AUSTRALIA AND NEW ZEALAND LIVER TRANSPLANT REGISTRY

From the Combined Registries of the Australian and New Zealand Liver Transplant Centres

DATA TO 30/06/01

Click on item to display.

Contents

Preface

The liver transplant centres in Australia and New Zealand report details of their liver graft recipients to a combined registry so that a National analysis can be done. Centres are situated in Adelaide, Brisbane, Melbourne, Perth and Sydney in Australia and Auckland, New Zealand.

This, the 13th Report, was prepared by the Australian National Liver Transplant Unit, Sydney. Data collected from the six units was analysed and the outcome of all liver transplant recipients from January 1985 to June 2001 is presented. The New Zealand Liver Transplant Unit began clinical practice in March 1998. Prior to this all New Zealand patients received their grafts in Australia.

The Editors thank the Liver Transplantation Units for contributing their data. A full list of units is included in the Appendix. They also wish to thank the Australia and New Zealand Organ Donor Registry for kindly contributing the donor information.

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Summary

Page

5. Within Australasia, between January 1985 and June 2001, 1845 orthotopic liver transplants (OLTx) were performed on 1698 patients. Of these, 1348 (79%) were adults and 350 (21%) children.

6. The rate of Tx in adults continues to climb steadily. In 2000, 152 adult transplants were performed. Child Tx fluctuated between 32 and 43 in the years 1991-93 but has fallen since to the 18-27 range, including a steady fall in international patients.

7 – 8. Of the adult recipients, 1093 (81%) were Australian citizens, 174 (13%) New Zealand Citizens and 81 (6%) were from other countries. In the paediatric group, 212 (61%) were Australian citizens, 52 (15%) New Zealand citizens and 86 (25%) were from other countries. The mean age of adults was 45.6 yr and of children 4.5 yr. Male patients numbered 795 (59%) and female 553 (41%).

9. Children received reduced liver allografts in 258/404 (64%) of cases, 29 (7%) were split-liver allografts. There were no differences in the utilisation of reduced allografts in Australian citizens 155/249 (62%) compared to New Zealand 39/57 (68%) or Other 64/98 (65%) citizens.

12 - 13. The most common underlying disease for which OLTx was performed on adult Australian citizens was chronic viral hepatitis (24%), followed by primary sclerosing cholangitis (13%), alcoholic liver disease (13%), primary biliary cirrhosis (10%), fulminant hepatic failure (9%) and metabolic disorders (7%).

In NZ citizens the most common indications for OLTx in adults were chronic viral hepatitis (24%), fulminant hepatic failure (19%) and primary sclerosing cholangitis (17%).

In Other citizens the most common indication for transplantation in adults was chronic viral hepatitis (27%).

14. In children, biliary atresia accounted for 51% (Australian), 60% (NZ) and 88% (Other) patients.

15. Hepatitis C is the most common indication for OLTx for chronic viral illness in Australian (60%) and Other citizens (77%), while hepatitis B is the most common in NZ citizens (55%).

17 - 18. Current 1 year patient survival (adults and children) is 85%. Five year and 10 year survivals are 78% and 70% respectively. There were no major differences in survivals at 1, 5 and 10 years between Australian, NZ or Other citizens.

19 – 20. Australian patients who are in the 3-14 year age group at the time of OLTx have the best long term survival, (87% at 5 years), followed by those in the age group 15-54 years of age (79%). Those who are >60 years of age survive less well (68%).

21 – 22. Since 1990 adult and child patient 1 yr survival has fluctuated between 80 – 93%.

23. Children under 8 kilograms of weight at the time of liver transplantation have a 1 year survival inferior to those over 8 kilograms of weight (69% v 86%).

24 - 25. There is a trend for paediatric recipients of whole liver allografts to have a superior patient survival from 1-6 years post Tx, over those who receive reduced liver allografts (84% vs 75%), but long term survival is similar. Just over 10% of paediatric recipients of reduced liver allografts were split-liver allografts.

26. Adult patients who undergo liver transplantation for alcoholic liver disease have the best survival at 1 and 5 years (90% and 89% respectively), followed by patients with primary biliary cirrhosis (89% and 83%) and with chronic autoimmune hepatitis (89% and 84%). Those transplanted for malignancy have the worst long term survival – 53% at 5 years.

27. In children with biliary atresia 1 and 5 year survivals are 84% and 79% respectively.

27. For fulminant hepatic failure adult 1 and 5 years survivals are 75% and 72% respectively and child survivals are 62% and 62% respectively.

28. One and 5 yr survival of adults with hep C are 89% and 79% and for hep B 75% and 68%.

29. Three (43%) of 7 living donor grafts remain functional and 4 (57%) of these patients remain alive, one with a secondary cadaveric donor graft.

30. Graft survival at 1 year is 81% following primary grafting, compared to 60% for a second allograft and 40% for a third graft.

31. In the first year following OLTx, the most common indicators for retransplantation are primary non function, vascular complications and rejection. After one year post OLTx, the most common indicators for retransplantation are graft failure due to chronic rejection, recurrent disease and vascular complications.

32. In the first year following transplantation patient death and vascular complications are the major causes of allograft loss. After one year, patient death and recurrent disease are the major factors for allograft loss.

34. Sepsis and graft failure are the most frequent causes of patient death in the first year. After one year, malignancy emerges as the major cause of patient death together with graft failure due to rejection or recurrent disease.

36. There is little difference in graft survivals for donors in the various age groups except for donors >65 years where 1 and 5 year survivals are 76% and 60%, though numbers are small.

36. Liver donation continues to increase (except 1998.

37. At the time of Tx 166 (9%) patients had cancer present (primary 3%, incidental 6%). Since Tx 34 (25% of those with Ca) have recurred, 50 (3% of all patients) have de novo Ca and 134 (9%) skin Ca.

39 – 42. Long term survival of patients with Ca (primary, incidental or de novo) is around 40%).

43. By 10 years post-tx 30% of patients will have cancer (10% recurrent or de novo non-skin Ca, 22% skin Ca)

Section 1

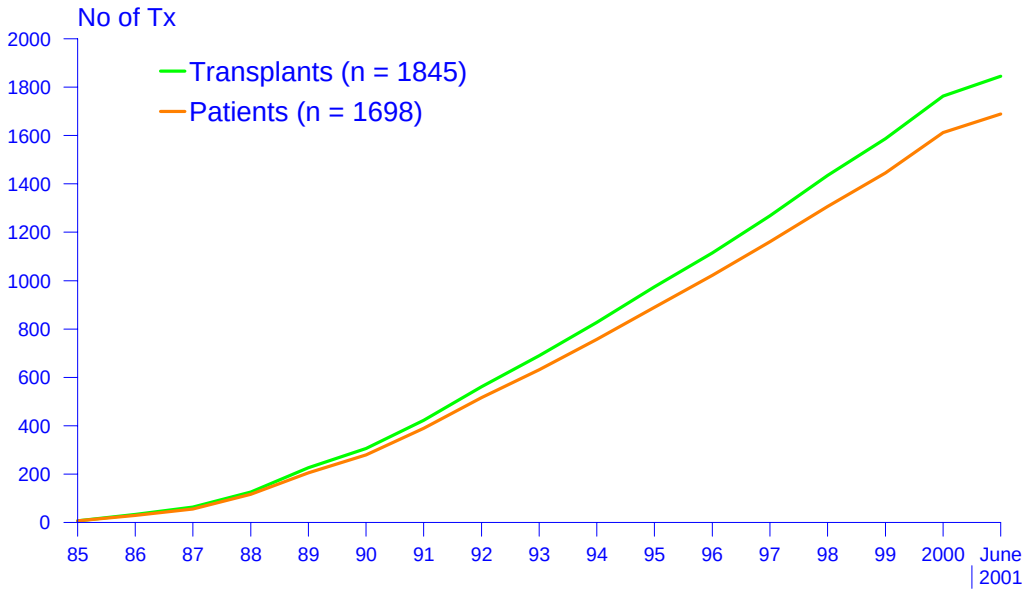
Demographic Data

Age and Gender
Summary Statistics

ALL PATIENTS (AUSTRALIAN, NEW ZEALAND, OTHER)

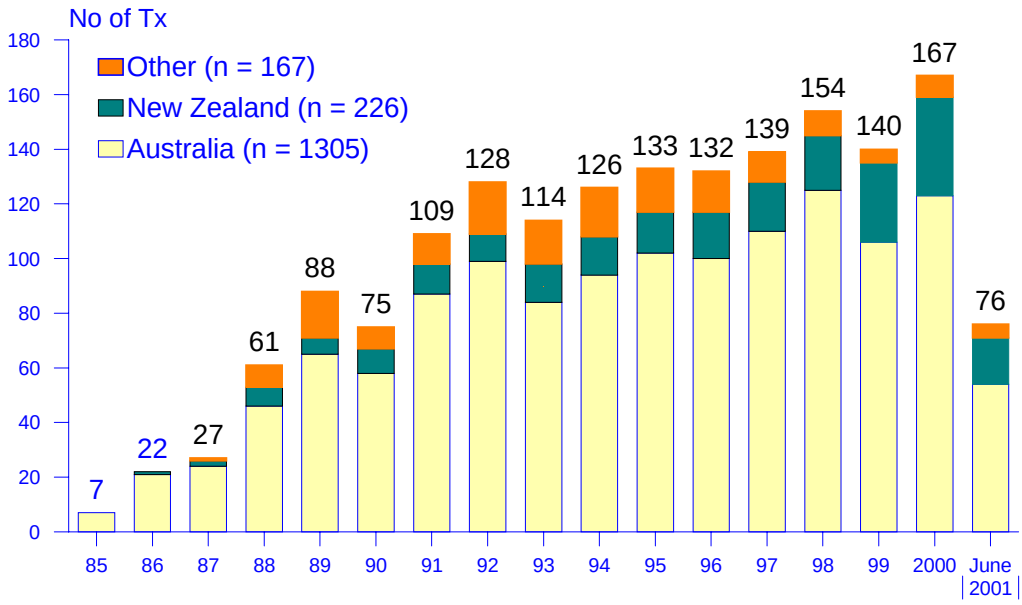
	Children	Adults	Total
Patients	350 (21%)	1348 (79%)	1698
Age			
Mean	4.5 ± 4.3	45.6 ± 12.2	37.1 ± 20
Median	2.5y	47.2y	43.7y
Range	1m - 14.9y	15 - 67.5y	1m - 67.5y
Gender			
Female	194 (55%)	553 (41%)	747 (44%)
Male	156 (45%)	795 (59%)	951 (56%)
Surviving	270 (77%)	1039 (77%)	1309 (77%)

CUMULATIVE NUMBER OF PATIENTS AND TRANSPLANTS



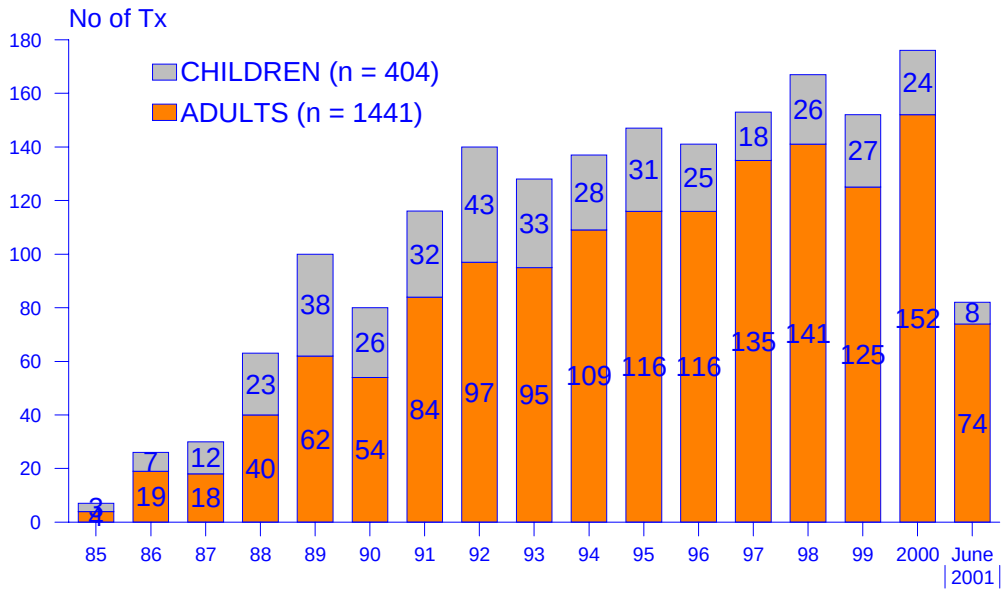
NUMBER OF NEW RECIPIENTS BY YEAR

n =1698



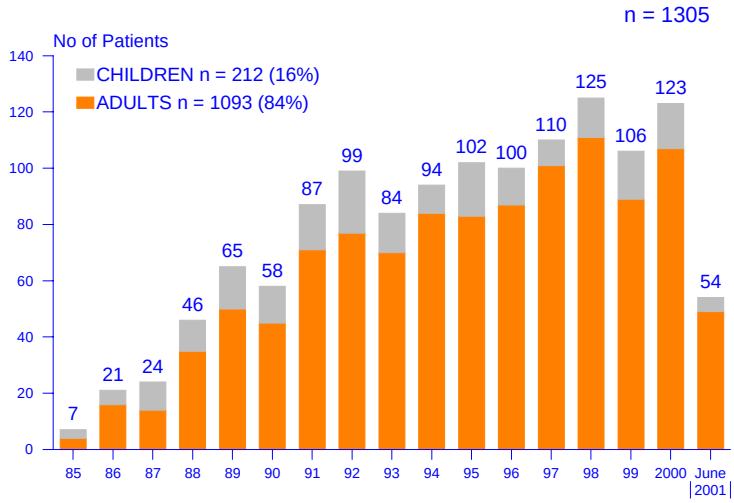
NUMBER OF TRANSPLANTS BY YEAR

n =1845

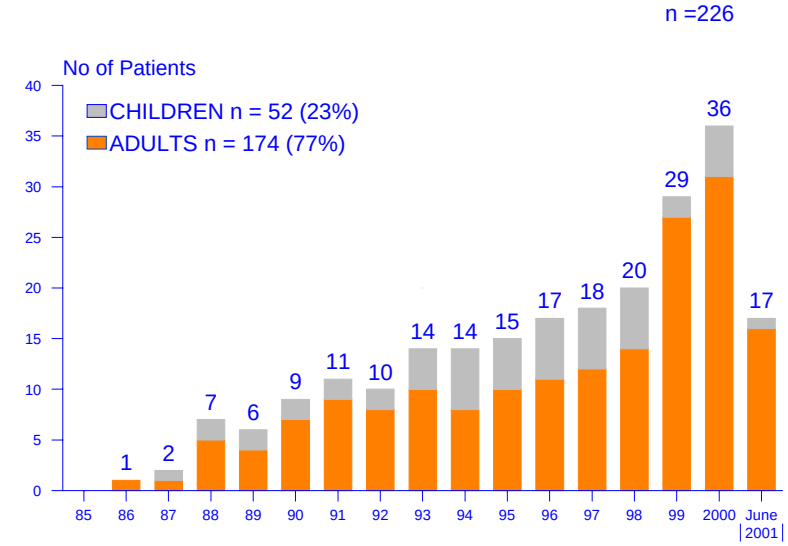


NUMBER OF RECIPIENTS BY YEAR (n = 1698)

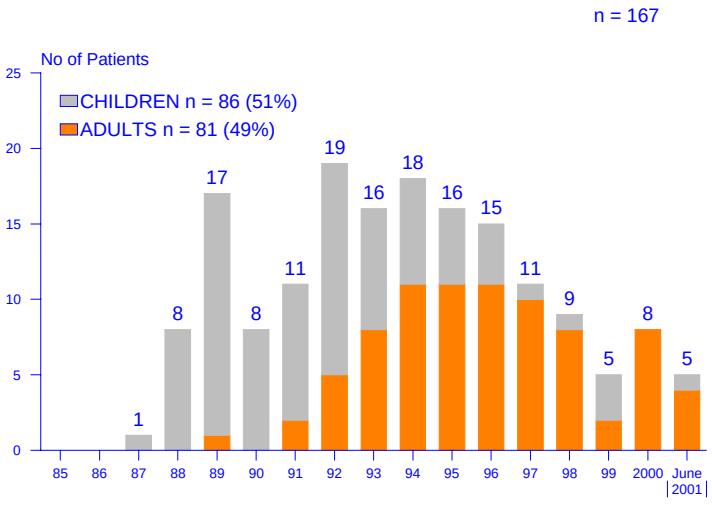
AUSTRALIAN CITIZENS



NZ CITIZENS

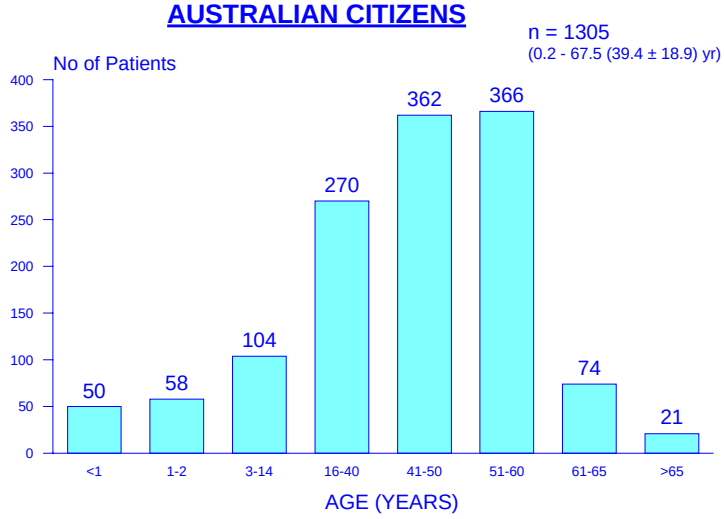


OTHER CITIZENS

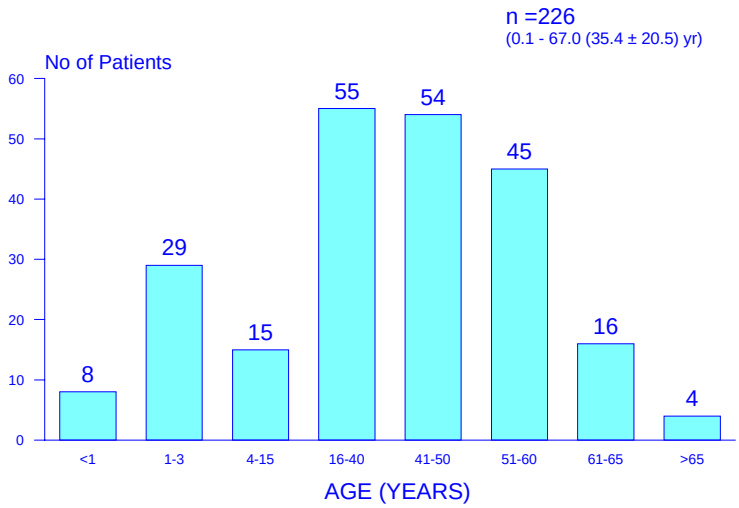


NUMBER OF RECIPIENTS BY AGE

AUSTRALIAN CITIZENS



NZ CITIZENS



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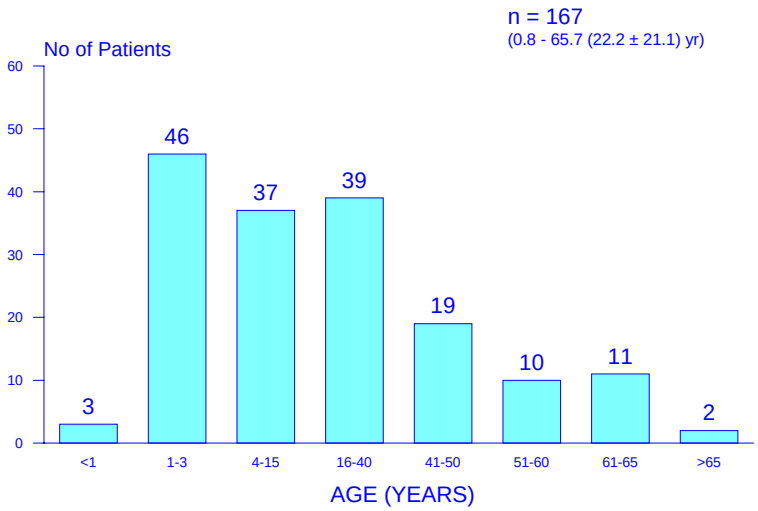
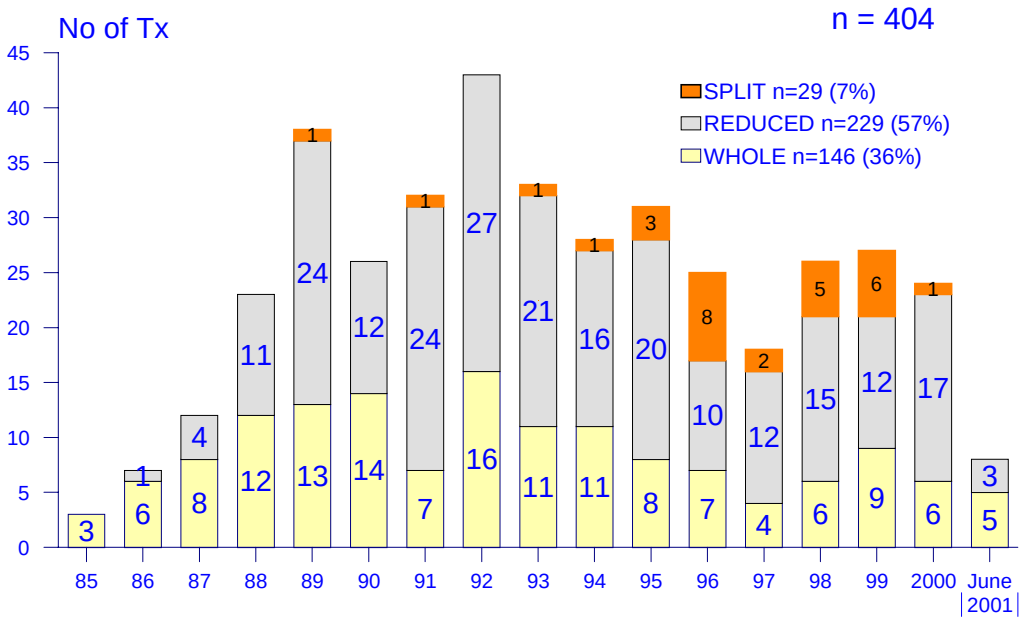
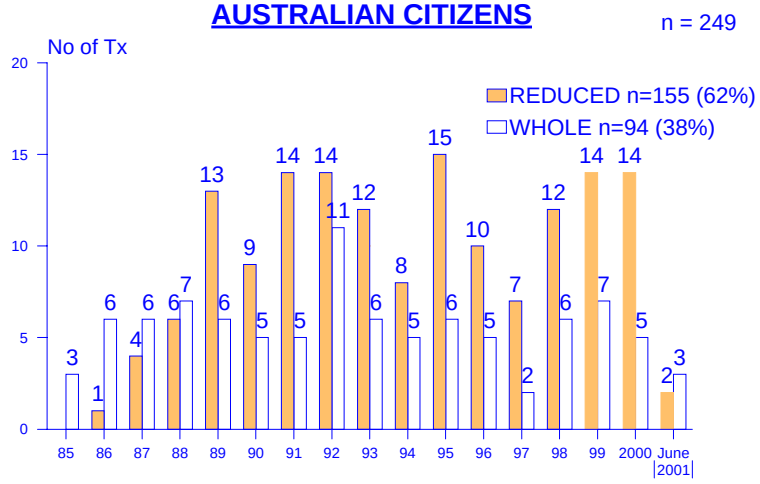


NUMBER OF GRAFTS BY YEAR

CHILDREN - SPLIT vs REDUCED vs WHOLE



CHILDREN
NUMBERS OF GRAFTS BY YEAR
REDUCED vs WHOLE
AUSTRALIAN CITIZENS



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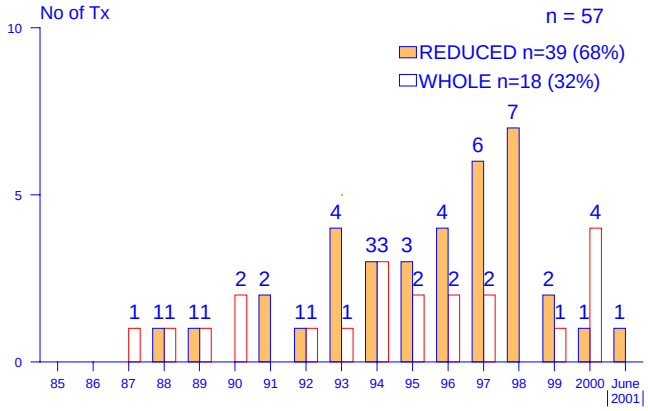

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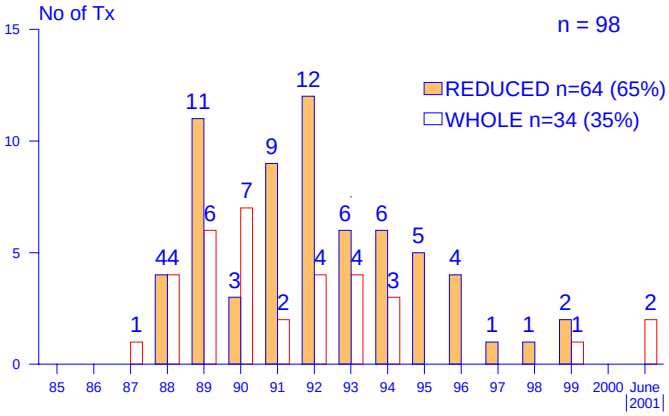

Section 2

Primary Diagnosis

PRIMARY DISEASES OF RECIPIENTS

AUSTRALIAN CITIZENS

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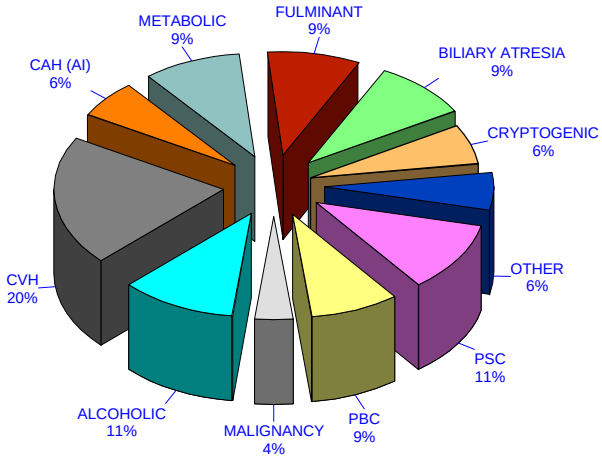

NZ CITIZENS

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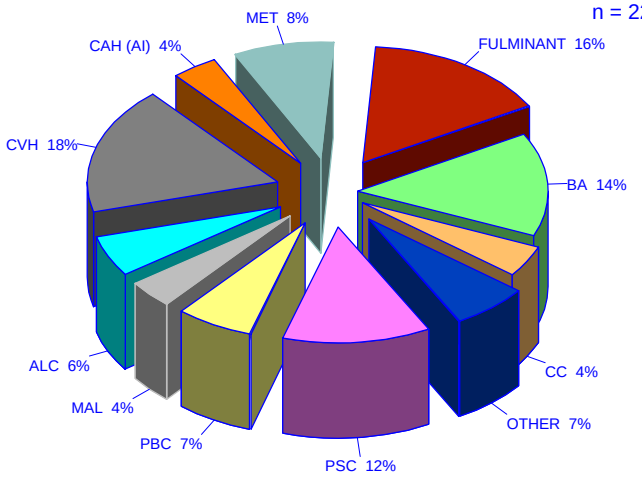
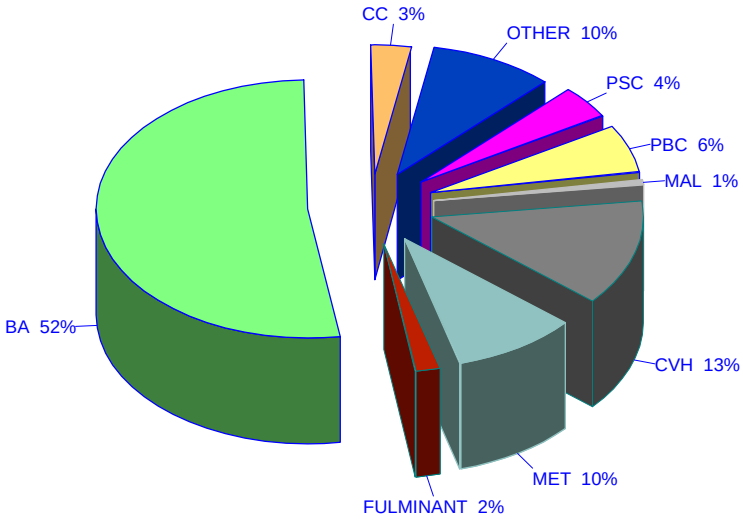


OTHER CITIZENS

n = 167



PRIMARY DISEASES OF RECIPIENTS

ADULTS - AUSTRALIAN CITIZENS

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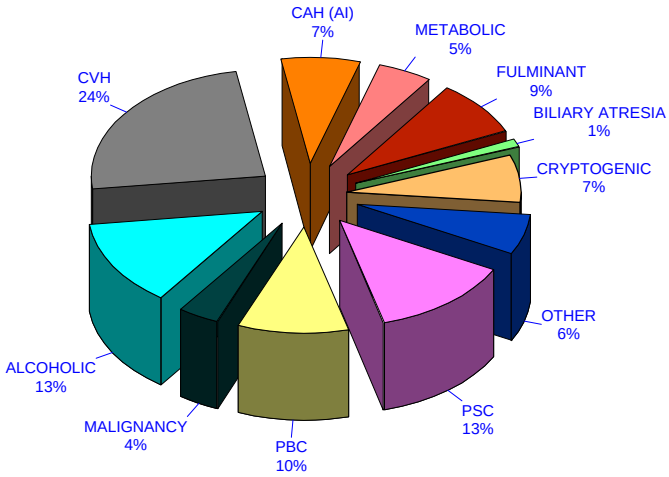
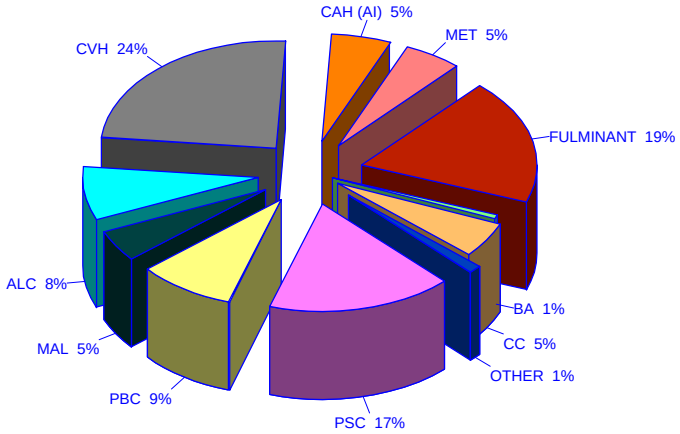


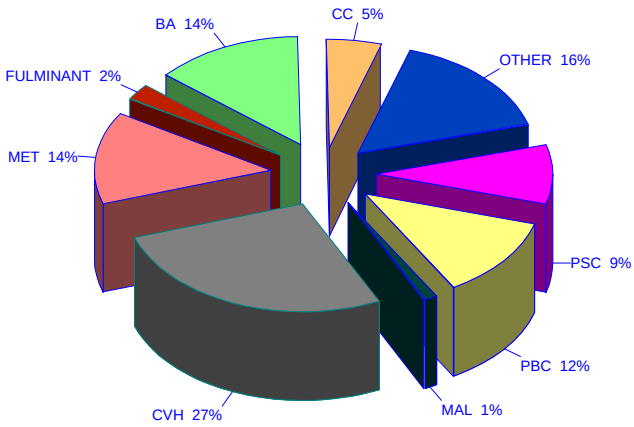
ADULTS - NZ CITIZENS

n = 174



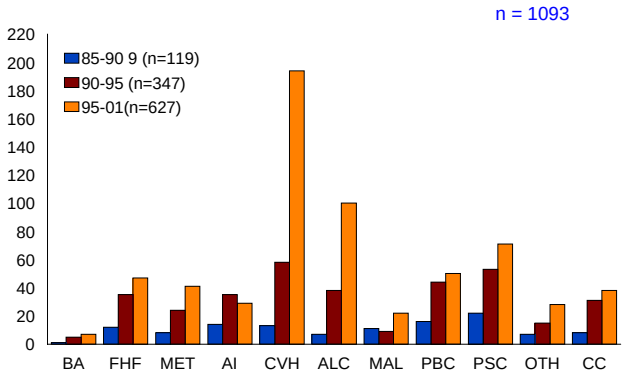
ADULTS - OTHER CITIZENS

n = 81



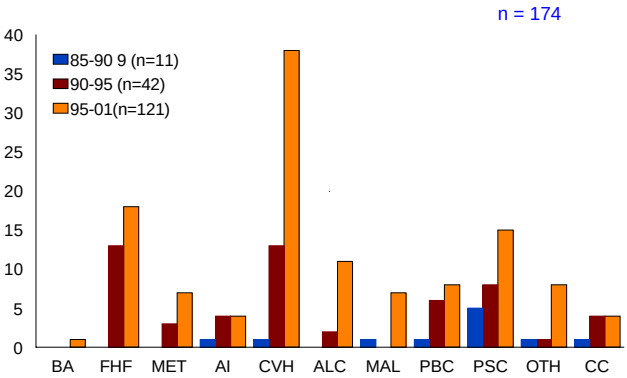
PRIMARY DISEASES OF RECIPIENTS

ADULTS - AUSTRALIAN CITIZENS



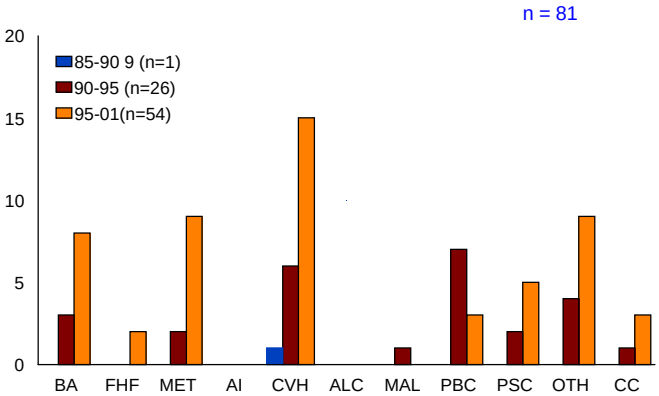
PRIMARY DISEASES OF RECIPIENTS

ADULTS - NZ CITIZENS



PRIMARY DISEASES OF RECIPIENTS

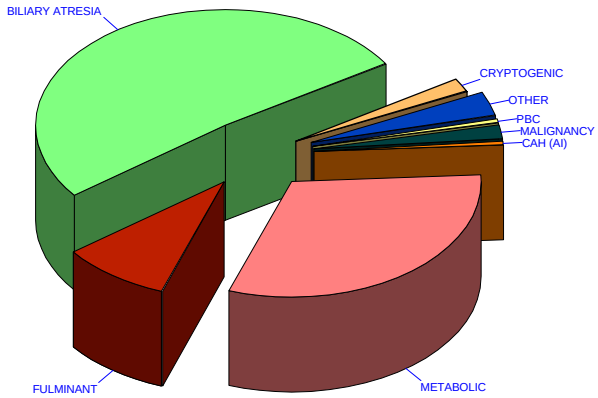
ADULTS - OTHER CITIZENS



PRIMARY DISEASES OF RECIPIENTS

CHILDREN - AUSTRALIAN CITIZENS

n = 212



CHILDREN - NZ CITIZENS

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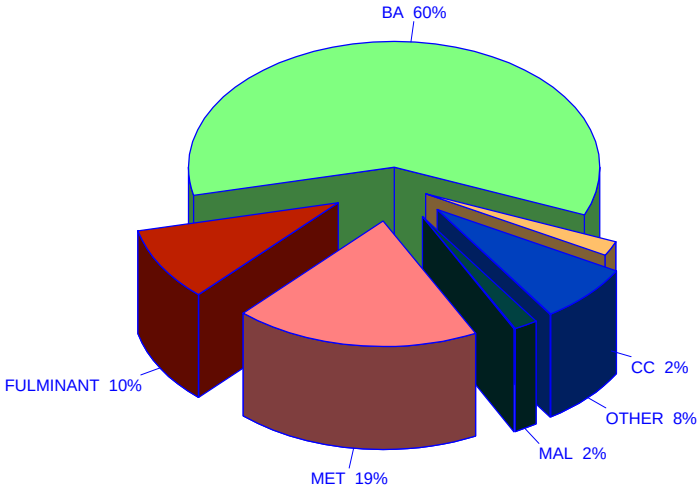
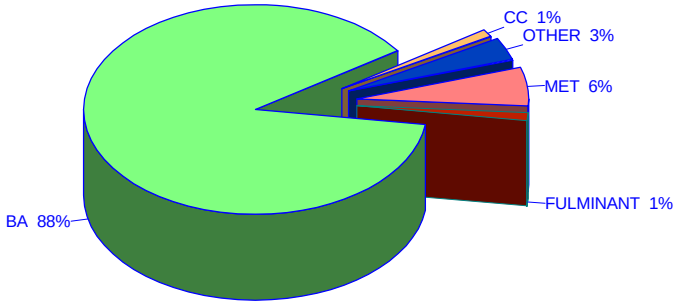


CHILDREN - OTHER CITIZENS

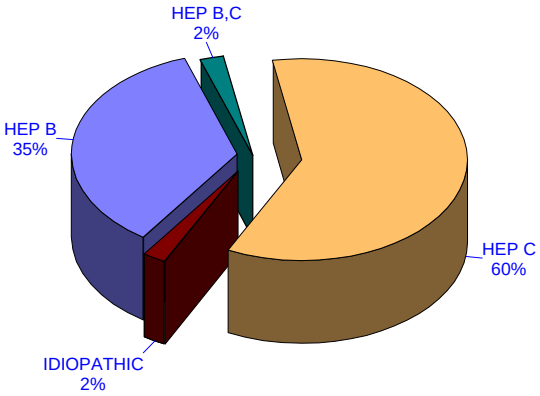
n = 86



CHRONIC VIRAL HEPATITIS

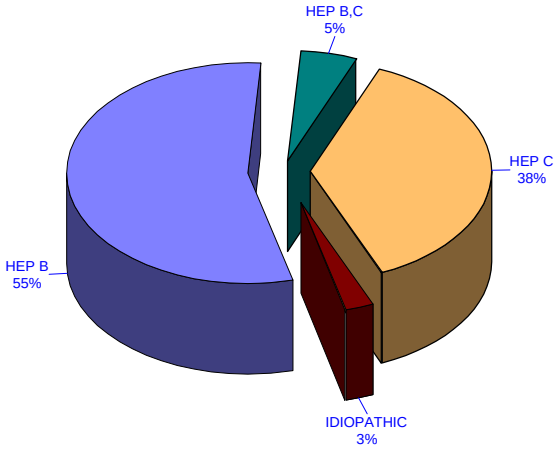
AUSTRALIAN CITIZENS

n = 265 (20%)



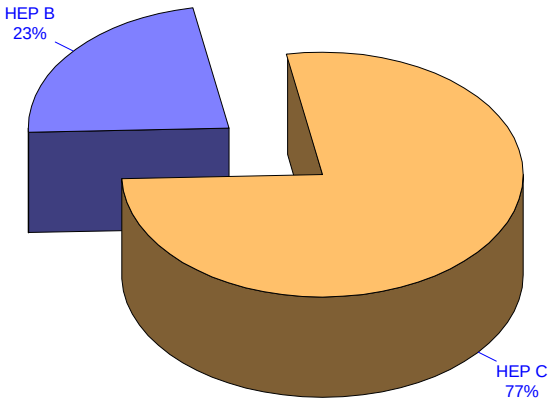
NZ CITIZENS

n = 40 (18%)



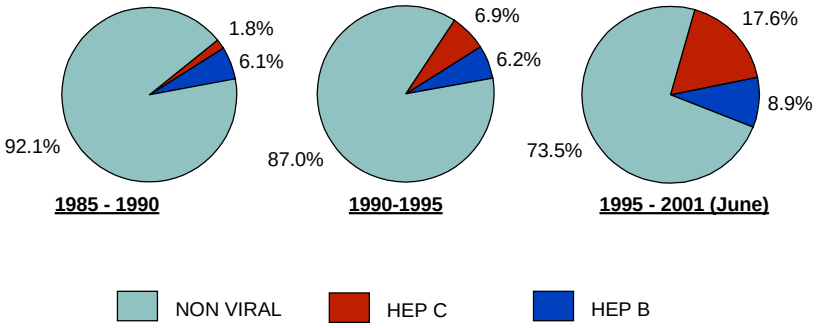
OTHER CITIZENS

n = 22 (13%)



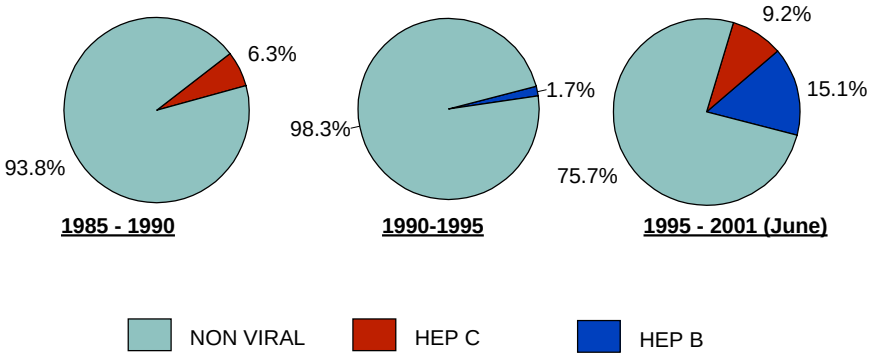
CHRONIC VIRAL HEPATITIS

AUSTRALIAN CITIZENS



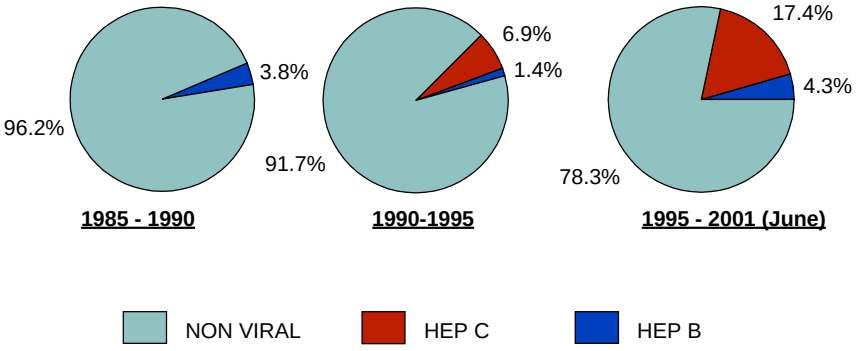
CHRONIC VIRAL HEPATITIS

NZ CITIZENS



CHRONIC VIRAL HEPATITIS

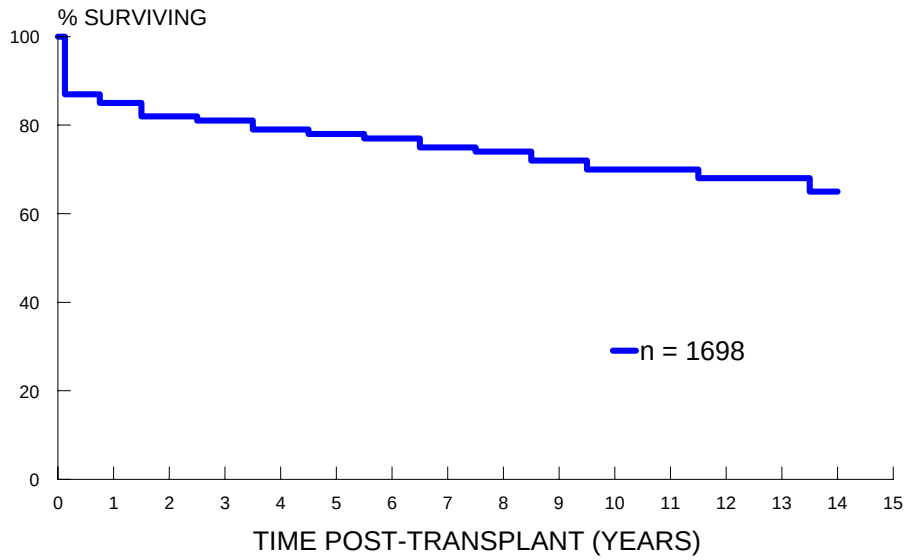
OTHER CITIZENS



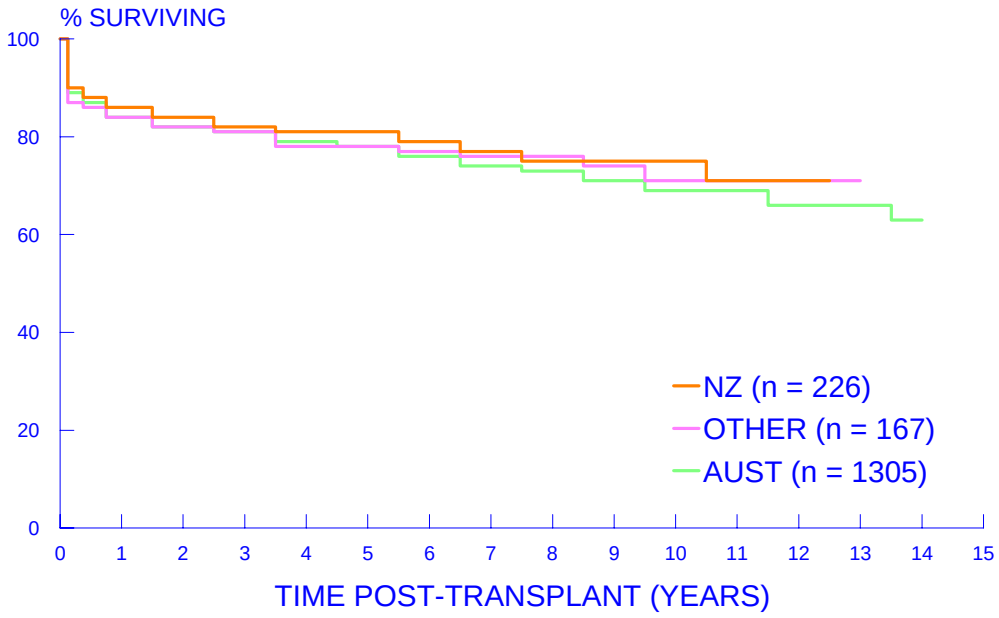
Section 3

Patient and Graft Survival

PATIENT SURVIVAL POST Tx

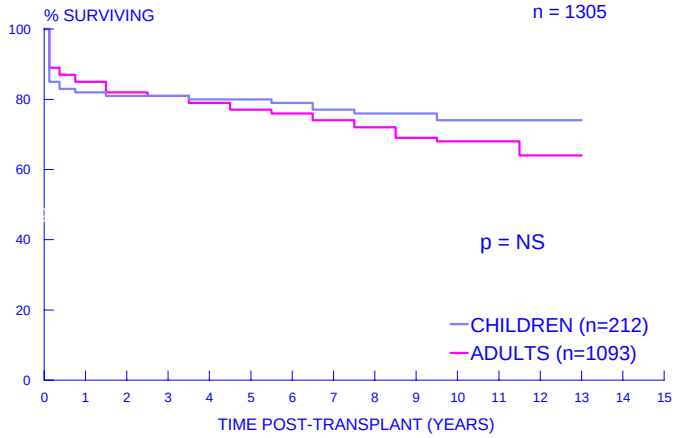


PATIENT SURVIVAL POST Tx

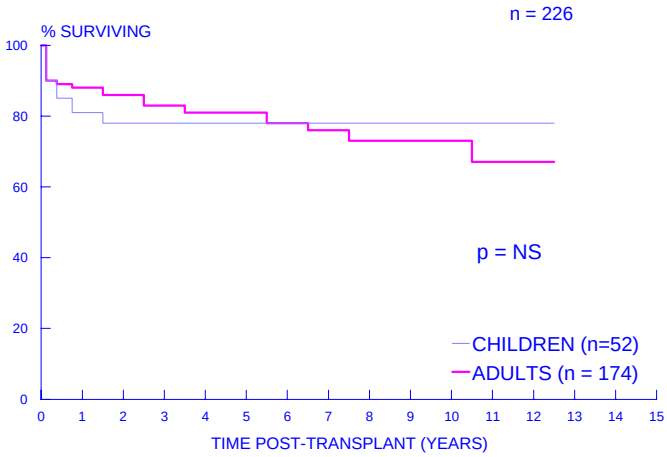


PATIENT SURVIVAL - ADULTS AND CHILDREN

AUSTRALIAN CITIZENS



NZ CITIZENS



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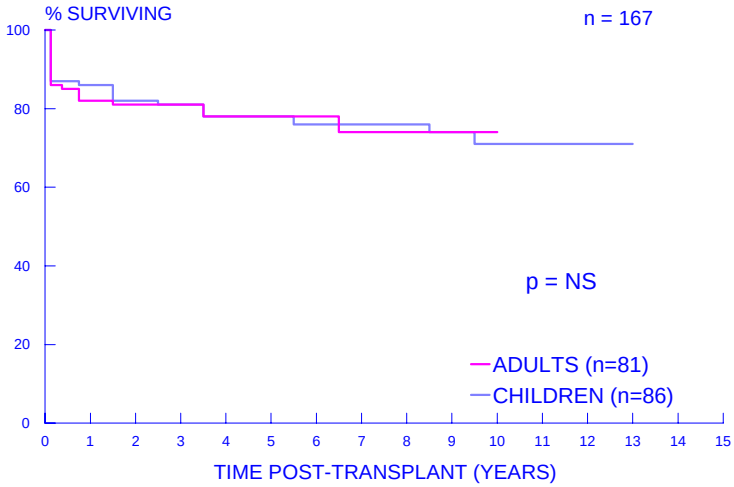

PATIENT SURVIVAL BY AGE AT TRANSPLANT

AUSTRALIAN CITIZENS - ADULTS

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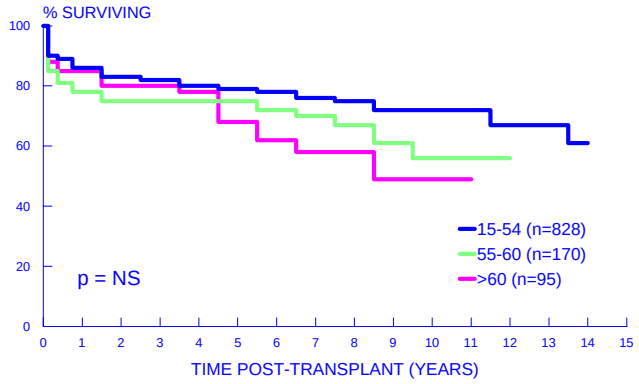
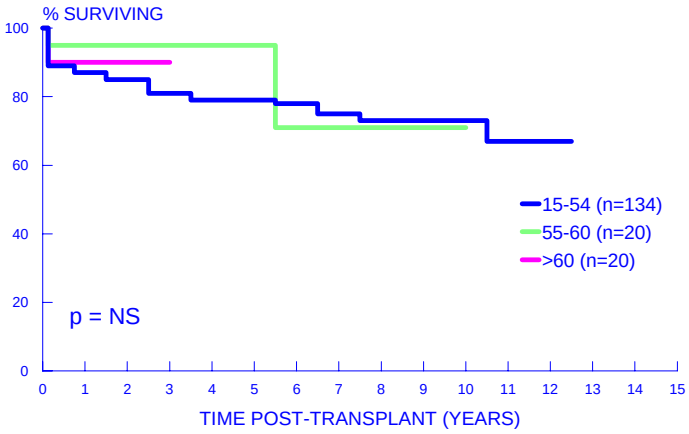


NZ CITIZENS - ADULTS

n = 174



OTHER CITIZENS - ADULTS

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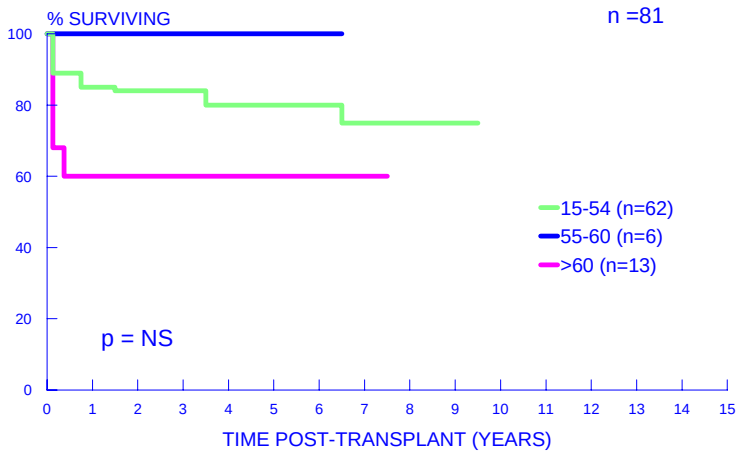
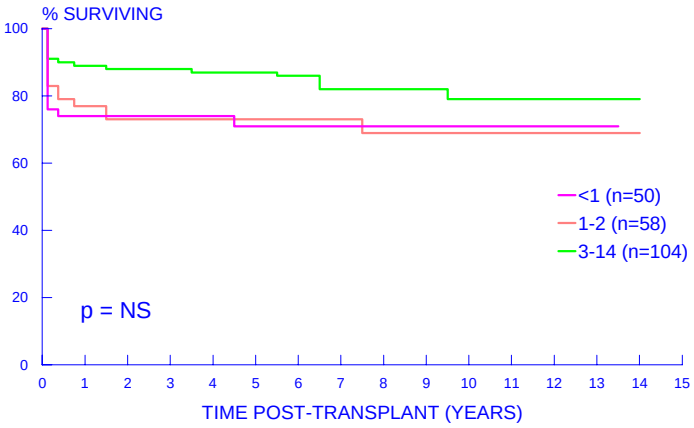
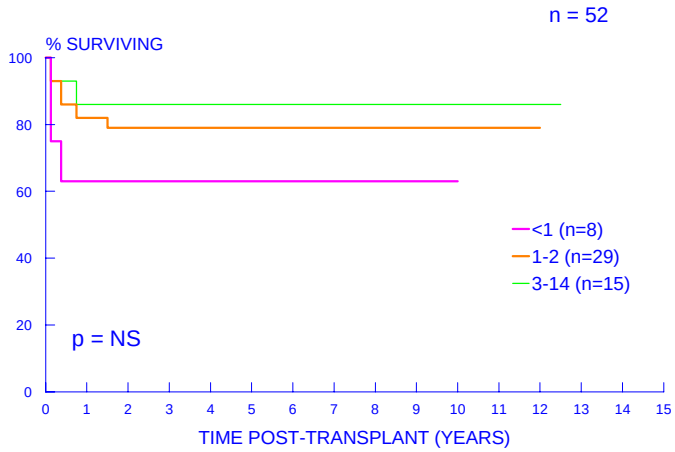


PATIENT SURVIVAL BY AGE AT TRANSPLANT

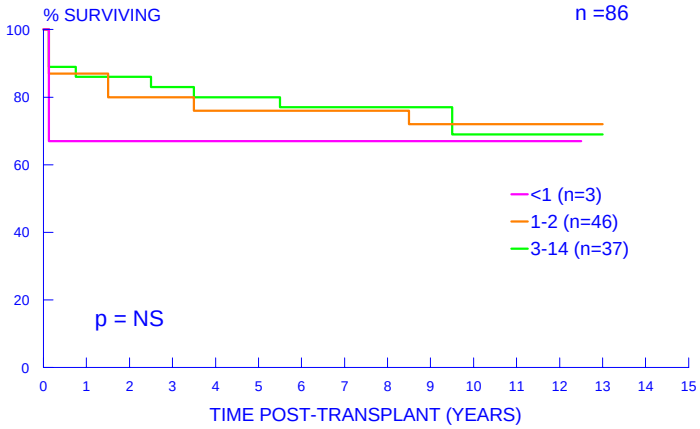
AUSTRALIAN CITIZENS - CHILDREN n = 212



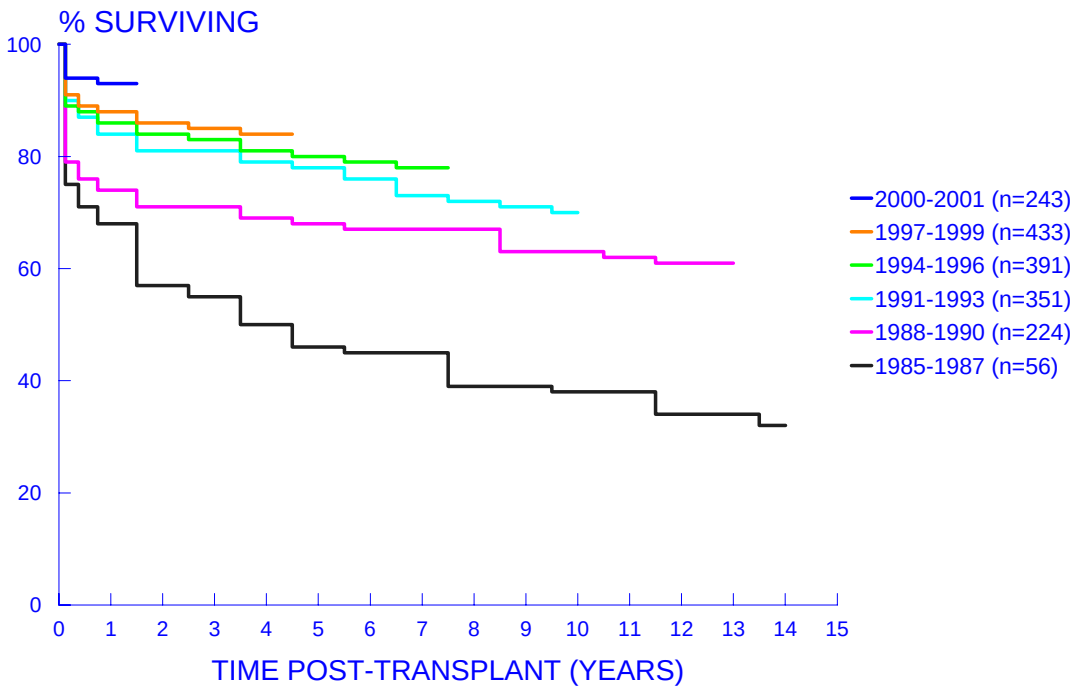
NZ CITIZENS - CHILDREN



OTHER CITIZENS - CHILDREN

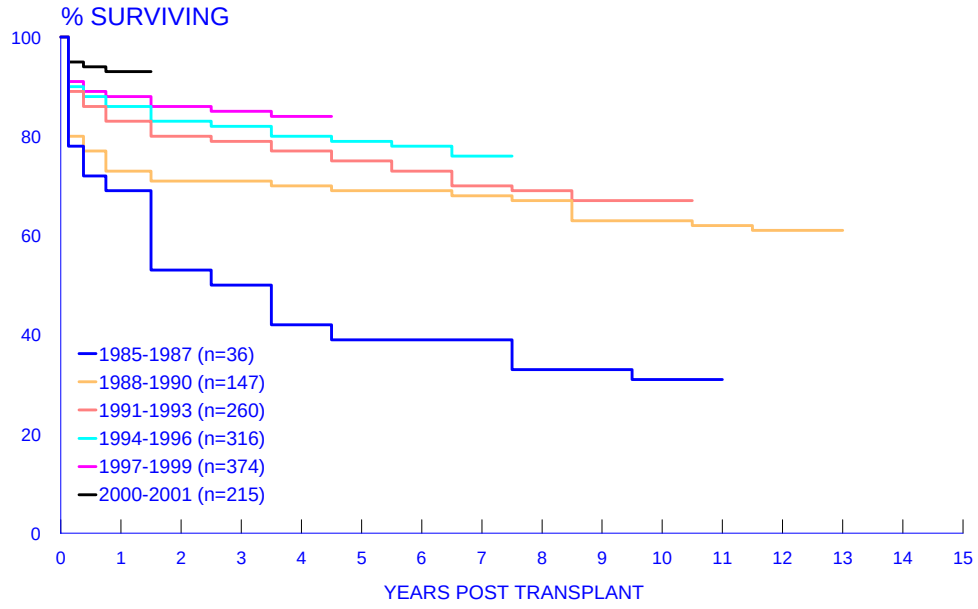


PATIENT SURVIVAL - BY YEAR OF Tx



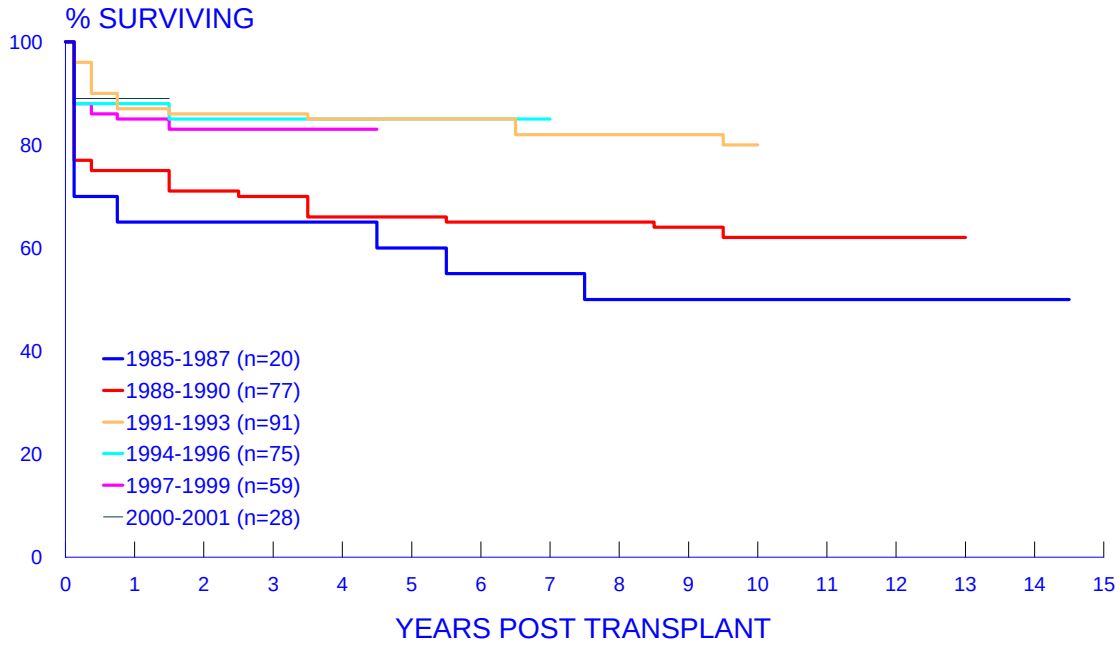
ADULTS

n = 1348



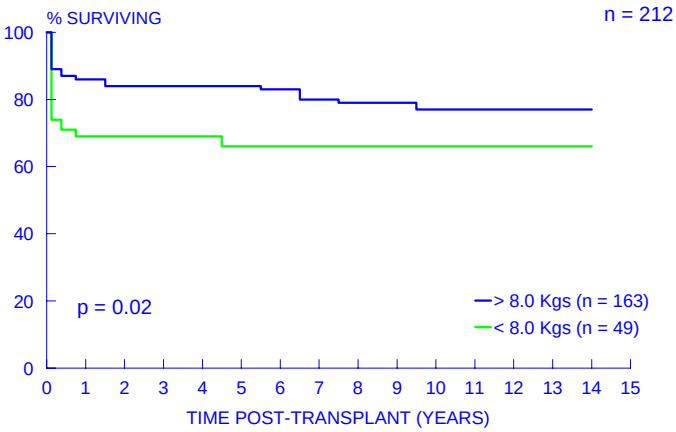
CHILDREN

n = 350

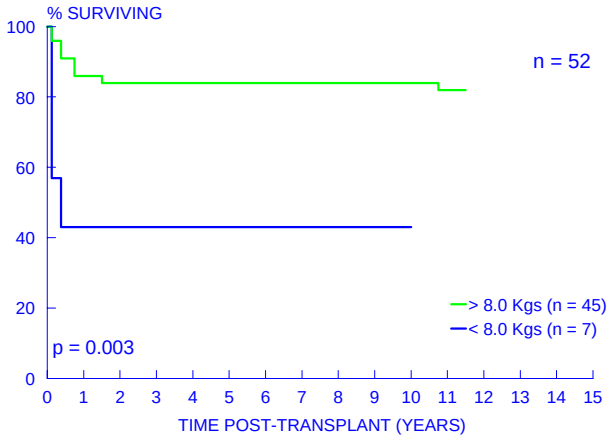


PATIENT SURVIVAL

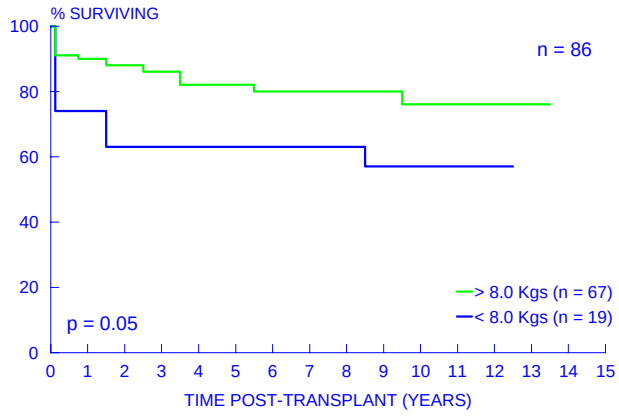
CHILDREN > 8.0 KG AND < 8.0 KG
AUSTRALIAN CITIZENS



NZ CITIZENS

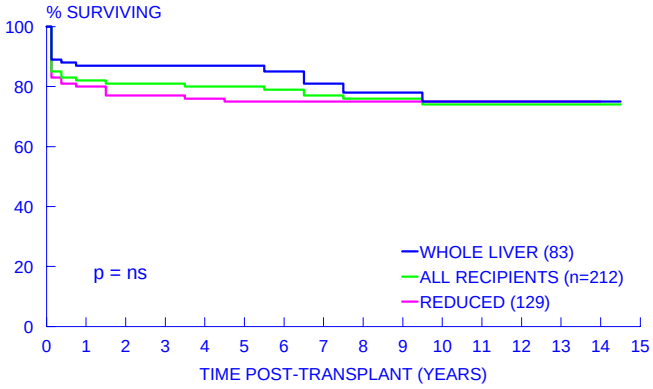


OTHER CITIZENS

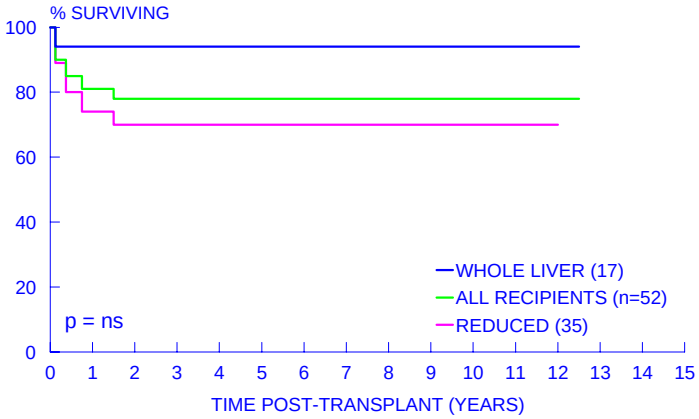


PAEDIATRIC PATIENT SURVIVAL

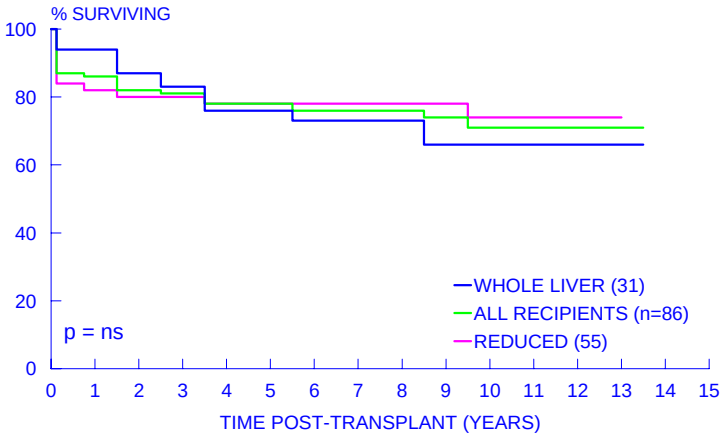
WHOLE LIVER V REDUCED LIVER AUSTRALIAN CITIZENS



NZ CITIZENS

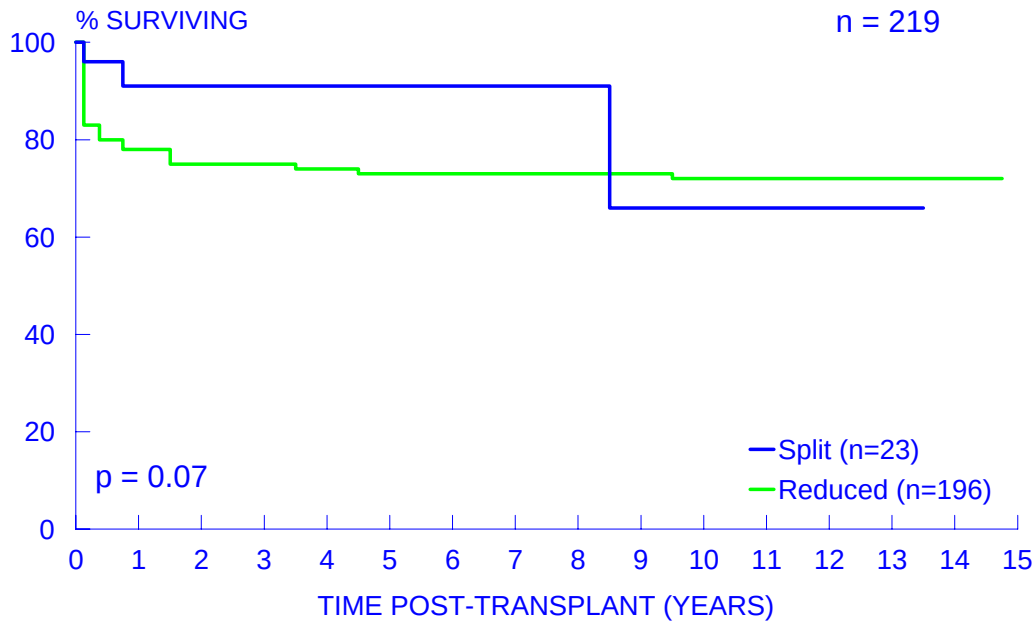


OTHER CITIZENS



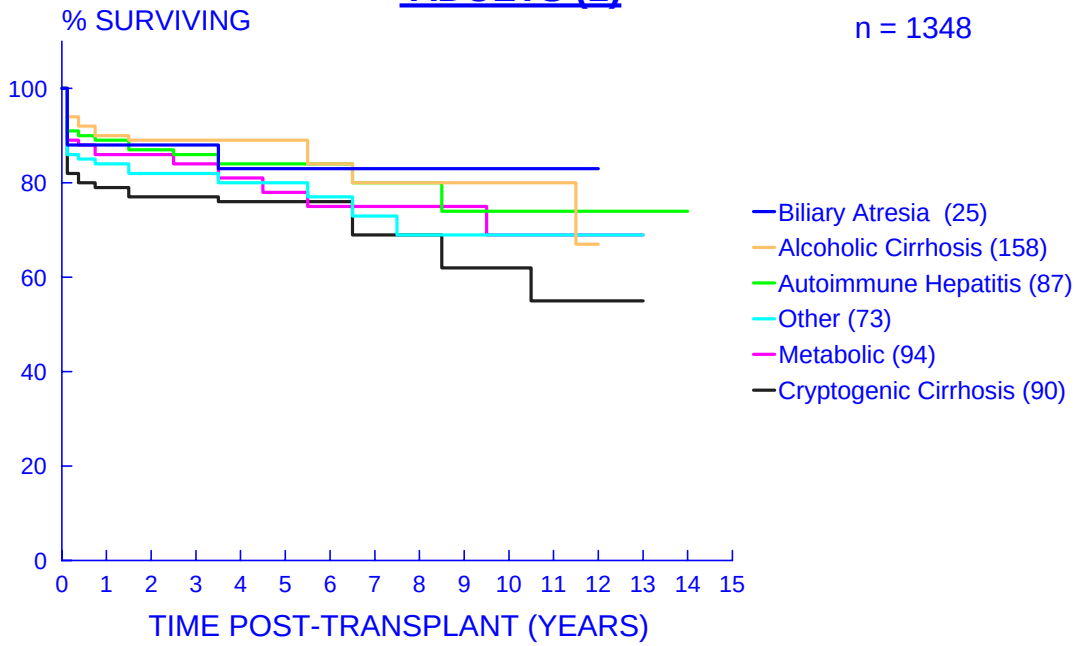
PATIENT SURVIVAL - CHILDREN

SPLIT vs REDUCED

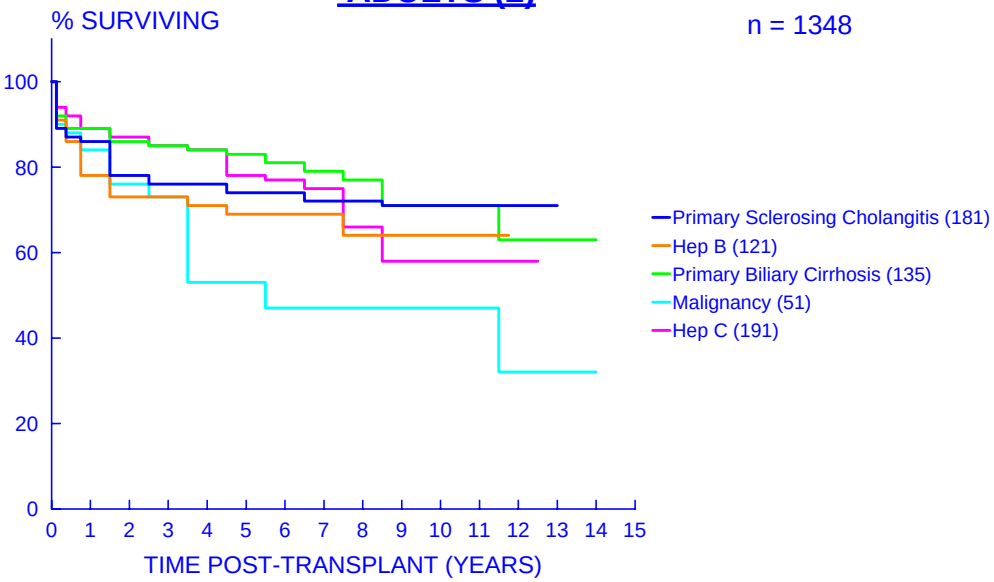


ALL PATIENTS

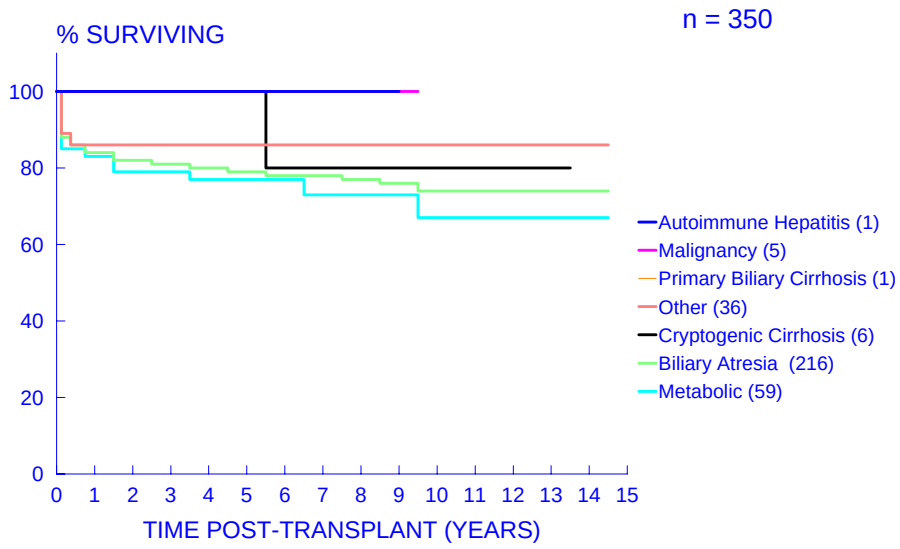
PRIMARY CONDITION AND OUTCOME (1)
ADULTS (1)



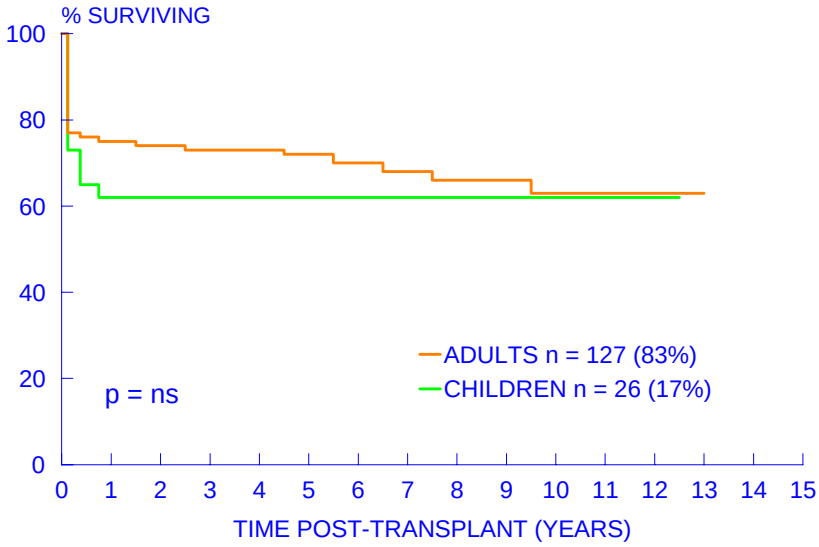
PRIMARY CONDITION AND OUTCOME (2)
ADULTS (2)



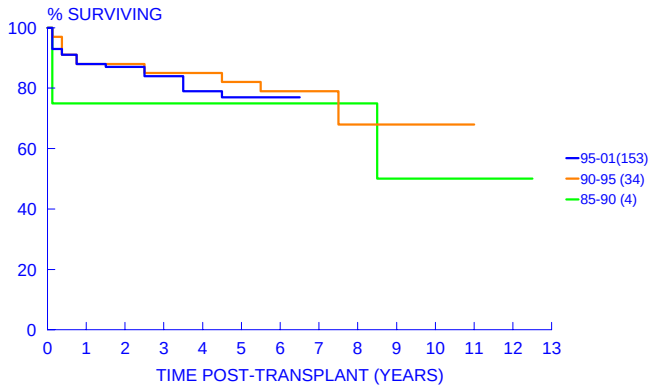
PRIMARY CONDITION AND OUTCOME (3)
CHILDREN (1)



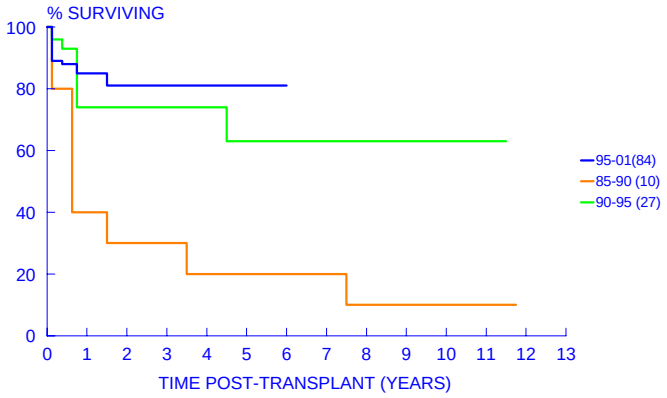
PRIMARY CONDITION AND OUTCOME (4)
FULMINANT DISEASE
ADULTS vs CHILDREN



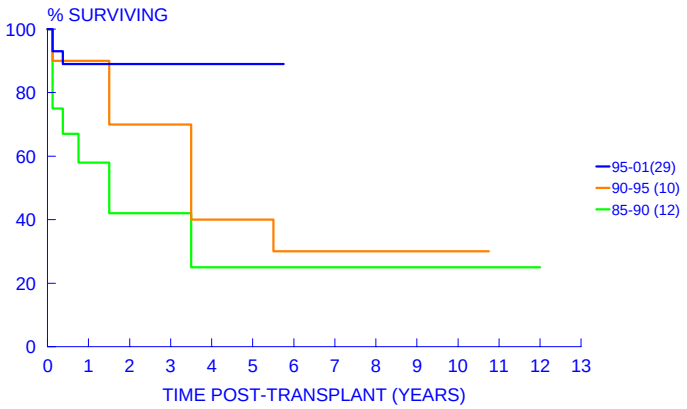
HEP C - ADULTS



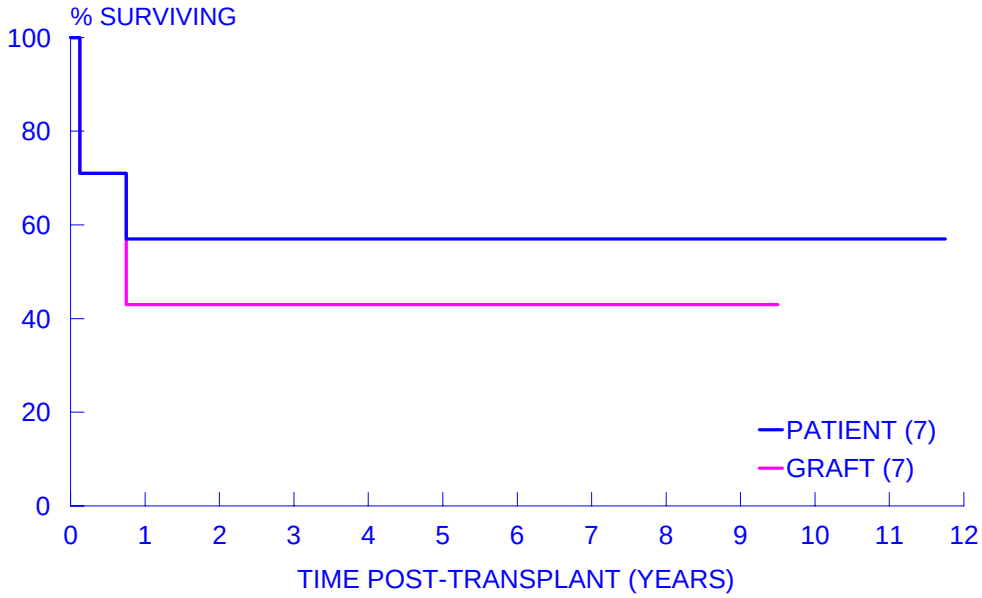
HEP B - ADULTS



MALIGNANCY - ADULTS

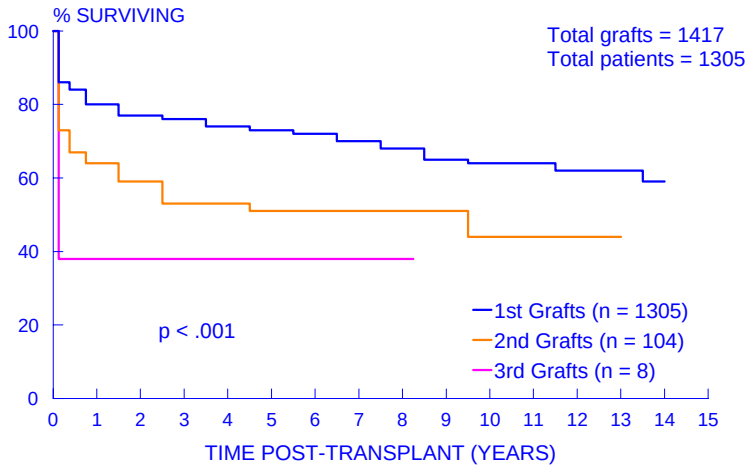


PATIENT AND GRAFT SURVIVAL
LDT

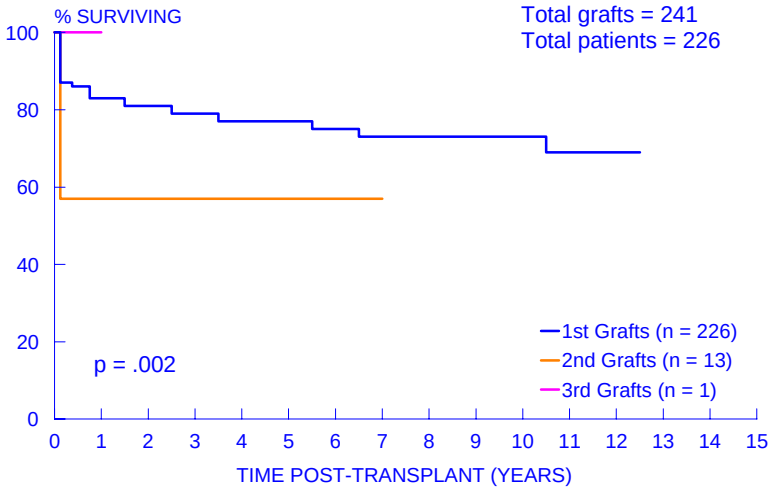


GRAFT SURVIVAL - PRIMARY AND SECONDARY

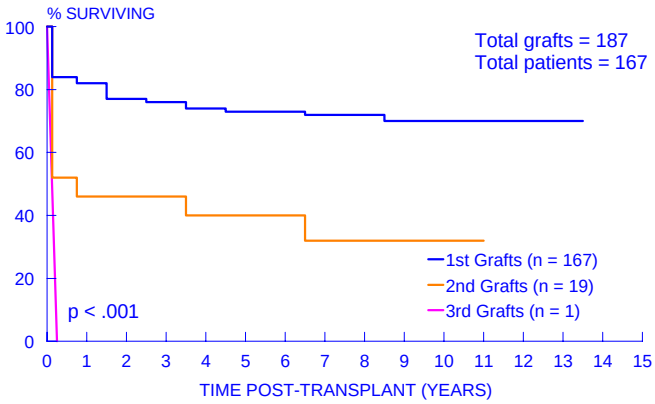
AUSTRALIAN CITIZENS



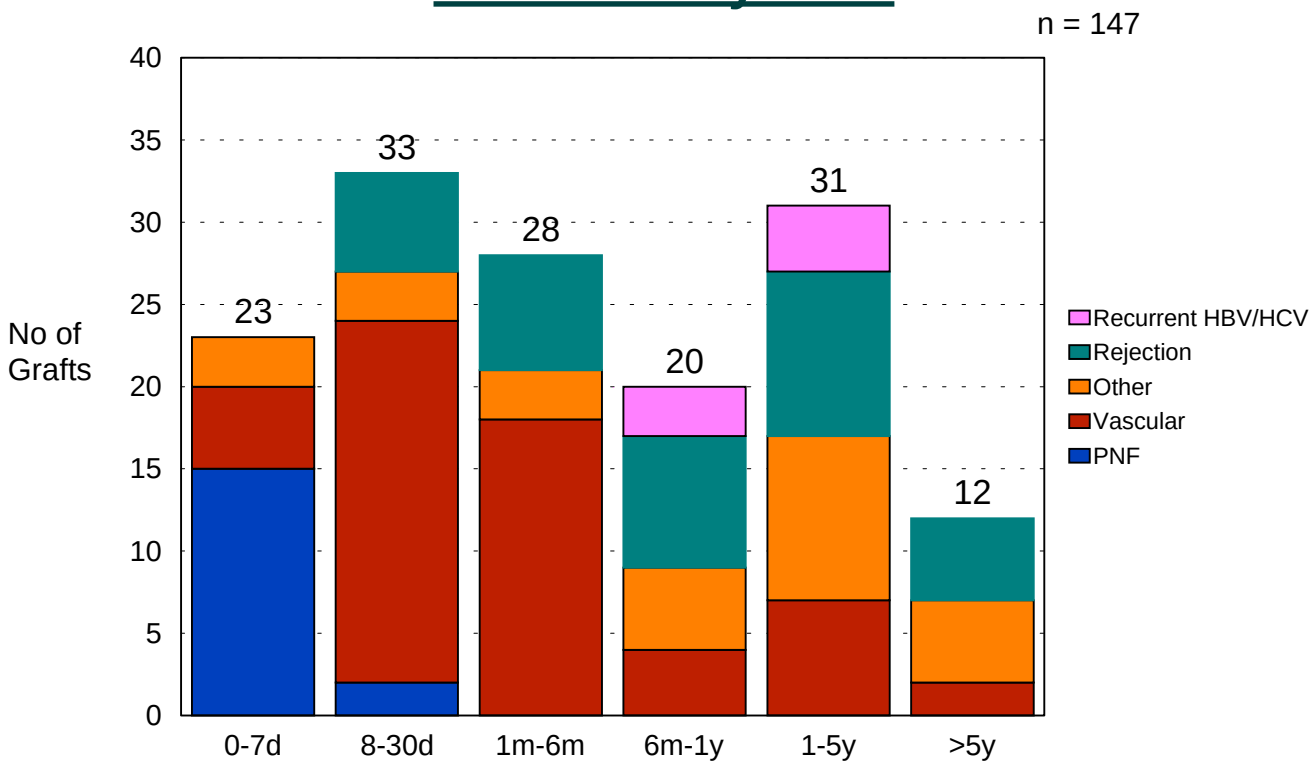
NZ CITIZENS



OTHER CITIZENS



SECONDARY TRANSPLANTATION
Indication by Time



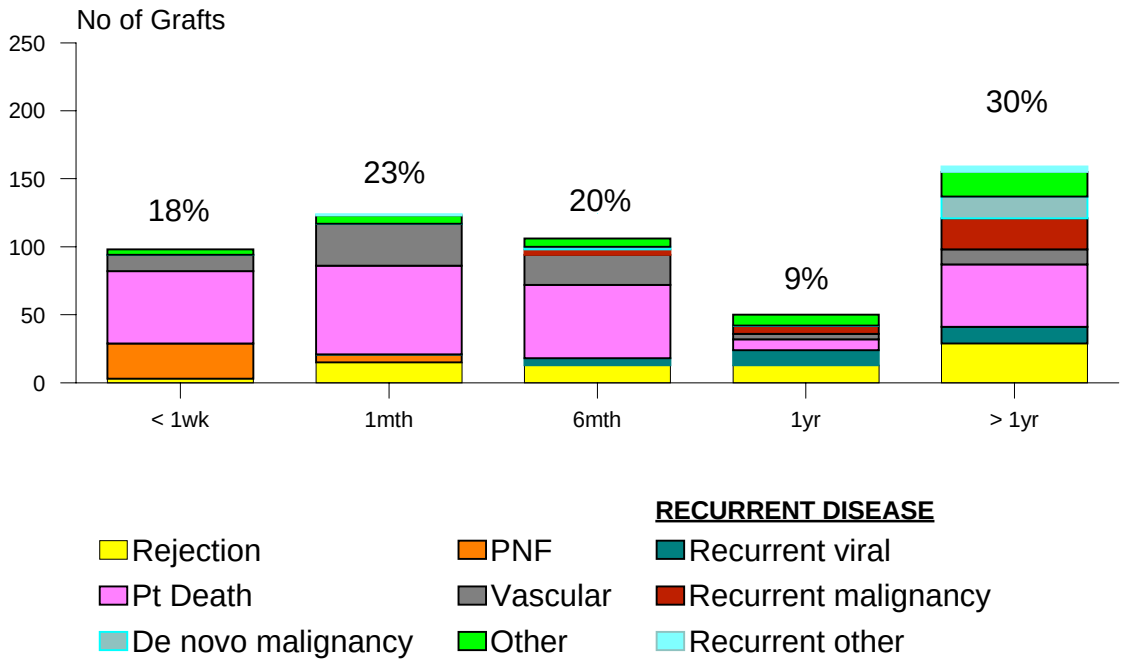
Section 4

Cause of Graft Failure

CAUSE OF GRAFT FAILURE

ALL GRAFTS

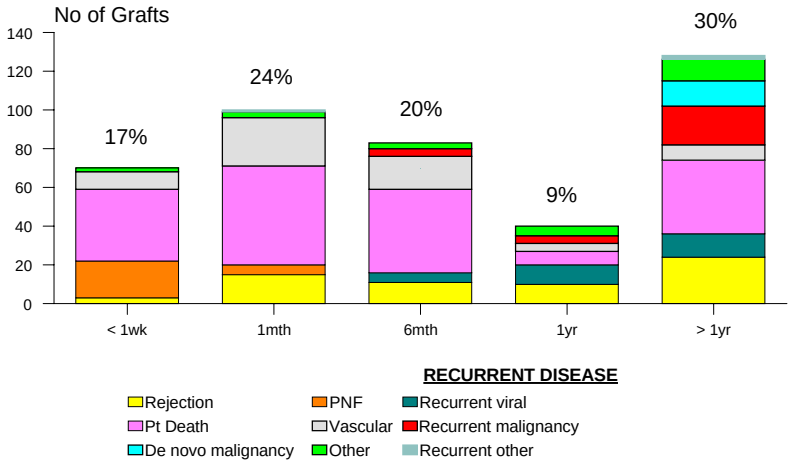
n = 537 (29%)



CAUSE OF GRAFT FAILURE

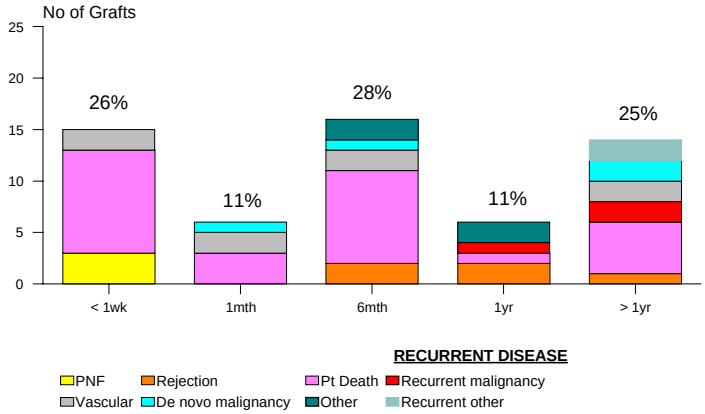
AUSTRALIAN CITIZENS

n = 422 (30%)



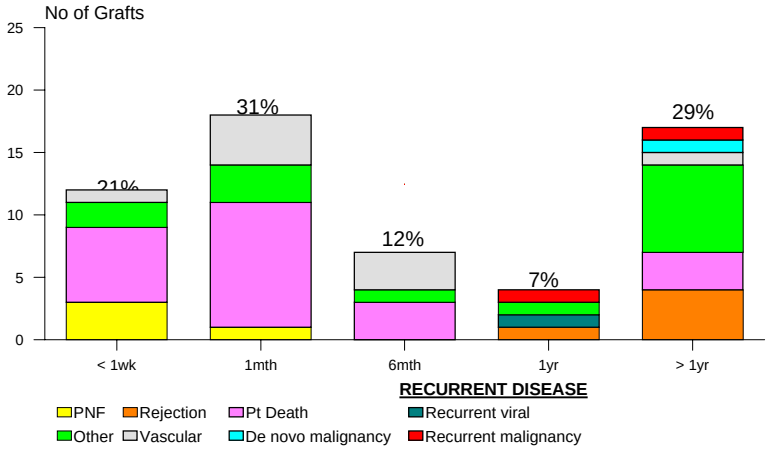
NZ CITIZENS

n = 57 (24%)



OTHER CITIZENS

n = 58 (31%)



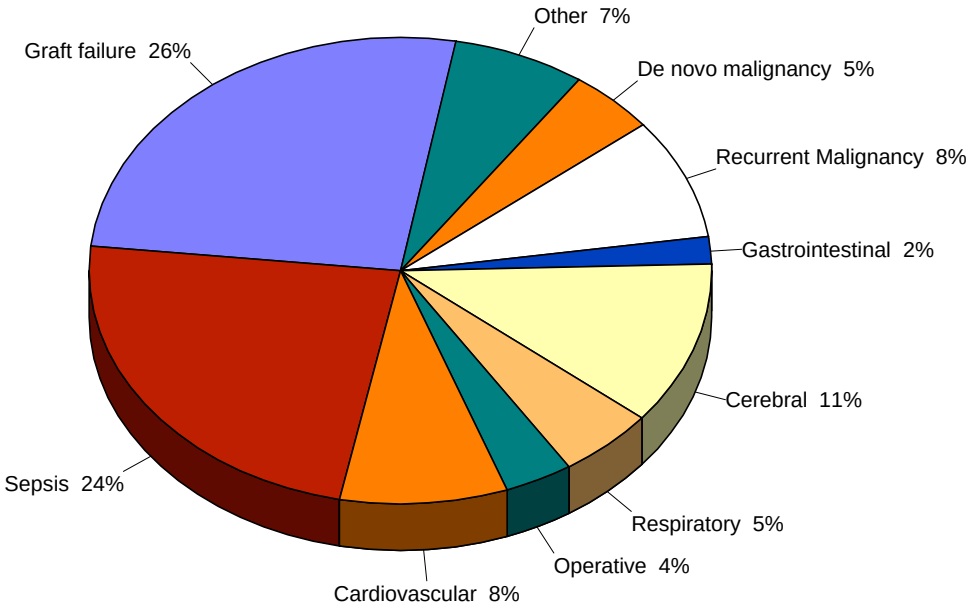
Section 5

Cause of Death

CAUSE OF DEATH

ALL PATIENTS

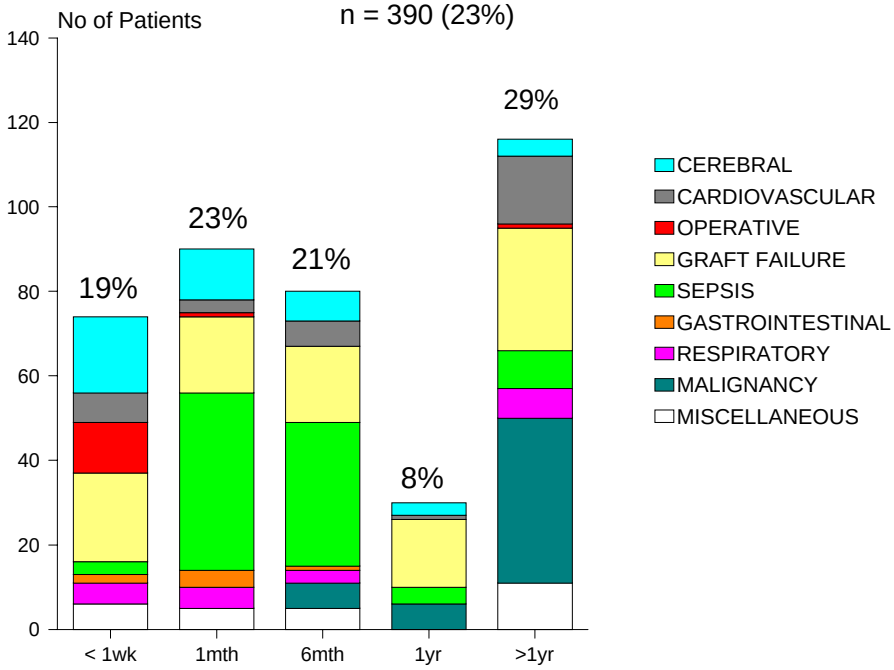
n = 390 (23%)



CAUSE OF DEATH

ALL PATIENTS

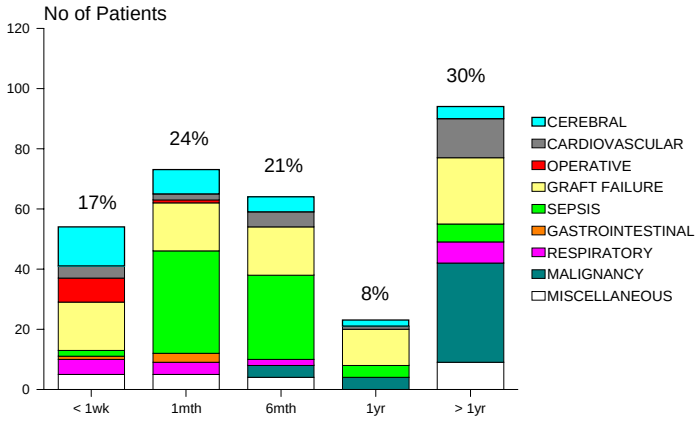
n = 390 (23%)



CAUSE OF DEATH

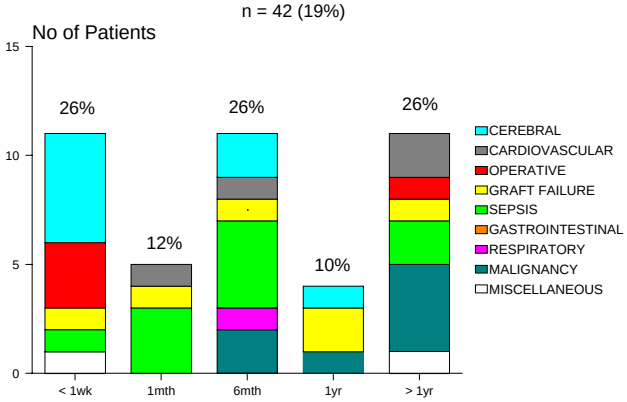
AUSTRALIAN CITIZENS

n = 308 (24%)



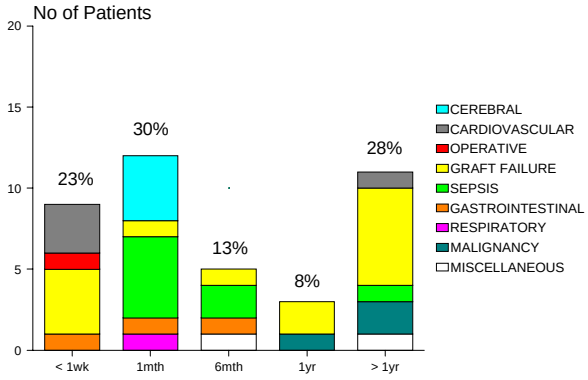
NZ CITIZENS

n = 42 (19%)



OTHER CITIZENS

n = 40 (24%)

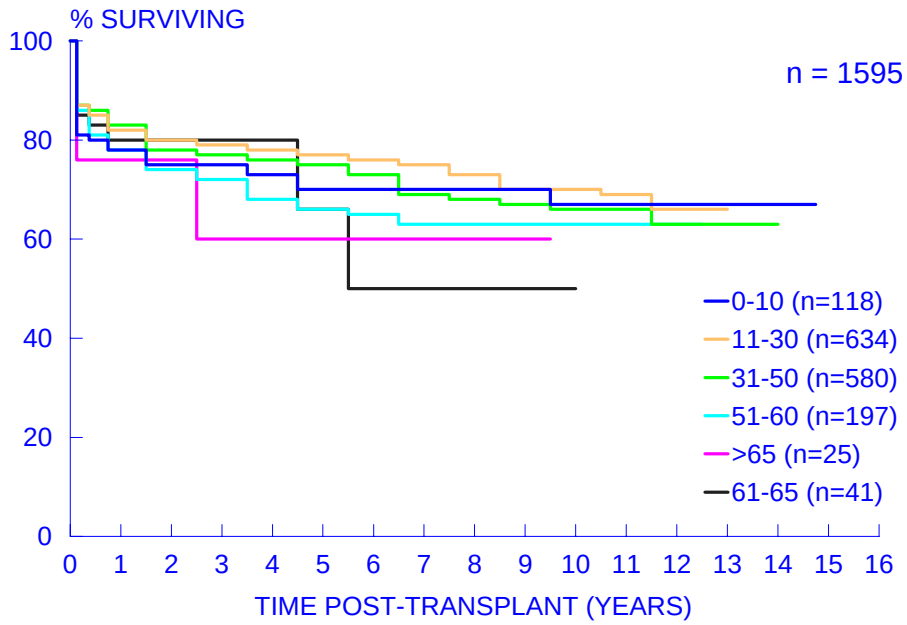


Section 6

Donor Information

PRIMARY GRAFT SURVIVAL

DONOR AGE vs SURVIVAL



DONATION BY YEAR

	QLD	NSW	VIC/ TAS	SA/ NT	WA	NZ	TOTAL
1990	22	27	16	5	-	7	77
1991	28	35	20	6	8	11	108
1992	43	31	18	9	8	24	133
1993	27	39	25	13	6	16	126
1994	31	39	23	12	10	21	136
1995	32	42	24	17	8	21	144
1996	33	38	19	17	10	24	141
1997	36	49	19	19	8	22	153
1998	14	18	9	10	5	13	69
1999	21	31	31	29	11	30	153
2000	28	56	31	23	12	34	184
2001 (June)	20	21	15	9	7	13	85

Section 7

Liver Transplantation and Cancer

TYPES OF CA IN LIVER Tx RECIPIENTS

AT Tx n = 1698

PRIMARY LIVER CA	56	(3%)
INCIDENTAL CA	110	(6%)

POST Tx

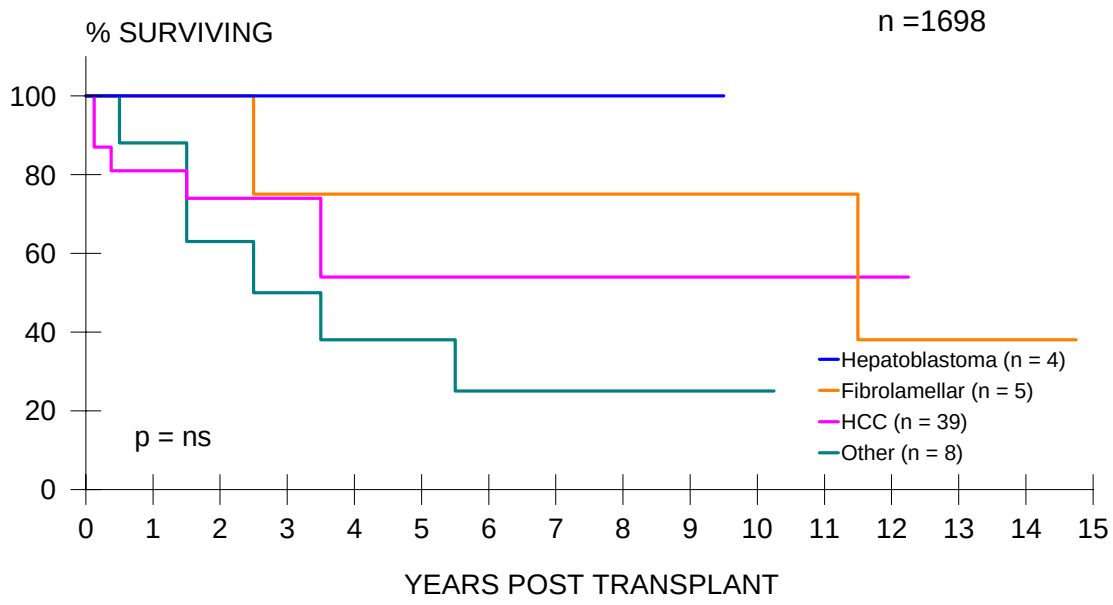
RECURRENT CA	38	(2% of all pts, 25% of pts with Ca at Tx)
DE NOVO CA	56	(3%) 59 (Ca)

PRIMARY LIVER MALIGNANCY

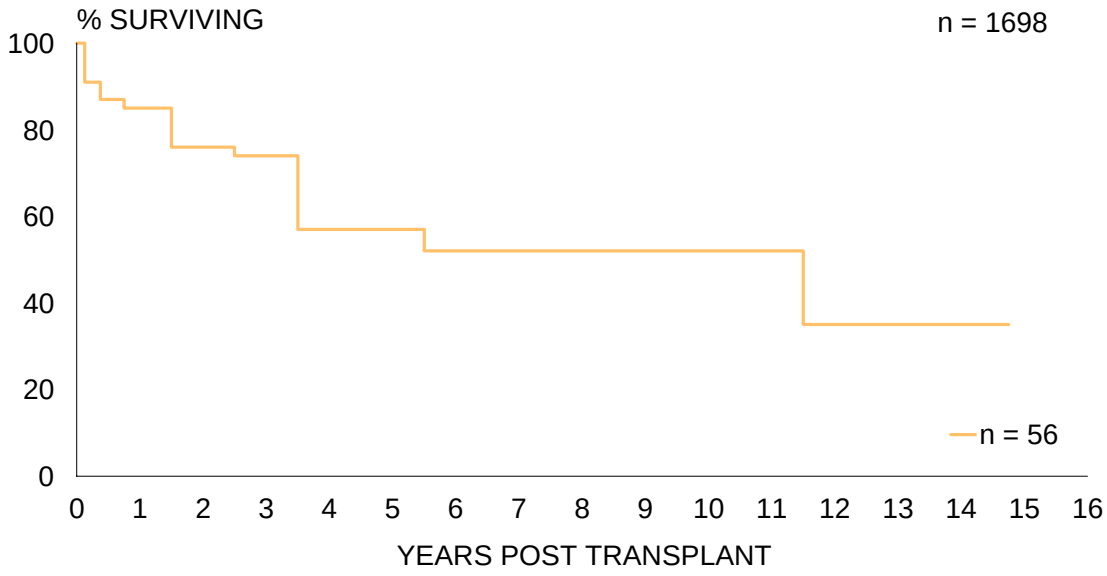
n =1698
n = 56 (3%) with cancer

TYPE OF CA	No	DIED	DIED OF CA
HEPATOCELLULAR CA	39	12	8 (21%)
LAMELLAR VARIANT	5	2	1 (25%)
CARCINOID	4	3	2 (50%)
ENDOCRINE	2	2	2 (100%)
HEPATOBLASTOMA	4	0	0
ANGIOSARCOMA	1	1	1 (100%)
EPITHELOID HAEMANGIOMA	1	0	0
TOTALS	56 (3% of pts)	20 (36% of those with PCa)	14 (25% of those with PCa)

PRIMARY LIVER CA



PRIMARY LIVER CA
ALL PATIENTS



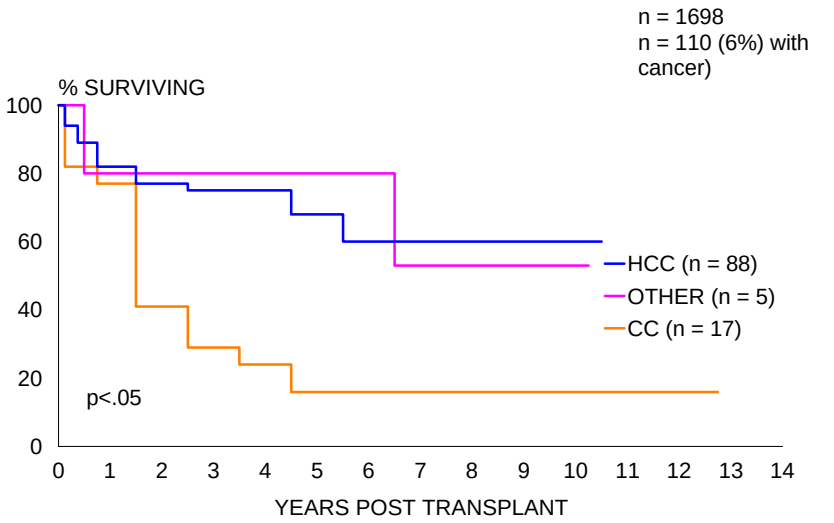
INCIDENTAL CA

n = 1698

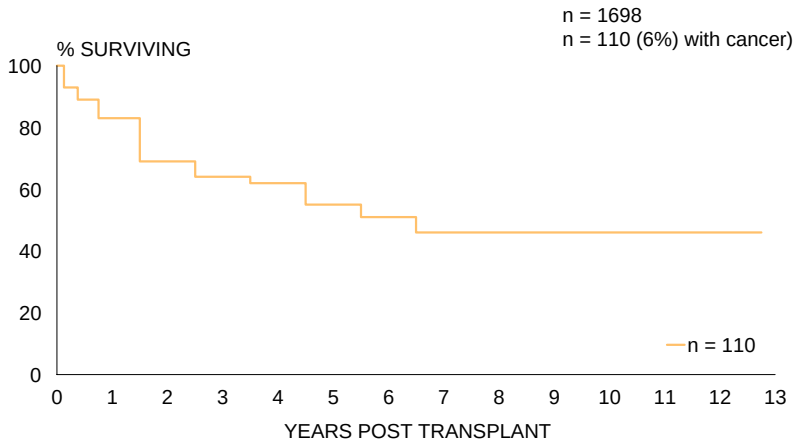
	NO	DIED	DIED OF CA
HEPATOCELLULAR CA*	88	20	8 (9%)
CHOLANGIO CA	17	14	11 (65%)
ANGIOSARCOMA	1	1	1 (100%)
ADENOCARCINOMA	2	1	0
HEPATOBLASTOMA*	2	1	0
FIBROLAMELLAR	1	0	0
TOTALS	111* in 110 (6% of pts)	37 (34%)	20 (18%)

* 1 patient had 2 different incidental Ca

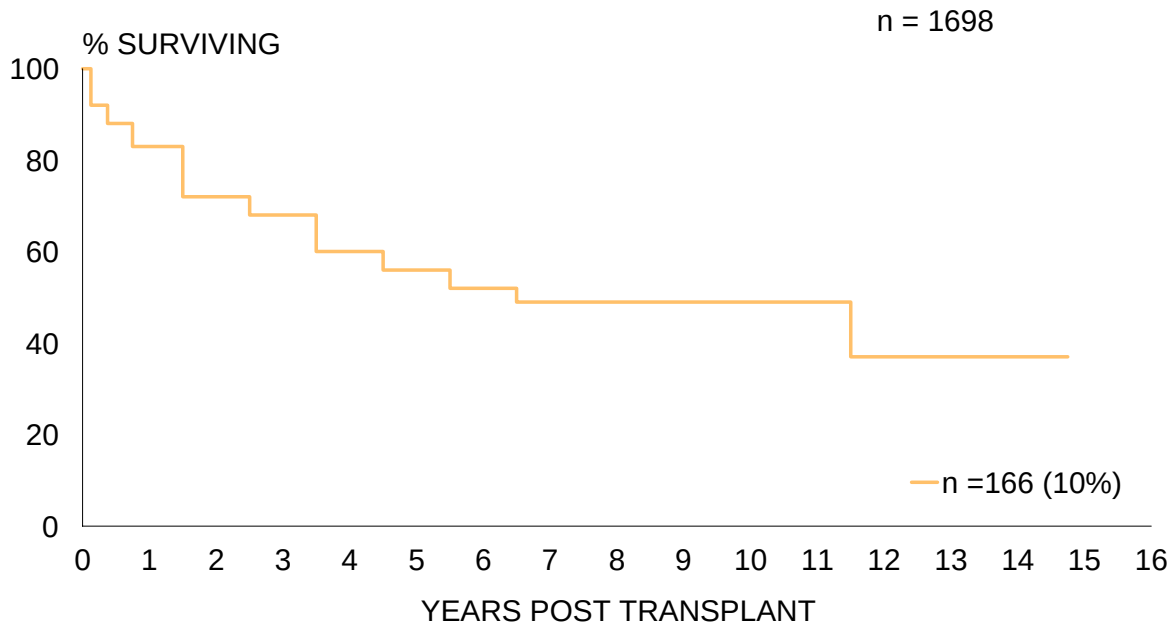
INCIDENTAL CA



INCIDENTAL LIVER CA ALL PATIENTS



PRE-TX LIVER CA (PRIMARY AND INCIDENTAL)



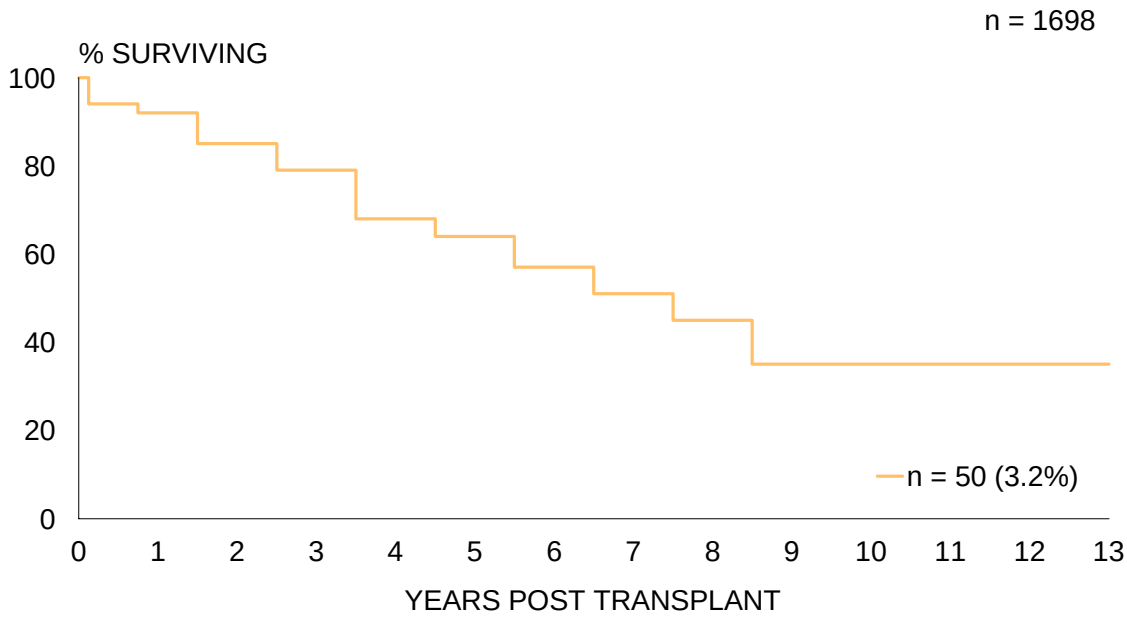
DE NOVO NON SKIN CA POST Tx

n = 1698

	NO	DIED	DIED THIS CA
NON HODGKINS LYMPHOMA	20 (37%)	14	10
KAPOSI SARCOMA	4	2	0
DIGESTIVE ORGANS	12	3	1
GLOTTIS	1	0	0
STOMACH	2	1	0
COLON	8	2	1
APPENDIX	1	0	0
GENITO-URINARY	6	4	1
BLADDER	2	2	1
TESTIS	1	1	0
KIDNEY	2	1	0
PROSTATE	1	0	0
RESPIRATORY	2	1	1
LEUKAEMIA	1	1	0
BREAST	2	0	0
ENDOCRINE	5	2	2
CERVIX	3	0	0
CEREBRAL	1	1	1
TOTALS	56 in 54 (3%) pts	28 (52% of pts with Ca))	16 (30% of pts with Ca)

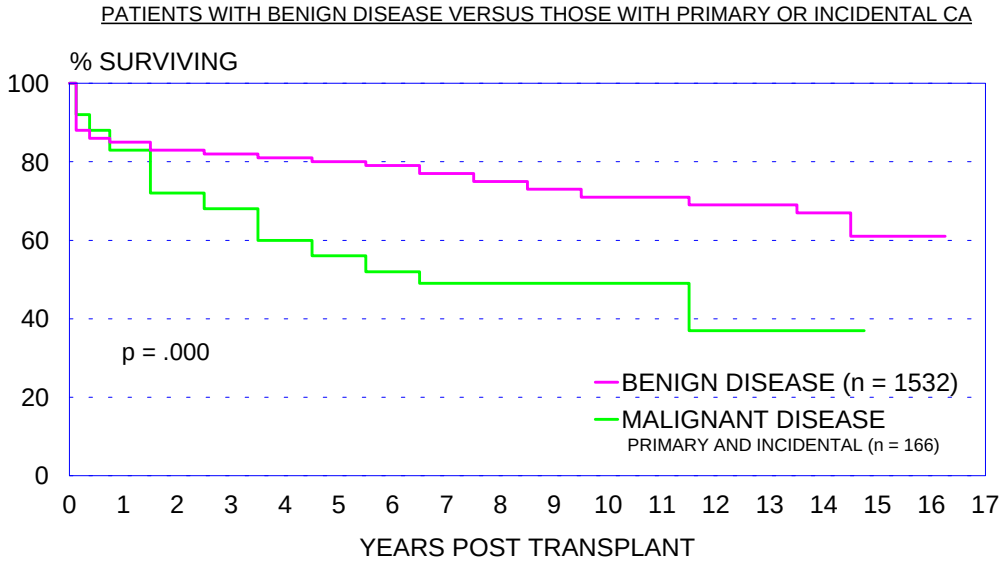
Seven patients also had incidental malignancy; two patients had two de novo malignancies

DE NOVO NON SKIN CA POST TX



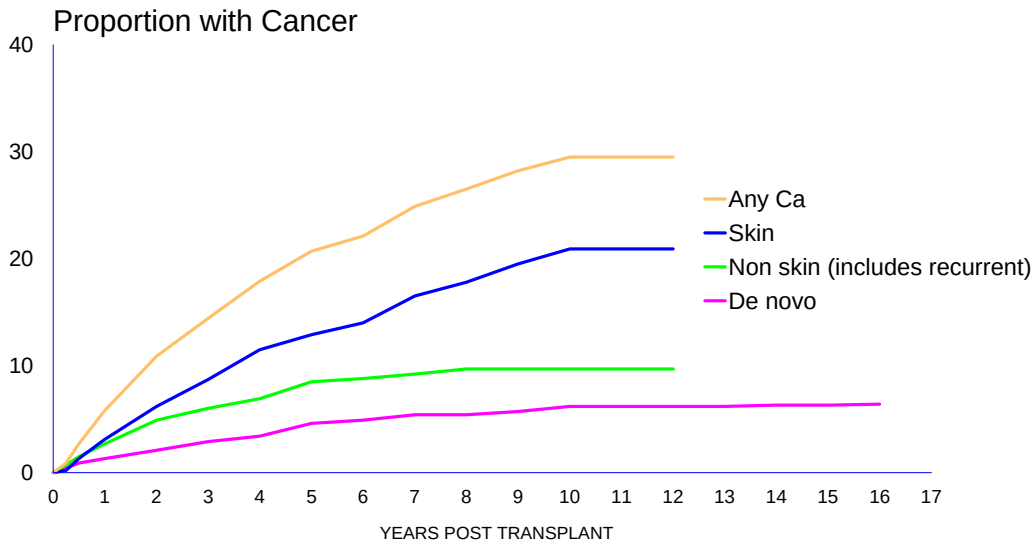
PATIENT SURVIVAL

n = 1698



CANCER DEVELOPMENT FOLLOWING LIVER Tx. AUSTRALIA.

n = 1698



Appendix

Appendix

Liver Transplantation Units of Australia and New Zealand

Australian National Liver Transplant Unit
Royal Prince Alfred Hospital
Missenden Road
CAMPERDOWN NSW 2050
Email: anltu@email.cs.nsw.gov.au
http://www.cs.nsw.gov.au/Gastro/LiverTransplant/default.htm

and

The New Children's Hospital
Hawkesbury Road
WESTMEAD NSW 2145

Liver Transplant Unit Victoria
The Austin Hospital
Sudley Road
HEIDELBERG VIC 3084

and

Royal Children's Hospital
Flemington Road
PARKVILLE VIC 3052

Queensland Liver Transplant Service
Princess Alexandra Hospital
Ipswich Road
WOOLLOONGABBA QLD 4102

and

Royal Children's Hospital
Bowens Bridge Road
HERSTON QLD 4029

South Australian Liver Transplant Unit
Flinders Medical Centre
Flinders Drive
BEDFORD PARK SA 5042
http://www.flinders.sa.gov.au/flinders_centre_for_digestive_health/default.asp?NAVGRP=2135

WA Liver Transplantation Service
Sir Charles Gairdner Hospital
Verdun Street
NEDLANDS WA 6009

New Zealand Liver Transplant Unit
Auckland Public Hospital
Park Road
Auckland
New Zealand
http://www.nzliver.org