

## **CHAPTER 4**

### **LIVER TRANSPLANTATION**

*Editor:*

Dr Ganesalingam A/L Kanagasabai

*Expert panel:*

Dato' Dr Zakaria Zahari (Chairman)

Dr Ganesalingam A/L Kanagasabai

Dr Goon Hong Kooi

Professor Dr Lee Way Seah

Dr Lim Chooi Bee

Dr Sushila Siva Subramaniam

Dr Tan Soek Siam

Dr Thavaranjitham

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#### **4.0 INTRODUCTION**

Liver transplantation represents a great conquest of medical science, and certainly gives hope to those suffering serious, and often grave, liver diseases.

Unfortunately, the problem of the lack of available cadaveric organs is a considerable and practical one; one can see this in the long waiting list of those whose only hope for survival is linked to the small number of organ donations. Malaysia continues to struggle with its liver transplantation program simply because of a lack of cadaveric donors.

It is necessary to overcome prejudices and misunderstanding, dispel suspicions and fears and substitute them with certainties and guarantees, so as to create in all Malaysians an awareness, ever more widespread, of the great gift of life.

4.1 STOCK AND FLOW

The number of liver transplants performed from 1993 to 2007 is ninety five. Eighty one (85%) were performed locally and fourteen (15%) were performed at overseas centres. Seven new liver transplants were done in 2007 and they were all done locally at Selayang Hospital.

Table 4.1.1: Stock and Flow of Liver Transplantation, 1993-2007

Year	93	94	95	96	*97	98	99	00	01	02	**03	04	05	06	07
New transplant patients	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7
Deaths	0	0	3	4	1	0	4	1	2	5	1	4	4	3	1
Re-transplant	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	1	1	0	0
Functioning graft at 31 <sup>st</sup> December	1	2	7	16	17	19	23	24	27	31	34	45	45	50	56

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

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

Figure 4.1.1: Stock and Flow of Liver Transplantation, 1993-2007

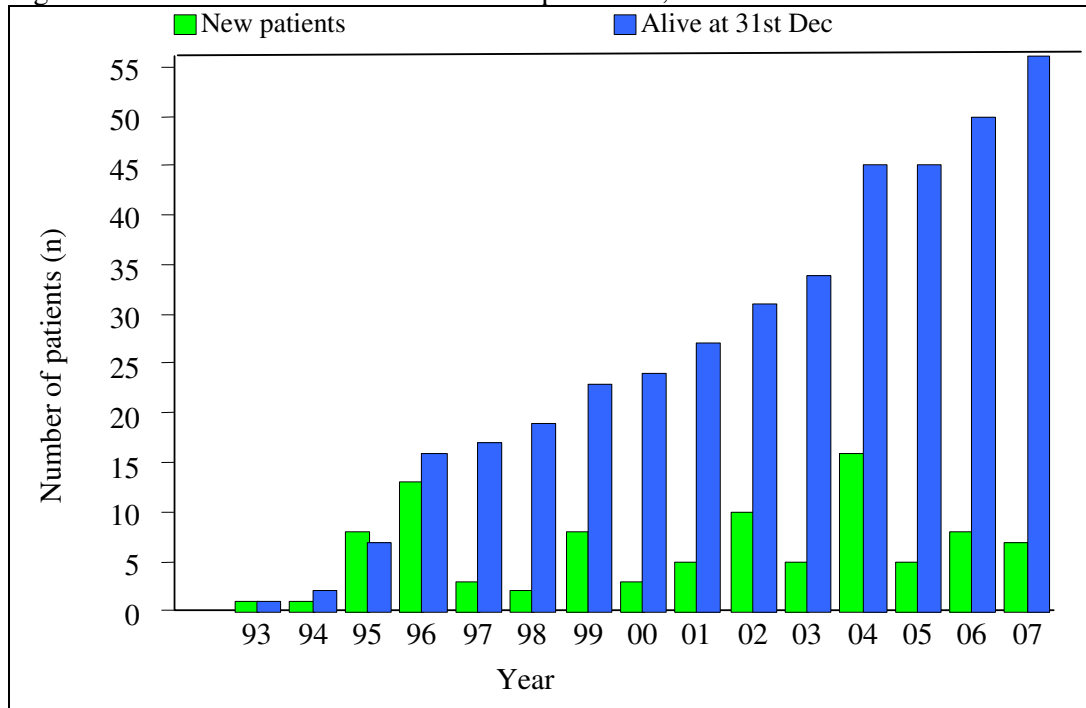


Table 4.1.2: Distribution of Patients by Place of Transplant, 1993-2007

Year	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	TOTAL
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Local	0	0	8	10	1	1	8	3	5	9	2	14	5	8	7	81
Overseas	1	1	0	3	2	1	0	0	0	1	3	2	0	0	0	14
<b>TOTAL</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>16</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>95</b>

Table 4.1.3: Distribution of Patients by Centres for Liver Transplantation, 1993-2007

Year	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	TOTAL
Centre	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Sime Darby Medical Centre	0	0	8	10	1	1	8	3	5	6	2	7	0	0	0	51
Hospital Selayang	0	0	0	0	0	0	0	0	0	3	0	7	5	8	7	30
Australia	1	0	0	3	1	0	0	0	0	0	0	0	0	0	0	5
National University Hospital, Singapore	0	0	0	0	1	1	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	1
Tianjin, China	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
Asian Centre for Liver Disease, Singapore	0	0	0	0	0	0	0	0	0	1	2	1	0*	0*	0*	4
<b>TOTAL</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>16</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>95</b>

\* Data was not reported

Table 4.1.4: Distribution of Transplant Recipients by Follow-up Centres, 2007

Centre	No.	%
Number of patient with functioning graft at 31 <sup>st</sup> December 2007	56	100
Kuala Lumpur Hospital	2	4
Sime Darby Medical Centre	27	48
Selayang Hospital	23	41
Singapore	1	2
Univeristy of Malaya Medical Centre	3	5

## 4.2 RECIPIENTS' CHARACTERISTICS

Fifty three (56%) were males and 42 (44%) were females. The ethnic distribution of the liver transplant recipients are as follows: Chinese 48 (50%), Malays 37 (39%), Indians 8 (9%), Others 2 (2%).

Eighty (84%) 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 69 (73%) 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, 1993-2007

Year	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	TOTAL
Gender	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Male	0	0	6	5	2	1	3	1	2	7	5	10	2	6	3	53
Female	1	1	2	8	1	1	5	2	3	3	0	6	3	2	4	42
<b>TOTAL</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>16</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>95</b>

Figure 4.2.1: Distribution of Patients by Gender, 1993-2007

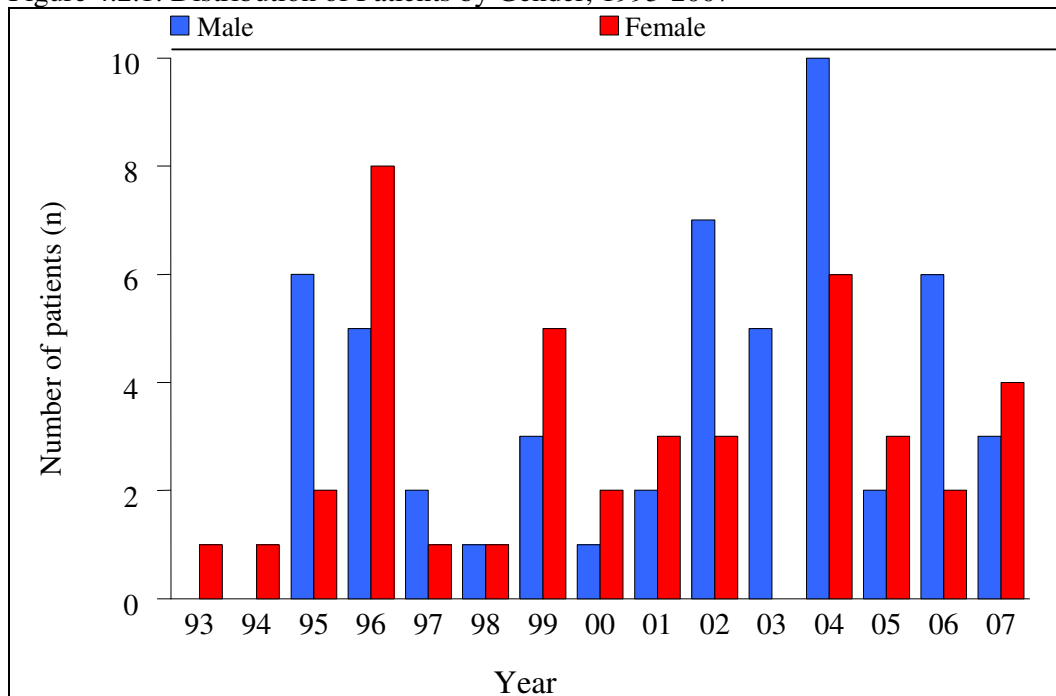


Table 4.2.2: Distribution of Patients by Ethnic Group, 1993-2007

Year	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	TOTAL
Ethnic group	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Malay	0	1	2	3	1	0	4	1	2	3	1	11	3	3	2	37
Chinese	1	0	6	8	2	1	2	2	3	6	4	5	1	3	4	48
Indian	0	0	0	2	0	1	1	0	0	0	0	0	1	2	1	8
Others	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
<b>TOTAL</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>16</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>95</b>

Figure 4.2.2: Distribution of Patients by Ethnic Group, 1993-2007

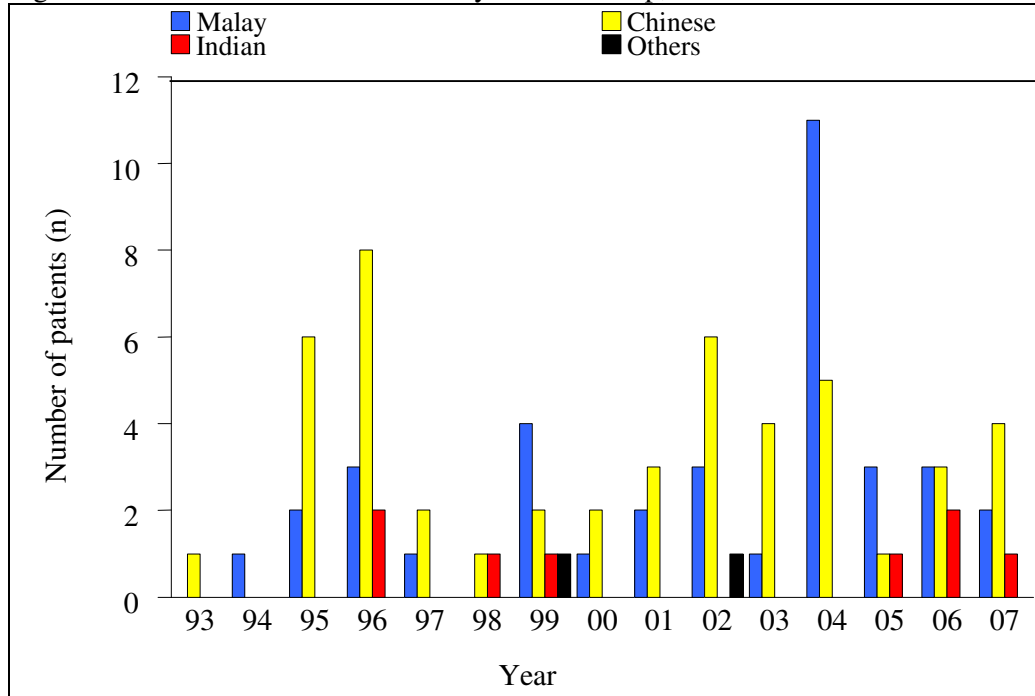


Table 4.2.3: Distribution of Patients by Age, 1993-2007

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL
Age, years*	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
<1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
1-4	1	1	3	11	3	1	5	3	4	4	2	9	2	4	3	56
5-9	0	0	3	1	0	0	2	0	1	4	2	3	3	1	2	22
10-14	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1	5
15-19	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	2
20-39	0	0	1	0	0	0	0	0	0	1	0	0	0	2	1	5
40-59	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
≥60	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
<b>TOTAL</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>16</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>95</b>
Mean	2	4	9	4	2	1	4	1	2	6	18	12	4	12	9	8
SD	-	-	9	4	1	1	5	1	2	7	31	22	3	15	13	13
Median	2	4	6	2	2	1	3	1	2	4	7	3	5	5	5	2
Minimum	2	4	2	2	1	3 months	1	1	1	4 months	1	1	1	2	1	3 months
Maximum	2	4	30	14	2	1	15	2	5	24	73	74	8	39	37	74

\* Age=date of transplant – date of birth

Table 4.2.4: Primary Diagnosis, 1993-2007 (N=95)

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL
Primary Diagnosis	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Biliary atresia	1	1	7	12	3	1	7	2	5	6	2	10	4	2	6	69
Metabolic liver disease	0	0	1	1	0	0	0	0	0	2	0	2	0	0	0	6
Cholestatic liver disease	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	3
Primary biliary cirrhosis	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
Autoimmune hepatitis	0	0	0	0	0	0	1	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	5
Chronic hepatitis C	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
Malignancies	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	4
Acute liver failure	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	4
Idiopathic / Cryptogenic	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	9

Note: 6 patients have more than one primary disease

Table 4.2.5: Indication for Transplantation, 1993-2007 (N=95)

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL
Indication for Transplantation	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Recurrent encephalopathy	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	3
Uncontrolled bleeding varices	0	0	0	7	1	0	4	1	1	0	0	2	0	0	0	16
Intractable ascites	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
Poor liver function	1	1	7	11	3	1	8	3	5	9	3	11	4	1	4	72
Malignancy	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Unacceptable quality of life	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
Failure to thrive, growth retardation in paediatric patients	0	0	6	10	3	2	6	3	5	7	2	10	3	1	0	58
Others	0	0	0	0	0	0	0	0	0	0	0	1	2	8	3	14
No data	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	4

Note: 28 patients had 1 indication for transplantation, 63 had more than 1 indication for transplantation

Table 4.2.6: Recipient Blood Group, 1993-2007 (N=95)

Year	1993	1994	1995	1996	1997	1998	1999	2000
Blood group	No.	No.	No.	No.	No.	No.	No.	No.
A	0	1	2	0	0	0	3	0
B	0	0	1	2	0	1	2	0
AB	0	0	0	1	0	1	0	0
O	0	0	2	5	1	0	3	3
No data	1	0	3	5	2	0	0	0
<b>TOTAL</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>8</b>	<b>3</b>

Year	2001	2002	2003	2004	2005	2006	2007	TOTAL
Blood group	No.	No.	No.	No.	No.	No.	No.	No.
A	1	3	1	4	1	4	2	22
B	1	1	0	1	1	3	3	16
AB	0	0	0	1	1	0	0	4
O	3	5	1	8	2	1	2	36
No data	0	1	3	2	0	0	0	17
<b>TOTAL</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>16</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>95</b>

**TRANSPLANT PRACTICES**

Seventy eight percent of liver transplants were living donor transplants while 22% were from cadaveric donors. 65.9% 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, 1993-2007 (N=95)

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL
<b>Type of Transplant</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>
Cadaveric	1	0	0	3	1	0	0	0	0	1	1	4	2	4	4	21
Living related - Mother	0	1	5	2	1	2	5	2	2	2	2	7	1	1	0	33
Living related - Father	0	0	2	7	1	0	2	0	2	3	0	1	1	3	3	25
Living related - Son	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
Living related - Brother	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Living related - emotionally	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Living unrelated	0	0	1	1	0	0	1	1	1	3	0	3	0	0	0	11
<b>TOTAL</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>16</b>	<b>4</b>	<b>8</b>	<b>7</b>	<b>94</b>

\* 1 patient in year 2005 is Living related - Other

Table 4.3.2: Immunosuppressive Drug Treatment at Transplantation, 1993-2007 (N=95)

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL
<b>Immunosuppressive drugs</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>	<b>No.</b>
Steroids	0	0	2	5	0	2	5	2	5	5	1	12	5	8	6	58
Azathioprine	0	0	0	0	0	0	0	0	0	0	0	4	5	8	4	21
Cyclosporin A	1	1	1	2	0	0	0	1	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	73
Mycophenolate Mofetil (MMF)	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	3
Monoclonal / Polyclonal antibody	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anti IL2R Antibodies	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
No data	0	0	4	3	1	0	0	0	0	0	0	4	0	0	0	14
<b>TOTAL patients</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>16</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>95</b>

Note: 22 patients had 1 type of drug, 38 patients had 2 types, 21 patients had 3 types

**4.3 TRANSPLANT OUTCOMES**

The 1 year survival rate for the period 1993 - 1998 and 1999 - 2006 was 71% and 69% respectively. The most common cause of death was sepsis.

Table 4.4.1: Patient Survival by Year of Transplant, 1993-2007 (N=95)

Year of Transplant	1993 - 1998		1999 - 2007	
Interval (months)	% Survival	SE	% Survival	SE
1	82	7	82	5
6	71	9	69	6
12	71	9	69	6

SE=standard error

Figure 4.4.1: Patient Survival by Year of Transplant, 1993-2007

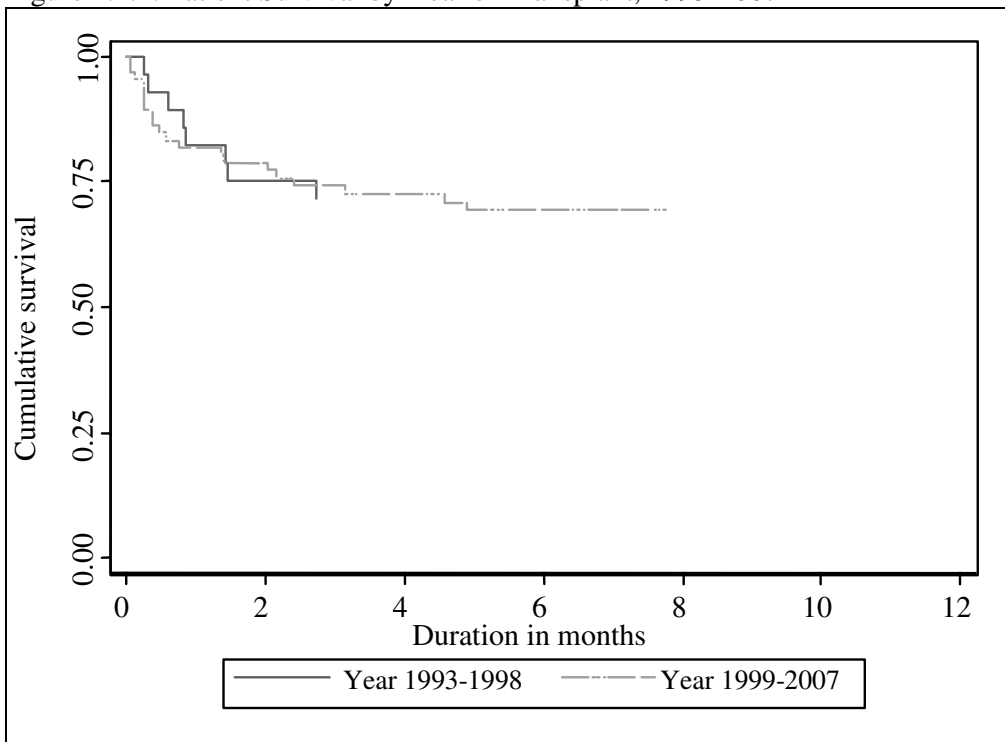


Table 4.4.2: Patient Survival by Gender, 1993-2007 (N=95)

Gender	Male		Female	
	% Survival	SE	% Survival	SE
1	83	5	81	6
6	71	6	69	7
12	71	6	69	7

SE=standard error

Figure 4.4.2: Patient Survival by Gender, 1993-2007

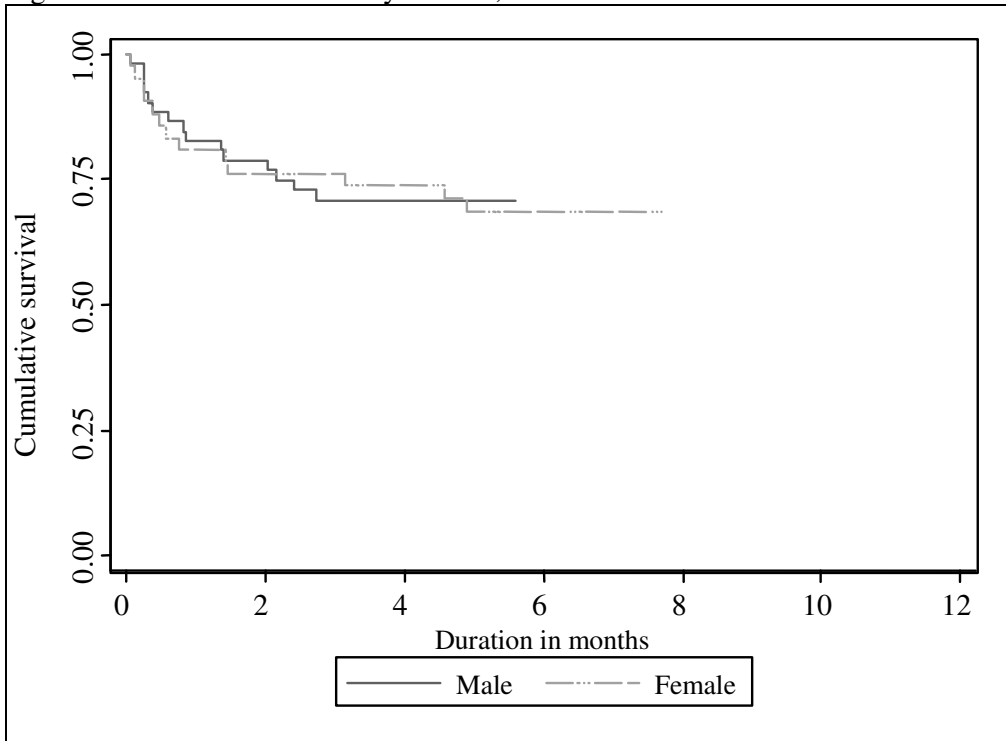


Table 4.4.3: Patient Survival by Age Group, 1993-2007 (N=95)

Age group Interval (months)	0-9 years		≥10 years	
	% Survival	SE	% Survival	SE
1	82	4	85	10
6	69	5	77	12
12	69	5	77	12

SE=standard error

Figure 4.4.3: Patient Survival by Age Group, 1993-2007

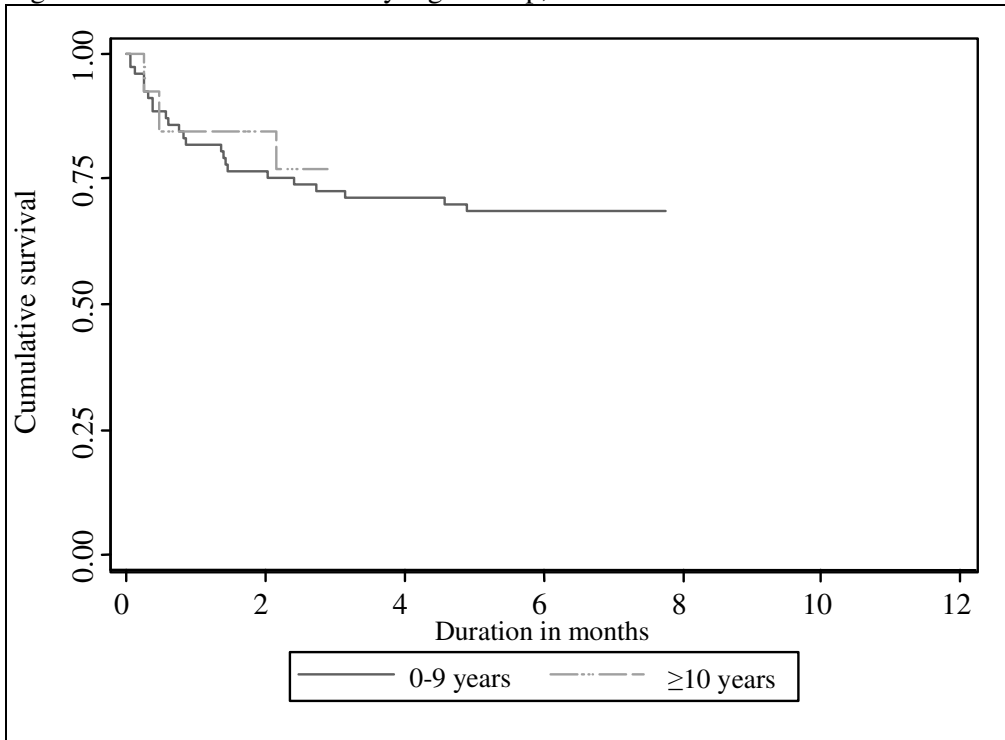


Table 4.4.4: Distribution of Patients by Cause of Death, 1993-2007 (N=95)

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL
Causes of death	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	1	2	0	1	4
Chronic graft rejection	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Intra-abdominal Bleeding	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Peritonitis	0	0	0	0	0	0	0	1	0	0	0	0	0	1
CMV Pneumonia	0	0	0	0	1	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	1
Intracranial hemorrhage	0	1	0	0	1	0	0	0	0	0	0	0	0	2
Malignancy	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Ivateal bleed	0	0	1	0	2	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	1
Post-transplant lymphoproliferative disease	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Sepsis	0	2	0	0	0	0	0	2	0	1	1	3	0	9
Unknown	3	0	0	0	0	0	0	1	0	2	0	0	0	7
<b>TOTAL</b>	<b>3</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>2</b>	<b>5</b>	<b>1</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>33</b>