

# CHAPTER 4

## LIVER TRANSPLANTATION

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Table 4.1.1 Stock and Flow of Liver Transplantation, 1993-2009

Year	93	94	95	96	97*	98	99	00	01	02	03**	04	05	06	07	08	09
New transplant patients	1	1	8	13	3	2	8	3	5	10	5	16	5	8	7	6	8
Deaths	0	0	3	4	1	1	4	1	2	5	1	5	6	4	3	2	4
Re-Transplant	0	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	0	0	0	0	0	1	0	0	0	0
Functioning graft at 31st December	1	2	7	16	18	19	23	25	28	33	37	48	46	50	54	58	62

Figure 4.1.1 Stock and Flow of Liver Transplantation, 1993-2009

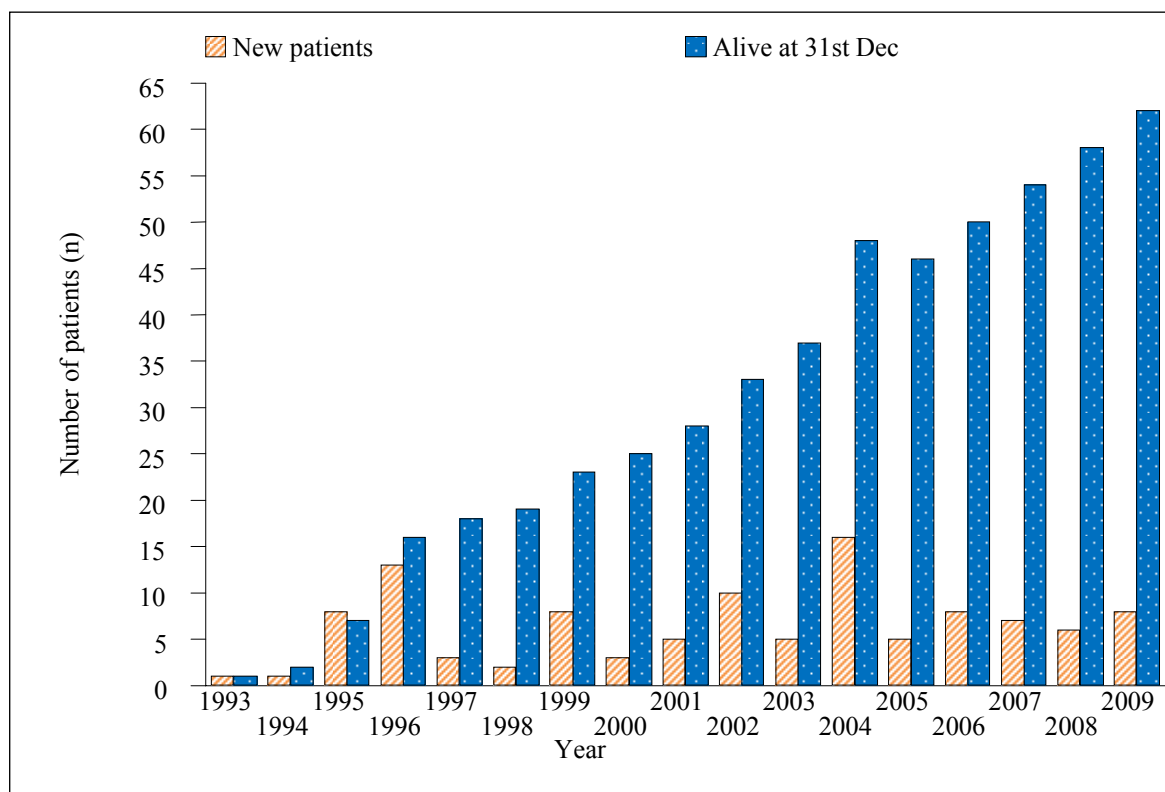


Table 4.1.2 Distribution of Patients by Place of Transplant, 1993-2009

Place of Transplant	Year (No.)																	
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	Total
Local	0	0	8	10	1	1	8	3	5	9	2	14	5	8	7	5	6	92
Overseas	1	1	0	3	2	1	0	0	0	1	3	2	0	0	0	1	2	17
<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>6</b>	<b>8</b>	<b>109</b>

Table 4.1.3 Distribution of Patients by Centres for Liver Transplantation, 1993-2009

Transplant Centre	Year (No.)																	
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	TOTAL
Sime Darby Medical Centre, Subang Jaya	0	0	8	10	1	1	8	3	5	6	2	7	0	0	0	0	0	51
Hospital Selayang	0	0	0	0	0	0	0	0	0	3	0	7	5	8	7	5	6	41
Royal Children's Hospital, Brisbane	0	0	0	2	1	0	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	1	2	5
Queensland Liver Transplant Service, Australia	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
King Collage Hospital, UK	0	1	0	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	0	2
Asian Centre for Liver Disease & Transplantation, Singapore	0	0	0	0	0	0	0	0	0	1	2	1	-	-	-	-	-	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>6</b>	<b>8</b>	<b>109</b>

Table 4.2.1 Distribution of Patients by Gender, 1993-2009

Gender	Year (No.)																	
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	TOTAL
Male	0	0	6	5	2	1	3	1	2	7	5	10	2	6	3	1	1	55
Female	1	1	2	8	1	1	5	2	3	3	0	6	3	2	4	5	7	54
<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>6</b>	<b>8</b>	<b>109</b>

Figure 4.2.1 Distribution of Patients by Gender, 1993-2009

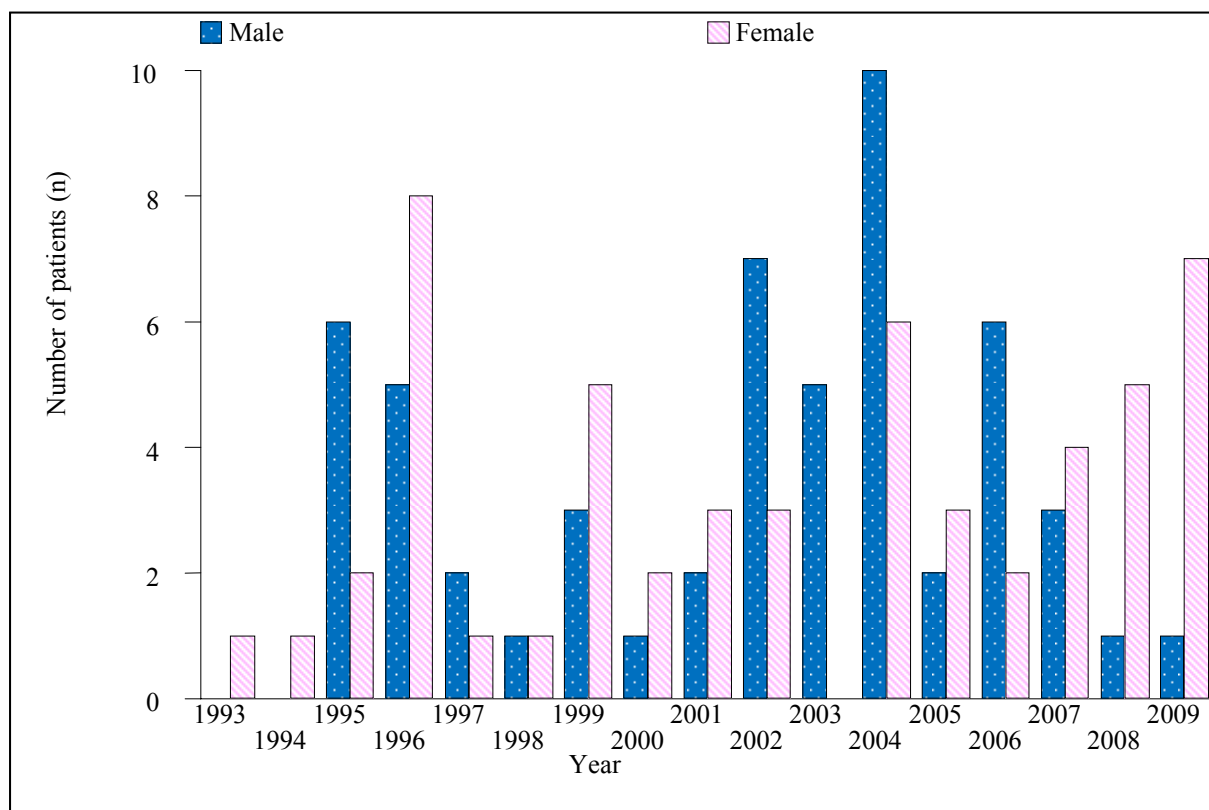


Table 4.2.2 Distribution of Patients by Ethnic Group, 1993-2009

Ethnic group	Year (No.)																	
	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	TOTAL
Malay	0	1	2	3	1	0	4	1	2	3	1	11	3	3	2	2	1	40
Chinese	1	0	6	8	2	1	2	2	3	6	4	5	1	3	4	4	7	59
Indian	0	0	0	2	0	1	1	0	0	0	0	0	1	2	1	0	0	8
Others	0	0	0	0	0	0	1	0	0	1	0	0	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>6</b>	<b>8</b>	<b>109</b>

Figure 4.2.2 Distribution of Patients by Ethnic Group, 1993-2009

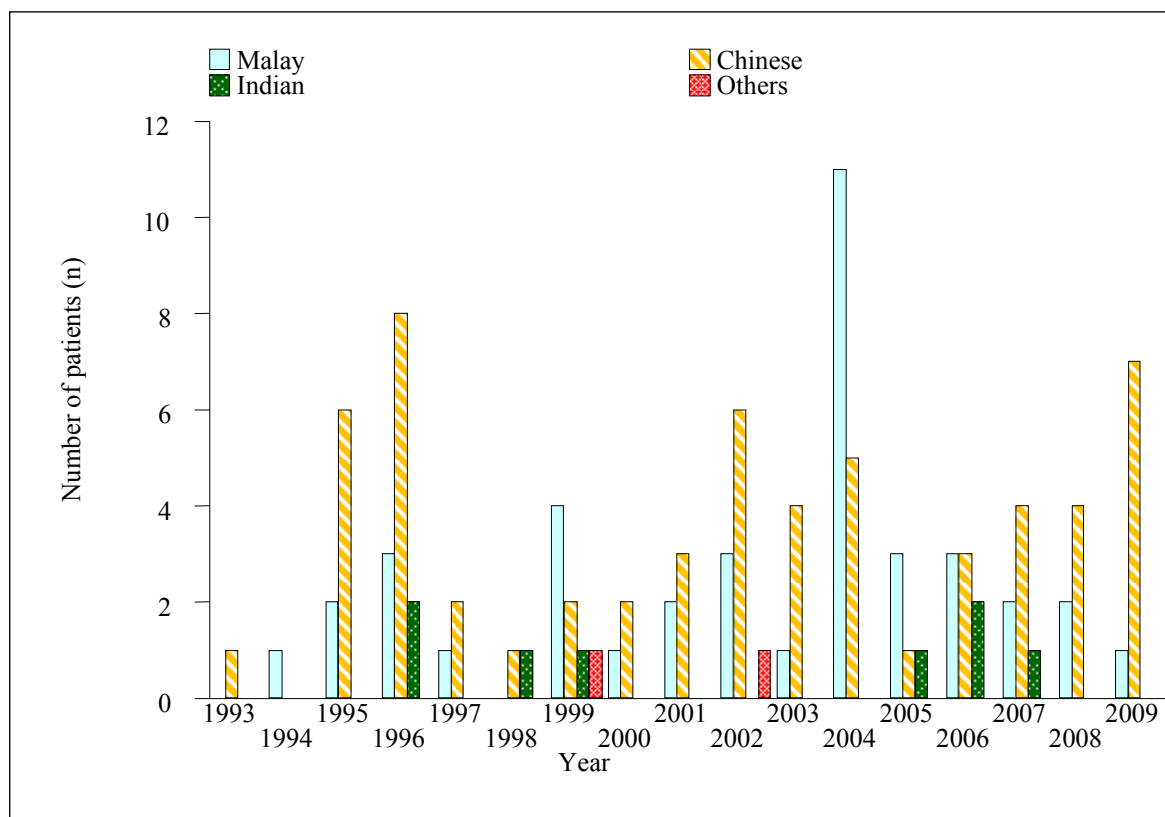


Table 4.2.3 Distribution of Patients by Age, 1993-2009

Age group	Year (No.)																	TOTAL
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
<1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	5
1-4	1	1	3	11	3	2	5	3	5	6	1	8	2	4	4	1	3	63
5-9	0	0	3	1	0	0	2	0	0	2	1	3	2	1	1	1	2	19
10-14	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1	0	1	6
15-19	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
20-39	0	0	1	0	0	0	0	0	0	1	0	0	0	2	1	3	1	9
40-59	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	3
≥60	0	0	0	0	0	0	0	0	0	0	1	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>6</b>	<b>8</b>	<b>109</b>
Mean	2	4.4	9.2	3.8	1.8	2.3	4.4	1.4	2.2	10.4	26.8	12.5	4.5	12.2	9.5	13.9	8.6	8.9
SD	-	-	9.2	3.6	0.7	1.4	4.8	0.1	1.6	14.2	32.8	21.6	2.9	15.2	12.8	11.3	8.2	14
Median	2	4.4	5.4	2.3	2	2.3	2.2	1.5	1.8	4	8.9	3.4	4.5	4.3	4.7	15.7	6.6	3.2
Minimum	2	4.4	2.2	1.6	1.1	1.4	1.1	1.3	1	1.3	11.8 months	11.8 months	11.9 months	1.5	1.5	10.6 months	8.9 months	8.9 months
Maximum	2	4.4	30	14.1	2.4	3.3	15	1.6	4.9	46	72.7	73.9	8.1	38.8	37.5	25.9	26.9	73.9

Table 4.2.4 Primary Diagnosis, 1993-2009 (N=109)

Primary diagnosis	Year (No.)																	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	TOTAL
Biliary atresia	1	1	7	12	3	1	7	2	5	6	2	10	4	2	6	4	3	76
Metabolic liver disease	0	0	1	1	0	0	0	0	0	2	0	2	0	0	0	0	1	7
Cholestatic liver disease	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	3
Primary biliary cirrhosis	0	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	0
Autoimmune hepatitis	0	0	0	0	0	0	1	0	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	0	5
Chronic hepatitis C	0	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	0
Malignancies	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	4
Acute liver failure	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	4
Idiopathic/ Cryptogenic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Others	0	0	0	0	0	0	0	0	0	2	0	1	1	4	1	3	4	16
<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>11</b>	<b>7</b>	<b>17</b>	<b>6</b>	<b>9</b>	<b>7</b>	<b>7</b>	<b>9</b>	<b>117</b>

Table 4.2.5 Indication for Transplantation, 1993-2009 (N=109)

Indication for transplantation	Year (No.)																	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	TOTAL
Recurrent encephalopathy	0	0	1	0	0	0	1	0	0	1	0	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	0	16
Intractable ascites	0	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	0
Poor liver function	1	1	7	11	3	1	8	3	5	9	3	11	4	1	4	1	4	77
Malignancy	0	0	0	0	0	0	0	0	0	0	1	0	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	1	2	5
Failure to thrive and growth retardation in paediatric patients	0	0	6	10	3	2	6	3	5	7	2	10	3	1	0	1	5	64
Others	0	0	0	0	0	0	0	0	0	0	0	1	2	8	3	5	6	25
No data	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	4
<b>TOTAL</b>	<b>1</b>	<b>1</b>	<b>14</b>	<b>28</b>	<b>7</b>	<b>3</b>	<b>19</b>	<b>7</b>	<b>11</b>	<b>19</b>	<b>7</b>	<b>26</b>	<b>10</b>	<b>10</b>	<b>7</b>	<b>8</b>	<b>17</b>	<b>195</b>



Table 4.2.6 Recipients' Blood Group, 1993-2009

Blood group	Year (No.)																	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	TOTAL
A	0	1	2	0	0	0	3	0	1	3	1	4	1	4	2	1	1	24
B	0	0	1	2	0	1	2	0	1	1	0	1	1	3	3	1	1	18
AB	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	1	5
O	0	0	2	5	1	0	3	3	3	5	1	8	2	1	2	2	2	40
No Data	1	0	3	5	2	0	0	0	0	1	3	2	0	0	0	2	3	22
<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>6</b>	<b>8</b>	<b>109</b>

Table 4.3.1 Distribution of Patients by Type of Donors, 1993-2009

Type of donor	Year (No.)																	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	TOTAL
Cadaveric	1	0	0	3	1	0	0	0	0	1	1	4	2	4	4	4	6	31
Living Related - Mother	0	1	5	2	1	2	5	2	2	2	2	7	1	1	0	0	2	35
Living Related - Father	0	0	2	7	1	0	2	0	2	3	0	1	1	3	3	2	0	27
Living Related - Daughter	0	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	0	2
Living Related - Brother	0	0	0	0	0	0	0	0	0	1	0	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	0
Living Related - Monozygotic twin	0	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	0
Living Related - Others	0	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	0	1
Living Unrelated	0	0	1	1	0	0	1	1	1	3	0	3	0	0	0	0	0	11
<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>6</b>	<b>8</b>	<b>109</b>

Table 4.3.2 Immunosuppressive Drug Treatment at Transplantation, 1993-2009 (N=109)

Immunosuppressive drugs	Year (No.)																	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	TOTAL
Steroids	0	0	2	5	0	2	5	2	5	5	1	12	5	8	6	5	6	69
Azathioprine	0	0	0	0	0	0	0	0	0	0	0	4	5	8	4	2	0	23
Cyclosporin A	1	1	1	2	0	0	0	1	0	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	7	84
Mycophenolate Mofetil (MMF)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4
Rapamycin	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3
Monoclonal/Polyclonal Antibodies	0	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	0
Others	0	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	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>6</b>	<b>8</b>	<b>109</b>

Table 4.4.1 Patient Survival by Year of Transplant, 1993-2009 (N=109)

Interval (months)	Year of transplant			
	1993-1998		1999-2009	
	% Survival	SE	% Survival	SE
1	82	7	79	5
6	71	9	67	6
12	71	9	65	6

Figure 4.4.1 Patient Survival by Year of Transplant, 1993-2009

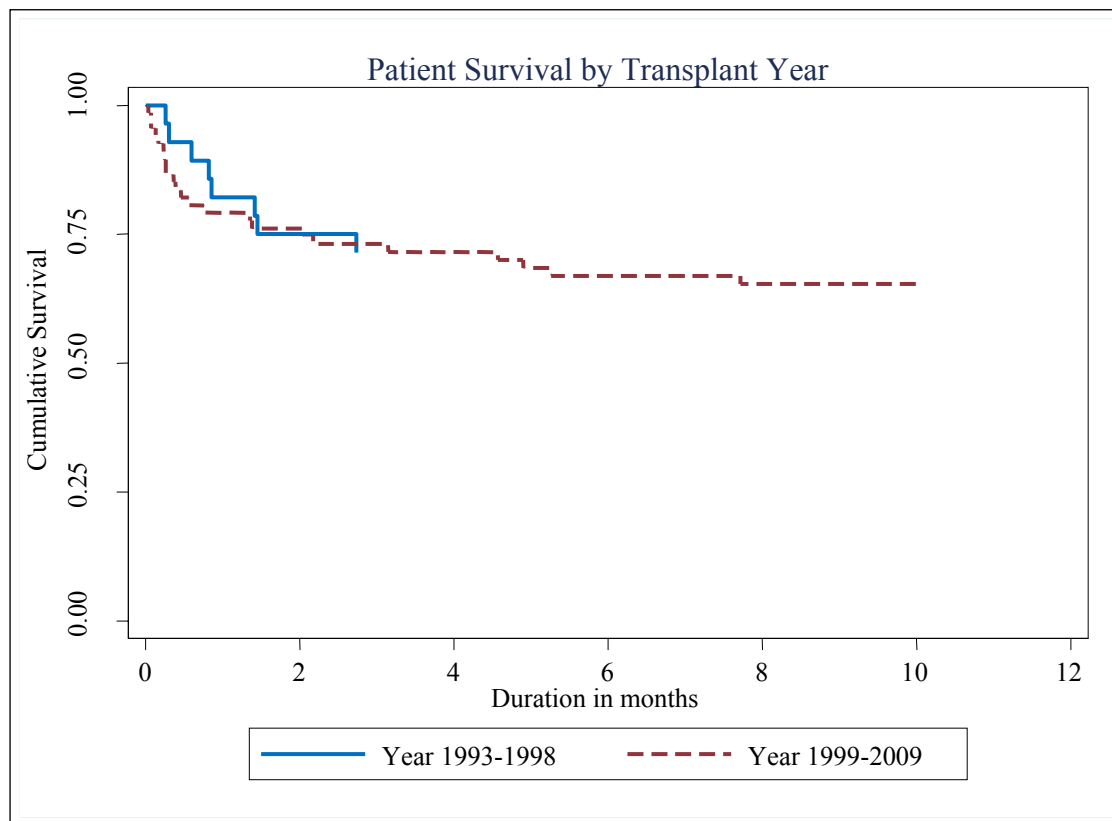


Table 4.4.2 Patient Survival by Gender, 1993-2009 (N=109)

Interval (months)	Gender			
	Male		Female	
	% Survival	SE	% Survival	SE
1	82	5	77	6
6	71	6	66	7
12	69	7	66	7

Figure 4.4.2 Patient Survival by Gender, 1993-2009

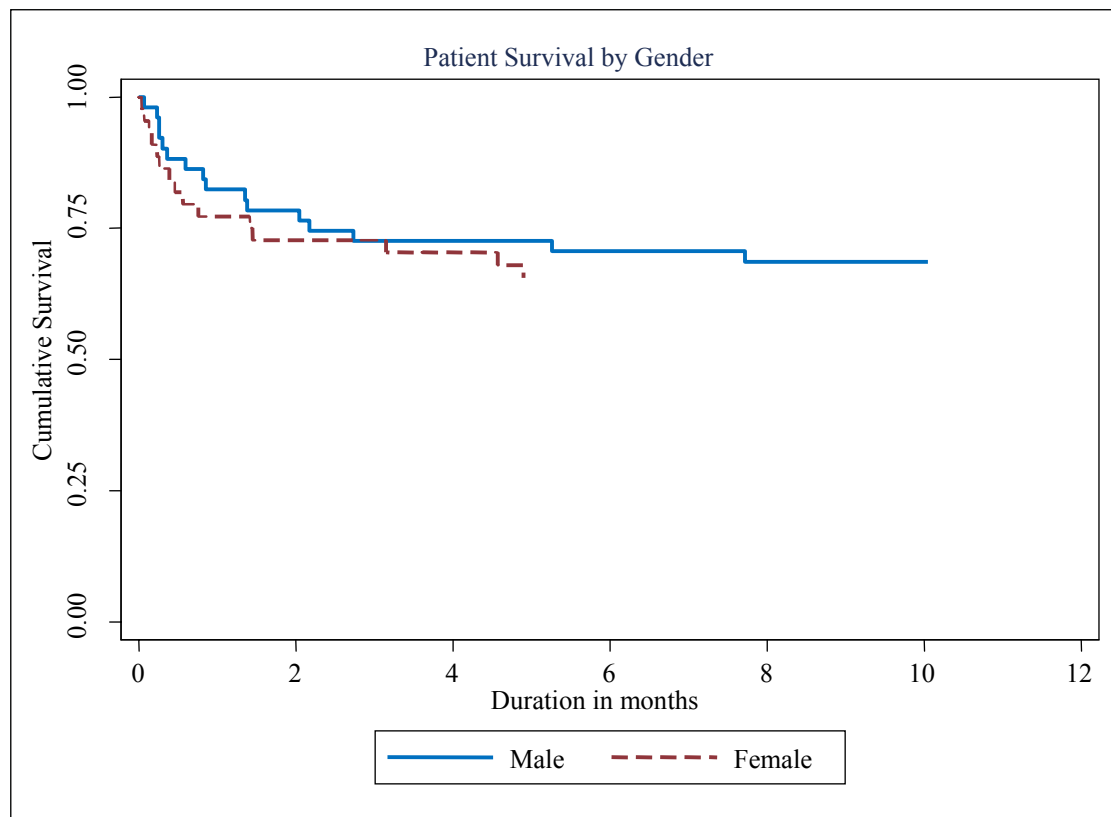


Table 4.4.3 Patient Survival by Age Group, 1993-2009 (N=109)

Interval (months)	Age Group			
	0-9 years		≥10 years	
	% Survival	SE	% Survival	SE
1	79	5	88	8
6	66	5	82	9
12	66	5	75	11

Figure 4.4.3 Patient Survival by Age Group, 1993-2009

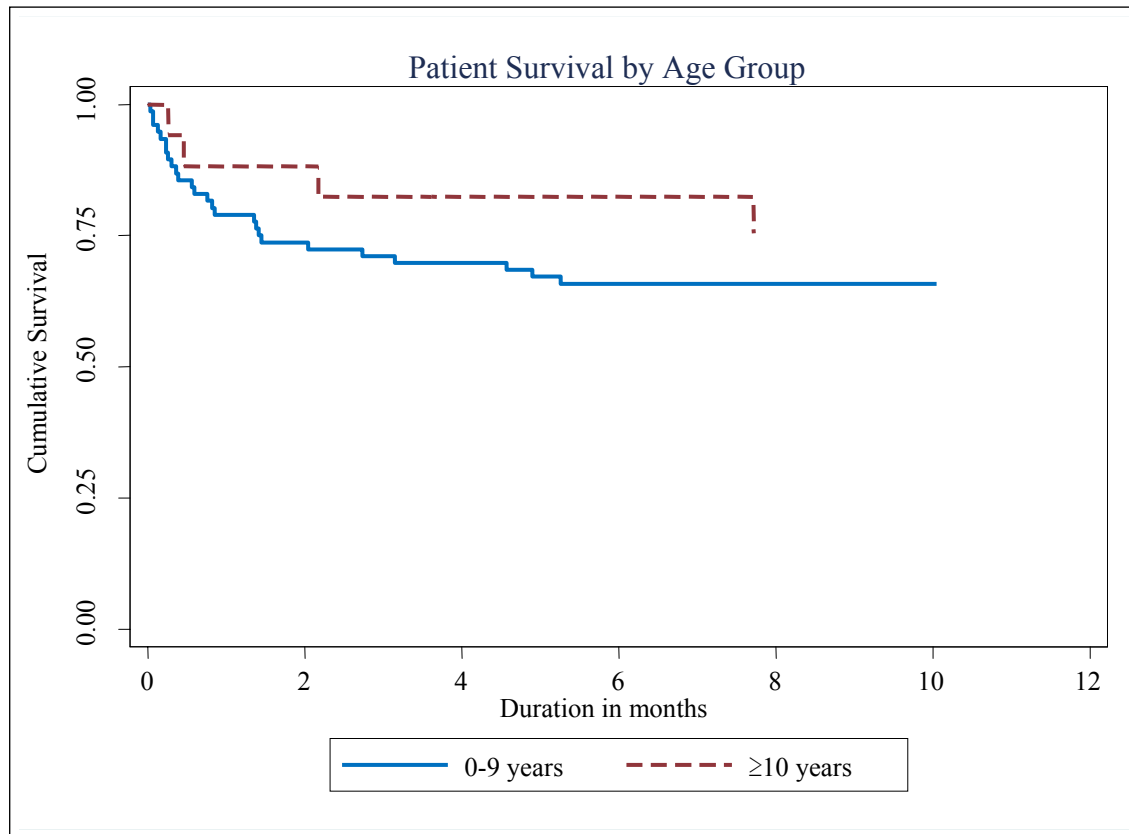


Table 4.4.4 Distribution of Patients by Cause of Death, 1993-2009 (N=109)

Cause of death	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Graft failure	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	3
Portal Vein Thrombosis	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Chronic graft rejection	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Intra-abdominal Bleeding	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Ischaemic liver necrosis	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Peritonitis and Septicaemia	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Graft versus host reaction	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
CMV Pneumonia	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Decompensated Liver cirrhosis post liver transplant with DIVC	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Died at home	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Intra-cerebral Haemorrhage	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Intracranial Haemorrhage	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Metastasis to scalp and chest	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Oesophageal Varices / Bleeding	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Pneumonia and Respiratory Failure	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Post Transplant Lymphoproliferative Disease and Septicaemia	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Sepsis	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Sepsis severe and multi-organ failure	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Bleeding oesophageal	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
Septicaemia	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	4
Septicemia and DIVC	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2
Gram negative Septicaemia	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Acute liver failure secondary to portal vein thrombosis post liver transplant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
End stage liver failure recurrent ascending cholangitis	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Retroperitoneal Hematoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Viral Bronchopneumonia	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Acute on Chronic Liver Failure	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
Staph aureus Septicaemia, Drug induced immunodeficiency	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Hepatitis B	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Unknown	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4
Acute graft rejection, post-transplant lymphoproliferative disorder, massive upper GI bleed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Chronic rejection complicated by Pneumocystis pneumonia infection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
<b>Total death</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>2</b>	<b>5</b>	<b>1</b>	<b>5</b>	<b>6</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>44</b>