

CHAPTER 11

PAEDIATRIC REPORT

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This year, as well as providing a summary of current trends in the frequency and causes of ESKD, the paediatric report provides a comprehensive analysis of kidney transplantation in children and adolescents in Australia and New Zealand - relative frequency of delivery compared with other forms of renal replacement therapy, recipient and donor characteristics, immunosuppressive use and patient and graft survival.

INCIDENCE AND PREVALENCE OF ESKD IN CHILDREN AND ADOLESCENTS 1980 - 2007

GENERAL OVERVIEW

As shown in Figure 11.1, there is no long term trend in the incidence of children and adolescents developing ESKD and being treated with renal replacement therapy, although there are fluctuations from year-to-year.

Prevalent numbers of treated ESKD have gradually increased across all age groups reflecting improved survival through increased duration of ESKD (Figure 11.2).

Figure 11.1

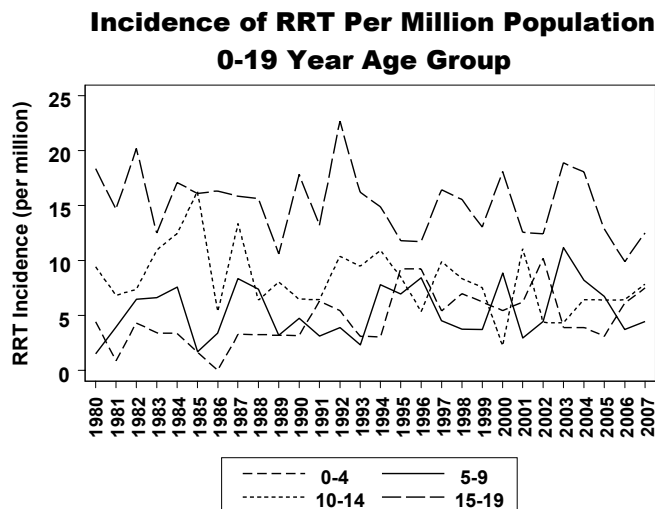
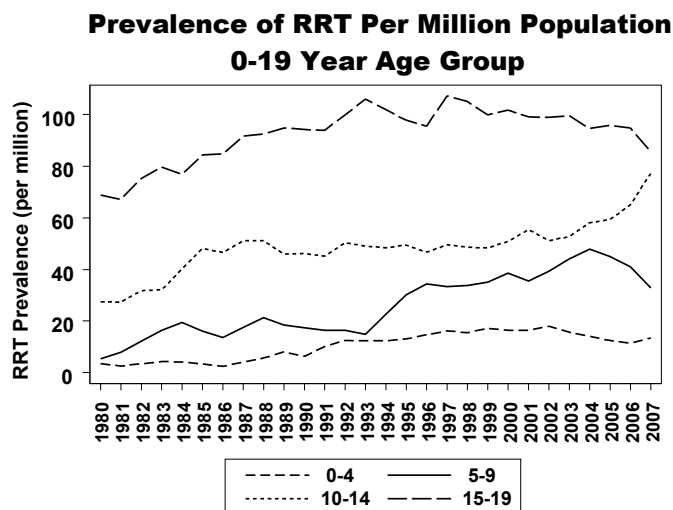


Figure 11.2



CAUSES OF ESKD IN CHILDREN AND ADOLESCENTS 2002 - 2007

Overall, glomerulonephritis remains the most common cause of ESKD among children and adolescents (29%) but causes vary significantly with age. In young children, hypoplasia/dysplasia is the most common cause, while reflux nephropathy is a common cause of ESKD in adolescents.

Figure 11.3

**Causes of End Stage Kidney Disease
In Children and Adolescents 2002 - 2007**

Primary Renal Disease	Age Groups (Years)				Total
	0-4	5-9	10-14	15-19	
Glomerulonephritis	4 (8%)	10 (16%)	21 (30%)	69 (41%)	104 (29%)
Familial Glomerulonephritis	-	-	2 (3%)	5 (3%)	7 (2%)
Reflux Nephropathy	-	2 (3%)	4 (6%)	31 (19%)	37 (10%)
Polycystic Kidney Disease	4 (8%)	4 (6%)	2 (3%)	-	10 (3%)
Medullary Cystic Disease	1 (2%)	3 (5%)	5 (7%)	9 (5%)	18 (5%)
Posterior Urethral Valve	11 (21%)	7 (11%)	5 (7%)	8 (5%)	31 (9%)
Haemolytic Uraemic Syndrome	2 (4%)	2 (3%)	2 (3%)	3 (2%)	9 (3%)
Hypoplasia / Dysplasia	16 (30%)	14 (22%)	14 (20%)	6 (4%)	50 (14%)
Diabetes	-	-	-	-	-
Cortical Necrosis	1 (2%)	2 (3%)	2 (3%)	3 (2%)	8 (2%)
Interstitial Nephritis	-	1 (2%)	-	5 (3%)	6 (2%)
Cystinosis	-	3 (5%)	2 (3%)	-	5 (1%)
Uncertain	1 (2%)	1 (2%)	3 (4%)	8 (5%)	13 (4%)
Miscellaneous / Other	13 (25)	15 (23%)	9 (13%)	20 (12%)	57 (16%)
Total	53 (100%)	64 (100%)	71 (100%)	167 (100%)	355 (100%)

MODALITY OF TREATMENT 2002 - 2007

The modality of the first renal replacement treatment is shown in Figure 11.4. Although numbers are small and therefore fluctuate from year to year, around 15% of children and adolescents receive pre-emptive kidney transplants with the remainder split almost equally between haemodialysis and peritonitis dialysis.

Figure 11.4

**Modality of Initial Renal Replacement Therapy
By Year of First Treatment - Australia and New Zealand
< 20 Years of Age at First Treatment**

Current Treatment	Year						Total
	2002	2003	2004	2005	2006	2007	
Haemodialysis	24 (38%)	28 (41%)	31 (54%)	24 (44%)	23 (45%)	24 (41%)	154 (43%)
Peritoneal Dialysis	34 (53%)	29 (43%)	22 (38%)	18 (33%)	18 (35%)	26 (44%)	147 (41%)
Transplant	6 (9%)	11 (16%)	5 (9%)	13 (24%)	10 (20%)	9 (15%)	54 (15%)
Total	64 (100%)	68 (100%)	58 (100%)	55 (100%)	51 (100%)	59 (100%)	355 (100%)



For prevalent patients (Figure 11.5), a very different pattern is seen, with the great majority of children and adolescents with a functioning transplant. This reflects the relatively high rate of transplantation among children.

Figure 11.5

Modality of Treatment for all Patients in Australia and New Zealand < 20 Years of Age at 31-December

Current Treatment	Year						Total
	2002	2003	2004	2005	2006	2007	
Haemodialysis	51 (14%)	43 (12%)	55 (15%)	47 (13%)	43 (11%)	43 (11%)	282 (13%)
Peritoneal Dialysis	71 (20%)	69 (19%)	52 (14%)	44 (12%)	45 (12%)	60 (16%)	341 (15%)
Transplant	237 (66%)	258 (70%)	260 (71%)	282 (76%)	290 (77%)	274 (73%)	1601 (72%)
Total	359 (100%)	370 (100%)	367 (100%)	373 (100%)	378 (100%)	377 (100%)	2224 (100%)

TRANSPLANT DEMOGRAPHICS

Figures 11.6 - 11.9 show the trends in paediatric transplants over the period 1996-2007. Recent transplant recipients tend to be older. 2006-2007 saw an increase in the proportion of parental live donors and pre-emptive transplants.

Figure 11.6

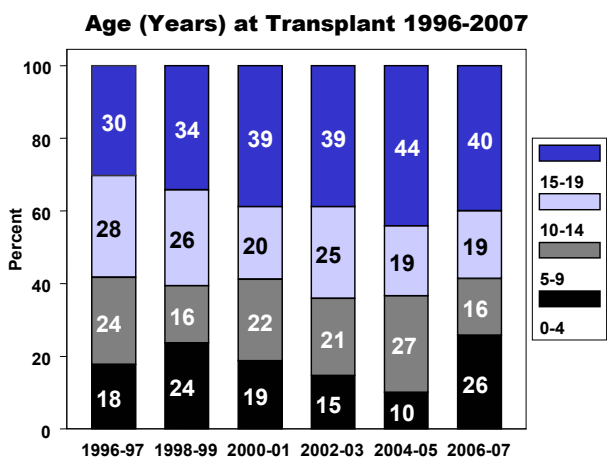


Figure 11.7

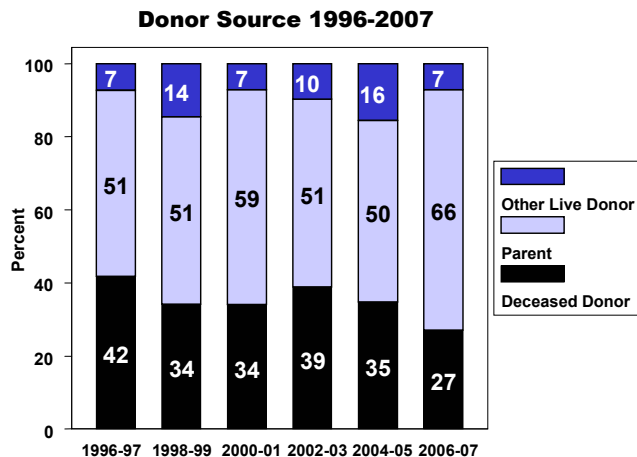


Figure 11.8

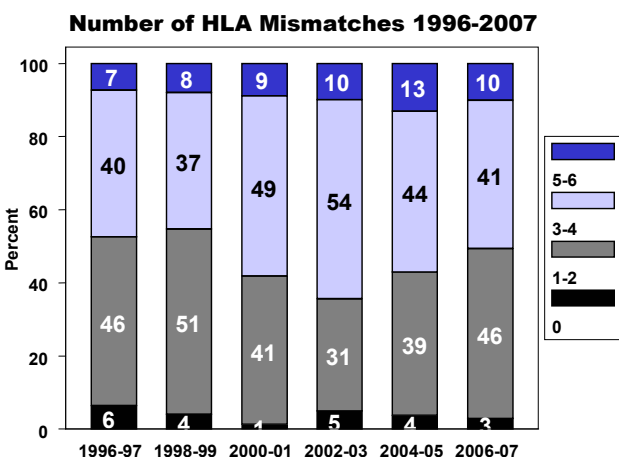
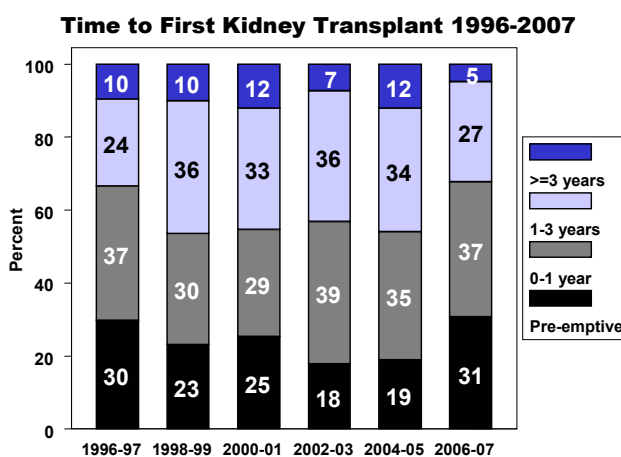


Figure 11.9



Recipient and graft survival rates have fluctuated over the period. Three year recipient survival have remained above 90% and graft survival above 80%.

Figure 11.10

Year	% [95% Confidence Interval]			
	Survival			
	6 months	1 year	3 years	5 years
Recipient Survival				
1996-1997 n=95	98 [92, 99]	97 [91, 99]	96 [89, 98]	94 [86, 97]
1998-1999 n=75	100 [0, 0]	100 [0, 0]	95 [86, 98]	95 [86, 98]
2000-2001 n=81	99 [92, 100]	99 [92, 100]	99 [92, 100]	99 [92, 100]
2002-2003 n=102	93 [86, 97]	91 [84, 95]	90 [83, 95]	90 [83, 95]
2004-2005 n=107	100 [0, 0]	99 [93, 100]	99 [93, 100]	-
2006-2007 n=69	100 [0, 0]	100 [0, 0]	-	-
Graft Survival				
1996-1997 n=95	91 [83, 95]	89 [81, 94]	81 [72, 88]	71 [61, 79]
1998-1999 n=75	95 [86, 98]	95 [86, 98]	80 [69, 87]	72 [60, 81]
2000-2001 n=81	98 [91, 99]	96 [89, 99]	91 [83, 96]	88 [78, 93]
2002-2003 n=102	90 [83, 95]	89 [81, 94]	87 [79, 92]	80 [71, 87]
2004-2005 n=107	97 [92, 99]	96 [90, 99]	90 [81, 95]	-
2006-2007 n=69	95 [86, 98]	95 [86, 98]	-	-

Figure 11.11

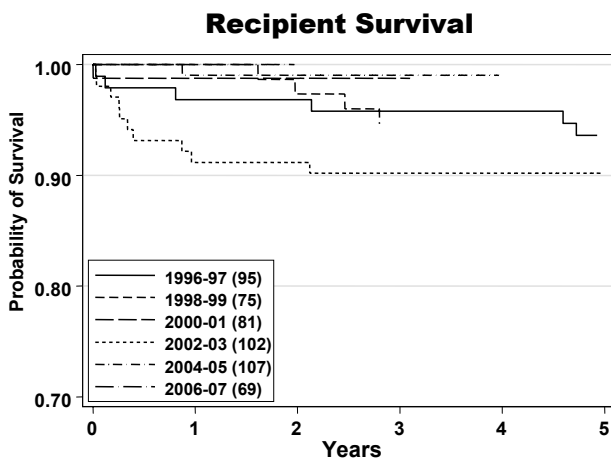


Figure 11.12

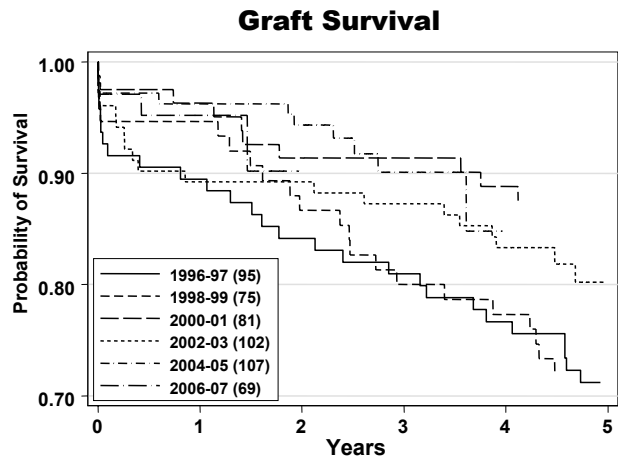


Figure 11.13

Causes of Graft Failure 1996 - 2007

Reason for Failure	Age Groups (Years)				Total
	0-4	5-9	10-14	15-19	
Rejection - Acute	4 (21%)	2 (10%)	1 (4%)	4 (8%)	11 (9%)
Rejection - CAN	4 (21%)	5 (25%)	17 (61%)	17 (35%)	43 (37%)
Rejection - Hyperacute	1 (5%)	-	-	1 (2%)	2 (2%)
Vascular rejection	1 (5%)	3 (15%)	-	3 (6%)	7 (6%)
Technical reasons	3 (16%)	1 (5%)	4 (14%)	4 (8%)	12 (10%)
Recurrent disease	-	2 (10%)	-	4 (8%)	6 (5%)
Non-compliance	1 (5%)	3 (15%)	2 (7%)	8 (16%)	14 (12%)
Death with function	4 (21%)	2 (10%)	2 (7%)	6 (12%)	14 (12%)
Other	1 (5%)	2 (10%)	2 (7%)	2 (4%)	7 (6%)
Total	19	20 (100%)	28	49 (100%)	116 (100%)

Chronic allograft nephropathy is the most common cause of graft failure in recipients aged <20 years at the time of transplant. Acute rejection is also an important cause of graft failure in young children (aged <4 years) while non-compliance with drug therapy is a main cause in older children (aged 15-19 years).



IMMUNOSUPPRESSION

Tacrolimus is now the most commonly used calcineurin inhibitor (CNI) at induction and its dominance increases with time-post transplant.

Mycophenolate is the most commonly used antimetabolite, with almost all patients receiving it at induction. Its use does decrease with time-post transplant in all but the 1996 and 1997 cohorts.

The proportion of prednisolone-free patients at induction has stabilised at zero and those at 6 months and 1 year have been decreasing since the 2004 cohort. On the other hand, the proportion of patients without prednisolone at 3 years has been increasing since the 2002 cohort.

Figure 11.14

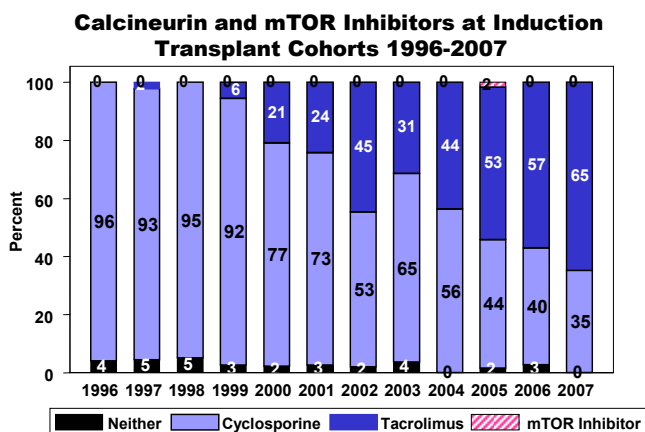


Figure 11.15

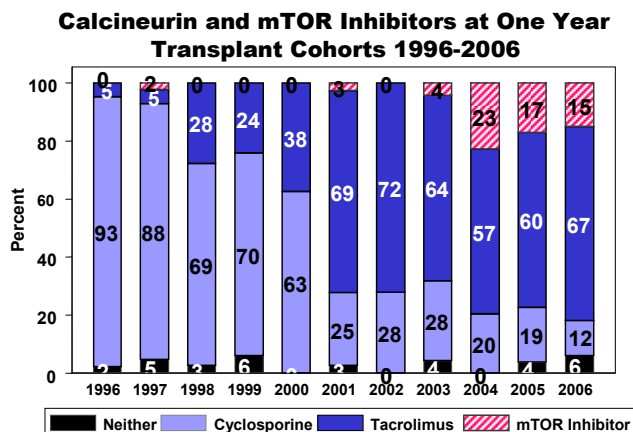


Figure 11.16

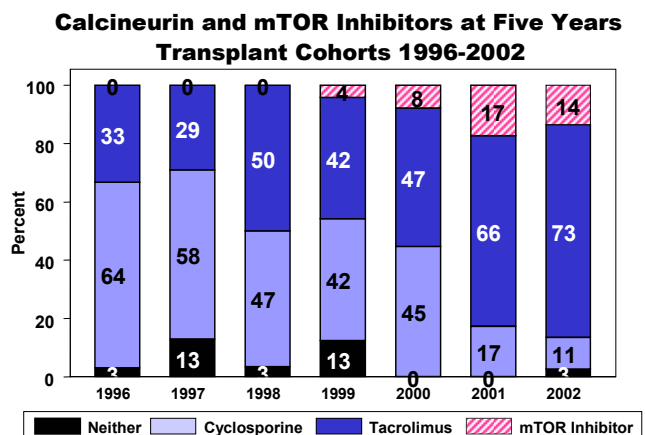


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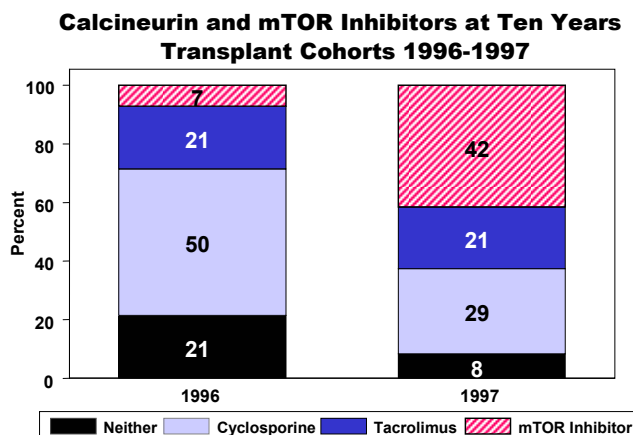


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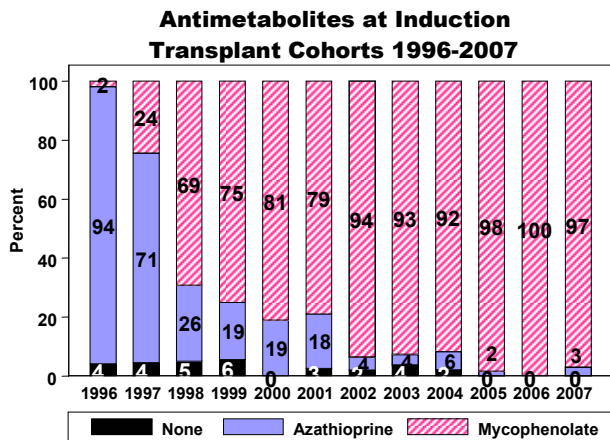


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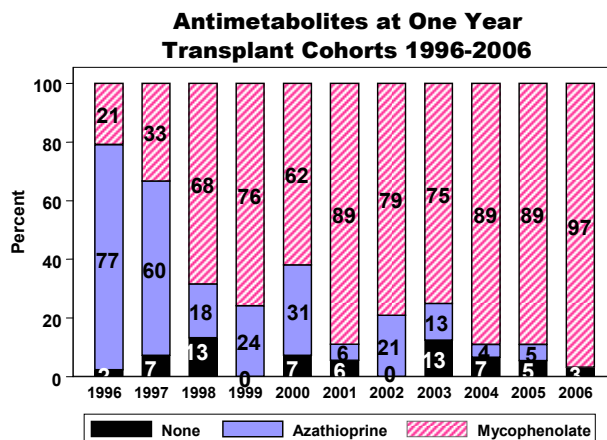


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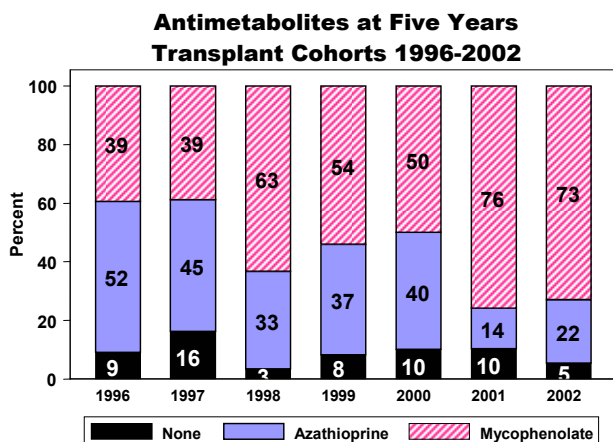


Figure 11.21

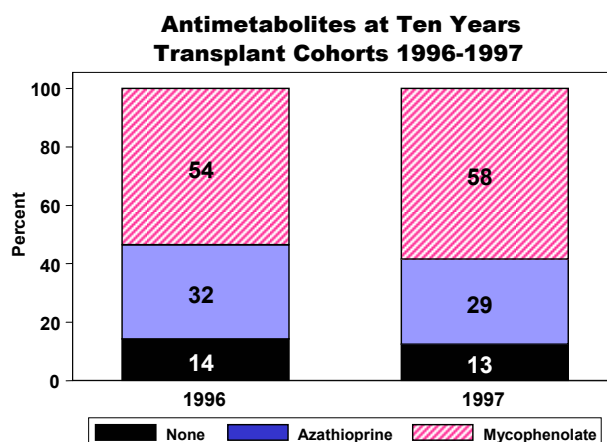
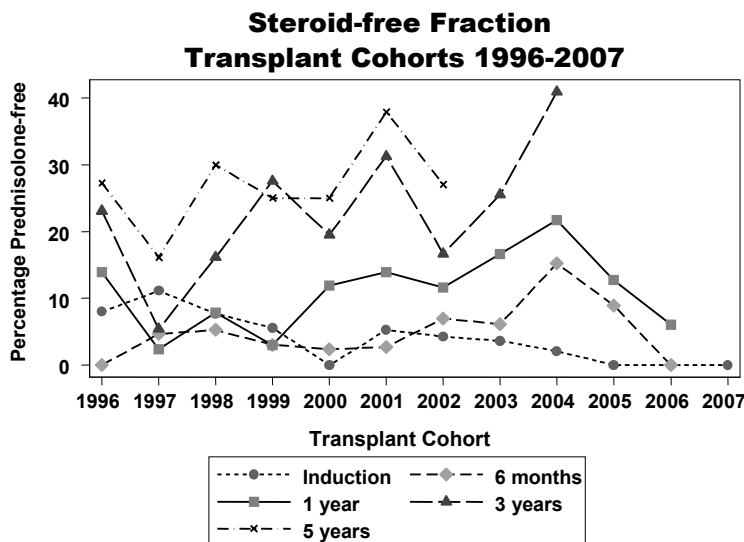


Figure 11.22





REJECTION AND GRAFT FUNCTION

Figure 11.23

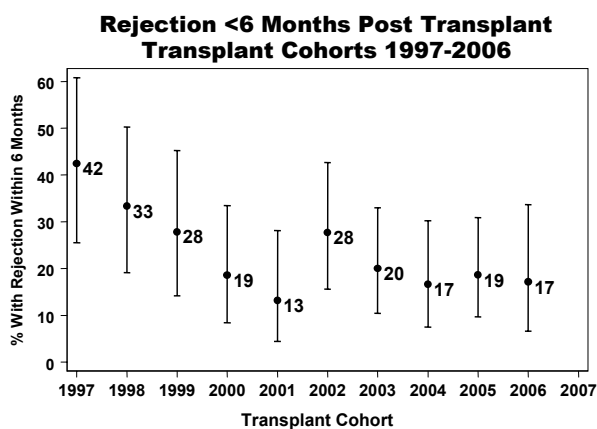


Figure 11.24

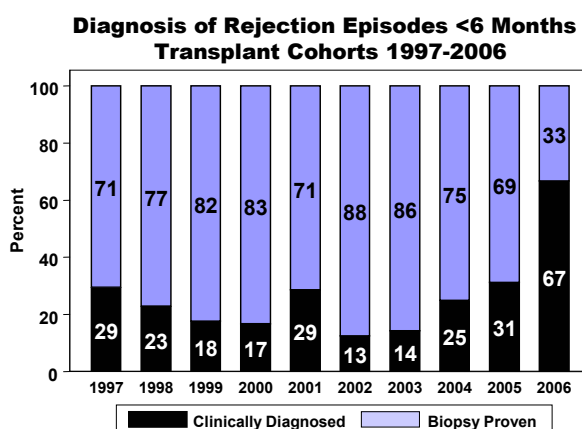


Figure 11.25

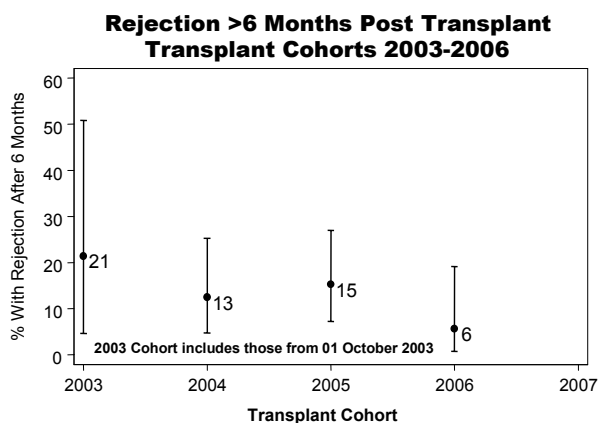
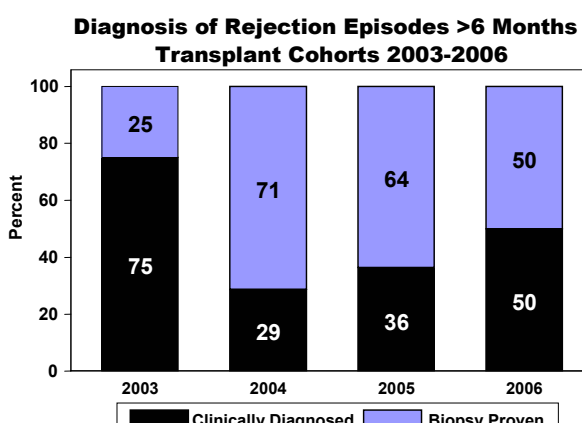


Figure 11.26



The proportion of patients experiencing least one episode of acute rejection, biopsy proven or clinically diagnosed in the first six months is stabilising. The proportion of biopsy proven episodes in the first six months fluctuates but has been declining since 2003.

Renal function at anytime post transplant has improved since the 1996-1998 cohort. There is little change in the rate of decline in renal function post transplant.

Figure 11.27

