

CHAPTER 4

LIVER TRANSPLANTATION

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4.1 STOCK AND FLOW

The number of liver transplants performed from 1993 to 2008 is one hundred. Eighty six (86%) were performed locally and fourteen (14%) were performed at overseas centres. Five new liver transplants were done in 2008 and they were all done locally at Selayang Hospital.

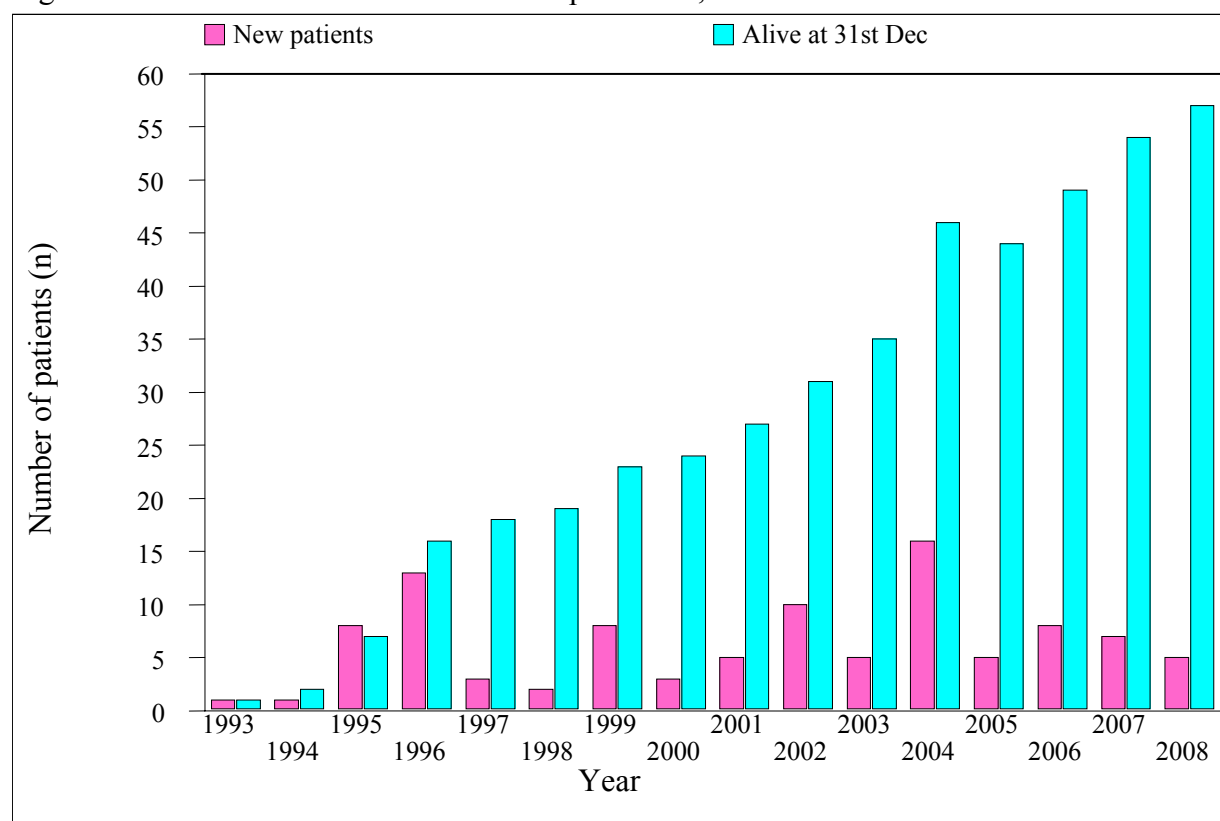
Table 4.1.1 Stock and Flow of Liver Transplantation, 1993-2008

Year	93	94	95	96	97*	98	99	00	01	02	03**	04	05	06	07	08
New transplant patients	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7	5
Deaths	0	0	3	4	1	1	4	1	2	5	1	5	6	3	2	2
Re-Transplant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lost to follow up	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0
Functioning graft at 31st December	1	2	7	16	18	19	23	24	27	31	35	46	44	49	54	57

*1 patient who was alive until 05/12/1997 is recorded dead with missing date of death

** 1 patient transplanted in 2003 is recorded as dead with missing date of death

Figure 4.1.1 Stock and Flow of Liver Transplantation, 1993-2008



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Table 4.1.2 Distribution of Patients by Place of Transplant, 1993-2008

Place of Transplant	Year (No.)																TOTAL
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	
Local	0	0	8	10	1	1	8	3	5	9	2	14	5	8	7	5	86
Overseas	1	1	0	3	2	1	0	0	0	1	3	2	0	0	0	0	14
TOTAL	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7	5	100

Table 4.1.3 Distribution of Patients by Centres for Liver Transplantation, 1993-2008

Transplant Centre	Year (No.)																TOTAL
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	
Sime Darby Medical Centre, Subang Jaya	0	0	8	10	1	1	8	3	5	6	2	7	0	0	0	0	51
Hospital Selayang	0	0	0	0	0	0	0	0	0	3	0	7	5	8	7	5	35
University of Malaya Medical Centre	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Royal Children's Hospital, Brisbane	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
National University Hospital, Singapore	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Queensland Liver Transplant Service, Australia	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Kings College Hospital, UK	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Tianjin, China	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
Asian Centre for Liver Disease & Transplantation, Singapore	0	0	0	0	0	0	0	0	0	1	2	1	-	-	-	-	4
TOTAL	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7	5	100

4.2 RECIPIENTS' CHARACTERISTICS

Fifty four (54%) were males and 46 (46%) were females. The ethnic distribution of the liver transplant recipients are as follows: Chinese 51 (51%), Malays 39 (39%), Indians 8 (8%), Others 2 (2%).

Eighty (80%) of the transplant recipients were between 1 and 9 years of age at the time of transplantation. Biliary atresia was the primary liver disease in 72 (72%) of the recipients. The commonest indication for liver transplantation was failure to thrive with growth retardation and poor liver function. The commonest blood group amongst the liver transplant recipients was group O (38%).

Table 4.2.1 Distribution of Patients by Gender, 1993-2008

Gender	Year (No.)																
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	TOTAL
Male	0	0	6	5	2	1	3	1	2	7	5	10	2	6	3	1	54
Female	1	1	2	8	1	1	5	2	3	3	0	6	3	2	4	4	46
TOTAL	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7	5	100

Figure 4.2.1 Distribution of Patients by Gender, 1993-2008

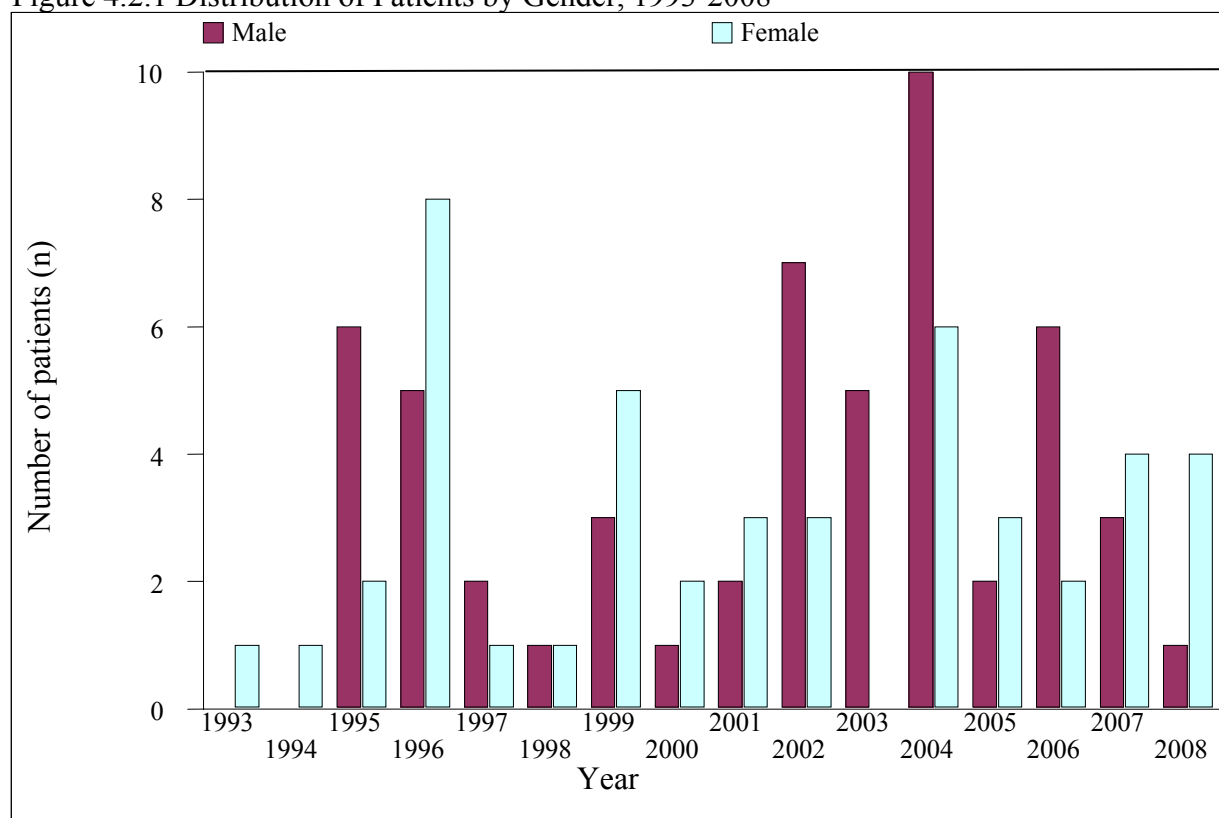


Table 4.2.2 Distribution of Patients by Ethnic Group, 1993-2008

Ethnic group	Year (No.)																
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	TOTAL
Malay	0	1	2	3	1	0	4	1	2	3	1	11	3	3	2	2	39
Chinese	1	0	6	8	2	1	2	2	3	6	4	5	1	3	4	3	51
Indian	0	0	0	2	0	1	1	0	0	0	0	1	2	1	0	8	
Others	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	
TOTAL	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7	5	100

Figure 4.2.2 Distribution of Patients by Ethnic Group, 1993-2008

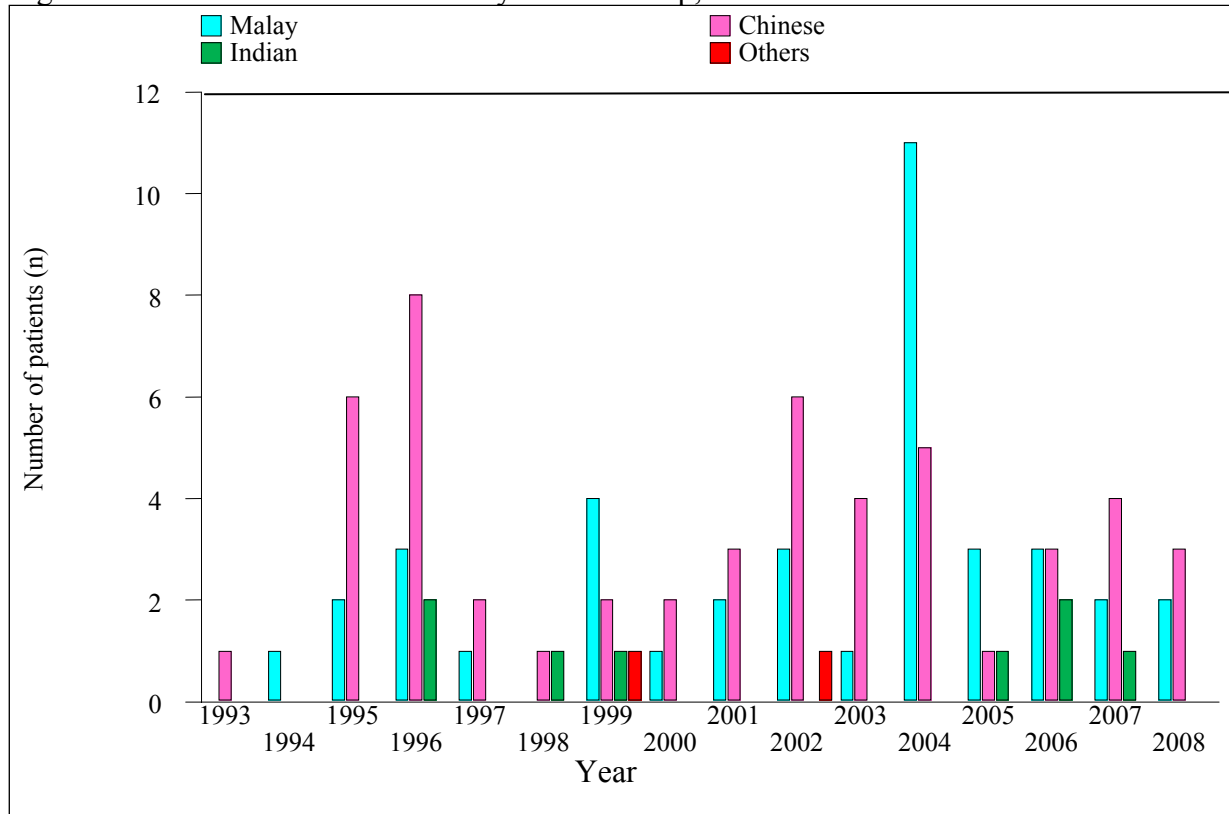


Table 4.2.3 Distribution of Patients by Age, 1993-2008

Age Group*	Year (No.)																
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	TOTAL
<1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1-4	1	1	3	11	3	1	5	3	4	5	2	9	2	4	3	1	58
5-9	0	0	3	1	0	0	2	0	1	3	1	3	3	1	2	1	21
10-14	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1	0	5
15-19	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2
20-39	0	0	1	0	0	0	0	0	0	1	0	0	0	2	1	3	8
40-59	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	3
≥60	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
TOTAL	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7	5	100
Mean	2	4	9	4	2	1	4	1	2	10	27	12	4	12	10	17	9
SD	-	-	9	4	1	1	5	0	2	14	33	22	3	15	13	10	14
Median	2	4	5	2	2	1	2	1	2	4	9	3	5	4	5	23	3
Minimum	2	4	2	2	1	3 months	1	1	1	4 months	1	1	1	2	2	2	3 months
Maximum	2	4	30	14	2	1	15	2	5	46	73	74	8	39	37	26	74

* Age=date if transplant – date of birth

Table 4.2.4 Primary Diagnosis, 1993-2008 (N=100)

Primary diagnosis	Year (No.)												TOTAL				
	93	94	95	96	97	98	99	00	01	02	03	04		05	06	07	08
Biliary atresia	1	1	7	12	3	1	7	2	5	6	2	10	4	2	6	3	72
Metabolic liver disease	0	0	1	1	0	0	0	0	0	2	0	2	0	0	0	0	6
Cholestatic liver disease	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	3
Primary biliary cirrhosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Primary sclerosing cholangitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Autoimmune hepatitis	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Chronic hepatitis B	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	5
Chronic hepatitis C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alcoholic liver disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malignancies	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	4
Acute liver failure	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	4
Idiopathic/ Cryptogenic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	2	0	1	1	4	1	3	12
TOTAL	1	1	8	13	3	2	8	3	5	11	7	17	6	9	7	6	107

** 7 patients have more than one primary disease

Table 4.2.5 Indication for Transplantation, 1993-2008 (N=100)

Indication for transplantation	Year (No.)																	TOTAL
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08		
Recurrent encephalopathy	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	3	
Uncontrolled bleeding varices	0	0	0	7	1	0	4	1	1	0	0	2	0	0	0	0	16	
Intractable ascites	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Spontaneous bacterial peritonitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Poor liver function	1	1	7	11	3	1	8	3	5	9	3	11	4	1	4	0	72	
Malignancy	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
Unacceptable quality of life	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2	
Failure to thrive and growth retardation in paediatric patients	0	0	6	10	3	2	6	3	5	7	2	10	3	1	0	0	58	
Others	0	0	0	0	0	0	0	0	0	0	0	1	2	8	3	5	19	
No data	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	4	
TOTAL	1	1	14	28	7	3	19	7	11	19	7	26	10	10	7	5	175	

** 33 patients had 1 indication for transplant, 63 had more than 1 indication for transplantation

Table 4.2.6 Recipients' Blood Group, 1993-2008

Blood group	Year (No.)																
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	TOTAL
A	0	1	2	0	0	0	3	0	1	3	1	4	1	4	2	1	23
B	0	0	1	2	0	1	2	0	1	1	0	1	1	3	3	1	17
AB	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	4
O	0	0	2	5	1	0	3	3	3	5	1	8	2	1	2	2	38
No Data	1	0	3	5	2	0	0	0	0	1	3	2	0	0	0	1	18
TOTAL	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7	5	100

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4.3 TRANSPLANT PRACTICES

Seventy five (75%) of liver transplants were living donors while twenty five (25%) were from cadaveric donors. 62% of living donors were first degree relatives with mother to child being the most common. The immunosuppressive medications most commonly used are tacrolimus and steroids.

Table 4.3.1 Distribution of Patients by Type of Donors, 1993-2008

Type of donor	Year (No.)																
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	TOTAL
Cadaveric	1	0	0	3	1	0	0	0	0	1	1	4	2	4	4	4	25
Living Related - Mother	0	1	5	2	1	2	5	2	2	2	2	7	1	1	0	0	33
Living Related - Father	0	0	2	7	1	0	2	0	2	3	0	1	1	3	3	1	26
Living Related - Daughter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Living Related - Son	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
Living Related - Brother	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Living Related - Sister	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Living Related - Monozygotic twin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Living Related - Dizygotic twin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Living Related - Others	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Living Related - Emotionally	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Living Unrelated	0	0	1	1	0	0	1	1	1	3	0	3	0	0	0	0	11
TOTAL patients	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7	5	100

Table 4.3.2 Immunosuppressive Drug Treatment at Transplantation, 1993-2008 (N=100)

Immunosuppressive drugs	Year (No.)																
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	TOTAL
Steroids	0	0	2	5	0	2	5	2	5	5	1	12	5	8	6	5	63
Azathioprine	0	0	0	0	0	0	0	0	0	0	0	4	5	8	4	2	23
Cyclosporin A	1	1	1	2	0	0	0	1	0	0	0	0	0	0	0	0	6
Tacrolimus (FK506)	0	0	3	7	2	2	8	2	5	9	5	12	5	8	5	4	77
Mycophenolate Mofetil (MMF)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rapamycin	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	3
Monoclonal/Polyclonal Antidies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anti IL26 Antibodies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No Data	0	0	4	3	1	0	0	0	0	1	0	4	0	0	1	0	14
TOTAL patients	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7	5	100

Note: 22 patients had 1 type if drug, 41 patients had 2 types, 23 patients had 3 types

4.4 TRANSPLANT OUTCOMES

The 1 year survival rate for the period 1993 - 1998 and 1999 - 2007 was 71% and 69% respectively. The most common cause of death was sepsis.

Table 4.4.1 Patient Survival by Year of Transplant, 1993-2008 (N=100)

Interval (months)	Year of transplant			
	1993-1998		1999-2008	
	% Survival	SE	% Survival	SE
1	82	7	82	5
6	71	9	70	5
12	71	9	69	6

Figure 4.4.1 Patient Survival by Year of Transplant, 1993-2008

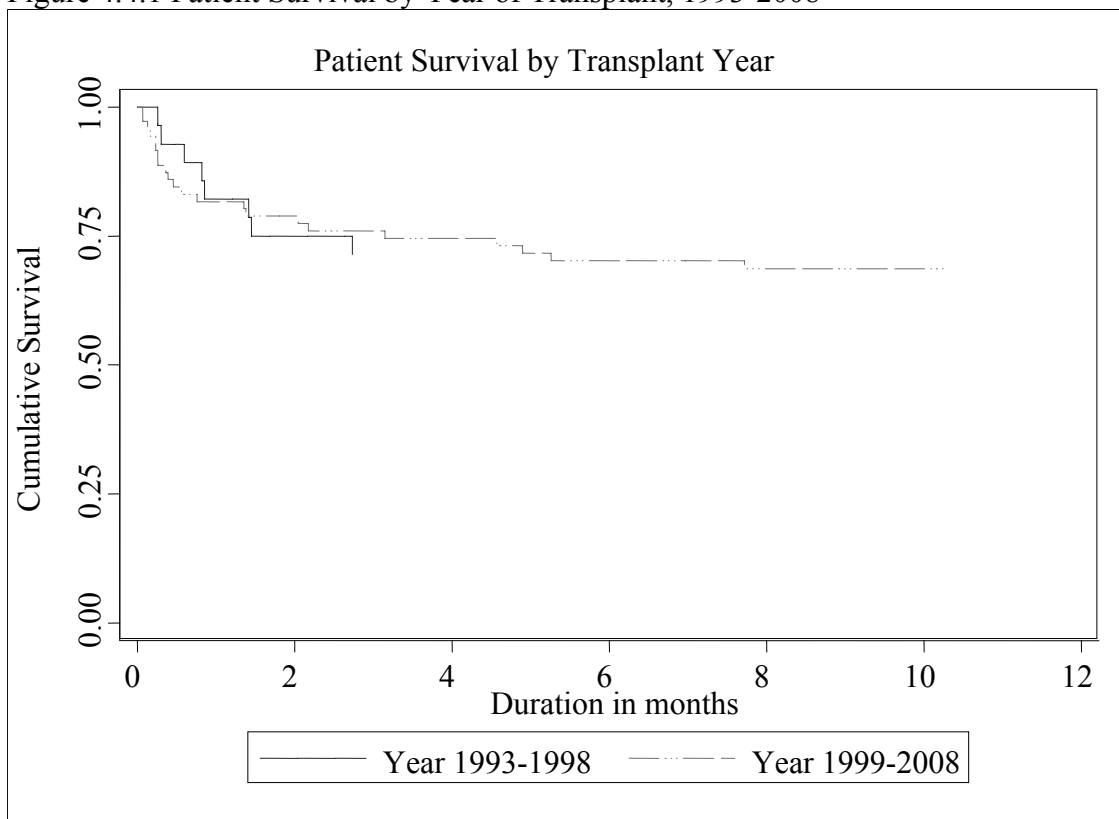


Table 4.4.2 Patient Survival by Gender, 1993-2008 (N=100)

Interval (months)	Gender			
	Male		Female	
	% Survival	SE	% Survival	SE
1	83	5	80	6
6	72	6	69	7
12	70	6	69	7

Figure 4.4.2 Patient Survival by Gender, 1993-2008

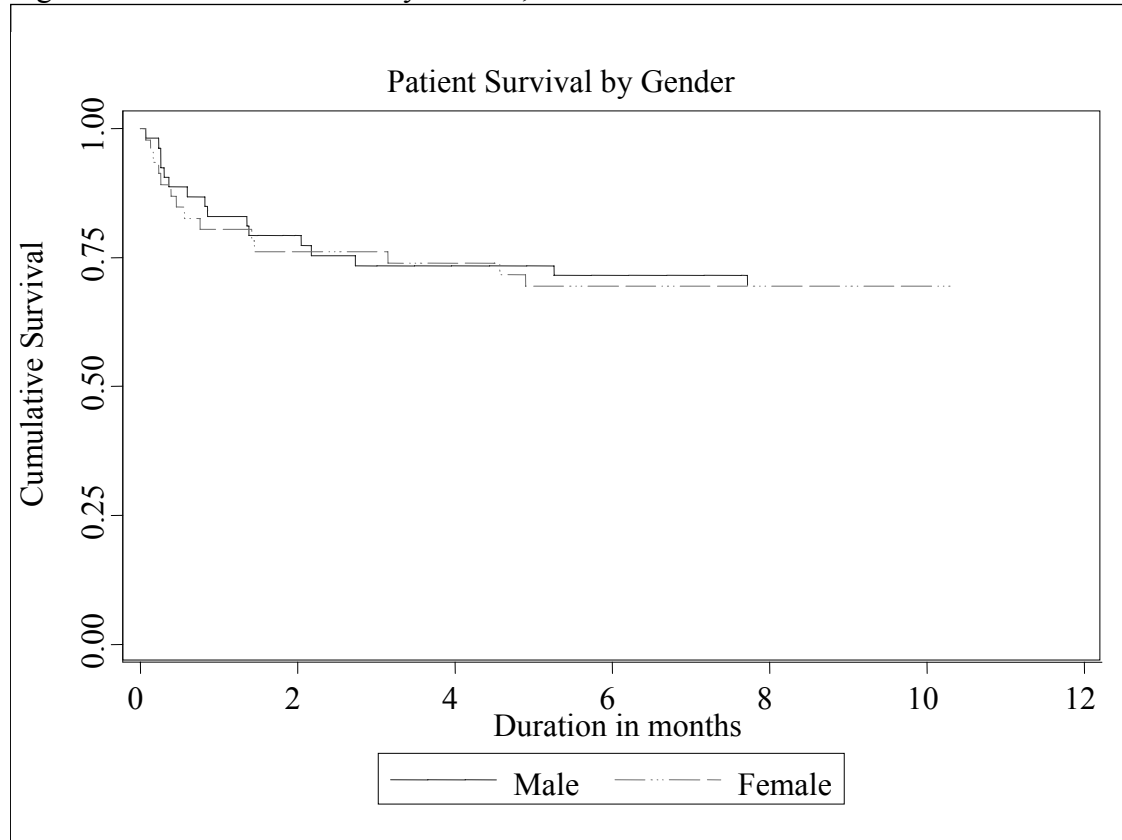


Table 4.4.3 Patient Survival by Age Group, 1993-2008 (N=100)

Interval (months)	Age Group			
	0-9 years		≥10 years	
	% Survival	SE	% Survival	SE
1	81	5	85	8
6	70	5	80	9
12	70	5	74	10

Figure 4.4.3 Patient Survival by Age Group, 1993-2008

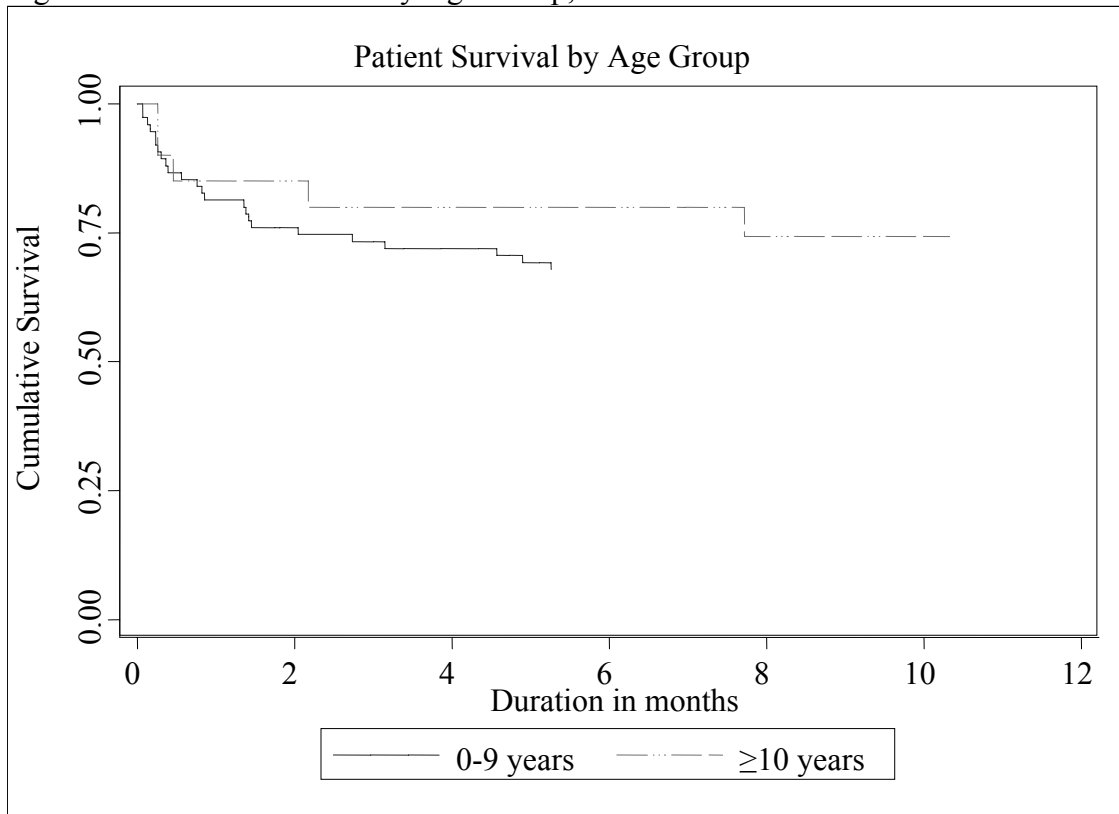


Table 4.4.4 Distribution of Patients by Cause of Death, 1993-2008 (N=100)

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	TOTAL
Causes of death	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Graft failure	0	0	0	0	0	1	0	0	0	0	2	0	1	0	4
Chronic graft rejection	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Intra-abdominal Bleeding	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Peritonitis	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
CMV Pneumonia	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Decompensated liver cirrhosis	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Intracranial hemorrhage	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2
Malignancy	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
Variceal bleed	0	0	1	0	2	0	0	0	0	0	0	0	0	0	3
Pneumonia and respiratory failure	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Post transplant lymphoproliferative disease	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Sepsis	0	2	0	0	0	0	0	2	0	1	2	3	0	0	10
Acute liver failure secondary to portal vein thrombosis post liver transplant														1	1
End stage liver failure recurrent ascending cholangitis				1											1
Acute or Chronic Liver Failure												1	1		2
Viral bronchopneumonia										1					1
Hepatitis B										1					1
Cholethiasis											1				1
Unknown	3	0	0	0	0	0	0	1	0	3	0	0	0	0	7
TOTAL	3	4	1	1	4	1	2	5	1	6	6	4	2	2	42