

## Section C SURVIVAL

### C1 Survival analyses

A total of 13506 patients who have started RRT in Scotland since 1960 are available for the survival analyses (no patient has date of birth missing). Patients who started RRT outside of Scotland are excluded. Those who have moved from Scotland, or are lost to follow-up, are censored at the date at which this occurred, even if death at a later date is reported to the Registry.

C1.1 Median survival of patients starting RRT 1986-2010 by age and diagnosis group							
Age group	Diagnosis group	Number starting RRT	Number dead by 31/12/2010	Median survival (years)	95% CI for median survival		Log rank p value
≥75 years	Unknown	648	525	1.5	1.2	1.7	0.007
	Diabetes	219	182	1.5	1.1	1.9	
	Multisystem	678	559	1.3	1.1	1.5	
	Interstitial	260	213	1.9	1.5	2.3	
	Glomerulo-nephritis	171	139	1.4	1.1	1.6	
65-74 years	Unknown	658	519	2.6	2.3	2.8	<0.0001
	Diabetes	537	420	1.9	1.6	2.1	
	Multisystem	988	822	1.6	1.4	1.8	
	Interstitial	492	376	3.4	3.0	3.8	
	Glomerulo-nephritis	359	274	3.4	2.9	3.9	
45-64 years	Unknown	518	355	5.0	4.4	5.5	<0.0001
	Diabetes	888	643	3.0	2.7	3.3	
	Multisystem	853	635	3.2	2.7	3.6	
	Interstitial	989	512	8.6	7.8	9.5	
	Glomerulo-nephritis	690	377	8.1	7.1	9.1	
20-44 years	Unknown	274	90	18.2	13.4	23.0	<0.0001
	Diabetes	454	236	7.9	6.3	9.5	
	Multisystem	273	97	15.9	13.2	18.5	
	Interstitial	702	162	24.2	21.3	27.1	
	Glomerulo-nephritis *	528	109	.	.	.	

Age group	Diagnosis group	Number starting RRT	Number dead by 31/12/2010	Median survival (years)	95% CI for median survival		Log rank p value
<20 years	Unknown *	66	9	.	.	.	0.3
	Diabetes +	1	1	.	.	.	
	Multisystem *	50	11	.	.	.	
	Interstitial *	196	29	.	.	.	
	Glomerulonephritis *	53	7	.	.	.	
<b>All ages</b>	<b>All diagnoses</b>	<b>11545</b>	<b>7302</b>	<b>4.1</b>	<b>3.9</b>	<b>4.2</b>	

\* A median was not observed as more than half of the patients are still alive at the end of the study period.

+ A minimum of 5 patients need to be observed in a group to calculate a median.

The differences between survival in the <20 years age group did not reach statistical significance because of the small numbers of patients involved and because in this age group more than half of the patients are still alive.

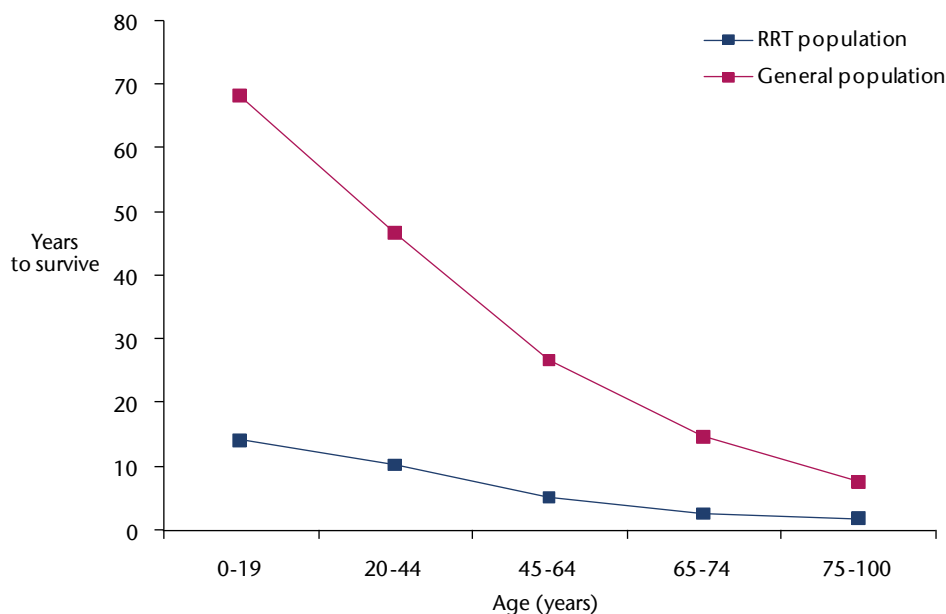
## C1.2 Life expectancy for the general population of Scotland 2007-2009

Life expectancy in years for the general population of Scotland in 2007-2009 by sex, at the exact age given, is shown in this table (© Crown copyright. Data supplied by the General Registrar Office for Scotland). This allows comparison with patients receiving RRT.

Age	Life expectancy males	Life expectancy females
85	5.4	6.3
75	10.0	11.7
65	16.4	19.0
55	24.2	27.4
45	32.8	36.5

Source: GROS life expectancy tables

**C1.3 Survival of incident RRT patients 1960-2010 compared with life expectancy of the general Scottish population 2010**



Data for life expectancy in the general population is based on population estimates for 2010 from the UK Office of National Statistics. The average life expectancy has been calculated for the age groups: <20 years, 20-44 years, 45-64 years, 65-74 years and >=75 years. The life expectancy figures have been adjusted according sex and to the population number in the each of the age groups.

13506 patients incident to RRT since 1960 have been included in the analysis of survival of RRT patients for comparison. Therefore the comparison, by necessity, is with historical data relating to the survival of RRT patients, not a prediction of the expected survival of incident patients in 2010.

**C2 Survival of patients aged 45-64 when starting RRT over time**

In order to investigate whether survival has improved for patients starting RRT in more recent years, logistic regression was employed to determine if the survival of patients in a single diagnosis group, glomerulonephritis, and a single age group, 45-64 years, has changed over time. The number of incident patients in these groups has not changed significantly for the past 20 years – see A4.2 and A5.2. Data relating to patients starting RRT 2006-2010 are excluded to ensure a minimum follow up of 5 years.

This analysis was repeated for patients of the same age group with a diagnosis of diabetic nephropathy, these patients have only been treated in appreciable numbers since the middle of the 1980s.

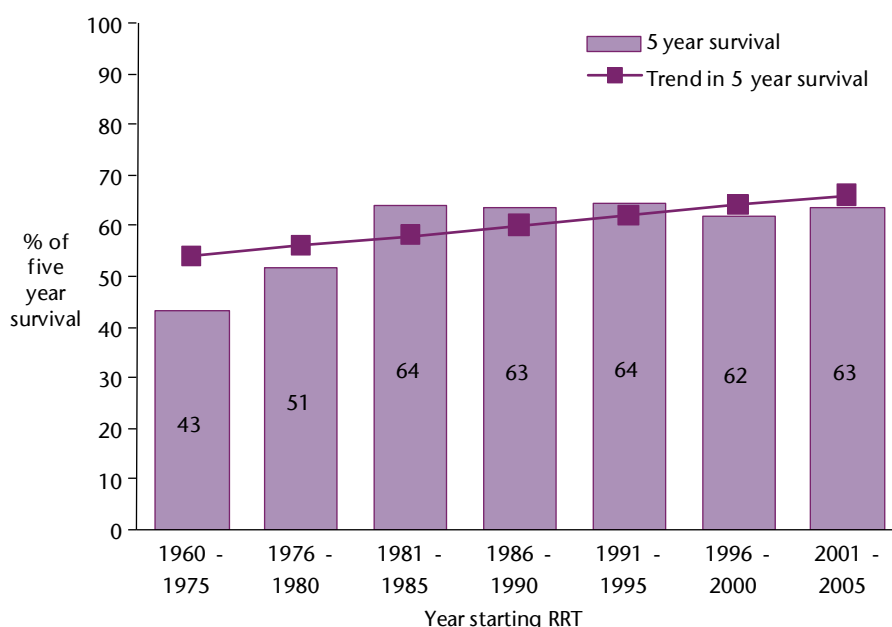
### C2.1 Five year survival of patients 45-64 in the glomerulonephritis PRD group

863 patients in the glomerulonephritis PRD group were of age 45-64 years when starting RRT. Of these 150 started RRT between 2006 and 2010 and were excluded to ensure a minimum of 5 years of follow-up RRT. A further 22 patients were excluded because of censoring. Of the 691 remaining patients, 268 died within 5 years of beginning RRT.

Year starting RRT	Patients	Surviving at 5 years	(%) Surviving	Median survival (years)	95% CI	
1960-1975	28	12	42.9	4.3	2.30	6.40
1976-1980	70	36	51.4	5.2	3.70	6.70
1981-1985	72	46	63.9	7.7	6.10	9.30
1986-1990	109	69	63.3	6.6	5.20	8.00
1991-1995	146	94	64.4	7.6	6.60	8.60
1996-2000	152	94	61.8	8.1	7.30	8.80
2001-2005	114	72	63.2	6.5	5.90	7.00

There is no significant difference in survival when comparing the different years when patients start RRT.

### C2.2 Trend in survival by 5 years of RRT for patients aged 45-64 in the glomerulonephritis PRD group



The trend in 5 year survival is not significant (p=0.06).

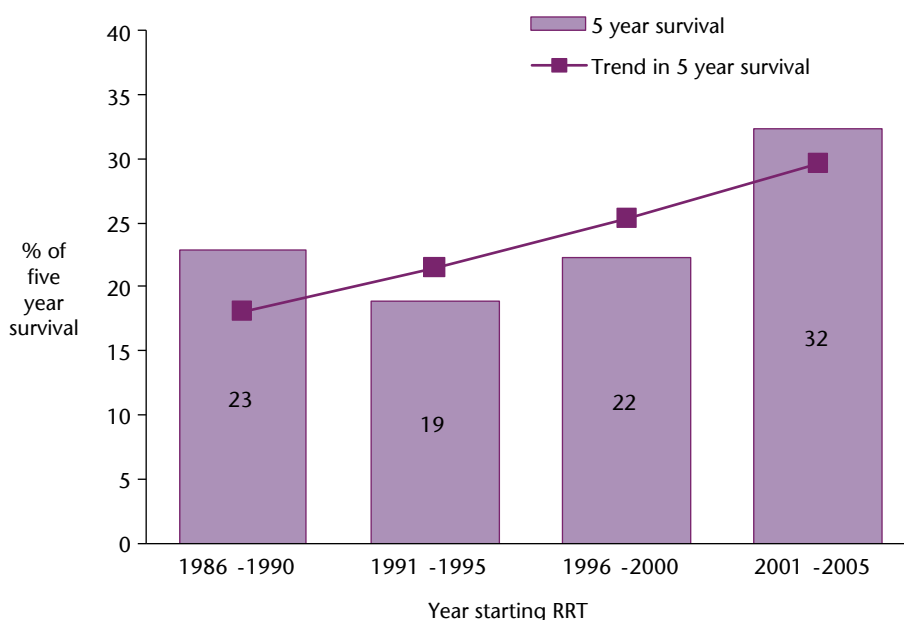
### C2.3 Five year survival of patients 45-64 in the diabetic nephropathy PRD group

934 patients in the diabetic nephropathy PRD group were of age 45-64 years when starting RRT. Of these 249 started RRT between 2006 and 2010 and were excluded to ensure a minimum of 5 years of follow-up RRT. A further 4 patients were excluded because of censoring. Of the 635 remaining patients, 477 died within 5 years of beginning RRT.

Year starting RRT	Patients	Surviving at 5 years	(%) Surviving	Median survival (years)	95% CI	
1986-1990	92	21	22.8	2.6	2.10	3.17
1991-1995	127	24	18.9	2.3	1.64	3.04
1996-2000	215	48	22.3	2.5	2.15	2.91
2001-2005	201	65	32.3	3.3	2.59	4.03

There is a significant difference in survival between the 2001-2005 year banding compared with the other groups, but not between the other groups when compared with each other; p=0.03 (Mantel Cox).

### C2.4 Trend in survival by 5 years of RRT for patients aged 45-64 in the diabetes PRD group



There is an increasing trend in survival which is statistically significant (OR 1.24, 95% CI 1.04 to 1.5 p=0.02).

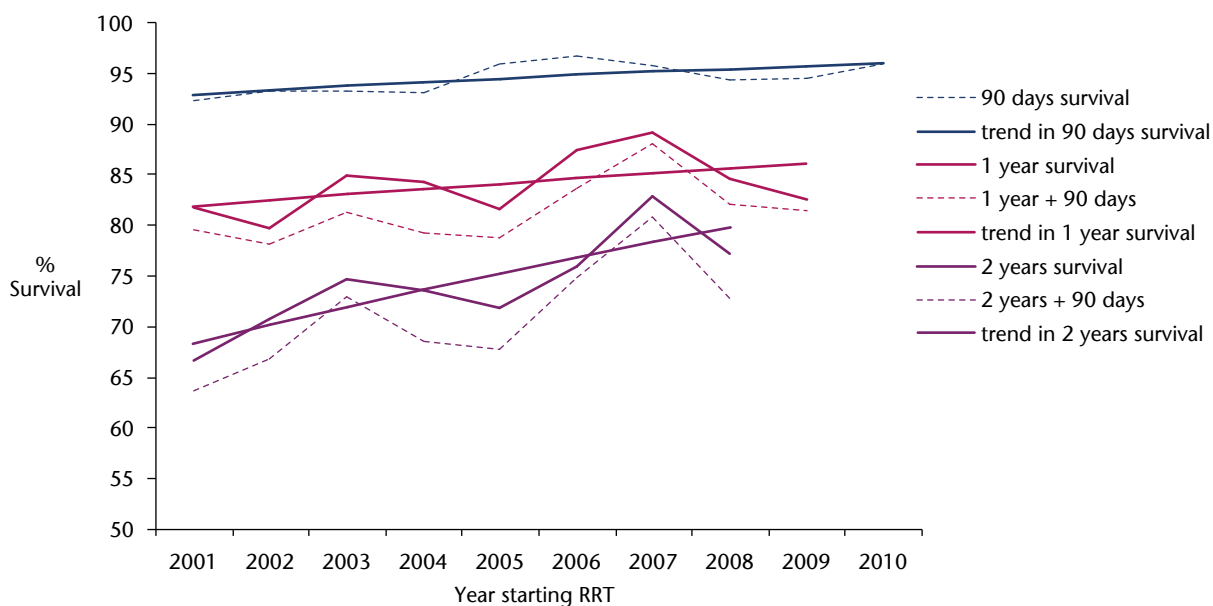
## C2.5 Survival of patients aged 45-64 by year of start of RRT 2001-2010

Patients with insufficient follow-up and those who recovered within 90 days or who were lost to follow-up within the relevant period have been excluded.

Date starting RRT	% surviving 90 days	% surviving 1 year	% surviving 1 year + 90 days	% surviving 2 years	% surviving 2 years + 90 days
2001	92.4	81.8	79.5	66.7	63.6
2002	93.3	79.8	78.1	70.8	66.9
2003	93.4	84.9	81.3	74.7	72.9
2004	93.1	84.3	79.2	73.6	68.6
2005	96.0	81.6	78.7	71.8	67.8
2006	96.7	87.4	83.6	76.0	74.9
2007	95.9	89.1	88.1	82.9	80.8
2008	94.4	84.6	82.1	77.2	72.8
2009	94.6	82.6	81.4		
2010	96.1				

Note: Censored patients are excluded from this table.

**C2.6 Trends in survival of all patients aged 45-64 when starting RRT 2001-2010**



Trend in 90 days survival: year to year OR 1.07 (95%CI 0.99-1.16).

Trend in 1 year survival: year to year OR 1.05 (95%CI 0.98-1.10).

Trend in 2 year survival: year to year OR 1.09 (95%CI 1.03-1.15).

There is no statistically significant trend in 90 day nor 1 year survival when different years of starting RRT are compared.

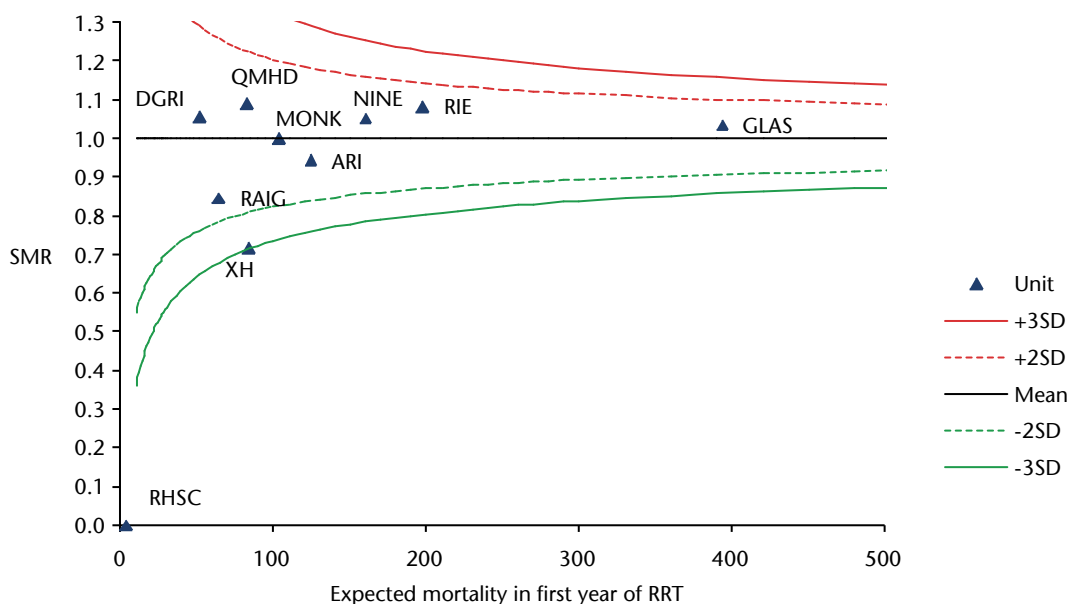
The trend in two years survival is statistically significant (p<0.05).

There has been an increase in 2 year survival of 11% over the eight year period 2001-2008 in patients aged 45-64 when starting RRT.

### C3 Comparison of survival by renal unit providing first RRT using Cox regression

#### C3.1 Standardised Mortality Ratio for 1 year mortality by renal unit providing first RRT for patients starting RRT in 2000-2009

The standardised mortality ratio (SMR) is the number of deaths in every unit divided by the expected number of deaths in that unit. This makes the SMR a measure of case-mix adjusted mortality (hence the label 'standardised'). The expected number of deaths is based on a logistic regression comprising patient's age, sex, and diagnosis. A SMR close to one means that the observed number of deaths is close to the expected number. A SMR higher than one means that the observed number of deaths is higher than the expected number. The units within the outer control limits (-3SD, +3SD) are considered equivalent and different only by chance. The control limits are calculated via the Poisson probability distribution.

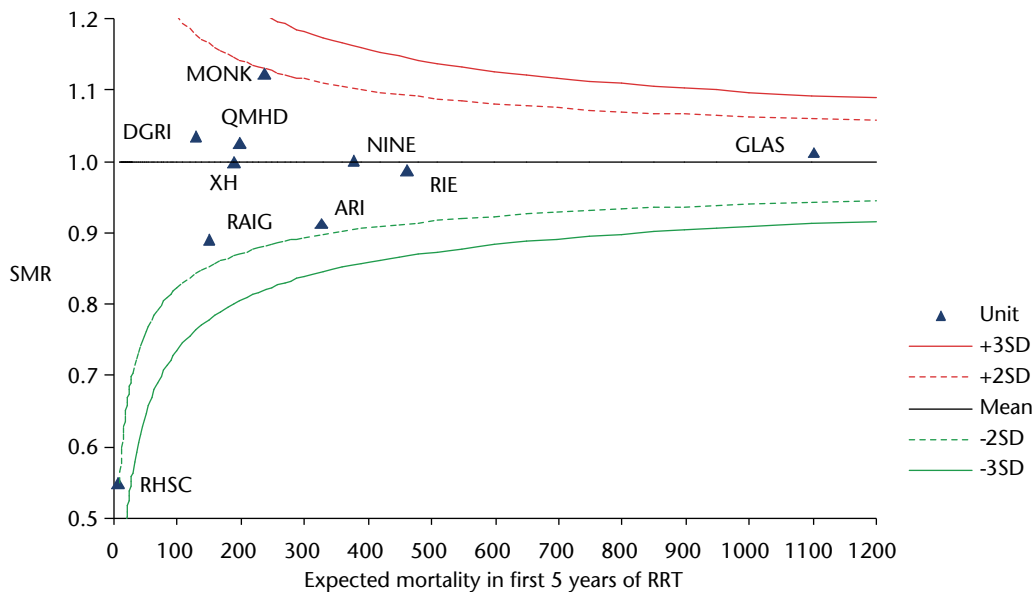


All units except XH fall within 3 standard deviations of the mean. Expected mortality based on sex, age groups and groups of diagnoses.

The mortality in first year of RRT for patients starting RRT 2000-2009 was 23%.



**C3.2 Standardised Mortality Ratio for 5 year mortality by renal unit providing first RRT for patients starting RRT in 1996-2005**

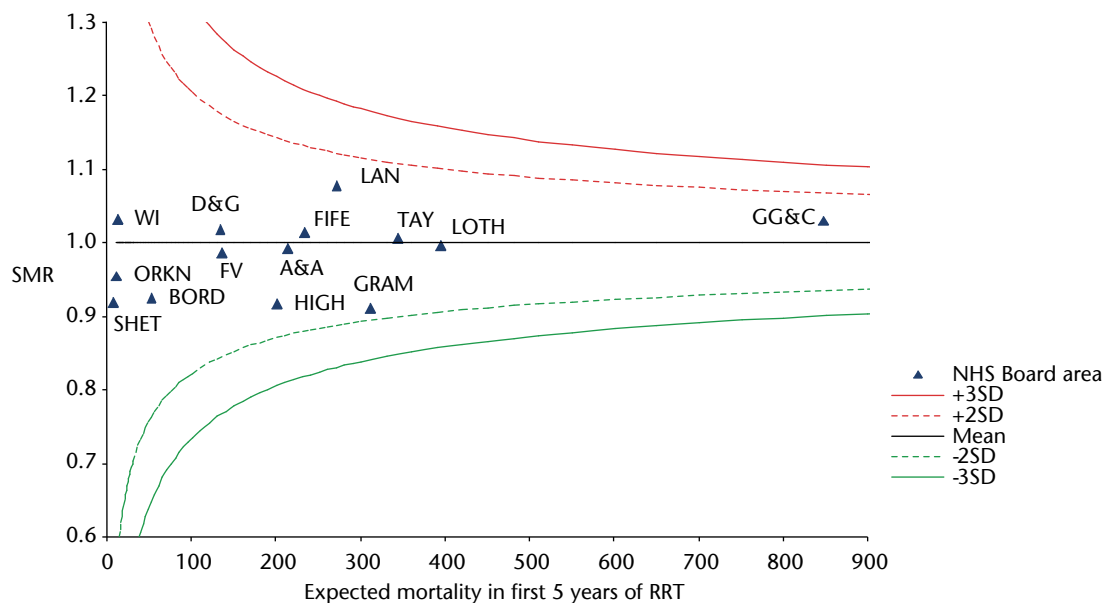


All units fall within 3 standard deviations of the mean.  
 Expected mortality based on sex, age groups and groups of diagnoses.

The mortality in first five years of RRT for patients starting RRT 1996-2005 was 60%.

## C4 Survival by NHS Board area of residence

### C4.1 Standardised Mortality Ratio for 5 year mortality for patients starting RRT 1996-2005 by NHS Board area of residence



All NHS Board areas fall within 3 standard deviations of the mean.

The mortality in first five years of RRT for patients starting RRT 1996-2005 was 60%.