CHAPTER 13

RENAL TRANSPLANTATION

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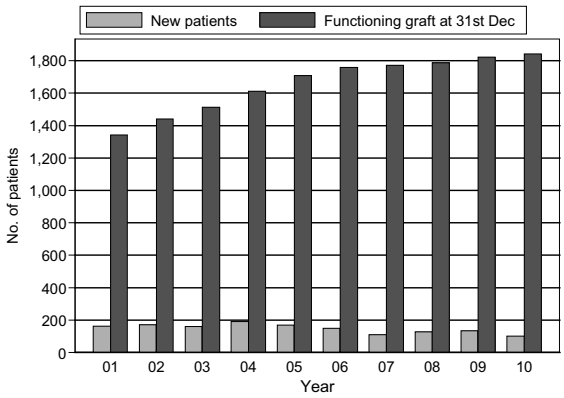
SECTION 13.1: STOCK AND FLOW

The number of new renal transplant patients shows an initial rise from 163 transplants per year in 2001 to a peak of 192 transplants in 2004. This is a rise of nearly 18% but the number declined subsequently to only 102 in 2010 (Table 13.1.1). This is due to reduction in the number of transplantations done in oversea. As renal transplantation in the country is still dependant on the availability of commercial cadaveric transplantation done abroad, this drop is partially explained by the implementation of restriction of commercial organ transplantation by the Chinese Ministry of Health. The number of functioning renal transplants had increased from 1343 in 2001 to 1841 in 2010 (Table 13.1.1).

Table 13.1.1: Stock and Flow of Renal Transplantation, 2001-2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New transplant patients	163	172	160	192	170	149	111	128	135	102
Died	40	38	42	44	47	58	46	60	49	33
Graft failure	39	33	41	43	21	36	36	39	35	45
Lost to Follow up	2	4	4	6	6	4	16	14	16	4
Functioning graft at 31st December	1343	1440	1513	1612	1708	1759	1772	1787	1822	1841

Figure 13.1.1: Stock and Flow of Renal Transplantation, 2001-2010



The incidence of renal transplantation shows a modest decline of 6 to 7 per million population in the early 2000's to 4-5 per million population in the last 3 years (Table 13.1.2) while transplant prevalence rate has grown slowly from 56 per million in 2001 to 65 per million population in 2005 (Table 14.1.3), an increase of 16% over the 2001 figures, and subsequently has remained static over the last five years. However, compared to growth in the prevalence rate of dialysis patients (which has increased by 325 from 326 per million population in 2001 to 812 in 2010) our transplant prevalence rate has not kept up. In fact, the incidence rate has reduced over the last ten years and the prevalence rate has remained static over the last 5 years (4 and 65 per million population respectively) (Table 13.1.2 and 13.1.3).

Table 13.1.2: New transplant rate per million population (pmp), 2001-2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New transplant patients	163	172	160	192	170	149	111	128	135	102
New transplant rate, pmp	7	7	6	7	6	6	4	5	5	4

Figure 13.1.2: New transplant rate, 2001-2010

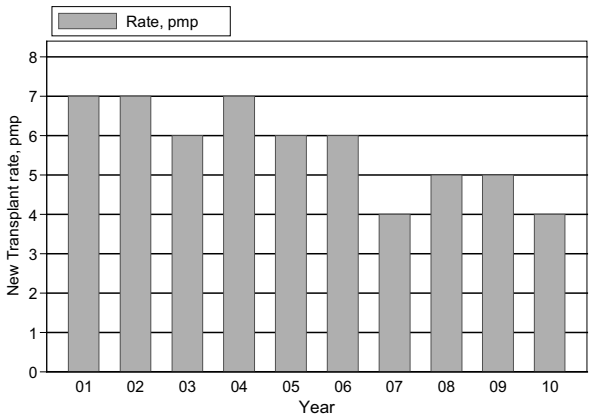


Figure 13.1.3: Transplant prevalence rate, 2001-2010

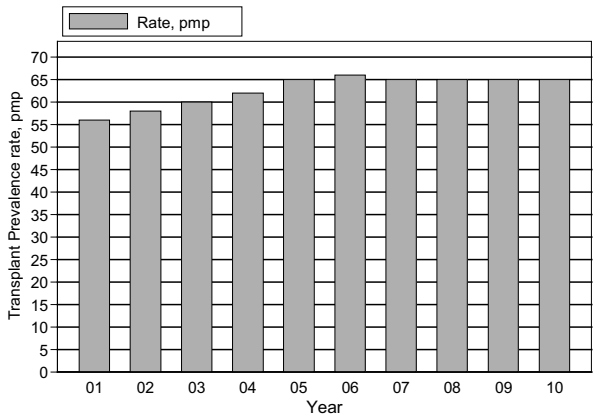


Table 13.1.3: Transplant prevalence rate per million population (pmp), 2001-2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Functioning graft at 31st December	1343	1440	1513	1612	1708	1759	1772	1787	1822	1841
Transplant prevalence rate, pmp	56	58	60	62	65	66	65	65	65	65

In terms of place of transplantation, transplantation within local centres has remained relatively fluctuated in the last decade with 67 cases in 2001, gradually decreasing and was at its lowest in 2004 with only 40 cases and slowly increasing in the last 5 years. Unfortunately, the number of transplant has decreased again in 2010. This is disturbing data as it underscores our failure to improve rate of transplantation within the country, which is mainly due to the lack of both living as well as cadaver donors. Transplantation in China continues to drop from 139 cases (69%) at its peak in 2004 down to 35 cases (34%) in 2010 (Table 13.1.4).

Table 13.1.4: Place of transplantation, 2001-2010

Year	2001		2002		2003		2004		2005	
	n	%	n	%	n	%	n	%	n	%
HKL	33	20	30	17	26	16	20	10	31	18
UMMC	23	14	15	9	6	4	7	4	8	5
Selayang Hospital	11	7	11	6	11	7	11	6	5	3
Other local	4	3	1	1	1	1	2	1	4	2
China	83	51	103	60	111	69	139	72	110	65
India	8	5	12	7	4	3	11	6	7	4
Other overseas	1	1	0	0	1	1	2	1	4	2
Unknown	0	0	0	0	0	0	0	0	1	1
Total	163	100	172	100	160	100	192	100	170	100

Year	2006		2007		2008		2009		2010		TOTAL	
	n	%	n	%	n	%	n	%	n	%	n	%
HKL	35	24	36	32	32	25	36	27	25	25	304	21
UMMC	5	3	3	3	10	8	10	7	4	4	91	6
Selayang Hospital	9	6	14	13	10	8	19	14	18	18	119	8
Other local	2	1	4	4	8	6	10	7	8	8	44	3
China	87	58	45	41	63	49	58	43	35	34	834	56
India	7	5	3	3	3	2	1	1	1	1	57	4
Other overseas	4	3	5	5	2	2	1	1	3	3	23	2
Unknown	0	0	1	1	0	0	0	0	8	8	10	1
TOTAL	149	100	111	100	128	100	135	100	102	100	1482	100

SECTION 13.2: RECIPIENTS' CHARACTERISTICS

In terms of renal transplant recipients' characteristics, age at transplant has remained unchanged, with a mean between 37 to 42 years old. Between 58% and 70% of recipients were males over the last 10 years.

The proportion of diabetic patients undergoing renal transplantation increased during the first half of the decade from 14% in 2001 to 18% in 2005(Table 13.2.2). However, there is a drop in the number of diabetic patients who underwent transplantation in 2007 and dropped further to 12% in 2010. This coincided with the drop in China transplants where the majority of the diabetic patients underwent their transplantation.

Patients with hepatitis B have decreased from 5-8% earlier to 2% in the last 2 years. The proportion of patients with hepatitis C fluctuated in the last ten years. In terms of cause of end stage renal failure (Table 13.2.2), the primary cause was still glomerulonephritis, followed by hypertension and diabetes as the third cause. Up to 40% of transplant recipients had end stage renal disease due to unknown causes, belying the fact that majority of these patients presented late.

Table 13.2.1: Renal Transplant Recipients' Characteristics, 2001-2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New Transplant Patients	163	172	160	192	170	149	111	128	135	102
Age at transplant (years), Mean	41	40	41	42	38	37	37	37	38	40
Age at transplant (years), SD	13	12	13	13	14	15	16	15	14	14
% Male	63	58	66	63	69	66	64	59	64	63
% Diabetic (co-morbid/ primary renal disease)	18	15	23	21	21	20	14	19	17	12
% HBsAg positive	5	7	8	5	4	7	7	3	2	2
% Anti-HCV positive	15	9	10	8	2	8	9	3	7	2

Table 13.2.2: Primary causes of end stage renal failure, 2001-2010

Year	2001		2002		2003		2004		2005	
	n	%	n	%	n	%	n	%	n	%
New transplant patients	163	100	172	100	160	100	192	100	170	100
Glomerulonephritis	44	27	54	31	55	34	64	33	47	28
Diabetes Mellitus	23	14	16	9	27	17	32	17	31	18
Hypertension	17	10	24	14	26	16	52	27	42	25
Obstructive uropathy	3	2	2	1	3	2	4	2	3	2
ADPKD	1	1	3	2	5	3	5	3	3	2
Drugs/ toxic nephropathy	0	0	0	0	2	1	2	1	0	0
Hereditary nephritis	0	0	0	0	0	0	1	1	0	0
Unknown	61	37	71	41	57	36	82	43	57	34
Others	23	14	15	9	12	8	28	15	14	8

Year	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
New transplant patients	149	100	111	100	128	100	135	100	102	100
Glomerulonephritis	53	36	31	28	33	26	40	30	38	37
Diabetes Mellitus	22	15	10	9	19	15	21	16	12	12
Hypertension	32	21	27	24	22	17	28	21	24	24
Obstructive uropathy	6	4	1	1	2	2	4	3	3	3
ADPKD	1	1	2	2	0	0	7	5	2	2
Drugs/ toxic nephropathy	1	1	0	0	2	2	0	0	0	0
Hereditary nephritis	0	0	0	0	0	0	0	0	1	1
Unknown	48	32	42	38	55	43	51	38	35	34
Others	16	11	14	13	12	9	3	2	6	6

SECTION 13.3: TRANSPLANT PRACTICES

The proportion of commercial transplantation has gradually reduced from 79% at its peak in 2004 to 34% in 2010. This is predominantly due to the marked decline in commercial cadaveric transplantation (76% in 2004 to 10% in 2010), which is in keeping with the implementation of restriction of cadaveric organ transplantation by the Chinese Ministry of Health. However, the number of commercial live donation has increased in 2010.

Live donor transplantation made up 29% of transplants (25 recipients) in 2010, which was down from 41 cases (32%) in 2009 and 40 cases (32%) in 2008. The number of life donor has remained low.

Local cadaveric donation made up 18% of transplants (24 recipients) in 2006 although it had shown an initial promising rise to 37 recipients in 2010. 2010 also marked the first time in 10 years where there were more local transplantations (66%) compared to commercial transplantations in oversea (34%).

Table 13.3.1: Type of Renal Transplantation, 2001-2010

Year	2001		2002		2003		2004		2005	
	n	%	n	%	n	%	n	%	n	%
Commercial cadaver	83	51	103	60	112	70	145	76	107	64
Commercial live donor	7	4	11	6	3	2	6	3	9	5
Live donor (genetically related)	31	19	32	19	24	15	21	11	36	22
Live donor (emotionally related)	5	3	4	2	6	4	2	1	4	2
Cadaver	37	23	22	13	15	9	17	9	10	6
Total	163	100	172	100	160	100	191	100	166	100

Year	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
Commercial cadaver	85	58	45	41	60	48	33	26	8	10
Commercial live donor	8	5	4	4	2	2	20	16	20	24
Live donor (genetically related)	24	16	21	19	34	27	26	20	18	21
Live donor (emotionally related)	4	3	13	12	6	5	15	12	7	8
Cadaver	26	18	27	25	23	18	35	27	31	37
Total	147	100	110	100	125	100	129	100	84	100

*Commercial Cadaver (China, India, other oversea) *Commercial live donor (living unrelated) *Cadaver (local)

Table 13.3.2: Biochemical data, 2006-2010

Biochemical parameter	Summary	2006	2007	2008	2009	2010
Creatinine, umol/L	n	1592	1688	1698	1695	1792
	Mean	135.7	131.8	131.9	128.1	131.1
	SD	81.3	77.6	80.8	62.8	88.1
	Median	120	116	115	115	112
	Minimum	21.7	36	29	10.7	10.3
	Maximum	1152	1186	1181	657	1145
Hb, g/dL	n	1592	1688	1698	1695	1792
	Mean	12.7	12.8	12.8	12.6	12.6
	SD	1.9	1.9	1.9	1.8	1.9
	Median	12.8	12.8	12.8	12.8	12.8
	Minimum	3.3	4.4	6.2	5.3	1.8
	Maximum	19.8	18.7	18.6	18.5	18.5
Albumin, g/L	n	1592	1688	1698	1695	1792
	Mean	39.7	39.8	39.8	39.7	39.7
	SD	0.7	0.8	0.8	1.2	1.4
	Median	39.7	39.7	39.7	39.7	39.7
	Minimum	29	29	30	21	24
	Maximum	48	48	50	50	75

Table 13.3.2: Biochemical data, 2006-2010 (cont'd)

Biochemical parameter	Summary	2006	2007	2008	2009	2010
Calcium, mmol/L	n	1592	1688	1698	1695	1792
	Mean	2.3	2.3	2.3	2.3	2.3
	SD	0.2	0.2	0.2	0.2	0.2
	Median	2.3	2.3	2.3	2.3	2.3
	Minimum	1.1	1.4	1	1.1	1.1
	Maximum	3.1	3.2	3.5	3.3	3.2
Phosphate, mmol/L	n	1592	1688	1698	1695	1792
	Mean	1.1	1.1	1.1	1.1	1.1
	SD	0.2	0.3	0.3	0.2	0.3
	Median	1.1	1.1	1.1	1.1	1.1
	Minimum	0.5	0.5	0.5	0.5	0.5
	Maximum	3.5	3.9	3.2	2.8	3.1
Alkaline Phosphate (ALP), U/L	n	1592	1688	1698	1695	1792
	Mean	79.1	79.4	79	80	82.3
	SD	43.2	39.8	46.4	45.3	56.5
	Median	71	72.5	72	73	73
	Minimum	24	22	20	21	20
	Maximum	700	508	985	732	964
ALT, U/L	n	1592	1688	1698	1695	1792
	Mean	29.8	29.8	30.1	29.9	27
	SD	30.4	25.6	37.8	32.5	24.8
	Median	22	23	23	24	21
	Minimum	4	4	4	4	4
	Maximum	433	356	881	881	410
Total cholesterol, mmol/L	n	1592	1688	1698	1695	1792
	Mean	5.3	5.2	5.2	5.2	5.2
	SD	1	1	1	1.1	1.1
	Median	5.3	5.3	5.3	5.3	5.3
	Minimum	1.5	1.7	2	1.9	2
	Maximum	11.1	11.4	11.2	10.6	11.5
LDL cholesterol, mmol/L	n	1592	1688	1698	1695	1792
	Mean	3	2.9	2.9	2.8	2.9
	SD	0.8	0.8	0.8	1	0.9
	Median	2.9	2.9	2.9	2.9	2.9
	Minimum	1	1	0.9	0.9	0.9
	Maximum	11.1	8.9	7.7	10.8	10.4
HDL cholesterol, mmol/L	n	1592	1688	1698	1695	1792
	Mean	1.6	1.5	1.6	1.5	1.5
	SD	0.5	0.4	0.5	0.5	0.5
	Median	1.6	1.6	1.6	1.6	1.6
	Minimum	0.4	0.4	0.5	0.4	0.4
	Maximum	5.8	7.5	7.5	6.9	6.8
Systolic Blood Pressure, mmHg	n	1592	1688	1698	1695	1792
	Mean	130.7	131.6	129.4	130.1	129.8
	SD	15.9	15.7	15.3	14.7	14.8
	Median	130	130	130	130	130
	Minimum	66	80	80	65	70
	Maximum	210	210	245	210	192
Diastolic Blood Pressure, mmHg	n	1592	1688	1698	1695	1792
	Mean	78.9	78.8	77.5	78.2	77.5
	SD	9.8	9.4	9.2	8.7	9.4
	Median	80	80	78.8	79	78.8
	Minimum	30	20	20	40	10
	Maximum	120	116	133	120	124

In 2010, Cyclosporine based regimes remained the mainstay of immunosuppressive therapy with 61% of patients receiving it. This showed a gradual declining trend from 76% of all immunosuppression used since 2006, which coincided with increasing trend in Tacrolimus usage. Tacrolimus based regimes has increased from 17% in 2006 to 30% in 2010. There has been continuous increase in the use of Mycophenolate Mofetil as the second immunosuppressive agent in 59% of patients in 2010 compared to 48% of patients in 2006. During the same period, the use of Azathioprine declined from 34% in 2006 to 27% in 2010. Monotherapy of immunosuppresion is mostly not noted except in a small number of patients. Sirolimus was used in 1% of all transplant recipients in 2010.

In terms of non-immunosuppressive medications, in year 2010 only 26% of patients were on ACE inhibitors or Angiotensin II receptor blockers (AIIRB) or both and this trend has been relatively static since 2006. Calcium Channel blockers appeared to be the mainstay of antihypertensive therapy in 50% of patients whilst Beta Blockers use was reported in 38% of patients. Other antihypertensives were reported in 10% of patients. The widespread use of Calcium Channel blockers either as monotherapy or combination may be due to the use of the dihydropyridine group to minimize the dose of Cyclosporine, which remains the main immunosuppressive drug.

Table 13.3.3: Medication data, 2006-2010

Medication data	Single drug treatment									
	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
All	1482	100	1666	100	1429	100	1747	100	1432	100
(i) Immunosuppressive drug(s) treatment										
Prednisolone	8	1	9	1	6	0	6	0	11	1
Azathioprine	0	0	0	0	0	0	1	0	0	0
Cyclosporin A	5	0	8	0	2	0	15	1	5	0
Tacrolimus (FK506)	0	0	4	0	3	0	14	1	2	0
Mycophenolate Mofetil (MMF)	0	0	1	0	2	0	0	0	1	0
Rapamycin	0	0	0	0	1	0	0	0	0	0
Others	0	0	0	0	0	0	1	0	0	0
(ii) Non-Immunosuppressive drug(s) treatment										
Beta blocker	77	5	90	5	88	6	118	7	130	9
Calcium channel blocker	199	13	184	11	138	10	161	9	185	13
ACE inhibitor	39	3	38	2	29	2	41	2	35	2
AIIRB	27	2	19	1	17	1	21	1	31	2
Anti-lipid	156	11	95	6	89	6	117	7	109	8
Other anti-hypertensive	11	1	6	0	25	2	26	1	21	1

Medication data	Combined drug treatment									
	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
All	1482	100	1666	100	1429	100	1747	100	1432	100
(i) Immunosuppressive drug(s) treatment										
Prednisolone	1444	97	1612	97	1385	97	1645	94	1356	95
Azathioprine	497	34	479	29	382	27	385	22	388	27
Cyclosporin A	1119	76	1191	71	983	69	1122	64	873	61
Tacrolimus (FK506)	254	17	349	21	345	24	475	27	434	30
Mycophenolate Mofetil (MMF)	708	48	908	55	776	54	1048	60	852	59
Rapamycin	7	0	33	2	30	2	32	2	20	1
Others	18	1	4	0	1	0	26	1	41	3
(ii) Non-Immunosuppressive drug(s) treatment										
Beta blocker	597	40	735	44	615	43	681	39	540	38
Calcium channel blocker	787	53	905	54	687	48	736	42	573	40
ACE inhibitor	292	20	384	23	287	20	311	18	215	15
AIIRB	141	10	211	13	141	10	146	8	153	11
Anti-lipid	679	46	732	44	627	44	710	41	513	36
Other anti-hypertensive	159	11	140	8	191	13	167	10	142	10

SECTION 13.4: TRANSPLANT OUTCOMES

13.4.1: Post-transplant complications

In the year 2010, 58% of patients were hypertensive prior to transplantation whereas 27% developed hypertension post transplantation. Thirteen percent of patients had diabetes mellitus prior to transplant whereas only 6% of patients developed post transplant diabetes mellitus. These trends have been quite the same since 2006. In terms of cardiovascular and cerebrovascular disease 3% had either or both prior to transplant and another 3% developed these post transplantation.

Table 13.4.1: Post-transplant complications, 2006-2010

Medication data	Pre transplant									
	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
All patients	1592	100	1688	100	1705	100	1710	100	1824	100
Diabetes (either as Primary Renal Disease or co-morbid)	218	14	232	14	233	14	211	12	239	13
Cancer	2	0	3	0	2	0	1	0	2	0
Cardiovascular disease + cerebrovascular disorder	73	5	72	4	67	4	51	3	60	3
Hypertension	1036	65	1063	63	1055	62	1028	60	1059	58
	Post transplant									
All patients	1592	100	1688	100	1705	100	1710	100	1824	100
Diabetes (either as Primary Renal Disease or co-morbid)	124	8	113	7	119	7	88	5	114	6
Cancer	20	1	21	1	24	1	16	1	19	1
Cardiovascular disease + cerebrovascular disorder	45	3	54	3	72	4	56	3	48	3
Hypertension	354	22	451	27	413	24	448	26	498	27

*Hypertension: BP systolic>140 and BP diastolic >90
OR have either Beta blocker/ Calcium channel blocker / ACE inhibitor / AIIRB / Other anti-hypertensive

13.4.2: Deaths and Graft loss

In 2010, 33 transplant recipients died and 45 lost their grafts. The rates of transplant death and graft loss have remained static for the past 10 years (Table 13.4.2). The main known causes of death have been infection and cardiovascular disease with 37% and 18% respectively. Another 18% of patients died at home, which is usually presumed to be cardiovascular death as well.

Cancer death rates have been significantly high since 2001 contributing to 13% of all deaths in 2001, 18% in 2008 and 13% in 2009. Death due to liver disease has remained relatively static at 3% and 4% in 2009 and 2010 respectively.

In terms of graft loss, majority were due to rejection.

Table 13.4.2: Transplant Patients Death Rate and Graft Loss, 2001-2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number at risk	1302	1392	1477	1563	1660	1734	1766	1780	1805	1832
Transplant death	40	38	42	44	47	58	46	60	49	33
Transplant death rate %	3.1	2.7	2.8	2.8	2.8	3.3	2.6	3.4	2.7	1.8
Graft loss	39	33	41	43	21	36	36	39	35	45
Graft loss rate %	3	2.4	2.8	2.8	1.3	2.1	2	2.2	1.9	2.5
Acute rejection	0	0	4	19	14	19	14	23	31	70
Acute rejection rate %	0	0	0.3	1.2	0.8	1.1	0.8	1.3	1.7	3.8
All losses	79	71	83	87	68	94	82	99	84	78
All losses rate %	6.1	5.1	5.6	5.6	4.1	5.4	4.6	5.6	4.7	4.3

*Graft loss=graft failure
*All losses=death / graft loss (acute rejection happens concurrently with graft failure / death)

Figure 13.4.2(a): Transplant Recipient Death Rate, 2001-2010

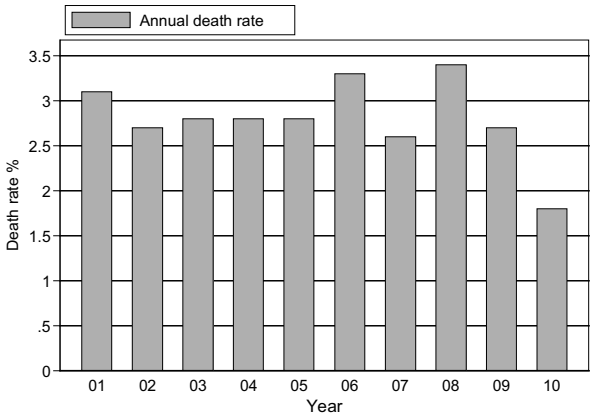


Figure 13.4.2(b): Transplant Recipient Graft Loss Rate, 2001-2010

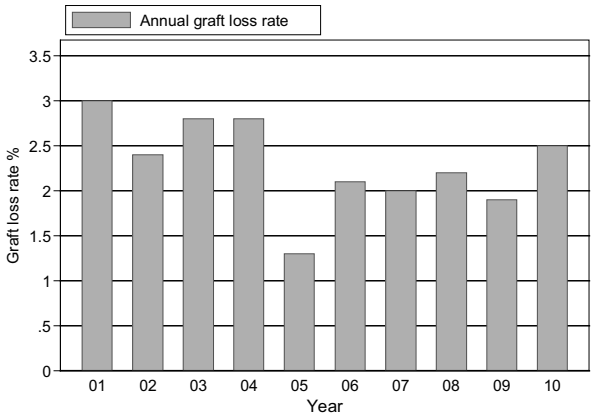


Table 13.4.3: Causes of Death in Transplant Recipients, 2001-2010

Year	2001		2002		2003		2004		2005	
	n	%	n	%	n	%	n	%	n	%
Cardiovascular	7	15	6	15	14	30	6	13	5	10
Died at home	5	11	5	13	5	11	5	11	6	13
Infection	22	48	14	35	14	30	17	36	27	56
Graft failure	0	0	0	0	0	0	3	6	0	0
Cancer	6	13	5	13	7	15	8	17	5	10
Liver disease	2	4	5	13	3	6	4	9	3	6
Accidental death	1	2	1	3	1	2	0	0	1	2
Others	0	0	2	5	1	2	3	6	0	0
Unknown	3	7	2	5	2	4	1	2	1	2
TOTAL	46	100	40	100	47	100	47	100	48	100

Year	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
Cardiovascular	13	21	9	18	11	17	12	22	7	18
Died at home	7	11	5	10	12	18	9	17	7	18
Infection	25	40	18	35	20	30	19	35	14	37
Graft failure	0	0	4	8	0	0	1	2	1	3
Cancer	5	8	6	12	12	18	7	13	3	8
Liver disease	5	8	0	0	0	0	2	4	1	3
Accidental death	1	2	0	0	0	0	0	0	0	0
Others	2	3	1	2	5	8	1	2	4	11
Unknown	5	8	8	16	6	9	3	6	1	3
TOTAL	63	100	51	100	66	100	54	100	38	100

Table 13.4.4: Causes of Graft Failure, 2001-2010

Year	2001		2002		2003		2004		2005	
	n	%	n	%	n	%	n	%	n	%
Rejection	24	60	19	54	20	47	29	67	15	68
Calcineurin toxicity	0	0	1	3	1	2	0	0	0	0
Other drug toxicity	0	0	0	0	0	0	0	0	0	0
Ureteric obstruction	0	0	0	0	0	0	0	0	0	0
Infection	2	5	0	0	2	5	1	2	1	5
Vascular causes	1	3	0	0	3	7	4	9	2	9
Recurrent/ de novo renal disease	2	5	2	6	2	5	1	2	0	0
Others	0	0	3	9	1	2	0	0	1	5
Unknown	11	28	10	29	14	33	8	19	3	14
TOTAL	40	100	35	100	43	100	43	100	22	100

Year	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
Rejection	25	68	25	69	27	64	23	62	25	54
Calcineurin toxicity	0	0	0	0	0	0	1	3	1	2
Other drug toxicity	0	0	0	0	0	0	1	3	1	2
Ureteric obstruction	0	0	1	3	0	0	0	0	0	0
Infection	2	5	1	3	3	7	1	3	0	0
Vascular causes	4	11	1	3	3	7	1	3	3	7
Recurrent/ de novo renal disease	1	3	0	0	1	2	0	0	0	0
Others	2	5	3	8	2	5	0	0	4	9
Unknown	3	8	5	14	6	14	10	27	12	26
TOTAL	37	100	36	100	42	100	37	100	46	100

SECTION 13.5: PATIENT AND GRAFT SURVIVAL

Overall patient survival rates from 2001 to 2010 have been 94%, 91%, 87% and 80% at year 1, 3, 5 and 10 respectively. Overall graft survival rate has been 93%, 87%, 81% and 68% at year 1, 3, 5 and 10 respectively.

Table 13.5.1(a): Patient survival, 2001-2010

Interval (years)	n	% Survival	SE
0	1482	100	
1	1263	94	1
2	1097	93	1
3	952	91	1
4	818	89	1
5	670	87	1
6	494	85	1
7	337	83	1
8	209	82	1
9	95	80	2
10	4	80	2

*n=Number at risk SE=standard error

Figure 13.5.1(a): Patient survival, 2001-2010

Table 13.5.1(b): Risk factors for transplant patient survival 2001-2010

Factors	n	Hazard Ratio	95% CI	P value
Year of transplant				
• 2001-2005 (ref*)	857	1.00		
• 2006-2010	625	1.46	(0.99;2.17)	0.057
Age at transplant				
• <20	148	0.35	(0.15; 0.82)	0.016
• 20-39 (ref*)	554	1.00		
• 40-54	670	1.81	(1.25; 2.63)	0.002
• >=55	110	2.00	(1.18; 3.37)	0.010
Gender:				
• Male (ref*)	938	1.00		
• Female	544	0.97	(0.70; 1.34)	0.857
Primary diagnosis:				
• Unknown primary (ref*)	773	1.00		
• Diabetes mellitus	126	1.22	(0.77; 1.94)	0.394
• GN/SLE	352	0.84	(0.56; 1.26)	0.398
• Polycystic kidney	24	0.52	(0.13; 2.19)	0.377
• Obstructive nephropathy	42	1.80	(0.78; 4.11)	0.166
• Others	165	0.96	(0.60; 1.55)	0.882
Type of transplant				
• Commercial cadaver (ref*)	781	1.00		
• Commercial live donor	87	0.82	(0.40;1.69)	0.591
• Living donor	342	0.67	(0.41;1.10)	0.113
• Cadaver	243	2.62	(1.80;3.81)	<0.001
HbsAg				
• Negative (ref*)	1,452	1.00		
• Positive	30	1.75	(0.90; 3.41)	0.098
Anti-HCV				
• Negative (ref*)	1,436	1.00		
• Positive	46	1.50	(0.88; 2.55)	0.140

Figure 13.5.1(b): Adjusted Transplant Patient Survival related to Year of Transplant, 2001-2010
(adjusted for age, gender, primary diagnosis, type of transplant, HBsAg and Anti-HCV status)

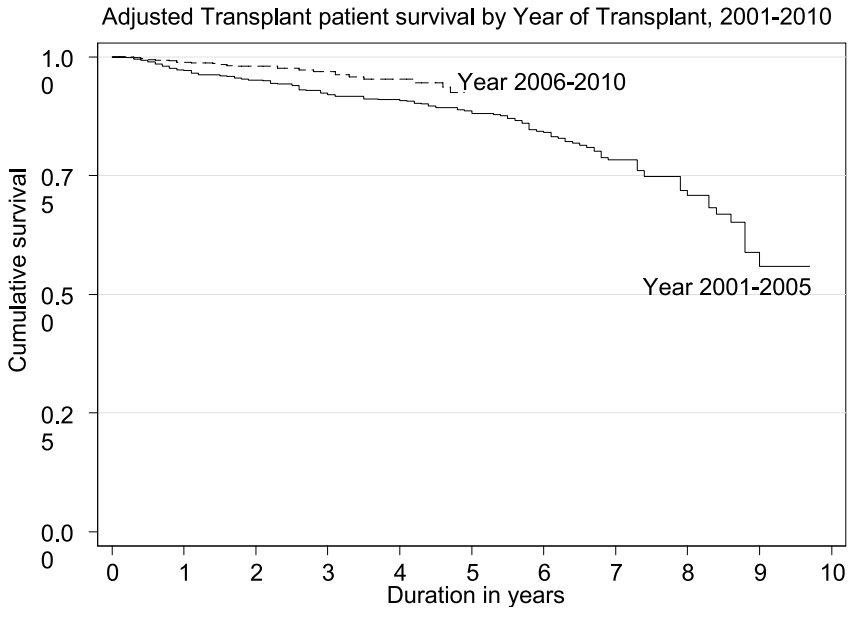


Table 13.5.2 (a): Graft survival, 2001-2010

Interval (years)	n	% Survival	SE
0	1482	100	-
1	1263	92.61	0.69
2	1097	89.55	0.83
3	952	87.07	0.93
4	818	84.21	1.04
5	670	81.31	1.15
6	494	77.12	1.32
7	337	74.28	1.46
8	209	71.11	1.69
9	95	68.22	1.95
10	4	68.22	1.95

*n=Number at risk SE=standard error

Figure 13.5.2 (a): Graft survival, 2001-2010

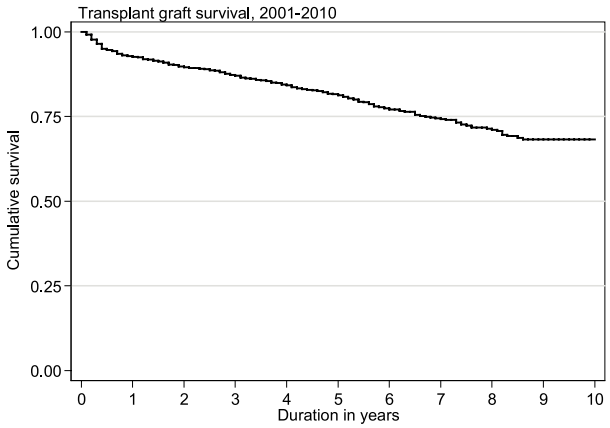
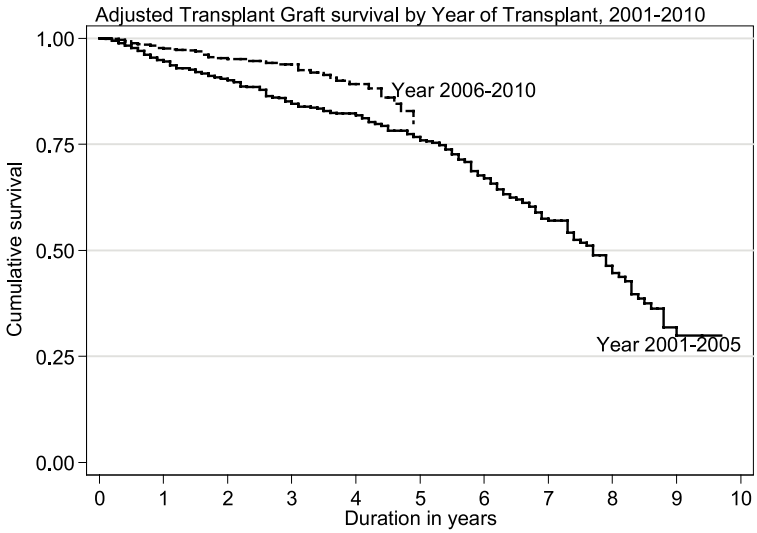


Table 13.5.2(b): Risk factors for transplant graft survival 2001-2010

Factors	n	Hazard Ratio	95% CI	P value
Year of transplant				
• 2001-2005 (ref*)	857	1.00		
• 2006-2010	625	1.46	(0.99;2.17)	0.06
Age at transplant				
• <20	148	0.35	(0.15; 0.82)	0.02
• 20-39 (ref*)	554	1.00		
• 40-54	670	1.81	(1.25;2.63)	0.00
• >=55	110	2.00	(1.18;3.37)	0.01
Gender:				
• Male (ref*)	938	1.00		
• Female	544	0.97	(0.70; 1.34)	0.86
Primary diagnosis:				
• Unknown primary (ref*)	773			
• Diabetes mellitus	126	1.22	(0.77; 1.94)	0.39
• GN/SLE	352	0.84	(0.56; 1.26)	0.40
• Polycystic kidney	24	0.52	(0.13; 2.19)	0.38
• Obstructive nephropathy	42	1.80	(0.78; 4.11)	0.17
• Others	165	0.96	(0.60; 1.55)	0.88
Type of transplant				
• Commercial cadaver (ref*)	781	1.00		
• Commercial live donor	87	0.82	(0.40; 1.69)	0.59
• Living donor	342	0.67	(0.41; 1.10)	0.11
• Cadaver	243	2.62	(1.80; 3.81)	0.00
HbsAg				
• Negative (ref*)	1,452	1.00		
• Positive	30	1.75	(0.90; 3.41)	0.10
Anti-HCV				
• Negative (ref*)	1,436	1.00		
• Positive	46	1.50	(0.88; 2.55)	0.14

Figure 13.5.2(b): Adjusted Transplant Graft Survival related to Year of Transplant, 2001-2010
(adjusted for age, gender, primary diagnosis, type of transplant, HBsAg and Anti-HCV status)



Outcomes of renal transplantation from the 4 donor groups are shown in Figures 13.5.3 and 13.5.4. In terms of patient survival, live donor grafts maintained good survival rates with 96%, 95%, 94% and 90% at years 1, 3, 5 and 10 respectively. In terms of graft survival, commercial cadaver grafts performed similarly well with a survival of 94%, 89%, 82% and 72% at year 1, 3, 5 and 10 compared to 95%, 92%, 90% and 72% for the same intervals for live donor grafts.

Table 13.5.3: Unadjusted Patient survival by type of transplant, 2001-2010

Type of Transplant	Commercial Cadaver			Commercial Live Donor			Live Donor			Cadaver		
Interval (years)	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE
0	781	100	0	81	100	0	342	100	0	243	100	0
1	724	95	1	69	99	1	289	96	1	165	86	2
2	667	93	1	49	97	2	245	95	1	125	83	3
3	589	91	1	45	95	3	208	95	1	103	80	3
4	528	89	1	38	95	3	168	94	2	78	79	3
5	436	86	1	29	91	4	141	94	2	59	78	3
6	334	84	1	16	75	8	95	92	2	49	76	3
7	210	82	2	11	75	8	76	92	2	42	75	4
8	122	81	2	7	75	8	52	92	2	28	71	4
9	51	80	2	2	75	8	24	90	3	18	68	5
10	1	80	2	2	0	0	1	90	3	2	68	5

*n=Number at risk SE=standard error

Figure 13.5.3: Patient survival by type of transplant, 2001-2010

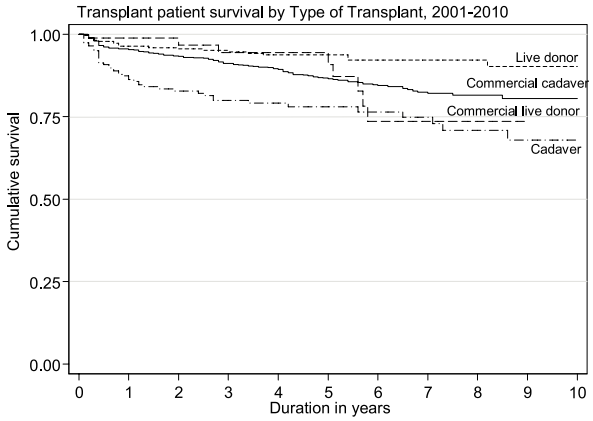


Figure 13.5.4: Graft survival by type of transplant, 2001-2010

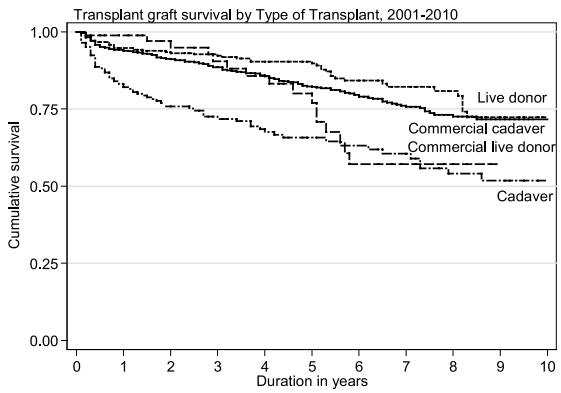


Table 13.5.4: Graft survival by type of transplant, 2001-2010

Type of Transplant	Commercial Cadaver			Commercial Live Donor			Live Donor			Cadaver		
Interval (years)	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE
0	781	100	0	87	100	0	342	100	0	243	100	0
1	724	94	1	66	99	1	297	95	1	165	82	3
2	667	91	1	46	95	3	252	93	1	125	76	3
3	589	89	1	42	91	4	215	92	2	103	72	3
4	528	86	1	35	86	5	174	90	2	78	68	4
5	436	82	1	26	77	7	145	90	2	59	66	4
6	334	79	2	16	57	9	95	84	3	49	63	4
7	210	76	2	11	57	9	76	82	3	42	61	4
8	122	73	2	7	57	9	52	81	3	28	54	5
9	51	72	2	2	57	9	24	72	5	18	52	5
10	1	72	2	2	0	0	1	72	5	2	52	5

*n=Number at risk SE=standard error

Patient and graft survival for living related transplants were compared between two cohorts. The patient survival for 2001-2005 cohort and the 2006-2010 cohort were comparable (Figures 13.5.5).

However, graft survival for living related transplants (Figure 13.5.6) was better in patients in the 2006-2010 cohort even from the outset probably due to increased usage of newer immunosuppressive agents.

Table 13.5.5: Patient survival by year of transplant (Living related transplant, 2001-2010)

Year of Transplant	2001-2005			2006-2010		
Interval (years)	n	% Survival	SE	n	% Survival	SE
0	144	100	-	123	100	-
1	136	95	2	102	97	1
2	131	94	2	73	96	2
3	129	94	2	45	96	2
4	127	93	2	26	94	3
5	124	93	2	2	94	3
6	82	91	2	-	-	-
7	64	91	2	-	-	-
8	45	91	2	-	-	-
9	21	91	2	-	-	-
10	1	91	2	-	-	-

*n=Number at risk SE=standard error

Figure 13.5.5: Patient survival by year of transplant (Living related transplant, 2001-2010)

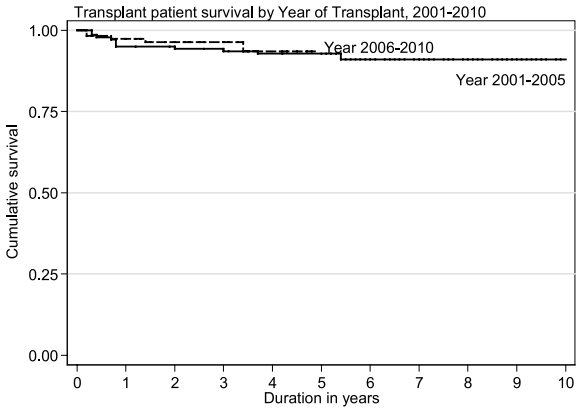


Figure 13.5.6: Graft survival by year of transplant (Living related transplant, 2001-2010)

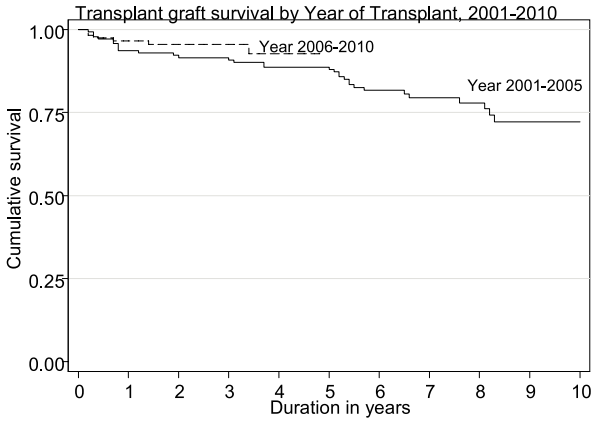


Table13.5.6: Graft survival by year of transplant (Living related transplant, 2001-2010)

Year of Transplant	2001-2005			2006-2010		
Interval (years)	n	% Survival	SE	n	% Survival	SE
0	144	100	-	123	100	-
1	136	94	2	102	97	2
2	131	92	2	73	96	2
3	129	91	2	45	96	2
4	127	89	3	26	93	3
5	124	88	3	-	-	-
6	82	82	3	-	-	-
7	64	79	4	-	-	-
8	45	78	4	-	-	-
9	21	72	5	-	-	-
10	1	72	5	-	-	-

*n=Number at risk SE=standard error

Patient and graft survival for commercial transplants were comparable between the 2001-2005 cohort and the 2006-2010 cohort (Figures 13.5.7). This result was also comparable to the living related renal transplant done in the country.

Table 13.5.7: Patient survival by year of transplant (Commercial cadaver transplant, 2001-2010)

Year of Transplant	2001-2005			2006-2010		
Interval (years)	n	% Survival	SE	n	% Survival	SE
0	550	100	-	231	100	-
1	512	95	1	212	96	1
2	491	93	1	176	95	1
3	476	90	1	116	93	2
4	455	89	1	73	91	2
5	434	86	2	2	90	3
6	334	84	2	-	-	-
7	210	81	2	-	-	-
8	122	81	2	-	-	-
9	51	80	2	-	-	-
10	1	80	2	-	-	-

*n=Number at risk SE=standard error

Figure 13.5.7: Patient survival by year of transplant (Commercial cadaver transplant, 2001-2010)

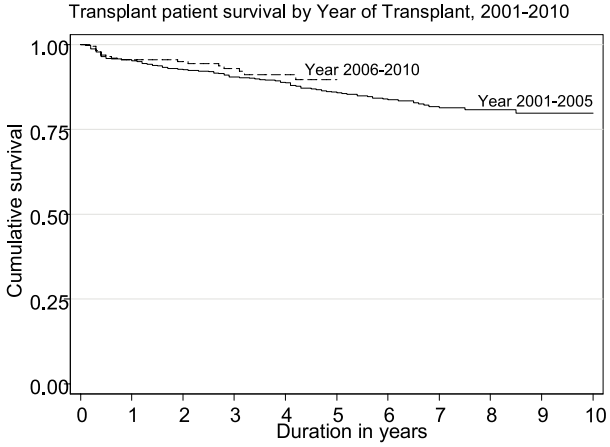


Figure 13.5.8: Graft survival by year of transplant (Commercial cadaver transplant, 2001-2010)

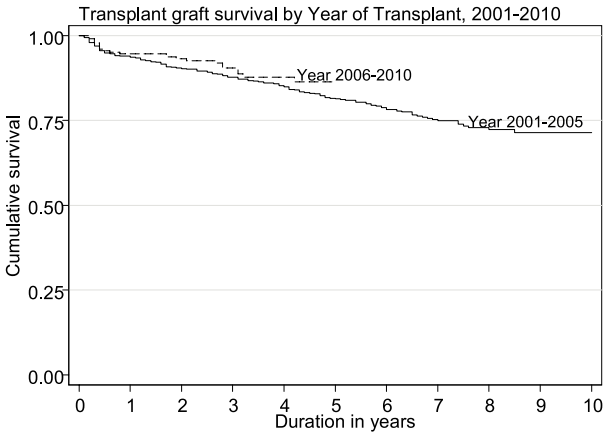


Table 13.5.8: Graft survival by year of transplant (Commercial cadaver transplant, 2001-2010)

Year of Transplant	2001-2005			2006-2010		
Interval (years)	n	% Survival	SE	n	% Survival	SE
0	550	100	-	231	100	-
1	512	94	1	212	95	1
2	491	90	1	176	93	2
3	476	88	1	116	90	2
4	455	85	2	73	88	3
5	434	81	2	2	86	3
6	334	78	2	-	-	-
7	210	75	2	-	-	-
8	122	72	2	-	-	-
9	51	71	2	-	-	-
10	1	71	2	-	-	-

*n=Number at risk SE=standard error

SECTION 13.6: CARDIOVASCULAR RISK IN RENAL TRANSPLANT RECIPIENTS

13.6.1: Risk factors for Ischaemic Heart Disease

In 2010, 86.8% of patients were hypertensive, 21.2% were diabetic and 48.3% had renal insufficiency fulfilling CKD III and above. Forty-three percent of patients had 2 cardiovascular risk factors while 6.5% had all 3 major risk factors.

Table 13.6.1: Risk factors for IHD in renal transplant recipients at year 2006-2010

	2006	2007	2008	2009	2010
Diabetes	21 (1.4)	25 (1.6)	18 (1.1)	28 (1.8)	33 (2.0)
Hypertension**	454 (31.0)	588 (37.3)	664 (41.8)	646 (41.1)	627 (38.3)
CKD	177 (12.1)	127 (8.1)	117 (7.4)	156 (9.9)	163 (9.9)
Diabetes + Hypertension**	156 (10.7)	177 (11.2)	203 (12.8)	163 (10.4)	187 (11.4)
Diabetes + CKD	18 (1.2)	11 (0.7)	22 (1.4)	18 (1.1)	22 (1.3)
CKD + Hypertension**	490 (33.5)	517 (32.8)	457 (28.7)	474 (30.2)	501 (30.6)
Diabetes + CKD + Hypertension**	147 (10.0)	132 (8.4)	109 (6.9)	86 (5.5)	106 (6.5)

**Hypertension: BP systolic > 140 and BP diastolic > 90

OR have either Beta blocker / Calcium channel blocker / ACE inhibitor / AIIRB / Other anti-hypertensive drugs

GFR (mL/min/1.73m2) = 1.2*(140-age(year))*weight(kg) / creatinine (µmol/L) if male

GFR (mL/min/1.73m2) = 0.85*(1.2*(140-age(year))*weight(kg) / creatinine (µmol/L) if female

CKD stage III-GFR, 30-60

CKD stage IV-GFR, 15-30

CKD stage V-GFR, <15

Figure 13.6.1(a): Venn Diagram for Pre and Post Transplant Complications (in %) at year 2006

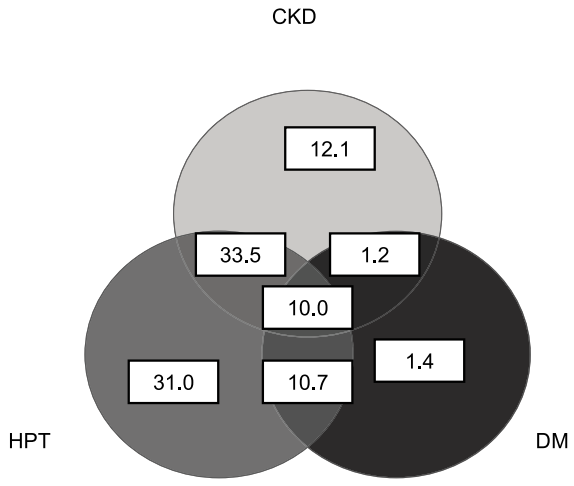


Figure 13.6.1(b): Venn Diagram for Pre and Post Transplant Complications (in %) at year 2007

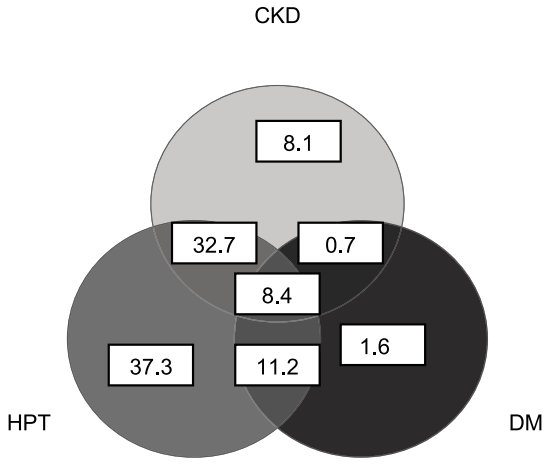


Figure 13.6.1(c): Venn Diagram for Pre and Post Transplant Complications (in %) at year 2008

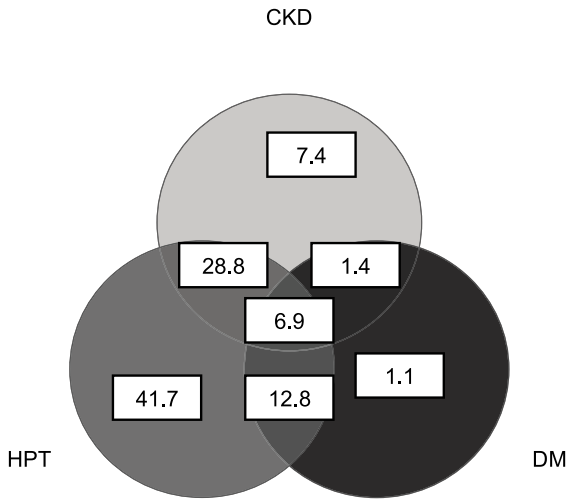


Figure 13.6.1(d): Venn Diagram for Pre and Post Transplant Complications (in %) at year 2009

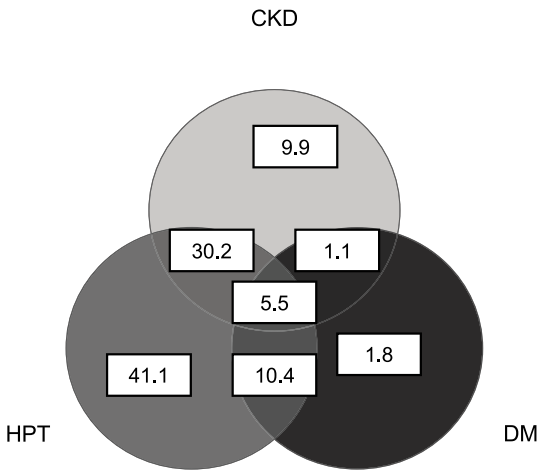
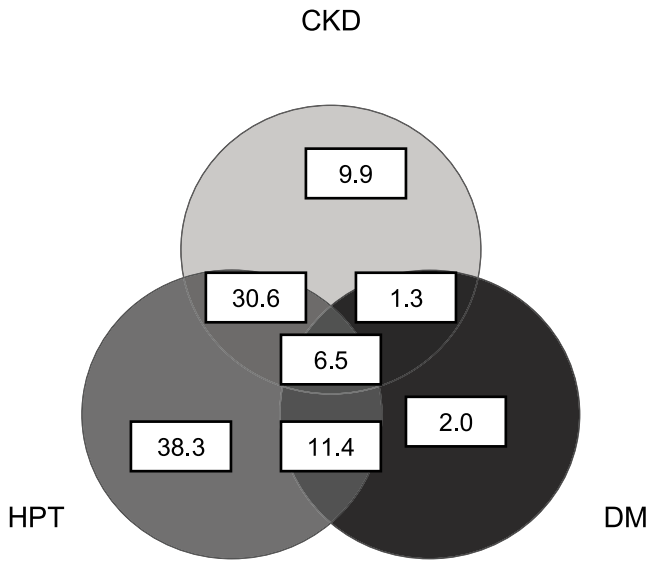


Figure 13.6.1(e): Venn Diagram for Pre and Post Transplant Complications (in %) at year 2010



13.6.2 : Blood Pressure classification according to JNC VI criteria, 2006-2010

In 2010, 18% of renal transplant recipients had stage I hypertension whereas 5% had stage II hypertension and 0.6% had stage III hypertension despite being on treatment (Table 13.6.2 (a)). In terms of diastolic hypertension 11% had stage I hypertension, 1.1% of patients had stage II diastolic hypertension and 0.22% of patients had stage III diastolic hypertension despite being on treatment (Table 13.6.2 (b)).

Table 13.6.2(a): Systolic BP, 2006-2010

Systolic BP	2006		2007		2008		2009		2010	
(mmHg)	n	%	n	%	n	%	n	%	n	%
<120	249	15.64	240	14.22	289	17.02	269	15.87	331	18.47
120-129	395	24.81	392	23.22	377	22.20	376	22.18	390	21.76
130-139	483	30.34	531	31.46	612	36.04	638	37.64	661	36.89
140-159	353	22.17	409	24.23	335	19.73	340	20.06	314	17.52
160-179	93	5.84	99	5.86	75	4.42	62	3.66	86	4.80
>=180	19	1.19	17	1.01	10	0.59	10	0.59	10	0.56

Figure 13.6.2(a): Systolic BP, 2006-2010

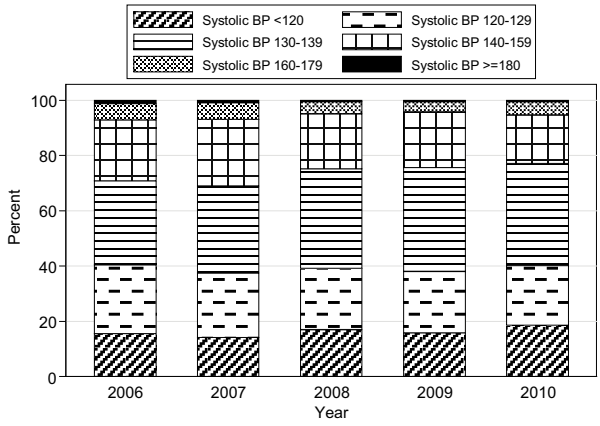


Figure 13.6.2(b): Diastolic BP, 2006-2010

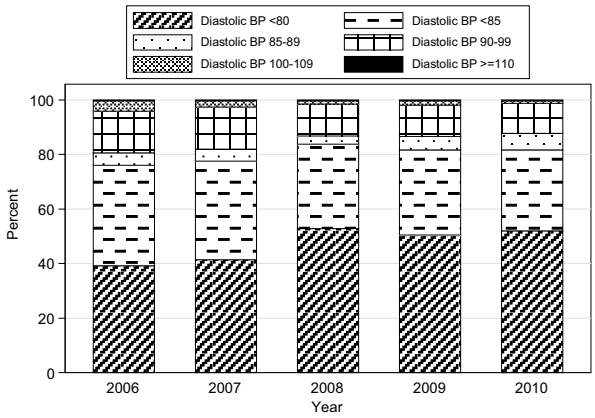


Table 13.6.2(b): Diastolic BP, 2006-2010

Diastolic BP	2006		2007		2008		2009		2010	
(mmHg)	n	%	n	%	n	%	n	%	n	%
<80	624	39.20	699	41.41	898	52.89	856	50.50	932	52.01
80-84	586	36.81	610	36.14	525	30.92	528	31.15	533	29.74
85-89	73	4.59	74	4.38	50	2.94	84	4.96	108	6.03
90-99	244	15.33	261	15.46	198	11.66	195	11.50	196	10.94
100-109	61	3.83	39	2.31	22	1.30	27	1.59	19	1.06
>=110	4	0.25	5	0.30	5	0.29	5	0.29	4	0.22

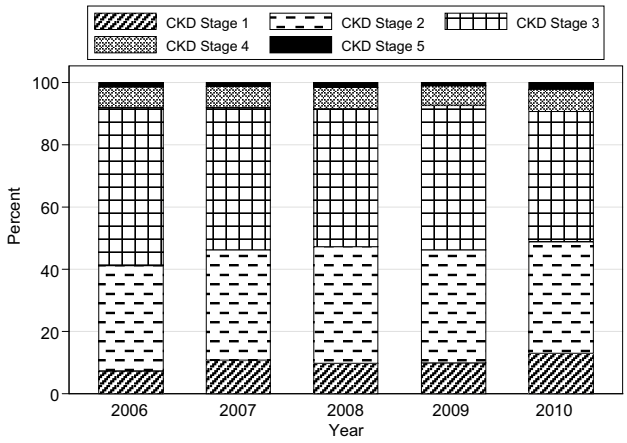
13.6.3: Level of allograft function

Table and Figure 13.6.3 shows the CKD Stage classification by year and in 2010, 41.9% of renal transplant recipients had CKD Stage III whilst another 7.1% had CKD Stage IV. CKD Stage V (impending renal replacement therapy) was found in 2.2% of renal transplant recipients.

Table 13.6.3: CKD stages, 2006-2010

Year	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
Stage 1	116	7.33	180	10.78	164	9.80	165	9.92	231	13.08
Stage 2	535	33.80	592	35.45	628	37.51	604	36.30	630	35.67
Stage 3	803	50.73	762	45.63	738	44.09	771	46.33	740	41.90
Stage 4	107	6.76	113	6.77	118	7.05	106	6.37	126	7.13
Stage 5	22	1.39	23	1.38	26	1.55	18	1.08	39	2.21

Figure 13.6.3: CKD stages by year



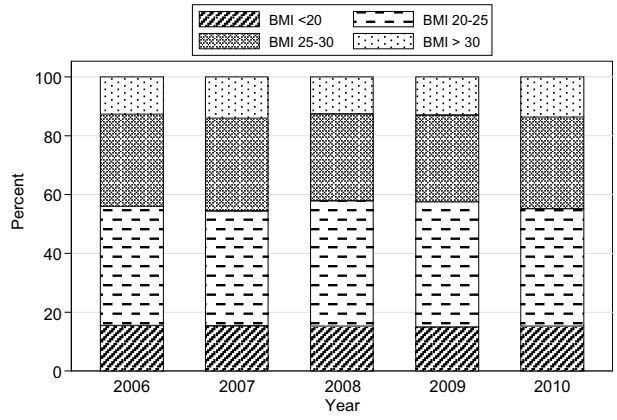
13.6.4: Body Mass Index

In 2010, 55.1% of renal transplant recipients had BMIs of 25 or below. However 31.1% were overweight and another 14% were obese. There seems to be a slow but steady increase in numbers of obese patients over the last few years.

Table 13.6.4: BMI, 2006-2010

Year	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
<20	246	15.45	259	15.34	257	15.14	253	14.93	273	15.23
20-25	647	40.64	660	39.10	725	42.70	723	42.65	715	39.90
25-30	496	31.16	531	31.46	501	29.51	499	29.44	558	31.14
> 30	203	12.75	238	14.10	215	12.66	220	12.98	246	13.73

Figure 13.6.4: BMI, 2006-2010



13.6.5: Lipid profile

LDL cholesterol has been identified as the primary lipid target for prevention of coronary heart disease by NCEP with a log linear relationship between risk of CHD and level of LDL cholesterol. In terms of renal transplant recipients in 2010, 33.9% have LDL levels below 2.6 mol/l .This has been relatively the same since 2006. Whether or not this translates into less cardiovascular mortality in the transplant population is still questionable. Patients with serum LDL >3.4 also demonstrated downward trend over the last few years.

In terms of other cholesterol parameters for 2010, 44.5% had total cholesterol levels < 5.2 and 7.2% had HDL cholesterol levels <1.0 .

Table 13.6.5(a): LDL, 2006-2010

Year	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
< 2.6	492	30.90	528	31.28	586	34.51	648	38.23	608	33.93
2.6-3.4	738	46.36	779	46.15	779	45.88	715	42.18	854	47.66
>= 3.4	362	22.74	381	22.57	333	19.61	332	19.59	330	18.42

Figure 13.6.5(a): LDL, 2006-2010

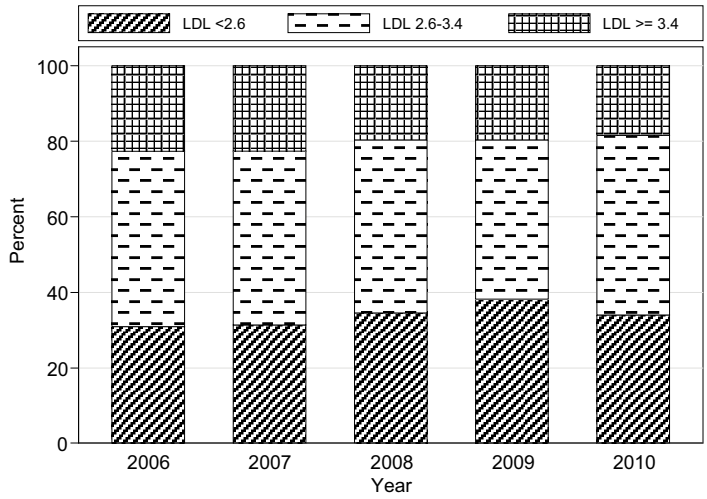


Table 13.6.5(b): Total Cholesterol, 2006-2010

Year	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
<4.1	160	10.05	210	12.44	208	12.25	233	13.75	259	14.45
4.1-5.1	490	30.78	539	31.93	529	31.15	507	29.91	539	30.08
5.1-6.2	700	43.97	721	42.71	728	42.87	721	42.54	783	43.69
6.2- 7.2	173	10.87	159	9.42	160	9.42	159	9.38	144	8.04
> 7.2	69	4.33	59	3.50	73	4.30	75	4.42	67	3.74

Figure 13.6.5(b): Total Cholesterol, 2006-2010

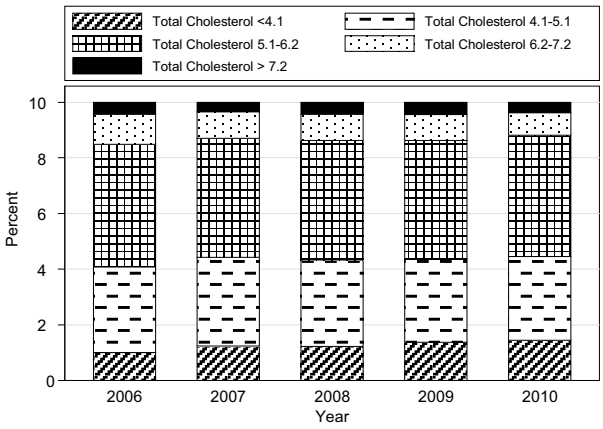


Figure 13.6.5(c): HDL, 2006-2010

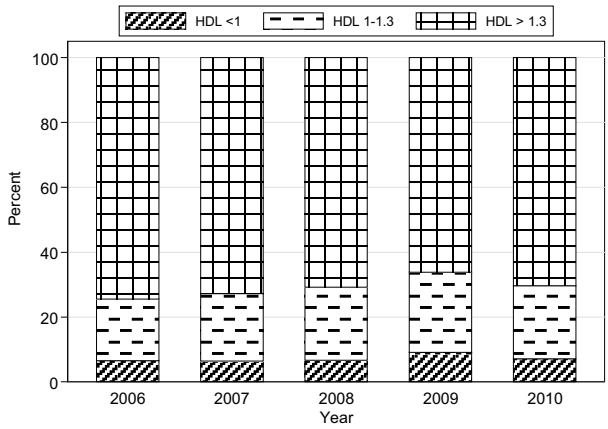


Table 13.6.5(c): HDL, 2006-2010

Year	2006		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%
<1	104	6.53	108	6.40	114	6.71	153	9.03	129	7.20
1-1.3	302	18.97	350	20.73	382	22.50	421	24.84	402	22.43
>1.3	1186	74.50	1230	72.87	1202	70.79	1121	66.14	1261	70.37

13.6.6: Blood Pressure Control

In 2010, 82% percent of patients were on antihypertensives and the majority (34%) were on 1 antihypertensive drug, 27% on 2 antihypertensives and 15% on 3 antihypertensives. Six percent of patients still had systolic BP of > 160 mmHg and 13% had diastolic BP of > 90 mmHg despite being given antihypertensive(s), however, this is an improvement from previous years.

Table 13.6.6(a): Treatment for hypertension, 2006-2010

Year	n	% on anti-hypertensives	% on 1 anti-hypertensive drug	% on 2 anti-hypertensives	% on 3 anti-hypertensives
2006	1592	86	34	26	17
2007	1688	85	25	31	21
2008	1698	78	25	28	19
2009	1695	81	29	29	17
2010	1792	82	34	27	15

Table 13.6.6(b): Distribution of Systolic BP without anti-hypertensives, 2006-2010

Year	n	Mean	SD	Median	LQ	UQ	% Patients ≥ 160mmHg
2006	189	123.8	14.4	120	117	130	4
2007	196	125.2	16.5	120	113	134	4
2008	178	123.7	15.5	120	110	130	3
2009	230	123.9	15.3	120	111	130	3
2010	270	128.7	42.5	123	117	136	4

Table 13.6.6(c): Distribution of Diastolic BP without anti-hypertensives, 2006-2010

Year	n	Mean	SD	Median	LQ	UQ	% patients ≥ 90mmHg
2006	189	76.4	10.3	80	70	80	11
2007	196	76.6	10	80	70	80	12
2008	177	75.1	10	80	70	80	10
2009	230	77.4	9.1	80	70	80	12
2010	269	76.9	10.5	80	70	82	16

Table 13.6.6(d): Distribution of Systolic BP on anti-hypertensives, 2006-2010

Year	n	Mean	SD	Median	LQ	UQ	% Patients ≥ 160mmHg
2006	1334	131.7	16.3	130	120	140	8
2007	1389	132.6	16	130	120	140	8
2008	1269	129.9	16.6	130	120	140	6
2009	1222	131	15.9	130	120	140	5
2010	1317	130.2	16.2	130	120	140	6

Table 13.6.6(e): Distribution of Diastolic BP on anti-hypertensives, 2006-2010

Year	n	Mean	SD	Median	LQ	UQ	% Patients ≥ 90 mmHg
2006	1334	79.2	9.9	80	70	86	22
2007	1388	79.1	9.6	80	70	85	20
2008	1255	77.6	10	80	70	80	16
2009	1220	78.3	9.5	80	70	82	16
2010	1313	77.9	21.5	80	70	82	13

SECTION 13.7: QOL INDEX SCORE IN RENAL TRANSPLANT RECIPIENTS

1249 patients who were transplanted between 2001-2010 were analyzed for QoL index score. They reported median QoL index score of 10 (Table 13.7.1 and Figure 13.7.1). It was interesting to note that for those who underwent renal transplantation between this period, diabetics and non-diabetics had the same median QoL index score of 10 (Table 13.7.2 and Figure 13.7.2), and this is in contrast to HD and CAPD patients where diabetics reported lower QoL index score than non-diabetics. There was also no difference seen between gender (Table 13.7.3 and Figure 13.7.3) and age (Table 13.7.4 and Figure 13.7.4). It is worthwhile to note that those above 60 year-old also enjoyed the same QoL index score (10) as their younger counterpart (Table 13.7.4 and Figure 13.7.4). This trend of high QoL index score among renal transplant patients was maintained over the last 10 years (Table 13.7.5 and Figure 13.7.5).

Table 13.7.1: Cumulative distribution of QoL-Index score in relation to Dialysis Modality, Transplant recipient patients 2001-2010

Dialysis modality	QoL score
Number of patients	1249
Centile	
0	0
0.05	9
0.1	9
0.25 (LQ)	10
0.5 (median)	10
0.75 (UQ)	10
0.9	10
0.95	10
1	10

Figure 13.7.1: Cumulative distribution of QoL-Index score in relation to Dialysis Modality, Transplant recipient patients 2001-2010

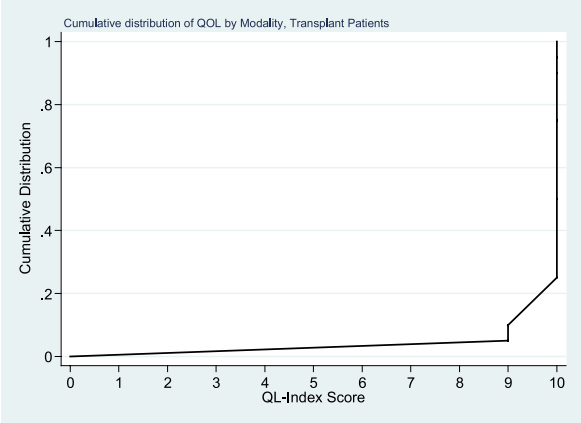


Table 13.7.2: Cumulative distribution of QoL-Index score in relation to Diabetes mellitus, Transplant recipient patients 2001-2010

Diabetes mellitus	No	Yes
Number of patients	1194	55
Centile		
0	0	0
0.05	9	7
0.1	10	8
0.25 (LQ)	10	9
0.5 (median)	10	10
0.75 (UQ)	10	10
0.9	10	10
0.95	10	10
1	10	10

Figure 13.7.2: Cumulative distribution of QoL-Index score in relation to Diabetes mellitus, Transplant recipient patients 2001-2010

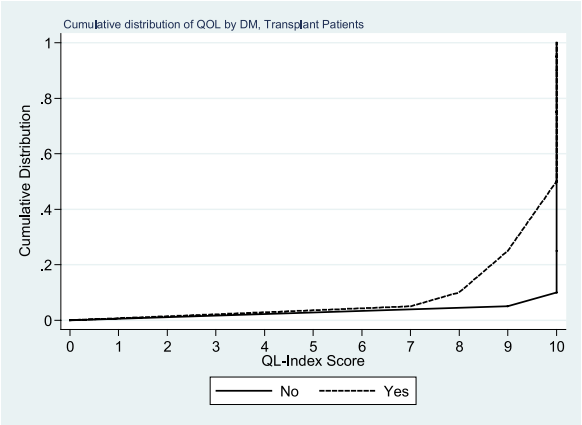


Table 13.7.3: Cumulative distribution of QoL-Index score in relation to Gender, Transplant recipient patients 2001-2010

Gender	Male	Female
Number of patients	783	466
Centile		
0	0	0
0.05	9	9
0.1	10	9
0.25 (LQ)	10	10
0.5 (median)	10	10
0.75 (UQ)	10	10
0.9	10	10
0.95	10	10
1	10	10

Figure 13.7.3: Cumulative distribution of QoL-Index score in relation to Gender, Transplant recipient patients 2001-2010

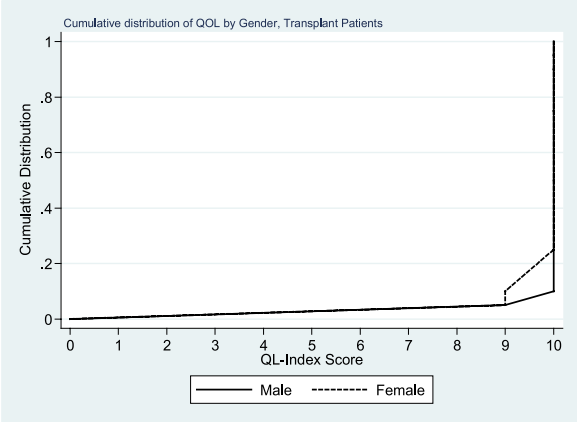


Table 13.7.4: Cumulative distribution of QoL-Index score in relation to Age, Transplant recipient patients 2001-2010

Age group (years)	<20	20-39	40-59	>=60
Number of patients	132	480	549	88
Centile				
0	0	0	0	0
0.05	10	9	9	7
0.1	10	10	9	8
0.25 (LQ)	10	10	10	9
0.5 (median)	10	10	10	10
0.75 (UQ)	10	10	10	10
0.9	10	10	10	10
0.95	10	10	10	10
1	10	10	10	10

Figure 13.7.4: Cumulative distribution of QoL-Index score in relation to Age, Transplant recipient patients 2001-2010

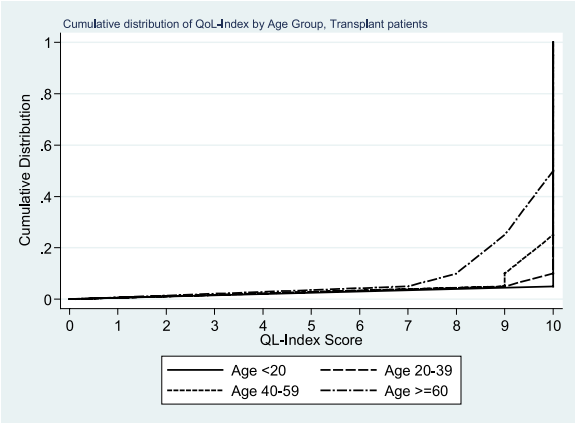


Figure 13.7.5: Cumulative distribution of QoL-Index score in relation to Year of entry, Transplant recipient patients 2001-2010

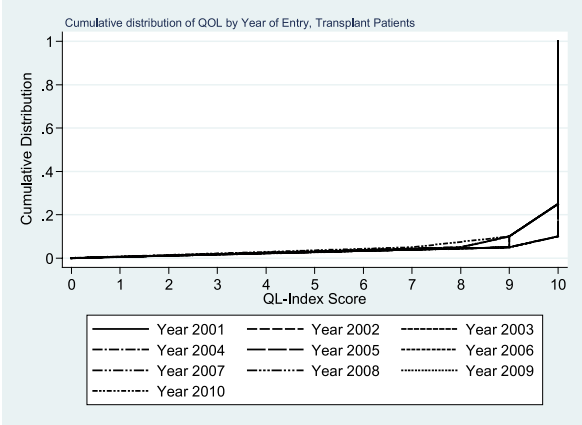


Table 13.7.5: Cumulative distribution of QoL-Index score in relation to Year of entry, Transplant recipient patients 2001-2010

Year of Entry	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of patients	127	145	136	168	154	137	95	106	112	69
Centile										
0	0	0	0	0	0	0	0	0	0	0
0.05	9	9	8	9	9	9	8	8	9	7
0.1	9	10	9	9	10	10	9	9	10	9
0.25 (LQ)	10	10	10	10	10	10	10	10	10	10
0.5 (median)	10	10	10	10	10	10	10	10	10	10
0.75 (UQ)	10	10	10	10	10	10	10	10	10	10
0.9	10	10	10	10	10	10	10	10	10	10
0.95	10	10	10	10	10	10	10	10	10	10
1	10	10	10	10	10	10	10	10	10	10