

CHAPTER 8

CADAVERIC ORGAN AND TISSUE DONATION

Editor:

Datin Dr Lela Yasmin Mansor

Dr Hooi Lai Seong

Expert Panel

Datin Dr Lela Yasmin Mansor (Chairperson)

Dr Hooi Lai Seong

Dr Rosnawati Yahya

Dr Omar Sulaiman

Dr Muhammed Anis Abdul Wahab

Matron Jamaliah Kario

Staff Nurse Santi A/P Krishanan

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8.0 INTRODUCTION

In 2010, deceased (cadaveric) organ and tissue donor details were collected online for the first time using the National Transplant Procurement Management (NTPM) application. This is a separate database linked to the National Transplant Registry. The NTPM application was developed for deceased donors' sub-registry as part of the plan to convert all sub-registries of the NTR to online applications.

NTPM database collects information on potential organ and tissue donor referrals as well as actual donations in Malaysia. From the potential donor referral database, some idea of the frequency and distribution characteristics of the cases referred may be deduced. The factors that affect conversion of potential donors to actual donors could be identified. This may help to improve the donation rate in the country. The actual donor database provides donor related information that may impact on the outcome of organ and tissue transplantations.

Deceased donations can occur as heart-beating donations following brain death or non-heart beating donations after cardiac (circulatory) death. Heart beating brain dead donors can donate solid organs such as heart, kidneys, livers and lungs as well as tissues such as cornea (eyes), heart valve, bone and skin. Malaysia does not as yet have the policy or procedures in place for non heart-beating organ donation and only tissues are donated after cardiac death.

Transplant Procurement Management Units (TPMU)

The National Transplant Procurement Management Unit (NTPMU) is the Unit under the Ministry of Health (MOH) which is responsible for centrally managing and coordinating deceased organ and tissue donations in the country. This includes arranging the logistics of moving retrieval teams from transplant hospitals to the donor to procure organs and tissues. Established in 2001 and based at the National Transplant Resource Centre, Hospital Kuala Lumpur, NTPMU manages deceased donors together with the Transplant Organ Procurement (TOP) teams in donor hospitals, facilitated by transplant coordinators from Regional TPMUs. TOP Teams are hospital based TPMUs comprising of part time medical and nursing staff from intensive care units, emergency and forensic department who manage the donors at the hospital level: potential donor detection, donor suitability evaluation, maintenance of organ function, talking to the deceased's family, getting medicolegal clearance and arranging the local logistics for the procurement surgery in the hospital. First set up in late 1999 in 16 state MOH hospitals, the TOP teams became formally established following a directive from the Director General of Health in 2008. Restructuring made the TOP Team a hospital wide organisation with medical and non medical members from different disciplines who are involved in the management of the donor and donation process. TOP teams have been formed in more than 50 hospitals throughout the country in the MOH as well as in the university hospitals. Regional TPMUs with full time donor transplant coordinators (DTCs) were also established in Hospital Sultanah Aminah Johor Baru (Southern Peninsular region), Hospital Pulau Pinang (Northern Peninsular region), Hospital Tengku Ampuan Afzan Kuantan (East Coast region), Hospital Raja Permaisuri Bainun Ipoh (Perak Region), Hospital Queen Elizabeth / Likas (Sabah), and Hospital Umum Sarawak in Kuching. The regional

DTCs assist the TOP teams in managing donors in hospitals including private centres in their regions.

8.1 POTENTIAL DONOR REFERRALS 2010

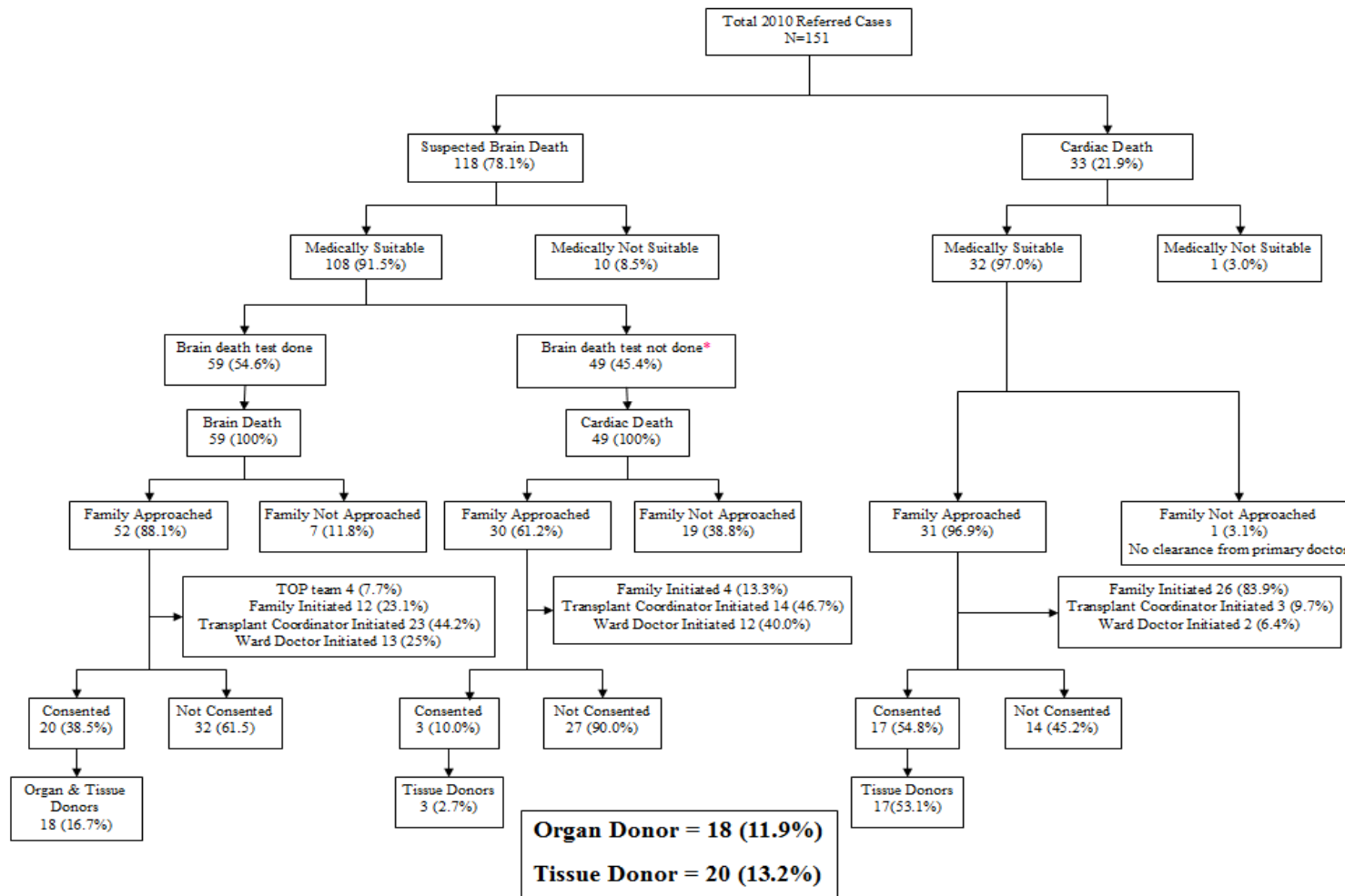


Figure 8.1.1: Conversion of Potential Donors to Actual Donors, 2010

Figure 8.1.1 shows the conversion of potential donors to actual donors in 2010. There were a total of 151 potential deceased donors referred to the NTPMU from 32 hospitals nationwide (23 MOH hospitals, 2 University hospitals and 7 private hospitals). 118 (78%) were cases of suspected brain death at initial referral while 33 (22%) were confirmed cardiac death. 140 of the referred cases (108 suspected brain dead and 32 cardiac dead) were deemed medically suitable for donation. Non-suitability was due to overwhelming sepsis, unacceptable malignancies, Hepatitis B in a potential tissue donor and 2 cases of suspected brain death which turned out not to be brain dead.

Only 55% (n=59) of the medically suitable suspected brain deaths were formally tested and confirmed to be brain dead. 49 cases did not undergo formal testing for brain death but proceeded to cardiac death. Reasons for not doing the brain death tests (Table 8.1.1) included not getting clearance from the primary doctors (14%) and family members (19%), being unable to correct the necessary hemodynamic and metabolic parameters (10%) or the patient asystoled before the test could be done (4%). In 18 of the cases no reasons were given as to why the test was not done. This is an important factor to note. Failure to formally test and confirm brain death in suspected cases reduces the pool of potential organ donors. Increasing the rate of the brain death confirmatory testing in suspected cases is something that can be done in order to improve the donation rate. Many doctors caring for the patients were still reluctant to conduct brain death tests because of the perceived effort and resources required and instead opted to withdraw hemodynamic support once the poor prognosis had been informed to the family. There were instances when the patients' families initiated organ donation after prolonged periods of hypotension following the withdrawal of support. Much effort and resources were required to reinstate the haemodynamic and metabolic status of the patient for the brain death confirmatory tests to be carried out and the donation process to take place. This resulted in the procurement of marginal organs and tissues which were lesser in number than what was offered by the family. To increase the number of donations this practice will have to change.

Out of the 59 cases that were confirmed brain dead, organ donation was discussed with 52 (88%) families of the deceased. Majority of the discussions (44%) were initiated by the Donor Transplant Coordinator, 25% by the ward doctors, 23% were initiated by the families themselves after being informed about brain death. Twenty families consented for donation, (consent rate 38.5%) but only 18 of the brain dead patients proceeded to actual donation. One family wanted to donate organs only but the organs were already in poor condition and were not accepted by the recipient teams, while offer of donation by another family could not be accepted because of active sepsis.

Thirty families of the 49 unconfirmed brain dead patients who proceeded to cardiac death, and 31 families of the 32 who died with cardiac death at first detection were approached for tissue donation. 30 out of these 61 family discussions were initiated by the families themselves. Twenty families gave consent, resulting in the successful donation of at least one (usually cornea) if not multiple tissues.

Overall, the consent rate was 35% (40/113).

Twenty-seven potential donors' families (7 brain death and 20 cardiac death) were not approached about donation (Table 1.1.2). The most common reason (10/27) why families were not approached was because the primary doctors looking after the deceased did not give clearance for organ donation to be discussed with the family, usually in situations where there was family unhappiness with the management of the patient. Another 5 families could not accept the death of their loved ones so were not asked about organ donation, while 3 potential donor families could not be contacted in time. For 1 potential donor after cardiac death, the ward staff was not comfortable talking about organ donation with the family and the opportunity was missed.

The number of referrals to NTPMU averaged 13 a month (Table 8.1.3) with a peak in February which probably reflected the higher death rate from road traffic accidents associated with the Chinese New Year celebration in that month.

Table 8.1.1: Reason for Brain Death Test Not Done, 2010

Reason for Brain Test Not Done	No.	%
No clearance from primary doctor	7	14
No clearance from family	9	19
Unable to correct parameters for brain death diagnosis	5	10
Proceeded to cardiac death before test could be done	7	14
Others	3	6
No reason given	18	37
Total	49	100

Table 8.1.2: Reason for Not Approaching the Family, 2010

Reason Family Not Approach	Brain Death		Cardiac Death		Total
	No.	%	No.	%	
No clearance from primary doctor	1	14	9	45	10
Family did not accept death	3	43	2	10	5
Staff uncomfortable about making the request	0	0	1	5	1
Unable to contact family	1	14	2	10	3
Others	2	29	6	30	8
Total	7	100	20	100	27

Table 8.1.3: Potential Donor Referrals and Actual Donations by Month, 2010

Month	Total Referred Cases	Actual donors	
		Brain Death Donors (BD)	Cardiac Death Tissue Donors (CD)
	No.	No.	No.
January	19	3	3
February	23	4	2
March	15	0	1
April	12	1	2
May	11	1	1
June	13	1	4
July	11	3	3
August	11	0	0
September	10	0	0
October	7	1	2
November	9	2	2
December	10	2	0
TOTAL	151	18	20

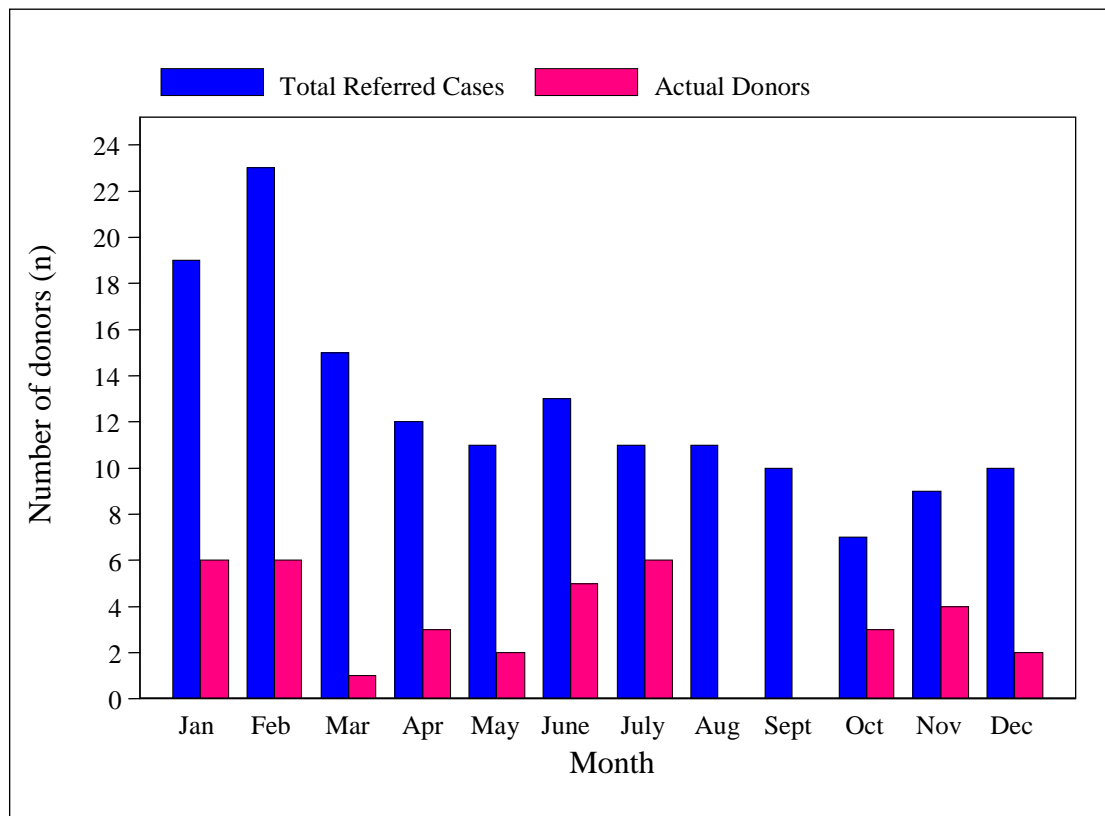


Figure 8.1.2: Total Referred Cases and Actual Donations by Month, 2010

8.2 ACTUAL DONATIONS

Table 8.2.1 shows the number of referrals and actual deceased donations from 1997 to 2010. In the earlier years there were very few donations, all referred by the primary team caring for the deceased to the transplant centres. Formation of the dedicated TOP teams to manage donors in 16 MOH hospitals in late 1999, albeit with part time staff, saw a threefold rise in the number of donations for the year 2000. The donation rate was further doubled after the NTPMU was formed in 2001 with full time donor transplant coordinators to manage and coordinate the deceased donation process centrally. The SARS (severe acute respiratory syndrome) epidemic in 2003, followed by negative publicity in the press pushing for unrelated living donation in 2004 and 2005, saw a marked decline in the number of donors by almost 50% in 2005. Establishment of national guidelines and policies in 2007, restructuring and expansion of the TOP teams to the more MOH hospitals in 2008 led to a 150% rise in the donation rate in 2009.

Although there were more referrals compared to the previous year, there was a slight drop in the number of donors in 2010. There were 38 donors in total, of which 18 were organ and tissue donors after brain death while 20 were tissue donors after cardiac death. This is equivalent to a total donation rate of 1.34 organ and/or tissue donors per million population (Table 8.2.1), or 0.64 organ donors per million population (Table 8.2.2).

A total of 117 organs and tissues were procured in 2010 (Table 8.2.3). There was an increase in cornea donation, but liver, heart valve, bone and skin donation was less compared to 2009, and no hearts were procured.

Table 8.2.1: Number of Donations by Year, 1997-2010

Number of donations by year N=291														
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of referrals	5	7	4	13	28	36	104	91	64	111	74	110	142	151
Number of Brain Death: Organ and Tissue Donor	4	6	4	11	22	17	10	10	5	14	15	14	18	18
Number of Cardiac Death: Tissue Donor	1	1	0	2	3	13	16	6	8	11	10	12	21	20
Number of donors	5	7	4	13	24	30	26	16	13	25	25	26	39	38
Rate of procurement (per million population)	0.23	0.32	0.18	0.55	1.0	1.22	1.04	0.63	0.5	0.94	0.92	0.94	1.38	1.34

Table 8.2.2: Number of Organ Donors by Year, 1997-2010

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of organ donors	4	6	4	11	20	13	9	9	5	13	14	13	18	18
Rate of organ donors (per million population)	0.18	0.27	0.18	0.47	0.83	0.53	0.36	0.35	0.19	0.49	0.52	0.47	0.64	0.64

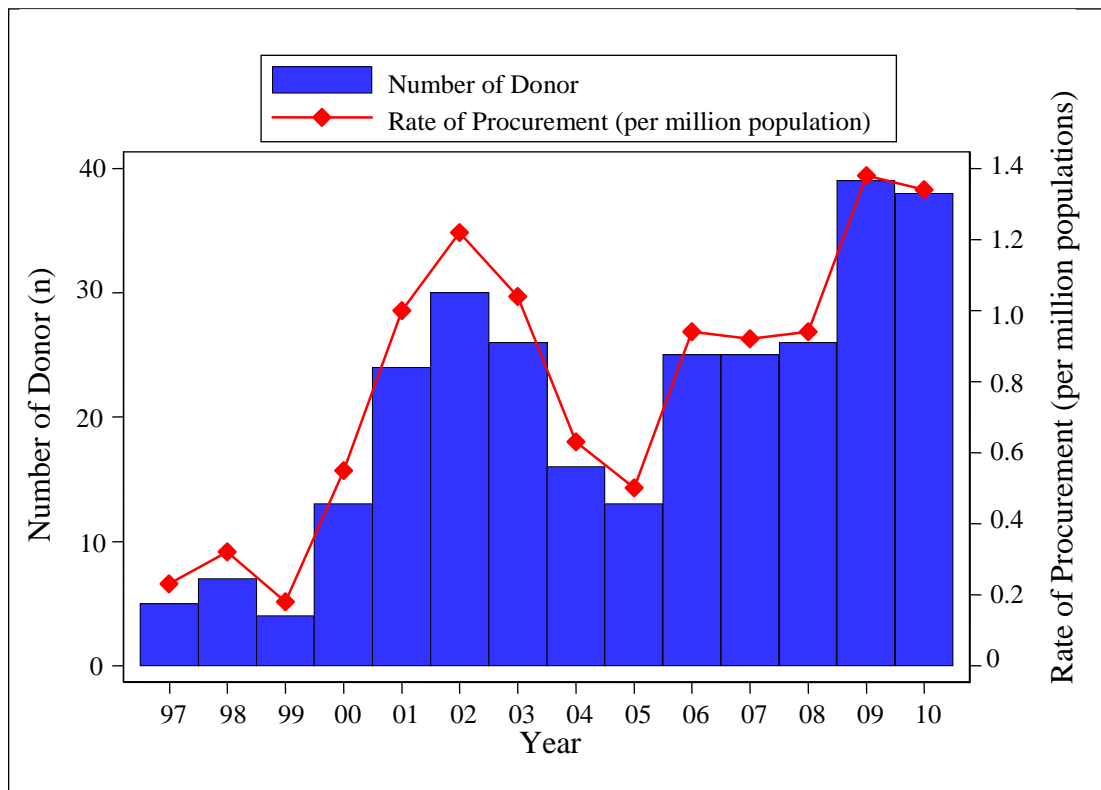


Figure 8.2.1: Number of Donations by Year, 1997-2010

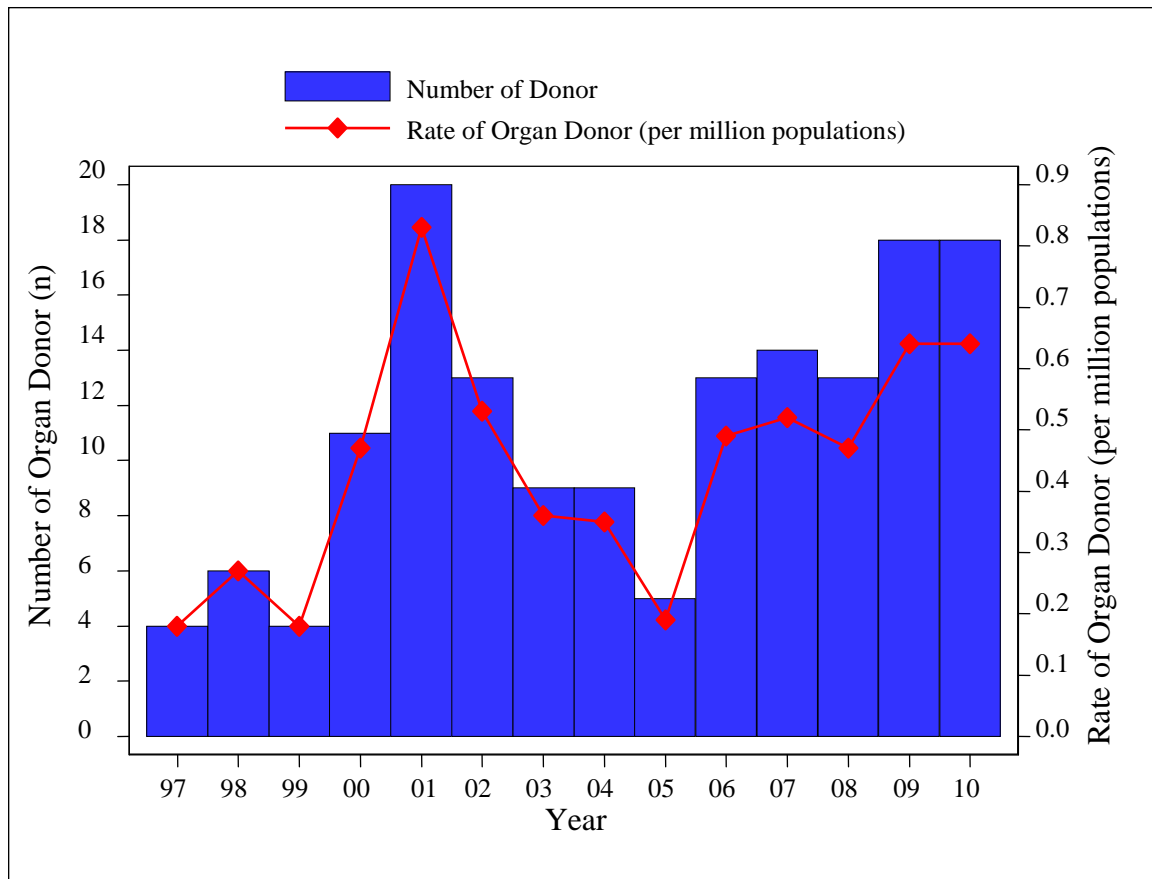


Figure 8.2.2: Number of Organ Donors by Year, 1997-2010

Table 8.2.3: Number of Organs Procured by Year, 1997-2010

Number of procurement by year N=291														
Organs procured	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Cornea	4	10	6	18	32	48	42	20	22	38	34	40	50	54
Heart	1	3	2	3	4	0	2	0	1	1	4	0	1	0
Liver	0	0	2	2	1	2	1	3	3	5	6	4	6	4
Kidney	8	10	6	22	38	26	18	18	10	26	28	26	36	36
Heart valve	0	1	2	8	10	10	11	11	6	16	8	13	20	14
Bone	0	1	0	3	2	6	5	5	2	5	5	4	9	7
Skin	0	0	0	2	2	2	1	1	0	2	0	0	3	1
Lung	0	0	0	0	0	0	0	0	1	1	3	0	0	1

8.3 DONOR CHARACTERISTICS

The donors in 2010 were older compared to the previous year with a mean age of 39.9 \pm 19.7, 32% were 50 years and older (Table 8.3.1). The youngest donor was 12 years old and the oldest 79 years old.

As in previous years, males formed the majority of the donors with 68% vs 32% females (Table 8.3.2). Chinese was the most common ethnic group at 68% (n=26) followed by Indians (26%, n=10), Malay (3%, n=1) and others (3%, n=1) (Table 8.3.3). There was an increasing trend in the number of donors among the Chinese ethnic group for the past five years. Malays made up only 5% (n=16) of total donors from 1997-2010.

All the donors in 2010 were Malaysian (Table 8.3.5). Overall, there were nine non-Malaysians who became organ/tissue donors from 1997-2010. In 2010, 9 donors came from Johor (24%), followed by Selangor and Perak with seven donors (18%) each (Table 8.3.6). Only 18% (n=7) of deceased donors in 2010 carried the organ donor pledge card (Table 8.3.7). The main cause of death was due to trauma related injuries accounting for 57.9% (22/38) for all donors (Table 8.3.8 and Table 8.3.9). Eleven (61%) of brain dead donors and 45% of post cardiac death donors (n=9) died from road traffic accidents

Of the 18 organ donors in 2010, the most common blood group was O (39%, n=7) followed by B (n=5, 28%), A (n=4, 22%) with only two (11%) from AB group. Overall, the data shows that the commonest blood group among organ donors is O (Table 8.3.10).

Table 8.3.1: Age Distribution of Donors, 1997-2010

Donor's age (years)	1997 N=5		1998 N=7		1999 N=4		2000 N=13		2001 N=24		2002 N=30		2003 N=26		2004 N=16		2005 N=13		2006 N=25		2007 N=25		2008 N=26		2009 N=39		2010 N=38		Total N=291			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
<1	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	2	1
1-9	1	20	0	0	0	0	1	8	1	4	1	3	1	4	1	6	1	8	2	8	3	12	3	12	3	8	0	0	18	6		
10-19	0	0	1	14	2	50	7	54	2	8	3	10	4	15	3	19	1	8	9	36	6	24	3	12	8	21	3	8	52	18		
20-29	1	20	3	43	2	50	1	8	6	25	6	20	4	15	3	19	2	15	2	8	6	24	7	27	7	18	10	26	60	21		
30-39	1	20	0	0	0	0	0	0	5	21	1	3	3	12	2	13	1	8	1	4	1	4	3	12	9	23	4	11	31	11		
40-49	0	0	1	14	0	0	2	15	4	17	8	27	4	15	4	25	2	15	3	12	5	20	5	19	3	8	9	24	50	17		
50-59	1	20	2	29	0	0	1	8	4	17	7	23	3	12	3	19	1	8	2	8	2	8	2	8	6	15	8	21	42	14		
60-69	0	0	0	0	0	0	1	8	2	8	0	0	3	12	0	0	3	23	4	16	2	8	1	4	0	0	3	8	19	7		
70-79	0	0	0	0	0	0	0	0	0	0	4	13	3	12	0	0	1	8	2	8	0	0	1	4	0	0	1	3	12	4		
80-89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	0	0	0	0	0	0	0	0	0	0	1	0		
No data	1	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	2	5	0	0	4	1	
Total	5		7		4		13		24		30		26		16		13		25		25		26		39		38		291			
Mean	27.25		34.43		20.50		25.23		36.88		42.37		39.41		32.50		46.19		35.71		29.64		31.72		29.00		39.90		35.11			
SD	21.06		17.12		4.43		18.71		15.67		19.61		21.78		15.57		24.70		23.43		18.81		18.82		14.78		16.73		19.15			
Median	28.00		25.00		21.00		17.00		37.00		46.00		39.79		31.50		48.00		23.00		23.00		27.00		29.00		41.75		34.00			
Minimum	2		16		15		5		8		4		<1*		8		3		3		1**		1		<1*		12		<1*			
Maximum	51		57		25		60		66		79		77		55		82***		77		68		71		56		79		82***			

* The youngest tissue donor was 25 day old baby who donated heart valves in 2009 and 37 day old who donated heart valves in 2003

** The youngest organ donor was 14.5 month old who donated kidneys in 2007

*** The oldest tissue donor was 82 year old who donated eyes in 2005; the oldest organ donor was 66 year old who donated kidneys in 2001

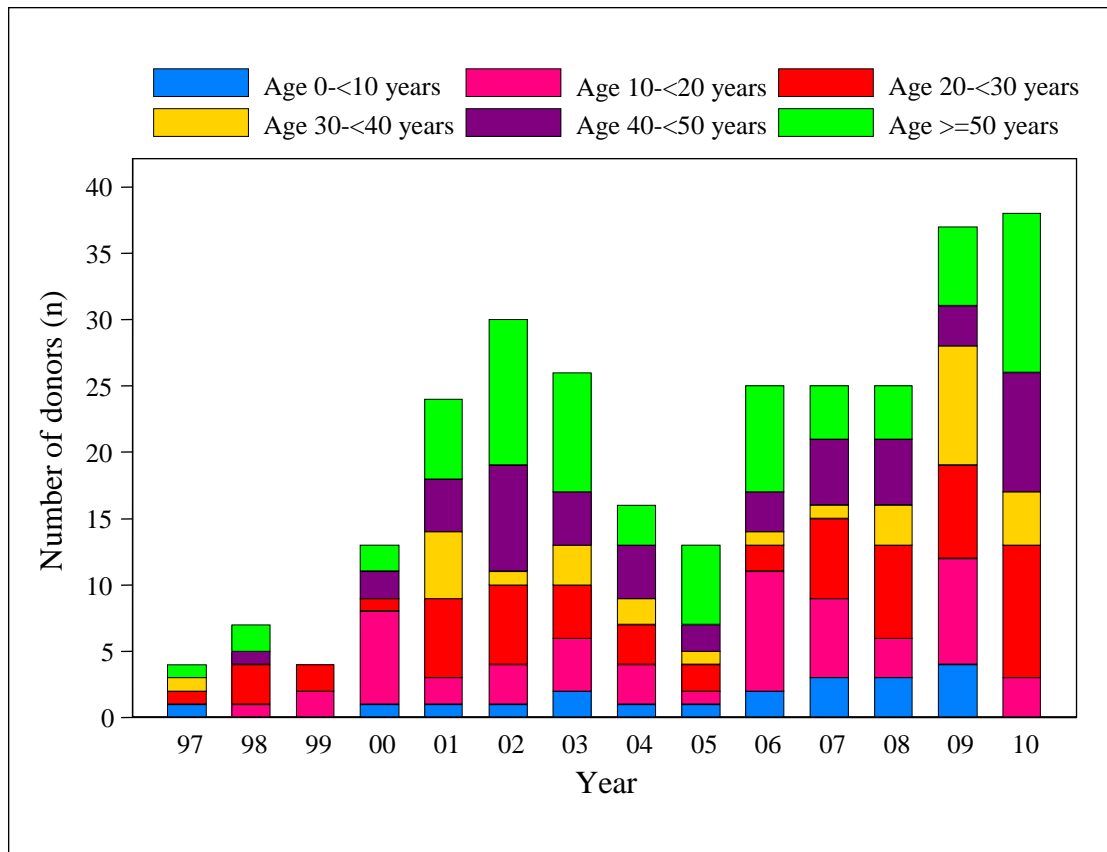


Figure 8.3.1.1: Donor's Age Group, 1997-2010

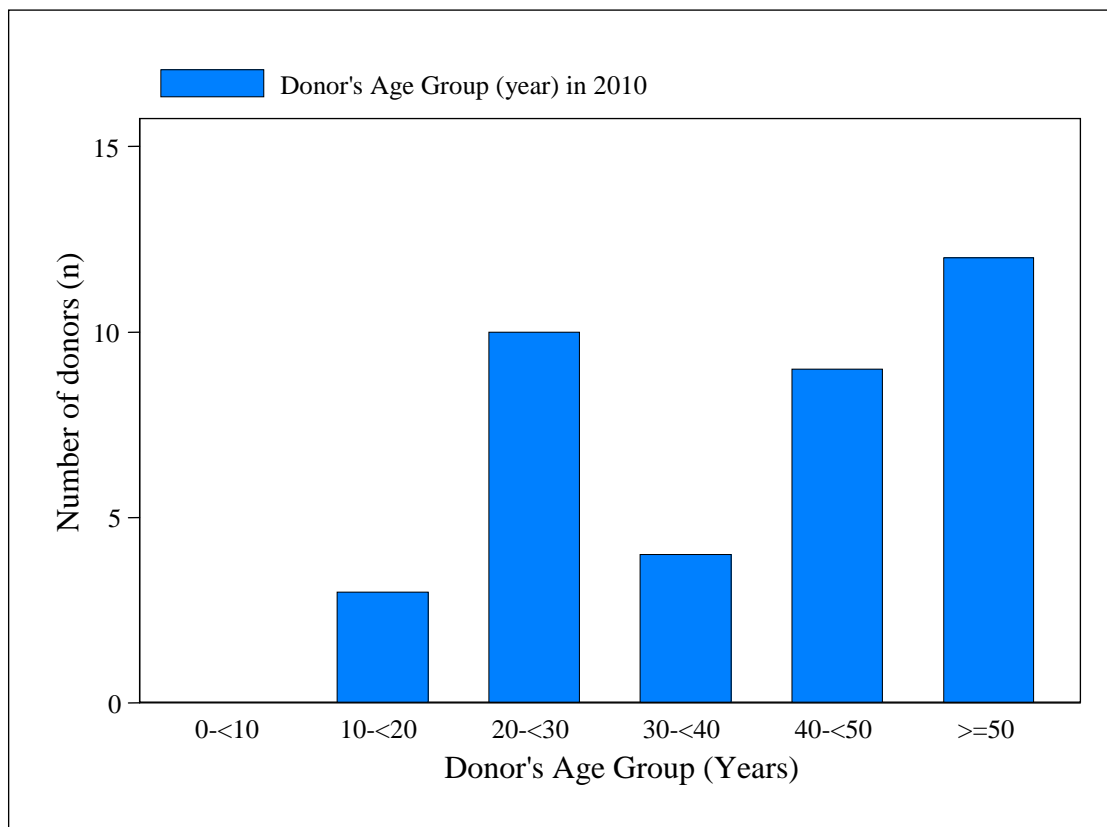


Figure 8.3.1.2: Donor's Age Group, 2010

Table 8.3.2: Donor's Gender, 1997-2010

Donor's gender	1997 N=5		1998 N=7		1999 N=4		2000 N=13		2001 N=24		2002 N=30		2003 N=26		2004 N=16	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Male	3	60	7	100	3	75	11	85	20	83	27	90	22	85	12	75
Female	2	40	0	0	1	25	2	15	4	17	3	10	4	15	4	25

Donor's gender	2005 N=13		2006 N=25		2007 N=25		2008 N=26		2009 N=39		2010 N=38		Total N=291	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Male	8	62	19	76	20	80	18	69	26	67	26	68	222	76
Female	5	38	6	24	5	20	8	31	13	33	12	32	69	24

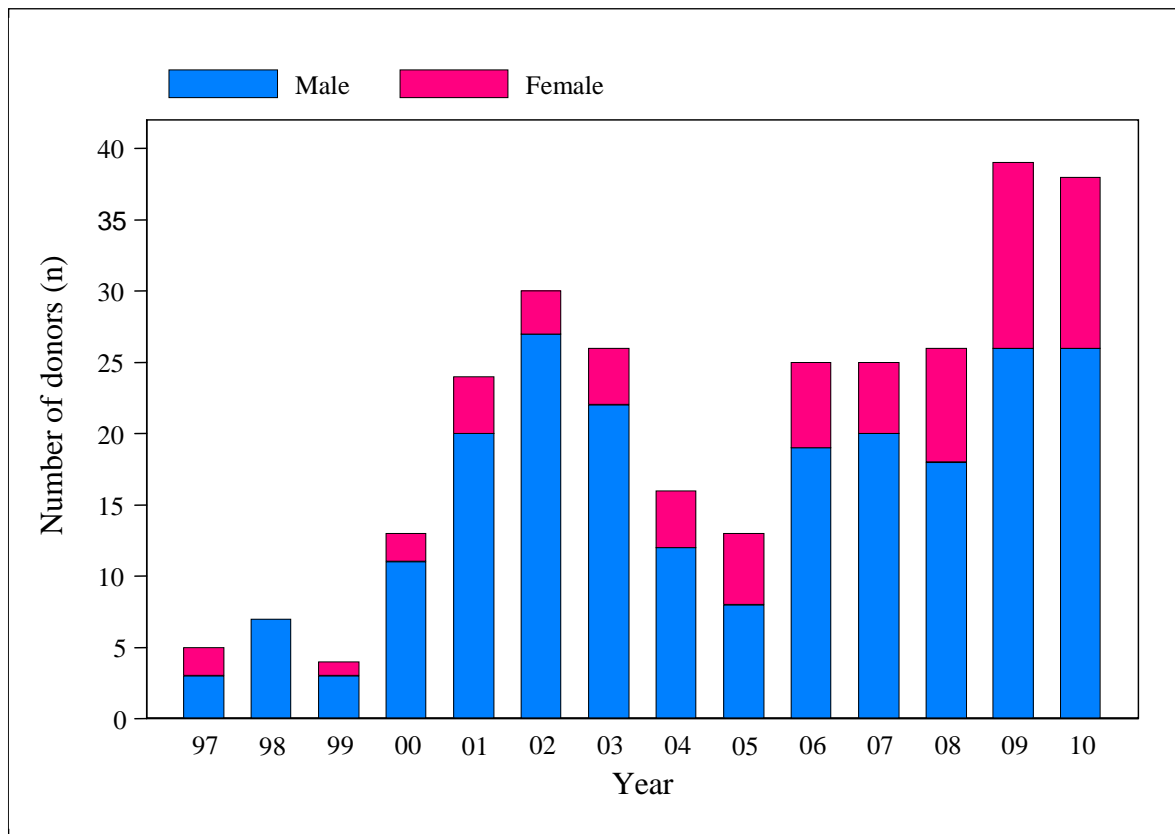


Figure 8.3.2: Donor's Gender, 1997-2010

Table 8.3.3: Donor's Ethnic Group, 1997-2010

Donor's ethnic group	1997 N=5		1998 N=7		1999 N=4		2000 N=13		2001 N=24		2002 N=30		2003 N=26		2004 N=16	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	1	20	0	0	0	0	2	15	1	4	0	0	0	0	1	6
Chinese	3	60	4	57	4	100	7	54	17	71	13	43	14	54	14	88
Indian	1	20	3	43	0	0	3	23	4	17	15	50	10	38	1	6
Others	0	0	0	0	0	0	1	8	2	8	2	7	2	8	0	0

Donor's ethnic group	2005 N=13		2006 N=25		2007 N=25		2008 N=26		2009 N=39		2010 N=38		Total N=291	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	1	8	1	4	5	20	0	0	3	8	1	3	16	5
Chinese	5	38	12	48	14	56	17	65	26	67	26	68	176	60
Indian	7	54	11	44	3	12	6	23	10	26	10	26	84	29
Others	0	0	1	4	3	12	3	12	0	0	1	3	15	5

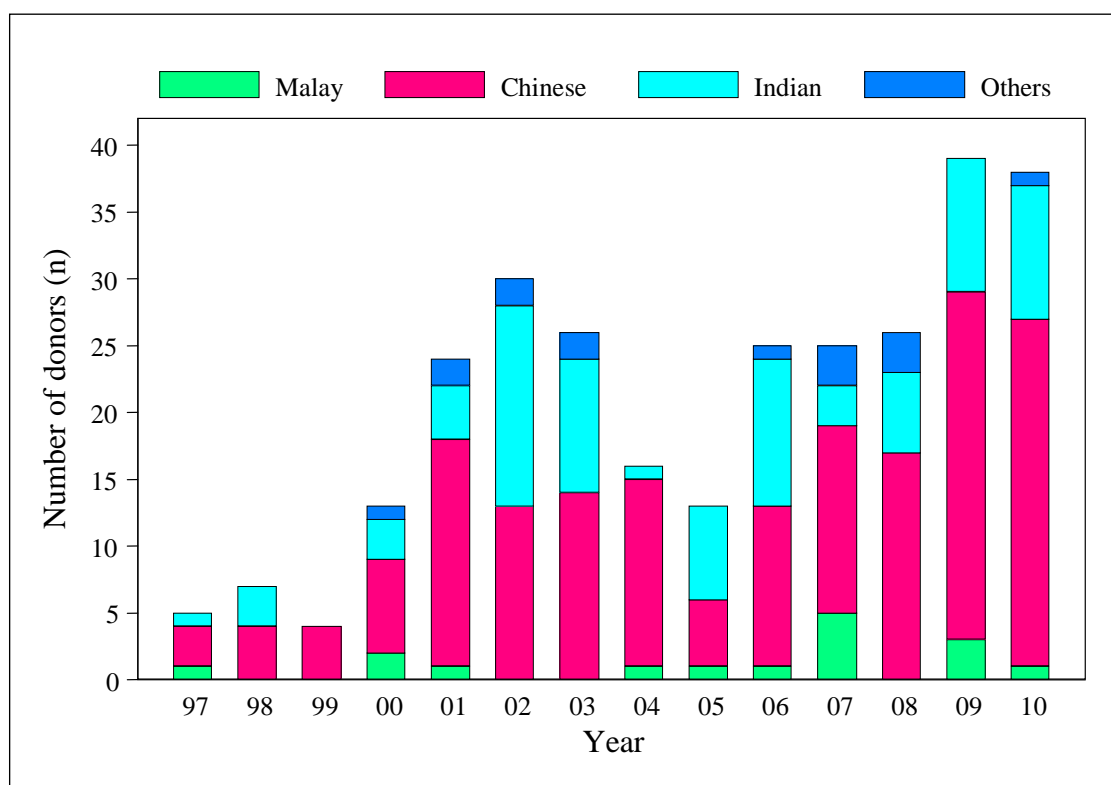


Figure 8.3.3: Donor's Ethnic Group, 1997-2010

Table 8.3.4: Donor's Religion, 1997-2010

Donor's religion	1997 N=5		1998 N=7		1999 N=4		2000 N=13		2001 N=24		2002 N=30		2003 N=26		2004 N=16	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Islam	1	20	0	0	0	0	2	15	1	4	0	0	1	4	2	13
Buddhism	3	60	3	43	0	0	0	0	1	4	5	17	14	54	14	88
Hinduism	1	20	3	43	0	0	3	23	3	13	13	43	7	27	0	0
Christianity	0	0	0	0	0	0	1	8	0	0	1	3	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0	0	0	2	8	0	0
Unknown	0	0	1	14	4	100	7	54	19	79	11	37	2	8	0	0

Donor's religion	2005 N=13		2006 N=25		2007 N=25		2008 N=26		2009 N=39		2010 N=38		Total N=291	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Islam	1	8	2	8	5	20	0	0	3	8	1	3	19	7
Buddhism	4	31	11	44	13	52	16	62	3	8	25	66	112	38
Hinduism	5	38	10	40	2	8	6	23	3	8	9	24	65	22
Christianity	0	0	0	0	4	16	3	12	0	0	1	3	10	3
Others	2	15	0	0	1	4	0	0	0	0	2	5	7	2
Unknown	1	8	2	8	0	0	1	4	30	77	0	0	78	27

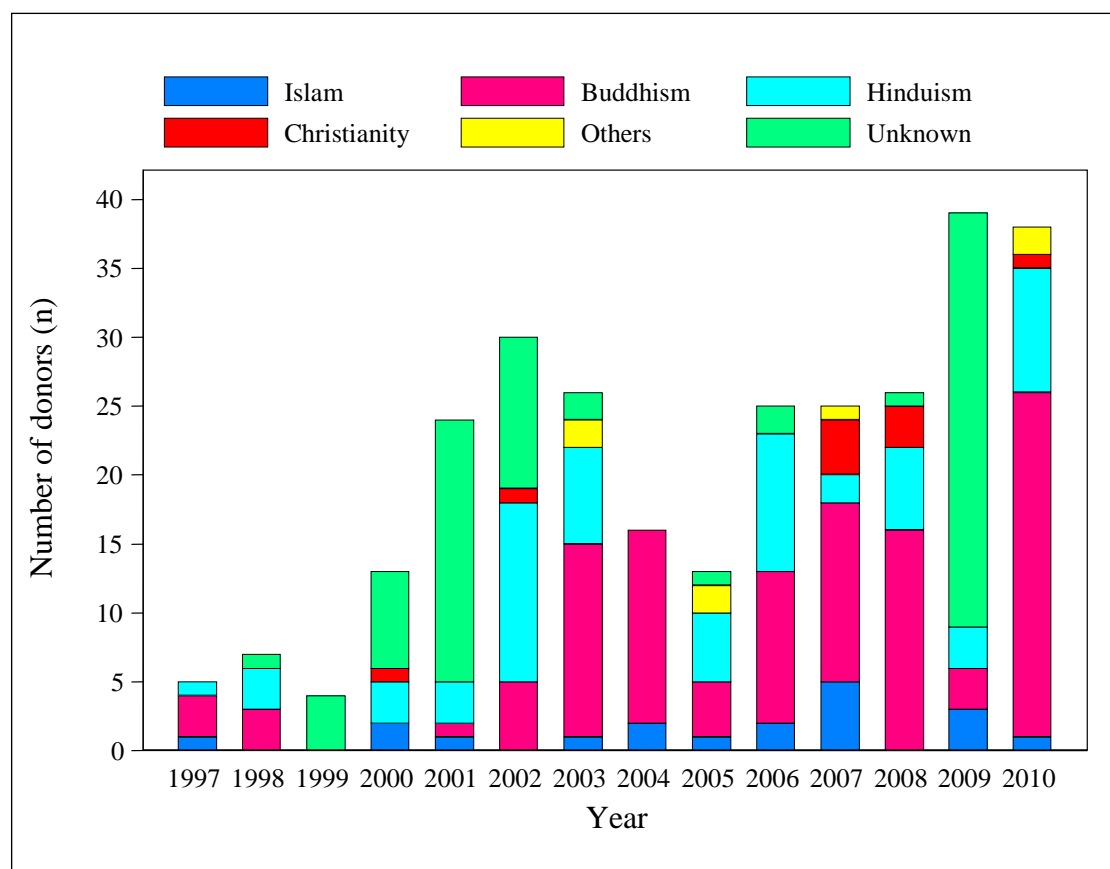


Figure 8.3.4: Donor's Religion, 1997-2010

Table 8.3.5: Donor's Nationality, 1997-2010

Nationality	1997 N=5		1998 N=7		1999 N=4		2000 N=13		2001 N=24		2002 N=30		2003 N=26		2004 N=16	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malaysian	5	100	7	100	4	100	13	100	21	88	29	97	25	96	16	100
Non-Malaysian	0	0	0	0	0	0	0	0	3	12	1	3	1	4	0	0

Nationality	2005 N=13		2006 N=25		2007 N=25		2008 N=26		2009 N=39		2010 N=38		Total N=291	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malaysian	13	100	24	96	24	96	24	92	39	100	38	100	282	97
Non-Malaysian	0	0	1	4	1	4	2	8	0	0	0	0	9	3

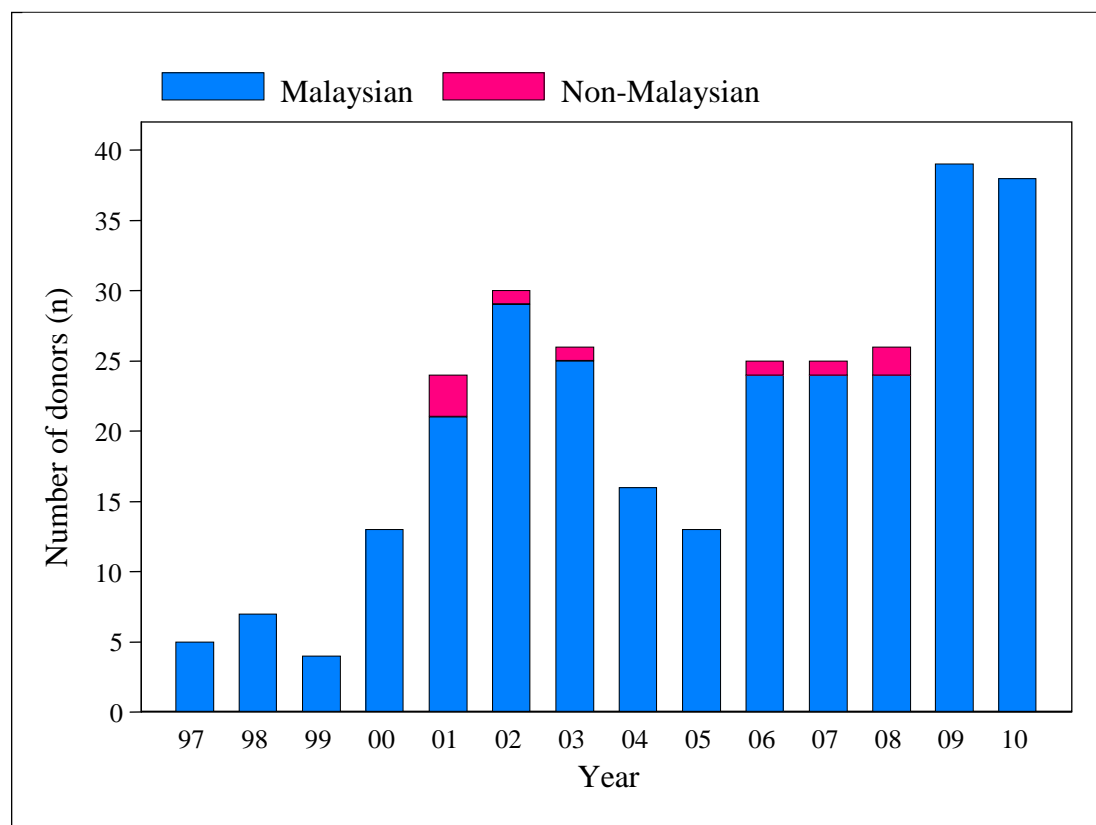


Figure 8.3.5: Donor's Nationality, 1997-2010

Table 8.3.6: Donor's State of Residence, 1997-2010

Donor's state of residence	1997 N=5		1998 N=7		1999 N=4		2000 N=13		2001 N=24		2002 N=30		2003 N=26		2004 N=16	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Johor	0	0	0	0	0	0	3	23	0	0	2	7	4	15	1	6
Malacca	0	0	1	14	1	25	0	0	0	0	1	3	2	8	0	0
Negeri Sembilan	0	0	1	14	0	0	1	8	0	0	1	3	4	15	0	0
Selangor	2	40	1	14	0	0	0	0	3	13	9	30	6	23	6	38
WP Kuala Lumpur	1	20	1	14	2	50	0	0	0	0	6	20	2	8	3	19
WP Putrajaya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Perak	1	20	2	29	1	25	3	23	0	0	4	13	0	0	2	13
Kedah	0	0	0	0	0	0	2	15	3	13	1	3	0	0	1	6
Perlis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pulau Pinang	0	0	0	0	0	0	1	8	3	13	1	3	3	12	2	13
Pahang	0	0	1	14	0	0	0	0	3	13	2	7	2	8	0	0
Terengganu	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0
Kelantan	0	0	0	0	0	0	1	8	0	0	0	0	0	0	0	0
Sabah	0	0	0	0	0	0	2	15	1	4	0	0	1	4	1	6
Sarawak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	1	20	0	0	0	0	0	0	10	42	3	10	2	8	0	0

Donor's state of residence	2005 N=13		2006 N=25		2007 N=25		2008 N=26		2009 N=39		2010 N=38		Total N=291	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Johor	1	8	1	4	5	20	3	12	6	15	9	24	35	12
Malacca	1	8	2	8	1	4	0	0	1	3	3	8	13	4
Negeri Sembilan	1	8	2	8	1	4	2	8	3	8	1	3	17	6
Selangor	7	54	2	8	6	24	3	12	13	33	7	18	65	22
WP Kuala Lumpur	2	15	6	24	3	12	8	31	6	15	6	16	46	16
WP Putrajaya	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Perak	1	8	4	16	2	8	3	12	4	10	7	18	34	12
Kedah	0	0	1	4	2	8	1	4	0	0	0	0	11	4
Perlis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pulau Pinang	0	0	4	16	2	8	2	8	5	13	4	11	27	9
Pahang	0	0	1	4	1	4	2	8	1	3	0	0	13	4
Terengganu	0	0	0	0	1	4	0	0	0	0	0	0	2	1
Kelantan	0	0	1	4	0	0	0	0	0	0	0	0	2	1
Sabah	0	0	0	0	0	0	2	8	0	0	1	3	8	3
Sarawak	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	1	4	1	4	0	0	0	0	0	0	18	6

Table 8.3.7: Donors who were registered pledgers, 1997-2010

Donor's pledged status	1997 N=5		1998 N=7		1999 N=4		2000 N=13		2001 N=24		2002 N=30		2003 N=26		2004 N=16	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pledged	0	0	0	0	0	0	0	0	0	0	5	17	6	23	5	31
Non-Pledged	5	100	7	100	4	100	13	100	24	100	25	83	20	77	11	69
Unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	5	100	7	100	4	100	13	100	24	100	30	100	26	100	16	100

Donor's pledged status	2005 N=13		2006 N=25		2007 N=25		2008 N=26		2009 N=39		2010 N=38		Total N=291	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pledged	4	31	3	12	3	12	1	4	3	8	7	18	37	13
Non-Pledged	9	69	22	88	22	88	25	96	34	87	30	79	251	86
Unknown	0	0	0	0	0	0	0	0	2	5	1	3	3	1
Total	13	100	25	100	25	100	26	100	39	100	38	100	291	100

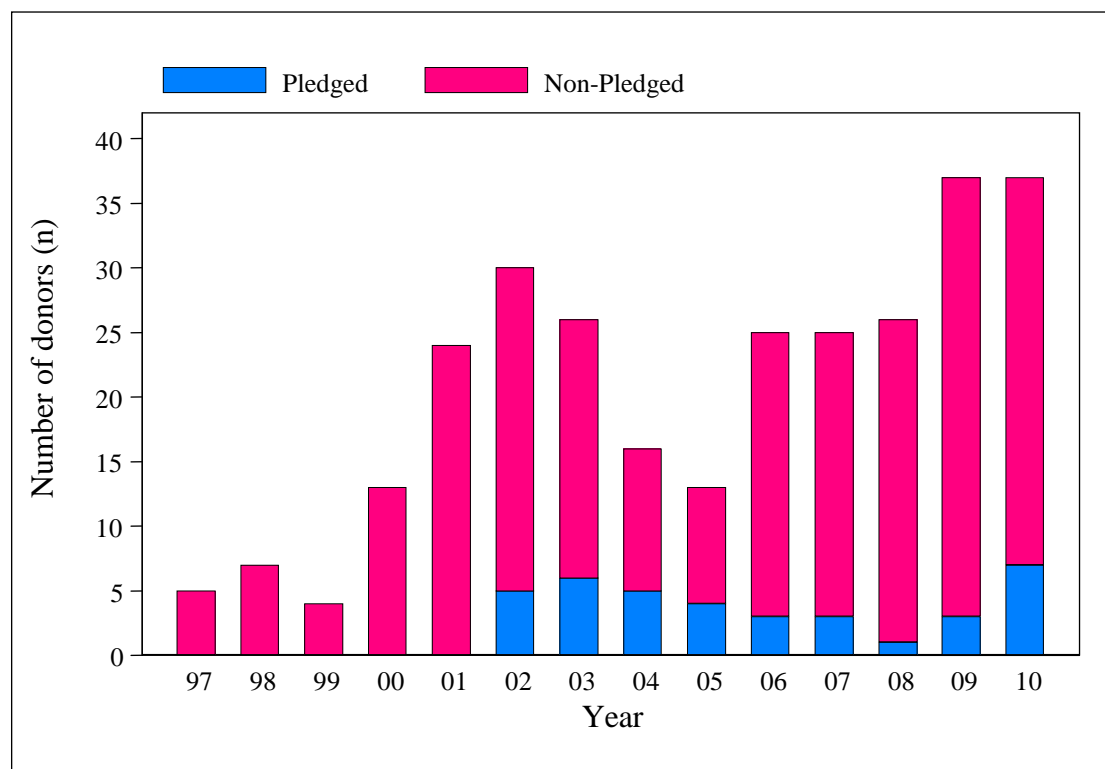


Figure 8.3.7: Donors who were registered pledgers, 1997-2010

Table 8.3.8: Brain Dead Donor's Cause of Death, 2010

Cause of Death	2010 N=18	
	No.	%
Traumatic Head Injury		
• Road Traffic Accident	11	61
Spontaneous Intracranial Hemorrhage	4	22
Thromboembolic Brain Infarct	1	6
Others	2	11

Table 8.3.9: Cardiac Death Donor's Cause of Death, 2010

Cause of Death	2010 N=20	
	No.	%
Traumatic Injury		
• Road Traffic Accident	9	45
• Fall	1	5
• Homicide	1	5
Heart Disease	3	15
Respiratory Disease	1	5
Infection	1	5
Others	4	20

Table 8.3.10: Organ Donor's Blood Group, 1997-2010

Blood group	No. (%)							
	1997 N=4	1998 N=6	1999 N=4	2000 N=11	2001 N=20	2002 N=13	2003 N=9	2004 N=9
A	1 (25)	1 (17)	0 (0)	1 (9)	5 (25)	3 (23)	4 (44)	2 (22)
B	0 (0)	1 (17)	1 (25)	5 (45)	4 (20)	3 (23)	3 (33)	4 (44)
AB	1 (25)	1 (17)	0 (0)	0 (0)	1 (5)	0 (0)	0 (0)	0 (0)
O	2 (50)	2 (33)	3 (75)	5 (45)	10 (50)	7 (54)	2 (22)	3 (33)

Blood group	No. (%)						
	2005 N=5	2006 N=13	2007 N=14	2008 N=13	2009 N=18	2010 N=18	Total N=157
A	1 (20)	4 (31)	7 (50)	4 (31)	6 (33)	4 (22)	43 (27)
B	2 (40)	5 (38)	3 (21)	2 (15)	2 (11)	5 (28)	40 (25)
AB	0 (0)	2 (15)	0 (0)	0 (0)	1 (6)	2 (11)	8 (5)
O	2 (40)	2 (15)	4 (29)	7 (54)	9 (50)	7 (39)	65 (42)

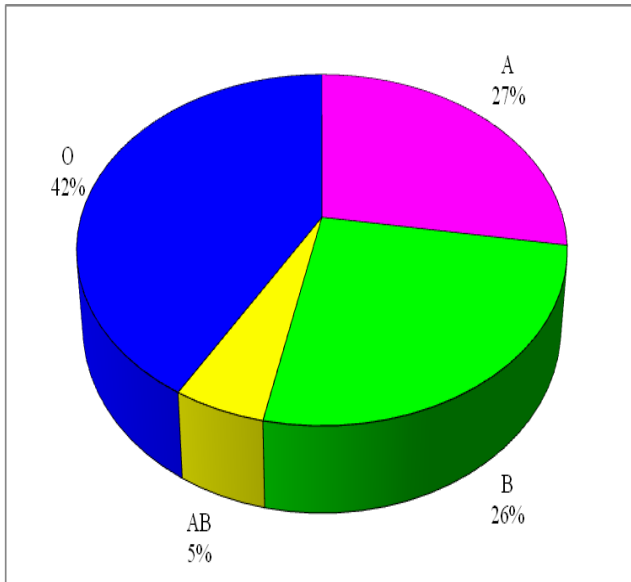


Figure 8.3.8a: Organ Donor's Blood Group, 1997-2010

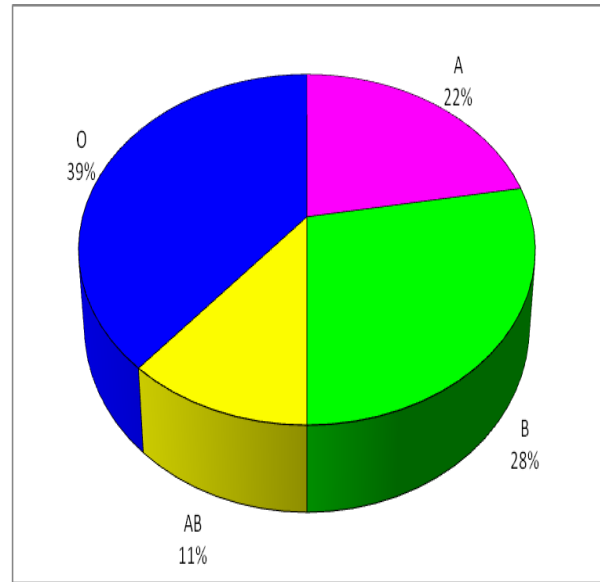


Figure 8.3.8b: Organ Donor's Blood Group, 2010

8.4 DONOR MANAGEMENT

In 2010, 58% (n=22) of donations took place in MOH state hospitals followed by MOH specialist hospitals (n=14, 37%) and only 5% (n=2) of donations took place in private hospitals (Table 8.4.2). Majority of donors (n=22, 58%) were referred from ICU (Table 8.4.3) while 26% (n=10) of them were referred from mortuary. There were three donors referred (8%) from emergency department and general ward respectively.

In 2010, all 18 brain dead organ donors needed inotropic support for maintenance of blood pressure, with more than a quarter (27.8%, n=5) requiring three inotropes, seven (38.9%) on double inotropes and six (33.3%) on a single inotrope (Table 8.4.4). Noradrenaline was used in 89% (16/18).

A majority of donors had no significant past medical history (n=22, 58%). However, 11 (29%) of them were smokers, eight (21%) consumed alcohol and 10 (27%) had at least one comorbidity (heart disease, hypertension or diabetes) (Table 8.4.6).

The mean cold ischaemic duration for lung was recorded at 4.9 hours, liver 5.5 hours and 13.1 hours for kidney (Table 8.4.7). The shortest cold ischaemic duration for liver was 3.1 hours and 1.3 hours for kidney while the maximum was 7.2 hours and 25.5 hours for liver and kidney respectively.

Table 8.4.1: State where organ and tissue procurement took place, 1997-2010

State	1997 N=5		1998 N=7		1999 N=4		2000 N=13		2001 N=24		2002 N=30		2003 N=26		2004 N=16	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Johor	1	20	0	0	0	0	3	23	0	0	2	7	5	19	1	6
Kedah	0	0	0	0	0	0	3	23	4	17	1	3	0	0	1	6
Kelantan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacca	0	0	1	14	1	25	0	0	0	0	2	7	1	4	0	0
Negeri Sembilan	0	0	0	0	0	0	1	8	0	0	0	0	3	12	0	0
Pahang	0	0	1	14	0	0	0	0	0	0	3	10	1	4	0	0
Perak	0	0	2	29	1	25	2	15	0	0	2	7	0	0	2	13
Perlis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pulau Pinang	0	0	0	0	0	0	1	8	3	13	0	0	3	12	2	13
Sabah	0	0	0	0	0	0	1	8	0	0	0	0	1	4	1	6
Sarawak	0	0	0	0	0	0	1	8	0	0	0	0	0	0	0	0
Selangor	1	20	0	0	1	25	0	0	2	8	4	13	4	15	2	13
Terengganu	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0
WP Kuala Lumpur	2	40	3	43	1	25	1	8	14	58	15	50	8	31	7	44
WP Labuan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WP Putrajaya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	1	20	0	0	0	0	0	0	0	0	1	3	0	0	0	0

State	2005 N=13		2006 N=25		2007 N=25		2008 N=26		2009 N=39		2010 N=38		Total N=291	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Johor	1	8	3	12	4	16	2	8	6	15	9	24	37	13
Kedah	0	0	1	4	2	8	1	4	0	0	0	0	13	4
Kelantan	0	0	2	8	0	0	0	0	0	0	0	0	2	1
Malacca	1	8	2	8	1	4	1	4	2	5	3	8	15	5
Negeri Sembilan	1	8	1	4	2	8	2	8	1	3	3	8	14	5
Pahang	0	0	0	0	1	4	0	0	1	3	0	0	7	2
Perak	1	8	1	4	2	8	2	8	4	10	6	16	25	9
Perlis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pulau Pinang	0	0	2	8	2	8	2	8	5	13	3	8	23	8
Sabah	0	0	0	0	0	0	2	8	0	0	1	3	6	2
Sarawak	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Selangor	4	31	4	16	4	16	5	19	11	28	10	26	52	18
Terengganu	0	0	0	0	1	4	0	0	0	0	0	0	2	1
WP Kuala Lumpur	5	38	9	36	6	24	7	27	9	23	3	8	90	31
WP Labuan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WP Putrajaya	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	2	8	0	0	0	0	4	1

Table 8.4.2: Establishments where organ and tissue procurement took place, 1997-2010

Donor's Institution of Procurement	1997 N=5		1998 N=7		1999 N=4		2000 N=13		2001 N=24		2002 N=30		2003 N=25		2004 N=16	
	No.	%	No.	%	No.	%	No.	No.	No.	%	No.	%	No.	%	No.	%
MOH State hospitals	2	40	5	71	1	25	10	77	16	67	18	60	16	62	11	69
MOH Specialist hospitals	0	0	0	0	0	0	2	15	0	0	4	13	3	12	2	13
MOH Non-Specialist hospitals	0	0	0	0	0	0	0	0	0	0	0	0	1	4	1	6
University hospitals	1	20	1	14	0	0	0	0	6	25	3	10	3	12	1	6
Private hospitals	1	20	0	0	3	75	1	8	2	8	4	13	3	12	1	6
Others	1	20	1	14	0	0	0	0	0	0	1	3	0	0	0	0

Donor's Institution of Procurement	2005 N=13		2006 N=25		2007 N=25		2008 N=26		2009 N=39		2010 N=38		Total N=291	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
MOH State hospitals	6	46	17	68	14	56	8	31	20	51	22	58	166	57
MOH Specialist hospitals	3	23	3	12	6	24	7	27	12	31	14	37	56	19
MOH Non-Specialist hospitals	0	0	0	0	1	4	0	0	1	3	0	0	4	1
University hospitals	1	8	3	12	2	8	3	12	4	10	0	0	28	10
Private hospitals	3	23	2	8	2	8	6	23	2	5	2	5	32	11
Others	0	0	0	0	0	0	2	8	0	0	0	0	5	2

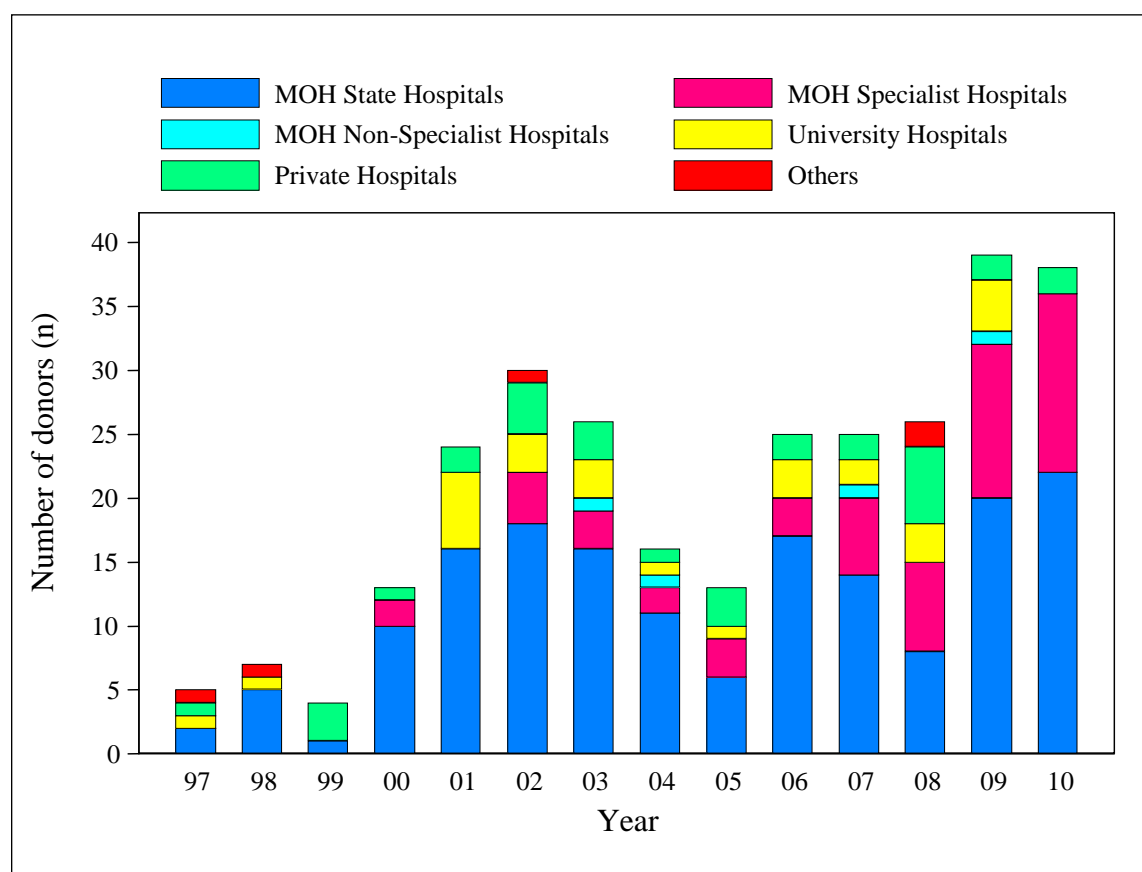


Figure 8.4.2: Establishments where organ and tissue procurement took place, 1997-2010

Table 8.4.3: Location where donors were referred from, 1997-2010

Donor Referral Site	1997 N=5		1998 N=7		1999 N=4		2000 N=13		2001 N=24		2002 N=30		2003 N=26		2004 N=16	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
ICU	1	20	0	0	0	0	1	8	14	58	16	53	13	50	12	75
Ward	0	0	0	0	0	0	0	0	0	0	1	3	3	12	1	6
Emergency department	0	0	0	0	0	0	0	0	3	13	4	13	1	4	0	0
Mortuary	0	0	0	0	0	0	0	0	0	0	3	10	5	19	3	19
Home	1	20	0	0	0	0	0	0	0	0	1	3	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown/Missing	3	60	7	100	4	100	12	92	7	29	5	17	4	15	0	0

Donor Referral Site	2005 N=13		2006 N=25		2007 N=25		2008 N=26		2009 N=39		2010 N=38		Total N=291	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
ICU	7	54	16	64	17	68	17	65	18	46	22	58	154	53
Ward	3	23	3	12	1	4	3	12	4	10	3	8	22	8
Emergency department	0	0	3	12	1	4	1	4	2	5	3	8	18	6
Mortuary	1	8	3	12	5	20	3	12	13	33	10	26	46	16
Home	0	0	0	0	0	0	2	8	0	0	0	0	4	1
Others	0	0	0	0	0	0	0	0	2	5	0	0	2	1
Unknown/Missing	2	15	0	0	1	4	0	0	0	0	0	0	45	15

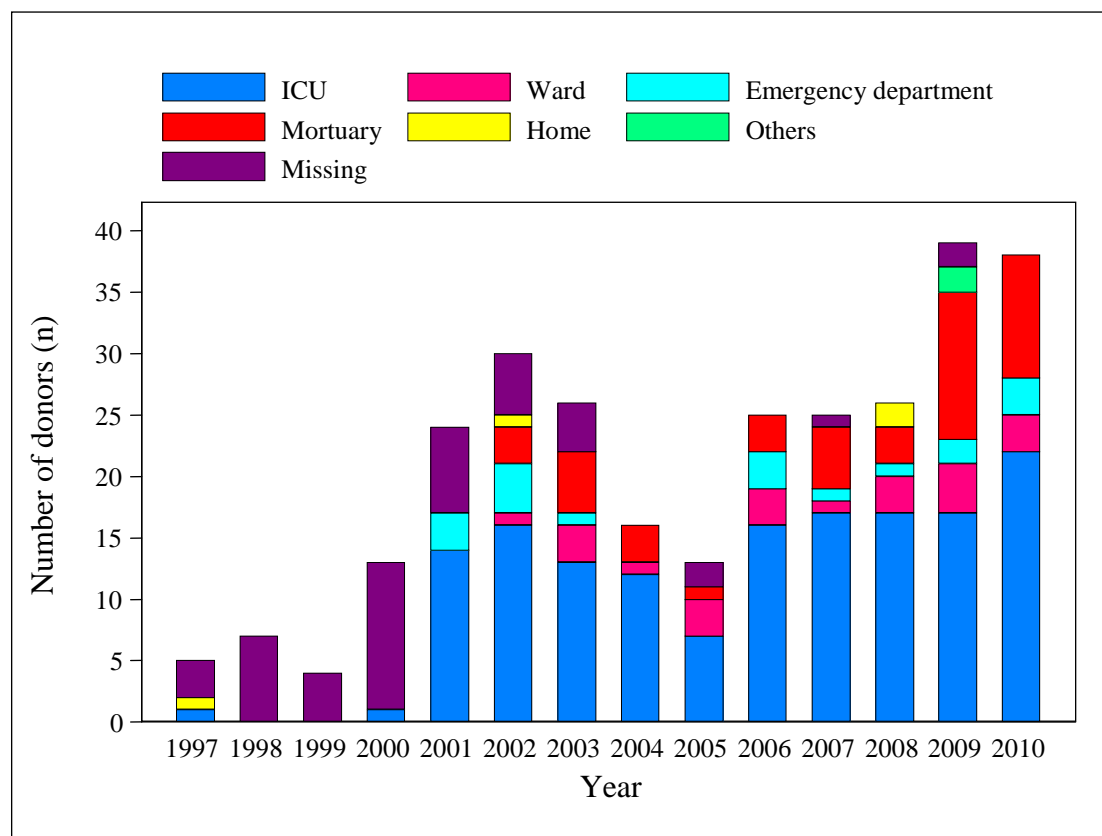


Figure 8.4.3: Location where donors were referred from, 1997-2010

Table 8.4.4: Inotrope Usage, 2010

Inotropes	No.	%
Noradrenaline only	4	22.2
Dopamine only	2	11.1
Dopamine and Noradrenaline	7	38.9
Dopamine, Noradrenaline and Adrenaline	1	5.56
Dopamine, Dobutamine and Noradrenaline	4	22.2
Total	18	100

Table 8.4.5: Serology Profile, 1997-2010

Serology	1997	1998	1999	2000	2001	2002	2003	2004
HBs Antigen Positive	0	1	0	0	1	0	0	1
HBsAb & Hep B Core Ab Positive	No data							
HBsAb Negative & Anti Hep B Core Ab Positive	No data							
HBsAb Positive	No data							
Hep B Core Ab Positive	No data						1	4

Serology	2005	2006	2007	2008	2009	2010	Total
HBs Antigen Positive	0	1	0	0	3	1	8
HBsAb & Hep B Core Ab Positive	No data				1	4	5
HBsAb Negative & Anti Hep B Core Ab Positive	No data				3	3	6
HBsAb Positive	No data				2	8	10
Hep B Core Ab Positive	0	4	5	2	4	7	27

Table 8.4.6: Donor's medical history, 2010

Medical History	Number (N=38)	%
Heart Disease	4	11
Hypertension	4	11
Diabetes	2	5
Drank Alcohol	8	21
Smoked	11	29
None	22	58

Table 8.4.7: Cold Ischaemic Duration for Various Organs, 2010

Organs	Heart	Lung	Heart & Lung	Liver	Kidney
No. Of Organs	0	1	0	3	34
Mean (Time, hours)	-	4.9	-	5.5	13.1
SD (Time, hours)	-	-	-	2.1	6.2
Median (Time, hours)	-	4.9	-	6.3	13.1
Minimum (Time, hours)	-	4.9	-	3.1	1.3
Maximum (Time, hours)	-	4.9	-	7.2	25.5