

CHAPTER 6

HOMOGRAFT - HEART VALVE TRANSPLANTATION

Editor:

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6.0 INTRODUCTION

The use of cardiovascular tissue homografts has become routine especially in paediatric cardiac surgery. These homografts have been successfully implanted as biological conduit prostheses during operations to repair congenital heart defects. Part of the reason for the increasing demand for these homografts with or without valves is because of its recognised inherent value, such as superior perfusion parameters, durability of conducting performance, ease of handling during implantation and the reduced risk of thrombo-embolic phenomena. Its use will remove the need for postoperative anticoagulation therapy. This is particularly essential in children, women of childbearing age and other patients in whom anticoagulation is contraindicated. Allograft implantation i.e. implantation of tissues of the same species is also preferred in an environment where sepsis is of concern. Allografts have an inherent resistance to infection as compared to non-biological prostheses.

In a response to the rising demand for homograft implantation that corresponds to a growing paediatric cardiac practice, Institut Jantung Negara (IJN) has embarked on establishing a cardiovascular tissue bank in 1995. The rising cost of imported homografts has further supported the establishment of the tissue bank within the institution. IJN has successfully retrieved and prepared cardiac homografts that have been implanted in more than a hundred patients.

The homograft unit at IJN comprises of surgeons and medical technicians involved in retrieving, processing and cryopreserving cardiovascular tissue for storage. The main issue remains the unresolved shortage of donors. This is despite continued efforts and steps taken to streamline the organisational structure for organ donation, build an efficient network system and improve public and medical staff awareness. With an anticipated increase in demand for homografts in the coming years and our country's hopes of attaining self-sufficiency it is important that this problem is given its due consideration.

6.1 STOCK AND FLOW

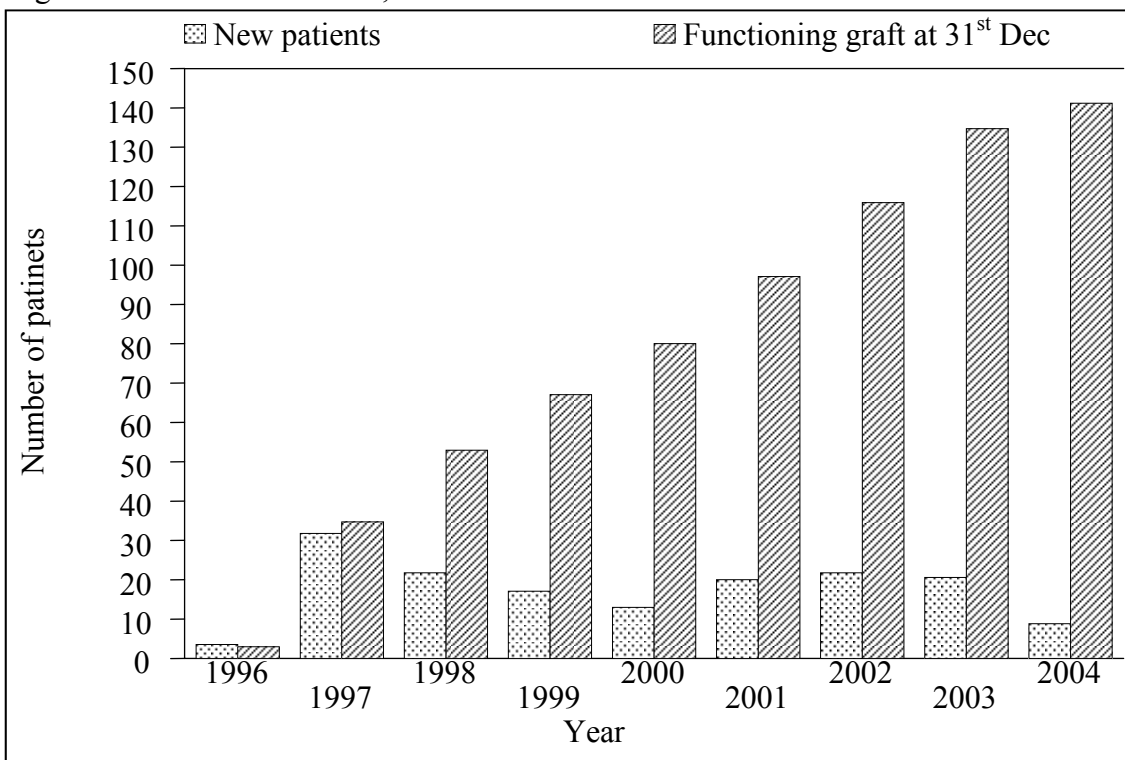
Out of 160 patients receiving a homograft 141 patients survived the procedure (survival 141/160). The highest number of tissue retrieval was in 1997 (32 pieces). Over the years 2001 to 2003 retrieval was averaging 20 pieces a year, but in the year 2004 only 9 pieces of homograft have been retrieved.

Table 6.1.1: Stock and Flow, 1996-2004

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004
New transplant	4	32	22	17	13	20	22	21	9
Deaths*	1	0	4	3	0	3	3	2	3
Lost to follow up	0	0	0	0	0	0	0	0	0
Alive with functioning graft at 31 st December	3	35	53	67	80	97	116	135	141

*based on year of death

Figure 6.1.1: Stock and Flow, 1996-2004



6.2 RECIPIENTS' CHARACTERISTICS

In the recipient population, there was an equal gender distribution (male:female ratio 81:79) (Table 6.2.1) and Malays (97/160) constituted more than half of the recipients (Table 6.2.2). The majority of recipients were in the age group of 0 to 9 years old (90/160) followed by 10 to 19 years (52/160) and >20 years of age (18/160) (Table 6.2.3).

Table 6.2.1: Gender distribution, 1996-2004

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	TOTAL
Gender	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Male	2	19	9	9	10	6	9	14	3	81
Female	2	13	13	8	3	14	13	7	6	79
TOTAL	4	32	22	17	13	20	22	21	9	160

Figure 6.2.1: Gender distribution, 1996-2004

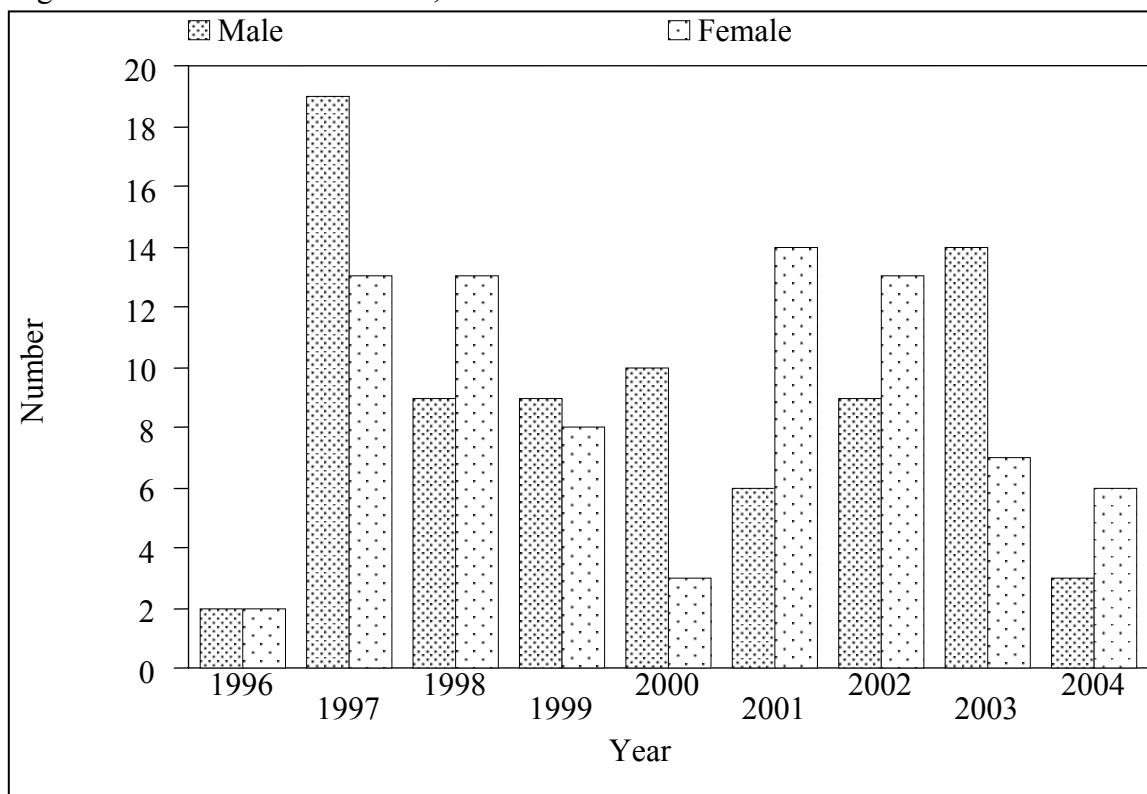


Table 6.2.2: Ethnic group distribution, 1996-2004

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	TOTAL
Ethnic group	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Malay	1	19	15	9	9	10	16	12	6	97
Chinese	3	11	4	3	2	9	4	6	1	43
Indian	0	2	2	2	0	1	2	2	1	12
Others	0	0	1	3	2	0	0	1	1	8
TOTAL	4	32	22	17	13	20	22	21	9	160

Figure 6.2.2: Ethnic group distribution, 1996-2004

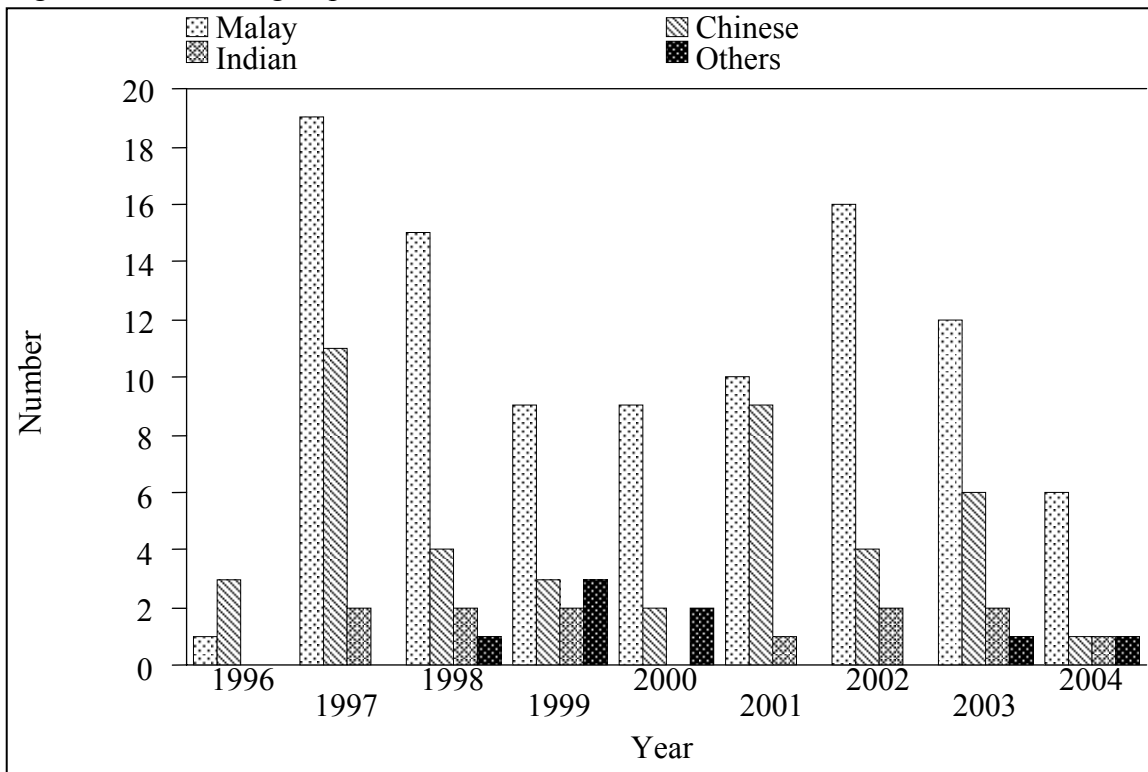
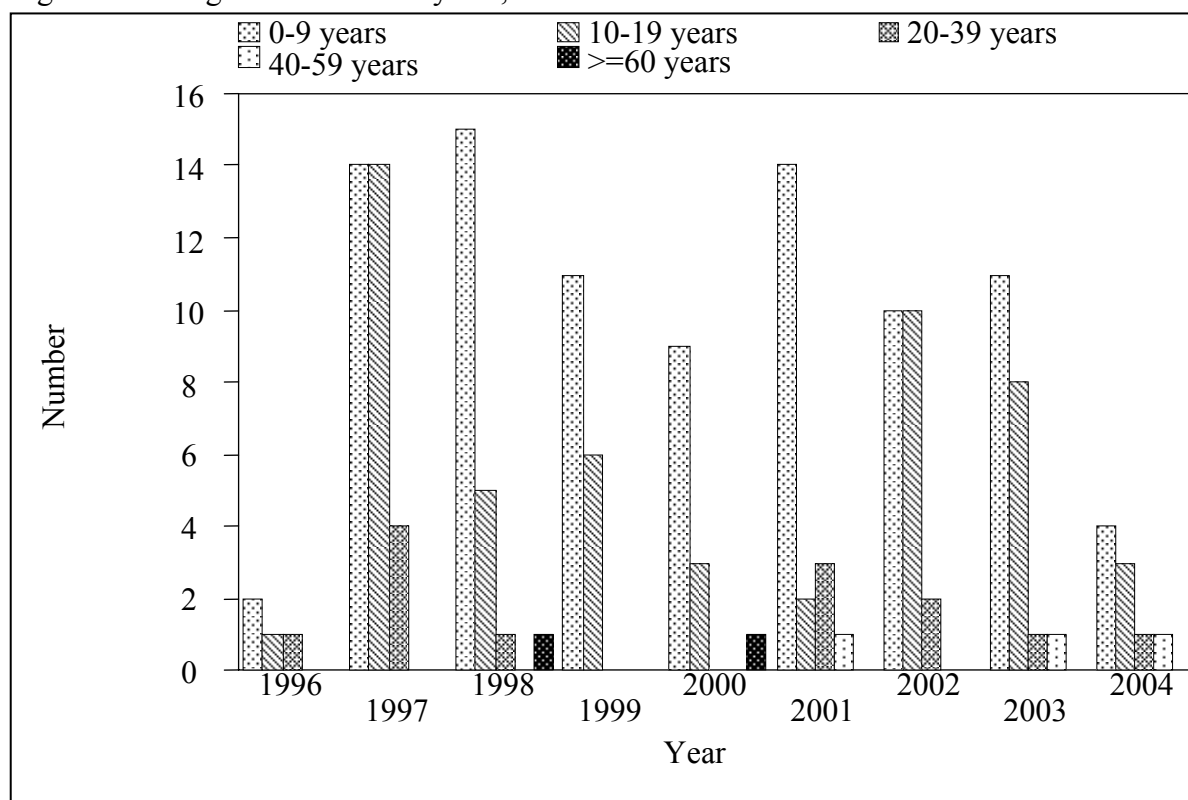


Table 6.2.3: Age distribution in years, 1996-2004

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	TOTAL
Age group (years)	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
0-9	2	14	15	11	9	14	10	11	4	90
10-19	1	14	5	6	3	2	10	8	3	52
20-39	1	4	1	0	0	3	2	1	1	13
40-59	0	0	0	0	0	1	0	1	1	3
>=60	0	0	1	0	1	0	0	0	0	2
TOTAL	4	32	22	17	13	20	22	21	9	160
Mean	12	12	11	7	13	11	10	12	15	11
SD	7	7	15	4	17	14	6	11	11	11
Median	11	11	8	7	9	5	10	9	10	9
Minimum	5	3 months	3 months	1	2	6 months	3	2	5	3 months
Maximum	21	30	70	17	67	53	28	53	42	70

*Age=date of implantation – date of birth

Figure 6.2.3: Age distribution in years, 1996-2004



6.3 TRANSPLANT PRACTICES

6.3.1 Donor details

A total of 160 cardiovascular homograft implantations had been carried out, 81 aortic and 79 pulmonary, according to tissue of origin, from 1996 till the end of 2004.

Table 6.3.1: Number of valves harvested by type of homograft, 1996-2004

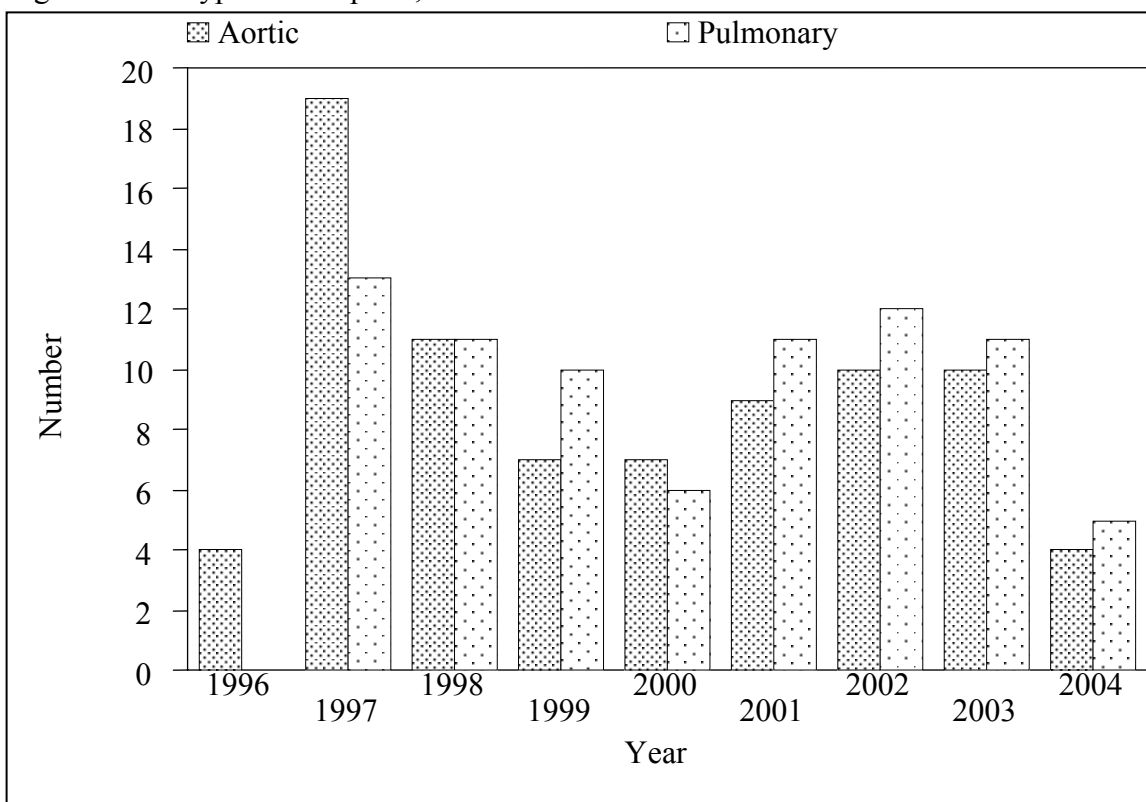
Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	TOTAL
Type of homograft	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Aortic	8	17	10	8	11	14	10	7	2	87
Pulmonary	1	14	11	10	12	12	14	8	4	86
TOTAL	9	31	21	18	23	26	24	15	6	173

6.3.2 Transplant details

Table 6.3.2: Type of transplant, 1996-2004

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	TOTAL
Type of transplant	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Aortic	4	19	11	7	7	9	10	10	4	81
Pulmonary	0	13	11	10	6	11	12	11	5	79
TOTAL	4	32	22	17	13	20	22	21	9	160

Figure 6.3.2: Type of transplant, 1996-2004



6.4 TRANSPLANT OUTCOMES

Table 6.4.1: Patient survival by gender, 1996-2004

Gender	Male		Female		
	Interval (years)	% Survival	SE	% Survival	SE
1		91	3	89	4
3		89	4	86	4
5		89	4	86	4

SE=standard error

Figure 6.4.1: Patient survival by gender, 1996-2004

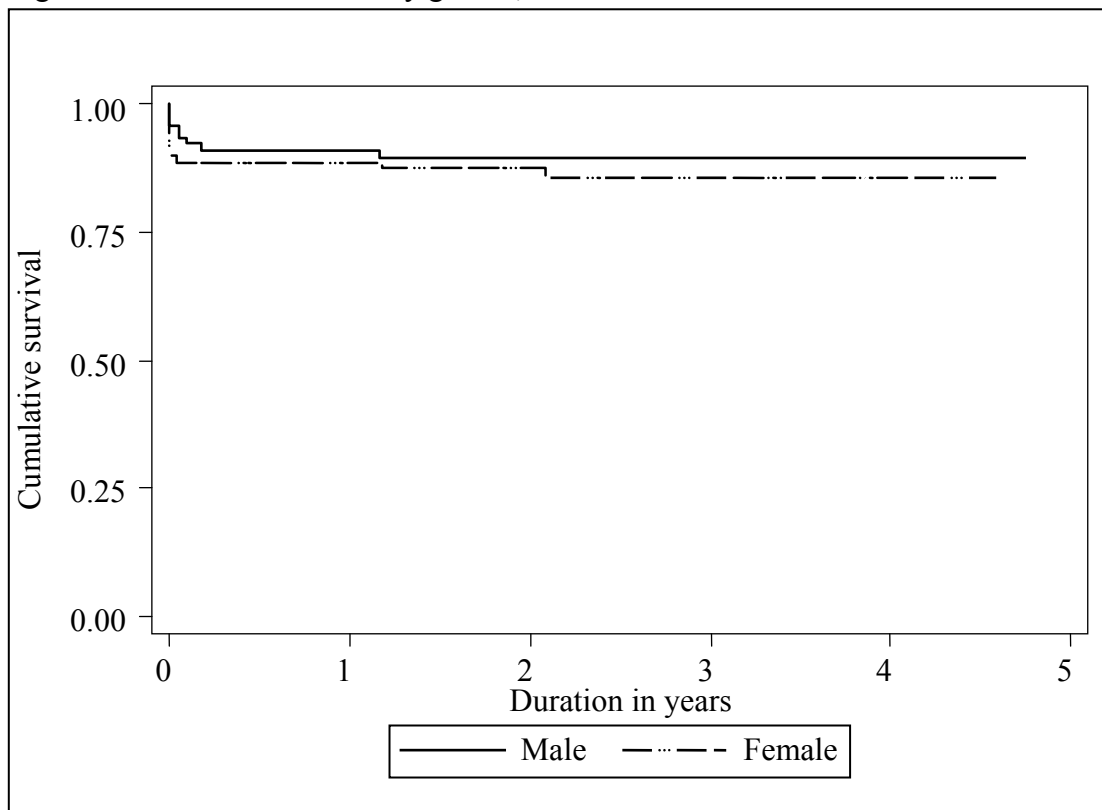


Table 6.4.2: Patient survival by age group, 1996-2004

Age group Interval (months)	0-9 years		10-19 years		≥20 years	
	% Survival	SE	% Survival	SE	% Survival	SE
1	86	4	96	3	94	5
3	84	4	92	4	94	5
5	84	4	92	4	94	5

SE=standard error

Figure 6.4.2: Patient survival by age group, 1996-2004

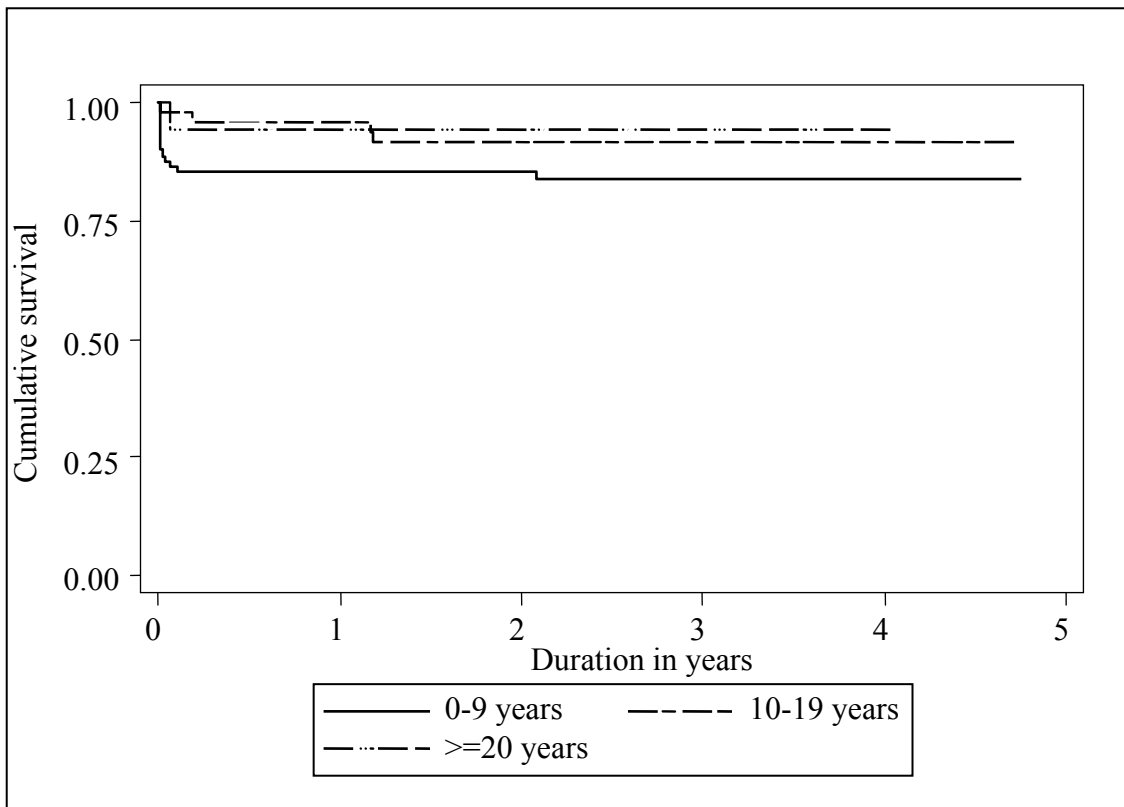


Table 6.4.3: Patient survival by type of homograft, 1996-2004

Type of homograft	Aortic		Pulmonary	
	% Survival	SE	% Survival	SE
Interval (years)				
1	91	3	89	4
3	87	4	89	4
5	87	4	89	4

SE=standard error

Figure 6.4.3: Patient survival by type of homograft, 1996-2004

