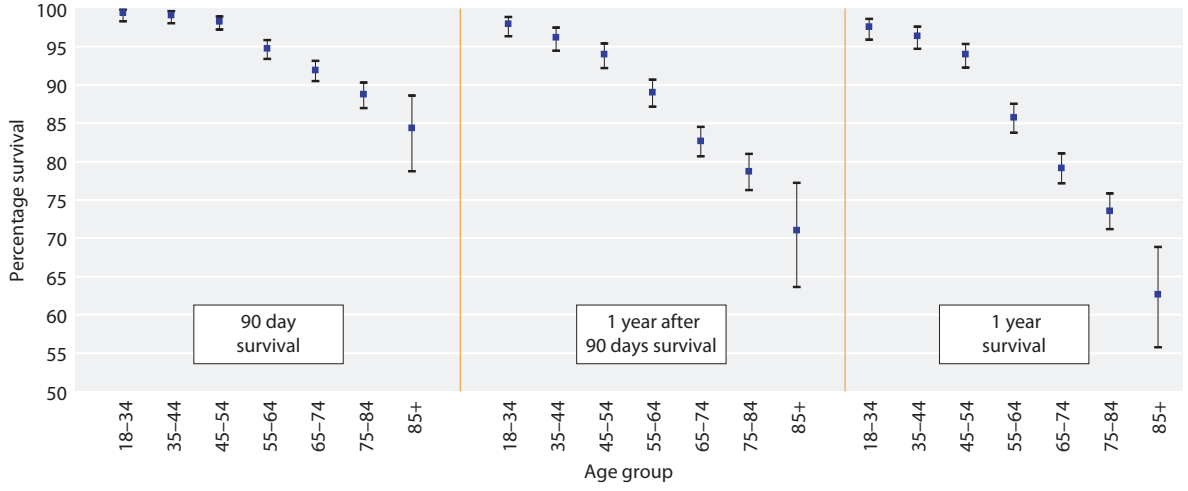

Fig. 6.2. Unadjusted survival of all incident patients by age band, 2008 cohort

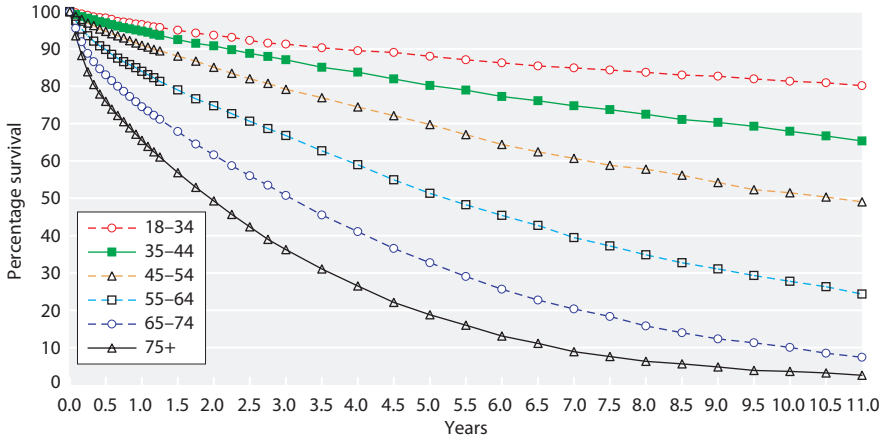

Fig. 6.4. Kaplan–Meier survival of incident patients 1998–2008 cohort (from day 0), without censoring at transplantation

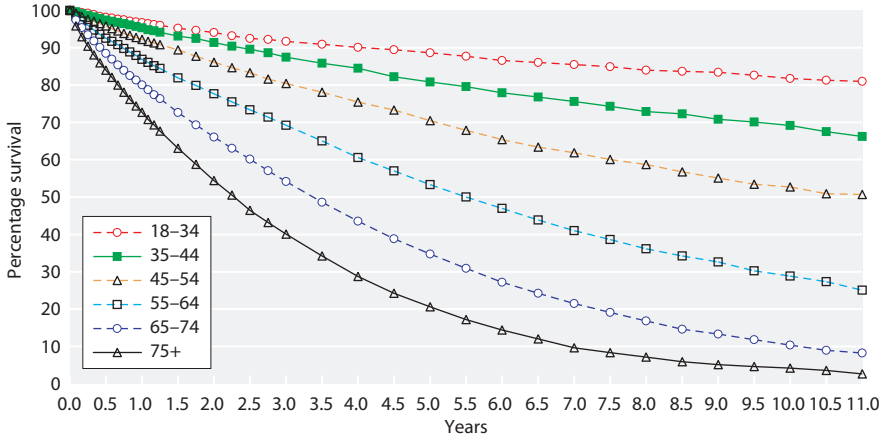

Fig. 6.5. Kaplan–Meier survival of incident patients 1998–2008 cohort (from day 90), without censoring at transplantation

it made the longer term outcomes of younger patients (who are more likely to have undergone transplantation) appear worse than was 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. Without censoring, the 10 year survival for patients aged 18–34 years is 81.3% (figure 6.4), which contrasts with a 56.4% survival if censoring at the time of transplantation (data not shown). For more detailed information on this effect, refer to the 2008 Report chapter 7 Survival [7].

From figure 6.4, it can be seen that 50% of patients starting RRT aged 50 survived for 10.5 years, 50% of patients starting aged 60 survived for 5 years and 50% of patients starting aged 70 survived for 3 years.

Figure 6.5 shows the survival of incident patients, excluding those who died within the first 90 days and shows that 50% of patients aged 60 survived for 5.5 years and 50% of patients aged 70 survived for 3.5 years.

Age and hazard of death by age in the first 12 months

Figure 6.6 shows the monthly hazard of death from the 1st day of starting RRT by age, which falls sharply during the first 3–4 months particularly for older

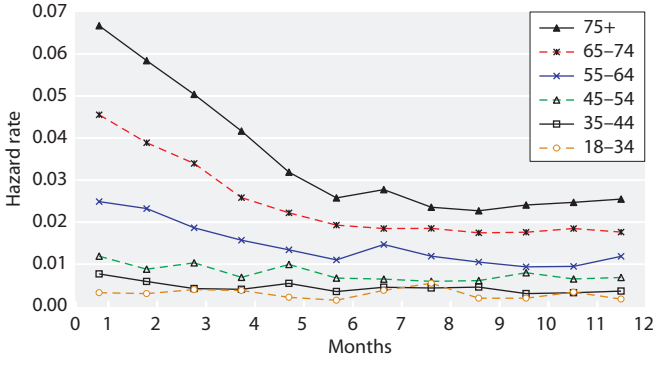

Fig. 6.6. First year monthly hazard of death, by age band 1997–2008 combined incident cohort

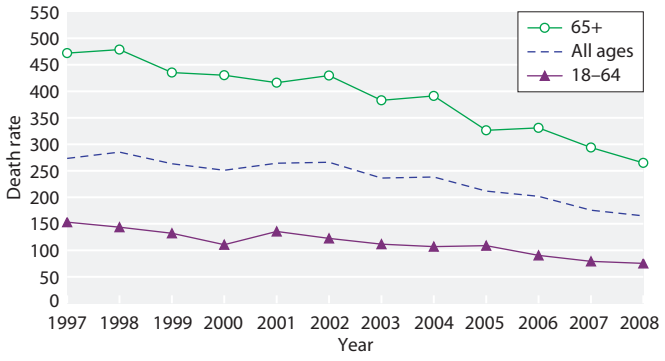

Fig. 6.7. One-year incident death rate per 1,000 patient years for all age groups

patients. In renal registries that receive details on all patients starting RRT from day zero, this difference in the change in hazard of death between the age groups will affect proportionality in any Cox model analysis that uses data starting from day zero and combines these different aged cohorts. This is why survival from day 90 is often used by other countries. Both are presented here to demonstrate this phenomenon of early deaths.

The hazard of death for each 10 year increase in patient age (unadjusted for primary renal disease) is shown in table 6.6. The difference in the hazard of death in the first 90 days and in the year after day 90 has been increasing over time (data not shown). This could reflect greater access to RRT for older and possibly more comorbid patients in recent years.

Changes in survival from 1997–2008

The 1st year death rate per 1,000 patient years is shown in figure 6.7. There was a continued fall in death rate in the 65 years and over age group to 265 per 1,000 patient years in 2008 from 294 per 1,000 patient years in 2007 and 331 per 1,000 patient years in 2006. In the under 65 year age group the fall in death rate also continued: from 90 per 1,000 patient years in 2006 to 75 per 1,000 patient years in 2008.

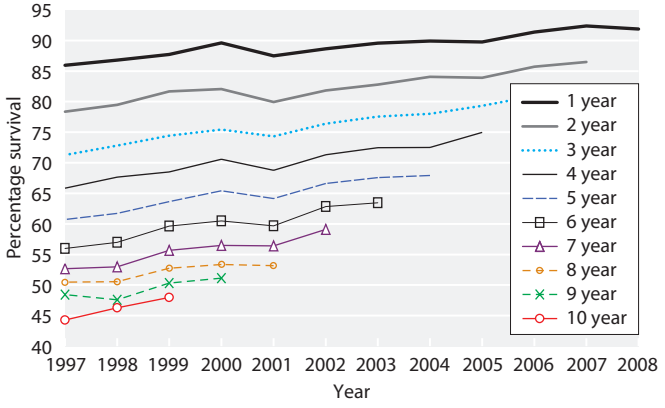

Fig. 6.8. Change in KM long term survival by year of starting RRT; for incident patients aged 18–64 years

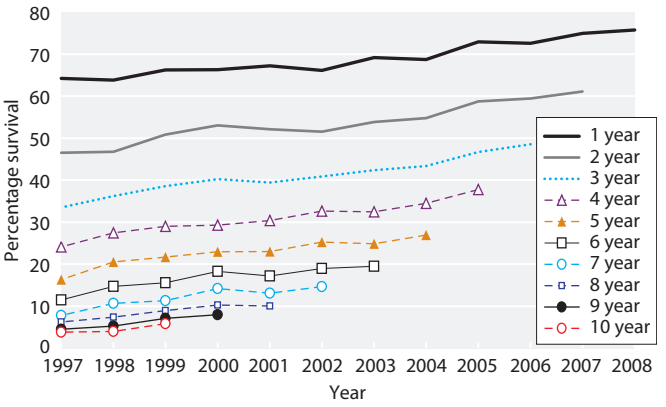

Fig. 6.9. Change in KM long term survival by year of starting RRT; for incident patients aged ⩾65 years

It is important to note that these death rates are not directly comparable with those produced by the USRDS Registry, as the UK data include the first 90 day period when the death rates are higher than subsequent time periods.

The unadjusted KM survival analyses (tables 6.7 and 6.8, figures 6.8 and 6.9) and annual death rates show a large improvement in 1 to 12 year survival across the time periods for both those under and those aged 65 years and over. One year survival amongst patients aged less than 65 years at start of RRT has improved from 85.9% in 1997 to 91.9% in 2008.

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). Figure 6.10 demonstrates this clearly for all patients. In the older age groups, there were decreasing numbers remaining alive beyond 7 years accounting for the increased variability seen. Figures 6.11 and 6.12 show these data for the non-diabetic and diabetic patients respectively.

Time trend changes in incident patient survival, 1999–2008

The time trend changes are shown in figure 6.13. The left hand plot, which includes only those centres that have been sending data continuously since 1999, shows a similar improvement in survival to the plot in which data from all renal centres is analysed.

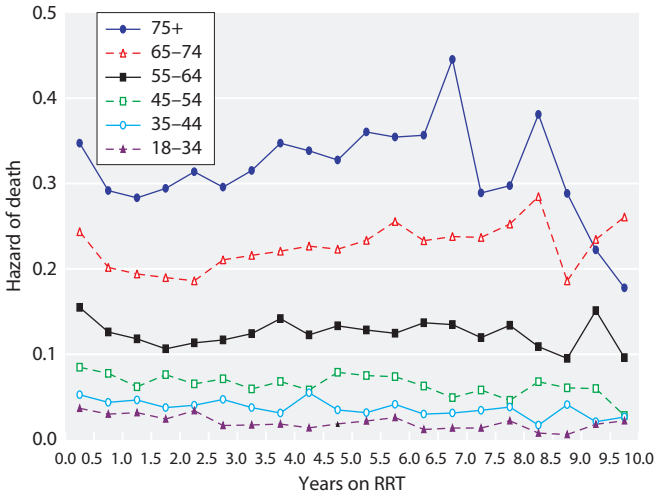

Fig. 6.10. Six monthly hazard of death, by vintage and age band, 1997–2008 incident cohort after day 90

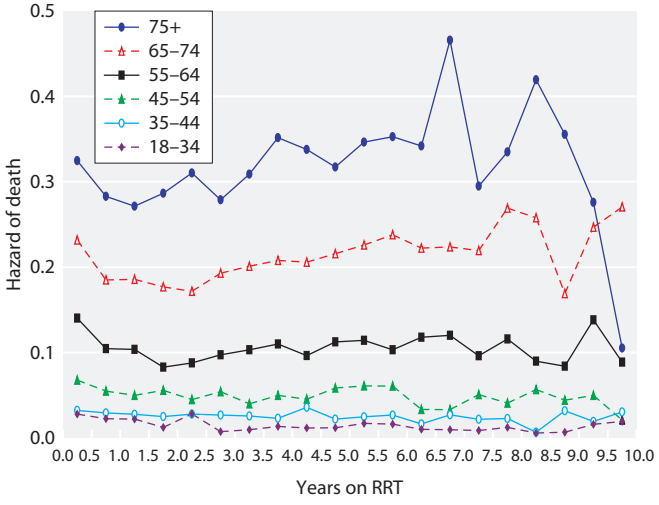

Fig. 6.11. Six monthly hazard of death, by vintage and age band, 1997–2008 non-diabetic incident cohort after day 90

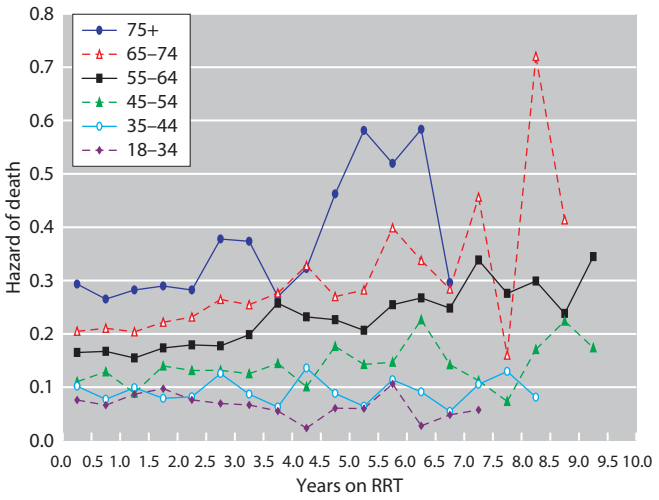

Fig. 6.12. Six monthly hazard of death, by vintage and age band, 1997–2008 diabetic incident cohort after day 90

Analysis of centre variability in 1 year after 90 days survival

The one year after 90 day survival for the 2008 incident cohort is shown in figure 6.14 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 6.24 and 6.25). The age-adjusted individual centre survival for each of the last 10 years can also be found in appendix 1, table 6.26.

In the analysis of 2008 survival data, some of the smaller centres had wide confidence intervals (figure 6.14). This was addressed by including a larger cohort across several years, which will also assess sustained performance. Similar to previous years, this is shown as a rolling 4 year cohort, with the data in this report for the 4 year period 2005 to 2008. These data are

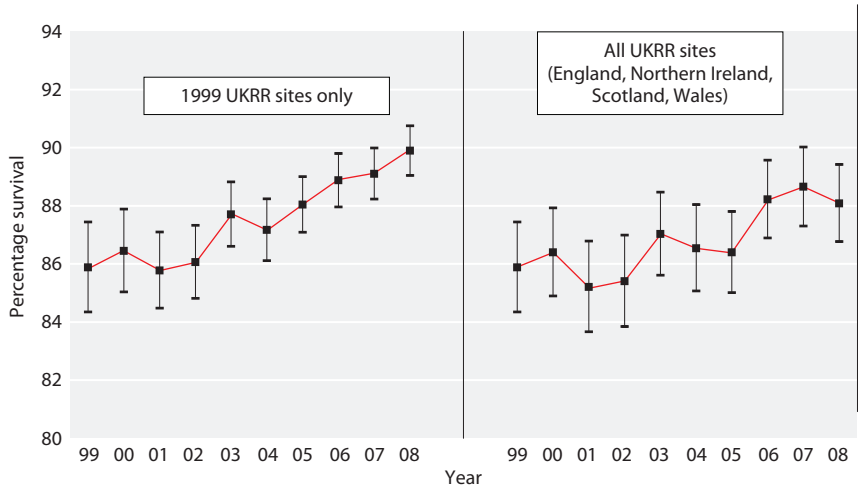

Fig. 6.13. Change in one-year after 90 day survival, 1999–2008 (adjusted to age 60)
Showing 95% confidence intervals

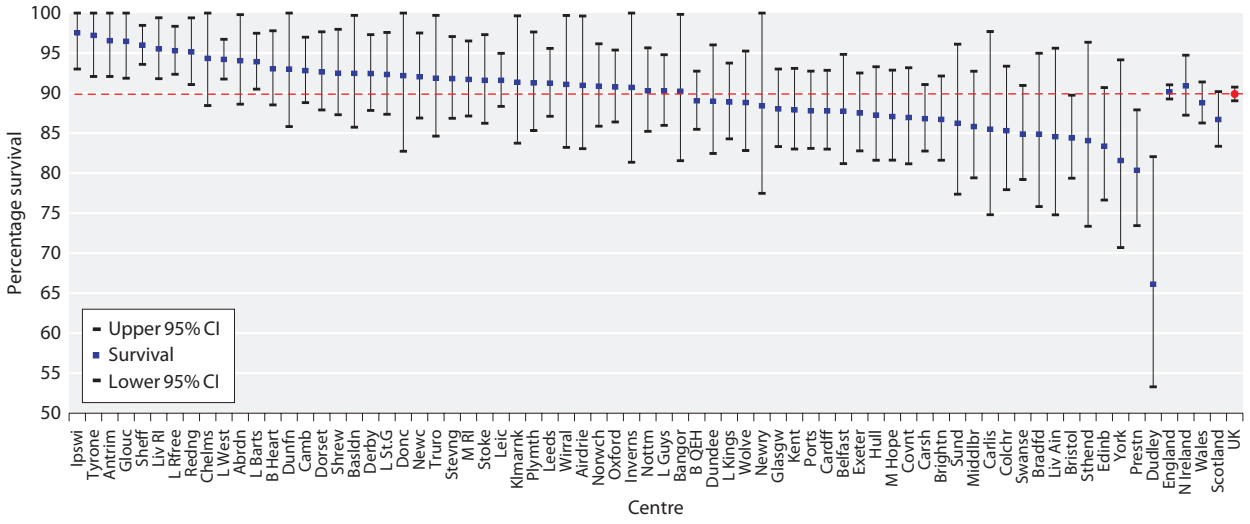

Fig. 6.14. Survival one-year after 90 days, adjusted to age 60, 2008 cohort

presented as a funnel plot in figure 6.15. 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 SDs (dotted lines, 99.9% limits). Table 6.10 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. These data have not been adjusted for any patient related factor except age (i.e. not comorbidity, primary renal disease or ethnicity) and have not been censored at transplantation, so the effect of differing centre rates of transplantation was not taken into account.

There are known regional differences in the life expectancy of the general population within the UK [8]. Table 6.11 shows differences in life expectancy between the UK countries. These differences in life expectancy are not accounted for in these analyses and are likely to be one of the reasons behind the variation in survival between renal centres [9].

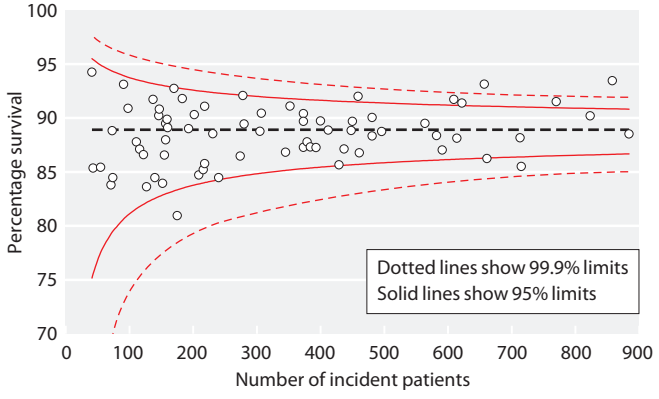

Fig. 6.15. Funnel plot for age adjusted 1 year after 90 days survival, 2005–2008 cohort

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

Comorbidity returns to the UKRR have remained poor. Using the combined incident cohort from 2004–2008, it was found that 11 centres had returned comorbidity data for more than 85% of patients and these centres were included in this analysis. Adjustment was first performed to age 60, then to the average distribution of primary diagnoses for all 11 centres. Further adjustment was then made to the average distribution of comorbidities present at those centres.

It can be seen that adjustment for age has the largest effect, with only minor differences within centres after adjustment for primary renal diagnosis; in two centres (Bradford, Swansea) adjustment for comorbidity had a noticeable effect on adjusted survival (table 6.12 and figure 6.16).

Results of prevalent patient survival analyses

Table 6.13 shows the one year survival on dialysis, after censoring at the time of transplantation. Patients who have been on dialysis for less than 90 days were excluded.

Table 6.10. Adjusted (to age 60) 1 year after 90 day survival, 2005–2008 incident cohort

Centre	N	1 year after 90 day survival %
Donc	41	94.2
Ulster	43	85.3
Colchr	55	85.4
D & Gall	71	83.8
Newry	73	88.8
Clwyd	74	84.5
Tyrone	91	93.1
Wrexm	98	90.9
Carlis	111	87.8
Inverns	116	87.1
Bangor	122	86.6
Liv Ain	127	83.6
Sthend	137	91.7
Dunfn	140	84.5
Antrim	146	90.2
Basldn	147	90.8
Dudley	152	83.9
York	155	86.6
Stoke	157	88.0
Chelms	157	89.5
Truro	159	89.9
Klmarnk	160	89.1
Ipswi	170	92.7
Airdrie	175	80.9
L St.G	183	91.8
Wirral	193	89.0
Shrew	202	90.3
Sund	209	84.7
Abrdn	216	85.2
Glouc	218	91.1
Dundee	218	85.8
Dorset	231	88.5
Bradfd	240	84.5
Plymth	274	86.5
Derby	278	92.1
M RI	280	89.4
Wolve	305	88.8
Kent	307	90.4
Middlbr	345	86.8
Redng	352	91.1
Belfast	373	90.4
Norwch	373	89.7
Edinb	373	87.3
Covnt	379	87.8
Stevng	384	87.3
Newc	393	87.2
B Heart	400	89.7
Hull	412	88.9
Swanse	429	85.7
Exeter	437	87.1
Brightn	448	88.8
Liv RI	450	89.7
Camb	459	92.0
Prestn	461	86.8
Nottm	481	90.0
M Hope	481	88.3
L Kings	496	88.7
Oxford	564	89.5
Leeds	582	88.4
Ports	591	87.0
L Guys	609	91.7
Bristol	614	88.1
Sheff	622	91.4
L Rfree	657	93.1
Glasgw	661	86.2
Carsh	713	88.2
Cardff	715	85.5
L Barts	770	91.5
B QEH	823	90.2
L West	858	93.4
Leic	884	88.5

Data from centres with <20 incident patients are not shown (Derry)
* Data from London West excluded for 2005

Table 6.11. Life expectancy in years in UK countries, 2005–2008 (source ONS)

	At birth		At age 65	
Country	Male	Female	Male	Female
England	78.3	82.3	18.0	20.6
N Ireland	76.8	81.4	17.2	20.0
Scotland	75.4	80.1	16.5	19.1
Wales	77.2	81.6	17.4	20.1
UK	**77.9**	**82.0**	**17.8**	**20.4**

Table 6.14 gives the 2009 one-year death rate for prevalent dialysis patients in each UK country. The median age of prevalent patients in Northern Ireland and Wales was higher than those in England and this together with socio-economic reasons probably explains the higher death rate in these two countries.

Table 6.15 gives the 2009 one-year survival for transplanted patients.

Figure 6.17 shows the one year survival of dialysis patients who were alive and receiving dialysis on 1st January 2009.

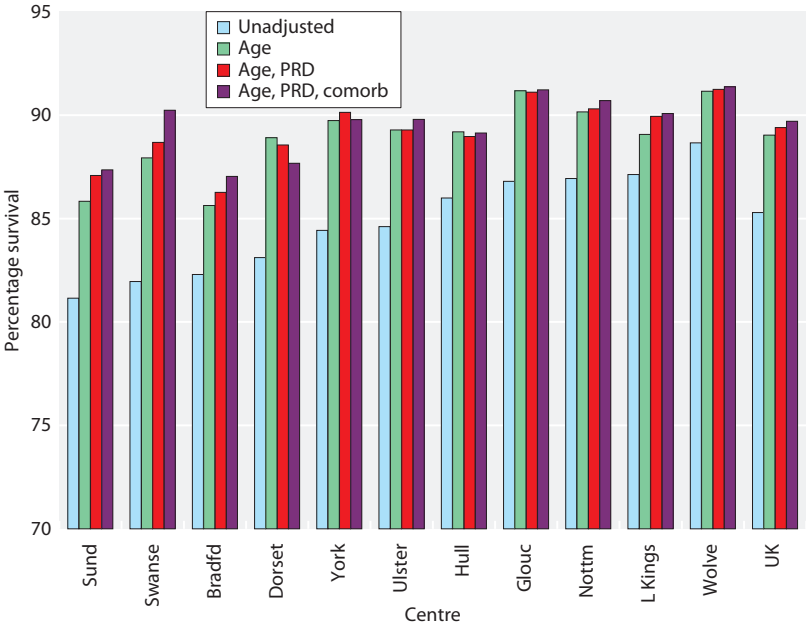

Fig. 6.16. The effect on survival after sequential adjustment for age, PRD and comorbidity, 2004–2008 cohort

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 6.13 and is illustrated in figures 6.18 and 6.19; the data for those patients aged <65 years and those aged 65 years and over are separated. Figure 6.20 shows the age adjusted data (60 years) and in figure 6.21 as a funnel plot. The solid lines show the 2 standard deviation limits (95% limits) and the dotted lines the limits for 3 standard deviations (99.9% limits). With over 70 centres included, it would be expected by chance that 3 centres would fall outside the 95% (1 in 20) confidence limits. Table 6.13 allows centres to be identified by finding the number of patients treated by the centre and then looking up this number on the x-axis.

The 2009, one year death rate in prevalent dialysis patients by age band

The death rates on dialysis by age band are shown in figure 6.22. The younger patients included in this analysis are a selected higher risk group, as the similar aged transplanted patients have been excluded. The increase in death rate is non-linear with age: with 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

Table 6.12. The effect of adjustment for age, PRD and comorbidity on survival, 2004–2008 cohort

	% survival 1 year after 90 days			
Centre	Unadjusted	Age adjusted	Age, PRD adjusted	Age, PRD and comorbidity adjusted
Ulster	81.1	85.8	85.2	85.7
Bradfd	82.0	87.9	89.1	90.6
Dorset	82.3	85.6	86.1	86.8
York	83.1	88.9	89.1	88.2
Nottm	84.4	89.7	90.4	90.0
Hull	84.6	89.3	89.7	90.3
Glouc	86.0	89.2	89.1	89.3
L Kings	86.8	91.2	91.6	91.7
Wolve	86.9	90.2	90.9	91.2
Sund	87.1	89.1	90.0	90.1
Swanse	88.7	91.2	91.4	91.5
All centres	**85.3**	**89.0**	**89.5**	**89.8**

* Centres included if >85% comorbidity data available

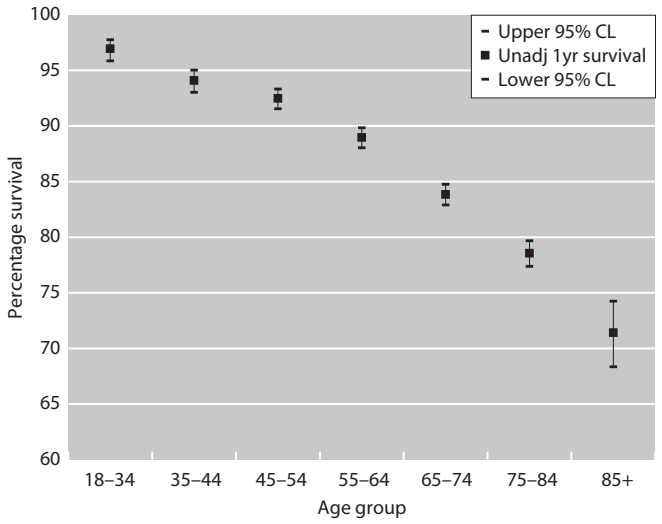

Fig. 6.17. One year survival of prevalent dialysis patients in different age groups, 2009

Table 6.13. One year survival of prevalent dialysis patients in each centre (adjusted to age 60), 2009

Centre	N	Adjusted 1 year survival	*Lower 95% CI*	*Upper 95% CI*
Abrdn	229	89.6	*85.9*	*93.4*
Airdrie	166	85.6	*80.6*	*91.0*
Antrim	147	89.6	*85.5*	*94.0*
B Heart	422	90.6	*88.1*	*93.2*
B QEH	948	90.2	*88.4*	*92.0*
Bangor	100	84.5	*78.4*	*91.0*
Basldn	163	92.4	*88.9*	*96.1*
Belfast	298	87.4	*84.0*	*91.0*
Bradfd	203	85.4	*80.8*	*90.2*
Brightn	412	87.6	*84.8*	*90.4*
Bristol	503	84.9	*82.1*	*87.8*
Camb	444	90.4	*88.0*	*92.9*
Cardff	563	86.8	*84.3*	*89.4*
Carlis	97	81.3	*74.3*	*88.9*
Carsh	767	89.3	*87.4*	*91.3*
Chelms	140	85.7	*80.7*	*91.0*
Clwyd	76	87.8	*81.3*	*94.9*
Colchr	101	90.9	*86.1*	*95.9*
Covnt	372	90.9	*88.3*	*93.6*
D & Gall	64	88.2	*81.6*	*95.4*
Derby	316	90.9	*88.0*	*93.8*
Derry	60	90.8	*84.5*	*97.6*
Donc	90	83.9	*77.3*	*91.0*
Dorset	238	89.8	*86.5*	*93.2*
Dudley	178	88.9	*84.7*	*93.4*
Dundee	190	93.8	*90.9*	*96.8*
Dunfn	142	87.6	*82.8*	*92.6*
Edinb	339	86.5	*83.1*	*90.1*
Exeter	372	85.1	*82.0*	*88.3*
Glasgw	670	88.6	*86.4*	*90.9*
Glouc	184	92.0	*88.8*	*95.4*
Hull	369	87.9	*84.9*	*91.0*
Inverns	120	92.2	*88.0*	*96.5*
Ipswi	148	85.1	*79.8*	*90.7*
Kent	383	88.0	*85.0*	*91.0*
Klmarnk	177	88.3	*84.2*	*92.7*
L Barts	835	90.7	*88.7*	*92.7*
L Guys	554	91.3	*89.1*	*93.5*
L Kings	476	87.9	*85.2*	*90.8*
L Rfree	710	89.7	*87.6*	*91.8*
L St.G	259	89.9	*86.7*	*93.2*
L West	1,307	92.2	*90.9*	*93.6*
Leeds	566	89.2	*86.9*	*91.6*
Leic	879	88.7	*86.8*	*90.7*
Liv Ain	118	92.2	*87.9*	*96.7*
Liv RI	474	89.2	*86.5*	*92.0*
M Hope	443	88.1	*85.2*	*91.0*
M RI	497	87.4	*84.6*	*90.4*
Middlbr	304	86.9	*83.5*	*90.4*
Newc	310	87.5	*84.1*	*91.0*
Newry	104	94.7	*91.0*	*98.6*
Norwch	355	89.0	*86.3*	*91.9*
Nottm	478	87.9	*85.2*	*90.6*
Oxford	504	89.0	*86.5*	*91.5*
Plymth	181	85.7	*81.4*	*90.3*
Ports	500	89.0	*86.6*	*91.5*
Prestn	481	89.7	*87.2*	*92.3*
Redng	296	92.1	*89.5*	*94.9*
Sheff	653	89.4	*87.2*	*91.6*
Shrew	210	88.3	*84.3*	*92.4*
Stevng	465	90.5	*88.1*	*92.9*
Sthend	135	91.1	*87.1*	*95.4*
Stoke	321	88.3	*85.1*	*91.6*
Sund	176	85.7	*80.9*	*90.8*
Swanse	397	87.6	*84.8*	*90.5*
Truro	161	88.6	*84.6*	*92.8*
Tyrone	99	87.1	*81.4*	*93.2*
Ulster	94	87.5	*82.0*	*93.2*
Wirral	205	90.4	*86.8*	*94.2*
Wolve	330	89.5	*86.6*	*92.6*
Wrexm	112	90.2	*85.4*	*95.2*
York	145	88.0	*83.4*	*92.9*
England	**20,178**	**89.2**	***88.7***	***89.6***
N Ireland	**802**	**89.0**	***87.0***	***91.0***
Scotland	**2,097**	**88.8**	***87.5***	***90.1***
Wales	**1,248**	**87.2**	***85.5***	***88.9***
UK	**24,325**	**89.0**	***88.6***	***89.5***

Table 6.14. One-year death rate per 1,000 prevalent dialysis patient years in 2009 and median age of prevalent patients by country

	England	N Ireland	Scotland	Wales
Death rate	146	155	149	184
95% CI	*140–152*	*128–187*	*132–167*	*160–211*
Median age	64.5	65.9	63.7	66.4

Table 6.15. One-year survival of prevalent RRT patients in the UK by modality (unadjusted unless stated otherwise)

Patient group	Patients	Deaths	KM survival	*KM 95% CI*
Transplant patients 2009				
Censored at dialysis	20,368	487	97.6	*97.3–97.8*
Not censored at dialysis	20,368	524	97.4	*97.2–97.6*
Dialysis patients 2009				
All	24,325	3,216	86.2	*85.8–86.7*
All adjusted age = 60	24,325	3,216	89.0	*88.6–89.5*
2 year survival – dialysis patients 2008				
All 1/1/2008 (2 year)	23,496	5,766	73.5	*72.9–74.1*
Dialysis patients 2009				
All age <65	12,438	945	91.8	*91.3–92.3*
All age 65+	11,887	2,271	80.7	*80.0–81.4*
Non-diabetic <55	6,045	254	95.4	*94.8–95.9*
Non-diabetic 55–64	3,600	332	90.3	*89.2–91.2*
Non-diabetic 65–74	4,448	645	85.2	*84.1–86.2*
Non-diabetic 75+	4,745	1,065	77.5	*76.3–78.7*
Non-diabetic <65	9,645	586	93.4	*92.9–93.9*
Diabetic <65	2,348	316	85.9	*84.4–87.3*
Non-diabetic 65+	9,193	1,710	81.2	*80.4–82.0*
Diabetic 65+	2,268	480	78.7	*77.0–80.3*

KM = Kaplan Meier survival
Cohorts of patients alive on 1/1/2009 unless indicated otherwise

years in the older age groups. In all age groups these death rates are lower than comparable death rates reported by the USRDS in 2009 [10].

One year survival of prevalent dialysis patients by UK country from 1997 to 2009

Scotland and Wales are showing a continued improvement in the age-adjusted survival on dialysis (figure 6.23) whilst England and Northern Ireland show no change in age-adjusted survival in the past 2 years. The change in prevalent survival by centre over the years 2000 to 2009 is shown in this chapter, appendix 1, table 6.27.

One year survival of prevalent dialysis patients with a primary diagnosis of diabetes from 2000 to 2009

The previously improving age-adjusted survival in patients with diabetic renal disease in the UK has plateaued over the last three years (table 6.16) with no further improvements in survival.

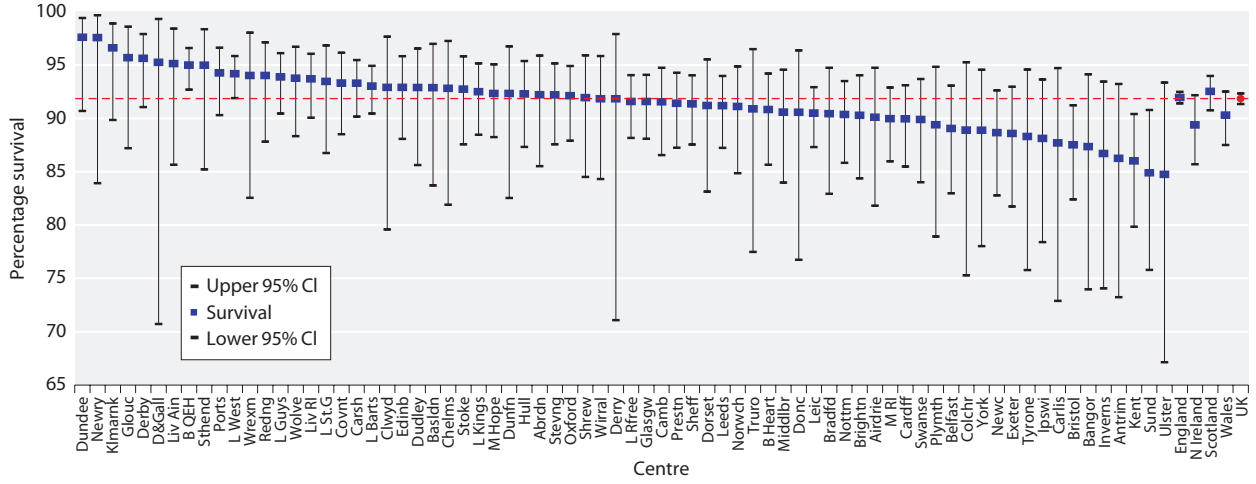

Fig. 6.18. One year survival of prevalent dialysis patients aged under 65 years in each centre, 2009

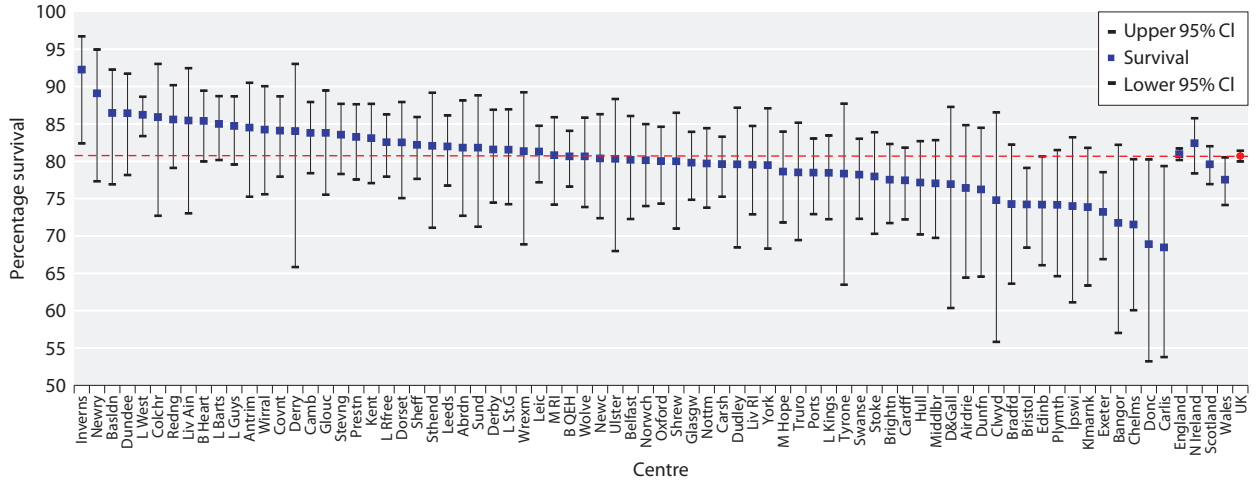

Fig. 6.19. One year survival of prevalent dialysis patients aged 65 years and over in each centre, 2009

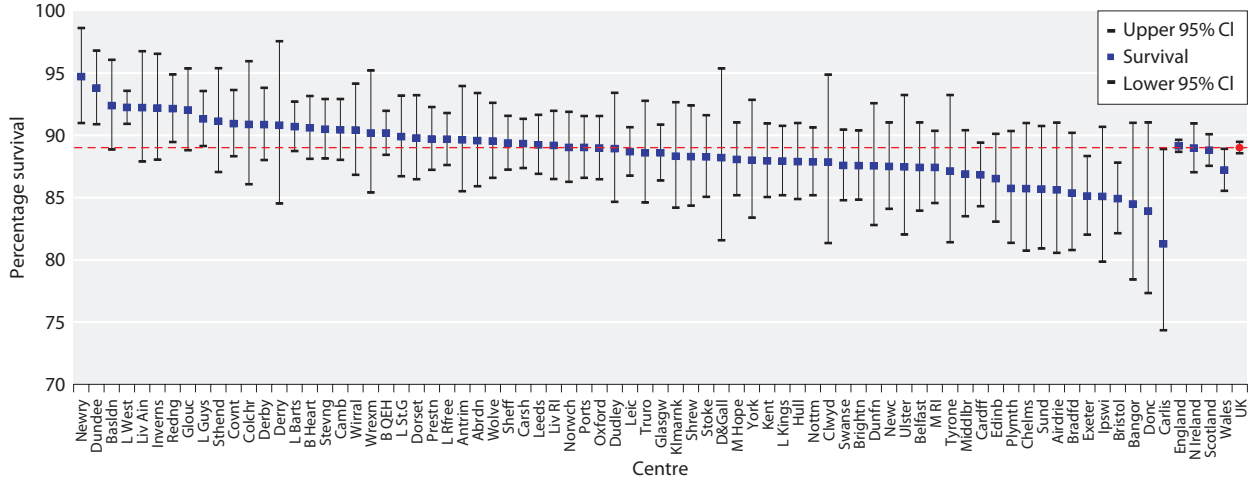

Fig. 6.20. One year survival of prevalent dialysis patients in each centre adjusted to age 60, 2009

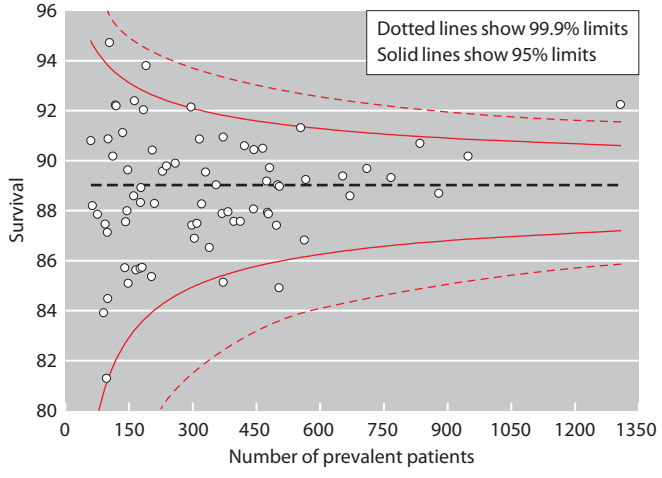

Fig. 6.21. One year funnel plot of prevalent dialysis patients in each centre adjusted to age 60, 2009

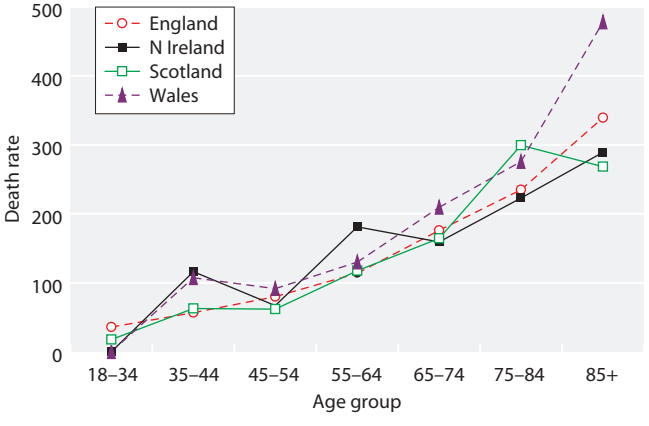

Fig. 6.22. One year death rate per 1,000 patient years by UK country and age group for prevalent dialysis patients, 2009

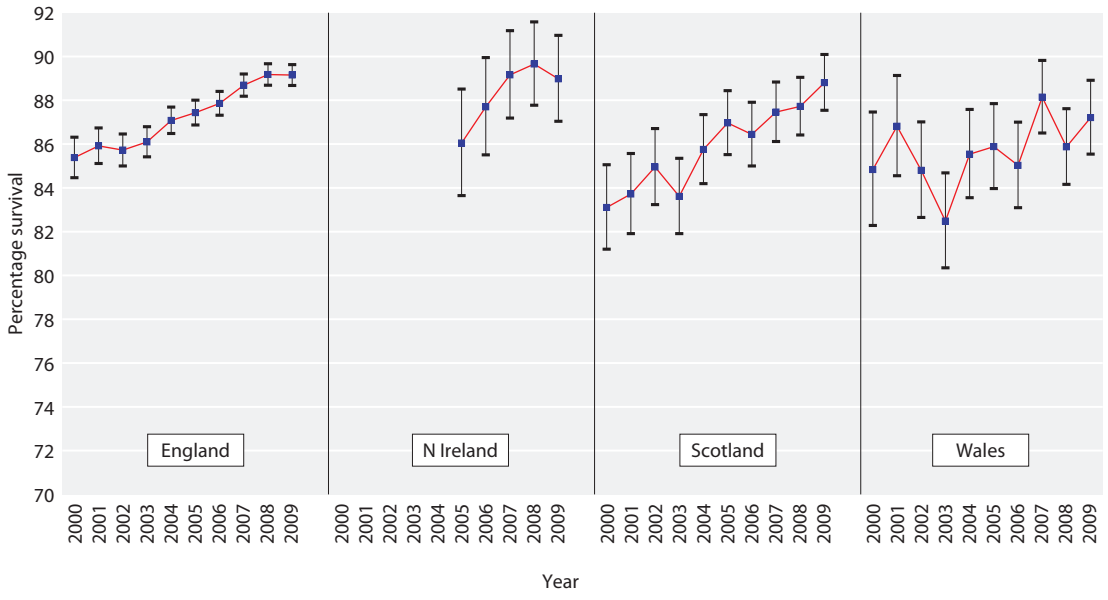

Fig. 6.23. Serial 1 year survival for prevalent dialysis patients by UK country from 2000–2009 adjusted to age 60

Death rate on RRT compared with the UK general population

The death rate compared to the general population is shown in table 6.17. Figure 6.24 shows that the relative risk of death on RRT decreased with age from 19 times that of the general population at age 30 to 34 to 2.4 times the general population at age 85+. With the reduction in rates of death on RRT over the last 10

Table 6.16. Serial 1 year survival of prevalent dialysis patients with a primary diagnosis of diabetes from 2000–2009

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1 year survival	76.6	77.3	78.6	77.9	80.7	82.5	81.8	84.7	83.6	83.6

Table 6.17. Death rate by age for all prevalent RRT patients on 1/1/2009, compared with the general population and with previous analyses in the 1998–2001 cohort

Age group	UK population mid 2008 (thousands)	UK deaths	Death rate per 1,000 population	Expected number of deaths in UK RR population	UKRR Registry deaths	UKRR deaths per 1,000 prevalent RRT patients	Observed: expected ratio 2009	Observed: expected ratio 1998–2001
20–24	4,230	2,032	0.5	0	12	12.9	27.0	41.1
25–29	4,076	2,364	0.6	1	17	11.5	19.8	41.8
30–34	3,828	3,024	0.8	2	29	15.2	19.2	31.2
35–39	4,439	4,775	1.1	3	65	21.4	19.9	26.0
40–44	4,712	7,186	1.5	6	112	27.4	18.0	22.6
45–49	4,353	10,125	2.3	11	167	35.8	15.4	19.0
50–54	3,807	13,978	3.7	17	207	44.2	12.0	12.8
55–59	3,634	20,542	5.7	26	304	65.3	11.6	10.1
60–64	3,642	31,932	8.8	44	420	82.8	9.4	10.4
65–69	2,757	39,338	14.3	63	535	122.2	8.6	7.9
70–74	2,399	55,598	23.2	95	685	166.4	7.2	7.2
75–79	1,985	78,774	39.7	125	675	214.3	5.4	5.3
80–84	1,455	101,056	69.5	128	504	274.6	4.0	4.0
85+	1,335	202,467	151.7	113	269	360.6	2.4	3.0
Total	46,652	573,191	12.3	635	4,001	89.4	6.3	7.7

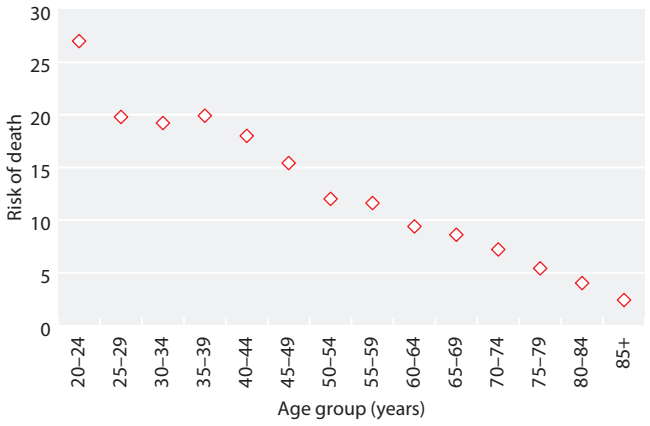

Fig. 6.24. Relative risk of death in all prevalent RRT patients in 2009 compared with the UK general population in 2008

years the age-standardised mortality ratios compared with the general population are falling (7.7 in 2001, 6.3 in 2009).

Results of analyses on causes of death

Data completeness

Data completeness is shown in table 6.18. Overall, it was less than 50% and has not improved over the last 5 years. Interpretation of patterns of cause of death must be cautious as it was not known whether non-return was associated with cause. Some centres consistently achieve a very high rate of data return for cause of death because a process is in place to make sure that

Table 6.18. Percentage completeness of EDTA causes of death for incident patients by centre and year of starting RRT

Centre	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Abrdn	28.0	31.3	30.6	23.5	27.0	24.2	19.2	87.5	71.4	80.0
Airdrie	40.0	32.6	35.7	36.1	54.5	40.0	45.0	77.8	100.0	100.0
Antrim						10.0	18.2	14.3	0.0	100.0
B Heart	75.0	82.6	78.4	70.6	76.6	90.0	88.7	87.0	100.0	100.0
B QEH					36.7	2.2	3.0	5.8	1.7	0.0
Bangor			54.2	26.3	59.3	48.1	44.0	37.5	50.0	66.7
Basldn				48.0	59.3	33.3	57.1	46.2	80.0	80.0
Belfast						25.0	19.4	41.9	26.7	40.0
Bradfd		78.6	88.6	92.2	81.1	89.5	86.7	96.4	93.8	83.3
Brightn					3.8	3.3	3.5	0.0	0.0	0.0
Bristol	51.0	50.0	65.0	71.7	76.0	59.3	70.3	48.1	61.7	77.8
Camb		0.0	0.0	0.0	0.0	4.5	5.8	2.9	0.0	6.3
Cardff	0.0	0.0	0.8	0.0	0.0	0.0	1.1	0.0	0.0	0.0
Carlis	36.0	27.3	65.0	60.9	75.0	71.4	58.3	71.4	77.8	100.0
Carsh	3.5	2.3	0.9	0.9	0.0	0.0	1.3	0.0	0.0	0.0
Chelms					55.9	88.9	80.8	94.4	40.0	50.0
Clwyd			12.5	0.0	11.1	6.3	63.6	50.0	100.0	0.0
Colchr									0.0	0.0
Covnt	20.0	9.2	14.3	2.1	0.0	0.0	0.0	0.0	0.0	0.0
D & Gall	94.0	72.2	92.3	83.3	72.7	88.2	90.9	100.0	100.0	100.0
Derby	39.0	43.9		55.6	73.0	90.9	85.2	92.9	82.4	78.6
Derry							100.0	0.0	100.0	*
Donc								100.0	80.0	75.0
Dorset				31.7	72.2	77.8	75.0	68.4	71.4	80.0
Dudley	29.0	4.5	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dundee	75.0	72.2	60.4	59.5	61.9	30.6	19.0	23.1	40.0	90.0
Dunfn	81.0	85.2	80.0	66.7	73.3	64.0	60.0	66.7	40.0	83.3
Edinb	76.0	59.5	56.9	42.0	53.7	51.1	64.4	86.2	100.0	100.0
Exeter	28.0	25.9	20.0	25.4	14.5	9.7	7.0	0.0	2.6	0.0
Glasgw	53.0	58.9	55.7	57.2	48.2	57.9	67.4	85.0	88.6	82.6
Glouc	53.0	71.9	53.1	51.4	60.6	56.7	20.8	54.5	57.1	81.8
Hull	73.0	67.9	67.6	57.4	64.7	62.5	47.1	63.3	32.1	18.2
Inverns	27.0	8.3	21.1	14.3	11.1	33.3	40.0	37.5	100.0	33.3
Ipswi			19.4	25.0	32.0	17.2	46.7	7.7	0.0	0.0
Kent								56.8	51.7	43.8
Klmarnk	7.7	14.3	28.6	33.3	30.0	30.4	37.5	85.7	85.7	66.7

Table 6.18. Continued

Centre	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
L Barts					75.3	83.0	75.9	78.3	58.8	72.7
L Guys	0.0	4.2	1.3	2.6	0.0	4.5	2.9	3.8	0.0	0.0
L Kings			63.6	73.1	76.6	76.8	87.5	75.8	71.9	33.3
L Rfree						2.4	0.0	0.0	0.0	0.0
L St.G								22.2	10.0	0.0
L West			49.2	42.9	36.8	9.3	1.1	3.4	4.5	0.0
Leeds	49.0	59.6	58.0	42.4	48.4	51.3	40.0	15.0	23.3	16.7
Leic	70.0	75.6	81.6	81.6	78.6	74.8	72.9	60.3	62.8	80.0
Liv Ain					0.0	50.0	69.2	88.2	76.9	100.0
Liv RI		76.3	72.3	73.9	70.1	77.8	76.8	81.5	66.7	100.0
M Hope				0.0	0.0	0.0	2.1	0.0	0.0	0.0
M RI								2.4	0.0	0.0
Middlbr	77.0	74.6	67.1	55.2	52.5	68.3	35.2	23.7	18.2	33.3
Newc			42.6	28.3	36.7	50.0	46.5	47.2	43.8	11.1
Newry						45.5	0.0	25.0	66.7	100.0
Norwch					29.5	23.3	24.0	15.8	40.0	66.7
Nottm	93.0	97.5	96.8	95.9	96.8	92.6	87.0	95.0	100.0	100.0
Oxford	12.0	7.6	6.1	4.5	15.1	6.0	0.0	0.0	0.0	0.0
Plymth	47.0	39.2	50.0	56.3	44.7	40.6	47.6	56.7	46.2	25.0
Ports		25.0	21.3	20.0	19.0	11.9	20.0	13.3	27.5	36.4
Prestn	67.0	69.6	62.3	62.7	50.0	44.0	43.5	47.1	21.4	21.4
Redng	66.0	60.0	78.6	79.5	92.3	69.2	92.3	89.3	81.3	90.0
Sheff	57.0	42.3	52.8	29.5	3.7	2.7	9.2	1.7	11.5	0.0
Shrew					50.0	36.8	23.8	22.2	20.0	0.0
Stevng	26.0	42.2	67.2	39.7	42.4	51.2	45.8	36.0	12.5	60.0
Sthend	41.0	32.1	32.0	37.9	20.8	16.7	0.0	77.8	83.3	*
Stoke								28.6	6.7	55.6
Sund	51.0	57.7	60.5	51.6	46.9	73.5	64.3	64.0	70.0	40.0
Swanse	84.0	87.5	92.0	94.3	90.9	88.1	96.5	97.8	86.7	100.0
Truro		45.8	34.9	39.5	5.7	6.3	6.3	33.3	16.7	40.0
Tyrone						42.9	50.0	50.0	33.3	0.0
Ulster						83.3	60.0	100.0	80.0	0.0
Wirral			57.6	76.7	63.6	60.0	71.4	64.3	14.3	14.3
Wolve	91.0	88.1	84.1	81.8	71.4	57.8	55.3	55.0	64.7	100.0
Wrexm	9.8	3.7	19.0	9.5	16.7	25.0	54.5	55.6	60.0	100.0
York	33.0	44.0	58.3	62.9	62.5	58.3	40.9	63.6	46.7	66.7
England	**49.0**	**48.0**	**49.0**	**44.3**	**43.5**	**41.0**	**37.7**	**35.6**	**31.4**	**34.6**
N Ireland						**29.9**	**27.9**	**34.9**	**34.3**	**58.3**
Scotland	**54.0**	**51.5**	**51.1**	**47.6**	**48.0**	**47.5**	**53.1**	**72.7**	**82.1**	**85.9**
Wales	**26.0**	**33.2**	**37.8**	**37.0**	**31.3**	**34.1**	**40.6**	**36.2**	**48.9**	**55.6**
UK	**48.0**	**47.3**	**48.2**	**44.1**	**43.1**	**40.9**	**39.2**	**39.0**	**37.2**	**42.8**

Blank cells, data not available for that year
* no deaths recorded

these data were entered. The Scottish centres overall had the highest rate of data return. Several centres have shown significant improvement in data returns but others 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

See table 6.19.

Causes of death within one year after 90 days

Treatment withdrawal as a cause of death (table 6.19 and table 6.20) was more common in the older age group.

Causes of death in prevalent RRT patients in 2009

Table 6.21 and figures 6.25 and 6.26 show the frequency of the causes of death for both prevalent dialysis and transplant patients. These data are neither age-adjusted nor

Table 6.19. Cause of death in the first 90 days for incident patients by age, 2000–2008

	All age groups		<65 years		⩾65 years	
Cause of death	Number of deaths	%	Number of deaths	%	Number of deaths	%
Cardiac disease	479	28	114	31	365	28
Cerebrovascular disease	86	5	20	5	66	5
Infection	292	17	47	13	245	19
Malignancy	137	8	37	10	100	8
Treatment withdrawal	260	15	43	12	217	16
Other	153	9	33	9	120	9
Uncertain	282	17	73	20	209	16
Total	**1,689**		**367**		**1,322**	
No cause of death data	2,120		470		1,650	

Table 6.20. Cause of death in 1 year after 90 days for incident patients by age, 2000–2008

	All age groups		<65 years		⩾65 years	
Cause of death	Number of deaths	%	Number of deaths	%	Number of deaths	%
Cardiac disease	684	24	212	27	472	24
Cerebrovascular disease	152	5	40	5	112	6
Infection	512	18	149	19	363	18
Malignancy	282	10	100	13	182	9
Treatment withdrawal	450	16	71	9	379	19
Other	196	7	68	9	128	6
Uncertain	529	19	159	20	370	18
Total	**2,805**		**799**		**2,006**	
No cause of death data	3,637		1,047		2,590	

adjusted for differences in the comorbidity between the two groups. 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. Malignancy and infection were both responsible for a greater percentage of deaths in the transplanted group. Treatment withdrawal still occurs in the transplanted group, in patients who choose not to restart dialysis when their renal transplant fails.

Table 6.22 shows there were no differences in the causes of death between transplanted patients aged <55 or ⩾55 years. Table 6.23 shows these data for dialysis patients. Dialysis patients aged 65 years and over were significantly more likely to withdraw from treatment than younger patients but otherwise causes of death were similar in both age groups.

Table 6.21 Cause of death in prevalent RRT patients by age and modality on 1/1/2009

	All age groups		Dialysis		Transplant	
Cause of death	Number of deaths	%	Number of deaths	%	Number of deaths	%
Cardiac disease	381	23	341	24	40	18
Cerebrovascular disease	76	5	68	5	8	4
Infection	339	21	279	19	60	28
Malignancy	150	9	101	7	49	23
Treatment withdrawal	208	13	207	14	1	0
Other	150	9	127	9	23	11
Uncertain	348	21	312	22	36	17
Total	**1,652**		**1,435**		**217**	
No cause of death data	2,352		1,965		387	

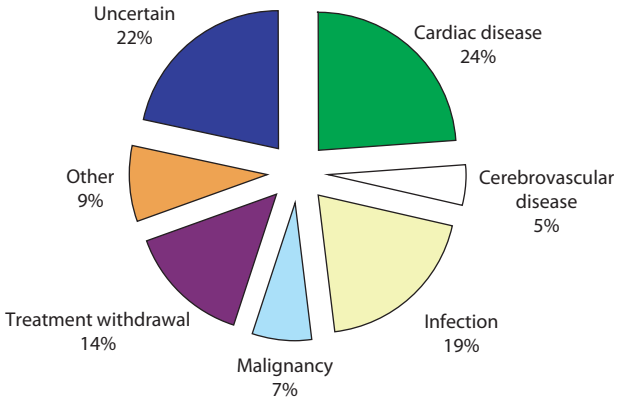

Fig. 6.25. Frequency of causes of death for prevalent dialysis patients in 2009

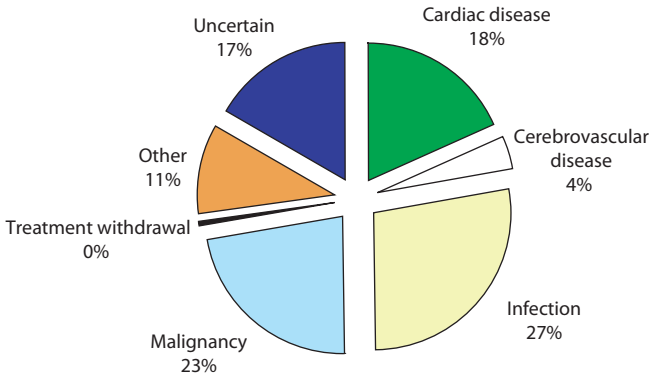

Fig. 6.26. Frequency of causes of death for prevalent transplant patients in 2009

Table 6.22. Cause of death in prevalent transplanted patients by age on 1/1/2009

	All age groups		<55 years		⩾55 years	
Cause of death	Number of deaths	%	Number of deaths	%	Number of deaths	%
Cardiac disease	40	18	10	16	30	19
Cerebrovascular disease	8	4	3	5	5	3
Infection	60	28	19	31	41	26
Malignancy	49	23	10	16	39	25
Treatment withdrawal	1	0	0	0	1	1
Other	23	11	9	15	14	9
Uncertain	36	17	10	16	26	17
Total	**217**		**61**		**156**	
No cause of death data	387		106		281	

Expected life years remaining on RRT

For the statistical methodology for this analysis please refer to the methodology section at the start of this chapter.

Figure 6.27 shows the median remaining life years expected by age band. All incident patients starting RRT from 1997 to 2008 have been included in this analysis and the projected median survival will be different for low risk (e.g. polycystic kidney disease with a transplant) vs. high risk (diabetic with previous myocardial infarction on dialysis) patients even within the same age band.

Conflicts of interest: none

Table 6.23. Cause of death in prevalent dialysis patients by age on 1/1/2009

	All age groups		<65 years		⩾65 years	
Cause of death	Number of deaths	%	Number of deaths	%	Number of deaths	%
Cardiac disease	341	24	108	24	233	23
Cerebrovascular disease	68	5	20	5	48	5
Infection	279	19	94	21	185	19
Malignancy	101	7	31	7	70	7
Treatment withdrawal	207	14	43	10	164	17
Other	127	9	57	13	70	7
Uncertain	312	22	90	20	222	22
Total	**1,435**		**443**		**992**	
No cause of death data	1,965		562		1,403	

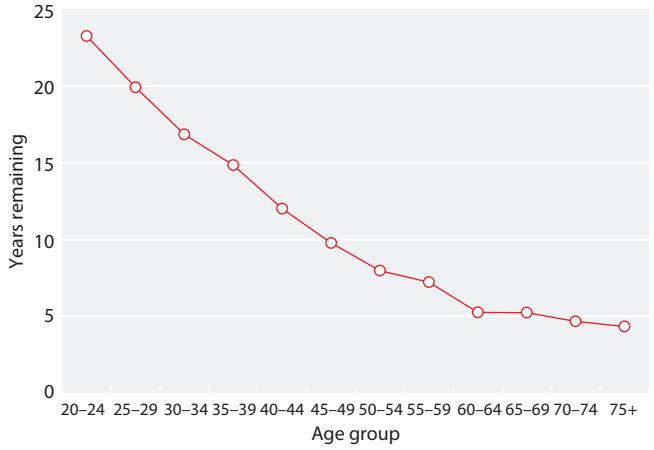

Fig. 6.27. Median remaining life years on RRT by age band, 2009

References

1 Miskulin DC, Meyer KB, Martin AA, Fink NE, Coresh J, Powe NR, et al. Comorbidity and its change predict survival in incident dialysis patients. American journal of kidney diseases: the official journal of the National Kidney Foundation 2003;41(1):149–161

2 Plantinga LC, Fink NE, Levin NW, Jaar BG, Coresh J, Levey AS, et al. Early, Intermediate, and Long-Term Risk Factors for Mortality in Incident Dialysis Patients: The Choices for Healthy Outcomes in Caring for ESRD (CHOICE) Study. American journal of kidney diseases: the official journal of the National Kidney Foundation 2007; 49(6):831–840

3 Tomson C, Maggs C. UK Renal Registry 12th Annual Report (December 2009): chapter 2: introduction. Nephron Clin Pract 2010;115(Suppl 1):c3–8

4 Ford DJ, Fogarty DG, Steenkamp R, Tomson CRV, Ben-Shlomo Y, Ansell D. Chapter 13: The UK Renal Registry Advanced CKD Study: frequency of incorrect reporting of date of start of RRT. Nephron Clinical Practice; 115(Suppl. 1):c271–c278

5 Office National Statistics http://www.statistics.gov.uk/statbase/Product.asp?vlnk = 14409

6 http://www.renal.org/clinical/GuidelinesSection/Guidelines.aspx

7 Ansell D, Roderick P, Hodsman A, Ford D, Steenkamp R, Tomson C. UK Renal Registry 11th Annual Report (December 2008): Chapter 7 Survival and causes of death of UK adult patients on renal replacement therapy in 2007: national and centre–specific analyses. Nephron Clin Pract 2009;111(Suppl 1):c113–139

8 Office for National Statistics. www.ons.gov.uk

9 Yoshino M, Kuhlmann MK, Kotanko P, Greenwood RN, Pisoni RL, Port FK, et al. International Differences in Dialysis Mortality Reflect Background General Population Atherosclerotic Cardiovascular Mortality. Journal of the American Society of Nephrology 2006 December 1, 2006;17(12):3510–3519

10 US Renal Data System, USRDS 2009 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases 2009

Appendix 1: Survival tables

Table 6.24. One-year after 90-day incident survival by centre for 2008, unadjusted and adjusted to age 60

Centre	Unadjusted 1 yr after 90 d survival	Adjusted 1 yr after 90 d survival	Adjusted 1 yr after 90 d 95% CI	Centre	Unadjusted 1 yr after 90 d survival	Adjusted 1 yr after 90 d survival	Adjusted 1 yr after 90 d 95% CI
Abrdn	92.52	94.05	88.6–99.8	L Rfree	94.49	95.30	92.4–98.3
Airdrie	89.19	90.96	83.1–99.6	L St.G	90.84	92.33	87.4–97.6
Antrim	94.44	96.55	92.1–100.0	L West	93.08	94.21	91.8–96.7
B Heart	91.27	93.05	88.5–97.8	Leeds	89.59	91.24	87.1–95.6
B QEH	86.46	89.04	85.5–92.7	Leic	89.43	91.59	88.3–95.0
Bangor	84.94	90.23	81.6–99.8	Liv Ain	80.56	84.56	74.8–95.6
Basldn	89.74	92.46	85.7–99.7	Liv RI	94.77	95.53	91.8–99.4
Belfast	82.95	87.75	81.2–94.8	M Hope	85.79	87.07	81.6–92.9
Bradfd	85.42	84.86	75.8–95.0	M RI	91.22	91.71	87.1–96.5
Brightn	80.73	86.71	81.6–92.1	Middlbr	82.59	85.81	79.4–92.7
Bristol	81.19	84.39	79.4–89.7	Newc	90.66	92.04	86.9–97.5
Camb	89.62	92.81	88.8–97.0	Newry	85.71	88.40	77.5–100.0
Cardff	85.31	87.78	83.0–92.8	Norwch	86.83	90.86	85.9–96.2
Carlis	83.33	85.49	74.8–97.7	Nottm	88.41	90.29	85.2–95.7
Carsh	81.90	86.81	82.8–91.1	Oxford	88.42	90.77	86.4–95.4
Chelms	90.91	94.34	88.4–100.0	Plymth	88.79	91.27	85.3–97.6
Colchr	77.95	85.30	77.9–93.4	Ports	85.00	87.79	83.1–92.7
Covnt	84.07	86.96	81.2–93.2	Prestn	78.03	80.34	73.4–87.9
Derby	89.77	92.45	87.8–97.3	Redng	94.23	95.15	91.1–99.4
Donc	90.15	92.18	82.7–100.0	Sheff	94.22	96.00	93.6–98.5
Dorset	88.83	92.65	87.9–97.7	Shrew	88.33	92.48	87.3–98.0
Dudley	66.02	66.12	53.3–82.1	Stevng	90.51	91.82	86.8–97.1
Dundee	82.67	88.99	82.5–96.0	Sthend	79.31	84.07	73.4–96.3
Dunfn	90.00	92.99	85.8–100.0	Stoke	89.40	91.60	86.2–97.3
Edinb	79.71	83.36	76.6–90.7	Sund	84.09	86.23	77.4–96.1
Exeter	80.99	87.51	82.8–92.5	Swanse	80.74	84.87	79.2–90.9
Glasgw	85.25	88.03	83.3–93.0	Truro	88.19	91.86	84.6–99.7
Glouc	95.35	96.47	91.9–100.0	Tyrone	95.83	97.21	92.1–100.0
Hull	84.48	87.26	81.6–93.3	Wirral	89.19	91.09	83.2–99.7
Inverns	87.62	90.71	81.4–100.0	Wolve	86.62	88.82	82.8–95.2
Ipswi	97.37	97.54	93.0–100.0	York	72.87	81.58	70.7–94.1
Kent	84.24	87.90	83.0–93.1	**England**	**87.73**	**90.15**	**89.3–91.0**
Klmarnk	86.90	91.35	83.7–99.7	**N Ireland**	**87.09**	**90.91**	**87.2–94.7**
L Barts	94.19	93.92	90.5–97.5	**Scotland**	**85.22**	**88.79**	**86.3–91.4**
L Guys	88.87	90.27	86.0–94.8	**Wales**	**83.13**	**86.70**	**83.4–90.2**
L Kings	86.55	88.89	84.3–93.8	**UK**	**87.28**	**89.89**	**89.0–90.7**

Excluded: Data from centres with less than 20 patients are excluded (Clwyd, Derry, D & Gall, Ulster, Wrexham)

Table 6.25. Ninety day incident survival by centre for 2008, unadjusted and adjusted to age 60

Centre	Unadjusted 90 day survival	Adjusted 90 day survival	Adjusted 90 day 95% CI	Centre	Unadjusted 90 day survival	Adjusted 90 day survival	Adjusted 90 day 95% CI
Abrdn	96.4	97.5	94.2–100.0	L West	94.3	95.9	94.0–97.8
Airdrie	94.9	96.2	91.2–100.0	Leeds	91.9	94.0	90.8–97.2
Antrim	90.0	94.8	90.0–99.9	Leic	93.4	95.5	93.3–97.7
B Heart	91.4	94.5	91.0–98.1	Liv Ain	85.7	90.7	83.9–98.0
B QEH	91.4	94.1	91.8–96.5	Liv RI	95.1	96.3	93.2–99.5
Bangor	70.7	83.6	75.5–92.7	M Hope	95.7	96.5	93.9–99.3
Basldn	97.5	98.4	95.4–100.0	M RI	95.5	96.2	93.3–99.2
Belfast	97.1	98.2	95.9–100.0	Middlbr	93.5	95.7	92.4–99.1
Bradfd	92.1	93.0	87.3–99.1	Newc	95.9	96.9	94.0–99.9
Brightn	95.9	97.8	95.9–99.7	Norwch	95.5	97.5	95.1–99.9
Bristol	93.7	95.6	93.1–98.2	Nottm	91.4	93.7	89.9–97.6
Camb	93.8	96.4	93.8–99.1	Oxford	92.5	94.9	92.1–97.9
Cardff	96.7	97.6	95.6–99.7	Plymth	95.7	97.2	94.1–100.0
Carsh	93.0	95.8	93.6–97.9	Ports	91.8	94.2	91.3–97.3
Chelms	97.1	98.5	95.7–100.0	Prestn	96.4	97.1	94.4–99.9
Colchr	91.7	95.6	91.8–99.5	Redng	91.4	93.7	89.7–97.8
Covnt	93.9	95.5	92.3–98.8	Sheff	96.7	98.0	96.5–99.6
Derby	95.7	97.2	94.6–99.9	Shrew	98.4	99.1	97.5–100.0
Donc	88.5	92.7	85.3–100.0	Stevng	95.1	96.3	93.1–99.5
Dorset	87.1	93.1	89.2–97.2	Sthend	83.2	89.9	82.5–97.9
Dudley	89.4	92.3	86.1–98.9	Stoke	92.7	95.1	91.3–99.0
Dundee	84.4	91.6	86.7–96.8	Sund	97.8	98.3	95.1–100.0
Edinb	87.4	91.2	86.7–95.9	Swanse	95.1	96.7	94.2–99.3
Exeter	91.8	95.7	93.3–98.3	Truro	90.0	94.3	89.1–99.8
Glasgw	92.4	94.7	91.9–97.7	Wirral	92.9	95.2	90.2–100.0
Glouc	91.5	94.4	89.2–99.8	Wolve	95.5	96.8	93.8–99.9
Hull	92.9	95.1	91.8–98.5	Wrexm	85.7	89.7	80.1–100.0
Kent	95.7	97.3	95.1–99.5	York	83.8	91.8	85.8–98.3
Klmarnk	94.1	96.7	92.4–100.0	**England**	**94.0**	**96.0**	**95.4–96.6**
L Barts	97.6	97.6	95.6–99.7	**N Ireland**	**95.4**	**97.4**	**95.6–99.2**
L Guys	98.8	99.1	97.8–100.0	**Scotland**	**92.2**	**95.1**	**93.5–96.6**
L Kings	96.0	97.1	94.9–99.4	**Wales**	**92.3**	**95.0**	**93.1–96.9**
L St.G	97.9	98.5	96.4–100.0	**UK**	**93.8**	**95.9**	**95.4–96.5**

Excluded: centres with data from less than 20 incident patients (Clwyd, Derry, D & Gall, Ulster), centres with no deaths in 90 days (Carlisle, Dunfermline, Inverness, Ipswich, Newry, Tyrone)

Table 6.26. One year after 90-day incident survival by centre for incident cohort years 2000–2008, adjusted to age 60

	One year after 90 days survival								
Centre	2000	2001	2002	2003	2004	2005	2006	2007	2008
Abrdn	79.8	92.3	88.0	82.9	89.9	79.5	82.8	85.2	94.0
Airdrie	83.1	84.7	78.5	78.8	85.6	72.3	75.6	84.7	91.0
Antrim						86.2	94.4	84.9	96.6
B Heart	83.7	85.8	88.7	86.5	87.6	85.9	89.9	90.9	93.0
B QEH					88.5	90.3	87.8	93.3	89.0
Bangor			83.1	88.9	84.2	81.4	81.5	92.7	90.2
Basldn				91.9	95.1	92.4	91.0	87.8	92.5
Belfast						90.4	92.3	90.1	87.7
Bradfd		93.4	86.4	84.5	84.5	85.7	76.9	86.8	84.9
Brightn					87.9	83.2	90.3	94.2	86.7
Bristol	86.7	85.7	88.0	87.2	87.8	83.5	93.2	90.9	84.4
Camb		90.7	82.2	88.9	87.6	91.0	92.3	91.7	92.8
Cardff	88.6	83.1	83.0	89.3	86.3	88.4	85.9	81.9	87.8
Carlis	78.4		87.8	78.3	87.0	82.8	91.1	92.8	85.5
Carsh	86.2	76.1	84.6	90.8	86.9	91.6	85.8	89.2	86.8
Chelms					81.4	86.6	87.2	90.3	94.3
Clwyd						80.1		82.8	
Colchr									85.3
Covnt	82.8	87.7	90.5	82.9	85.6	87.4	85.1	91.2	87.0
D & Gall		73.8	78.2						
Derby	88.3	85.0		83.7	86.8	89.3	92.7	94.0	92.4
Derry									
Donc									92.2
Dorset				86.3	91.2	82.7	90.0	86.1	92.7
Dudley	86.3	90.6	89.4	89.2	85.8	96.7	89.5	84.7	66.1
Dundee	77.6	86.8	84.0	89.6	84.2	85.6	89.7	79.4	89.0
Dunfn	72.2	70.2	87.0	85.7	87.9	77.1	83.2	85.3	93.0
Edinb	80.4	80.4	82.6	83.2	79.7	86.0	87.9	92.4	83.4
Exeter	85.4	85.4	87.1	85.2	86.8	86.2	87.8	86.8	87.5
Glasgw	84.7	79.8	83.8	85.5	81.2	84.4	84.8	88.2	88.0
Glouc	95.1	82.5	82.5	85.0	86.9	93.4	89.8	86.6	96.5
Hull	86.1	88.8	85.9	87.6	86.2	89.6	92.1	86.4	87.3
Inverns	84.1	91.7	83.7	88.0	83.5	85.4	91.0	80.1	90.7
Ipswi			98.3	93.7	91.2	85.6	96.1	94.3	97.5
Kent								92.5	87.9
Klmarnk	91.5	88.2	87.4	85.3	84.0	94.0	84.0	90.4	91.4
L Barts					87.6	93.0	91.6	87.9	93.9
L Guys	88.0	87.6	86.6	93.9	88.0	93.1	91.0	92.7	90.3
L Kings			88.1	85.9	88.8	88.9	88.8	88.3	88.9
L Rfree						91.6	92.3	93.4	95.3
L St.G								91.5	92.3
L West			93.2	95.6	91.9	94.1	94.0	92.0	94.2
Leeds	90.6	89.7	85.7	89.0	90.0	89.6	85.5	87.5	91.2
Leic	84.7	87.4	88.0	90.7	85.4	85.6	87.7	88.8	91.6
Liv Ain						85.5	86.3	80.4	84.6
Liv RI		87.2	85.0	83.4	84.8	91.1	83.8	89.6	95.5
M Hope				88.1	82.8	92.3	91.6	82.6	87.1
M RI								87.6	91.7
Middlbr	89.2	82.9	78.5	82.5	85.5	83.2	89.8	87.4	85.8
Newc			87.1	86.8	83.1	83.6	87.0	86.4	92.0
Newry						86.6			88.4
Norwch					86.1	90.2	89.0	89.0	90.9
Nottm	89.3	89.9	86.7	86.4	84.8	86.8	94.6	88.7	90.3
Oxford	90.0	86.6	89.0	87.9	90.6	87.0	90.8	89.2	90.8
Plymth	84.4	73.2	82.1	81.5	81.1	82.1	83.3	89.6	91.3

Table 6.26. Continued

	One year after 90 days survival								
Centre	2000	2001	2002	2003	2004	2005	2006	2007	2008
Ports		86.7	86.2	87.9	89.4	83.5	86.4	89.9	87.8
Prestn	87.0	87.2	86.7	86.0	84.5	92.0	84.8	89.2	80.3
Redng	76.3	83.7	92.5	92.0	93.8	88.6	90.4	90.3	95.1
Sheff	94.9	94.3	84.4	90.1	89.9	92.1	89.5	87.2	96.0
Shrew					88.0	87.6	89.7	89.5	92.5
Stevng	91.1	81.2	87.7	94.8	87.7	79.7	88.4	88.8	91.8
Sthend	82.5	80.5	87.7	90.8	87.3	92.3	96.4	92.1	84.1
Stoke								85.5	91.6
Sund	83.6	85.2	71.3	81.4	88.1	82.5	82.6	87.6	86.2
Swanse	84.9	85.6	83.4	82.4	82.3	84.2	83.5	89.5	84.9
Truro		91.4	84.0	88.6	92.4	88.1	92.8	86.6	91.9
Tyrone							89.8	89.7	97.2
Ulster									
Wirral			78.2	94.9	82.5	88.3	91.0	86.9	91.1
Wolve	87.4	77.1	88.0	82.7	88.0	85.9	90.1	90.8	88.8
Wrexm	85.2	83.2	93.2	83.9	91.8	91.8	90.8	90.7	
York	83.6	87.0	82.4	78.7	90.0	85.3	83.2	94.6	81.6
England	**87.5**	**86.5**	**86.6**	**88.2**	**87.7**	**88.6**	**89.4**	**89.6**	**90.2**
N Ireland						**89.8**	**91.8**	**89.6**	**90.9**
Scotland	**82.1**	**82.7**	**83.8**	**85.4**	**83.7**	**84.0**	**85.0**	**86.6**	**88.8**
Wales	**87.0**	**84.1**	**84.5**	**85.9**	**85.7**	**86.3**	**85.6**	**85.7**	**86.7**
UK	**86.4**	**85.8**	**86.1**	**87.7**	**87.2**	**88.0**	**88.9**	**89.1**	**89.9**

Blank cells: centres with <20 patients for that year or centres with no data available for that year

Table 6.27. One year prevalent survival by centre for prevalent cohort years 2000–2009, adjusted to age 60

	One-year survival									
Centre	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Abrdn	85.9	89.4	87.3	80.6	85.6	87.5	86.8	87.1	89.7	89.6
Airdrie	78.0	78.3	81.9	84.1	84.1	82.7	79.5	79.6	85.6	85.6
Antrim						83.6	92.0	85.7	89.1	89.6
B Heart	86.7	87.5	87.7	87.6	86.8	87.9	86.3	87.7	90.5	90.6
B QEH					89.2	89.1	88.8	88.6	88.7	90.2
Bangor			85.4	81.4	89.6	86.4	89.3	80.7	88.7	84.5
Basldn				81.6	88.0	90.7	90.2	91.0	93.1	92.4
Belfast						86.3	86.8	90.8	87.3	87.4
Bradfd		80.3	87.8	82.6	88.0	86.4	82.6	84.4	88.0	85.4
Brightn					87.2	84.1	87.7	87.6	89.5	87.6
Bristol	87.2	86.2	87.7	88.8	86.8	87.5	87.7	89.2	87.2	84.9
Camb		86.1	86.7	86.9	87.6	87.7	89.0	88.2	92.8	90.4
Cardff	85.3	85.8	86.0	80.9	84.5	84.4	84.4	88.8	82.8	86.8
Carlis	82.8	89.1	81.1	83.0	82.6	85.8	84.4	86.2	87.0	81.3
Carsh	83.1	83.8	82.9	85.2	88.0	86.5	89.2	88.9	90.0	89.3
Chelms					87.0	82.2	85.7	86.3	84.6	85.7
Clwyd			88.2	89.0	75.7	81.8	78.9	90.7	87.9	87.8
Colchr										90.9
Covnt	87.3	85.4	85.5	87.8	88.7	89.4	85.5	87.2	87.9	90.9
D & Gall	87.2	83.5	83.4	85.3	83.3	90.6	82.1	90.2	85.5	88.2
Derby	89.0	89.6		86.7	88.9	88.2	89.0	87.5	90.9	90.9
Derry								86.8	92.4	90.8
Donc									93.9	83.9
Dorset				90.2	88.1	90.4	86.3	87.4	89.8	89.8
Dudley	85.6	83.4	83.4	84.8	86.9	86.4	87.3	87.0	89.4	88.9
Dundee	77.2	86.3	85.2	84.0	85.5	87.8	87.6	84.0	84.2	93.8
Dunfn	76.6	79.4	82.7	83.9	89.1	91.1	88.9	89.1	90.2	87.6
Edinb	82.8	81.7	83.8	83.3	86.2	86.0	86.8	88.2	88.2	86.5
Exeter	86.3	85.2	87.5	86.7	86.1	84.3	90.9	87.4	85.5	85.1
Glasgw	86.1	83.5	85.9	83.9	85.6	87.4	86.5	88.4	87.8	88.6
Glouc	89.2	80.0	84.2	82.3	89.3	88.7	91.2	88.0	87.4	92.0
Hull	81.5	87.1	87.5	85.6	85.7	84.9	85.8	90.2	87.0	87.9
Inverns	81.4	89.0	88.6	87.6	86.9	87.1	86.4	94.5	89.1	92.2
Ipswi			82.5	85.1	90.5	86.2	85.0	85.5	91.6	85.1
Kent									86.6	88.0
Klmarnk	80.6	85.5	82.7	82.4	87.2	84.8	91.5	87.0	88.8	88.3
L Barts					83.9	85.6	88.3	89.2	88.7	90.7
L Guys	86.2	86.7	86.3	88.7	88.6	89.2	87.8	90.7	90.1	91.3
L Kings			81.1	77.5	81.6	86.5	88.9	84.9	88.4	87.9
L Rfree						90.1	90.5	90.5	91.3	89.7
L St.G								95.9	94.0	89.9
L West			89.7	91.4	91.1	91.6	91.7	91.9	90.5	92.2
Leeds	83.4	85.4	87.2	86.2	85.2	88.8	89.2	88.2	87.8	89.2
Leic	83.3	84.7	84.1	83.7	85.2	87.2	84.6	90.1	89.6	88.7
Liv Ain			90.8	90.9	87.2	97.0	86.8	91.0	89.0	92.2
Liv RI		81.2	82.1	84.5	85.9	84.0	88.1	85.4	87.5	89.2
M Hope				84.6	82.2	84.5	86.3	88.4	87.2	88.1
M RI								85.9	86.7	87.4
Middlbr	84.1	84.2	84.4	84.5	83.2	86.1	85.5	87.2	87.2	86.9
Newc			83.1	81.0	81.1	86.2	84.0	86.6	87.0	87.5
Newry						86.0	88.0	87.1	90.6	94.7
Norwch					87.0	87.7	89.9	87.0	90.9	89.0
Nottm	85.2	87.1	83.1	85.1	86.4	85.1	83.3	89.5	88.4	87.9
Oxford	87.8	88.3	85.6	86.6	88.1	87.5	88.0	87.4	88.3	89.0
Plymth	85.1	87.5	76.7	84.9	86.9	87.5	83.5	82.9	88.4	85.7

Table 6.27. Continued

	One-year survival by centre and year									
Centre	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Ports		83.8	80.8	81.6	89.1	85.4	84.8	89.8	88.7	89.0
Prestn	85.8	87.2	86.4	84.8	85.8	85.7	86.6	90.9	90.4	89.7
Redng	84.1	79.0	86.3	82.4	90.0	86.4	89.4	90.0	89.5	92.1
Sheff	84.2	88.0	90.5	91.0	87.8	87.1	89.2	88.7	88.8	89.4
Shrew					85.3	87.3	86.3	89.4	89.1	88.3
Stevng	89.6	91.2	86.6	88.4	89.5	88.6	89.8	89.7	92.9	90.5
Sthend	85.5	88.9	89.6	87.2	89.2	86.7	83.6	85.9	90.2	91.1
Stoke								84.6	87.4	88.3
Sund	77.1	79.3	78.4	76.0	82.8	86.5	79.5	83.3	87.7	85.7
Swanse	84.6	87.6	80.8	82.4	87.9	89.3	86.1	88.5	89.7	87.6
Truro		89.1	82.9	90.4	90.2	86.0	92.0	89.1	90.4	88.6
Tyrone						88.9	82.7	93.1	93.4	87.1
Ulster						86.1	91.6	89.4	92.3	87.5
Wirral			93.8	84.5	87.7	89.5	89.4	88.1	88.9	90.4
Wolve	84.6	90.1	86.7	83.9	86.6	87.6	89.6	88.0	93.2	89.5
Wrexm	84.3	88.1	87.3	86.0	86.2	84.6	85.1	88.9	86.0	90.2
York	86.7	80.0	85.4	81.3	83.1	88.7	83.5	89.1	88.3	88.0
England	**85.4**	**85.9**	**85.7**	**86.1**	**87.1**	**87.4**	**87.9**	**88.7**	**89.2**	**89.2**
N Ireland						**86.0**	**87.7**	**89.2**	**89.7**	**89.0**
Scotland	**83.1**	**83.7**	**85.0**	**83.6**	**85.8**	**87.0**	**86.4**	**87.5**	**87.7**	**88.8**
Wales	**84.8**	**86.8**	**84.8**	**82.5**	**85.5**	**85.9**	**85.0**	**88.1**	**85.9**	**87.2**
UK	**84.9**	**85.7**	**85.6**	**85.5**	**86.8**	**87.3**	**87.6**	**88.6**	**88.9**	**89.0**

Blank cells: data not available for that year or less than 20 patients in that year