

Organ and Tissue Donation and Transplantation in New Zealand

2005 Report

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Introduction

This report summarises organ and tissue donation (from deceased donors) and organ and tissue transplantation activity in New Zealand in 2005, and this activity is compared to previous years from 2000 onwards.

The report also contains a summary of the current and planned activity of Organ Donation New Zealand (ODNZ).

It is intended that similar reports will be published annually – soon after the end of the relevant calendar year and that they will be available electronically via the ODNZ website.

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Organ Donation New Zealand

During 2005 the National Office of Transplant Donor Coordination was expanded and renamed Organ Donation New Zealand (ODNZ). ODNZ is the national Organ and Tissue Donation Agency, and provides a national service in accord with a new service specification with the Ministry of Health. ODNZ is accountable to the Auckland District Health Board, which in turn is being funded for ODNZ on behalf of all District Health Boards. The offices of ODNZ are located at the Green Lane Clinical Centre, in Auckland. The staffing and funding of ODNZ has been increased and there are now three full-time donor coordinators, a part-time clinical director (since October 2005) and a full time team support staff member. ODNZ is required to have an Advisory Committee and this will be established soon, as the Terms of Reference of the Committee have recently been finalised. The Advisory Committee is expected to first meet in mid-2006. The existing Link Nurse programme (wherein every intensive care unit (ICU) in New Zealand has a senior intensive care nurse in a “Link” role with ODNZ) is being expanded into a “Link Team” programme, with the addition of an ICU Link Doctor and an Operating Room (OR) Link Nurse. Terms of reference of Link Doctors and OR Link Nurses have been finalised and many of these have already been appointed. It is expected that all ICUs will have a Link Doctor and an OR Link Nurse during 2006.

High-level service objectives of ODNZ

- Further develop, maintain and enhance nationally consistent processes for deceased-donor organ donation in New Zealand
- Provide information and follow-up for the whanau/families of organ and tissue deceased-donors
- Provide information to the public and advice to health professionals about organ and tissue donation in New Zealand
- Co-ordinate organ and tissue donation and retrieval from patients who become brain-dead in Intensive Care Units, and deceased multi-tissue donors in the hospital and the community setting (excluding the Auckland Coronial service and eye-only donors outside of intensive care units)
- Provide educational programmes to health professionals involved with organ and tissue donation

Current activities of ODNZ

- Coordinating organ and tissue donation from deceased-donors in ICUs around New Zealand
- Providing ongoing support for the families of these donors
- Development of a new program (in Auckland initially) for tissue donation from donors who died in ICU but did not become brain dead.
- Providing 5-10 hospital study days per year for hospital staff in organ and tissue donation
- Continuing to provide the Link Nurse program
- Expanding this into a Link Team program with the addition of a Link Doctor in every ICU and an OR Link Nurse.
- Continuing to provide the ADAPT nursing and medical modules for staff involved in organ and tissue donation
- Establishing the Advisory Committee of ODNZ
- Assessing local hospital “organ and tissue donation problem issues” early in 2006
- Identifying and addressing local hospital organ and tissue donation needs
- Developing robust systems to audit organ and tissue donation processes at local hospital level
- Providing increased public access to information on organ and tissue donation.

Recent publications by ODNZ staff

- Dittmer I, Roake J, Langlands J. Dual kidney transplants In New Zealand. (Abstract). *Immunology and Cell Biology* 83 (4), A1-A34, 2005
- Streat SJ. Organ donation. In *Oh's Intensive Care Manual 5th Edition*. Eds Soni N, Bersten A. Butterworth-Heinemann, Edinburgh, 2003
- Streat S. Moral assumptions and the process of organ donation in the intensive care unit. *Crit Care* 2004 Oct; 8:382-388
- Streat SJ. Illness trajectories are also valuable in critical care (letter). *BMJ*. 2005 May 28; 330(7502):1272.
- Streat S. When do we stop? *Crit Care Resuscitation*. 2005; 7: 227-232
- Whetstone L, Streat S, Darwin M, Crippen D. Ethics roundtable debate: When is dead really dead? *Crit Care* 2005, 9:538-542

Organ and tissue donation

During 2005 there were 29 deceased donors from ICUs in 12 donor hospitals who donated organs (and tissues) for transplantation. All donors were certified brain dead and the option of organ donation was offered to families by intensive care staff. There were no non-heart-beating donors during 2005. There were somewhat fewer donors in 2005 compared to previous recent years and a trend towards increasing donor age and non-traumatic causes of donor death continued during 2005. [We believe that there are fewer patients becoming brain dead now (JA Judson, personal communication). There may be a variety of reasons for this and we suspect that in particular the increasing use in New Zealand of decompressive craniectomy in traumatic brain injury¹ and of ventriculostomy and early endovascular and surgical aneurysm occlusion in subarachnoid haemorrhage² may be largely responsible. These matters will be investigated during 2006].

Table 1 – Number of Organ Donors by Donor Hospital and Year

Hospital	2000	2001	2002	2003	2004	2005	Total
DCCM, Auckland City*	9	7	12	8	5	6	47
Christchurch	4	4	1	5	4	3	21
Dunedin	5	4	0	5	6	3	23
Gisborne	1	0	0	0	0	0	1
CVICU, Auckland City†	0	1	0	0	0	0	1
Hawkes Bay‡	3	3	1	3	2	2	14
Hutt	0	0	1	1	0	0	2
Middlemore	1	0	3	1	2	1	8
Nelson	1	3	1	0	1	0	6
North Shore	4	0	0	1	1	0	6
Palmerston North	2	2	2	1	0	2	9
New Plymouth	1	0	0	0	3	1	5
Rotorua	0	2	2	1	1	0	6
Southland	0	1	1	4	1	1	8
Starship Children's	0	0	1	1	0	0	2
Tauranga	0	0	1	0	1	3	5
Timaru	0	1	1	0	0	0	2
Waikato	2	2	6	6	3	1	20
Wairau	0	0	0	0	0	0	0
Wanganui	0	0	0	0	1	0	1
Wellington	8	7	5	2	9	5	36
Whakatane	0	0	0	1	0	0	1
Whangarei	0	0	0	0	0	1	1
Total	41	37	38	40	40	29	225

*Formerly "Auckland Hospital", †Formerly "Green Lane Hospital", ‡Napier and Hastings

Table 2 – Cause of Donor Death by Year

	2000	2001	2002	2003	2004	2005	Total
CVA	24	22	21	20	19	17	123
Trauma (road)	6	9	8	9	6	3	41
Trauma (other)	5	2	5	7	6	3	28
Other	6	4	4	4	9	6	33
Total	41	37	38	40	40	29	225

Table 3 – Age of Donors by Year

	2000	2001	2002	2003	2004	2005
Mean	39.7	41.1	40.3	38.0	43.0	44.9
Median	42.7	42.6	42.6	39.7	46.1	48
Minimum	5.5	16.6	7.7	13	1.1	17
Maximum	68.5	68.9	66.7	75.1	78.2	64

Table 4 – Ethnicity of Donors by Year

	2000	2001	2002	2003	2004	2005	Total
European	38	34	33	39	35	25	204
Maori	3	1	3	0	3	0	10
Pacific Peoples	0	0	1	1	1	0	3
Other	0	2	1	0	1	4	8
Total	41	37	38	40	40	29	225

Table 4 – Organs and Tissues retrieved for Transplantation

	2000	2001	2002	2003	2004	2005	Total
Kidneys*	82 (7)	68 (1)	70 (1)	74	65 (3)	55	414 (12)
Hearts	13	15	9	25	7 (1)	16	85 (1)
Lungs[‡]	16	13	12	22	12	11	86
Liver	36 (2)	30 (1)	28 (1)	34	35	22	185 (4)
Pancreas	3	3	2	6	2	2	18
Corneas#	12	13	29	35	32	11	132
Heart Valves#	19	13	20	9	21	6	88
Bone#	2	0	2	2	0	1	7

* Single kidneys, [‡] number of lung recipients, () Organs not suitable for transplantation, # Number of donors of these tissues

Table 5 – Organs from New Zealand donors transplanted in Australia

	2000	2001	2002	2003	2004	2005	Total
Liver	7	2	5	5	6	4	29
Hearts	0	0	2	3	2	3	10
Lungs	4	2	4	9	3	2	24
Kidneys	0	0	0	0	1	4	5

Table 6 – Organs from Australian donors transplanted in New Zealand

	2000	2001	2002	2003	2004	2005	Total
Liver	6	9	11	8	7	6	47
Hearts	0	0	1	0	0	0	1
Lungs	0	0	0	0	0	0	0
Kidneys	0	0	0	0	0	0	0

Tissue donation

Tissues including eyes (for corneas and sclera), heart valves and skin are donated for transplantation by a number of deceased donors in various circumstances. The option of tissue donation is offered to families by the Donor Tissue Co-ordinators, Department of Molecular Medicine and Pathology, University of Auckland. These donors are having coroner's autopsies performed in Auckland and the tissues are removed during that process. Eye donation is offered to families by the staff of Bereavement Care at Middlemore Hospital in conjunction with the New Zealand National Eye Bank. Tissue donation is also offered by intensivists to families of organ donors. Tissue donation also occurs when dying patients or their families offer donation and this is coordinated by the New Zealand National Eye Bank or ODNZ. In addition, there were 11 heart transplant recipients who donated heart valves from their explanted hearts during 2005.

[The number of coronial autopsies performed in Auckland continues to decline. As a direct consequence the availability of donated tissue in these circumstances is also declining. ODNZ is working closely with everyone currently involved in tissue donation to address this issue with a new tissue donation initiative during 2006. ODNZ will ensure that this initiative is carried out to a consistent and excellent standard of process.]

Organ Transplantation

Overview

Transplantation in New Zealand includes the following organs: kidney, heart, lung, liver and pancreas and these tissues: corneas (and scleras), heart valves and skin.

Kidney transplantation is provided at Auckland City Hospital (and Starship Childrens Hospital), Wellington Hospital and Christchurch Hospital. Heart, lung, liver and pancreas transplantation are provided at the Auckland City Hospital site (including paediatric heart, lung, liver, and kidney transplantation at Starship Children’s Hospital). There are well established live-donor kidney transplantation programs at all three centres, and live-donor adult-to-adult and adult-to-child liver transplantation is also provided as part of the liver transplant program.

Corneal tissue is stored for up to 21 days at the New Zealand National Eye Bank, at the Faculty of Medical and Health Sciences, University of Auckland. Corneal transplantation takes place in 13 centres throughout New Zealand, most commonly for keratoconus.

Heart valves are stored for up to five years at the New Zealand Heart Valve Laboratory, Starship Children’s Hospital, and are transplanted (into both adults and children) at Auckland City Hospital, Starship Children’s Hospital, Mercy Hospital and Ascot Hospital.

Skin is stored for up to five years at the Tissue Bank at the New Zealand Blood Service (71 Great South Road, Epsom) and it is subsequently used as a “temporary dressing” to cover large wounds, most commonly debrided burn wounds.

Kidney transplantation

Kidney transplantation is now performed at three centres – Auckland City Hospital (and Starship Childrens Hospital), Wellington Hospital and Christchurch Hospital. All centres contribute data to the Australia and New Zealand Dialysis and Transplant Registry (see <http://www.anzdata.org.au/>).

Kidney transplantation began in New Zealand³ in May 1965 (Williams L, personal communication) and there were 2967 kidney transplants performed up until the end of 2004. At this time there were 1224 New Zealand patients alive with a functioning kidney transplant, including 829 patients who

received a graft from a deceased donor and 395 who had received a graft from a living donor. These 1224 patients included 83 whose grafts had been functioning for more than 21 years (the longest for 35 years). The majority (65/83, 78%) of these long-functioning grafts were from deceased donors. The current New Zealand one-year and five-year patient survival after first-time kidney transplantation from a deceased-donor is approximately 97% and 82% and one-year and five-year graft survival is approximately 92% and 73%.

During 2005 there were 93 kidney transplants performed, including 47 where the graft was from a deceased donor and 46 from a living donor.

Table 6 – Kidney transplantation by year and donor type

	2000	2001	2002	2003	2004	2005	Total
Recipients, deceased-donor, single kidney	75	67	69	66	54	47	378
Recipients, deceased-donor, double kidney				1	4	0	5
Living-donor	31	43	48	44	48	46	260
Total	106	110	117	111	106	93	643

Heart transplantation and Lung transplantation

Heart transplantation in New Zealand⁴ commenced in December 1987 and lung transplantation commenced in 1993, both at Green Lane Hospital. These services have been provided at the Auckland City Hospital site since the end of 2003 following the opening of the new hospital on the Grafton site. The heart and lung transplant services contribute data to the Australia and New Zealand Cardiothoracic Organ Transplant Registry (which in turn contributes to the registry of the International Society for Heart and Lung Transplantation, which is available online at <http://www.ishlt.org/registries/heartLungRegistry.asp>).

There have been 183 heart transplants and 94 lung transplants performed in New Zealand up till the end of 2005, including 13 heart transplants and 8 lung transplants in 2005. During 2005 two patients received implanted ventricular assist devices as a “bridge to transplant” and both are currently well while awaiting heart transplantation. The current New Zealand one-year and five-year patient survival after heart transplantation is approximately 85% and 80% and one-year and five-year patient survival after lung transplantation is approximately 80% and 55%. These outcomes are in accord with or

better than international outcomes as reported to the International Society for Heart and Lung Transplantation.

Table 7 – Heart and Lung transplantation by year

	2000	2001	2002	2003	2004	2005	Total
Heart	13	15	7	22	4	13	74
Lung*	12	11	11	14	7	8	63

*Lung recipients

Liver transplantation

Liver transplantation in New Zealand⁵ commenced in February 1998, initially with adult recipients, and in 2002 liver transplantation was extended to children as well. These services are provided at the Auckland City Hospital site, including Starship Children’s Hospital. The New Zealand Liver Transplant Unit (NZLTU) contributes data to the Australia and New Zealand Liver Transplant Registry (<http://www.cs.nsw.gov.au/Gastro/LiverTransplant/default.htm>).

There have been 249 liver transplants (on 240 recipients) performed in New Zealand up till the end of 2005, including 227 transplants in 219 adult recipients and 22 transplants in 21 children. Six of these transplants were from live donors (one adult recipient, five children). The current New Zealand one-year and five-year patient survival after liver transplantation is approximately 95% and 87%, somewhat above most internationally reported outcomes⁵.

Table 8 – Liver transplantation by year

	2000	2001	2002	2003	2004	2005	Total
Adult, deceased donor	33	36	31	32	33	21	186
Adult, live adult donor			1				1
Child, deceased donor			6	5	3	3	17
Child, live adult donor				1		4	5
Total	33	36	38	38	36	28	209

Pancreas transplantation

Pancreas transplantation in New Zealand commenced in 1998 – as “simultaneous-pancreas-kidney” (SPK) transplantation for insulin-dependent diabetics with end-stage renal failure. These services are provided at the Auckland City Hospital. There have been 21 SPK transplants performed in New Zealand up till the end of 2005. All patients are alive, including 19 with both functioning pancreas grafts (insulin-free, good glycaemic control) and functioning kidney grafts. Two patients in whom the pancreas graft failed have had it removed; one of these in whom the kidney graft also failed now has a second (functioning) kidney graft. Accordingly patient, pancreas and kidney graft survival are 100%, 90% and 95% respectively, a median of three years post-transplant. These are probably somewhat better than recent international reported outcomes⁶.

Table 9 – Pancreas transplantation by year

	2000	2001	2002	2003	2004	2005	Total
Pancreas	3	3	2	6	2	2	18

Recently, approval has been obtained for isolated pancreas transplantation and planning for this is now underway. These patients will either have a pancreas graft after a previous, usually live-donor, kidney graft [“pancreas-after-kidney”, PAK] or a “pancreas-transplant-alone” (PTA). The latter (rare) patients will be those with unstable glycaemic control who are particularly at risk because of unawareness of hypoglycaemia.

Tissue transplantation

Corneal Transplantation

The New Zealand National Eye Bank (NZNEB) was established in 1987, is located within the Department of Ophthalmology of the Faculty of Medical and Health Sciences, University of Auckland, and provides all of the donated ocular tissue for transplantation in New Zealand.

The activities of the NZNEB are reported annually, and have been comprehensively published over the last few years⁷⁻⁹.

Corneal transplantation is performed by 25 ophthalmologists in 13 centres around the country. The most common indication for corneal transplantation in New Zealand is keratoconus, followed by corneal oedema and degenerations. Overall, one year corneal graft survival is 87% (range 69 - 95% depending on pre-operative diagnosis) and approximately 60% of patients achieve visual acuity of 6/18 or better.

During 2005 the NZNEB procured ocular tissue from 109 donors, including 52 donors from the Auckland Coroners service, 39 from public hospitals, 12 from multi-organ donors and 6 from private hospitals or rest-homes.

A total of 215 donor corneas were received during 2005, 192 of which were transplanted and 23 of which were unsuitable for transplantation.

Heart Valve Transplantation

Homograft valve replacements were first performed in New Zealand in August 1962 at Green Lane Hospital^{10,11} and the pioneering work of these clinicians and their successors has been comprehensively reported over the subsequent four decades¹²⁻¹⁴.

Since 2003, following the transfer of clinical services from the Epsom site (Green Lane and National Womens') by the Auckland District Health Board these procedures have been performed at the Grafton site (Auckland City Hospital and Starship Children's Hospital). Some procedures also take place at two private hospitals in Auckland (Mercy Hospital and Ascot Hospital). Aortic and

pulmonary valves are retrieved for transplantation into children and adults, most commonly in the aortic position.

During 2005 heart valves were retrieved from 43 donors, including 24 donors who had undergone Coronial autopsy at the Auckland Coroners service, seven multi-organ donors and 11 heart transplant recipients. Approximately 30% of retrieved valves are unsuitable for transplantation for various reasons.

Skin Transplantation

Skin is stored for up to five years at the “Tissue Bank” at the New Zealand Blood Service and is transplanted at Middlemore and Waikato Hospitals, largely as a “temporary dressing” (lasting some weeks) to cover large areas of debrided burns, and occasionally for other indications (necrotising fasciitis, meningococcal sepsis). Such a skin cover reduces many of the life-threatening complications of these wounds (e.g. fluid loss, heat loss, infections and breakdown of other tissues). Skin was donated from 21 donors in 2005.

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The logo features a stylized grey figure of a person with arms raised, holding a heart above their head. The figure is positioned to the left of the text.

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