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Organ and Tissue Donation and Transplantation Project Final Report

Independent Health and Aged Care Pricing Authority

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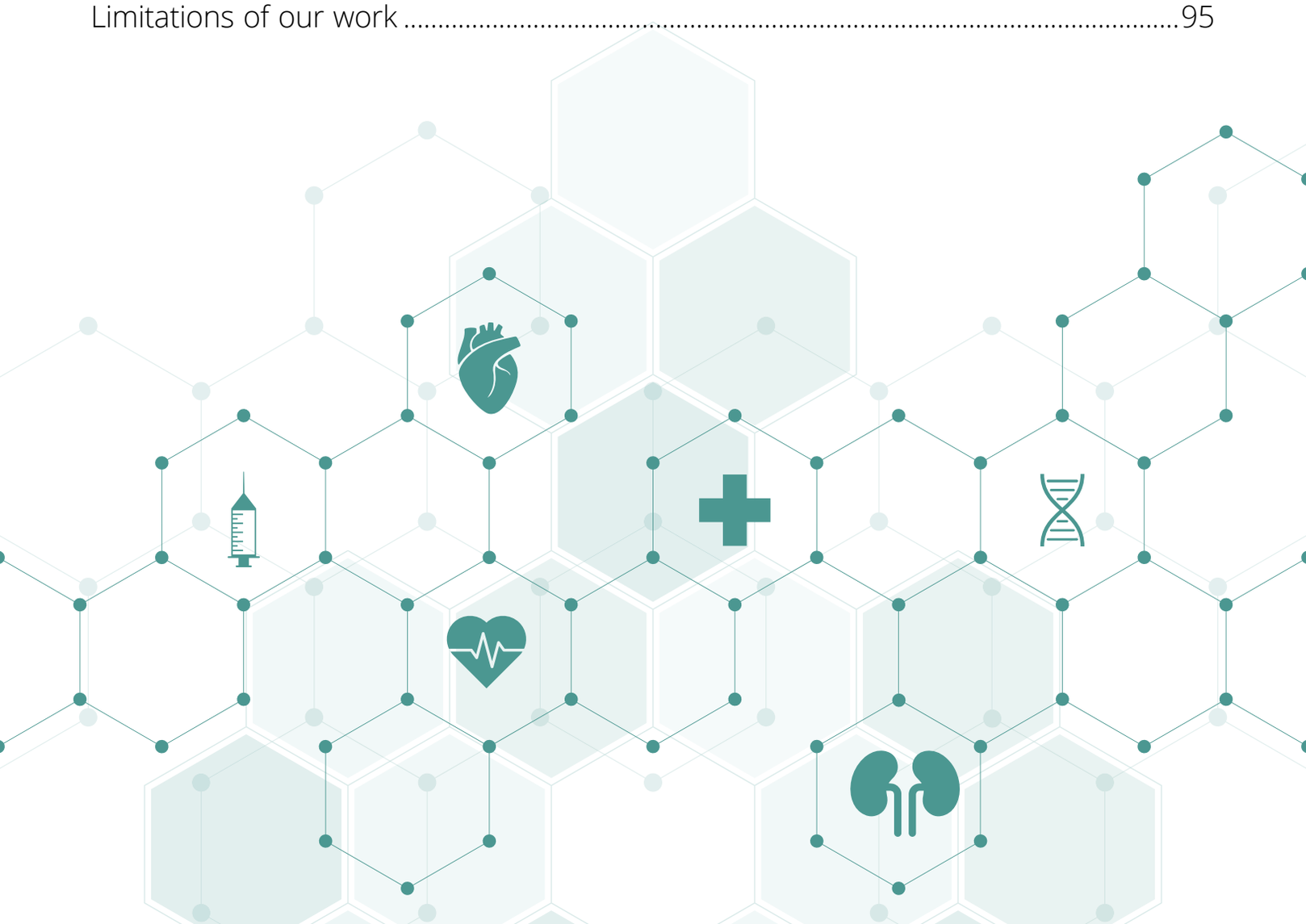
Deloitte Access Economics

Contents



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Glossary

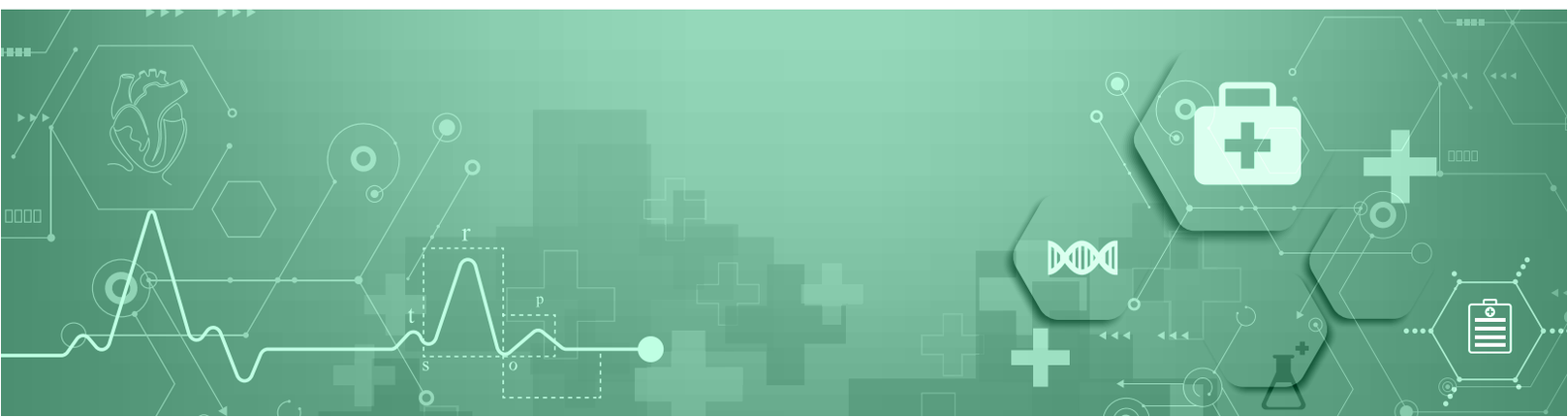
Acronym	Full name
ABF	Activity-Based Funding
ABMDR	Australian Bone Marrow Donor Registry (now named Stem Cell Donors Australia)
ABO	Blood Groups (A, B, AB, O)
ACHI	Australian Classification of Health Interventions
ACT	Australian Capital Territory
ACS	Australian Coding Standards
ADRG	Adjacent Diagnosis Related Group
AECC	Australian Emergency Care Classification
AHPCS	Australian Hospital Patient Costing Standards
ALOS	Average Length of Stay
ANZETDR	Australian and New Zealand Eye and Tissue Donation Registry
ANZDATA	Australian and New Zealand Dialysis and Transplant Registry
ANZKX	Australian and New Zealand Paired Kidney Exchange
ANZLITR	Australia and New Zealand Liver and Intestinal Transplant Registry
ANZLKD	Australian and New Zealand Living Kidney Donor Registry
ANZOD	Australian and New Zealand Organ Donation Registry
ANZIPTR	Australian and New Zealand Islet and Pancreas Transplant Registry
ANZTCT	Australian and New Zealand Transplant and Cellular Therapies
AODR	Australian Organ Donor Registry
APC	Admitted Patient Care
AR-DRG	Australian Refined Diagnosis Related Groups
BMDC	Bone Marrow Donor Centres
BMDI	Bone Marrow Donor Institute
BMT	Bone Marrow Transplant
BMTP	Bone Marrow Transplant Program
CALD	Culturally and Linguistically Diverse
CAR T-Cells	Chimeric Antigen Receptor T-Cells
CG	Costing Guidelines
DCDD	Donation after Circulatory Determination of Death
DNDD	Donation after Neurological Determination of Death
DoHDA	Department of Health, Disability and Ageing
DPMP	Donors Per Million Population
DRG	Diagnosis Related Group
DTBV	Donor Tissue Bank of Victoria
EBAANZ	Eye Bank Association of Australia and New Zealand

Acronym	Full name
EBMT	European Group for Blood and Marrow Transplantation
ECD	Expanded Criteria Donor
ECMO	Extra Corporeal Membrane Oxygenation
ED	Emergency Department
EDP	Emergency Department Patient
EDR	Electronic Donor Record
EMSs	Electronic Management Systems
ESKD	End-Stage Kidney Disease
FACT	Foundation for Accreditation of Cellular Therapy
GCSF	Granulocyte Colony Stimulating Factor
GVHD	Graft Versus Host Disease
HLA	Human Leucocyte Antigen
HMP	Hypothermic Machine Perfusion
HSC	Haematopoietic Stem Cell
HSCT	Haematopoietic Stem Cell Transplant
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification
ICU	Intensive Care Unit
IDM	Infectious Disease Markers
IHACPA	Independent Health and Aged Care Pricing Authority
IPTAAS	Isolated Patients Travel and Accommodation Assistance Scene
ISCT	International Society for Cellular Therapy
JACIE	Joint Accreditation Committee of the International Society for Cellular Therapy (ISCT) Europe & European Group for Blood and Marrow Transplantation (EBMT)
LDN	Laparoscopic Donor Nephrectomy
Lifeblood	Australian Red Cross (Lifeblood)
LHN	Local Health Networks
LOS	Length of Stay
L/RVAD	Left or Right Ventricular Assist Device
MBS	Medicare Benefits Schedule
MDT	Multi-Disciplinary Team
MRN	Medical Record Number
NAP	Non-Admitted Patient
NATA	National Association of Testing Authorities
NBEDS	National Best Endeavours Data Set
NEC	National Efficient Cost
NEP	National Efficient Price
NFC	Nationally Funded Centres
NHCDC	National Hospital Cost Data Collection
NHRA	National Health Reform Agreement

Acronym	Full name
NMDS	National Minimum Data Set
NMP	Normothermic Machine Perfusion
NSW	New South Wales
NT	Northern Territory
NWAU	National Weighted Activity Unit
ODHSF	Organ Donation Hospital Support Funding
OTA	Organ and Tissue Authority
OTDT	Organ and Tissue Donation and Transplantation
OR	Operating Room
PATS	Patient Assisted Travel Scheme
PBS	Pharmaceutical Benefits Scheme
PBSC	Peripheral Blood Stem Cells
PCC	Palliative Care Component
Qld	Queensland
RDN	Robotic-assisted Donor Nephrectomy
RLDN	Robotic-assisted Living Donor Nephrectomy
SA	South Australia
SCDA	Stem Cell Donors Australia
SCS	Static Cold Storage
SF	Supplementary Finding
SPK	Simultaneous Pancreas Kidney
Tas	Tasmania
TIS	Transplantation and Immunogenetics
TPIAT	Total Pancreatectomy with Islet Auto-Transplantation
TSANZ	Transplant Society of Australia and New Zealand
UDG	Urgency Disposition Groups
URG	Urgency Related Groups
Vic	Victoria
VPTAS	Victorian Patient Transport Assistance Scheme
VAD	Voluntary Assisted Dying
WA	Western Australia
WCRS	Withdrawal of Cardiorespiratory Support
WHO	World Health Organisation

Term	Definition
ABO Incompatibility	When an organ donor and recipient have incompatible ABO blood types and generally requires desensitisation process before proceeding to transplantation.
ABF	A method of funding hospitals whereby they are paid for the number and mix of patients treated.
Acute Care	Acute care is defined by its primary treatment goal, which includes treatments to relieve symptoms, reduce severity, and protect against illness injury that could threaten life of normal function). This may also include interventions to cure illness or provide definitive treatment of injury, including to perform surgery or other diagnostic/therapeutic procedures.
Admitted Patient Care	An episode of care occurring in the admitted hospital setting.
Allogeneic	Transplants using organs, tissues or cells from a related or unrelated donor.
Allograft	Transplants using tissues or cells from a human donor.
Apheresis	A machine led procedure where the patient's blood is withdrawn to obtain red (haemapheresis) or white blood cells (leucopheresis), platelets (cytopheresis), and plasma (plasmapheresis).
Australian Emergency Care Classification	A classification system used for emergency department presentations to determine the level of patient complexity.
Autograft	Transplants using tissue from the recipient.
Autologous	Transplants using organs, tissues or stem cells from the recipient.
Capital	Referring to the costs associated with owning and maintaining medical machinery and equipment to support transplantation.
Care Type 1	Represents care that occurs withing the general acute hospital setting. Acute care refers to healthcare provided with the primary aim of managing labour, curing illness or treating injury, performing surgery, relieving symptoms (excluding palliative care), reducing the severity or preventing complications of illness or injury, and conducting diagnostic or therapeutic procedures.
Care Type 9	Represents deceased organ procurement occurring during the posthumous episode.
Clinical Labour	Labour performed by any clinical staff, including but not limited to nursing, allied health, pathology, medical, surgical.
Consumables	Referring to the costs associated with single-use disposable products that support patient care (i.e. syringes, masks, gloves).
Diagnosis of Circulatory Death	Categorised as the irreversible cessation of circulation.
Diagnosis of Neurological Death	Categorised as the irreversible cessation of all brain function.
Diagnosis Related Groups	A classification system grouping hospital cases into categories based on similar diagnoses and procedures.
Expanded Criteria Donor	A donor who doesn't meet standard criteria for organ donation, including being over the age of 60, or over the age of 50 with certain health conditions such as high blood pressure, elevated creatinine levels, or death resulting from a stroke.
Graft Failure	Where a transplanted organ, tissue or Haematopoietic Stem Cell does not function or develop as expected after transplantation or fail after initially functioning from surgical complications or from rejection by the recipient's immune system.
Haematopoietic Stem Cell	A type of cell found in blood and bone marrow that can develop into mature blood cells.
Human Leucocyte Antigen	Cell surface proteins which identify and distinguish between own and foreign cells.
Immunotherapy	A treatment mobilising the body's own immune system to recognise and attack cancer cells.
Infectious Disease Markers	An indicator of whether the donor has current or previous infectious diseases which could be transmitted to the recipient.
Inpatient	An episode of care occurring in the admitted hospital setting.

Term	Definition
Machine Perfusion	Used to preserve organs outside the body for extended ischemic time, blood vessels of the organ are circulated with perfusate and oxygen.
Medical Labour	Labour performed by a medical doctor, outside of a surgical setting.
Multi-Disciplinary Team	For organ and HSCT recipients, multi-disciplinary team meetings (comprising medical, surgical, specialist, nursing, and allied health) are held to discuss patient pathways and treatment options.
National Efficient Price	The determined price underpinning activity-based funding across public hospital services in Australia.
Nationally Funded Centres	A system for state jurisdictions to pool funding to allow national provision of specialised high-cost, low-volume procedures, mostly but not exclusively, in the transplantation area.
National Hospital Cost Data Collection	A data set matching patient level activity with any costs incurred by the hospital in relation to that activity, used to determine the national efficient price for funding of public hospital services.
Non-Admitted Acute	An episode of care where patients do not require full admission for acute care i.e. ED presentations
Non-Admitted Patient	An episode of care where patients do not require full admission for care i.e. outpatient clinics
Outpatient	An episode of care occurring outside the admitted hospital setting.
Palliative Care	Utilised for patients on an end-of-life pathway, care is focused on decreasing discomfort and improving quality, rather than extending, life.
Pathology	Refers to provision of diagnostic testing and laboratory analysis of blood and tissue samples.
Peripheral Blood Stem Cells	Haematopoietic Stem cells collected from the bloodstream after hormone stimulation.
Posthumous	An episode of care occurring after the patient has died.
Prosthesis	Referring to a processed and sterilised tissue product utilised for transplantation to a third party.
Subacute	Care performed by a multidisciplinary clinical and allied health team to support patient function and quality of life.
Surgical Labour	Labour performed by a medical doctor within the surgical setting.
Tier 2	The Tier 2 Non-Admitted Services Classification, which is the current activity-based funding classification for non-admitted care. Tier 2 categorises a hospital's non-admitted services into classes which are generally based on the nature of the service provided, and the type of clinician providing the service.
Tissue Typing	Also referred to as HLA testing, is used to determine gene compatibility between a transplant, donor and recipient
Urgency Disposition Groups	A classification system used for emergency service presentations to determine the episode end status.
Xenograft	Transplants using organs, cells or tissue from an animal source.



Executive Summary

The organ, cell and tissue donation and transplantation system in Australia is complex. The system delivers life changing transplants for those with organ failure, malignancies, chronic disease and tissue damage. Over the last 30 years, clinical transplantation has been a rapidly developing field of medical practice, providing terminally ill patients with a second opportunity for life, and enabling recovery of sight and replacement of bone, ligaments and tendons.

While clinical transplantation has experienced significant technological advancements in the last 3 decades, the complexities surrounding donation and transplantation continue to pose challenges for the classification and capture of service delivery. There is a requirement to contemporise funding systems to account for the interdependent and complex networks delivering these services.

In 2018, the Council of Australian Governments Health Council initiated a review of Australia's organ donation, retrieval and transplantation system (the Review). The Review determined that a new national strategy was essential to enhance the sector's performance and address the growing demand, and included 2 recommendations that relate to the Independent Health and Aged Care Pricing Authority's (IHACPA) functions under the *National Health Reform Act 2011* as part of the National Health Reform Agreement (NHRA):

- **Recommendation 52:** IHACPA to conduct a costing study and classification review for the classification of organ donation, retrieval, and transplantation to take into account the cost impact of the use of donation after circulatory death donated organs and organs from expanded criteria donors (ECDs) and to appropriately attribute retrieval costs.
- **Recommendation 54:** IHACPA to conduct a costing study and classification review for the classification of non-admitted pre- and post-organ transplantation care.

In response to the recommendations from the Review and in consultation with states and territories and the Organ and Tissue Authority (OTA), IHACPA commissioned the Organ and Tissue Donation and Transplantation Project in August 2024 to investigate improvements in activity and cost data collections and classification refinement for the capture of posthumous organ donation, retrieval and transplantation costs.

The Organ and Tissue Donation and Transplantation Project has sought to bring the various and multifaceted complexities associated with organ, cell and tissue donation and transplantation into consideration through examination of the end-to-end classification, costing and funding systems.

This report highlights the findings, recommendations, and considerations for implementation, to enable the provision of high-quality, life changing transplantation to be better integrated within Australia's public health ecosystem. The recommendations were informed by the findings from the development of a comprehensive literature review and desktop scan, detailed activity and cost data analysis and an extensive stakeholder consultation program that involved more than 450 individuals and 240 hours of consultations over an 11-month period.

Overview: Organ, Cell and Tissue Donation and Transplantation Services

Organ, cell and tissue donation is legally defined as a gift of the organ, cell or tissue by a deceased or living person, with ownership passing irrevocably from donor to recipient without valuable consideration.

The organ, cell and tissue donation and transplant system in Australia has developed progressively, through clinical innovation, since the mid-1980s. It is underpinned by a collaborative approach involving multiple stakeholders, including the Australian Government, state and territory health departments, hospitals, donation agencies and transplantation teams.

The multi-faceted landscape of hospital clinical teams, donor and transplant coordinators, transplant surgical teams, laboratories, shared services and specialist infrastructure are reflected in the complexity of data collection, reporting, costing and funding.

Deceased Donation

A potential organ donor will typically be cared for in a hospital's intensive care unit (ICU). The suitability for organ donation will only be considered after the decision to discontinue treatment has been made, either because brain death is confirmed or imminent, or because ongoing active treatment is no longer in the patient's best interests. The Australian Organ Donor Registry (AODR) and the potential donor's family will always be consulted to confirm the donor's wishes and consent for donation. The consented donor will be formally assessed and tested for medical suitability to donate organs and/or tissues for transplantation, including: kidney, liver, heart, lungs, pancreas (and islets), intestine, and in rare circumstances, uterus and other vascular conduits. Tissue donation can include; cornea, bone, skin, cardiovascular tissue and other musculoskeletal tissue. One deceased person can provide for the needs of many recipients.

Deceased organ donation is led and funded by the Australian Government's OTA and delivered through the DonateLife Network who work with critical care teams caring for donors. States and territories are responsible for hospitals, transplant units, retrieval teams and transplant support services.

There are 2 legal definitions of death that lead to the potential for donation:

- Donation after Neurological Determination of Death (DNDD) – is the most common pathway and leads to maintenance of the deceased patient after declaration of death, while consent is given, suitability for donation determined, retrieval teams organised and the family farewell their loved one.
- Donation after Circulatory Determination of Death (DCDD) – represents approximately 35% of all deceased donation and this has continued to increase. Patients are determined to be on an end-of-life pathway, leading to family consent for withdrawal of cardiorespiratory support (WCRS) and to donate organs after death.

The uniqueness of the 2 pathways present clinical and logistical challenges that impact resource use, coordination, and organ viability differently.

As with DNDD, a period of time is taken to determine suitability for DCDD donors and for family farewells. At the commencement of the donation process, WCRS takes place and the potential donor must be declared deceased within 90 minutes due to irreversible cessation of circulation (although 30 minutes or less is preferred to allow maximum availability of organs for donation)[1]. Meanwhile retrieval teams and operating theatre resources are on standby for the donation surgery. Approximately 30% of the time, the potential donor maintains circulation for longer than 90 minutes and the solid organ donation cannot eventuate due to the lack of perfusion to the organs, although tissue donation may still be an option in some circumstances.

Living Donation

A living person may donate a kidney or, on rare occasions in Australia, part of their liver to another person. This may involve a single hospital caring for both the donor and the recipient, or 2 separate services. All Haematopoietic Stem Cell (HSC) donations are from living donors who are a very close (or preferably exact) match between the Human Leucocyte Antigen (HLA) Tissue Type of the recipient and the donor. Other means of living cell and tissue donation include Amnion and Cord Blood Stem Cells which can be donated after childbirth, and Bone, which can be donated as a by-product of surgical procedures, most commonly hip replacement.

Autologous Donation

Organ, cell or tissue donated and transplanted into another individual is called an "allogeneic" transplant. There are instances where an individual can donate their own pancreatic islets, HSC, or tissues to themselves, called "autologous" donation. In HSC transplant (HSCT), the patient's own HSCs or bone marrow is collected and cryopreserved when a patient's disease is in remission and then transplanted after 'ablative treatment' which destroys all bone marrow cells and, ideally, all residual tumour cells. Autologous tissue transplants (Autografts) are transplanted from one part of a person's body to another part of the same individual in the same or separate anaesthetic events.

Organ Waitlists

Despite ongoing efforts to increase the availability of donor organs, the number of patients on transplant waitlists continues to outpace the donation of suitable organs, as is consistent with international experience. From 2016 to 2023, the number of people on the deceased organ waiting lists, which include kidney, liver, heart, lung, pancreas and intestine, has increased by 42% (1,261 to 1,794 people respectively in 2016 and 2023). There are an additional 14,000 people on dialysis, many of whom could benefit from a kidney transplant. The emergence of the COVID-19 pandemic in 2020 directly impacted donation and transplantation, in particular kidney transplantation. The majority of people waiting for deceased donor transplants are for kidney (81%), followed by liver (6%), lung (5%), pancreas (4%), heart (3%) and intestine (<1%).

Transplant Recipients

The indications for organ, cell and tissue transplantation vary widely depending on the individual and the organ, cell or tissue required, such as:

- An individual will be considered for an organ transplant when they are acutely critically ill, suffering from chronic progressive organ failure or have a malignancy treatable by transplantation.
- HSC recipients have a common need for replacement of their bone marrow, however reasons for requiring a transplant vary, such as bone marrow failure due to aplastic anaemia, or malignant diseases of the bone marrow cells such as leukaemias, and lymphomas which require therapy that destroys bone marrow alongside the tumour.
- A patient may require a tissue transplant when they have damaged tissue that cannot heal on its own and requires repair or replacement.

[1] Organ and Tissue Authority. (2021). Best Practice Guideline for Donation after Circulatory Determination of Death (DCDD) in Australia. Available at: https://www.donatelife.gov.au/sites/default/files/2022-01/ota_bestpracticeguidelinedcdd_02.pdf (accessed 6 December 2024).

Transplant Services

Transplantation requires a substantial and complex infrastructure for coordination of donation, retrieval, and transplantation, and requires multidisciplinary effort from clinical, medical, administrative, and governmental stakeholders.

Transplant centres are concentrated in metropolitan areas where large tertiary referral hospitals and specialised units have the resources and infrastructure to support these complex multidisciplinary transplantation procedures. There are 2 critical types of laboratory infrastructure required to support transplant services:

- Bone Marrow Transplant (BMT) processing and storage laboratories, which are based in major transplant units usually servicing a number of transplant programs (HSCT only).
- Laboratories which undertake HLA typing (required for HSC and 24/7 for organ donation and transplantation).

For tissue donation and transplant, across Australia there is a network of tissue banks critical to the collection, storage, preparation, and distribution of tissue.

Further detail on the Organ, Cell and Tissue Donation and Transplantation Landscape can be found in Section 4.

Project Findings and Recommendations

The recommendations and implementation considerations were contextualised by the literature and desktop scan with a number of findings across the research domains of *Programs, initiatives and services, Funding arrangements, Costing, Reporting, Investment, and Other factors influencing donation and transplantation*, and the data analyses which considered data from IHACPA activity and cost data sets, a state and territory data request, and national public hospital costing survey.

The literature and desktop scan were augmented by a comprehensive stakeholder engagement program involving consultations with representatives in provision or governance of organ, cell and tissue services, and their governance across Australia. This provided an opportunity for preliminary findings from the literature scan and data analysis to be tested and validated by those directly involved, to ensure accuracy and alignment with stakeholder feedback.

These multiple inputs have been synthesised to inform the development of the project schema in Section 7, which describe donor and recipient pathways, and identifies the key stakeholders, classification, costing, and funding mechanisms involved in the delivery of these services.

Table 1 below outlines the 15 recommendations that propose the next steps for IHACPA, alongside the OTA, states and territories and the Australian Government, including an outline of rationale and responsibilities. Further considerations, including rationale for implementation of these recommendations are outlined in Section 8, and at Appendix B.

Table 1: Project Findings and Recommendations

Recommendation Topic: Data Collection | Classification | Costing | Funding and Pricing

Recommendations	Findings	Topic
Recommendation 1 ***IHACPA & the OTA*** Redefine the 'Posthumous Organ Procurement' care type to reflect 'Actual or Intended Donor' (or another name that demonstrates the change in clinical intent, rather than being associated with a determination of death).	• Depending on the definition of death, DNDD or DCDD, donation activity will occur either after or before the determination of death, resulting in 2 distinct activity profiles. • The use of the posthumous organ procurement episode is on a 'best endeavours' basis. This has resulted in inconsistency in its application across states and territories. • The trigger for care type change (acute to donation episode) should be aligned to signed donation consent, to improve consistency in the recording of donor episodes.	
Recommendation 2 ***IHACPA & States and Territories*** Change the pricing approach such that all donation costs incurred by the donor hospital are allocated to the 'Consented Potential Donor' episode and are redistributed directly to donor hospitals through the posthumous organ procurement Australian Refined Diagnosis Related Group (AR-DRG).	• Costs allocated to the current posthumous organ procurement episode are distributed across transplant episodes by states and territories, meaning there is misalignment between the model for reimbursement and the site at which the cost is incurred. • Correct allocation of the costs of donation activity is required to ensure donation hospitals are reimbursed for the costs incurred.	

Recommendations	Findings	Topic
Recommendation 3 ***IHACPA*** Review current costing standards and coding guidelines for opportunities to improve guidance in costing and coding of posthumous organ procurement activities.	• There is a high degree of variability in costs that are currently recognised as donation related costs. • Consistent application of costing standards and guidelines are required to better capture the true cost of donation activity.	
Recommendation 4 ***IHACPA & the OTA*** In collaboration with the OTA and jurisdictions, determine the ongoing requirement for the Organ Donation Hospital Support Funding (ODHSF) payment, and the most appropriate mechanism for funding of donation activities.	• The OTA provides the ODHSF payment to hospitals undertaking donation activity due to the current issues with reimbursement in the activity-based funding (ABF) model. • If the reimbursement model is improved, there will be double counting of some donation related costs if the ODHSF is retained in its current form, and thus a future funding model for donation related activities should be agreed with the OTA.	
Recommendation 5 ***IHACPA*** Enhance the capture of living donation activity to allow for the differentiation between directed living donor and Australian and New Zealand Paired Kidney Exchange (ANZKX) living donor data governance and management.	• ANZKX donations have a higher cost profile than direct living donors, due to scheduling of donation surgery outside typical operating hours and additional testing, coordination and medical liaison. There is currently no way to identify ANZKX donors in current data sets. • The ability to differentiate between direct living donors, and ANZKX donors in data capture is recommended, to enable improved capture of these episodes to account for complexity and associated costs.	
Recommendation 6 ***IHACPA, The Australian Government, States and Territories*** Collect distinct activity and cost data for organ retrieval activity, separate to donation and transplantation, to promote improved data capture and quality and inform accurate pricing and funding.	• Retrieval is a high-cost activity, that is highly variable between states and territories, due to travel arrangements, clinical employment models, and the use of machine perfusion. • Recognising organ retrieval as a unique service (separate to donation and transplantation) will support suitable data capture to improve visibility of all organ retrieval activities and costs. • Due to the highly variable nature of retrieval, consideration should be given as to the most appropriate funding mechanism that is aligned with national goals for donation.	
Recommendation 7 ***IHACPA & States and Territories*** Enhance the capture of peri-transplant activity to allow for the greater distinction between standard, low complexity cases and those episodes that are clinically and resource-intensive. Investigate the appropriateness of grouping for multi-organ transplants, in particular Simultaneous Pancreas Kidney (SPK) transplant.	• The resource intensity of the peri-transplantation episode is high, and highly varied. Though there is a wide distribution of transplant episode costs, there is only a single Diagnosis Related Group (DRG) for each type of organ transplant (except kidney transplants). • Consideration should be given to expanding the capture of complexity for solid organ transplants. • Multi-organ transplants are grouped to a single organ DRG dependent on the organ hierarchy. National weighted activity unit (NWAU) adjustments largely account for the increased price, except for SPK transplants. This requires further investigation as to the appropriateness of grouping of multi-organ transplants to minimise cost-price variance.	

Recommendations	Findings	Topic
Recommendation 8 ***IHACPA & States and Territories*** States and territories to engage regularly with IHACPA on issues regarding application of costing guidelines surrounding outreach services to refine the inputs for National Hospital Cost Data Collection (NHCDC) modelling.	• Outreach is a critical activity to enable access to waitlists and pre- and post-transplant care for rural and remote populations, however hospitals do not often allocate a discrete budget for outreach, and these costs are generally captured as overheads. • Although costing guidelines encourage an outreach cost centre, this is not consistently applied and is further complicated by travelling clinicians delivering services outside their employed health service, and in some cases, interstate. • States and territories should review practices for costing outreach services against the costing guidelines, and report variations to IHACPA.	
Recommendation 9 ***IHACPA & States and Territories*** Enhance the capture of non-admitted activity to increase granularity and distinguish all pre-and post-transplant patients (such as patients receiving waitlist management, assessment and patient bridging/support) from all other patient cohorts across all specialties.	• The pathway of services (both admitted and non-admitted) to prepare for transplantation is more expensive and requires specialised care, compared to non-transplant services in the same specialty. • These services are often coded to non-transplant specialties that do not account for the added complexity of transplant patients, leading to inequity in reimbursement if using a national average. • Aside from data linkage using patient identifiers, there is currently no means to identify if a patient is a transplant recipient. • The ability to identify pre- and post-transplant patients within these delivered services will enable better visibility of the increased cost profile of transplant patient pathways.	
Recommendation 10 ***IHACPA*** Enhance the capture of HSC donation activity to include pre-donation workup and donor search, and post-donation care in admitted and non-admitted settings.	• The average number of potential donors screened per transplant case is increasing, driving increasing costs in the donor search phase, and pre-donation activity and donor follow-up is informal and often uncaptured. • There is no specific data collection that records hospital activity related to the search for potential HSC donors, and there is a significant workload for donor coordinators that is unlikely being captured. • It is recommended that donor search activities (phone calls and co-ordination activities) are costed as interim products to HSC donation activity. This aims to improve visibility of resources expended in the donor search and work-up phase, and in post-donation follow-up activities.	
Recommendation 11 ***IHACPA*** Consider the relationship between HSC donor match type and complexity, and its impact on grouping to existing high and low complexity DRGs.	• Match type is correlated with length of stay (LOS) in the transplant episode, due to the length of the engraftment period. • Different hospitals have different matching strategies, and facilities with broader eligibility criteria, such as those accepting older or more clinically complex patients, incur higher costs. • AR-DRG groups have a high and low complexity stratification, but there is no significant relationship between match type and complexity in current application. • Further analysis should assess the factors driving cost-price differentials in HSCT DRGs, to review whether the current hierarchy of DRGs sufficiently captures clinical variation and resource intensity.	

Recommendations	Findings	Topic
Recommendation 12 ***States and Territories*** States and territories should undertake laboratory costing studies to determine costs associated with processing and cryopreservation of cells for transplant, to enable episodic cost allocation and accurate representation of laboratory costs in the NHCDC.	• The laboratory costs associated with HSC processing are high and variable, depending on the extent of processing and cryopreservation, and are not consistently captured within hospital costing. • The method of laboratory cost allocation directly affects the way these expenses are reported in NHCDC submissions, with internal management generally resulting in non-specific overhead allocations. • National data sets are not able to describe in detail where laboratory costs are held. • A costing study conducted by hospitals and laboratories would provide further clarity to the true cost of laboratory services and to enable accurate costing of HSC transplant episodes.	
Recommendation 13 ***IHACPA & States and Territories*** States and territories should report costs associated with Foundation for Accreditation of Cellular Therapy (FACT)/ Joint Accreditation Committee of the International Society for Cellular Therapy (ISCT)-Europe & European Group for Blood and Marrow Transplantation (EBMT) (JACIE) accreditation to ensure the inputs for NHCDC modelling enables supporting resources to maintain accreditation and quality patient care. IHACPA should assess whether the costing guidelines are sufficiently detailed to support accreditation cost allocation.	• There is a significant administrative and resource burden associated with gaining compliance with regulatory requirements, particularly FACT accreditation. • Current costing guidelines expand upon costing practices for functions adjacent to accreditation (teaching and training, research), but do not provide specific guidance on costs of accreditation. • Hospitals rarely account for the accreditation and regulatory requirements of cell therapy laboratories in their cost modelling. This contributes to these costs being inconsistently captured within the NHCDC. • Accurate reporting of these costs in the NHCDC would enable reimbursement through the NHRA.	
Recommendation 14 ***The Australian Government*** The Australian Government should, with states and territories, create a nationally agreed data set to enable the identification of the type and source of tissue products being transplanted.	• It is difficult to identify factors impacting tissue transplantation episodes, such as the source of the tissue and type of tissue difficult to identify in existing data. • Tissue donation is also inconsistently recorded, with observed discrepancies between the volume of tissue donation recorded in admitted data, compared to the volume of tissue transplantation. This is partially explained by large volumes of imported tissue products, though there is limited visibility of these volumes. • The Australian Government with states and territories should implement a national data set for tissue transplant activity to capture the source of transplanted tissue products.	
Recommendation 15 ***The Australian Government, States and Territories (with a tissue bank)*** The Australian Government should, with states and territories, conduct a review of the funding and cost modelling of tissue banks, in alignment with relevant federal and state and territory legislative requirements, to support the understanding of the true cost of tissue supply, and consider a national approach to tissue donation and transplantation.	• Tissue banks operate through a cost-recovery model, with costs invoiced to the receiving facility. Where this is not sufficient to operate the tissue bank, remaining costs are offset by centrally allocated funding. • There is variability in the costs incurred and recovered by tissue banks, depending on the tissue bank, the type of tissue and the governance and funding structure to support operations. • Where additional funding is provided, states and territories concurred that the remaining costs of operating state-based tissue banks are held centrally and not included in NHCDC submissions. • A national review into the funding and refined cost modelling of national tissue banks is recommended to determine whether costs are accurately reflected in the current pricing and funding of tissue products.	

1. Background and Context

Organ transplantation started in Australia in 1963 with the first living donor kidney transplants.[2] Transplantation provided an alternative to dialysis for end stage kidney failure for an increasing proportion of Australians. In the mid-1980s, liver, heart and then lung and pancreas transplantation began to develop. Funding was delivered predominantly through the Nationally Funded Centres (NFC) program which concentrated clinical expertise for low volume high complexity transplant services. During the past 15 years, transplant procedures have become more frequent and better standardised, and the multiple kidney transplant centres have been augmented by liver, heart and lung programs in New South Wales (NSW), Victoria (Vic), Queensland (Qld), Western Australia (WA) and South Australia (SA). NFC funding has since been replaced largely by funding through the NHRA, with few NFC programs still in place.

The NHRA, introduced in 2011, marked a shift in the way healthcare funding is allocated in Australia. The primary aim of the NHRA was to improve the sustainability and efficiency of the public hospital system by linking funding directly to the services provided, with a commitment to funding public hospitals using ABF where practicable. By moving to an ABF model, healthcare expenditure became more transparent and equitable, ensuring that funding levels reflected the actual cost of services delivered. The NHRA also emphasised collaboration between the Australian Government and state and territory governments to improve health outcomes for all Australians, promoting a more coordinated approach to healthcare delivery.

As a key component of the NHRA, IHACPA was established under the National Health Reform Act 2011. IHACPA's primary role was to determine the national efficient price (NEP) and national efficient cost (NEC) for public hospital services, which are central to calculating the Australian Government's funding contributions to public hospitals. These price and cost benchmarks were intended to ensure that funding allocations were based on the efficient provision of services, incentivising hospitals to optimise their operational efficiency. In addition to its role in setting the NEP and NEC, IHACPA is required to undertake an ongoing program of work to refine the national pricing model, which includes developing and specifying the national classification systems and determining the data requirements and standards. As part of this program of work, IHACPA sought to investigate opportunities for refinement to national classification systems, data collections and costing standards to ensure that the NEP and NEC remain reflective of cost profiles for Organ, Tissue and Cell Donation and Transplantation services and changing models of care.

The program of work had arisen from jurisdictional and broader stakeholder feedback on gaps in data collections for OTDT services, as well as the recommendations from the Council of Australian Governments Health Council Review of the Australian Organ Donation, Retrieval, and Transplantation System, which was conducted in 2018.[3] The Review identified several critical issues within organ and tissue donation and transplantation (OTDT) services, particularly regarding the allocation of costs of retrieval services. Another key issue identified was that the current AR-DRG classification arrangements for organ transplantation are not sufficiently refined to accurately identify and price the difference in costs between DCDD and DNDD organ transplantation. Additionally, the Review noted that the current Tier 2 Non-Admitted Services Classification is not sufficiently refined to allow differential pricing of the wide spectrum of pre-transplantation assessment. To address these concerns, the review provided 2 recommendations that relate to IHACPA's functions:

- **Recommendation 52:** IHACPA conduct a costing study and classification review for the classification of organ donation, retrieval and transplantation to take into account the cost impact of the use of DCDD donated organs and organs from ECDs and to appropriately attribute retrieval costs.
- **Recommendation 54:** IHACPA conduct a costing study and classification review for the classification of non-admitted pre- and post-organ transplantation care.

In response to these findings and in consultation with the OTA and IHACPA's Jurisdictional Advisory Committee and Technical Advisory Committee, IHACPA commissioned Deloitte to deliver the Organ and Tissue Donation and Transplantation Project, to identify opportunities to refine the national pricing model for OTDT services.

[2] Australian Bureau of Statistics (2002). Health Related Actions: Organ Donation. https://www.abs.gov.au/ausstats/abs@.nsf/2f762f95845417aeca25706c00834efa/16d33563bd5c555cca2570ec000ace6c!OpenDocument#:~:text=The%20first%20transplant%20operations%20commonly.have%20been%20performed%20in%20Australia. (accessed August 2025)

[3] Ernst & Young. (2018). Review of the Australian organ donation, retrieval and transplantation system. Department of Health, Disability and Ageing. Available from: https://www.health.gov.au/sites/default/files/documents/2020/02/review-of-the-organ-donation-retrieval-and-transplantation-system-final-report-final-report.pdf (accessed 18 June 2025).

2. Purpose and Objectives

The objective of the Organ and Tissue Donation and Transplantation Project was to develop a comprehensive schema that would categorise all elements of organ, cell and tissue donation and transplantation, considering both live and posthumous donations. This schema would be developed from a data capture, costing, and funding perspective, to determine whether all aspects of OTDT activity were represented within the national pricing framework, by:

- Conducting a desktop and literature scan of the existing landscape of OTDT services in Australia, identifying both current trends and emerging developments in service delivery.
- Analysing existing activity and cost data to gain a deeper understanding of OTDT services and current data collections to guide the development of the draft schema.
- Establish a nationally consistent definition for DCDD and DNDD, supporting uniformity in the application of these definitions across all states and territories.
- Develop a schema to systematically categorise the entire OTDT landscape, ensuring that the schema accounts for all relevant activities, from donor identification to transplantation and follow-up care.
- Provide recommendations for improving national classification systems, data collections, and costing standards to better align with contemporary practices and emerging models of care.

Table 2 below details the scope of organ, tissue, and cell donation and transplants that were explored throughout this project.

Table 2: Project scope

Transplant type	In Scope	Out of Scope
Organ	• Living donor: kidney, liver, uterus. • Potential/actual deceased donor: kidney, liver, heart, lung, pancreas, islets, intestine, uterus, vascular composite. • Autologous islets.	• Xenograft
Tissue	• Human tissue from deceased donor: corneas/ eyes, bone, processed bone, skin, heart valves/ aortic root, • Human tissue from Living donor: bone, processed bone, amnion. • Autologous human tissue regulated by the Therapeutic Goods Administration (TGA). • Autologous bone grafts (TGA exempt).	• Human reproductive tissue • Non-human tissue • Vascular conduits • Autologous fat grafts • Living donor skin • Tissues retrieved and reimplanted under single anaesthetic
Cells	• Potential/actual related & unrelated haematopoietic stem cells: bone marrow, Peripheral Blood Stem Cells (PBSC), cord blood bank, Peripheral Blood T cells. • Autologous haematopoietic stem cells: bone marrow, PBSC.	• Chimeric Antigen Receptor Cells (CAR T-Cells) • Reproductive cells and embryos • Xenotransplantation unless used in the production of substances of human origin
Medical Products of Human Origin		• Blood and blood products, breast milk
Other		• Research products not on the TGA register • Biological medicines • Faecal microbiota transplant product

3. Project Methodology and Approach

A literature and desktop scan, detailed data analysis of activity and costing data sets, and extensive stakeholder consultations with health services and other key organisations across Australia were undertaken. This approach revealed the complexities surrounding Australia's OTDT landscape and would provide the key inputs needed for the development of the schema, alongside findings and recommendations. A summary of the activities undertaken is presented below.

Literature and Desktop Scan
Deloitte undertook a detailed literature and desktop scan with a key objective to gather a broader understanding of the current OTDT landscape and to contextualise the information presented in the schema. Secondary data was used throughout the literature and desktop scan. Relevant project documentation (such as previous reviews of the donation and transplantation system) and data from IHACPA and relevant stakeholders were provided to Deloitte for review. This included using Google search engine to identify literature (for example to identify government reports and reports from health departments), PubMed to identify peer-reviewed literature (including academic publications) and ClinicalTrials.gov to identify ongoing clinical trials of emerging interventions in organ transplantation.

All search strategies were conducted in English and restricted to the last 5 years to ensure the inclusion of the most recent and relevant evidence, reflecting current practices and advancements in the field. Search strategies were restricted to sources describing current practice in Australia, however, the search strategy for the domain 'Future Innovation' was extended to peer countries including the United States of America, Canada, the United Kingdom, France, Germany, Sweden, Norway, Denmark, Switzerland, Austria, the Netherlands, Belgium, Italy, Spain, Korea, Japan and Singapore.

To assist with the literature and desktop scan process, together with IHACPA, Deloitte developed a research framework to ensure a consistent and systematic approach to data collection and analysis. The framework was structured around 6 key research domains which included:

- programs, initiatives and services
- funding arrangements
- costing
- reporting
- investment
- other factors influencing donation and transplantation.

Each domain was aligned with a set of guiding research questions to help identify recurring themes, gaps, and opportunities across the literature.

Activity and Cost Data Analysis
The data analysis phase of this project involved a detailed analysis of national activity and cost data sourced from IHACPA against publicly available sources, such as DonateLife reports and national donation and transplant outcome registries.

The data analysis included both descriptive and diagnostic approaches. Descriptive analysis examined key trends and patterns, including transplant volumes, donor activity (both living and deceased), and associated costs at different stages of the donor and transplant pathways. This analysis assessed the completeness, consistency, and reliability of the national data sets, identifying discrepancies when compared to publicly available reports. The diagnostic analysis focused on whether the data accurately captured the full spectrum of OTDT activities, particularly identifying areas where costs such as organ retrieval or transport were underreported or variably allocated. This project did not examine activity or costs incurred by the private hospital sector, which provides some services for pre- and post-transplant recipients and living donors.

IHACPA Activity and Cost Data Sets
IHACPA provided activity and costing data from 2017-18 to 2023-24 (activity data) and 2022-23 (costing data) for admitted episodes, non-admitted service events, palliative care and emergency department (ED) presentations. Using nationally recognised coding systems such as the Australian Classification of Health Interventions (ACHI) and the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM), Tenth to Twelfth edition, the analysis focused on using ICD-10-AM/ACHI codes to isolate admitted episodes of care and using Tier 2 codes to isolate non-admitted clinic service events related to organ, cell and tissue transplantation and both living and deceased donation. Outputs were disaggregated by state and territory, facility, organ/tissue donation or transplantation type, and phase of the organ, cell or tissue patient pathway. The key data sources used in this analysis are identified in Table 3.

Table 3: Summary of key data sources used in this analysis

Source	Activity Data (from 2017-18 to 2023-24)	Costing Data (from 2017-18 to 2022-23)
IHACPA	Admitted Patient Care (APC) - activity for transplantation/ potential donation/posthumous donation/living donation episodes. Non-Admitted Patient (NAP) - activity for outpatient clinic service events. Emergency Department Patient (EDP) - activity for ED presentations.	NHCDC Acute - costing data for transplantation/potential donor/living donation episodes. NHCDC Subacute - costing data for posthumous donation (care type 9). NHCDC Outpatients – costing data for outpatient clinic service events.
Registries	DonateLife activity reporting - to assess annual transplant volumes and living kidney donation statistics. Australian and New Zealand Organ Donation Registry (ANZOD) annual reports - assessment of activity for deceased donations and waitlist statistics. Other Registries – included clinical (e.g. ANZDATA), Search, Australian and New Zealand Transplant & Cellular Therapies (ANZTCT) and Banking registries (e.g. tissue banks). See Appendix A for full list of registries.	

State and Territory Data Request

The absence of reliable national and statewide patient identifiers, and jurisdictional boundaries, limited the ability to track patients over time and between different health services and across national data sets. This restricted a complete view of the pre-to-post-transplantation patient journey. To address this, state and territory health departments provided additional data through a formal data specification request, enabling supplementary analysis of patient activity before and after solid organ or HSC transplant across admitted, non-admitted, and emergency settings. This supported a more comprehensive assessment of resource utilisation and variation across states and territories.

States and territories were requested to share all activity from 2017-18 to 2023-24 linked to a 2022-23 solid organ or HSCT episode, based on ACHI codes. Data was received from NSW, Northern Territory (NT), Qld, SA and WA. Admitted activity was classified under DRGs, non-admitted activity was classified under the Tier 2 classification, and ED activity was classified under Urgency Related Groups (URG) in NSW and Australian Emergency Care Classification (AECC) in other states and territories.

Hospital Costing Methodology Survey

A hospital costing methodology survey was developed and distributed to health services prior to the health services consultation program. The purpose of this survey was to examine how patient-level costing practices, methodologies, and feeder systems for organ donation, retrieval, and transplantation differed across facilities, states, and territories. The responses from health services revealed current costing approaches, identified potential gaps, and informed the development of recommendations for more consistent costing, classification, and pricing practices. The survey was completed by 29 hospitals across 5 states, including 13 transplant units and 16 donation-only hospitals.

Stakeholder Engagement

Over 450 individuals were invited to participate in consultations for the Organ and Tissue Donation and Transplantation Project across all states and territories jurisdictions (refer to Figure 1). The program delivered approximately 240 hours of virtual or face-to-face consultation with stakeholders directly and indirectly involved in the provision or governance of OTDT services in Australia.

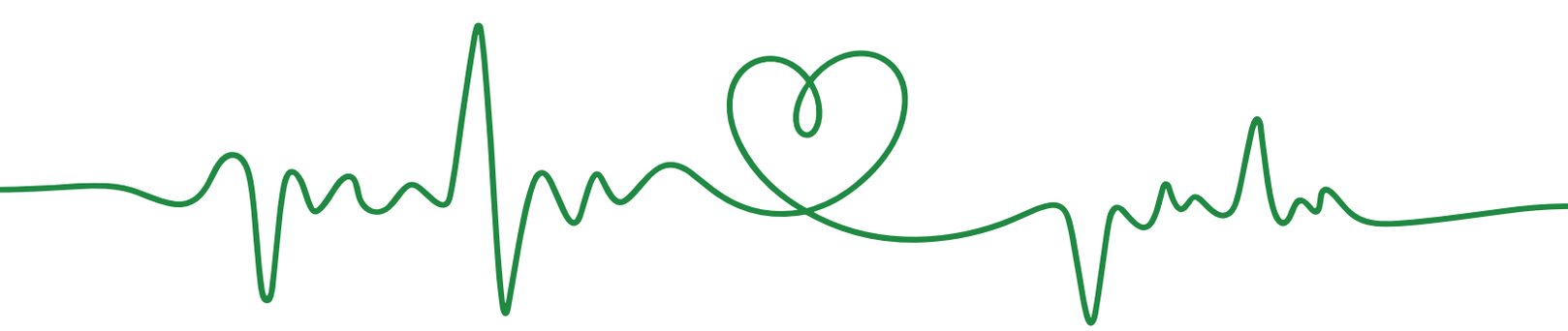


Figure 1: Summary of stakeholder consultation schedule

Stakeholder Consultations

Project Introduction (Jurisdictions)

NSW	NSW
VIC	VIC
QLD	QLD
SA	SA
WA	WA
NT	NT
TAS	TAS
ACT	ACT

Project Introduction (Registries)

- ANZDATA
- ANZCGR
- ANZLITR
- ANZIPTR
- ANZTCT
- ABMDR

Project Introduction (Other)

- OTA
- TSANZ
- RACS
- ANZICS
- TA
- AOA
- DOHAC

Jurisdiction Data Workshops

- NSW
- VIC
- QLD
- SA
- WA
- NT
- TAS
- ACT

Costing Survey

- Seminar
- Seminar
- Seminar

Labs & Matching

- Lifeblood
- Redcross (Vic)
- TTAC
- Pathwest
- Pathology QLD

Tissue

- BAA
- NSW Tissue Bank
- Tissue Banks

Donor Coordination Workshops (DonateLife)

NSW	NSW
VIC	VIC
QLD	QLD
SA	SA
WA	WA
NT	NT
TAS	TAS
ACT	ACT

Hospital Visit Preparation (TSANZ Chairs)

- Liver
- Lung
- Kidney
- Pancreas | Islet
- Vascular Composite
- Paediatrics
- Donor Surgeons & Coordinators

Hospital Visit Preparation (Other)

- ANZTCT
- ABMDR

Hospital Visits: Transplant Clinicians, Business Managers, BMT, Tissue

RPA	RPA	RPA	RPA	Westmead	Westmead	Westmead
Westmead	SCHN	WCH	WCH	WCH	POW	POW
St Vincents	St Vincents	John Hunter	St Vincent's	St Vincent's	St Vincent's	SALHN/ CALHN
Women's & Children's	Flinders Medical	Flinders Medical	Royal Adelaide Hospital	Royal Adelaide Hospital	Princess Alexandra	Princess Alexandra
Princess Alexandra	QCH	Prince Charles	RBWH	Royal North Shore	Royal North Shore	Townsville
SCH	QCH	RCH	RCH	RCH	RMH	St Vincent's Melbourne
The Austin	The Austin	The Alfred	The Alfred	Monash	Peter Mac	Fiona Stanley
Fiona Stanley	Sir Charles Gairdner	Perth Children's	RCH	Fiona Stanley	Royal Perth	Royal Perth

Jurisdictional Playback Meetings

- SA Health
- QLD Health
- WA Health
- Vic Health
- NSW Health

Other

- Kidney Health Australia
- The Leukaemia Foundation
- National Indigenous Kidney Taskforce
- Transplant Nurses Association

The first phase of consultations sought input from Jurisdictional Health Departments, Department of Health, Disability and Ageing (DoHDA), the OTA, and transplant registries. Deloitte engaged these key organisations to understand Australia's OTDT landscape, and gather feedback on the project's scope and approach. During these initial consultations, the framework Deloitte had developed to undertake analysis (including the proposed approach for gathering data) was validated, confirming the project's scope and approach.

The second phase of consultations involved engaging with the DonateLife Network and OTDT professional bodies. Discussions with retrieval and coordination teams provided Deloitte with insight into activities, costs and funding of deceased donation services. Consultation with professional bodies such as Stem Cell Donors Australia contextualised stem cell transplantation and donation in Australia. Deloitte also engaged with Transplantation Society of Australia and New Zealand (TSANZ) committee chairs to inform the development of the patient pathways with an understanding of organ transplantation by organ type.

The final consultation phase was an extensive exercise involving over 30 hospitals and health services across Australia. Clinical and non-clinical stakeholders were engaged at select hospitals performing solid organ, HSC or tissue transplant. Stakeholders were invited to participate in a 2-hour face-to-face or virtual workshop to understand service delivery at a site level, validate initial findings and explore concepts such data collection methods, costing practices and current funding arrangements.

Schema Development

The final schema, detailed in Section 7, comprises 2 interconnected layers which provide an overview of current stakeholders, data capture, costing, and funding mechanisms. The OTA[4] functional diagrams informed the initial schema pathways, which were subsequently refined through clinical consultation.

Ultimately, 10 donation and transplantation pathways were identified as in scope: Deceased Organ Donor, Deceased Organ Retrieval, Solid Organ Recipient, Living Solid Organ Donor, Living Cell Donor (Unrelated), Living Cell Donor (Related), Cell Donor (Autologous), Cell Recipient (Allogeneic and Autologous), Deceased Tissue Donor and Retrieval, and Tissue Recipient. Each layer and pathway is structured to represent a process of patient interactions with the public health and hospital system. Key activities and decision points are articulated, as well as instances of state and territory variation, to serve as a gap analysis and support refinement of national classification systems, data collection, and costing standards. Variation and inconsistency across each pathway is identified and colour coded, then directly linked to the key findings, recommendations, and implementation considerations delivered in this report.

[4] Ernst & Young. (2018). Review of the Australian organ donation, retrieval and transplantation system. Department of Health, Disability and Ageing. Available from: https://www.health.gov.au/sites/default/files/documents/2020/02/review-of-the-organ-donation-retrieval-and-transplantation-system-final-report-final-report.pdf (accessed 18 June 2025).

4. Findings from Literature and Desktop Scan

The organ, cell and tissue donation and transplant system in Australia has developed progressively, through clinical innovation, since the mid-1980s and is underpinned by a collaborative approach involving multiple stakeholders, including the Australian Government, state and territory health departments, hospitals, donation agencies and transplantation teams. It is a complex and highly coordinated network designed to provide lifesaving and life enhancing transplants to individuals with severe organ failure or tissue damage. Its foundation lies in the Human Tissue Acts which govern organ and tissue donation in each Australian state and territory.[5] Organ, tissue and cell donation is legally defined as a gift of an organ, cell or tissue by either a deceased or living person.[6] Ownership of the organ, cells or tissue passes irrevocably from the donor to the recipient without valuable consideration.

Solid Organ Donation and Transplantation

Context

Deceased organ donation

Deceased organ donation is a nationally coordinated effort, where specialist retrieval capability is shared between states and territories, and organs travel across borders, including to New Zealand, to reach recipients most in-need. One deceased donor can provide organs for up to 7 organ transplant recipients, and many more tissue recipients. In 2024, there were 527 deceased organ donors and 1,328 organ transplant recipients.[7]

Since 2009 the OTA has played a central role in overseeing the Australian Government's national program to improve organ and tissue donation and transplantation outcomes. The OTA has prioritised both raising awareness of the importance of organ donation and leading the development of a nationally coordinated and consistent clinical organ donation system. The OTA leads initiatives to promote donor registration and enhance awareness about the importance of organ donation.[8]

DonateLife is the public facing brand name for the national deceased donation network of agencies overseen by the OTA that manages the donation process from donor identification through to post retrieval, including donor family follow-up.[9] DonateLife is funded by the OTA with some states and territories contributing additional funding. Only hospitals with intensive care capacity are capable of supporting and converting potential deceased donors to actual donors. Not all donating hospitals are classified as part of the DonateLife Network.

A deceased organ donor may have registered their intent and/or consent to donate while they are still living, utilising the AODR or, in some instances, state driver's licence registrations. A potential organ donor will typically be receiving care in a hospital's ICU or ED on an end-of-life pathway where consideration will be given as to whether or not they are suitable for organ donation. The potential donor's family will always be sought out and consulted to confirm consent for donation and the donor will be formally assessed and tested for medical suitability to donate organs and/or tissues for transplantation.[10] DonateLife specialist nurses play a crucial role in supporting the family through this decision-making process, providing information and addressing any questions or concerns.

Deceased organ donation in Australia occurs through 2 pathways, DCDD and DNDD, each presenting unique clinical and logistical challenges that impact resource use, coordination, and organ viability. DCDD donors are declared deceased after irreversible cessation of cardiac function, necessitating only a few minutes delay before commencing cold perfusion and retrieval surgery, which thus requires rapid and efficient coordination of resources and retrieval teams to maintain organ viability.[11] In contrast, DNDD donors after declaration of brain death, remain on mechanical ventilation support to maintain organ perfusion until retrieval.

DNDD and DCDD differ significantly in their resource utilisation, with DCDD typically requiring more intensive coordination, higher staffing costs, and additional processes to minimise warm ischemia time and optimise organ viability. Compared to DNDD donors, DCDD donors also yield fewer organs per donor as a lower number of organs are considered medically suitable.[12] These differences impact cost structures, yet Australia's current classification systems, including the AR-DRG classification, does not account for these variations in resource use.

[5] Department of Health and Aged Care. (2022). Organ and tissue donation – Legislation. Available from: https://www.health.gov.au/topics/organ-and-tissue-donation/what-were-doing-about-organ-and-tissue-donation#legislation (accessed 2 April 2025).

[6] Federal Register of Legislation. (2024). Australian Organ and Tissue Donation and Transplantation Authority Act 2008. Available from: https://www.legislation.gov.au/C2008A00122/latest/text (accessed 7 April 2025).

[7] Organ and Tissue Authority. (2024). Australian Donation and Transplantation Activity Report. Available from: https://www.donatelife.gov.au/sites/default/files/2024-02/2023%20Donation%20and%20Transplantation%20Activity%20Report.pdf (accessed 3 February 2025).

[8] Department of Health and Aged Care. (2024). Australian Organ and Tissue Authority. Available from: https://www.health.gov.au/contacts/australian-organ-and-tissue-authority-ota (accessed 10 November 2024).

[9] Organ and Tissue Authority. (2024). National DonateLife Program. Available from: https://www.donatelife.gov.au/about-us/who-we-are/national-program (accessed 10 November 2024).

[10] Organ and Tissue Authority. (2022). Organ and tissue donation opt-in and opt-out consent systems. Available from: https://www.donatelife.gov.au/sites/default/files/2022-02/OTA_2021ActivityReport_Opt-in_Opt-out_Factsheet_Feb2022-Final.pdf (accessed 10 November 2024).

[11] Organ and Tissue Authority. (2021). Best Practice Guideline for Donation after Circulatory Determination of Death (DCDD) in Australia. Available from: https://www.donatelife.gov.au/sites/default/files/2022-01/ota_bestpracticeguidelinedcdd_02.pdf (accessed 6 December 2024).

[12] DonateLife. (2024). Australian Donation and Transplantation Activity Report 2024. Available from: https://www.donatelife.gov.au/donation-and-transplantation-data (accessed 2 May 2025).

Once suitability for donation is determined, a Multi-Disciplinary Team (MDT) is assembled across, or in some cases between, states to coordinate and undertake the retrieval process.

Living organ donation

A living organ donor is someone who donates a kidney or, on rare occasions in Australia, part of their liver to another person. The most common occurrence is when an individual donates a kidney to a relative or a close friend who has end-stage kidney disease.[13] In 2024, there were 253 living kidney donors. This included 187 directed, related and spousal living kidney donors and 66 living unrelated kidney donors approved through the ANZKX Program.[14] ANZKX matches incompatible donor and recipient pairs with other incompatible pairs across Australia and New Zealand. Compatible pairs may also enter the ANZKX either through altruism or hope for a better immunological match.[15]

Over a 13-year period from 2011 to 2024, the volume of living organ donation has remained relatively stable (257 and 253 living organ donations respectively). However, the proportion of living kidney donations facilitated through the ANZKX Program has increased, from 10% in 2011 to 26% in 2024. There is a small number of living kidney donors who are neither relatives nor friends of the recipient who donate to a 'non-directed' recipient with the aim of helping those in need of a kidney. These are allocated either by OrganMatch as if they were providing a deceased donor organ, or more commonly they are utilised in the ANZKX Program where they can facilitate multiple organ transplants.[16]

An 'allogeneic donation' provides living organs, cells or tissues for transplantation to another person (and thus across an immunological barrier), while an 'autologous donation' provides cells or tissue for transplantation to the person themselves, for use at a separate procedure after a period of storage or processing and storage.

Solid organ recipient & transplantation

An individual will be referred for consideration of waitlisting for an organ transplant by their specialist when they have organ failure, suffering from progressive organ failure, or have a malignancy treatable by organ transplantation. As of 2024, there are approximately 1,800 people on the combined organ transplant waitlists in Australia. In addition, there are around 14,000 people on dialysis, many of whom might benefit from a kidney transplant.[17]

When a patient is referred for listing to a transplant program, a health assessment and a review of their medical history are conducted to determine if they may be suitable to proceed to detailed evaluation for a transplant waiting list. If deemed potentially suitable, a comprehensive assessment is performed to assess their eligibility for a transplant and to evaluate any concerns and risks associated with the surgery and immunosuppression. Assessment includes screening tests designed to ensure medical suitability for transplantation, as directed by the transplant team. The specific assessment/workup process for each organ is outlined in the TSANZ Clinical Guidelines for Organ Transplantation from Deceased Donors.[18] Transplant workup is generally undertaken in outpatient clinics, however, it may also be undertaken in the inpatient setting if the lung or heart transplant patient requires oxygen support, or if they have to travel long distances to the transplant unit. For patients awaiting a kidney transplant, workup in many cases is undertaken in non-transplant hospitals that have a large nephrology service.

Patients being evaluated for solid organ transplants must undergo histocompatibility testing to be added to the deceased donor transplant waiting list. This involves high-resolution HLA typing across all loci and Luminex Single Antigen Bead testing to determine the patient's HLA antibody profile. Once all testing is complete, the recipient is added to the transplant waiting list. However, to be eligible for matching with a deceased donor, the recipient must also meet the 'readiness criteria' specified in OrganMatch, a clinical transplant system that conducts compatibility matching of recipients and donors for organ transplantation in Australia (launched in April 2019 as a replacement for the National Organ Matching System). The system enables national waitlist management, kidney matching and allocation of deceased organs, ANZKX and living donor organ transplants. Access to OrganMatch is available to clinicians and transplant coordinators in Australia and New Zealand and to scientists from Australian Transplantation and Immunogenetics, or 'tissue typing' laboratories.[19] Patients on the transplant waiting list are screened 4 times a year for HLA antibodies using single antigen testing beads.[20]

Bridging strategies may be used to temporarily manage the health condition of patients who are awaiting an organ transplantation whilst on the waitlist. Various approaches may be used depending on the organ needed, the underlying diagnosis and patient characteristics.

[13] Organ and Tissue Authority. (2024). Understanding living donation. Available from: https://www.donatelife.gov.au/all-about-donation/understanding-living-donation (accessed 1 November 2024).

[14] Organ and Tissue Authority. (2023). Australian Donation and Transplantation Activity Report. Available from: https://www.donatelife.gov.au/sites/default/files/2024-02/2023%20Donation%20and%20Transplantation%20Activity%20Report.pdf (accessed 1 November 2024).

[15] Organ and Tissue Authority. (2024). Australian and New Zealand Paired Kidney Exchange Program. Available from: https://www.donatelife.gov.au/for-healthcare-workers/ANZKX (accessed 1 November 2024).

[16] DonateLife. (2025). Information for patients - ANZKX program. Available from: https://www.donatelife.gov.au/for-healthcare-workers/ANZKX/information-patients-anzkx-program (accessed 23 June 2025).

[17] Australian and New Zealand Organ Donation Registry. (2024). ANZOD Annual Report 2024. Available from: https://www.donatelife.gov.au/news-events/news/2025/2024-australian-donation-and-transplantation-activity-report-now-available (accessed 10 March 2025).

[18] TSANZ (2023). Clinical Guidelines for Organ Transplantation from Deceased Donors. Available from: https://tsanz.com.au/storage/documents/TSANZ_Clinical_Guidelines_Version-111_13062023Final-Version.pdf (accessed 15 August 2025).

[19] DonateLife. (2025). OrganMatch. Available from: https://www.donatelife.gov.au/for-healthcare-workers/organmatch (accessed 4 April 2025).

[20] DonateLife (2025). OrganMatch The Virtual Crossmatch Version 8. Available from: https://www.donatelife.gov.au/sites/default/files/2025-03/OM-032%20Virtual%20Crossmatch%20v8.pdf (accessed 4 April 2025).

For instance, for patients awaiting a heart or lung transplant, left or right ventricular assist device (L/RVAD) and/or Extra Corporeal Membrane Oxygenation (ECMO) may be used to provide circulatory support and/or oxygenation.[21,22] Patients waitlisted for a lung transplant are routinely provided access to pulmonary rehabilitation to remain fit for transplantation. For patients requiring a kidney transplant, dialysis is required to sustain them prior to transplant.[23]

Transplant procedures and recovery protocols vary by organ type:

- Kidney transplant surgeries generally last 3-4 hours, followed by a hospital stay of 5-7 days with frequent monitoring for signs of rejection.[24]
- Pancreas transplants, often conducted alongside kidney transplants for diabetic patients, are more complex and require a hospital stay of 7-10 days.[25]
- Liver transplants, typically performed for patients with cirrhosis or liver failure, can last 4-12 hours and involve several days in intensive care and extended recovery in a transplant ward.
- Heart transplants for end-stage heart failure involve surgeries lasting 6-12 hours, with patients spending 5-7 days in ICU and several weeks in hospital.[26]
- Lung transplants, used to treat advanced respiratory diseases, are complex surgeries requiring recovery in ICU, after which the recipients are transferred to the transplant ward for rehabilitation which includes respiratory therapy, physiotherapy and pharmaceutical support to reduce the likelihood of rejection.[27]
- Less common transplant types require more specialised care. Intestinal transplant surgery, for example, can last between 8 and 12 hours and involve extended hospital stays with invasive monitoring for rejection and infection.

Islet transplantation is another highly specialised procedure. Autologous islet transplantation is typically conducted as part of total pancreatectomy with islet auto-transplantation (TPIAT) and is offered to patients with chronic pancreatitis experiencing severe, unmanageable pain and a decline in quality of life. The TPIAT procedure involves the surgical removal of the pancreas, followed by the isolation of islet cells from the resected tissue in a specialised laboratory. The patient's own isolated islets are then infused into their own liver via the portal vein. This complex procedure requires a MDT, in addition to advanced laboratory facilities which are essential for the isolation and purification of islet cells.[28]

Allogeneic islet transplantation is an alternative to whole pancreas transplantation, primarily considered for individuals with type 1 diabetes who experience severe hypoglycaemia and have not achieved adequate glycaemic control despite intensive insulin therapy, but with preserved renal function.[29] The transplantation procedure involves isolating insulin-producing islets from deceased human donor pancreases and infusing them into the recipient's liver via the portal vein.[30] Due to the limited availability of suitable donor islets, multiple infusions from different donors may be necessary to achieve optimal graft function.[27]

Post-operative care is critical across all organ transplant types for recovery and monitoring purposes. Patients are closely monitored for signs of rejection, infection, and other surgical complications, while strong immunosuppressive therapy is administered to prevent immune-mediated graft failure. Long-term care includes regular clinical reviews, medication adjustments to reduce the immunosuppression slowly, and lifestyle modifications to support transplant success and patient health over time.

Legislative Framework

Australia's organ donation and transplantation system operates within a set of legislative frameworks, authorities, and guidelines designed to regulate processes and provide ethical and clinical guidance. These components collectively support the management of donation, assessment, and transplantation practices nationwide, and include the:

- Human Tissue Acts which serve as legislative frameworks that regulate the removal, storage, and use of organs and tissues in each Australian state and territory, with some variations between states and territories.[31]

[21] Holley, C. T., Harvey, L., & John, R. (2014). Left ventricular assist devices as a bridge to cardiac transplantation. Journal of thoracic disease, 6(8): 1110–1119.

[22] Faccioli, E. et al. (2021). Extracorporeal membrane oxygenation in lung transplantation: Indications, techniques and results. World journal of transplantation, 11(7): 290–302.

[23] Tang, S. & Lai, K. (2020). Peritoneal dialysis: the ideal bridge from conservative therapy to kidney transplant. Journal of nephrology, 33(6): 1189–1194.

[24] Queensland Government. (2019). Transplant recovery and rehabilitation. Available from: https://www.qld.gov.au/health/services/specialists/kidney-transplant/after-the-transplant/transplant-recovery-and-rehabilitation (accessed 7 May 2025).

[25] Transplant Australia. (2019). Pancreas transplant. Available from: https://transplant.org.au/types-of-transplant/pancreas-transplant/ (accessed 6 May 2025).

[26] Joshi Y. et al. (2024). Australian outcomes from heart transplantation in the machine perfusion era. Annals of Cardiothoracic Surgery, 13(6): 502-512.

[27] Lung Foundation. (2024). Lung transplant for Interstitial Lung Disease. Available from: https://lungfoundation.com.au/wp-content/uploads/2023/06/Fact-Sheet_Lung-transplant_Lung-Foundation-Australia.pdf (accessed 9 May 2025).

[28] Bampton T. et al. (2021). Australian experience with total pancreatectomy with islet autotransplantation to treat chronic pancreatitis. ANZ Journal of Surgery, 91(12): 2663-2668.

[29] Deakin University. (2017). Islet transplantation: positive step for people with type 1 diabetes. Available from: https://www.deakin.edu.au/research/research-news-and-publications/articles/islet-transplantation-positive-step-for-people-with-type-1-diabetes (accessed 9 May 2025).

[30] Sydney University. (2020). From stem cells to islets – hope for treatment of type 1 diabetes. Available from: https://www.sydney.edu.au/news-opinion/news/2020/08/20/from-stem-cells-to-islets-hope-for-treatment-of-type-1-diabetes.html (accessed 9 May 2025).

[31] Australian Government Department of Health and Aged Care. (2022). Organ and tissue donation – Legislation. Available from: https://www.health.gov.au/topics/organ-and-tissue-donation/what-were-doing-about-organ-and-tissue-donation#legislation (accessed 4 April 2025).

- Australian Organ and Tissue Donation and Transplantation Authority Act 2008 which establishes the OTA as responsible for overseeing organ and tissue donation and transplantation activities.[32]
- National Health and Medical Research Council's Ethical Guidelines for Organ Transplantation from Deceased Donors (2016) that provide ethical guidance on assessing donor eligibility, determining organ suitability, and making allocation decisions.[33]
- Australian and New Zealand Intensive Care Society Guidelines for end of life care.
- Best Practice Guideline for Offering Organ and Tissue Donation in Australia which outlines recommended approaches for healthcare professionals when referring potential donors and supporting families through the donation process.[34]
- TSANZ Clinical Guidelines for Organ Transplantation from Deceased Donors that guide eligibility and assessment criteria, as well as protocols for allocating deceased donor organs.[35]
- TSANZ Surgical Technique for Deceased Donor Abdominal Organ Retrieval Guidance Document which offers guidance on surgical techniques for the retrieval of abdominal organs.[36]
- World Health Organisation (WHO) Guiding Principles on Human Cell, Tissue and Organ Transplantation that provide an international ethical framework that informs legislation and professional practices globally.[37] Furthermore, the Declaration of Istanbul, established in 2008, addresses ethical concerns in organ transplantation, particularly organ trafficking and transplant tourism. It aims to ensure that organ donation and transplantation are conducted ethically and equitably. It has been designed to accompany the WHO Guiding Principles on Human Cell, Tissue and Organ Transplantation to act as an international professional standard of care.

Collectively, these legislative frameworks, guidelines, and principles provide a structured and ethical foundation for the regulation and clinical management of organ and tissue donation and transplantation in Australia.

Programs, Initiatives, and Services

The availability of transplant services, resources and infrastructure across Australia varies by state and territory. With the exception of the newly established regional kidney transplant centre at Townsville University Hospital, all other transplant centres are concentrated in metropolitan areas in NSW, Vic, Qld, SA and WA where large tertiary hospitals and specialised units have the resources and infrastructure to perform complex procedures. There are no transplant units in NT, Tasmania (Tas) and Australian Capital Territory (ACT), instead patients from these states and territories access cross-border transplant care. Nationally, there are 25 transplant hospitals, including 7 paediatric centres.[38] The majority (around 90%) offer kidney transplantation, while each state typically supports a single unit for heart, lung, and liver transplants. Specialist services for pancreas and islet transplants are centralised in NSW, SA and Vic, with Vic also being the only state performing intestinal transplants. In addition to transplant surgeries, larger units coordinate retrieval teams for deceased organ donation, which are transported across state borders when required. Although SA and the NT have retrieval teams for thoracic and abdominal organs, respectively, they do not have transplant units to support the transplants locally.[39]

Australia's transplant infrastructure also includes NFCs, which provide access to low-volume, high-cost procedures across states and territories. There is variability in the laboratory capability and accreditation between states and territories. The TSANZ clinical guidelines require all testing laboratories to be accredited by the National Association of Testing Authorities (NATA), the Royal College of Pathologists of Australia, or licensed by the TGA. Australian Red Cross Lifeblood (Lifeblood) operates Transplantation and Immunogenetics (TIS) Laboratories in Melbourne, Sydney and Adelaide which provide tissue typing, Infectious Disease Markers (IDM) and immunology testing across all states and territories, except for Qld and WA.[40]

Access to transplantation is further shaped by barriers (such as geographic, cultural and gender related factors) which can contribute to delays in receiving timely and equitable care. Geographic location affects access to care due to travel costs, variability of local resources, and scarcity of specialist services, which can delay pre-transplant clinic appointments and complicate follow-up care.[41] People from Aboriginal and Torres Strait Islander backgrounds face a number of barriers to care, including distrust of the healthcare system, discrimination and systemic inequities.[42]

[32] Federal Register of Legislation. (2024). Australian Organ and Tissue Donation and Transplantation Authority Act 2008. Available from: https://www.legislation.gov.au/C2008A00122/latest/text (accessed 7 April 2025).

[33] National Health and Medical Research Council. (2016). Ethical Guidelines for organ transplantation from deceased donors. Available from: https://www.nhmrc.gov.au/about-us/publications/ethical-guidelines-organ-transplantation-deceased-donors (accessed 7 April 2025).

[34] Organ and Tissue Authority. (2021). Best Practice Guideline for Offering Organ and Tissue Donation in Australia Edition 2. Available from: https://www.donatelife.gov.au/sites/default/files/2021-05/final_best_practice_guideline_for_offering_organ_and_tissue_donation_apr2021.pdf (accessed 4 April 2025).

[35] TSANZ. (2024). Clinical Guidelines for Organ Transplantation from Deceased Donors Version 1.13. Available from: https://tsanz.com.au/clinical-guidelines (accessed 4 April 2025).

[36] TSANZ. (2023). Guidance document - Surgical technique for deceased donor abdominal organ retrieval Version 1.1. Available from: https://tsanz.com.au/storage/documents/TSANZ_SurgicalTechniqueForDeceasedDonorABDO_Version-11_02FINAL.pdf (accessed 4 April 2025).

[37] World Health Organization. (2010). WHO guiding principles on human cell, tissue and organ transplantation. World Health Organization. Available from: https://iris.who.int/handle/10665/341814 (accessed 20 May 2025).

[38] TSANZ. (2025). ADTCA-TSANZ-OTA National Standard Operating Procedure. Available from: https://tsanz.com.au/storage/Guidelines/TSANZ_OTA_ADTCA_NationalSOP_2025_02.pdf (accessed 3 April 2025).

[39] Gimpel, D. J. et al. (2022). Development of an organ procurement team in South Australia in response to COVID-19. ANZ J Surg, 92 (7-8): 1863-1866.

[40] Australian Red Cross Lifeblood. (2024). Transplant and Immunogenetics Services. Available from: https://www.Lifeblood.com.au/health-professionals/testing/transplantation-immunogenetics-services (accessed 09 December 2024).

[41] Scholes-Robertson, N.J. et al. (2022). Clinicians' perspectives on equity of access to dialysis and kidney transplantation for rural people in Australia: a semistructured interview study. BMJ Open, 12(2): e052315.

[42] NIKTT. (2020). Cultural Bias Initiatives to Improve Kidney Transplantation for Aboriginal And Torres Strait Islander People. Available from: https://tsanz.com.au/storage/NIKTT/CulturalBias_PolicyBrief.pdf (accessed 9 December 2024).

Aboriginal and Torres Strait Islander adults are less likely to receive a deceased or living donor kidney transplant, and are less likely to undergo transplantation within 5 years of commencing dialysis or as a pre-emptive procedure compared to non-Indigenous Australians.[43,44,45]

Gender factors also significantly influence access to kidney transplantation. For instance, males are more likely to receive kidney transplants and female donors are more common than male donors, with spousal donation often shaping donor-recipient relationships.[46] Women are 18% less likely than men to be listed for deceased donor transplant.[47]

Demand for all types of organ transplant continues to exceed supply, with around 1,800 people on the waiting list in 2024, and a further 14,000 receiving dialysis, many of whom might benefit from kidney transplantation.[48] Increasing donor registration and improving consent processes are key strategies that address this gap. Registration has a direct impact on consent with 8 in 10 families agreeing to organ donation in the hospital if their family member is registered. Australia currently has 36% of the eligible population registered (aged 16 and over). Lifting this to 50% will increase consent and organ donation in Australia.[48]

Spain, which operates under an opt-out system, is recognised as a global leader in organ donation, achieving 49.4 donors per million population (dpmp).[49] Australia's national dpmp in 2024 was 19.4, and dpmp rates varied widely across states and territories from between 15.5 in WA to 43.5 in Tas.[50] In 2024, only 53% of the 1,450 families approached for donation consent agreed, often due to uncertainty about the donor's wishes, lack of understanding of the process or cultural considerations.[48] Culturally and Linguistically Diverse (CALD) referrals for donation are significantly less likely to obtain family consent to donation.[51]

Deceased organ donation relies on a complex, highly coordinated system involving hospitals, retrieval teams, and transplant units. Coordination is critical for both DCDD and DNDD, demanding close collaboration between specialist nurses, surgical teams, and retrieval staff to ensure timely and viable organ recovery. A significant advancement in this process has been the introduction of machine perfusion, a technology for organ preservation that maintains the circulation of oxygenated blood or other fluids outside the body. This system is designed to deliver oxygen and nutrients, remove metabolic products and enzymes, and reduce metabolic activity, thereby minimising ischaemic injury. These advances have contributed to reduced wait times and improved transplant outcomes, with centres like St Vincent's Hospital in Sydney leading innovations in DCDD heart transplantation globally.[52] Once perfusion is complete, whether manual or machine-assisted, most organs are then placed in static cold storage, submerged in cold preservation solution held at 4°C to further slow metabolic processes. Transport to the transplant unit is carried out on the perfusion system such as *"Xvivo"* machines, and/or in a cooler box or a specialised cold container such as the SherpaPak, delivered either by a specialised courier service or the retrieval team.[53] Ensuring a rapid, well-coordinated organ retrieval remains essential to maintaining transplant success rates.

Cost of Solid Organ Donation and Transplant

Rising costs in organ donation are driven by several factors, including advanced diagnostic tools and pre-transplant evaluations (such as angiograms, bronchoscopies and computed tomography [CT] scans) which ensure better matches and outcomes, but require additional financial and logistical resources.[54] Examples of other factors include stricter regulatory standards which necessitate comprehensive compliance measures, such as rigorous documentation, quality control, and frequent monitoring, all contributing to higher operational costs.[54]

Costs also differ by donor pathway and organ type. DCDD is more expensive than DNDD due to more intensive coordination, additional staffing, and fewer transplantable organs retrieved per donor. Although Australia's ABF system does not fully capture these cost disparities, international data confirm the higher expenses associated with DCDD donors.[55] Regarding organ types, kidney transplants typically cost around $50,000 per episode, while heart and lung transplants can reach approximately $250,000, as reflected in the NHCDC Acute Data Set.

Despite the high upfront costs, organ transplantation is cost-effective compared to long-term treatments for end-stage organ failure. Kidney transplantation, for example, is more economical than ongoing dialysis[56], while paediatric heart transplants provide better outcomes at lower costs relative to L/RVAD. Strategies such as prioritising higher-quality organs for younger recipients have been shown to enhance cost-effectiveness.[57, 58]

[43] Walker, R. C. et al. (2019). Experiences, perspectives and values of Indigenous peoples regarding kidney transplantation: systematic review and thematic synthesis of qualitative studies. Int J Equity Health, 18(1): 204.

[44] Jaquelyne, T. H. et al. (2023). Advancing accessible kidney transplantation for Aboriginal and Torres Strait Islander people: the National Indigenous Kidney Transplantation Taskforce. Medical Journal of Australia, 219(8): 3-6.

[45] Chaturvedi, S. et al. (2021). Rising incidence of end-stage kidney disease and poorer access to kidney transplant among Australian Aboriginal and Torres Strait Islander children and young adults. Kidney International Reports, 6(6): 1704-1710.

[46] Kim, S. et al. (2023). Sociodemographic Drivers of Donor and Recipient Gender Disparities in Living Kidney Donation in Australia. Kidney Int Rep, 8(8): 1553-15561.

[47] Garg, P. P. et al. (2000). Impact of gender on access to the renal transplant waiting list for pediatric and adult patients. Journal of the American Society of Nephrology, 11(5): 958-964.

[48] Australian and New Zealand Organ Donation Registry. (2024). ANZOD Annual Report 2024. Available from: https://www.donatelife.gov.au/news-events/news/2025/2024-australian-donation-and-transplantation-activity-report-now-available (accessed 10 March 2025).

[49] IRODaT. (2024). Donation Activity Charts. Available from: https://www.irodat.org/?p=database (accessed 20 November 2024).

[50] DonateLife. (2024). Australian Donation and Transplantation Activity Report 2024. Available from: https://www.donatelife.gov.au/sites/default/files/2025-02/2024%20Australian%20Donation%20and%20Transplantation%20Activity%20Report.pdf (accessed 20 November 2024).

[51] Waller, K. Et al. (2019). Effect of language and country of birth on the consent process and medical suitability of potential organ donors; a linked-data cohort study 2010-2015. J Crit Care (57): 23-29.

[52] NSW Health. (2022). A Heart in a Box: The Gift of Life. Available from: https://www.medicalresearch.nsw.gov.au/a-heart-in-a-box-the-gift-of-life/ (accessed 22 November 2024).

[53] Paragonix Technologies. (2025). SherpaPak. Available from: https://www.paragonixtechnologies.com/sherpapak (accessed 4 April 2025).

[54] DonateLife. (2024). Corporate Plan 2024-25. Available from: https://www.donatelife.gov.au/sites/default/files/2024-08/OTA%20Corporate%20Plan%20202425.pdf (accessed 30 November 2024).

[55] Lindemann, J. et al. (2018). Cost Evaluation of a Donation after Cardiac Death Program: How Cost per Organ Compares to Other Donor Types. J Am Coll Surg, 226(5): 909-916.

[56] Senanayake, S. et al. (2022). Cost-Effectiveness and Budget Impact Analysis of Implementing a 'Soft Opt-Out' System for Kidney Donation in Australia. Appl Health Econ Health Policy, 20(5): 769-779.

[57] Senanayake, S. et al. (2020). Donor Kidney Quality and Transplant Outcome: An Economic Evaluation of Contemporary Practice. Value in Health, 23(12): 1561-1569.

[58] Ye, XT. et al. (2019). Cost-effectiveness of the National Pediatric Heart Transplantation Program in Australia. The Journal of Thoracic and Cardiovascular Surgery, 157(3): 1158-1166.e2

Investment

Ongoing investment is essential to increase the number and diversity of registrants on the AODR, supporting higher solid organ donation rates and equitable transplant access. Despite improvements, Australia's donation rate remains below that of leading international nations[59,60], with low rates especially evident among CALD populations and Aboriginal and Torres Strait Islander communities.

In 2023, Aboriginal and Torres Strait Islander people accounted for 3% of the donor population.[61] While this is consistent with the proportion of Aboriginal and Torres Strait Islander people in the general population, Aboriginal and Torres Strait Islander people are overrepresented among people who require organ transplantation due to higher rates of end-stage organ failure.[62] For example, in 2011, almost 8% of people treated for end-stage kidney disease (ESKD) commencing kidney replacement therapy identified as Aboriginal or Torres Strait Islander, despite making up only 4% of the total Australian population.[63]

CALD individuals accounted for 15% of donors compared to 28% of the general population. Consent rates are consistently lower amongst CALD populations.[64] However, it is important to note that deceased organ donors typically belong to an older age group which does not reflect the underlying younger age structure of many CALD communities.

Research indicates that approximately half of Australians have a limited understanding of organ donation, with understanding of tissue donation even lower at just 28%.[65] Lower donation rates among priority populations such as people from CALD backgrounds and Aboriginal and Torres Strait Islander people are typically attributed to relatively low consent rates due to low organ donation health literacy, misunderstandings and myths around eligibility criteria, the organ donation process and what organs can be donated.

To address these gaps, the Australian Government and state and territory health departments have launched initiatives targeting donor registration and transplant access in priority populations. Programs such as the OTA's Community Awareness Grants engage CALD communities through digital campaigns and culturally tailored events like DonateLife Week.[66] The National Strategy for Organ Donation, Retrieval and Transplantation also highlights the importance of culturally sensitive education and partnership with Aboriginal and Torres Strait Islander communities. As of 1 November 2024, all governments have endorsed the National Strategy on Organ Donation, Retrieval and Transplantation to address these gaps, with the implementation approach yet to be decided. Enhancing donation rates in these groups, especially through consent rates and utilisation, aims to reduce disparities on transplant waiting lists.[67]

Emerging Technologies

Australia is actively investing in emerging technologies to improve transplant outcomes, increase donation rates, and optimise the use of donated organs. Key advancements include machine perfusion and robotic-assisted surgeries.

Machine perfusion technology is an advanced preservation technique used in organ donation and transplantation to maintain and improve the viability of donor organs before transplantation. Unlike traditional static cold storage (SCS), where organs are preserved in a cold solution, machine perfusion involves continuously pumping oxygenated preservation solution or blood through the organ, mimicking physiological conditions. This can help reduce ischaemic injury (damage caused by lack of oxygen), improve organ function, and extend preservation times.[68]

There are 2 types of machine perfusion used in organ transplantation in Australia:

- Hypothermic Machine Perfusion (HMP), where the organ (commonly used for kidney but increasingly being explored for other organs such as the liver and heart) is perfused with a cold preservation solution. The low temperature slows down metabolic activity, reducing cellular damage and preserving the organ for longer periods.
- Normothermic Machine Perfusion (NMP), where the organ (used for liver, heart and lungs) is perfused with a warm, oxygenated solution often containing nutrients and medications to support cellular function. This technique allows real-time assessment of organ function, making it possible to identify potentially viable organs that might otherwise be considered non-viable.

[59] DonateLife. (2024). Australian Donation and Transplantation Activity Report 2024. Available from: https://www.donatelife.gov.au/sites/default/files/2025-02/2024%20Australian%20Donation%20and%20Transplantation%20Activity%20Report.pdf (accessed 20 November 2024).

[60] IRODaT. (2024). Donation Activity Charts. Available from: https://www.irodat.org/?p=database (accessed 20 November 2024).

[61] May, N. & Nicholas, J. (2 June 2024). 'It's only because of your son that my daughter's living': overcoming the cultural barriers to organ donation. The Guardian. Available from: https://www.theguardian.com/australia-news/article/2024/jun/02/australia-organ-donation-statistics-diversity

[62] May, N. & Nicholas, J. (2 June 2024). 'It's only because of your son that my daughter's living': overcoming the cultural barriers to organ donation. The Guardian. Available from: https://www.theguardian.com/australia-news/article/2024/jun/02/australia-organ-donation-statistics-diversity

[63] AIHW. (2023). Projections of the prevalence of treated end-stage kidney disease in Australia 2012-20. Available from: https://www.aihw.gov.au/getmedia/8caf25d6-b11a-41f7-8fa4-1cca30fc6f3e/17373.pdf (accessed 20 February 2025).

[64] AIHW. (2024). Culturally and linguistically diverse Australians. Available from: https://www.aihw.gov.au/reports-data/population-groups/cald-australians/overview (accessed 20 February 2025).

[65] Organ and Tissue Authority. (2024). Annual Report 2023-24. Available from: https://www.donatelife.gov.au/sites/default/files/2024-10/OTA%20Annual%20Report%202023-24.pdf (accessed 18 December 2024).

[66] Department of Health and Aged Care. (2024). Increasing organ donation by speaking directly to CALD communities. Available from: https://www.health.gov.au/ministers/the-hon-ged-kearney-mp/media/increasing-organ-donation-by-speaking-directly-to-cald-communities (accessed 18 December 2024).

[67] Department of Health and Aged Care. (2024). National Strategy for Organ Donation, Retrieval and Transplantation. Available from: https://www.health.gov.au/sites/default/files/2024-10/national-strategy-for-organ-donation-retrieval-and-transplantation_0.pdf (accessed 18 December 2024).

[68] Hosgood, S. et al. (2021). Advances in Kidney Preservation Techniques and Their Application in Clinical Practice. Transplantation, 105(11): e202–e214.

The accessibility to machine perfusion is limited by funding. For instance, machine perfusion systems can be acquired under a lease agreement for $410,000 annually,[69] and those not registered with the TGA are ineligible for direct funding support and are used only in a research context. Despite these financial barriers, there are significant long-term savings by improving organ utilisation rates, reducing discard rates, and decreasing post-transplant complications such as delayed graft function and organ failure.[70,71,72]

Robotic-assisted surgeries have also increasingly been adopted in living kidney and liver donation, demonstrating superior outcomes compared to traditional open and laparoscopic techniques. These procedures leverage the precision, dexterity and less invasive nature of robotic platforms, improving donor safety and recovery while maintaining graft viability and recipient outcomes.[73] The use of robotics in transplant surgery continues to evolve, with research highlighting the benefits in surgical precision, reduced postoperative complications and enhanced recovery times.

Robotic-assisted donor nephrectomy (RDN) has been widely studied and implemented, showing a strong safety profile and improved donor experience.[74] Compared to laparoscopic donor nephrectomy (LDN), RDN offers several advantages. Studies indicate that RDN is associated with reduced blood loss, shortened average LOS, and lower complication rates.[75] In addition to this technology, robotic-assisted living donor hepatectomy (RLDH) remains a more recent but rapidly evolving innovation in liver transplantation. The use of robotics in donor hepatectomy has demonstrated significant benefits over laparoscopic and open hepatectomy, particularly in terms of surgical precision and donor safety.[76] The robotic system provides improved manoeuvrability, allowing for meticulous dissection and enhanced haemostasis, which reduces the risk of intraoperative bleeding and bile duct injury.[77]

Cell Donation and Transplantation

Context

HSC donor

Living HSC donors play a crucial role in treating patients who require haematopoietic stem cell transplants due to malignant or non-malignant conditions.[78] HSCT recipients have a common need for replacement of their bone marrow, however the reasons for requiring an HSCT vary and include bone marrow failure and malignant diseases of the bone marrow cells. HSCT reconstitutes the elements of normal bone marrow function which include production of red cells, white cells, and platelets.

The sources of HSCs include:

- **Autologous:** This is where the patient's own HSCs or bone marrow is collected and stored when a patient's disease is in remission and then transplanted after 'ablative treatment' which destroys all bone marrow cells and, ideally, all residual tumour cells.
- **Allogeneic:** HSCs are sourced from another person. This requires a very close and preferably exact match between the HLA Tissue Type of the recipient and the donor to reduce the risk that the immune system will recognise the new cells as foreign as this can lead to a 2-way problem common to all HSCTs. If the patient's own bone marrow is not fully ablated by pre-transplant 'conditioning' therapy then it will immunologically attack and destroy any mismatched HSCT cells and cause failure of engraftment. Alternatively, if the HSC successfully engrafts, but is mismatched, then it will 'immunologically reject' the patient – a process called Graft Versus Host Disease (GVHD). The best source of a fully HLA matched HSC is an HLA-identical sibling.
- **Cord blood banks:** These store HSC from cord blood donations which can be searched for a match. The degree of matching can be less stringent than if the HSC donor is an adult.

Successful transplantation relies on precise tissue-type matching between donor and recipient. Donors can be either closely related family members or unrelated individuals. In Australia, unrelated donors are identified through the services of Stem Cell Donors Australia, which is part of a global network connecting registries with over 42 million potential donors. The donor may be matched with an unrelated recipient in Australia or another country. Stem Cell Donors Australia also coordinate and provide accreditation to networked organisations such as Lifeblood, Cord Blood Banks, collection centres, transplant centres and laboratories.[79] There is a slight downward trend in related (matched sibling and other related) transplant rates and a slight rise in unrelated transplantation rates since 2021 (see Figure 2). Umbilical cord blood, collected after birth from the placenta or umbilical cord is available from Australia's public cord blood banks with an inventory of over 35,000 units. Small numbers of privately stored autologous cord blood are also available, though it is not clear if these have actually been used for transplantation.

[69] Levvey, B. et al. (2022). Ex-vivo machine perfusion of donor organs: An update from Australian experts. Transplant Journal of Australasia, 31(2), pp. 5-9.

[70] Handley, T. J. et al. (2023). Despite increasing cost, perfusion machines expand the donor poll of livers and could save lives. Journal of Surgical Research, 283: 42-51.

[71] Webb, A. N. et al. (2022). Cost-utility analysis of normothermic machine perfusion compared to static cold storage in liver transplantation in the Canadian setting. American Journal of Transplantation, 22(2): 541-51.

[72] Chikako, E. et al. (2024). Cost-effectiveness of Dual Hypothermic Oxygenated Machine Perfusion Versus Static Cold Storage in DCD Liver Transplantation. Transplantation, 109(2): e101-8.

[73] Spiers, H. et al. (2021). Robot-assisted kidney transplantation: an update. Clinical Kidney Journey, 15(4): 635-43.

[74] O'Connor-Cordova, M. A. et al. (2023). Living donor robotic-assisted kidney transplant compared to traditional living donor open kidney transplant. Where do we stand now? A systematic review and meta-analysis. Transplantation Reviews, 37:4.

[75] Spaggiari, M. et al. (2022). Robotic Assisted Living Donor Nephrectomies: A Safe Alternative to Laparoscopic Technique for Kidney Transplant Donation. Ann Surg, 275(3): 591-595.

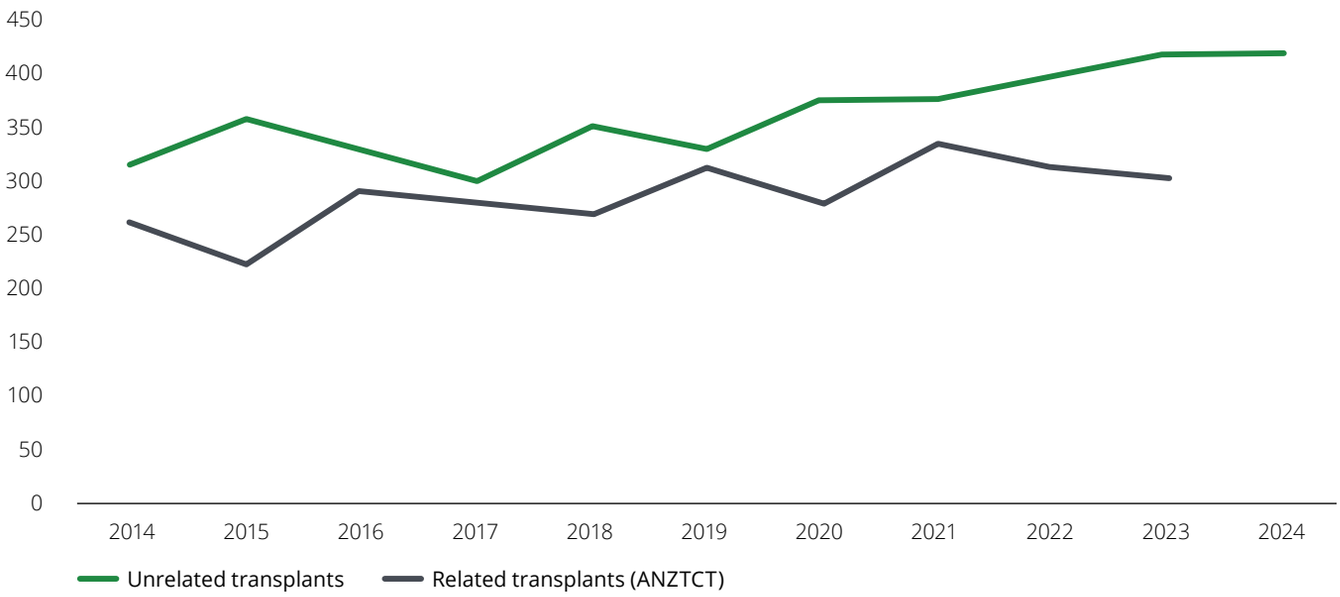
[76] Semash, K. (2024). Robotic surgery in living liver donors and liver recipients. Laparoscopic, Endoscopic and Robotic Surgery, 7(3): 123-7.

[77] Broering, D. C. et al. (2024). Pioneering fully robotic donor hepatectomy and robotic recipient liver graft implantation - a new horizon in liver transplantation. Int J Surg, 110(3): 1333-6.

[78] Leukemia Foundation. (2024). Blood stem cell (bone marrow) donation. Available from: https://www.leukaemia.org.au/get-involved/bone-marrow-donor/ (accessed 1 November 2024).

[79] Stem Cell Donors Australia. (2025). Registry Network. Available from: https://stemcelldonors.org.au/about/registry-network/ (accessed 27 March 2025).

Figure 2: HSCT activity between 2014-24 for unrelated and related transplants



Source: Stem Cell Donors Australia (data supplied) and ANZTCT.[80]

HSCs can be collected through several methods. Bone marrow collection is a surgical procedure performed under general anaesthesia, usually involving the pelvic bones, and can take up to 2 hours. Recovery of the donor typically takes one to two days. Peripheral blood stem cell donation accounts for 90% of donations[81], involving the stimulation of stem cell release from the bone marrow using granulocyte colony-stimulating factor (GCSF) before collection via cytapheresis.[82] This process can take several hours and may require a second session if an adequate number of stem cells is not collected initially. Cord blood retrieval is a non-invasive procedure performed after birth, where blood is drawn from the umbilical cord vein and processed for long term storage in liquid nitrogen.[83]

Currently, around 1,100 patients in Australia are searching for donors through Stem Cell Donors Australia.[84]

HSC recipient & transplantation

Before an HSCT, recipients typically undergo chemotherapy and occasionally radiotherapy to destroy diseased bone marrow and induce disease remission, as well as ablate the immune cells that would reject donor bone marrow. Transplant units define a hierarchy of treatment options depending on the availability of suitable donors. The optimal donor is an HLA identical sibling donor. If there is no suitable sibling then a fully matched unrelated donor is the next best option, followed by a well-matched Cord blood unit if the recipient is a child. If none of these options are available then the opportunities to find a donor broaden, but the outcomes deteriorate. A 'haploidentical' related donor (half matched), a partly mismatched related or unrelated donor and finally an autologous transplant may be considered.

In autologous HSCTs, the patient's own stem cells are used, while in allogeneic transplants, donor haematopoietic stem cells are employed after they have been processed, selected, optimised for the patient, and then counted before they are despatched to the patient for transplant. The transplantation involves infusing the stem cells intravenously, where they migrate to the bone marrow to begin blood cell production.

Post-transplant, recipients are highly vulnerable to infections due to their immunosuppressed state and may be treated with antibiotics and other medications. Platelet, red cell or donor lymphocyte transfusions may also be necessary to prevent bleeding, anaemia and infection respectively while awaiting engraftment. The timing of the engraftment process, where the donor cells begin producing blood cells, varies by transplant type.

Allogeneic HSCTs with an HLA-identical match typically have faster engraftment, taking around 14 days, compared to 16 days in haploidentical transplants,[85,86] while in autologous transplants, it can take between 3-6 months to fully recover.

[80] ANZTCT (2025) ANZTCT Registry Annual Data Summary. Available from: https://anztct.org.au/documents/registry-annual-data-summary-2022/ (accessed 27 March 2025).

[81] Leukaemia Foundation (2024). Bone Marrow Donor. Available from: https://www.leukaemia.org.au/get-involved/bone-marrow-donor/ (accessed 11 December 2024).

[82] Stem Cell Donors Australia. (2025). The donation process – patient donor timeline. Available from: https://stemcelldonors.org.au/the-donation-process/patient-donor-timeline/ (accessed 20 March 2025).

[83] AusCord. (2023). About AusCord and Public Cord Blood Banking. Available from: https://thewomens.r.worldssl.net/images/uploads/fact-sheets/About-Auscord-and-Public-Cord-Blood-Banking-V2.pdf (accessed 20 March 2025).

[84] Stem Cell Donors Australia. (2024). Stem Cell Donors Australia. Available from: https://stemcelldonors.org.au/ (accessed 4 December 2024).

[85] Chen, D. et al. (2018). Comparison of outcomes in hematological malignancies treated with haploidentical or HLA-identical sibling hematopoietic stem cell transplantation following myeloablative conditioning: A meta-analysis. PloS one, 13(1): e0191955.

[86] Jaime-Pérez, J. C. et al. (2024). A comparison of haploidentical versus HLA-identical sibling outpatient hematopoietic cell transplantation using reduced intensity conditioning in patients with acute leukemia. Frontiers in immunology, 15: 1400610.

Relapse is more common after an autologous transplant, and if this happens, the patient may undergo chemotherapy and/or another transplants, or a drug to stimulate their immune system to fight the disease.[87] In allogeneic transplants, it can take up to 12 months for a full recovery.[88] Long-term care focuses on immune system recovery and managing potential complications such as GVHD which can be acute (i.e., occurs typically within the first 100 days post-transplant) and range in severity from grades I to IV, or chronic (i.e., occurs more than 100 days post-transplant).[89]

Legislative Framework

Australia maintains the following comprehensive and ethically grounded regulatory framework to ensure the safe, effective, and responsible use of human blood, tissues, and cellular therapy products for therapeutic purposes:

- Human Tissue Acts serve as legislative frameworks that regulate the removal, storage, and use of organs and tissues in each Australian state and territory, with some variations between states and territories.[90]
- Australian Code of Good Manufacturing Practice (GMP) for Blood and Blood Components, Human Tissues, and Human Cellular Therapy Products (2013) sets out essential requirements for organisations involved in the manufacture of these products. It covers the collection, processing, testing, storage, release for supply, and quality assurance, ensuring that all steps are carried out under conditions that prioritise safety, quality, and clinical effectiveness.[91]
- GMP Code, the Therapeutic Goods (Standard for Biologicals Labelling Requirements) (TGO 107) Order 2021 establishes clear standards for the labelling of human biologicals. It applies to all stages of production, from starting materials to finished therapeutic goods, ensuring proper identification and safe use across the supply chain.[92]
- Therapeutic Goods (Standard for Human Cell and Tissue Products Donor Screening Requirements) (TGO 108) Order 2021 introduces screening measures for donors of human cells and tissues.[93]
- To clarify the scope of regulatory oversight, the TGA provides specific guidance on understanding whether a human cell and tissues product is excluded from TGA regulation.[94]
- Globally, the WHO Guiding Principles an orderly, ethical and internationally accepted framework for the acquisition and transplantation of human cells, tissues and organs for therapeutic purposes. They influence the development of appropriate professional codes and practices, as well as legislation, globally.[95]

Programs, Initiatives, and Services

The availability of transplant services, resources and infrastructure across Australia varies by state and territory. Similar to organ transplants, major transplant centres (for both adults and paediatrics) and laboratories and pathology services are concentrated in larger capital cities in NSW, Vic, Qld, SA and WA where tertiary hospitals and specialised units have the resources and infrastructure to perform HSCTs. Some hospitals only perform autologous transplants, however, these are typically smaller centres. Access to HSCT units in major cities is achieved for all patients via local haematologists who work in most medium sized and all larger hospitals.

There are currently 15 transplant units across Australia, including 5 paediatric hospitals. There are 2 critical laboratories each transplant unit must access – BMT Processing and Storage laboratories, which are based in the main transplant units usually servicing a number of transplant programs, and laboratories which undertake HLA typing. HLA typing for the Stem Cell Donors Australia donors, and cord blood banks, is mostly undertaken as part of transplantation and immunogenetic testing performed by Lifeblood, through their network of TIS laboratories in Sydney (NTIS), Melbourne (VTIS), Brisbane (QTIS) and Adelaide (SATIS).[96]

[87] Leukaemia Foundation. (2024). Autologous stem cell transplants. Available from: https://www.leukaemia.org.au/blood-cancer/journey/active-treatment/treatment-options/stem-cell-transplants/autologous, (accessed 11 December 2024).

[88] The Memorial Sloan Kettering Cancer Centre. (2025). Allogeneic Stem Cell Transplant: A Guide for Patients & Caregivers. Available from: https://www.mskcc.org/cancer-care/patient-education/allogeneic-stem-cell-transplantation (accessed 24 January 2025).

[89] Leukaemia Foundation. (2025). Graft versus host disease (GVHD). Available from: https://www.leukaemia.org.au/blood-cancer/journey/active-treatment/treatment-options/stem-cell-transplants/allogeneic/graft-versus-host-disease-gvhd/ (accessed 20 June 2025).

[90] Federal Register of Legislation. (2024). Australian Organ and Tissue Donation and Transplantation Authority Act 2008. Available from: https://www.legislation.gov.au/C2008A00122/latest/text (accessed 7 April 2025).

[91] TGA. (2013). Australian Code of Good Manufacturing Practice for human blood and blood components, human tissues and human cellular therapy products v1.0. Available from: https://www.tga.gov.au/sites/default/files/manuf-cgmp-human-blood-tissues-2013.pdf (accessed 7 April 2025).

[92] Federal Register of Legislation. (2021). Therapeutic Goods (Standard for Biologicals—Labelling Requirements) (TGO 107) Order 2021. Available from: https://www.legislation.gov.au/F2021L01325/latest/versions (accessed 7 April 2025).

[93] Federal Register of Legislation (2022). Therapeutic Goods (Standard for Human Cell and Tissue Products—Donor Screening Requirements) (TGO 108) Order 2021. Available from: https://www.legislation.gov.au/F2021L01326/latest/versions (accessed 7 April 2025).

[94] TGA. (2024). Manufacturing excluded autologous human cell and tissue (HCT) products. Available from: https://www.tga.gov.au/resources/guidance/manufacturing-excluded-autologous-human-cell-and-tissue-hct-products (accessed 7 April 2025).

[95] World Health Organization. (2010). WHO guiding principles on human cell, tissue and organ transplantation. World Health Organization. Available from: https://iris.who.int/handle/10665/341814 (accessed 20 May 2025).

[96] Lifeblood (2025). Transplantation and immunogenetics services. Available from: https://www.lifeblood.com.au/health-professionals/testing/transplantation-immunogenetics-services (accessed 2 May 2025).

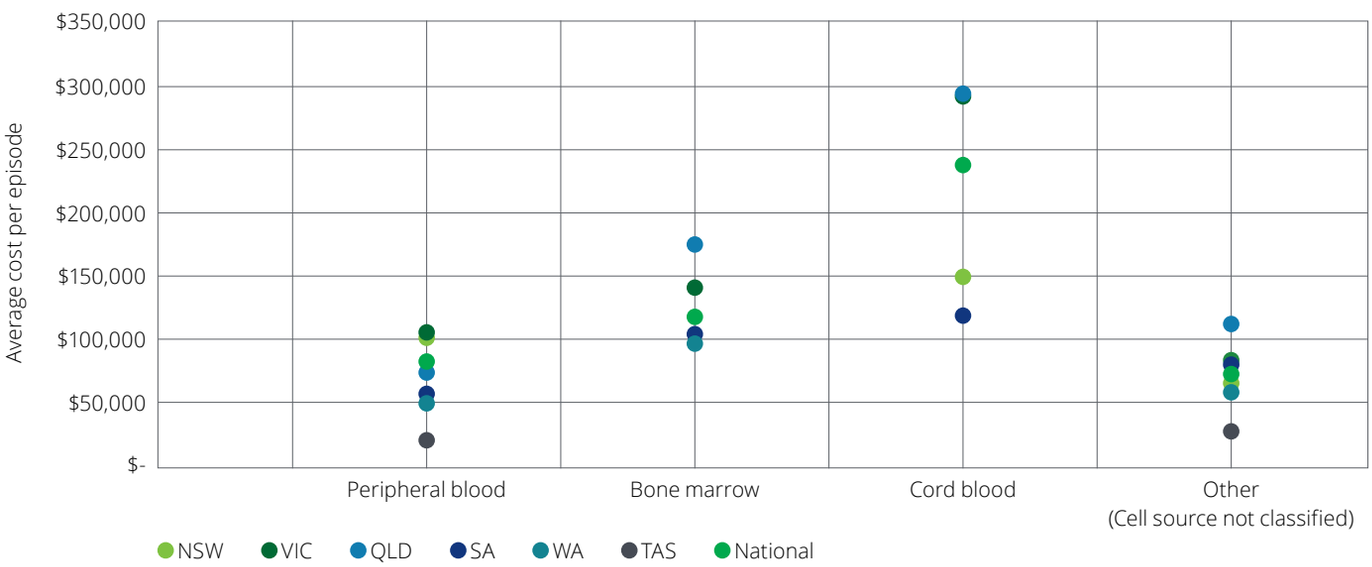
AusCord is the national network of public cord blood banks in Australia that manage the donation, storage and release of umbilical cord blood units to patients in need of a transplant.[97] It is comprised of 3 cord blood banks: Bone Marrow Donor Institute (BMDI) Cord Blood Bank, Queensland Cord Blood Bank at The Mater, and Sydney Cord Blood Bank. Cell Care is the primary private cord blood bank provider in Australia, storing over 40,000 cord blood units for autologous use.[98] Another provider, Cryosite, based in NSW, only preserves cord blood samples collected and processed prior to 2017, after which new cord blood collection operations ceased.[99] The collected cord blood undergoes testing for blood count, tissue typing, and infectious diseases before being cryopreserved for later use. Although cord blood transplants generally have a slower engraftment process due to the smaller number of stem cells, they can be more effective in reducing the risk of GVHD because the cells are less likely to react against the recipient's body. Cord blood transplant recipients have similar post-transplantation care to allogeneic HSCTs. Antibiotics and other drugs are commonly prescribed to recipients to help prevent or treat infections post-transplant.

One of the key challenges Australia's bone marrow donation sector faces is the underrepresentation of donors who match the ethnic diversity in the Australian population. Northern and Western European donors are overrepresented in international registries, while donors of Aboriginal and Torres Strait Islander, Māori, Pasifika, and Asian ancestry are underrepresented. Combined with the small size of Australia's donor pool, this has led to a heavy reliance on international donors, with over 80% of Australian recipients of unrelated-donor transplants receiving their transplants from international donors. [100,101]

Cost of HSC Transplant

The costs associated with HSCTs vary depending on the donor source and transplant type (refer to Figure 3), which excludes the costs of donor acquisition, collecting and testing. Autologous HSCT, where patients receive their own stem cells, is the least costly, averaging approximately $51,000 per transplant episode. Allogeneic HSCT, which involves donor cells, is significantly more expensive, with average costs around $170,000 per episode. The increased expense reflects additional factors such as donor identification through HLA typing and immunogenetic testing[102], donor recruitment and transportation[103], and more complex laboratory processing.[104]

Figure 3: Average cost of transplant episode by cell type and jurisdiction, 2022-23



Source: NHCDC Acute Data Set (2022–23). Note: ACT and NT did not record episodes of HSCT in NHCDC acute data.

Higher and variable costs in allogeneic transplants are driven by the management of complications such as GVHD, which necessitates expensive immunosuppressive treatments and extended hospital stays. The intensive pre-transplant conditioning regimens required further contribute to the risk of infections and other complications, increasing overall cost. Cord blood transplants tend to be the most expensive, averaging $300,000 per episode (in 2022-23); however, this estimate is based on limited data and may not fully represent the true cost.

[97] AusCord. (2025). About AusCord and Public Cord Blood Banking. Available from: https://thewomens.r.worldssl.net/images/uploads/fact-sheets/About-Auscord-and-Public-Cord-Blood-Banking-V2.pdf (accessed 20 February 2025).

[98] CellCare. (2024). Why Choose Cell Care? Available from: https://cellcare.com.au/banking-with-cell-care/why-choose-cell-care/ (accessed 26 March 2025).

[99] Cryosite. (2024). Cord blood. Available from: https://cryosite.com/cord-blood/ (accessed 28 March 2025).

[100] McErlean, G. et al. (2023). If we do not count it, it does not count: ethnicity in allogeneic haemopoietic stem cell transplant in Australia. Internal Medicine Journal, 53(12): 2155-58.

[101] ABMDR. (2023). Donor Enrolment. Available from: https://stemcelldonors.org.au/wp-content/uploads/2021/02/ABMDR-STD-NCU-1-Donor-enrolment-extended-HLA-and-verification-typing.pdf (accessed 25 November 2024).

[102] Khera, N. et al. (2012). Economics of hematopoietic cell transplant. Blood, 120(8): 1545-51.

[103] Department of Health and Aged Care. (2023). Recommendations on Adult Haemopoietic Progenitor Cell Donor Recruitment Reform. Available from: https://www.health.gov.au/sites/default/files/2023-12/recommendations-on-adult-haemopoietic-progenitor-cell-donor-recruitment-reform_0.pdf (accessed 15 May 2025).

[104] Blommestein, H. M. et al.(2012). Real-world costs of autologous and allogeneic stem cell transplantations for haematological diseases: a multicentre study. Annals of Hematology, 91(12): 1945–1952.

Investment

The Australian Government has identified the need to expand the domestic bone marrow donor pool to reduce dependence on international sources. Currently, approximately 80% of stem cells used for HSCT are sourced from overseas donors, primarily from countries such as Germany, the US, UK, France, and Canada.[105] This reliance introduces challenges including delays in transport, high shipping costs, and difficulties in finding well-matched donors for ethnically diverse populations, especially First Nations people.[106]

To address these issues, the DoHDA in partnership with state and territory governments, is investing up to $4.2 million to increase both the number and diversity of local bone marrow donors. The initiative focuses on recruitment activities such as cheek swabbing for HLA typing, aiming to improve donor accessibility and awareness.[107] By expanding the local donor registry, the program seeks to reduce logistical delays, lower transportation expenses, and improve the efficiency of HSCT procedures in Australia.

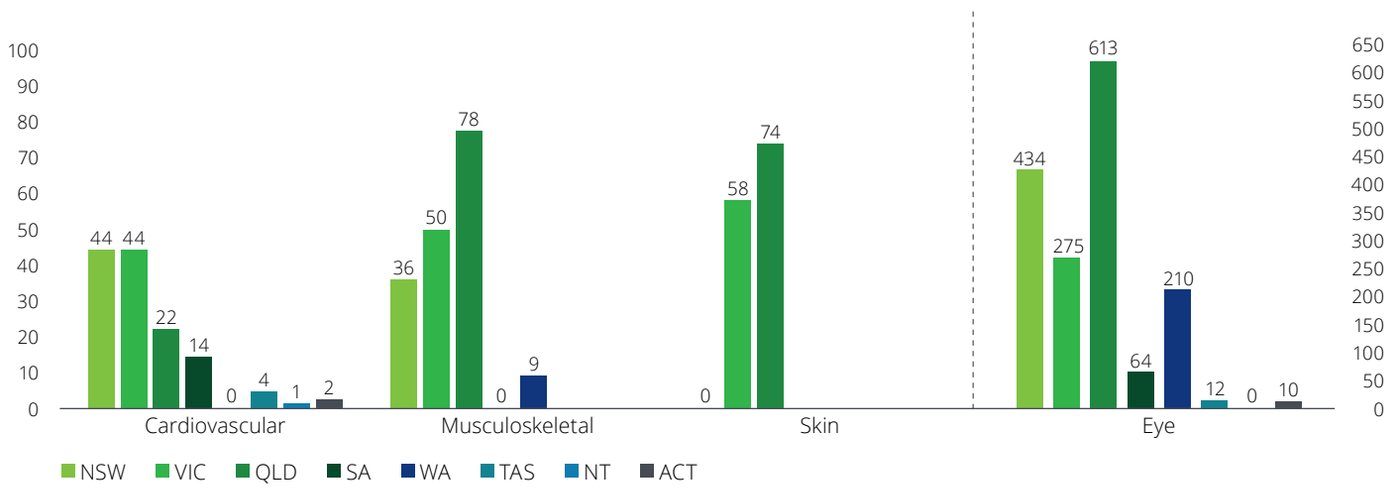
Tissue Donation and Transplantation

Context

Deceased tissue donor

A deceased tissue donor may have registered their intent to donate or their legally valid consent to donate organs and tissues after their death, while they are still living. This can be done through the AODR, or in some instances, state driver's licence registrations. When the donor is not on an organ donation pathway, the tissue-only donor's family are approached after death for consent to donate tissues. Unlike organ donation, eye and tissue donation can occur up to 24 hours after death and outside of a hospital, increasing the pool of potential donors.[108] From January to November 2024, there were a total of 1,618 eye donors and 280 unique deceased tissue donors.[109] From the 280 unique deceased tissue donors, a total of 436 donations were made, with musculoskeletal tissue forming the majority of donations (n=173), followed by cardiovascular (n=131) and skin (n=132) (refer to Figure 4).

Figure 4: Deceased tissue and eye donations by jurisdiction



Source: Australia and New Zealand Eye and Tissue Donation Registry (2024).[109]

Living tissue donor

A living tissue donor is someone who donates part of the human body that can be stored in a tissue bank prior to release and transplantation. This includes bone, processed bone and amnion. For example, patients undergoing a total hip replacement operation can donate their bone, the femoral head, which is otherwise discarded during surgery. The femoral head can be processed to produce bone grafts which can help up to 4 people with various types of orthopaedic and spinal injuries, including non-healing fractures, sport injuries, joint replacement surgeries, orthopaedic surgeries, neuro-spinal surgeries, chronic bone loss and dental or facial injuries.

Between January to November 2024, there were 2,860 unique living tissue donors reported through the Australia and New Zealand Eye and Tissue Donation Registry (ANZETD). During this same period, there were 2,911 living tissue donations, of which an overwhelming proportion were musculoskeletal tissue (includes bone and processed bone) (2,811 of 2,911 or 96.6%), followed by amnion (72 of 2,911 or 2.5%) and cardiovascular tissue (28 of 2,911 or 1.0%).[109]

[105] PricewaterhouseCoopers. (2018). Review of the HPC sector Final Report. Available from: https://www.health.gov.au/sites/default/files/documents/2021/10/review-of-the-hpc-sector-final-report-2018-review-of-the-hpc-sector---final-report.pdf (accessed 10 November 2024).

[106] Leukaemia Foundation. (2024). Blood Stem Cell and Bone Marrow Donations for Allogeneic Transplants. Available from: https://www.leukaemia.org.au/about-us/position-statements/blood-stem-cell-and-bone-marrow-donations-for-allogeneic-transplants-position-statement/ (accessed 17 February 2025).

[107] Department of Health and Aged Care. (2024). Increasing Australia's bone marrow donors. Available from: https://www.health.gov.au/ministers/the-hon-mark-butler-mp/media/increasing-australias-bone-marrow-donors (accessed 18 December 2024).

[108] DonateLife. (2024). Eye and tissue donation awareness. Available from: https://www.donatelife.gov.au/get-involved/eye-and-tissue-donation-awareness (accessed 28 May 2025).

[109] ANZETR. (2024). Eye and Tissue Donation in Australia Monthly Report November 2024. Available from: https://www.anzdata.org.au/wp-content/uploads/2024/12/20241219_Eye_Tissue_Monthly_Report_2024November.pdf (accessed 3 February 2025).

Retrieval and storage

Deceased tissue donors are transferred to the hospital mortuary where trained retrieval technicians will remove the tissue to be donated. Tissues such as the cornea/eye, bone, processed bone (milled from smaller sections of bone), skin and heart valve/aortic root are removed within 24 hours of death.[110] The cornea is unique as successful corneal transplantations require the cornea tissue to be living viable tissue upon transplantation.[111] Tissues are tested for integrity, infectious disease risk and suitability for transplantation and then stored in a storage medium until the time of surgery.[112] All tissue banks are regulated by the TGA and must be licensed to undertake retrieval, processing, storage and release of human material. There is also an increasing trend in the use of imported tissue from overseas commercial providers.[113]

Tissue recipient and transplantation

A patient may require a tissue transplant when they have damaged tissue that cannot heal on its own and requires repair or replacement. There are 2 primary types of tissue transplants:

- **Autografts:** Where tissues are transplanted from one part of a person's body to another part of the same individual in the same or separate anaesthetic events. This is commonly used in procedures like skin grafting for burn victims or reconstructive surgeries such as bone or tendon transfers.
- **Allografts:** Where tissues are transplanted from a donor to a recipient most commonly from deceased donors. This is used in a wide range of procedures, such as corneal transplants, bone grafts, heart valve replacements and skin grafts.

Common reasons for tissue transplants include:

- **Severe injuries:** Accidents or trauma may cause damage to bones, skin, or tendons that require grafting to restore function or appearance.
- **Burn treatment:** Skin grafts help in covering wounds, promoting healing, and preventing infection in severe burns.
- **Orthopaedic issues:** Bone grafts are used to repair fractures or other bone defects, often caused by injury, disease, or surgery.
- **Ligament and tendon damage:** Sports injuries or accidents can result in torn ligaments or tendons, which may be repaired using tissue transplants.
- **Corneal transplants:** When the cornea becomes damaged or diseased (for example, from keratoconus or scarring), a corneal transplant can restore vision.
- **Cancer treatment:** Patients undergoing cancer surgery, such as for bone or soft tissue cancers, may need tissue transplants to replace removed sections.
- **Degenerative diseases:** Conditions like arthritis may require tissue grafts to support joint repair or replacement.

Most eye tissue transplants, such as a corneal transplant, require the eye tissue to be viable, i.e. it contains living cells. Many tissue transplants are not viable but are instead simply a replacement of anatomical structures that may or may not be populated subsequently with living cells from the recipient. Tissue type and blood group matching is thus not critically important for most tissue transplants and the donated material is usually sterilised to prevent disease transmission.[114]

Legislative Framework

Australia's approach to the regulation and management of human tissue for therapeutic use involves multiple legislative frameworks, standards, and guidelines designed to ensure safety, quality, and ethical practice in the handling, processing, and transplantation of human tissues. These include:

- The Australian Organ and Tissue Donation and Transplantation Authority Act 2008 which establishes the OTA responsible for overseeing organ and tissue donation and transplantation activities across Australia.[115]
- The regulatory standards detailed in this report's Legislative Framework section for Cell Donation and Transplantation, including, but not limited to:
  - the Australian Code of GMP for Human Blood and Blood Components, Human Tissues, and Human Cellular Therapy Products (2013)
  - the Therapeutic Goods (Standard for Biologicals Labelling Requirements) (TGO 107) Order 2021
  - therapeutic Goods (Standard for Human Cell and Tissue Products Donor Screening Requirements) (TGO 108) Order 2021, also apply to tissue transplants.

[110] Australian Tissue Donation Network. (2025). Deceased Donation. Available from: https://tissuedonationnetwork.org.au/programs/musculoskeletal-donation (accessed 24 February 2025).

[111] Armitage, W. J. (2011). Preservation of Human Cornea. ***Transfusion medicine and hemotherapy***, 38(2): 143–147.

[112] Allografts.com. (2025). Allografts and Storage: What are the temperature requirements? Available from: https://allografts.com/allografts-and-storage-what-are-the-temperature-requirements/ (accessed 4 April 2025).

[113] Department of Health and Aged Care. (2022). National Eye and Tissue Sector Framework Report. Available from: https://www.health.gov.au/sites/default/files/documents/2022/09/eye-and-tissue-sector-framework.pdf (accessed 2 April 2025).

[114] Azad, F. et al. (2022). Live Donation of Corneal Tissue in the Setting of Orbital Exenteration for Malignancy. ***ePlasty,*** 13(22): e17.

[115] Federal Register of Legislation. (2024). Australian Organ and Tissue Donation and Transplantation Authority Act 2008. Available from: https://www.legislation.gov.au/C2008A00122/latest/text (accessed 7 April 2025).

- Therapeutic Goods (Standards for Biologicals General and Specific Requirements) (TGO 109) Order 2021 which details general and specific regulatory requirements for biological products, covering various human tissue types such as musculoskeletal, cardiovascular, ocular tissues, skin, and amnion products.[116]
- TGA guidance on manufacturing excluded autologous human cell and tissue products which assists sponsors in determining whether certain autologous tissue products derived from and intended for use in the same individual are exempt from TGA regulation.[117]
- WHO Guiding Principles on Human Cell, Tissue and Organ Transplantation that provide an internationally recognised ethical framework for the acquisition and transplantation of human tissues.[118]

Programs, Initiatives, and Services

Australia's tissue donation and supply is managed by 15 tissue banks responsible for collecting, storing, preparing, and distributing various tissue types. An inquiry into increasing the number of registered organ and tissue donors by The Legal and Social Issues Committee and recent media reports found that domestic demand for tissue exceeds supply.[119] The shortage of donated bone, skin, cardiac tissue and tendons means there is a dependence on overseas supplies.[120] However, the DonateLife 2023 Australian Donation and Transplantation Activity Report suggests that eye donation is currently meeting demand.[121]

Tissue transplantation in Australia is not managed by a waitlist but is dependent upon tissue availability via state-based tissue banks or private tissue providers. In 2023, there were 1,546 deceased eye donors, representing a 5% increase from 2022, resulting in 2,486 corneal transplants, a 6% rise.[121] Tissue donation included 3,286 donors in total, 328 deceased and 2,958 living, with the latter mainly donating musculoskeletal tissue from hip replacements or amnion post-birth.[121] In 2023, 9,898 tissue transplant recipients were recorded, slightly fewer than in 2019.[121] This difference between donation and transplant volumes is reflective of the fact that multiple recipients can benefit from tissues donated by a single donor. There is also an increasing trend in the use of imported tissue from overseas commercial providers.[122]

The disparity in the number of deceased tissue donors and donations between states and territories can in part be explained by the different governance structures in how tissue banks operate across Australia. The tissue banks in NSW, WA and Qld are governed by their respective health departments, whereas in Vic, the Donor Tissue Bank of Victoria (DTBV) is located in the Department of Justice and Community Safety and operates within the Victorian Institute of Forensic Medicine.[123] The tissue banks of NSW, Qld and WA receive rapid electronic notification of a person's death in their hospital.[124] This enables rapid assessment of electronic medical records and leads to timely discussion with next of kin so that tissues can be retrieved within an acceptable timeframe. This process does not occur in Vic as there is currently no electronic communication of death between the Vic Department of Health and Department of Justice and Community Safety, resulting in the notification of death to be manually communicated between departments.[125]

In August 2022, the National Eye and Tissue Sector Framework (the Framework) was published and sets the national objectives to ensure all Australians have safe, equitable and ethical access to tissue transplantation.[126] The Framework stipulates that Australia has an ethical responsibility to strive to meet its population's need for human tissue and tissue products using its own resources. Where Australia's tissue and tissue-based products needs cannot be met through locally donated supply, imported tissue and tissue-based products that meet Australian requirements can be used.

[116] Federal Register of Legislation. (2021). Therapeutic Goods (Standards for Biologicals—General and Specific Requirements) (TGO 109) Order 2021. Available from: https://www.legislation.gov.au/F2021L01332/latest/versions (accessed 7 April 2025).

[117] TGA. (2024). Manufacturing excluded autologous human cell and tissue (HCT) products. Available from: https://www.tga.gov.au/resources/guidance/manufacturing-excluded-autologous-human-cell-and-tissue-hct-products (accessed 7 April 2025).

[118] World Health Organization. (2010). WHO guiding principles on human cell, tissue and organ transplantation. World Health Organization. Available from: https://iris.who.int/handle/10665/341814 (accessed 20 May 2025).

[119] ABC News. (2025). Bone banks constantly short of donors despite being the second most transplanted tissue after blood. Available from: https://www.abc.net.au/news/2025-01-22/act-bone-banks-short-donors-second-most-transplanted-tissue/104839348 (accessed 20 February 2025).

[120] Legislative Assembly. (2024). Inquiry into increasing the number of registered organ and tissue donors. Available from: https://www.parliament.vic.gov.au/4ae8be/contentassets/5668a21808404e49b9b1c5257c0dd099/lalsic-60-01_register-and-talk-about-it_report.pdf (accessed 20 February 2025).

[121] DonateLife. (2023). Australian Donation and Transplantation Activity Report. Available from: https://www.donatelife.gov.au/sites/default/files/2024-02/2023%20Donation%20and%20Transplantation%20Activity%20Report.pdf (accessed 20 February 2025).

[122] Department of Health and Aged Care. (2022). National Eye and Tissue Sector Framework Report. Available from: https://www.health.gov.au/sites/default/files/documents/2022/09/eye-and-tissue-sector-framework.pdf (accessed 2 April 2025).

[123] Donor Tissue Bank of Victoria. (2025). About DTBV. Available from: https://dtbv.org.au/about/ (accessed 20 February 2025).

[124] Legislative Assembly Legal and Social Issues Committee. (2023). Inquiry into increasing the number of registered organ and tissue donors. Available from: https://www.parliament.vic.gov.au/4ae8f3/contentassets/753883d4a2194abd8602d1e121d740f8/2023_07_24_final-transcript_anzics-death-and-organ-donation-.pdf (accessed 20 February 2025).

[125] Legislative Assembly Legal and Social Issues Committee. (2023). Inquiry into increasing the number of registered organ and tissue donors. Available from: https://www.parliament.vic.gov.au/495e4c/contentassets/753883d4a2194abd8602d1e121d740f8/2023_07_24_final-transcript_anzics-death-and-organ-donation-.pdf (accessed on 20 February 2025).

[126] Australia Government. (2022). National Eye and Tissue Sector Framework. Available from: https://www.health.gov.au/sites/default/files/documents/2022/09/eye-and-tissue-sector-framework.pdf (accessed 20 February 2025).

However, currently there is a lack of centralised-collected data relating to imported tissue, or tissue-based products, including information such as the volume, type and origin of these material. The lack of comprehensive data means it is difficult to assess the extent to which Australia relies on imported tissue and tissue-based products and the specific clinical needs they address.

The lack of data also impedes long-term strategic planning for Australia's tissue sector. For example, supply and demand analysis of the tissue sector in 2014 found that domestic demand substantially exceeds domestic supply across many types of tissue, with demand likely to increase sharply over the next decade particularly for musculoskeletal tissue.[127] Additionally, the incoming influx of imported medical products of human origin, such as CAR T-Cells, and xenografts will require careful strategic planning and consideration. Understanding the trends in importation and exportation is critical for forecasting future demand, ensuring sustainable local supply, and identifying gaps in domestic capability.

[127] PricewaterhouseCoopers. (2016). Final Report Analysis of the Australian Tissue Sector. Available from: https://www.donatelife.gov.au/sites/default/files/2022-05/pwc_-_analysis_of_the_australian_tissue_sector_-_final_d16-1267056_2.pdf (accessed 20 February 2025).

5. Existing Activity, Data Collections and Reporting Mechanisms

Due to the complexity of Australia's organ, cell and tissue donation and transplant system, data is collected across numerous national activity and costing data sets, as well as registries. Interactions with the public hospital system for organ, cell and tissue donation and transplantation occur across multiple care settings (both admitted and non-admitted). This activity is contained in IHACPA's collection of National Activity Data Sets which are captured through reporting to the National Minimum Data Sets (NMDS). An exception to this is the capture of posthumous organ procurement, which is contained in the National Best Endeavours Data Sets (NBEDS) and unlike the NMDS, is not a mandatory reporting obligation.

Cost data for these interactions are captured across multiple data sets within the NHCDC. Registries hold additional relevant data, with further detail of this information outlined in Appendix A. The capturing of in-scope services in these data sets is outlined below, as well as notable complexities or challenges found in these systems during data analysis.

IHACPA National Activity Data Sets

Admitted Patient Care (APC)

When a solid organ, HSC or tissue donor or recipient enters the public hospital system as an admitted patient, these data are captured within the APC NMDS or in cases of posthumous organ procurement, captured in the APC NBEDS. The current classification system for APC is the ICD-10-AM/ACHI/Australian Coding Standards (ACS) to classify diseases and related health problems, surgeries, therapies, and health interventions. The admitted care type captured in the APC is defined as *the overall nature of a clinical service provided to an admitted patient during an episode of care (admitted care), or the type of service provided by the hospital for boarders or posthumous organ retrieval (care other than admitted care)*.[128] The APC data set provides insight into the distribution of solid organ, HSC and tissue donation and transplant activity, as well as all adjacent patients interactions in admitted setting by transplant recipients by state and territory as well as by hospital.

Organ, Cell and Tissue Donation in APC

APC data captures the point of formal discharge upon death from care type 1 (acute) to care type 9 (posthumous) for potential donors, where posthumous organ procurement activity is reported through the APC on a best endeavours basis. However, the classification of this transition is variably coded between states and territories. The ACS do not explicitly address ventilatory support during posthumous organ procurement, and ventilation ends at death, meaning ventilation codes are not assigned for the donation episode following diagnosis of neurological death. State and territory variation is observed in the recorded separation and admission modes during the change from care type 1 to care type 9. There is also state and territory variation for LOS and hours of mechanical ventilation. In addition, organ donations that proceeded through Voluntary Assisted Dying (VAD) pathways are not able to be identified in current activity data sets.

Tissue donation episodes are typically recorded only when they occur alongside solid organ donation. A majority of tissue donation activity occurs outside of the admitted setting (e.g. in the morgue or the community) and is therefore not identifiable in APC data. HSC donation activity from PBSC is variably captured in APC, as some PBSC retrievals occur in the non-admitted patient setting.

Non-Admitted Patient (NAP)

When solid organ, HSC or tissue donors or recipients do not undergo a formal hospital admission process, such as in outpatient clinics or at home, this activity in public hospitals is captured within the NAP data set. The current classification system for NAP care is the Tier 2 Non-Admitted Services Classification (Tier 2). Tier 2 categorises activity into classes based on the nature of services provided, and are grouped into either procedures, medical consultation services, diagnostic services, and allied health or clinical nurse specialist intervention services. NAP service events are common across pre- and post-transplant pathways for solid organ, HSC, and tissue transplantation. Currently, Tier 2 codes for transplant clinics do not delineate between pre- and post-transplant clinics or specify transplant type or nurse-led activity, making specific counting and costing for this activity challenging. It is also common for hospitals to record transplant related outpatient clinic service events as other specialty clinics (e.g. Nephrology, Cardiology) rather than a transplant clinic.

Emergency Department Patient (EDP)

EDP care refers to activity within ED presentations. Data collection at ED includes type of presentation, outcome (i.e. hospital admission, discharge), urgency of care and triage score, arrival method, and diagnosis. The current classification system for EDP care is the AECC or Urgency Disposition Group (UDG) classification. The extent to which these data are relevant to solid organ, HSC, and tissue pathways is generally limited to the deceased donor, as well as some instances of ED activity occurring pre- and post-transplant for recipients. A small proportion of solid organ transplant recipients may enter the acute episode via an ED admission.

[128] IHACPA. (2022). Admitted Hospital Care Types: Guide for use. Available from: https://www.ihacpa.gov.au/sites/default/files/2022-01/Admitted%20Hospital%20Care%20Types%20guide%20for%20use%20v5.0.pdf (accessed 18 June 2025).

Palliative Care Component (PCC)
Palliative care is a form of subacute care where the goal is to optimise the quality of life of a patient with a life-limiting illness. The PCC activity data set records the clinical setting of the palliative care, in addition to the 4 stages of palliative care including: stable, unstable, deteriorating and terminal. There may be a small number of patients who proceed to organ donation via this palliative care pathway (including potential Voluntary Assisted Dying donors), although this was not able to be isolated within the analysis.

Costing Data Sets

NHCDC Acute

The NHCDC Acute Data Set refers to the collection of submissions of costs associated with admitted patients in hospitals. The NHCDC Acute Data Set contains costs associated with organ, tissue and stem cell transplantation, living and deceased donations as well as other bridging to transplant and other adjacent service (e.g. haemodialysis). Approximately 95-100% of episodes of transplant activity have a corresponding NHCDC Acute submission. There is substantial facility level and state/territory level variation in cost allocation to patient episodes by cost bucket and cost centres.

Several cost components such as machine perfusion, retrieval team transport and donor or recipient suitability are commonly allocated across broader patient groups in the NHCDC as overheads or within virtual patient classifications. These costs are often assigned outside the transplant unit, including to specialty departments such as Nephrology or location-based areas such as intensive care. Although usually included in the NEP calculation, their association with transplant activity is often unclear, potentially leading to understated relative price weights. The costing survey distributed to hospitals further highlighted site-specific variability into costing practices of hospitals and alignment with existing guidelines for organ donation, retrieval and transplantation.

Identifying the high and variable costs associated with organ retrieval services within the existing NHCDC Acute Data Set is challenging. Several operational factors limited the appropriate application of the Australian Hospital Patient Costing Standards (AHPCS) Version 4.2 Costing Guidelines (CG) 7.3.6 and CG 7.3.7, which require that the costs of organ retrieval to be attributed to the transplant patient episode.

NHCDC Subacute
The NHCDC Subacute Data Set refers to specialised, multidisciplinary inpatient services aimed at optimising patients functioning and quality life. The NHCDC Subacute Data Set contains costs associated with posthumous organ procurement under care type 9. There is evidence of state and territory variation in the proportion of care type 9 episodes (as recorded in APC data sets) that are included in the NHCDC Subacute Data Set in addition to varying funding sources, either in health budget or out-of-scope, depending on state. According to AHPCS CG 7.3.4 and CG 7.3.5, the costs of preparation for posthumous organ donation (e.g. drug, setting, nursing) are allocated to the posthumous episode under care type 9. There is variation as to whether costs of posthumous episode are allocated to the posthumous or acute episodes. The timing of transferring the patient from acute to posthumous care episode impacts on the correct costs being allocated to the posthumous care versus prior acute episode, this is mostly driven by variations in DCDD and DNDD donor pathways.

NHCDC Outpatient (NAP)
The NHCDC Outpatient data set captures cost and activity data related to non-admitted patient services. This data set contains costs associated with pre- and post-organ transplant clinics, doctor and nurse led specialist clinics, bridging to transplant procedures (e.g. dialysis) and other high frequency adjacent services by transplant recipients. However, the resource intensive coordination, administrative elements of workup for transplantation, waitlisting, and bridging are variably captured.

Registry Data Sets

DonateLife Activity Reporting

DonateLife releases an annual Australian Donation and Transplantation Activity Report to provide a snapshot of key metrics across organ and tissue donation and transplantation. The analysis below shows a crosscheck and validation of transplant activity volumes highlighted in APC data set. Figure 5 outlines the annual solid organ donation and transplantation activity in both DonateLife Registries and National activity data sets.

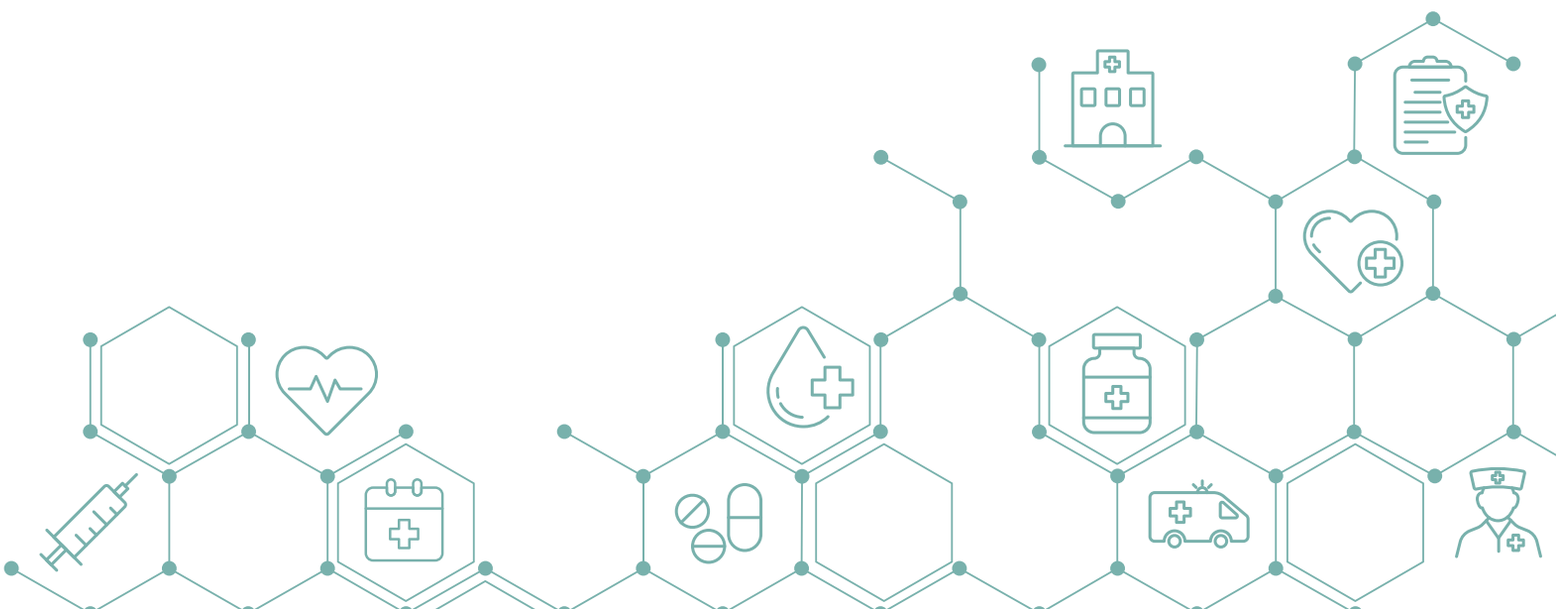
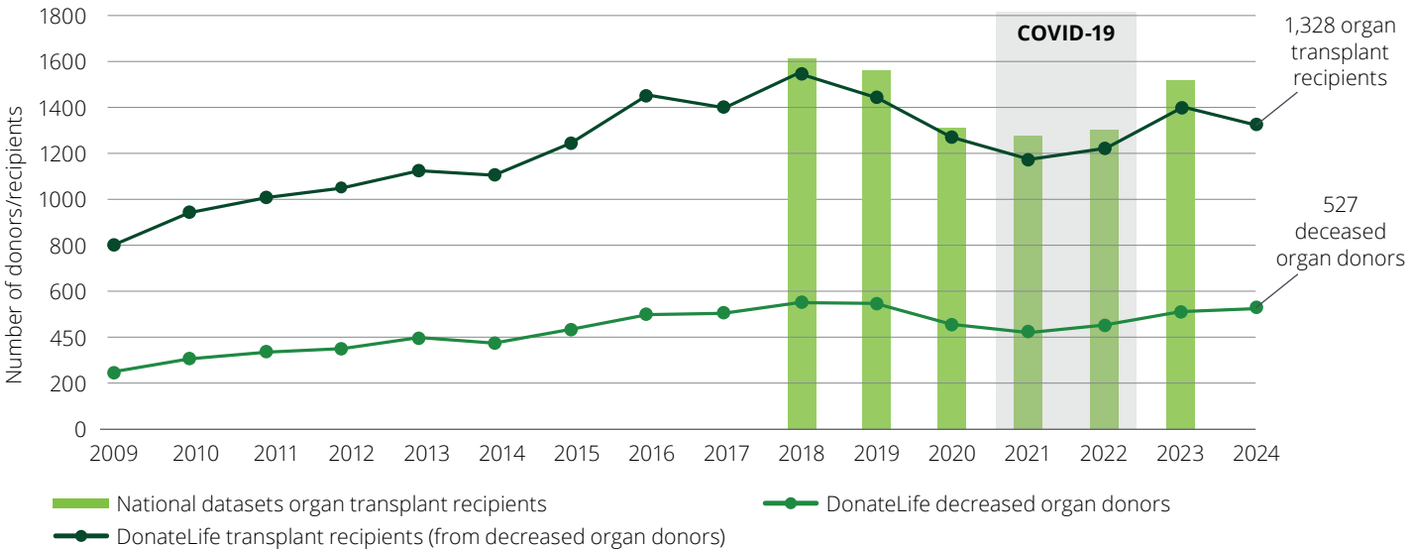


Figure 5: DonateLife deceased organ donation and transplantation reported activity, 2009-2024



Source: DonateLife Activity Reports (2009 to 2024). IHACPA APC data (2018 to 2023).

ANZOD Annual Reports

ANZOD registry publishes annual reports on the activity of organ and tissue donation in Australia and New Zealand and collection (See Appendix A for further detail).

This analysis identified that there are discrepancies in volume of actual donations within the ANZOD registry from what is reported in the APC data sets (under posthumous episode), in some instances of a 10-20% variance. There are several factors that contribute to this variance including the posthumous episode not being recorded as a NBEDS, state and territory variation in the correct coding and classification of procurement episodes.

Other registries

Several clinical-specific registries, search registries and banks operate within the sector, most of which capture comprehensive data on patient characteristics and outcomes, including rejection and readmission rates, and can be accessed through targeted searches of national registry and biobank platforms. A comprehensive list of other registries is found below (See Appendix A for a full list of data collected).

Clinical registries

- Australian and New Zealand Living Kidney Donor Registry (ANZLKD) Registry – collects data on living kidney donors across Australia and New Zealand.
- ANZDATA Registry – a clinical quality registry that collects outcome data for people living with ESKD.
- Australia and New Zealand Liver and Intestinal Transplant Registry (ANZLITR) – collects data on outcome data of patients with acute or end stage liver failure and/or intestinal failure.
- Australian and New Zealand Islet and Pancreas Transplant Registry (ANZIPTR) – collects data on islet and pancreas transplants performed in Australia and New Zealand.
- ANZTCT Registry – records details of bone marrow, peripheral blood and cord blood stem cell transplants and other cellular therapies, including CAR T-Cells, throughout Australia and New Zealand. The Annual Data Summary is reported annually to Government and publicly available upon request.
- ANZETD Registry – gathers information from all eye and tissue banks across Australia and New Zealand as well as the Eye Bank Association of Australia and New Zealand (EBAANZ).
- Australian Corneal Graft Registry – records information on all human corneal transplants across Australia.
- The cardiothoracic transplant registry is currently being reconstituted under the ANZDATA with the retrospective data added from the individual unit databases.

Search registries

- AODR – a national register for people to record their decision about becoming an organ and tissue donor for transplantation after death.
- Stem Cell Donors Australia – recruits and maintains a diverse pool of HSC donors. Registry operations and donor pool demographics are reported to all Australian Governments and are used to inform future donor recruitment activities.

Banks

- Eye and tissue banks across Australia.
- Cord blood banks.

6. Existing Funding Mechanisms

The funding arrangements for organ, cell and tissue donation and transplantation in Australia are complex and varied, with multiple funding mechanisms contributing to the service delivery for a single donor or recipient.

Solid Organ Donation and Transplantation

Australia uses a decentralised funding model for organ donation, retrieval, and transplantation, overseen by the Australian Government and state and territory government agencies. This activity is funded through multiple sources:

Programs funded by the Australian Government

- **NHRA:** The DoHDA contributes Australian Government funding (with additional contributions from state and territory health budgets) to the health funding under the NHRA. This includes the acute hospital system where transplantation, deceased donation and living donation services are delivered. Transplantation, donation, and retrieval services within public hospitals coordinate and deliver services through ABF as determined by the NEP.
- **Medicare Benefits Schedule (MBS):** The Australian Government funds the MBS, with billings from the MBS funding provision of primary care services to potential transplant recipients during disease diagnosis, specialist care, tissue typing and referral for waitlist assessment.
- **OTA:** The OTA is an Australian Government Agency funded to lead a nationally consistent and coordinated approach to donation which is delivered through the DonateLife Network. They also provide funding for systems and clinical guidelines which underpin the operations and data for the end-to-end organ donation and transplant (see details below).
- **Lifeblood:** The DoHDA provides funding in addition to state and territory contributions to Lifeblood.
- **AODR:** The Australian Organ Donor Registry is a national registry held by Services Australia to record an individual's intent and/or consent to become an organ and tissue donor for transplantation after death. It is funded as part of Medicare for people to register as organ and tissue donors.
- **Supporting Living Organ Donors Program:** Provides financial support to kidney or partial liver donors for up to 9 weeks of paid leave at the national minimum wage, or in exceptional circumstances up to 18 weeks for extended medical leave. The program also provides up to $4000 for out-of-pocket travel and accommodation expenses.

Programs funded by State and Territory Health Departments

- **NHRA:** State and territory health departments contribute budgetary funding (in conjunction with the DoHDA) to solid organ donation and transplantation services under the NHRA.
- **NFC Program:** Receives funding through pooled contributions from states and territories. Funding allocation is based on set procedure prices and estimated transplant numbers per funding cycle. Funding is subsequently reconciled to actual procedure volumes annually. All patients across Australia can be accepted onto NFC programs in line with the Nationally Funded Centre Agreement,[129] for the following procedure types:
  - *Adult Pancreas Transplantation:* Monash Medical Centre Clayton and Westmead Hospital.
  - *Adult Islet Cell Transplantation:* St Vincent's Hospital, Westmead Hospital, and Royal Adelaide Hospital.
  - *Paediatric Heart Transplantation:* The Royal Children's Hospital.
  - *Paediatric Liver Transplantation:* Queensland Children's Hospital, The Royal Children's Hospital with support from Austin Hospital and The Sydney Children's Hospital Network (Westmead).
  - *Paediatric Lung and Heart-Lung Transplantation:* The Alfred, with support from Royal Children's Hospital.[130]
- **Lifeblood:** Either funding or fee-for-service models on a state-by-state basis, except for WA and Qld which conduct HLA testing in statewide pathology labs.
- **Pathology:** Either funded or fee-for-service models (depending on jurisdiction).
- **Retrieval services:** Block or ABF under NHRA, or variable state-based/health-service based grants for statewide retrieval services. Can be held within hospital or health-service budgets for opportunistic retrieval services.

[129] Victoria Department of Health. (2022). Nationally Funded Centres. Available from: https://www.health.vic.gov.au/patient-care/nationally-funded-centres (accessed 27 November 2024).

[130] Australian Government Federal Register of Legislation. (2020). Direction to the Independent Hospital Pricing Authority on the performance of its functions under section 226 of the National Health Reform Act 2011 – No 1/2020. Available from: https://www.legislation.gov.au/F2020L00074/latest/text (accessed 4 May 2025).

- **Patient financial assistance schemes:** Schemes rely on centrally held funds to subsidise travel and accommodation for regional, rural, or remote patients e.g. Isolated Patients Travel and Accommodation Assistance Scene (IPTAAS), Victorian Patient Transport Assistance Scheme (VPTAS), Patient Assisted Travel Scheme (PATS).

Due to high transplantation volumes, NSW and Vic allocate additional funding for specific transplant services, including retrieval costs for interstate organ sharing. There are occasions where interstate cross-charging occurs, in instances where a service (i.e. organ retrieval) cannot be undertaken in a patient's home state and must be performed by an interstate hospital's retrieval team. In these scenarios the interstate hospital may charge the home state hospital costs associated with providing the retrieval service. However, it is important to note that cross-charging practices vary between states and territories. There is limited available information on the funding of patient transport for organ transplant under cross-border arrangements.

Programs funded by the OTA (via Australian Government)

The OTA was established in 2009 by the Australian Government under the Australian Organ and Tissue Donation and Transplantation Authority Act 2008, to lead a nationally consistent and coordinated donation program to increase organ and tissue donation and transplantation in Australia.

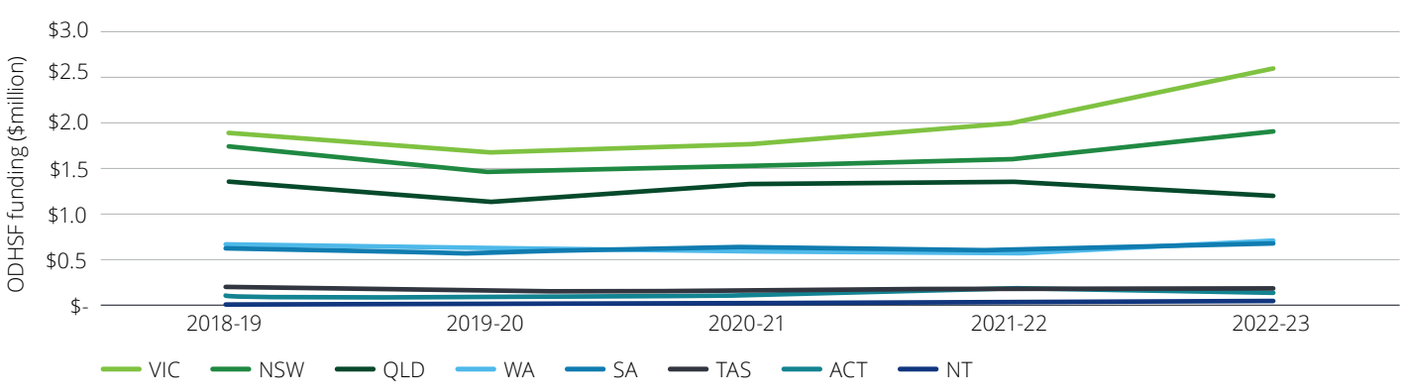
The OTA funds each jurisdiction for a specific workforce including: a DonateLife Agency manager and clinical manager, specialist donation nursing and medical staff, and specialist support staff, referred to as the DonateLife Network. This is based on core DonateLife Agency positions to deliver the coordinated national program within their state or territory, and additional medical and nursing specialist FTE which are usually embedded in the hospital (in ICU) which is modelled & allocated on donation activity within the jurisdiction

- **DonateLife Network:** The 'DonateLife' National Program is delivered collaboratively with state and territory governments, hospitals, the critical care and transplant sector and the community. The DonateLife Program receives funding from the OTA to conduct donation related activity and research, this includes:
  - *Deceased donor coordination:* The DonateLife Network of specialist medical and nursing staff support the best practice donation system across 95 hospitals. Staff may be embedded in the hospital or may be agency based.
  - *Community grants:* The OTA awards grants to a range of community partners to raise awareness and Transplant Australia are one of these grants. These are delivered directly to the partners.
- **ODHSF:** ABF is allocated directly to donor hospitals ($10,000 per actual or intended donor and $8,000 per regional transfer) to support costs associated with a donation episode.

The OTA provides funding to support donation and transplantation including:

- **OrganMatch:** The OTA provides funding to Lifeblood for OrganMatch - Australia's waitlisting, matching and allocation system for organ donation.
- **TSANZ:** Allocated funding to set national clinical guidelines, eligibility criteria and allocation protocols for deceased organ transplantation and donation.
- **ANZKX:** Allocated funding to coordinate and match living kidney donor-recipient pairs across Australia and New Zealand.
- **National Registries:** Funding is allocated to ANZDATA, ANZIPTR, ANZLITR and ANZOD for reporting on incidence, prevalence and outcomes of transplant treatments.

Figure 6: ODHSF funding provided by DonateLife to each jurisdiction between 2018-19 and 2022-23



Source: DonateLife (2023). Note: Figures are adjusted for inflation.

Programs funded by other sources

- **Philanthropy:** Some major tertiary transplant hospitals are recipients of philanthropic donations which are used to fund technology such as machine perfusion. Other hospitals noted in consultations that they utilise research grants to fund perfusion or build their own machines.
  - Philanthropy also contributes to funding certain types of transplants, particularly innovative and experimental procedures. For example, the Royal Hospital for Women Foundation has raised philanthropic donations to support uterus transplant surgeries and clinical trials.[131]

Haematopoietic Stem Cell Donation and Transplantation

Funding for HSC donation and transplantation services follows some of the same general sources and mechanisms as solid organ, including:

Programs funded by the DoHDA

- **MBS:** Receives Australian Government funding from the DoHDA for provision of primary care services to potential transplant recipients and donors prior to entering the public hospital system and for HSC tissue typing.
- **Lifeblood:** Receive funding for delivery of donor recruitment services and managing donor assessment in cases requiring unrelated HSC donation. Lifeblood also subsidises state and territory funding for transplant recipients with related donors.
- **International Searches Program (ISP):** The Australian Government provides funding (up to $12,000 per patient) to search and test donors from international registries, if a suitable HSC donor cannot be found in Australia.
- **Bone Marrow Transplant Program (BMTP):** The BMTP provides funding to cover the cost of collecting and transporting HSCs from an overseas resident donor, or the travel expenses of a related donor to come to Australia for donation.

Programs receiving cost-shared funding from Australian Government and State and Territory Health Departments

- **NHRA:**
  - The DoHDA contributes Australian Government funding (with additional contributions from state and territory health budgets) to the acute hospital system where HSC donation and transplantation services are delivered under the NHRA. HSC transplantation, donation, and retrieval services within public hospitals prepare, deliver, and manage these procedures through ABF as determined by the NEP. HSCT, HSC donation, and retrieval services within public hospitals prepare, deliver, and manage these procedures through ABF as determined by the NEP.
  - The state and territory health departments contribute budgetary funding (in conjunction with the DoHDA) to HSC donation and transplantation services under the NHRA.
- **National patient outcomes registry:** The ANZTCT receives funding on a 50:50 cost-shared basis from the Australian Government and states and territories for recording and reporting details of bone marrow, peripheral blood and cord blood HSCT outcomes via the ANZTCT Registry.
- **AusCord:** receives funding on a 50:50 cost-share basis from the Australian Government and states and territories for providing storage and release of cord blood units for transplant.
- **Stem Cell Donors Australia:** Receives cost-shared funding from the Australian Government and states and territories to manage the blood stem cell donor register including engagement with donors and coordinate the collection of donors cells in Australia and provision of donor cells from international registries for patients.
  - Costs associated with domestic donors for Australian recipients are recovered by transplant centres.
  - International recipients, international registries fund the collection and transport of Australian donor cells, with payments passed through Stem Cell Donors Australia to Bone Marrow Donor Centres (BMDCs) on a per-unit basis.[132]

State-based search co-ordination centres: Receive a combination of state and territory and MBS funding.

Programs funded by State and Territory Health Departments

- **Statewide Services:** Pathology and laboratory activity is funded through either block funding or subsidised by fee-for-service models. HLA testing is provided in Qld & WA while Lifeblood facilitates this in other jurisdictions.
- **Lifeblood:** Receives funding for donor recruitment and coordination activity, supporting 5 BMDCs, which are distributed across jurisdictions to provide geographic coverage. A breakdown of the centres, their coverage, and the funding sources is detailed in Table 4.
- **Patient financial assistance schemes:** Are allocated funding to subsidise travel and accommodation for regional, rural or remote patients (i.e. IPTAAS, VPTAS, PATS).

[131] The Royal Hospital for Women Foundation. (2024). Uterine Transplant Project. Available from: https://www.royalwomen.org.au/uterine-transplant-project (accessed 27 November 2024).

[132] Department of Health. (2021). Bone Marrow Transplant Program. https://www.health.gov.au/sites/default/files/documents/2021/03/bone-marrow-transplant-program-bmtp-guidelines-bmtp-guidelines.pdf (accessed 17 February 2025).

Table 4: List of BMDCs linked to service coverage and funding source

BMDC	Coverage	Funded By
NSW/ACT	NSW/ACT	NSW
Qld	Qld	Qld
Vic/Tas	Vic/Tas	Vic/Tas
SA/NT	SA/NT	SA
WA	WA	WA

Source: Stem Cell Donors Australia (2020).

Programs funded by other funding sources

- **Leukaemia Foundation:** receives grants and donations to provide accommodation support for those with leukaemia, lymphoma, myeloma and related blood disorders who live in regional, rural or remote areas of Australia and are required to travel for treatment.

Tissue Donation and Transplantation

Funding for tissue donation and transplantation services, encompassing eye, skin, bone, and cardiac tissue, follow the same general sources and mechanisms as solid organ and HSC, including:

Programs funded by the DoHDA

- **NHRA:** The DoHDA contributes Australian Government funding, with additional contributions from state and territory health budgets to the acute hospital system where tissue donation and transplantation services are delivered under the NHRA. Tissue transplantation, donation, and retrieval services within public hospitals prepare, deliver, and manage these procedures through ABF as determined by the NEP.

Programs funded by State and Territory Health Departments

- **NHRA:** State and territory health departments contribute budgetary funding (in conjunction with the DoHDA) to tissue donation and transplantation services under the NHRA.
- **National Eye and Tissue Banks:**
  - The supplier of tissue is reimbursed upon implantation by hospitals or state health departments through service agreements against listed prices on the Prescribed List of Medical Devices and Human Tissue Products (the Prescribed List), administered by the DoHDA. Payment for tissue allograft is released upon implantation.
  - States may contribute block funding to supplement the national cost-recovery model (fee-for-service).
  - In Vic, the Department of Justice and Community Safety provides additional funding to the DTBV instead of the State Health Department.

Programs funded by the OTA or Other Sources

- **ANZETDR:** Receives funding from the OTA to collect and record data from all eye and tissue banks across Australia and New Zealand, reporting on transplantation activity, performance measures and sector outcomes.
- **Australian Tissue Donation Network:** Receives funding, primarily via supply of grafts and cost recovery, to promote education and awareness of tissue donation and transplantation.
- **Private Health Insurance:** Tissue transplant recipients may receive care in private health system and may be funded via private health insurance.

7. Final Schema

The schema developed for the Organ and Tissue Donation and Transplantation Project provides IHACPA with a practical tool to support gap analyses and refine national classification systems, data collections, and costing standards.

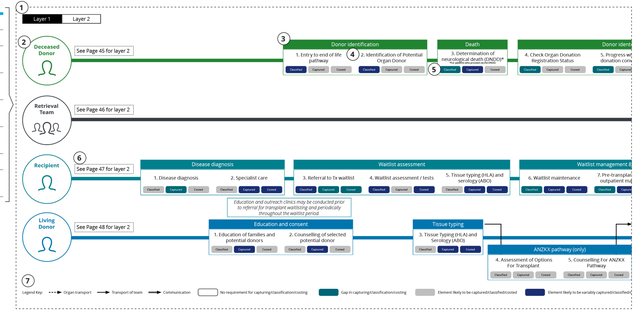
Using insights gathered from the literature review, data analysis, and stakeholder engagement, a multi-layered schema was developed to systematically represent and categorise the entire OTDT service journey. The schema articulates key processes and decision points, while highlighting instances of jurisdictional variation. Information presented in the schema includes data capture, costing, and funding for 10 pathways spanning solid organ, HSC, and tissue donation and transplantation. The schema comprises 2 interconnected layers which link directly to the findings and recommendations in the following chapter:

1. The first layer is a visual process map illustrating the relationship and flow between pathways, offering a comprehensive view of the OTDT service landscape.
2. The second layer provides a more detailed breakdown of each pathway. It maps pathway information on data capture and reporting, existing classification systems, costing approaches, and current funding mechanisms. Instances of variability across the OTDT system are highlighted for further review in findings and recommendations.
3. The findings and recommendations flagged on layer 2 provide further detail on key drivers of variation, and recommendations for IHACPA and other agencies to initiate improvement in the OTDT system.

Schema Layer 1 Navigation Guide

Layer 1 of the schema provides a high-level visual representation of the 10 donation and transplantation pathways currently in scope: Deceased Organ Donor, Deceased Organ Retrieval, Solid Organ Recipient, Living Solid Organ Donor, Living Cell Donor (Unrelated), Living Cell Donor (Related), Cell Donor (Autologous), Cell Recipient (Allogeneic and Autologous). Deceased Tissue Donor and Retrieval, and Tissue Recipient. These pathways are grouped under three overarching transplant types (Organ, Tissue, and Cell and Bone Marrow) and are presented to illustrate how they interrelate across the national system. This overview establishes a shared understanding of the donation and transplantation landscape and provides the necessary context for subsequent layers, which examine how each pathway is currently reported, costed and funded.

Reference	What it Means
1 Navigation Panel	Indicates the specific layer of the schema to which the page corresponds.
2 Pathway	Indicates which of the 10 donation and transplantation pathways the visual represents.
3 Pathway's Overarching Stages	Categorises the key stages of the pathway into broader, higher-level categories.
4 Pathways' Underlying Stages	Key stages of the pathway.
5 Costing and Reporting	Provides a status (using white, grey, dark blue and teal) to indicate the extent to which the activity for the specified stage is classified, captured, and costed.
6 Link to Layer 2	Provides a page number for corresponding additional detail provided on layer 2.
7 Legend Key	Explains the meaning of the various arrows and the different costing and reporting status colours.



Please note that the above is an indicative example for contextual purposes only

Schema Layer 2 Navigation Guide

Layer 2 builds on the high-level overview provided in Layer 1 by examining each stage within the 10 donation and transplantation pathways in greater detail. It identifies the key stakeholders involved at each stage and outlines how activities within each specific pathway are currently reported, costed and funded. This operational perspective enables a clearer understanding of how each pathway is implemented and supported in practice, while also highlighting potential gaps and inconsistencies in current reporting and funding arrangements. The insights captured in this layer provide the foundation for the findings and recommendations, which explore flagged components in further detail and links these to the findings of the project's report.

Reference	What it Means
1 Pathway's Stages	Key stages of the pathway.
2 Layer 1 Colours	A visual representation showing how these stages connect to those presented in Layer 1 of the schema.
3 Brief Summary	Provides a detailed summary of the activities involved in each stage of the pathway.
4 Key Stakeholders	Outlines the key organisations involved in each specified stage of the pathway.
5 Classification	Outlines the classification system used to capture the activity within the specified stage of the pathway.
6 National Activity Data Sets	Outlines which of IHACPA's Data Sets are used to capture the activity for the specified stage of the pathway.
7 Other Activity Data Sets	Outlines which Data Sets, external to IHACPA, are used to capture the activity for the specified stage of the pathway.
8 Patient Cost Drivers	The key factors directly related to the patient that contribute to the highest costs for the specified stage of the pathway are being captured.
9 Other Cost Drivers	The key factors, not directly related to the patient, that contribute to the highest costs for the specified stage of the pathway are being captured.
10 NHCDC Data Sets	Outlines which NHCDC Data Sets are used to capture the costs associated with the activity for the specified stage of the pathway.
11 Other Costing Data Sets	Outlines which Data Sets, external to NHCDC, are used to capture the costs associated with the activity for the specified stage of the pathway.
12 Funding Source	Describes how the specified stage of the pathway is currently being funded.
13 Legend Key	Explains the meaning of the flag symbol, along with the different costing and reporting status colours (which correspond to those presented in Layer 1).

Please note that the above is an indicative example for contextual purposes only

Solid Organ

Schema layer 1 & 2


Layer 1
Layer 2
Deceased Donor
See Page 45 for layer 2
Retrieval Team
See Page 46 for layer 2
Recipient
See Page 47 for layer 2
Living Donor
See Page 48 for layer 2
Donor identification
1. Entry to end of life pathway
2. Identification of Potential Organ Donor
Death
3. Determination of neurological death (DNDD)*
Donor identification
4. Check Organ Donation Registration Status
5. Progress with family donation conversation
6. Written consent from family and/or coroner consent
Donor assessment
7. Donor Medical Assessment
8. Suitability for Donation Confirmed
9. Organ matching, allocation, offer and acceptance
Coordination
10. Retrieval surgery scheduled and coordinated
Death
11. Determination of circulatory death (DCDD)*
In donor hospital
Organ retrieval
12. Retrieval surgery performed
Family support
13. Donor family support
Donor assessment
1. Donor medical assessment
2. Suitability for donation confirmed/ acceptance
Coordination
3. Retrieval surgery scheduled and coordinated
Team transport
4. Retrieval teams travel to site for retrieval
Organ retrieval
5. Retrieval surgery (+/-biopsy)
Organ preservation and transport
6. Organ perfusion and packaging
7. Organ transported to site of recipient
Disease diagnosis
1. Disease diagnosis
2. Specialist care
Waitlist assessment
3. Referral to Tx waitlist
4. Waitlist assessment / tests
5. Tissue typing (HLA) and serology (ABO)
Waitlist management & bridging treatment
6. Waitlist maintenance
7. Pre-transplant inpatient/ outpatient management
8. Bridging to transplant
Donor assessment
9. Assessment of Donor Factors and Organ Offer
10. Organ acceptance
Organ processing
11. Pancreatic/Islet Processing Lab
12. Organ preparation and/or perfusion
Organ transplant
13. Transplantation
Early post transplant care
14. Post transplant inpatient / outpatient care
15. Early post-transplant care/readmission
Long term follow-up
16. Long term post-transplant care
17. Graft failure / re-transplantation
Death
18. Death
Data & reporting
19. Registry Data Records
Education and outreach clinics may be conducted prior to referral for transplant waitlisting and periodically throughout the waitlist period.
Transport
11. Transport Between Centres
Education and consent
1. Education of families and potential donors
2. Counselling of selected potential donor
Tissue typing
3. Tissue Typing (HLA) and Serology (ABO)
ANZKX pathway (only)
4. Assessment of Options For Transplant
5. Counselling For ANZKX Pathway
Donor assessment
6. Donor Medical Assessment
ANZKX pathway (only)
7. Data Entry to ANZKX and ANZKX Matching Runs
8. Confirmed ANZKX Match
9. Retrieval surgery scheduled
Organ retrieval
10. Retrieval Surgery
Post Operative Care
12. Post Operative Inpatient Care
13. Counselling Outpatient Care
Long term follow-up
14. Long-term Follow-up
Data & reporting
15. Data Records ANZLKDR and ANZKX System
Classified
Captured
Costed
Legend Key:
Organ transport
Transport of team
Communication
No requirement for capturing/classification/costing
Gap in capturing/classification/costing
Element likely to be captured/classified/costed
Element likely to be variably captured/classified/costed

Layer 1 | Layer 2

Overview of Current Deceased Organ Donor Pathway

The deceased organ donor pathway outlines the donor's entry to the end-of-life pathway and activities that occur to facilitate donation, through to determination of death and ensuing organ retrieval. This process is generally managed by a combination of clinicians and DonateLife coordinators.

Activities	Brief Summary	Key Stakeholders
1. Entry to End of Life Pathway	The patient is recognised as approaching end-of-life. Notification to DonateLife processes vary between states & territories.	Donor Hospital
2. Identification of Potential Organ Donor	The patient is identified if they meet the criteria for potential organ donation.	Donor Hospital/DonateLife
3. Diagnosis of neurological death (DNDD)	For patients who proceed via the DNDD. Neurological death is confirmed following clinical protocols, verifying irreversible loss of brain function.	Donor Hospital
4. Check Organ Donation Registration Status	The organ donor register is checked for the patient's status, and preparation begins to discuss donation with the family.	Donor Hospital/DonateLife (steps 4–6)
5. Progress with family donation conversation	The family is engaged by the DonateLife agency who provide information to support decision-making.	Donor Hospital/DonateLife (steps 4–6)
6. Written consent from family to proceed with donation and/or coroner consent (where required)	Written consent is obtained from the family or legal authority, the coroner is notified if required.	Donor Hospital/DonateLife (steps 4–6)
7. Donor Medical Assessment, Donor Management & End of Life Care	The potential donor undergoes medical assessment including tissue typing, serology testing, clinical examinations, and review of medical and social history. Physiological stability is managed, and care continues throughout the process.	Donor Hospital, Retrieval Service, Transplant Unit, DonateLife, Lifeblood, State Laboratory, OrganMatch (steps 7–9)
8. Suitability for donation confirmed	Organ suitability for transplantation is confirmed, and all relevant parties are notified.	Donor Hospital, Retrieval Service, Transplant Unit, DonateLife, Lifeblood, State Laboratory, OrganMatch (steps 7–9)
9. Organ matching, allocation, offer and acceptance	A suitable organ is offered to transplant or retrieval teams for a matched recipient, who may accept or defer the offer to another unit. For kidney transplants, this often facilitated through OrganMatch post retrieval.	Donor Hospital, Retrieval Service, Transplant Unit, DonateLife, Lifeblood, State Laboratory, OrganMatch (steps 7–9)
10. Retrieval Surgery scheduled and coordinated	Retrieval surgery is scheduled, logistics are coordinated, and all necessary preparations are completed.	Donor Hospital/Retrieval Service
11. Diagnosis of Circulatory Death (DCDD)	Circulatory death is confirmed following withdrawal of treatment, and cardiac arrest is documented. For DNDD patient, withdrawal of respiratory support occurs here.	Donor Hospital
12. Retrieval Surgery Performed	Organ retrieval surgery is performed by the retrieval team.	Donor Hospital/Retrieval Service
13. Donor Family Support	Follow-up support is provided to the donor's family, including access to counselling and bereavement services.	DonateLife

Row	Steps	Content
Classification	1	ICD-10-AM/ACHI | ANSNAP/AECC/UDG No current VAD classification procedure Code (introduction of new ICD-10-AM code Z51.7 in Thirteenth Edition). [SF8] (travel icon)
Classification	2	ICD-10-AM (Z00.5 – examination of potential donor).
Classification	3	ICD-10-AM brain injury/stroke/ischemia. No ICD-10-AM classification to differentiate death pathway. [1.1, 1.3, SF1]
Classification	3	Posthumous episode likely to commence for patients who are pronounced neurologically dead.
Classification	4–10	For DCDD patients and some DNDD patients, episodes are captured within acute episode (indicated by ICD-10-AM – Z00.5) |All workup with a donation that does not proceed is likely to be in the acute episode, there is no ICD to indicate if donation does not progress. [1.2, 1.3, 1.4, 3.4]
Classification	4–10	For DNDD patients, there is jurisdictional and hospital variation to whether care type is changed to posthumous episode upon DNDD (submitted as an NBED). Evidence of patients proceeding to retrieval within donor episode (acute, ICD-10-AM; Z00.5) or posthumous episode (Care type 9 / ICD-10-AM Z52.x). When in posthumous episode, ventilation for this is not coded. (star icon) [1.2, 3.4]
Classification	11	Posthumous episode commences for DCDD patients. No ICD-10-AM classification to determine death pathway type. [1.1, 1.3, SF1]
Classification	12	Most episodes classified under posthumous procurement episode. ACHI code for procurement and organ perfusion, and ICD 52.x assignment. [1.2, 3.4, SF5, SF6, SF7]
Classification	11–12	No current ICD code for procurement attempted but not completed.
Data Reporting – National Activity Data Sets	1	Captured in either NAP Data Set, APC Data Set, NAA (NAPEDC) Data Set or PCC Data Set.
Data Reporting – National Activity Data Sets	2–4	Captured in either APC Data Set or NAPEDC Data Set (when in ED)
Data Reporting – National Activity Data Sets	5–9	Captured in APC Data Set. Continued care of donor (e.g. fluids, electrolytes and mechanical ventilation) will be represented in ICU hours/LOS when in acute episode. Activity may occur in palliative care but not visible in national Data Sets. For VAD pathway family consent, medical assessment can occur in outpatient setting
Data Reporting – National Activity Data Sets	5–9	Hours of mechanical ventilation are counted in posthumous episode, but no coding of ventilation ACHI codes (e.g. 13882-00). [3.4]
Data Reporting – National Activity Data Sets	10	APC Data Set. Jurisdictional variation on time between retrieval surgery scheduled and performed – due to geographical and cultural factors
Data Reporting – National Activity Data Sets	11	APC Data Set. For DCDD pathways, the determination of death can occur in either ICU or theatre. This is variable by state and territory, e.g. NSW occurring at theatre, most other states in ICU. [SF4, SF5, SF6]
Data Reporting – National Activity Data Sets	12	APC Data Set at donor hospital.
Data Reporting – National Activity Data Sets	13	Mostly uncaptured activity in APC Data Set (occurs in hospital post-surgery and once donor patient has left hospital).
Data Reporting – Other	1–6	Electronic Donor Record (EDR). There is state and territory variation on the point at which the record in the EDR is first created. [1.5, SF3]
Data Reporting – Other	6–11	EDR (Donor information in EDR consistent across all states and territories from written consent) |State-based Systems (bespoke donor management systems) | ANZOD (contains information on death pathway)
Data Reporting – Other	7–9	OrganMatch
Data Reporting – Other	12	ANZOD and retrieval service internal records. [SF3]
Costing – Cost Drivers – Patient	1–6	Extent of critical care required (e.g. mechanical ventilation).
Costing – Cost Drivers – Patient/Other	11	Time between withdrawal of cardio-respiratory support and cessation of circulation. [1.3]
Costing – Cost Drivers – Patient	12	Donor comorbidities | Organs retrieved
Costing – Cost Drivers – Other	1–6	Clinical labour (incl. DonateLife staff).
Costing – Cost Drivers – Other	7	Clinical labour | Pathology
Costing – Cost Drivers – Other	8–10	Clinical labour
Costing – Cost Drivers – Other	12	Retrieval team availability and resources.
Costing – NHCDC	1–3	Allocated to acute patient episode.
Costing – NHCDC	2–3	Between 88% to 98% of potential donor (Z00.5) episodes are costed in NHCDC.
Costing – NHCDC	4–7	Captured in either NHCDC Acute (for acute potential donor episodes) or Sub-Acute (for Posthumous Episodes) Data Set. Ventilation is not coded/costed for posthumous organ procurement episodes. [1.2, 3.4]
Costing – NHCDC	7–8	DonateLife resources for donor evaluation and data entry will not be counted in ICU hours and likely spread across all ICU patients in NHCDC Acute Data Set. [1.2, 1.4, SF1, SF7]
Costing – NHCDC	8–10	Captured in either NHCDC Acute or Sub-Acute Data Set. Cost of clinical labour involved in coordination and assessment variably allocated to patient episode. Likely to be underestimate of resource intensity of activity required. [3.3, SF7]
Costing – NHCDC	12	Captured in NHCDC Sub-Acute Data Set (variably allocated to donor or recipient episodes). [3.1, 3.2]
Costing – NHCDC	12	Activity is inconsistently costed in NHCDC (78-90% of total). Driven by jurisdictional differences.
Costing – Other		
Funding	1	NHRA
Funding	2–6	NHRA + DonateLife through OTA funding via State and Territory Health Departments. [2.1]
Funding	7	Donor Management: NHRA DonateLife Assessment: NHRA/DonateLife/State Block Funding
Funding	8–12	NHRA + DonateLife through OTA funding via State and Territory Health Departments. Costs of posthumous episode distributed onto transplant AR-DRGs and reimbursed via NHRA. [2.1]
Funding	9	OrganMatch | OTA
Funding	13	DonateLife through OTA funding via State and Territory Health Departments.
Funding	7–13	OTA ODHSF Payment [2.1]

Legend Key: (flag) Further details in Final Report – Chapter 8 (or Appendix B if labelled SF) | (white) No requirement for capturing/classification/costing | (teal) Gap in capturing/classification/costing | (grey) Element likely to be captured/classified/costed | (blue) Element likely to be variably captured/classified/costed | (star) Gap in classification to be resolved in ACHI and ICD-10-AM Thirteenth Edition | (plane) Patient and family travel and accommodation may be required

Layer 1 | Layer 2

Overview of Current Deceased Organ Retrieval Pathway

The organ from deceased person retrieval pathway outlines the movements of the retrieval teams from assessment and offer of the organ, to the perfusion and transport required.

Activities	1. Donor Medical Assessment	2. Suitability for donation confirmed and organ acceptance	3. Retrieval Surgery Scheduled and Coordinated	4. Retrieval Teams Travel to Site For Retrieval	5. Retrieval Surgery (+/- biopsy)	6. Organ Perfusion (+/- Machine Perfusion) and Organ Packaging	7. Organ Transported to Site of Recipient
Brief Summary	The potential donor undergoes medical assessment for donation, and the retrieval service and transplant units consult on the assessment process.	Assessment results are reviewed to confirm the donor's suitability for organ donation.	The retrieval surgery is scheduled with all relevant teams and resources coordinated. Logistics such as timing, operating theatre, and staff availability are finalised.	The abdominal and/or cardiothoracic retrieval teams travels to the donor hospital. They prepare all necessary equipment and plans for surgery. The retrieval teams will also be supported by a donor coordinator team.	The abdominal and/or cardiothoracic surgical teams perform the organ retrieval procedure.	Organs undergo perfusion to maintain viability during storage and transport. Machine perfusion is used where available. The organs are packaged to ensure they are preserved during transport.	The packaged organs are transported promptly to the transplant site. Transport logistics are managed to minimise delays and preserve organ quality.
Key Stakeholders	Donor hospital / Retrieval Service / Transplant Unit		Retrieval service/Donor Hospital	Retrieval service/Donor Hospital			
Classification	Refer to deceased donation pathway.		No visibility of retrieval attempted but not completed in ICD classification. Gaps in ACHI codes for intestine and pancreas procurement codes. [6.1, 6.3, SF10, SF11, SF12, SF13, SF16] (★)			ACHI Codes for Machine Perfusion applied inconsistently. [6.4, SF17]	
Data Reporting – National Activity Data Sets	Uncaptured involvement of retrieval service and/or transplant unit related to coordination and medical and donor suitability assessments. Retrieval teams are not listed at the donor hospital or mobile retrieval team from a transplant hospital. [3.3]			No visibility of retrieval team transport in National Activity Data Sets on transplant or donor episode. [6.2, SF13]	Captured in APC Data Set.		No visibility of organ transported / couriered. [6.3]
Data Reporting – Other				Retrieval services maintain comprehensive data collection of retrieval activities in addition to ANZOD registry. [6.3]			
Costing – Cost Drivers – Patient					Donor comorbidities	Type of organ	
Costing – Cost Drivers – Other	Clinical labour (often out-of-hours).			Transport type | Clinical labour | Machine perfusion use	Clinical labour | Multi-organ retrieval	Capital | Consumables (incl. perfusion fluid)	
Costing – NHCDC	Cost of Retrieval Service / Transplant Unit medical labour and coordination support generally spread across transplant episodes in transplant unit or specialty (e.g. nephrology) at the team's base hospital, regardless of whether the hospital performs the transplant. [SF14, SF15, SF16]			No visibility of retrieval team transport in national in costing. [6.2, SF13]	When facilities are retrieving within own service, costs are allocated to the posthumous donor episode, not the transplant episode. [SF14]	Spread across transplant patient episodes at transplanting hospital. May allocate at a patient level if organ retrieved and transplanted at same facility. [6.5, SF18]	Spread across transplant patient episodes. In some hospitals, specific cost centres for retrieval exist.
Costing – Other	Centrally-held state retrieval costs are not reallocated in NHCDC. [SF17]						
Funding	NHRA – via posthumous episode, redistributed to transplant AR-DRGs. Employment models of surgeons varies by facility and jurisdiction (academic and VMOs in some jurisdictions fall outside cost catchment). Variable state-based or health-service grants for statewide retrieval services. Often held within hospital / LHN budgets for opportunistic retrieval services. [SF12,SF13]					**Capital** - Philanthropic means and state-based grants **Consumables** - Variable state-based or held in hospital research budgets. [SF18]	NHRA

Legend Key: Further details in Final Report – Chapter 8 (or Appendix B if labelled SF) | No requirement for capturing/classification/costing | Gap in capturing/classification/costing | Element likely to be captured/classified/costed | Element likely to be variably captured/classified/costed | ★ Gap in classification to be resolved in ACHI and ICD-10-AM Thirteenth Edition | Patient and family travel and accommodation may be required

Layer 1 | Layer 2

Overview of Current Solid Organ Recipient Pathway

The solid organ recipient pathway outlines the activities from initial chronic disease diagnosis, to transplant waitlisting to eventual transplantation and post-transplant care. There are multiple interactions with various health services along this pathway, which there are some identified activity and costing discrepancies.

Activities – Brief Summary

1. **Disease Diagnosis** – The patient is diagnosed with end-stage organ failure, prompting consideration for transplant as a potential treatment.
2. **Specialist Care** – The patient is referred to a specialist team for further evaluation and management of their organ failure.
3. **Referral for Tx Waitlist Assessment** – A formal referral is made to a transplant centre for comprehensive waitlist assessment, including detailed medical, psychosocial, and functional assessments, as well as diagnostic testing. Pre-waitlist activities may include education and outreach (e.g., regional/First Nations cohorts).
4. **Waitlist Assessment/Tests** – (summary shared with step 3)
5. **Tissue typing (HLA) and Serology (ABO)** – HLA typing and antibody screening are conducted to determine compatibility with potential donors.
6. **Waitlist Maintenance** – Patients on the waitlist are monitored regularly to ensure continued suitability for transplant. Patients will go on to separate waitlists for each organ type.
7. **Pre-transplant Inpatient/Outpatient Management** – Patients may require ongoing care in outpatient or inpatient settings to manage complications while awaiting transplant.
8. **Bridging to Transplant** – In cases of clinical deterioration, bridging therapies such as dialysis, mechanical support, or intensive medical management are used.
9. **Assessment of Donor Factors and Organ Offer** – Donor suitability is assessed based on medical history, organ function, infectious risk, and immunological compatibility, to determine offer acceptance.
10. **Organ acceptance** – An organ is accepted for a waitlisted patient.
11. **Pancreatic/Islet Processing Lab** – On arrival, the pancreas undergoes a significant degree of processing to isolate the islets for transplant.
12. **Organ preparation and perfusion** – On arrival, solid organs will remain being perfused and/or cleaned up in backtable activity prior to transplantation.
13. **Transplantation** – The transplant procedure is performed by a surgical team, with intraoperative focus on successful implantation and graft preservation.
14. **Post Transplant Inpatient and Outpatient Care (First 30 Days)** – The patient is monitored for complications such as rejection or infection, with frequent follow-up after discharge.
15. **Early Post Transplant Care/Readmissions/Day Care Procedures (30-90 Days)** – Ongoing monitoring continues, with possible readmissions or day procedures for managing early complications.
16. **Long Term Post Transplant Care** – Long-term care includes regular clinic visits, medication management, and screening for complications.
17. **Graft Failure/Re-transplantation** – If graft failure occurs, the patient is assessed for the possibility of re-transplantation.
18. **Death** – In the event of patient death, the cause and related transplant factors are documented.
19. **Registry Data Records** – Key transplant data are submitted to clinical registries to support quality monitoring, benchmarking, and research.

Key Stakeholders

- [Step 1] Local Hospital/Primary Care
- [Steps 2–4] Local Hospital/Transplant Unit
- [Step 5] Lifeblood/State Pathology
- [Steps 6–8] Local Hospital/Transplant Unit
- [Steps 9–10] Transplant Unit
- [Step 11] Islet Laboratory
- [Steps 12–13] Transplant Unit
- [Steps 14–18] Transplant Unit or Local Hospital
- [Step 19] Registries/Transplant Unit

Classification

- [Step 1] ICD-10-AM/ACHI | Tier 2
- [Step 2] Tier 2 (20 series specialty clinic) | ICD-10-AM/ACHI
- [Steps 3–7] Tier 2 (Transplant clinic – 20.01 or specialty clinic) | ICD-10-AM/ACHI. MDTs likely to be captured as Tier 2 service event, but not allocated to transplant activity. ⚑ 9.2, 9.3
- [Steps 4–7] No ICD-10-AM code to identify a patient who is waitlisted for transplant. ⚑ 9.4 ★
- [Step 8] ICD-10-AM/ACHI | Tier 2 ⚑ 7.3, SF24
- [Step 9] No classification of donor factors on procedure code | ICD-10-AM ⚑ SF22
- [Step 11] Not represented in classification. ★
- [Step 12] Use of perfusion not reflected in classification on organ transplant episodes. ⚑ 6.5, SF18
- [Steps 13–14] ICD-10-AM/ACHI ⚑ SF18
- [Steps 13–14] No donor factors on transplant episode (e.g. split liver). ★
- [Steps 13–14] Insufficient granularity of recipient complexity in AR-DRGs by organ type. ⚑ 7.3, 7.4, SF22, SF24
- [Steps 15–16] ACHI/ICD-10-AM (T86) ⚑ 7.1
- [Steps 15–16] Tier 2 ⚑ 9.2, 9.3
- [Step 17] ICD-10-AM (T86) | EPD short List ★

Data Reporting

National Activity Data Sets

- [Steps 1–2] Variably captured in NAP Data Set. Not all components are fully captured. APC Data Set if initial diagnosis occurs in hospital.
- [Step 3] Point of referral not captured in National Data Sets or registries. ⚑ 9.4
- [Step 4] Captured in either NAP Data Set or APC Data Set ✈
- [Step 5] Variably captured in either NAP Data Set (under transplant clinic) or APC Data Set depending on organ type e.g kidney transplant - dialysis. ⚑ SF29
- [Steps 6–8] Workup can be recorded in outpatient (NAP Data Set) or as an admitted patient (APC Data Set). This is driven by clinical complexity, patient geography and other patient level factors. ⚑ 9.1, 9.2 ✈
- [Steps 6–8] If the waitlisted patients has an unrelated admission (e.g. appendicitis) whilst on transplant waitlists, these are variably captured as transplant activity. Related admissions are attempted to be linked to transplant episode where possible. ⚑ 9.4
- [Steps 9–10] Co-ordination and multidisciplinary interactions activity for donor/recipient suitability is poorly captured. ⚑ 3.3
- [Step 11] Pancreas/islet activity is uncaptured. ⚑ SF26
- [Step 12] Organ preparation and perfusion in same theatre or different theatre is rarely recorded activity (due to absence of Medical Reference Number). ⚑ SF19
- [Step 13] APC Data Set ✈
- [Steps 14–17] Captured in either NAP Data Set, APC Data Set or in some cases NAPEDC Data Set. Higher volume of post-transplant outpatient clinics than pre-transplant clinics. ⚑ SF30
- [Step 18] Captured in APC Data Set if death occurs in hospital. NAPEDC as date and time of death recorded in the ED.

Other

- [Steps 1–2] MBS Data Collection (for activity in General Practice or specialist who have procedures refundable via MBS).
- [Steps 4–9] Transplant co-ordinators maintain comprehensive record of interactions involving (or discussing) waitlisted patients, or patients being considered for waitlisting.
- [Steps 13–19] Comprehensive data on patient factors and outcomes, including rejection and readmission rates, are available from national registries including: ANZDATA (kidney), ANZLITR (liver and intestine), ANZPITR (pancreas and islets) and DonateLife (for activity data). The cardiothoracic transplant registry is currently being reconstituted under ANZDATA with the retrospective data added from the individual unit databases.

Costing

Cost Drivers – Patient

- [Step 3] Patient status | Travel
- [Step 4] Paediatrics (incl. genetic testing)
- [Step 5] ABO incompatibility
- [Step 13] Paediatrics | Multi-organ transplant | Presence of LVAD or ECMO
- [Steps 14–15] Paediatrics | Extended Criteria Donors | ABO incompatibility
- [Steps 16–17] Paediatrics ⚑ SF31

Cost Drivers – Other

- [Steps 3–4] Clinical labour
- [Step 5] Diagnostics
- [Steps 6–8] Clinical labour | Equipment & consumables | Diagnostics & pathology
- [Steps 9–10] Medical and clinical labour
- [Step 11] Islet laboratory consumables
- [Step 13] Clinical labour
- [Steps 14–15] Model of care for recovery| Pharmaceuticals
- [Step 16] Pharmaceutical dispensing

NHCDC

- [Steps 1–2] Captured in NHCDC Outpatient Data Set.
- [Step 2] Costs of education may be held within health budgets. Not allocated at patient episode. ⚑ SF28
- [Step 4] Captured in NHCDC Outpatient Data Set or Acute Data Set.
- [Steps 3–4] Cost of outreach variable allocated in NHCDC to patient episode, often held as overhead by either local hospital or visiting hospital ⚑ 8.1
- [Step 5] Variably captured and allocated at a patient level in NHCDC Data Set can be linked to transplant related service event, another service event or unlinked pathology. ⚑ SF29
- [Steps 6–7] Costs captured in either NHCDC Outpatient Data Set or Acute Data Set at patient level. Costs may be within transplant cost centre or not. ⚑ 9.2, 9.3
- [Steps 6–7] Jurisdiction variation in percentage of transplant outpatient clinic activity costed in NHCDC (ranges from 72% to 100%).
- [Step 8] Captured in NHCDC Outpatient Data Set or Acute Data Set.
- [Steps 9–10] Co-ordination and multidisciplinary interactions costs are not fully captured (underestimated level of input required to conduct organ donor/recipient suitability). ⚑ 3.3
- [Step 11] Partial capture of pancreas/islet processing labour and consumable in the NHCDC (due to current NFC funding). ⚑ SF26
- [Steps 12–13] Mostly captured in NHCDC submission. Evidence of some cost components that are not included or not allocated to transplant patients. ⚑ 7.1, 7.2, SF20, SF21
- [Step 12] Uncaptured cost of operating theatre / labour. Cost spread across all patients. ⚑ SF19
- [Step 13] 99-100% activity in costed in NHCDC.
- [Steps 14–15] Captured in the NHCDC Acute or Outpatient Data Sets. Bed-day charges and high-cost medicines are costed per episode; remaining expenses are apportioned across episodes.
- [Step 16] Captured in NHCDC Outpatient Data Set.
- [Step 16] Dispensing of medication and postage cost often covered by hospitals (in NHCDC). ⚑ SF24
- [Step 17] Captured in either NHCDC Acute Data Set or Outpatient Data Set.

Other

- [Steps 14–15] Patient travel costs are variably held centrally (these are not re-allocated for NHCDC submissions). ⚑ SF27
- [Step 16] Costs of long-term scripts either provided by hospital or PBS. ⚑ SF24

Funding

- [Steps 1–2] MBS (Primary Care) | NHRA (Local Hospital) | Education: State-based Block Funding & Grants
- [Step 3] MBS (Primary Care) | NHRA (Local Hospital)
- [Step 4] NHRA | Referring hospital may pay for transport (if required)
- [Step 5] NHRA | Variable State Funding Arrangements | MBS ⚑ SF29
- [Steps 6–10] NHRA
- [Step 11] Nationally Funded Centre | Philanthropic and Hospital Research Funding
- [Step 12] NHRA
- [Steps 13–17] Service Delivery: NHRA | Nationally Funded Centres
- [Steps 13–17] Travel: Patient Travel Funding Schemes (funded centrally or by health service) e.g. IPTAAS | Hospital specific travel arrangements | Nationally Funded Centres ✈ ⚑ SF27
- [Steps 13–17] Pharmacy: NHRA or PBS ⚑ SF21

Legend Key: ⚑ Further details in Final Report – Chapter 8 (or Appendix B if labelled SF) | (white box) No requirement for capturing/classification/costing | (green box) Gap in capturing/classification/costing | (grey box) Element likely to be captured/classified/costed | (blue box) Element likely to be variably captured/classified/costed | ★ Gap in classification to be resolved in ACHI and ICD-10-AM Thirteenth Edition | ✈ Patient and family travel and accommodation may be required

Layer 1 | Layer 2

Overview of Current Living Solid Organ Donor Pathway

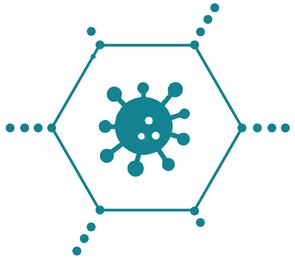
The living solid organ donor pathway is represented below. During a living donation, there is increased focus on the counselling of a potential donor and the requirement for post-donation follow-up. The interactions with the Paired Kidney Exchange Program (overseen by the ANZKX) present unique cost drivers and additional funding sources.

Activities	1. Education of Families and Potential Donors	2. Counselling of Selected Potential Donor	3. Tissue Typing, ABO	4. Assessment of Options For Transplant Determining Whether ANZKX is Best Route (ANZKX pathway only)	5. Counselling For ANZKX Pathway (ANZKX pathway only)
Brief Summary	Families and potential donors receive education about the donation process and expectations.	Selected potential donors undergo counselling to discuss risks, benefits, and implications of donation. The counselling ensures informed decision-making.	Tissue typing and ABO blood group testing are conducted to assess donor-recipient compatibility. Results guide further transplant planning.	The clinical team assesses transplant options and determines if the ANZKX pathway is the most suitable.	Potential donors and recipients receive counselling about the ANZKX process and implications. This supports informed consent and engagement.
Key Stakeholders	Donor/Recipient Hospital		Lifeblood/State pathology	Donor/Recipient Hospital	
Classification	Tier 2			Tier 2 (MDT) Unlikely to be recorded as transplant.	Tier 2 (often within transplant clinic) [9.2]
Data Reporting – National Activity Data Sets	Variably captured in NAP Data Set. [SF9]		Captured as NAP service event.	NAP Data Set	NAP Data Set Additional testing is required for ANZKX donors.
Data Reporting – Other	MBS Data Collection (for activity occurring in primary care).			ANZKX (where involved)	
Costing – Cost Drivers – Patient					
Costing – Cost Drivers – Other	Clinical labour		External provider service fees	Clinical labour	
Costing – NHCDC	Likely to be spread across nephrology or kidney transplant episodes in NHCDC submissions when education/counselling is not an outpatient service event.		Variably captured and allocated at a patient level in NHCDC Data Set (linked or unlinked pathology). [SF29]	Captured in NHCDC Outpatient Data Set – spread across patient episodes.	Captured in NHCDC Outpatient Data Set - allocated to patient episode.
Costing – Other			Cost of HLA processing sometimes not allocated to NHCDC		
Funding	NHRA		NHRA | Variable State Funding Arrangements | Hospital budgets | MBS [SF29]	NHRA	

Activities	6. Donor Medical Assessment: IDM markers, Clinical Examinations, Medical & Social History	7. Data Entry to ANZKX and ANZKX Matching Runs (ANZKX pathway only)	8. Confirmed ANZKX Match (ANZ KX pathway only)	9. Retrieval Surgery Scheduled and Coordinated Across ANZKX Group Participating Centres (ANZKX pathway only)	10. Retrieval Surgery
Brief Summary	Donors undergo comprehensive medical assessment including immunological markers, clinical exams, and history review. The team evaluates overall health and suitability.	Donor and recipient data are entered into the ANZKX system. Matching algorithms run to identify optimal donor-recipient pairs. Imaging of donor kidneys is shared with surgical team for suitability.	The matched donor-recipient group is finalised based on compatibility and logistics. Teams prepare for coordinated surgery.	Retrieval surgery is scheduled and coordinated at a ANZKX group participating centre.	The donor undergoes retrieval surgery.
Key Stakeholders	(Donor/Recipient Hospital, continued)	Donor/Recipient Hospital/ANZKX		Donor/Recipient Hospital/ANZKX	Donor Hospital
Classification	(Tier 2 (often within transplant clinic), continued)				ICD-10-AM/ACHI – sufficient codes for living donation. No identifier to determine match is via ANZKX pathway. No ICD code to identify when procedure abandoned after initiation. (Gap in classification to be resolved in ACHI and ICD-10-AM Thirteenth Edition)
Data Reporting – National Activity Data Sets	(NAP Data Set; Additional testing is required for ANZKX donors, continued)				APC Data Set (Patient and family travel and accommodation may be required)
Data Reporting – Other	EDR	ANZKX (where involved)/Royal Melbourne Hospital.		ANZLKD	
Costing – Cost Drivers – Patient					
Costing – Cost Drivers – Other	Pathology | Imaging				Clinical labour | ANZKX pathway
Costing – NHCDC	(Captured in NHCDC Outpatient Data Set - allocated to patient episode, continued)			Captured in NHCDC - coordination activity likely to be reported as out-of-scope costs in submissions. [5.1]	Captured in NHCDC Acute Data Set - allocated to patient episode. 87-100% of donation activity reported is costed within NHCDC.
Costing – Other				ANZKX (if through Paired Kidney Exchange Program). [5.1]	
Funding	NHRA	The OTA/NZMOH Funding to ANZKX.		(NHRA/State-based funding via transplant pathway). ANZKX/The OTA/NZMOH Funding (where involved).	NHRA Donor travel partially funded via statewide travel subsidy, or Supporting Living Kidney Donors Program.

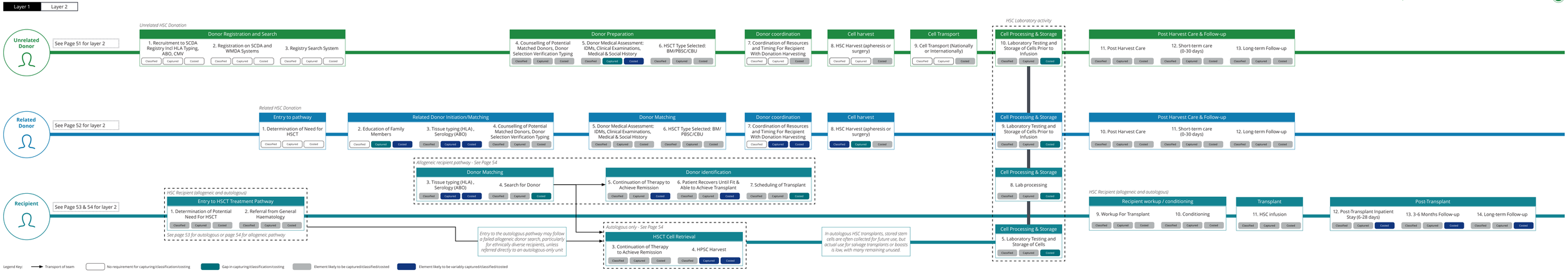
Activities	11. Transport Between Centres	12. Post Operative Inpatient Care	13. Short-term Outpatient Care (up to 30 days Post-Operative)	14. Long-term Follow-up	15. Data Records ANZLKDR and ANZKX System
Brief Summary	If required, the organ is transported securely between participating centres.	The donor receives inpatient care following surgery. Clinical teams monitor recovery and manage any complications.	The donor is closely monitored and supported during the first 30 days post-surgery. This includes outpatient visits and clinical assessments. There may also be rare readmissions for adverse events.	Long-term follow-up is conducted to monitor health outcomes and organ function. Teams provide ongoing support and manage any late complications.	All clinical and outcome data are recorded in the ANZLKDR and ANZKX systems. This supports monitoring, reporting, and research.
Key Stakeholders	Donor/Recipient Hospital/ANZKX	Donor Hospital			Donor/Recipient Hospital/ANZKX
Classification		AR-DRG | ICD-10-AM	Tier 2 | AR-DRG (for readmissions) | ICD-10-AM		
Data Reporting – National Activity Data Sets		APC Data Set	Captured in either NAP Data Set or APC Data Set (for readmissions).		
Data Reporting – Other					ANZLKDR ANZKX
Costing – Cost Drivers – Patient		Clinical complexities/complications			
Costing – Cost Drivers – Other	Mode of transport	Clinical labour			
Costing – NHCDC	Transport costs are likely to be held by recipient hospital, spread as an overhead.	Captured in NHCDC Acute Data Set - allocated to patient episode.	Captured in NHCDC Outpatient Data Set - allocated to patient episode.		
Costing – Other	ANZKX (if through Paired Kidney Exchange Program) transport costs not allocated to NHCDC. [5.1]				
Funding	ANZKX/The OTA/NZMOH Funding (where involved).	NHRA Supporting Living Kidney Donors Program			

Legend Key: [flag] Further details in Final Report – Chapter 8 (or Appendix B if labelled SF); [white] No requirement for capturing/classification/costing; [teal] Gap in capturing/classification/costing; [grey] Element likely to be captured/classified/costed; [blue] Element likely to be variably captured/classified/costed; [star] Gap in classification to be resolved in ACHI and ICD-10-AM Thirteenth Edition; [plane] Patient and family travel and accommodation may be required



Haematopoietic Stem Cell (HSC)

Schema layer 1 & 2


Layer 1
Layer 2
Unrelated Donor
See Page 51 for layer 2
Unrelated HSC Donation
Donor Registration and Search
1. Recruitment to SCDA Registry Incl HLA Typing, ABO, CMV
2. Registration on SCDA and WMDA Systems
3. Registry Search System
Classified
Captured
Costed
Donor Preparation
4. Counselling of Potential Matched Donors, Donor Selection Verification Typing
5. Donor Medical Assessment: IDMs, Clinical Examinations, Medical & Social History
6. HSCT Type Selected: BM/PBSC/CBU
Donor coordination
7. Coordination of Resources and Timing For Recipient With Donation Harvesting
Cell harvest
8. HSC Harvest (apheresis or surgery)
Cell Transport
9. Cell Transport (Nationally or Internationally)
HSC Laboratory activity
Cell Processing & Storage
10. Laboratory Testing and Storage of Cells Prior to Infusion
Post Harvest Care & Follow-up
11. Post Harvest Care
12. Short-term care (0-30 days)
13. Long-term Follow-up
Related Donor
See Page 52 for layer 2
Related HSC Donation
Entry to pathway
1. Determination of Need for HSCT
Related Donor Initiation/Matching
2. Education of Family Members
3. Tissue typing (HLA) , Serology (ABO)
4. Counselling of Potential Matched Donors, Donor Selection Verification Typing
Donor Matching
5. Donor Medical Assessment: IDMs, Clinical Examinations, Medical & Social History
6. HSCT Type Selected: BM/PBSC/CBU
Donor coordination
7. Coordination of Resources and Timing For Recipient With Donation Harvesting
Cell harvest
8. HSC Harvest (apheresis or surgery)
Cell Processing & Storage
9. Laboratory Testing and Storage of Cells Prior to Infusion
Post Harvest Care & Follow-up
10. Post Harvest Care
11. Short-term care (0-30 days)
12. Long-term Follow-up
Allogeneic recipient pathway - See Page 54
Donor Matching
3. Tissue typing (HLA) , Serology (ABO)
4. Search for Donor
Donor identification
5. Continuation of Therapy to Achieve Remission
6. Patient Recovers Until Fit & Able to Achieve Transplant
7. Scheduling of Transplant
Cell Processing & Storage
8. Lab processing
Recipient
See Page 53 & 54 for layer 2
HSC Recipient (allogeneic and autologous)
Entry to HSCT Treatment Pathway
1. Determination of Potential Need For HSCT
2. Referral from General Haematology
See page 53 for autologous or page 54 for allogeneic pathway
Entry to the autologous pathway may follow a failed allogeneic donor search, particularly for ethnically diverse recipients, unless referred directly to an autologous-only unit
Autologous only - See Page 54
HSCT Cell Retrieval
3. Continuation of Therapy to Achieve Remission
4. HPSC Harvest
In autologous HSC transplants, stored stem cells are often collected for future use, but actual use for salvage transplants or boosts is low, with many remaining unused.
Cell Processing & Storage
5. Laboratory Testing and Storage of Cells
HSC Recipient (allogeneic and autologous)
Recipient workup / conditioning
9. Workup For Transplant
10. Conditioning
Transplant
11. HSC infusion
Post-Transplant
12. Post-Transplant Inpatient Stay (6-28 days)
13. 3-6 Months Follow-up
14. Long-term Follow-up
Legend Key:
Transport of team
No requirement for capturing/classification/costing
Gap in capturing/classification/costing
Element likely to be captured/classified/costed
Element likely to be variably captured/classified/costed

Layer 1 | Layer 2

Overview of Current Living Cell Donor (Unrelated) Pathway

Layer 2 of the cells and bone marrow pathway, presented below, builds on Layer 1 by taking a closer look at the current living cell donor (unrelated) pathway. It details the key stakeholders involved and outlines how this specific pathway's activities are currently reported, costed, and funded.

Activities	1. Recruitment to SCDA Incl HLA Typing, ABO, CMV	2. Registration on SCDA and WMDA Systems	3. Registry Search System	4. Counselling of Potential Matched Donors, Donor Selection Verification Typing	5. Donor Medical Assessment: IDMs, (Serology), Clinical Examinations, Medical & Social History	6. HSCT Type Selected: BM/PBSC/CBU
Brief Summary	Potential donors are added to the SCDA and undergo HLA typing, ABO blood grouping, and CMV screening. This information supports future matching with recipients.	Donor details are registered on the SCDA and WMDA systems. This enables global visibility for matching purposes.	A search is conducted through registry systems to identify potential donor matches. Matching considers HLA compatibility and other key markers.	Matched donors receive counselling to discuss the donation process and implications. Verification typing confirms compatibility before proceeding.	Donors undergo a full medical assessment including IDMs, physical examinations, and a review of medical and social history. This ensures donor safety and eligibility.	The most suitable HSCT type is selected. The decision is based on clinical factors and donor suitability.
Key Stakeholders	Recruitment Centres (Lifeblood)	SCDA/WMDA [spans 2–3]		SCDA/Hospital [spans 4–6]		
Classification				Tier 2 | ICD-10-AM/ACHI [spans 4–6]		
Data Reporting – National Activity Data Sets				Captured in either NAP Data Set or APC Data Set. [spans 4–6]		
Data Reporting – Other	Stem Cell Donors Australia (SCDA). Activity unlikely to occur in National Activity Data Sets. [spans 1–3]					
Costing – Cost Drivers – Patient						
Costing – Cost Drivers – Other				Clinical labour | Pathology [spans 4–6]		
Costing – NHCDC				Captured in NHCDC Outpatient Data Set - allocated to patient episode. [spans 4–6]		
Costing – Other	Recruitment Centres		Transplant centres			
Funding	MBS and State funding (cost of pursuing donor typing – state pathology services invoices hospital which is paid through haematology services. Then reimbursed via State health budget.	State Health Budget and Australian Government funding provided via a contract to SCDA. Australian Government via SCDA provides access to the ISP for international unrelated donors. State Health Budget provides funding when ISP cap ($12,000 AUD per patient) is exceeded. [spans 2–3]		State health budgets for domestic unrelated donor testing AND international unrelated donors when testing exceeds $12,000 per patient. Australian Government funds testing of international unrelated donors up to $12,000 per patient.	Domestic donor for domestic patient – NHRA; International donor for domestic patient – BMTP; Domestic donor for international patient –State Health department reimbursed by Stem Cell Donors Australia. [spans 5–8]	

Activities	7. Coordination of Resources and Timing for Recipient With Donation Harvesting	8. HSC Harvest (apheresis or surgery) – PBSC	8. HSC Harvest (apheresis or surgery) – Bone Marrow	9. Cell Transport (Nationally or Internationally)	10. Laboratory Testing and Storage of Cells Prior to Infusion	11. Post Harvest Care	12. Short-term care (0-30 days)	13. Long-term Follow-up
Brief Summary	Donation and transplant dates are coordinated to align with recipient's readiness. Hospital, transport, and laboratory logistics are arranged, and donor travel occurs (if required).	Cells are collected from the donor from PBSC, bone marrow and on some occasions cord blood. [spans PBSC and Bone Marrow]		Collected cells are packaged and transported to the transplant centre, either within Australia or internationally.	Cells undergo laboratory testing for quality and viability. If needed, they are stored under controlled conditions until infusion.	Donors receive post-harvest medical care to monitor recovery and address any immediate side effects. Clinical teams provide support and follow-up.	Donors are monitored for the first 30 days following donation. Follow-up includes physical health checks and symptom management.	Long-term follow-up is conducted to assess the donor's health and ensure any late side-effects of the procedure are managed.
Key Stakeholders	Recipient/donor Hospital and SCDA	Donor Hospital [spans PBSC and Bone Marrow]		Recipient Hospital	Laboratory	Donor Hospital [spans 11–13]		
Classification		SF32 Tier 2 | ICD-10-AM/ACHI	ICD-10-AM /ACHI		ACHI (a small portion may be captured in donation episode – apheresis with cryopreservation)	Tier 2 | ICD-10-AM/ACHI (if readmission is required) [spans 11–12]		
Data Reporting – National Activity Data Sets	SF35 Coordination activities will be captured in labour of BMT coordinators. Likely to be underestimate of true resource utilisation.	SF32 Captured in either NAP Data Set or APC Data Set. (Patient and family travel and accommodation may be required)	APC Data Set (Patient and family travel and accommodation may be required)		APC Data Set (unlikely to be captured within donor procedure episode)	Captured in either NAP Data Set or APC Data Set. [spans 11–12]		
Data Reporting – Other	Donor travel is uncaptured activity.	No activity recorded if sample was from overseas. [spans PBSC and Bone Marrow]		SCDA		SCDA (reporting for clinical adverse events). [spans 11–13]		
Costing – Cost Drivers – Patient								
Costing – Cost Drivers – Other	Clinical labour	Consumables | Clinical labour [spans PBSC and Bone Marrow]		Transport	Capital | Consumables | Labour | FACT accreditation	Clinical labour | Consumables [spans 11–12]		
Costing – NHCDC	SF35 Coordinator costs are captured in the NHCDC, however depending on size of unit will be variably captured in transplant and non-transplant costs.	Captured in NHCDC Acute/ Outpatient Data Set - to patient episode. 96-100% activity costed in NHCDC. [spans PBSC and Bone Marrow]	Captured in NHCDC Acute/ Outpatient Data Set - to patient episode.		12.2 Variably allocated in NHCDC (held centrally or spread across haematology patients on transplant recipient)	NHCDC Outpatient Data Set. [spans 11–12]		
Costing – Other				Internally documented by recipient hospital. Unrelated international donor costs covered by BMTP. Unrelated domestic donor costs covered by state health budgets.	12.1, 12.2 Held centrally by state, university budget			
Funding	[continued from column 5: Domestic donor for domestic patient – NHRA; International donor for domestic patient – BMTP; Domestic donor for international patient –State Health department reimbursed by Stem Cell Donors Australia.]			SF33 International – BMTP Domestic – jurisdictional health departments	12.1 NHRA | jurisdictional variation in state-based block funding and employment arrangements for BMT labs | Hospital laboratory funding No reported direct funding for unused inventory.	NHRA [spans 11–12]		State block funding/grants.

Legend Key:
- Further details in Final Report – Chapter 8 (or Appendix B if labelled SF)
- No requirement for capturing/classification/costing
- Gap in capturing/classification/costing
- Element likely to be captured/classified/costed
- Element likely to be variably captured/classified/costed
- Gap in classification to be resolved in ACHI and ICD-10-AM Thirteenth Edition
- Patient and family travel and accommodation may be required

Layer 1 | Layer 2

Overview of Current Living Cell Donor (Related) Pathway

Layer 2 of the cells and bone marrow pathway, presented below, builds on Layer 1 by taking a closer look at the current living cell donor (related) pathway. It details the key stakeholders involved and outlines how this specific pathway's activities are currently reported, costed, and funded.

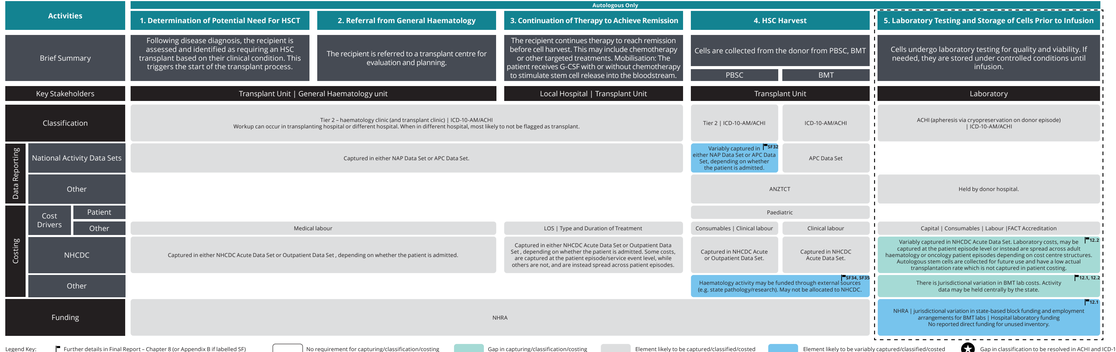
Activities	1. Determination of Need for HSCT	2. Education of Family Members	3. Tissue typing (HLA) , Serology (ABO), IDM	4. Counselling of Potential Matched Donors, Donor Selection Verification Typing	5. Donor Medical Assessment: IDMs, (Serology), Clinical Examinations, Medical & Social History	6. HSCT Type Selected: BM/PBSC	7. Coordination of Resources and Timing For Recipient With Donation Harvesting	8. HSC Harvest		9. Laboratory Testing and Storage of Cells Prior to Infusion	10. Post Harvest Care	11. Short-term care (0-30 days)	12. Long-term Follow-up
Brief Summary	The recipient is assessed and identified as requiring a HSCT based on their clinical condition. This triggers the start of the transplant process.	Family members receive information about cell donation, including the process, risks, and potential outcomes. This supports understanding and informed participation.	Tissue typing, ABO blood grouping, and IDM screening are performed on potential donors. Results guide matching and eligibility assessment.	Matched donors receive counselling to discuss the donation process and implications. Verification typing confirms compatibility before proceeding.	Donors undergo a full medical assessment including IDMs, physical examinations, and a review of medical and social history. This ensures donor safety and eligibility.	The most suitable HSCT type is selected. The decision is based on clinical factors and donor suitability.	Donation and transplant dates are coordinated to align with recipient's readiness. Hospital, transport, and laboratory logistics are arranged.	Cells are collected from the donor from PBSC, BM and on some occasions cord blood.		Cells undergo laboratory testing for quality and viability. If needed, they are stored under controlled conditions until infusion.	Donors receive post-harvest medical care to monitor recovery and address any immediate side effects. Clinical teams provide support and follow-up.	Donors are monitored for the first 30 days following donation. Follow-up includes physical health checks and symptom management.	Long-term follow-up is conducted to assess the donor's health and ensure any late side-effects of the procedure are managed.
								PBSC	Bone Marrow				
Key Stakeholders	Donor Hospital					Donor hospital (domestic donors) | Stem Cells Donors Australia (international donors)	Donor Hospital			Laboratory	Donor Hospital		
Classification	N/A – see cell recipient pathway.		Tier 2					SF32 Tier 2 | ICD-10-AM/ACHI *Limited visibility of apheresis in outpatients*	ICD-10-AM/ACHI	ACHI (a small portion may be captured in donation episode – apheresis with cryopreservation).	Tier 2		
Data Reporting – National Activity Data Sets		10.1, SF28, SF35 Uncaptured activity. Done within role of donor coordinators and/or medical officer.		NAP Data Set (possibly uncaptured if workup occurs internationally).			SF35 Coordination activities will be captured in labour of BMT coordinators. Likely to be underestimated of true resource utilisation.	SF32 Captured in either NAP Data Set or APC Data Set.	APC Data Set	APC Data Set (potentially captured within donor procedure episode).	NAP Data Set		NAP Data Set Noted to rarely occur for related donors.
Data Reporting – Other							Donor travel is uncaptured activity.			Internally documented by donor hospital.			
Costing – Cost Drivers – Patient								Paediatric			Patient complexity		
Costing – Cost Drivers – Other		Clinical labour	Pathology		Clinical labour | Pathology		Clinical labour | Transport	Consumables, | Clinical labour		Capital | Consumables | Labour | Accreditation	Clinical labour | Pathology activity		
Costing – NHCDC		SF35 Labour captured in NHCDC but unlikely to be allocated to patient episode.	SF29 Variably allocated in NHCDC Outpatient submissions (as linked or unlinked pathology).	Captured in NHCDC Outpatient Data Set – spread across haematology patient episodes or allocated to patient episode.	Captured in NHCDC Outpatient Data Set - allocated to patient episode. (International donor costs are submitted to NHCDC however are out of scope funding source).		SF35 Coordinator costs are captured in the NHCDC, however are spread across patient episodes.	Captured in NHCDC Acute/ Outpatient Data Set - to patient episode. 84-100% costed	Captured in NHCDC Acute/ Outpatient Data Set - to patient episode. 95-100% costed	12.1 Variably allocated in NHCDC (held centrally or spread across haematology patients on transplant recipient).	Captured in NHCDC Outpatient Data Set.		
Costing – Other			Centrally held costs.							12.1, 12.2 Held centrally by hospital or state.			
Funding		NHRA	SF29 MBS | Hospital reimbursed through state budget.	Funding for donor procedures varies widely; international sibling donors' resident in Australia without Medicare often incur unfunded costs absorbed by hospitals; international sibling donors resident overseas are funded by the Australian Government ISP up to VT testing (Activity 4) and when selected as the donor (Activity 6) are funded via the BMTP. In contrast, Australian unrelated donor expenses are billed to the unit, while some travel support exists for rural donors.			SF33 Related donor travel expenses are variably reimbursed through Federal (international donors via BMTP) and state funding when required. BMTP funding supports the transport of cells collected overseas from international domiciled related donors.	NHRA or state pathology / research – when cell collection is performed in Australia. BMTP – for cell collection performed overseas.		12.1 NHRA | jurisdictional variation in state-based block funding and employment arrangements for BMT labs | Hospital laboratory funding No reported direct funding for unused inventory.	NHRA		

Legend Key: Further details in Final Report – Chapter 8 (or Appendix B if labelled SF) | No requirement for capturing/classification/costing | Gap in capturing/classification/costing | Element likely to be captured/classified/costed | Element likely to be variably captured/classified/costed | Gap in classification to be resolved in ACHI and ICD-10-AM Thirteenth Edition | Patient and family travel and accommodation may be required

Layer 1 | Layer 2

Overview of Current Cell Donor Pathway (Autologous)

Layer 2 of the cells and bone marrow pathway, presented below, builds on Layer 1 by taking a closer look at the current living cell donor (autologous) pathway. It details the key stakeholders involved and outlines how this specific pathway's activities are currently reported, costed, and funded.



Autologous HSC transplants will re-enter into the Cell Recipient Pathway schema from activity '8. Lab Processing' (page 54)

8. Lab Processing

Donor stem cells are processed and tested in the laboratory prior to infusion. Processing ensures safety, quality, and suitability.

Legend Key: Further details in Final Report – Chapter 8 (or Appendix B if labelled SF) | No requirement for capturing/classification/costing | Gap in capturing/classification/costing | Element likely to be captured/classified/costed | Element likely to be variably captured/classified/costed | Gap in classification to be resolved in ACHI and ICD-10-AM Thirteenth Edition | Patient and family travel and accommodation may be required

Layer 1 | Layer 2

Overview of Current Cell Recipient Pathway (Allogeneic and Autologous)

Layer 2 of the cells and bone marrow pathway, presented below, builds on Layer 1 by taking a closer look at the current cell recipient (autologous and allogeneic) pathway. It details the key stakeholders involved and outlines how this specific pathway's activities are currently reported, costed, and funded

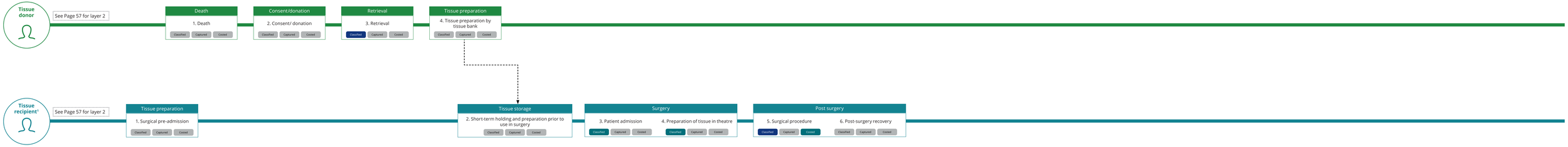
		Allogeneic Only							Both Autologous and Allogeneic						
Activities		1. Determination of Potential Need For HSC	2. Referral to General Haematology	3. Tissue typing (HLA) , Serology (ABO)	4. Search for Donor	5. Continuation of Therapy to Achieve Remission	6. Patient Recovers Until Fit & Able to Achieve Transplant	7. Scheduling of Transplant	8. Lab Processing	9. Workup For Transplant	10. Conditioning	11. HSC Infusion	12. Post-Transplant Inpatient Stay (6-28 days)	13. 3-6 Months Follow-up	14. Long-term Follow-up
Brief Summary		Following disease diagnosis, the recipient is assessed and identified as requiring an HSC transplant based on their clinical condition. This triggers the start of the transplant process.	The recipient is referred to a transplant centre for evaluation and planning.	The recipient undergoes HLA tissue typing and ABO grouping. These results guide donor matching.	Families are screened for a match. If a related donor can't be found, a donor search is conducted through national and international registries. Potential matches are then reviewed.	The recipient continues therapy to reach remission before transplant. This may include chemotherapy or other targeted treatments.	The recipient is monitored and supported until medically fit for transplant. Timing is adjusted based on their recovery and overall health.	The transplant date is scheduled to align with donor and centre availability. Coordination occurs across clinical and laboratory teams.	Donor stem cells are processed and tested in the laboratory prior to infusion. Processing ensures safety, quality, and suitability.	The recipient completes pre-transplant assessments including medical, psychological, and laboratory evaluations.	The recipient receives conditioning therapy to prepare for the transplant. This reduces disease burden and suppresses immune response.	The donor cells are infused into the recipient.	The recipient remains in hospital for monitoring during engraftment and early recovery. They receive supportive care and infection prevention.	The recipient attends regular outpatient follow-up to monitor graft function and manage complications.	Long-term follow-up is conducted to assess the recipient's health and ensure any late side-effects of the procedure are managed.
Key Stakeholders		Transplant Unit | General Haematology unit		Transplant Unit | Local Pathology	Hospital | SCDA	Local Hospital or Transplant Hospital		Transplant Hospital	Laboratory	Local Hospital or Transplant Hospital		Transplant Unit | Hospital Pharmacy			Local Hospital | Community Pharmacy
Classification		Tier 2 | ICD-10-AM/ACHI				Tier 2 | ICD-10-AM/ACHI Workup can occur in transplanting hospital or different hospital. When in different hospital, most likely to not be flagged as transplant.				Tier 2 | ICD-10-AM/ACHI		[11.1, 11.2] AR-DRG – classified by major / minor complexity. Noted to be poor classification for levels of complexity of HSC recipients. ACHI – classified by donor source: matched, unmatched, related, unrelated.		Tier 2	
Data Reporting	National Activity Data Sets	Captured in either NAP Data Set or APC Data Set, depending on whether the patient is admitted.				APC a Captured in either NAP Data Set or APC Data Set, depending on whether the patient is admitted. Set			Type of laboratory processing not visible in national data sets. Activity of laboratory is usually haematology, with a proportion of lab activity for transplants.	Captured in either APC Data Set or NAP Data Set, depending on whether the patient is admitted. Some transplant units reported provide outpatient services whilst not having an outpatient clinic – conduct these within hospital.		APC Data Set		NAP Data Set	
Data Reporting	Other				SCDA							ANZTCT			
Costing – Cost Drivers	Patient			Mismatched donor					Paediatric	Malignancy of Tumour | Haploidentical mismatched donors			Donor factors e.g mismatched.		
Costing – Cost Drivers	Other	Medical labour		Pathology	Clinical labour (HSCT Co-ordinators)	LOS | Type and Duration of Treatment		Clinical labour (HSTC Co-ordinators)	Capital | Consumables | Labour |FACT Accreditation	Diagnostics | Clinical labour	Pharmaceuticals | Immunotherapy	Clinical labour	Clinical labour | Pathology | Immunotherapy | Pharmaceuticals		
Costing	NHCDC	Captured in either NHCDC Acute Data Set or Outpatient Data Set, depending on whether the patient is admitted.		[SF29] Variably captured and allocated at a patient level in NHCDC Data Set (linked or unlinked pathology).	[10.1] Captured in either NHCDC Acute Data Set or Outpatient Data Set. Costs for donor search are spread across patient episodes.	[SF34] Captured in either NHCDC Acute Data Set or Outpatient Data Set, depending on whether the patient is admitted. Some costs, are captured at the patient episode/service event level, while others are not, and are instead spread across patient episodes (most commonly, haematology patients).		[SF35] Captured in either NHCDC Acute Data Set or Outpatient Data Set. Some costs, are captured at the patient episode/service event level, while others are instead spread across patient episodes.	[12.1] Sometimes captured in NHCDC Acute Data Set. Costs are rarely captured at the patient episode level and sometimes spread across transplant or haematology patient episodes. Accreditation costs poorly captured.	Captured in either NHCDC Acute Data Set or Outpatient Data Set, depending on whether the patient is admitted.		[SF34] NHCDC Acute Data Set 91% - 100% of episodes recorded in NHCDC costing.	[9.2, SF34, SF35] Captured in either NHCDC Acute Data Set or Outpatient Data Set, depending on whether the patient is admitted. Some costs, are captured at the patient episode/service event level, while others are not, and are instead spread across patient episodes.		
Costing	Other			Cost of tissue typing processing by labs variably allocated to NHCDC.					[12.1, 12.2] Costs can be held by pathology provider or centrally by state (in NSW).						
Funding		NHRA		[SF29] NHRA | Variable State Funding Arrangements | Hospital budgets | MBS	NHRA | State-based Block Funding | SCDA (donor search costs capped at $12,000 AUD)	NHRA			[12.1] NHRA | jurisdictional variation in state-based block funding and employment arrangements for BMT labs | Hospital laboratory funding No reported direct funding for unused inventory.	NHRA		NHRA		NHRA	

Legend Key: Further details in Final Report – Chapter 8 (or Appendix B if labelled SF) | No requirement for capturing/classification/costing | Gap in capturing/classification/costing | Element likely to be captured/classified/costed | Element likely to be variably captured/classified/costed | Gap in classification to be resolved in ACHI and ICD-10-AM Thirteenth Edition | Patient and family travel and accommodation may be required

Human Tissue

Schema layer 1 & 2

Layer 1 | Layer 2



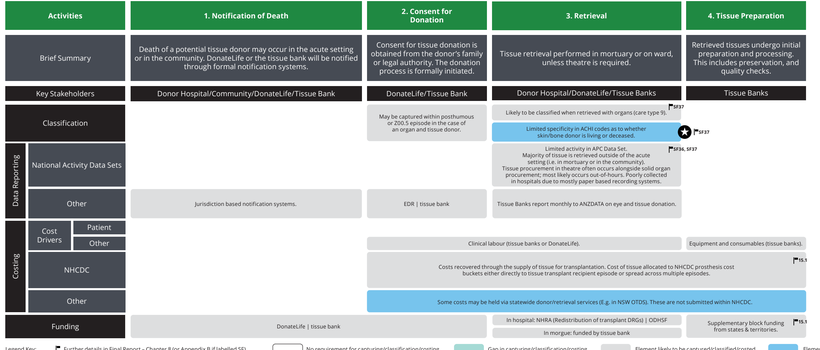
Legend Key: Organ transport | Transport of team | Communication | No requirement for capturing/classification/costing | Gap in capturing/classification/costing | Element likely to be captured/classified/costed | Element likely to be variably captured/classified/costed

[1] Autologous tissue donor/recipients are not included as autologous tissue donation/transplant primarily occurs during the same procedure under a single anaesthetic.

Layer 1 | Layer 2

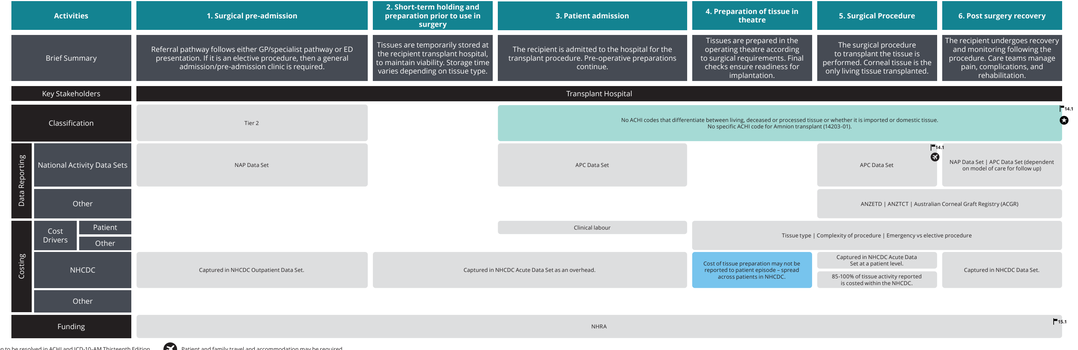
Overview of Current Deceased Tissue Donor and Retrieval Pathway

Layer 2 of the tissue pathway, presented below, builds on Layer 1 by taking a closer look at the current deceased tissue donor, retrieval and recipient pathway. It details the key stakeholders involved and outlines how this specific pathway's activities are currently reported, costed, and funded.



Legend Key: Further details in Final Report – Chapter 8 (or Appendix B if labelled SF) | No requirement for capturing/classification/costing | Gap in capturing/classification/costing | Element likely to be captured/classified/costed | Element likely to be variably captured/classified/costed | Gap in classification to be resolved in ACHI and ICD-10-AM Thirteenth Edition | Patient and family travel and accommodation may be required

Overview of Current Tissue Recipient Pathway



8. Project Findings and Recommendations

The findings and recommendations below are the culmination of insights derived from literature review, data analysis and extensive stakeholder consultation program, with accompanying recommendations for implementation by IHACPA and other government stakeholders. Supplementary findings that may be relevant for sector initiatives outside the scope of this review are detailed in Appendix B.

Solid Organ: Deceased Organ Donation

Recommendation 1: Supporting Evidence

Finding 1.1 – When donation is being considered, determination of death is used to mark the cessation of acute care on a best endeavours basis.

- Organ donation activity, including ongoing ICU level care (ventilation) and donor assessment provided only for the purposes of facilitating donation, is captured within 2 separate episodes of care:
  - **Acute episode:** In the episode where a patient dies, a patient will be assigned a Z00.5 ICD-10-AM code indicating examination of potential donor to signal donor intent (pre-death). This triggers a change in clinical intent from lifesaving pathway to an organ preserving/donor preparation pathway.
  - **Posthumous episode:** used for organ procurement. This is not an admitted episode of care following a change in care type to care type 9 (posthumous organ procurement). In this episode, the ACHI procedure code for organ retrieval, Z52 donation status code and machine perfusion procedure code (where applicable) are recorded as well as resources associated with clinician and operating theatre.
- There is currently no adjacent DRG (ADRG) for posthumous procurement and no explicit ADRG for a solid organ procurement. However, as of July 2025, there is a new ADRG A16 *Posthumous Organ Procurement* included in AR-DRG Version 12.0.

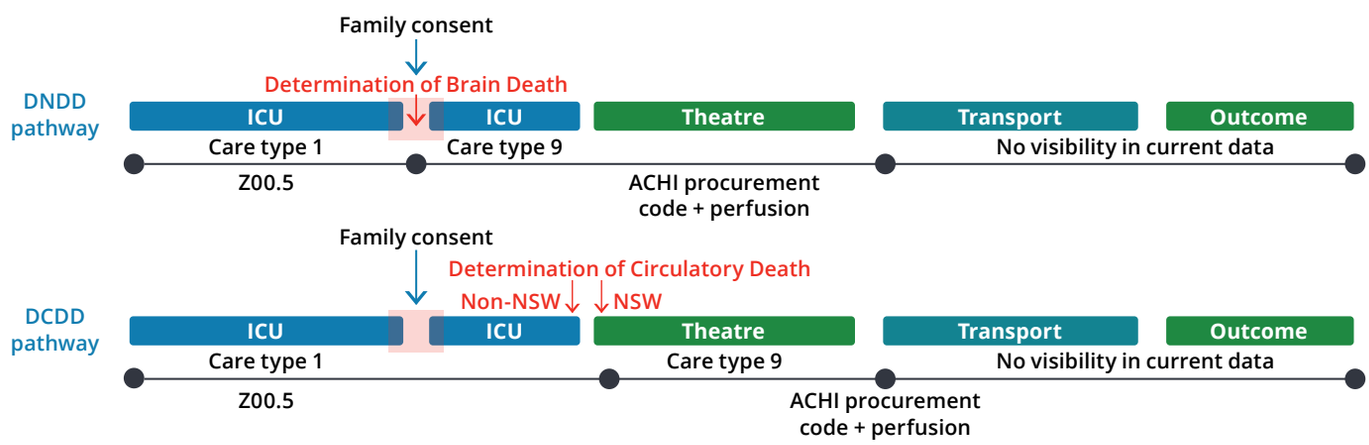
Finding 1.2 - There is variability in the way care type changes are applied in the context of deceased donation. Specifically, in the conversion of patients to the 'posthumous organ procurement' care type.

- Organ donor episodes may be assigned a care type 9 based on a decision made by the clinician responsible for the management of the care, based on judgements as to the primary clinical purpose of the care.
- There is variability in use of the posthumous episode (under care type 9) across states and territories. Some states and territories appear to interpret the care type change as a statistical change when the person has been pronounced neurologically deceased but retained on some mechanical and other support systems.
  - This is inferred from data derived from APC data sets across 2017-18 to 2023-24, where posthumous episodes have recorded a longer LOS in addition to evidence of mechanical ventilation and ICU hours.
    - ❖ **LOS:** 24% of episodes record a LOS greater than 1 day, for an average of 2.4 days for these episodes.
    - ❖ **HMV hours:** 15% of episodes recorded hours of mechanical ventilation in posthumous episode, with an average of 36 hours when counted.
    - ❖ **ICU hours:** 50% of episodes record at least some hours of ICU LOS, with an average of 24 hours for those that record.
    - ❖ **Cost profile:** higher than average cost associated with posthumous episode, with a greater proportion of critical and ward medical/nursing costs.
  - While others report the separation mode as died in hospital in ICU or within the operating theatre (at the point of cessation of ventilation or DNDD). This is inferred from data for which there is a longer LOS in the acute donor episode (Z00.5), and relatively lower LOS/cost of posthumous episode (and higher proportion of costs in operating room).
    - ❖ This is most prevalent in Qld, where majority of episodes are grouped under a Z64B AR-DRG (*Other factors influencing health status, minor complexity*) to indicate a primary diagnosis of Z00.5 examination for potential donation activity.

Finding 1.3 - The time at which the care type change occurs will differ between DCDD and DNDD donors. This difference can be multiple days.

- Declaration of Death mostly occurs prior to seeking consent for donation in DNDD cases. In DCDD cases, this occurs after consent has been given and 5 minutes after cessation of circulation, where the circulation stops within 90 minutes of withdrawal of cardiorespiratory support.
- This means that potential donors on a DCDD pathway will have all assessment activity performed during the acute episode, whereas potential donors on a DNDD pathway will have assessment activities performed in the posthumous episode (variably captured, as highlighted in Figure 7).
- The variation between DCDD and DNDD donors can be attributed in some part to inconsistent care typing practice between states and territories and as a result of posthumous procurement care type being submitted on a best endeavours basis.

Figure 7: Illustration of timings for the determination of death in the DNDD and DCDD pathways.



Source: Deloitte (2025)

Note: WCRS and determination of death for DCDD pathway may occur in either ICU or operating theatre.

Finding 1.4 - The difference in the commencement of the care type change results in 2 distinct activity profiles within the same care type for both the acute episode and the posthumous episode.

- Clinical activities undertaken for the purposes of donation, such as those which allow for safety and quality assessments for donation. This includes CT scans, Coronary Angiography, blood tests, occur after family consent and after death declaration in DNDD pathway, but before death declaration in DCDD pathway.
- As a result, costs of these clinical activities are allocated to variable episodes of care across states and territories.

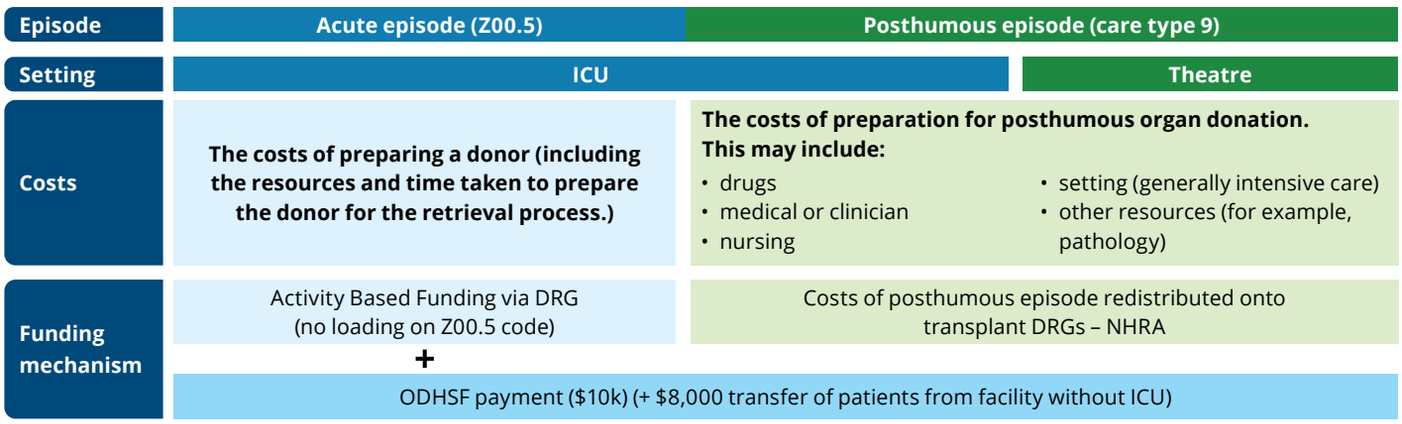
Finding 1.5 - Signed consent is related to a clinical decision point whereby the type of care changes. This is consistently recorded in the Electronic Donor Record (EDR) system.

- After formal written consent is undertaken and blood for tissue typing is sent, a donor identification number is generated through the EDR, that is completed by the donation specialist nurse for each potential donor.
- Though there is state level variation in when the EDR is activated, at the point of a potential donor's family providing consent, all states and territories will be consistently recording patient information in the EDR.

Recommendation	Implementation Considerations
Recommendation 1 *IHACPA & the OTA* Redefine the 'Posthumous Organ Procurement' care type to reflect 'Actual or Intended Donor' (or another name that demonstrates the change in clinical intent, rather than being associated with a determination of death). ***IHACPA Role:*** Implement in consultation with the OTA and states and territories.	a. Redefine the scope of the 'Posthumous Organ Procurement' care type to reflect the change in clinical intent on signed consent for donation, such as 'Actual or Intended Donor' (or another name that demonstrates the change in clinical intent, rather than being associated with a determination of death). Consider how this change might relate to other non-donation admitted episodes in the NMDS such as planning, research and public health purposes. b. Investigate the application of this care type to the VAD pathway to donation. ***See Appendix B (SF8) for more detail.*** c. Enhance the capture of the following clinical aspects that influence variability of donation and are currently not captured in national data sets: DCDD, DNDD, ECDs, VAD, multi-organ vs single organ, palliative care donors. ***See Appendix B (SF6-8) for more detail.*** d. Changes to national activity data collections are to be proposed by IHACPA and will require jurisdictional support through the Australian Institute of Health and Welfare's (AIHW) National Health Data Committees. These changes will require states and territories to report the data and invest in local data and costing systems to report this activity accurately.

Solid Organ: Deceased Organ Donation
Recommendation 2: Supporting Evidence

Figure 8: Concept diagram of donor preparation and posthumous care continuum.



Source: Deloitte (2025)

Finding 2.1 - Organ donation activity is funded through 2 sources: ODHSF via the OTA, and NHRA funding.

- Referring to Figure 8 above, there are separate costs attached to the acute episode (including preparing the donor for retrieval), and posthumous care which extends to retrieval.
- Three issues have been identified with regard to the allocation of costs between acute/posthumous episodes, and the downstream funding implications:
  - **Issue 1:** Costs allocated to the acute episode are accounted for directly through the redistribution model on ventilation codes. However, there is a significant increase in cost profile associated with ventilation codes linked to organ donation (Z00.5) which currently may not be accounted for in existing pricing.
  - **Issue 2:** Costs allocated to the posthumous episode are accounted for indirectly through the redistribution model on transplant DRG codes. This is problematic because in 2024 only 11% of deceased donor organs were transplanted within the same hospital[133], and between 2017-18 and 2023-24, 40% of donations occurred at hospitals where there is no transplant activity. Some of these costs are covered by the ODHSF payment, which is necessary in the current state due to the misalignment of reimbursement and the site of the donor. However at a system level, there is likely to be double counting of these costs for reimbursement via the ODHSF and the NHRA.
  - **Issue 3:** The ODHSF payment covers some of the shortfall caused by the redistribution of funds away from donation-only hospitals, however the payment hasn't been indexed since its establishment.

Table 5: Funding sources and current applications to transplantation activities.

Funding Mechanisms
Activity based funding via AR-DRG intended for potential donor (acute) episode *Description* Episodes identified via a potential donor ICD-10-AM code (Z00.5) receive NHRA funding. *Observations* • In the current classification system, potential donor episodes (coded under ICD-10-AM Z00.5) do not isolate donor assessment activity and associated costs from other clinical activities. • Majority of episodes are grouped to ventilation related DRGs (B42 or A14). When comparing the same DRGs across Z00.5 episodes and non-Z00.5 episodes. Z00.5 episodes have higher cost profile when adjusted for LOS, with a significant proportion of the total episode on mechanical ventilation • Pricing may not currently account for the larger cost profile of episodes associated with Z00.5 codes compared to those in similar DRGs not associated with a Z00.5 code

[133] Data provided by The OTA, 2025

Funding Mechanisms

NHRA funding loaded onto transplant DRGs for organ procurement episodes

Description

Costs reported for care type 9 (posthumous episode) are redistributed to transplant recipient episodes at a national level. The total cost of each organ procurement episode is reallocated to relevant patients in AR-DRGs that involve the transplantation of the corresponding organs

Observations

- The current redistribution model may be inequitable for donation-only hospitals (i.e. where there are no transplant DRGs). These hospitals will not receive any NHRA payments for donation activity.

Funding from the OTA intended to supplement both potential donor (acute) episode and organ procurement episode

Description

ODHSF allocation of $10,000 per actual or intended organ donor is designed to provide funding to support associated clinical and operational costs of deceased organ donation such as anaesthetist time, ICU bed and operating theatre time. There is also an $8,000 transfer payment (via the OTA) for hospitals who initially host a potential donor, but do not have ICU capability to proceed to donation and the patient is subsequently transferred to suitable hospital.

Observations

- In the period since the ODHSF was established, the LOS for DNDD donors in ICU has increased as well as the complexity of some donation assessments, increasing the cost profile of actual and intended donation.
- The ODHSF payment has not been indexed since its establishment. This was repeatedly noted through consultation.
- The ODHSF payment currently required to cover some of the shortfall created at a site level by the misalignment between funding (through reimbursement) and the site at which the donor episode costs are incurred. At a system level, there would be some degree of double counting of ODHSF payment in addition to the NHRA funding.

Recommendation	Implementation Considerations
Recommendation 2 ***IHACPA & States and Territories*** Change the pricing approach such that all donation costs incurred by the donor hospital are allocated to the 'Consented Potential Donor' episode and are redistributed directly to donor hospitals through the posthumous procurement AR-DRG. ***IHACPA Role:*** Implement	a. IHACPA to determine whether the new Adjacent Diagnosis Related Group created in AR-DRG V12.0 for posthumous organ procurement is sufficiently specific for the procurement and donation activity. b. States and territories should ensure accurate reporting of donor and recipient costs to support accurate pricing of posthumous organ procurement activity (as detailed in Recommendation 3).

Solid Organ: Deceased Organ Donation

Recommendation 3: Supporting Evidence

Finding 3.1 - There is variability in the understanding of costs that are related to donation activity.

- AHPCS Version 4.2 Costing Guideline (7.3.2) states; 'Costing practitioners should consult with their relevant clinicians, such as intensivists, to understand the pathway for posthumous care including the resources and time taken to prepare the donor for the retrieval process'.
- Extensive consultation and survey with hospital costing departments has confirmed that it is rare for a hospital costing department to be fully aware of the suite of activities that are involved with donation. As such, there is variability in cost allocation within the donor and posthumous episode.

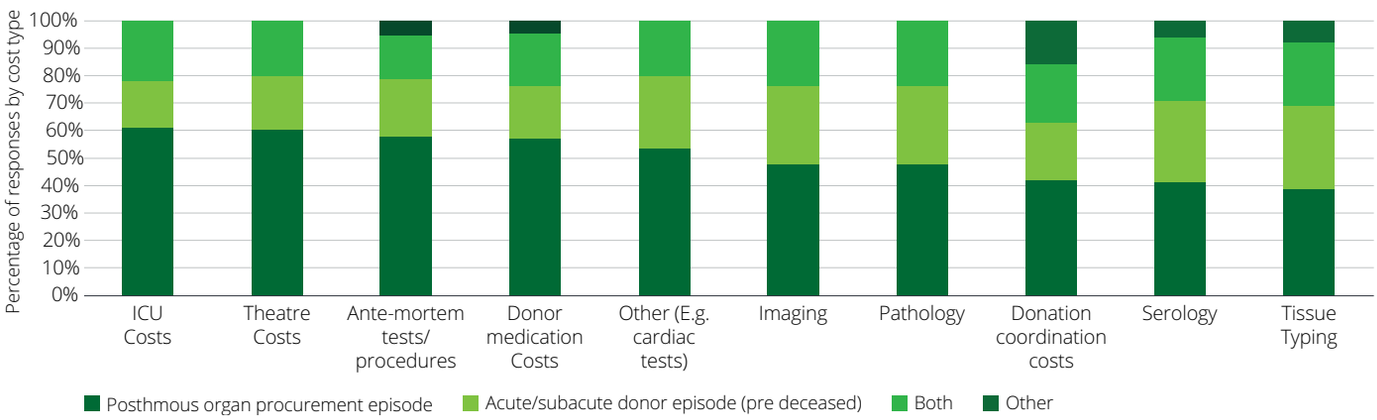
Finding 3.2 – There is variability in the allocation of costs to the posthumous episode between facilities.

- The costs of posthumous organ procurement episodes are reported as part of the NHCDC Subacute Data Set.
  - ❖ There is state and territory variation in posthumous episode costing.
    - The average cost allocated to the posthumous episode in Qld and NSW is nearly double that of SA and Vic.
    - Cost distribution also varies by cost bucket, with the greatest differences observed in operating room, ward medical, and ward nursing costs.

❖ *Denotes data-based insight*

- According to the NHCDC Subacute Data Set (2022-23), NSW allocates 26% to ward nursing/medical, compared to <2% in SA. Conversely, SA and Qld allocate over 60% to operating room costs, while NSW allocates under 20%.
  - ❖ The proportion of care type 9 episodes that are included in the NHCDC varies by state and territory. Between 2017-18 and 2022-23, 78% of episodes are costed to the NHCDC. One state only reported care type 9 costs in the NHCDC Subacute Data Set for a single year (2020-21), though expressed that this has resumed for future submissions.
  - ❖ Vic and Qld use Out-of-Scope funding source (88), whilst all other states record as funding source in heath budget (1). Funding source will impact the calculation of total costs of posthumous episodes to be redistributed on transplant patient episodes.
    - ❖ There is also facility-level variation in the allocation of donation costs between the potential donor (pre-deceased) episode and posthumous organ procurement episode, as reported by 25 solid organ donation hospitals in the costing methodology survey (Chart 1). Costs that were more likely to be allocated to the procurement episode include those relating to ICU and theatre. Some hospitals reported that donation costs would be allocated to either episode (hence responded 'both' episodes), based on the timing of the change from care type 1 to care type 9. This variability may be also influenced based on organs retrieved.

Figure 9: Response to survey question "Where are costs for organ donation incurred and what patient episode are they are allocated to, by cost type"



Source: Deloitte survey (2025)

Hospitals (n = 25, not all hospitals responded to every cost bucket)

Finding 3.3 - There is uncaptured activity related to medical and donor suitability assessments. These tasks often occur outside standard working hours.

- All hospitals highlighted the critical importance and intensity of medical suitability assessments involved in the organ donation and transplantation process. These assessments occur at 2 key points:
  - Evaluation of a potential donor's clinical status and organ viability (e.g. assessments for cancer and infectious diseases).
  - Medical suitability assessments of an organ for a particular recipient.
- Hospitals reported variability in how on-call roles are structured. In some cases, on-call doctors were specifically responsible for donor offers whereas for others, the role extended to multiple uncaptured responsibilities beyond just transplantation, creating difficulty in isolating time or resources dedicated to organ-related activity.
- The structure and operation of medical suitability assessments vary slightly across jurisdictions in the way that they apply expert medical assessment of potential donors. For instance:
  - NSW via the Organ and Tissue Donation Service (OTDS) has a formalised on-call roster for organ offer. Doctors are on call, although the activity undertaken during these hours is often unallocated and uncaptured in hospital systems. External OTDS costs were reported to not be re-allocated into the NHCDC.
  - In Qld, a statewide dedicated retrieval service is responsible for donor retrievals and suitability assessments. During normal working hours, consultants, registrars or fellows undertake medical suitability assessments as part of routine duties. However, during out-of-hours periods the resources are rarely captured.

Finding 3.4 - There is variability in the practice of coding ventilation in posthumous episodes.

- The ACS (refer 1006 - Ventilatory Support) does not define death from a clinical coding perspective, however states that the calculation of continuous ventilatory support ceases upon death, or when an episode care type change occurs. The ACS does not specify which of these to apply in the case of posthumous organ procurement episodes.
- Although the ACS supports the recommencement of ventilation coding during a new care type, only approximately 15% of posthumous procurement episodes have ventilation hours recorded and only a subset of these have ventilation ACHI procedure codes. Hospitals reported there is ambiguity around whether they should recommence counting ventilation in the posthumous episode.

❖ *Denotes data-based insight*

Recommendation	Implementation Considerations
Recommendation 3 *IHACPA* Review current costing standards and coding guidelines for opportunities to improve guidance in costing and coding of posthumous organ procurement activities. ***IHACPA Role:*** Implement	a. IHACPA to investigate options to support the full understanding of donation related costs, possibly through more detailed specification. This will require consultation with donation hospitals, the OTA and the DonateLife Network on the definition of donation related costs. b. States and territories should ensure that activity and cost data is correctly reported under the updated costing standards to support pricing. c. States and territories should recommence coding of ventilation at the commencement of the new 'Consented Potential Donor' care type, where appropriate. d. IHACPA to assess whether the guidelines on the recommencement of ventilation coding are sufficiently explicit to enable consistent application.

Solid Organ: Deceased Organ Donation

Recommendation 4: Supporting Evidence

- The OTA provides the ODHSF payment to hospitals undertaking donation activity due to the current issues with reimbursement in the ABF model.
- If the reimbursement model is improved and the ODHSF is retained in its current form, there will be double counting at a site level of some donation related costs.
- The future funding model for donation related activities should be agreed with the OTA.

Recommendation	Implementation Considerations
Recommendation 4 *IHACPA & the OTA* In collaboration with the OTA and jurisdictions, determine the ongoing requirement for the ODHSF payment, and the most appropriate mechanism for funding of donation activities. ***IHACPA Role:*** Implement in collaboration with the OTA and jurisdictions.	a. In consultation with the OTA, determine the most appropriate funding mechanism for donation related activity by either; – Deactivating the existing ODHSF payment upon implementation of a revised funding approach to organ donation through the NHRA, or; – Removing all costs for donation from the NHCDC (to prevent double counting) and funding donation through the ODHSF, reviewing the price annually through the NHCDC. – Removing costs for donation to the value of the ODHSF and funding the remaining costs through the NHRA. b. As a temporary measure, the OTA should escalate the ODHSF in line with a suitable economic indicator for cost inflation (e.g. Health Consumer Price Index/Wage Price Index).

Solid Organ: Living Organ Donation

Recommendation 5: Supporting Evidence

Finding 5.1 - There are additional costs associated with living donation through the ANZKX pathway. There is currently no way to differentiate related/directed living donors from ANZKX donors in classification.

- 20% of living donation episodes are conducted via the ANZKX pathway. ANZKX patients are likely to incur a greater number of interactions with the health system pre-donation, including additional counselling and psychological assessments.
- ANZKX transplants are more likely to involve early-morning retrieval surgeries, particularly when kidneys are transported interstate or between Australia and New Zealand to meet the needs of synchronous procedures under ANZKX protocols. These procedures often begin at 6am, with transplants occurring later the same day after transport of the organ between donor and recipient hospitals. As such, they occur frequently outside standard working hours. In contrast, related/directed donor surgeries typically take place within the same facility and are conducted sequentially or concurrently within normal operating hours. There is currently no way to identify an ANZKX donor or recipient in national data sets.
- ANZKX donors are likely to incur higher costs due to scheduling complexity and increased out-of-hours activity. These additional costs of facilitating an ANZKX donor are unlikely to be appropriately allocated in NHCDC costing.
- Consultation confirmed that the actual costs of transporting donated organs to the recipient hospital are paid for and absorbed by the ANZKX service, and not by the participating health services. This funding is directly administrated by the OTA, and costs will not be included in hospital-based NHCDC submissions.

Recommendation	Implementation Considerations
Recommendation 5 *IHACPA* Enhance the capture of living donation activity to allow for the differentiation between directed living donor and ANZKX living donor data governance and management. ***IHACPA Role:*** Implement	a. Consultation on this recommendation, in particular the drafting of definitions, should include (among others) stakeholders from the Australian Government, states and territories, the OTA, TSANZ and ANZKX. b. Investigate options for alternative data collection, such as linking existing data collections held by the ANZKX as a means of identifying patient episodes, including considerations for data governance and management, and legalities for the release of this information. c. Consider whether this data collection approach should be applied to any other types of live donation activity.

Solid Organ: Organ Retrieval

Recommendation 6: Supporting Evidence

Finding 6.1 - Retrieval surgical capabilities differ by jurisdiction.

- States differ in their retrieval capabilities: some maintain statewide teams for both retrieval groups, while others rely on interstate support for partial or full retrievals.
  - NSW, Vic, Qld and WA have statewide abdominal and cardiothoracic retrieval teams.
  - SA has an abdominal retrieval team and no cardiothoracic retrieval team, except for a single surgeon who is specialised in cardiothoracic retrieval surgery, who performs opportunistic intrastate retrievals with support provided by SA local staff.
  - In Tas, NT and ACT abdominal and cardiothoracic retrieval is delivered by interstate teams who travel to the donor hospital. Low complexity abdominal retrieval can be completed by a single surgeon in Darwin on occasions.

Finding 6.2 - Organ retrieval is not recognised or captured as a distinct service in hospital reporting structures, resulting in limited visibility of associated costs.

- Organ retrieval staff and theatre equipment costs are high cost, and often embedded within transplant or broader surgical services, despite being functionally separate. This limits the granularity of retrieval cost reporting in national data and cost allocation.
- Most hospitals do not maintain a separate cost centre for retrieval services, despite it being a separate service to both donation and transplant.
- Select facilities performing large volumes of retrievals have established dedicated retrieval cost centres to improve cost visibility for items such as consumables, transport, and on-call services.
- Current activity data sets do not identify the mode of transport or retrieval consumables such as machine perfusion.
- For lower volume transplant/retrieval services, it is not viable to maintain separate cost centre structures, consequently costs are captured within other specialty services, e.g. Nephrology, Cardiology etc.
- Most retrieval surgeons work across transplantation and/or other surgical roles, although there are 2 examples of surgeons employed solely in a retrieval role. Surgical staff are typically funded through transplant unit budgets, resulting in retrieval costs being absorbed within transplant cost centres.
- There is growing support to recognise retrieval as a specialised and independent area of practice, driven by its unique clinical governance needs and increasing operational separation to transplantation.

Finding 6.3 - There is no centralised national data set for recording organ retrieval activity visible to IHACPA.

- Large retrieval services maintain comprehensive internal data sets tracking retrieval volume, success rates, interstate procedures, and donor types (e.g. DCDD, DNDD).
- National registries (e.g. ANZOD and EDR) contain relevant retrieval data but are not integrated into national costing processes.

Finding 6.4 - National data sets variably capture and classify machine perfusion activity and associated inputs.

- Organ retrieval involves 2 types of perfusion; intra-operative manual perfusion for all organs and post-retrieval machine perfusion used for organ preservation and optimisation.
- The national activity data sets include a specific procedure ACHI code—996231-00 Machine perfusion for organ transplantation—which is used to specify machine perfusion use. This code is applied during the posthumous organ procurement episode alongside organ procurement codes, is assigned regardless of how many organs are procured or perfused, and does not specify the type of organ or perfusion method used. It is also applied to the donation episode, which is a separate event to retrieval.

- Several limitations in the current classification framework restrict accurate tracking and reporting:
  - Lack of recipient linkage: As machine perfusion is recorded during the donor hospital episode, there is no direct linkage to the transplant recipient hospital. This would result in spreading of machine perfusion costs rather than the ability to directly attribute the costs to the recipient episode.
  - Limited granularity: When multiple organs are retrieved from a single donor, the data set does not allow identification of which specific organs underwent machine perfusion.
  - Perfusion duration: There is no current mechanism within existing data to capture the duration of an organ is maintained on the machine perfusion system. This are known drivers of clinical and consumable resources.
  - Uncaptured perfusion modality: Current coding does not disaggregate between type of machine perfusion technology or the perfusion method.
- The use of organ perfusion procedure codes on care type 9 episodes varies by state and territory, and year.

❖ Qld had the highest volume of machine perfusion codes applied between 2017-18 to 2020-21 in APC data sets, representing 60% of total volume. However, this decreased to 6% of total volume after 2020-21.

Finding 6.5 - The costs of perfusion are inconsistently reported in NHCDC submissions across hospitals.

- The current AHPCS Costing Guidelines (CG 7.3.7) state that costs of retrieval, inclusive of organ perfusion and consumables (e.g. machine perfusion or static cold perfusion fluids) should be captured as a retrieval activity and costed to the transplant patient episode.
- Hospitals reported variability in how perfusion activities are costed, with some costs absorbed into broader surgical or transplant episodes and others not captured at all.
- Some facilities reported that all consumables associated with all types of perfusion were allocated into the NHCDC submissions.
  - ❖ Five retrieving hospitals noted machine perfusion supplies/fluids as an internal cost, while 4 noted the cost as sitting outside of the NHCDC.
- Some hospitals highlighted that organ perfusion costs can also be held centrally and not allocated to the NHCDC.

❖ Recording of organ perfusion costs in the NHCDC is inconsistent, with 21% of episodes involving organ perfusion having no costs reported in the NHCDC (acute or subacute).

❖ When costs of organ perfusion machines were allocated to the NHCDC, the allocation to patient episodes was variable. Three retrieving facilities reported spreading machine perfusion costs across all transplant patient episodes as an overhead, and 2 facilities reported allocating them to either the organ procurement or transplant patient episode.

- Within the NHCDC cost buckets, there is no consistent allocation of machine perfusion costs, with evidence of allocation to ward clinical supplies, operating theatre, critical or medical ward costs.

Recommendation	Implementation Considerations
Recommendation 6 ***IHACPA, The Australian Government, States and Territories*** Collect distinct activity and cost data for organ retrieval activity, separate to donation and transplantation, to promote improved data capture and quality and inform accurate pricing and funding. ***IHACPA Role:*** Implement in collaboration with States and Territories	a. Collect data related to retrieval activity, including the use of machine perfusion as a subset of retrieval. This will likely need to be a separate NMDS/NBEDS to APC NMDS as retrieval activity is distinct from donor and recipient activity. Existing data collections in retrieval services should be assessed for their suitability for application on a national scale. b. Changes to national activity data collections are to be proposed by IHACPA and will require jurisdictional support through the AIHW's National Health Data Committees. These changes will require states and territories to report the data and invest in local data and costing systems to report this activity accurately. c. Collect cost data within NHCDC once retrieval activity data is established. d. The Implementation Plan for the National Strategy for Organ Donation, Retrieval and Transplantation is due to consider national coordination for retrieval and transplantation. This implementation planning presents an opportunity to assess: – The suitability of ABF for retrieval services, or whether funding should be dispersed through an alternative mechanism aligned with national goals for organ donation. – The equitable funding and use of machine perfusion. e. If ABF is determined to be the most appropriate funding mechanism for retrieval, jurisdictions should negotiate, formalise and implement cost-sharing arrangements. This should target the high-cost, variable elements of retrieval that impact accurate costing.

❖ *Denotes data-based insight*

Solid Organ: Transplantation

Recommendation 7: Supporting Evidence

Finding 7.1 - The cost of transplant episodes is rising, driven by factors such as growing recipient complexity and the expanded use of ECD organs. This has resulted in increased variability across transplant episodes.

- Clinician consultation, literature review and data analysis has confirmed that there is an increasing cost of transplant episodes, underpinned by:
  - Expansion of eligibility criteria for donors (e.g. use of ECD organs, ABO-incompatible transplants), which reportedly increase recipient episode complexity and cost for recipients. Complexity can increase due to difficult donor-recipient matching, high HLA sensitisation, prior sternotomies, complicated explants, or multi-organ transplants.
  - Broadening clinical indications for transplants (e.g. inherited metabolic conditions for paediatric liver transplant).
- Transplantation episodes are marked by clinical variability. Many recipients of a transplant experience uncomplicated post-operative periods, however others can encounter more serious complications. This includes acute or chronic graft rejection, delayed graft function and major infections, all of which can present as longer ALOS, greater intensity of high-cost medical treatments, incidents of re-transplantation, and in some instances, death.
  - Clinical stakeholders noted that rejection incidence alone is not a reliable measure of clinical complexity or cost. Other factors such as transplant indication, ABO incompatibility, HLA sensitisation, and comorbidities play a role in influencing care requirements and associated costs.

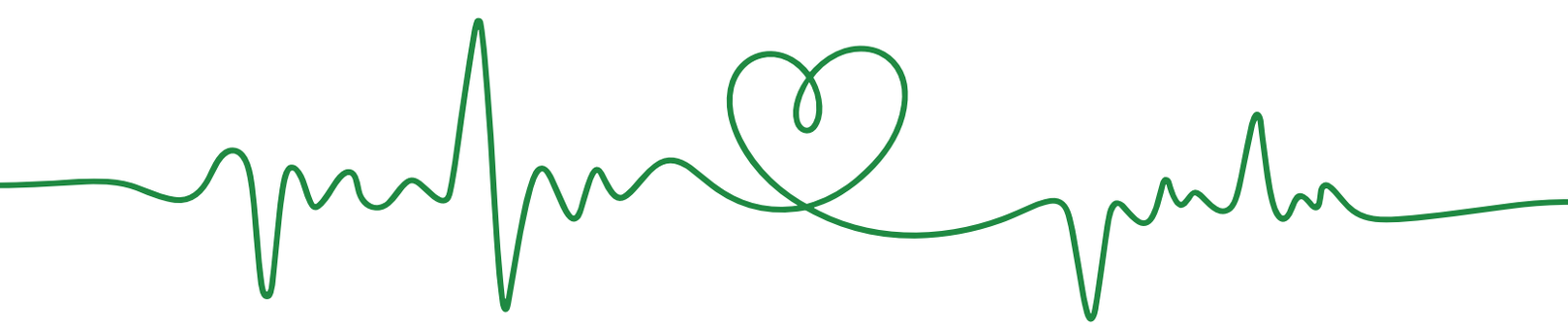
Finding 7.2 - The variable complexity of transplant episodes is not currently reflected in classification.

- The cost profile of organ transplant recipient episodes is high and variable. With significant variances in resource intensity required within the transplant admission (pre-surgery, transplantation surgery and post-operative recovery).
- Kidney transplants are the only organ type that have a minor and major complexity AR-DRG. All others have a single AR-DRG for all episodes. Current grouped DRGs do not distinguish between uncomplicated and complex transplant cases.
- For kidney transplants, there are also variations in AR-DRG grouping by jurisdiction. For example, in SA, all kidney transplants were classified as minor complexity despite documented rejection episodes.

Finding 7.3 - Multi-organ transplants are higher cost than single organ transplants. The current AR-DRG classification does not distinguish between multi-organ and single organ transplants.

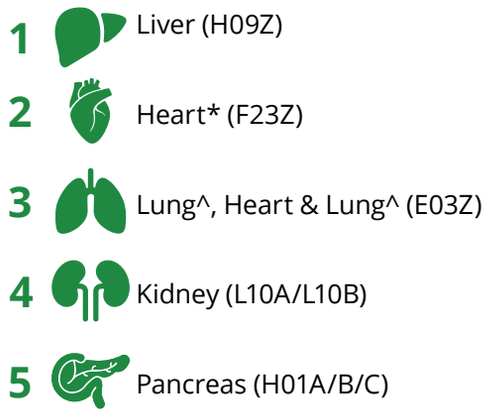
❖ Multi-organ transplant episodes represent approximately 5% of transplants (e.g. heart/lung, kidney/pancreas) and exhibit higher and more variable cost profiles compared to single organ transplants. For example, on average, kidney–pancreas transplants cost 21% more and kidney–liver transplants 303% more than a kidney-only transplant.

- There is no specific AR-DRG for SPK transplants, which are instead treated as complex kidney transplants. The clinical profile of a SPK transplant versus a complex kidney transplant (for example delayed kidney graft function) is markedly different.
- Multi-organ transplants can be standard scenarios which include heart/lung, kidney/pancreas, liver/kidney that have specific and not uncommon indications. There are also non-standard multi-organ transplants, inclusive of other random combinations which are patient specific and uncommon.
- Multi-organ transplants will group to the AR-DRG which is the highest on the intervention hierarchy.
- Figure 10 highlights the order of AR-DRG assignment in multi-organ transplants.
  - Based on AR-DRG grouping, all episodes with multiple transplanted organs, that include an insertion of artificial heart transplant (LVAD), and then subsequent heart transplant will be grouped to F22Z insertion of artificial heart.
  - A simultaneous liver and kidney transplant will always be grouped to H09Z Liver transplantation.



❖ *Denotes data-based insight*

Figure 10: Order of AR-DRG assignment in multi-organ transplants (based on AR-DRG allocation in multi-organ transplant combinations)



**When bridging transplant is LVAD and occurs in same episode as a heart transplant, it is grouped to F22Z. If LVAD implantation occurs in previous admission (and subsequent explant of LVAD in heart transplant episode), then the episodes group to F23Z. This is summarised below:*

1. LVAD implantation
2. Heart transplantation
3. LVAD adjustment or removal

^When ECMO is used as bridging treatment, episode is still grouped to E03Z.

Source: Deloitte (2025)

Finding 7.4 - Paediatric transplants require additional resources and are more variable than adult transplants. There is a higher cost-price variance for paediatric than for adult transplant episodes.

- Analysis demonstrates that there is a high cost-price variance for paediatric transplant episodes compared to adult episodes. For most transplant types, there is no disaggregation on AR-DRG (major or minor complexity) in price weights apart from paediatric loading.
  - ❖ The average in-scope cost per episode and NWAU for paediatric L10A is more than double that of the adult L10A AR-DRG ($142,404, NWAU 20.3 vs. $79,450, NWAU 13.3).
  - ❖ For kidney transplants, 76% of overall episodes have a cost greater than the price, with a mean cost-price variance of $25,000 (24%) variance. This is compared to adult kidney transplants for which 45% of episodes had a cost exceeding price. With a mean cost price variance of $1,000.
  - ❖ The same trend was also seen between liver transplant episodes, for approximately 60% of all episodes, with an average of $85,000 cost price variance (22%) for paediatric episodes.
    - By state, NSW appears to have the smallest difference between in-scope cost and price, driven by in general lower average costs of transplant episodes.

❖ Adult transplants were not disproportionately represented in episodes that were trimmed from NHCDC submissions. However, analysis demonstrated that paediatric transplant episodes were trimmed (for having an 'extreme cost' for its hospital-AR-DRG combination) at a higher rate than adult transplants.

Recommendation	Implementation Considerations
Recommendation 7 ***IHACPA & States and Territories*** Enhance the capture of peri-transplant activity to allow for the greater distinction between standard, low complexity cases and those episodes that are clinically and resource-intensive. Investigate the appropriateness of grouping for multi-organ transplants and trimming of paediatric transplant episodes in the pricing model. ***IHACPA Role:*** Implement	a. Consultation on this recommendation, in particular the drafting of definitions, should include (amongst others) stakeholders from the Australian Government, states and territories, the OTA, TSANZ, ANZKX. b. States and territories should ensure costs related to transplant that are in-scope for NHCDC submissions are correctly allocated to relevant patient records. c. IHACPA should review the trimming of paediatric transplant episodes in the admitted acute pricing model to ensure it is not having an unintended effect on the prices for transplant DRGs. d. IHACPA should investigate the appropriateness, in consultation with IHACPA's advisory and working group committees, of the creation of separate ADRGs for multiple organ transplants.

Solid Organ: Regional, Remote and Interstate Patients

Recommendation 8: Supporting Evidence

Finding 8.1 - Solid organ transplant requires complex treatment and multidisciplinary care. These services generally operate from metropolitan hospitals, meaning regional and remote populations face barriers to accessing care. Outreach is an important model for providing these services outside of metropolitan centres.

- There are different types of outreach activity including pre-transplant clinic/waitlist assessments as well as health promotion and transplant awareness education sessions.
- For complex transplants, many facilities mandate pre- and post-transplant care to be conducted within the transplant facility rather than the referring hospital. This may also include a requirement for the patient to present to the transplant hospital for a minimum time before and after the transplant admission. This means that many patients living in regional and remote areas are required to find temporary accommodation nearby.
- Where activities or admission occur at the local/regional hospitals, work completed by transplanting medical teams (e.g. receiving scans/advising on treatment strategies and transplant waitlist plan) is rarely captured and reported to be time-consuming.
- Additional outreach, pre- and post-transplant care, and culturally appropriate support are often required for regional patients and is rarely captured.
- Outreach for living donor activities is commonly bundled with kidney transplant recipient outreach.
- Clinicians report that patients from non-metropolitan areas are typically referred into transplant pathways at more advanced stages of disease, increasing clinical complexity and reducing transplant eligibility.
- Inadequate support for regional access may contribute to inequitable outcomes and underrepresentation of rural patients on transplant waitlists.
  - ❖ For example, NT recorded the highest number of admitted haemodialysis episodes per kidney transplant patient (476.2), followed by WA (275.6). This may be driven by a larger share of each state and territory's population living regionally compared to other states/territories, as well as a lack of transplant units in the NT and variance in home dialysis provision. All are barriers to accessing transplant.
- States and territories have individual schemes that provide reimbursement to patients for travel, with funding arrangements varying between centralised funding and delegated funding to Local Health Networks (LHN):
  - In most states and territories, Australian donor transport and accommodation expenses are subsidised under the Patient Transport Assistance Subsidy Schemes if the patient is located >100 km away from the hospital or determined to live in a rural area (includes interstate).
  - Hospitals expressed concern that patient subsidy schemes often did not reimburse patients who lived <100km, but who required transport. Hospitals may still provide some reimbursement of patient travel costs. In most instances, hospitals reported that they were either paying for accommodation for the patient and family or at least assist in finding affordable accommodation options. In the case that this cannot be arranged, this is a potential barrier to access for transplant care.
  - Funding models for nationwide patient travel subsidy schemes assume uniform access and care needs, overlooking the substantial travel, accommodation, and coordination costs borne by regional patients and health services.

Finding 8.2 - Hospitals are often not able to capture patient-level costs of outreach service delivery and do not have designated cost centres for such services.*

- The current method for reimbursement of direct costs (e.g. transport reimbursed through hospital overhead) does not provide a clear funding allocation for services to be delivered.
- Outreach services often perform pre-transplant non-admitted clinics for waitlist assessment and potential future waitlisted patients. Hospitals will on average visit 3 to 4 times per year with clinicians' travel funded by hospital budgets and variably captured in transplant activity.
- Consultations during outreach clinics are variably captured, with activity sometimes captured by the home hospital and sometimes captured by the hospital providing the outreach. Interstate outreach clinics will rarely be recorded as activity performed by the providing hospital, and outreach teams may not have access to medical records.
- Outreach is sometimes funded through special grants or temporary funding, and services may cease when allocated funding is exhausted.

❖ *Denotes data-based insight*

Recommendation	Implementation Considerations
Recommendation 8 ***IHACPA & States and Territories*** States and territories to engage regularly with IHACPA on issues regarding application of costing guidelines surrounding outreach services to refine the inputs for the NHCDC. ***IHACPA Role:*** Engage with and support jurisdictions and a potential longer term implementation role	a. States and territories should assess the appropriateness of dedicated cost centres for outreach activities (volume permitting) and ensure outreach activity is collected and reported in activity and cost data submissions, b. States and territories should standardise the use of the patient identifier from either the home or visiting hospital. c. States and territories should report back to IHACPA on the elements of costing guidelines that are difficult to implement. d. Longer term, IHACPA should assess whether outreach services require differentiated pricing, considering the extent to which existing remoteness adjustments account for variability in costs.

Solid Organ: Non-Admitted Care

Recommendation 9: Supporting Evidence

Finding 9.1 - Depending on the organ type and hospital, a waitlisted patient may receive adjacent care within an admitted or non-admitted setting. Transplant-adjacent care is often spread across transplant and non-transplant patients, despite these patients being higher cost and complexity.

Table 6: Workup & Waitlisting

Organ	Setting	Common activities/ bridging treatment	Classification *(#%) of total DRGs or Tier 2*
Kidney	Non-admitted setting (some short stay admissions for bridging treatment). Does not have to occur at transplant hospital.	Admitted – 3 to 4 days, at transplant hospital.	❖ **Non-Admitted** - Transplant, nephrology or dialysis (66.4% of non-admitted adjacent activity). ❖ **Admitted** – Haemodialysis (93.0%).
Liver	Admitted setting. Patients are admitted for 3 to 4 days work up.	Cardiology, imaging, psychology. Alcohol addiction patients require additional workup in admitted.	❖ **Non-Admitted –** Transplant, hepatology or hepatobiliary clinic (40.1%). Nutrition/dietetics (4.3%). ❖ **Admitted –** Haemodialysis (53.6%), or liver-related disorders (12.9%).
Heart	Mostly completed in admitted setting 5 to 7 days at transplant hospital. Some testing may not be completed in admitted and completed in non-admitted.	LVAD or ECMO admission, inotrope/cardiac optimisation.	❖ **Non-Admitted –** Transplant clinic, cardiology clinic (40.0%). Cardiac rehabilitation (21.4%). ❖ **Admitted –** Haemodialysis (38.9%). Circulatory disorders (17.2%). Implant of LVAD. Reported under circulatory disorders (F42B) in some instances. Inotropes/cardiac optimisation.
Lung	Mostly completed in admitted setting, 3 to 5 days admission in hospital.	ECMO admission.	❖ **Non-Admitted –** Transplant clinic (20%), respiratory clinic (32.1%). Pulmonary rehabilitation (18.2%). ❖ **Admitted –** Health Service Contacts with Endoscopy (Z40Z) (24.6%), Bronchoscopy (E42) (12.2%), chronic obstructive pulmonary disease (E65) (8.4%)**.** If ECMO is used in same admission, episode will be grouped to ECMO AR-DRG.

Source: Deloitte (2025) and Data Request Specification from State and Territory Departments (2017-18 to 2023-24)

❖ Dialysis is a common bridging to transplant treatment for patients on a kidney waitlist. Admitted Dialysis events (L61Z) linked to transplant episodes had higher average costs than those not linked to transplant patients. This was driven by increases in pharmacy and pathology cost buckets (14% and 63% greater than non-transplant patients respectively).

❖ *Denotes data-based insight*

Finding 9.2 - Transplant non-admitted services can be delivered through either transplant clinics or specialty clinics. Coding of pre- and post-transplant events to transplant clinics (20.01) varies by hospital.

- Transplant non-admitted care is delivered through a combination of transplant-specific clinics and specialty clinics, with the capturing of this activity varying across sites.
- High-volume transplant centres typically operate dedicated transplant clinics (20.01) in conjunction with other specialty non-admitted appointments, depending on clinical need and workforce availability.
- In contrast, centres with lower volume including paediatric programs and smaller kidney transplant units often lack the patient activity throughput to maintain a dedicated transplant clinic. These services are often delivered within the scope of broader specialty clinics (e.g. nephrology and dialysis clinics). This is despite transplant patients typically requiring a greater resource intensity than non-transplant patients captured in the same clinic code.
- Hospitals noted that a substantial portion of transplant non-admitted activity is delivered by nursing staff. However, this activity is not well captured within current Tier 2 classification, particularly the 40 series clinics, which limits visibility of the care provided.
- Early post-transplant care typically involves high-frequency, high-resource clinics (daily or several times per week), often replacing extended admitted stays. These clinics may include intensive monitoring and procedures such as biopsies or intravenous antibiotic administration, dialysis support or plasma exchange for antibody mediated rejection.

Finding 9.3 - Non-admitted services for transplant patients have a higher cost profile than non-transplant patients.

- Clinicians highlighted that transplant non-admitted services were longer and more resource intensive than other specialist appointments.
- Transplant patients who received transplant care captured as other specialty clinics (e.g. cardiology), had a higher total cost of service compared to other non-transplant patients.
  - ❖ The average cost of cardiology clinic service events for transplant patients linked to a transplant clinic (20.01) is approximately 21% higher than cardiology-only patients (2021-22), with most cost differences seen in pharmacy and pathology costs.

Finding 9.4 - When waitlisted transplant patients present to hospital for a reason unrelated to their transplant, some hospitals reported conducting transplant-related consultations, which are variably captured and costed as transplant activity.

- Waitlisted transplant patients may present to their transplanting hospital for admission for a reason unrelated to the transplant itself.
- There is no existing means to identify waitlisted transplant patients. Many stakeholders reported that their technology does not support the systematic identification of waitlisted patients who present to non-transplant units, and thus require proactive identification of admitted waitlisted patients by transplant and specialist teams.
- Transplant units may screen hospital admissions or referrals to identify admitted waitlisted patients and may engage with these patients for transplant-related activity (often opportunistically) during the unrelated admission. The level of engagement varies between hospitals and can depend on coordinator networks and informal communication.
- Some hospitals reported admitting waitlisted patients to their hospital transplant unit, even if the admission is unrelated to transplant. These facilities are more likely to capture and cost transplant activity back to transplant cost centres.

More broadly, transplant patients who present to non-transplanting hospitals, either pre- or post-transplant, are often managed in consultation with the transplanting hospital. Local clinicians may contact the transplanting hospital for advice and support. This activity is mostly uncaptured.

Recommendation	Implementation Considerations
Recommendation 9 *IHACPA & States and Territories* Enhance the capture of non-admitted activity to increase granularity and distinguish all pre- and post-transplant patients (such as patients receiving waitlist management, assessment and patient bridging/ support) from all other patient cohorts across all specialties. ***IHACPA Role:*** Implement post-uptake of the Individual Healthcare Identifiers.	a. Consultation on this recommendation, should include (amongst others) stakeholders from the Australian Government, states and territories, the OTA, TSANZ, ANZKX. b. Jurisdictions should apply the national patient identifier as a priority for waitlisted and post-transplant patients to enable linkage of pre- and post-transplant activity in the short-term. c. IHACPA should analyse the transplant activity profiles to confirm the requirement for additional coding of waitlisted patients.

❖ *Denotes data-based insight*

Haematopoietic Stem Cell: Donation

Recommendation 10: Supporting Evidence

Finding 10.1 - The resources required for the identification of a related donor for a single recipient are variable and may be significant.

- Health services with a large proportion of ethnically diverse patients may need to assess up to 20 potential donors for one transplant recipient, a higher donor assessment workload than units managing mostly Caucasian patients. This generally stems from differences in family size, complexity, and geographic location that complicate the searching process. Potential donors are not yet patients hence this activity is uncaptured in current data. Donor coordinator roles and associated costs are variably captured against transplant episodes (see Recommendation 8 for further detail).
- MDT meetings to discuss potential donor availability can be hours in duration due to the complexity of the decision making. These meetings are currently not captured as transplant activity as potential donors are not yet patients.
- There are instances where related donors are not eligible for Medicare with hospitals covering the cost of assessment and donation. This contrasts to living kidney donation, where non-Medicare-eligible treatment costs are met.
  - Hospitals with ethnically diverse catchments and paediatric hospitals were most affected by the ideal related donor not being eligible for Medicare.

Finding 10.2 – Hospitals reported increasing donor HLA testing costs, whilst funding for unrelated donor testing has been capped.

- The cost burden associated with confirmatory tissue typing/testing is escalating, as the average number of potential donors tested increases due to:
  - A large portion of registry-listed donors still lacking sequence-based typing.
  - There is a growing focus on extended family typing and haploidentical donor identification, and centres are increasingly engaging first-degree relatives, beyond just siblings, earlier in the donor work-up process.
- When a suitably matched domestic donor cannot be found, a cap of $12,000 AUD for testing international donors via the ISP is managed by Stem Cell Donors Australia. When this cap is exceeded, the Registry seeks recovery of test costs requested directly from the transplant centres. These instances were reported as being increasingly frequent.

Finding 10.3 – Post-donation activity for related donors is informal and rarely captured.

- Stakeholders reported that related donor follow-up activity is informal and often uncaptured, typically consisting of a phone call from the hospital coordinator within one to 6 weeks following the donation.
- Unrelated donors receive lifetime monitoring and follow-up from Stem Cell Donors Australia.
- FACT or JACIE accreditation may mandate a follow-up procedure. For example, one FACT-accredited hospital reported an externally run follow-up review for all donors.
- All Australian cord blood banks are required to monitor patient outcomes as part of their FACT accreditation

Recommendation	Implementation Considerations
Recommendation 10 *IHACPA* Enhance the capture of HSC donation activity to include pre-donation workup and donor search, and post-donation care in admitted and non-admitted settings. ***IHACPA Role:*** Implement	a. Consultation on this recommendation, in particular the drafting of definitions, should include (amongst others) stakeholders from the Australian Government, states and territories and Stem Cell Donors Australia. b. The capture of donor search activity can be through an interim product data set to enable donation work to be attached to a donor episode.

Haematopoietic Stem Cell: Transplantation

Recommendation 11: Supporting Evidence

Finding 11.1 - The procedure classification for bone marrow/ hematopoietic stem cell transplantation is broad and sufficiently covers allogeneic and autologous transplant episodes, whilst also classifying related, unrelated, matched and unmatched donor factors.

- The updates from the ICD-10-AM/ACHI/ACS Eleventh to Twelfth Edition were highlighted to improve transplant coding specificity. Bone marrow transplants ACHI procedure codes were revised from block 802 to 820, further specifying distinctions in transplants between stem cell and bone marrow. The ICD-10-AM/ACHI/ACS Twelfth Edition currently includes differences for donor source (e.g. bone marrow, peripheral blood, other stem cells, or cord blood).
- There is also classification for matched, unmatched, related and unrelated donors on transplant episode.

Finding 11.2 – Match type correlates with LOS, however there is no correlation between match type and current DRG allocation.

❖ The longer the engraftment period, the longer the recipient is immunocompromised and susceptible to bacterial, viral and fungal infections The ALOS for a transplant with a matched procedure code is 37 days vs unmatched at 53 days.

❖ The proportion of unmatched transplants allocated to the major complexity DRG does not significantly differ from the proportion of matched transplants (45-55%).

Recommendation	Implementation Considerations
Recommendation 11 *IHACPA* Consider the relationship between HSC donor match type and complexity, and its impact on grouping to existing high and low complexity DRGs. ***IHACPA Role:*** Implement	a. IHACPA should assess the existing grouping logic for HSC transplant episodes and determine feasibility of match type as a variable in the logic, given its statistically significant relationship with LOS. b. Select sites for analysis in consultation with states and territories to ensure representation of allogeneic and autologous HSCT units and FACT accreditation status.

Haematopoietic Stem Cell: Laboratories

Recommendation 12: Supporting Evidence

Finding 12.1 - HSC laboratories in Australia operate under diverse operating and funding models, with variation across jurisdictions and facilities.

- All HSC products require specialist 'BMT Laboratory' processing before transplantation. The complexity of processing varies depending upon the exact clinical circumstances; from flow cytometry of CD34 positive cells (the actual stem cell subset) through to manipulation of the product to enrich it with some cell types and deplete it of others. These specialised laboratories are situated in major hospitals, sharing the laboratory capacity between hospitals or operating in a hub and spoke model to support hospitals undertaking simpler autologous transplants only.
- BMT laboratories are primarily funded to support activities related to HSC donation and transplantation but also play a critical role in the processing of other cellular therapies, such as CAR T-cell treatments.
- There are currently 18 HSC laboratories operating across 5 Australian jurisdictions:
  - NSW: 8 labs operated mostly under NSW Health Pathology. Royal Prince Alfred (RPA) and St Vincent's under separate lab arrangements.
  - Vic: 5 labs operated under independent arrangements with hospital.
  - Qld: 2 labs operated under Queensland Health Pathology, Metro North Hospital and Health Service.
  - SA: 1 lab operated under SA pathology.
  - WA: 2 labs operated under Pathwest.
- Operating models differ by state:
  - In most states, HSC laboratories are integrated within statewide pathology services and co-located at major transplant centres.
  - In Vic however, laboratories are not operated as state entities and are instead embedded within site-based haematology pathology services.
- A large proportion of paediatric HSCT laboratory activity is undertaken within adult hospital-based pathology services, highlighting a reliance on shared infrastructure. Costs for all potential paediatric transplant recipients are borne by the adult hospital labs. Some hospitals reported that they are attempting to separate adult labs from paediatric labs.

❖ *Denotes data-based insight*

- Funding mechanisms are variable and may include a combination of state block funding, local health district or hospital operating budgets, MBS funding, NHRA funding, and donor or research grants.
- High-cost infrastructure such as cryopreservation tanks and related equipment are funded through a mix of hospital, state capital investments and philanthropic means. These assets require ongoing funding for maintenance, temperature monitoring, and workforce given their essential role in the long-term storage of cellular products.
- Laboratory related activity is not specifically identifiable in national activity data sets. However:
  - There is evidence of ACHI codes specifying whether cryopreservation of stem cell samples are taken (13750-05).
  - There is also evidence of 2 procedure codes relating to in-vitro processing of bone marrow or blood for allogeneic/ autologous stem cell transplantation, to indicate further processing of stem cells.
- There may be increased costs of products coming from international sources, which may need to be manipulated in labs. Hospitals reported the funding mechanism for this as unclear.

Finding 12.2 - Laboratory activities associated with HSC transplantation are inconsistently costed and reported within hospital NHCDC submissions, resulting in incomplete and inaccurate representation of transplant-laboratory processing expenses.

- The costs associated with HSC processing activities are not consistently captured within hospital costing.
- Variation in both funding models and laboratory operational arrangements across hospitals contribute to this inconsistency.
- Some hospitals manage laboratories internally, embedding associated costs within broader operational budgets, while others outsource these services and directly attribute costs to patient episodes.
- The method of laboratory cost allocation directly affects the way these expenses are reported in NHCDC submissions, with internal management generally resulting in non-specific overhead allocations.
- Stakeholders across hospitals and departments acknowledged challenges in accurately allocating laboratory costs. In many cases, these costs are distributed as overheads across:
  - Bone marrow transplant recipient episodes
  - Haematology patient episodes
  - All admitted episodes.
- In NSW, laboratory costs specific to HSCT services are not included in hospital-level NHCDC submissions. Whilst all other states referenced variable allocation of these costs.
- One facility reported that only costs of molecular testing are allocated to patient episodes.
- There is no systematic mechanism to isolate laboratory activity costs at the patient level within transplant services.
  - ❖ National data sets are not able to describe the extent to which laboratory costs are borne by the state or territory health department, individual hospitals, or attributed directly to patient episodes. Based on consultations with hospital costing practitioners, it appears unlikely that the full cost of laboratory services is captured within the NHCDC due the absence of feeder systems or guidelines.

Recommendation	Implementation Considerations
Recommendation 12 ***States and Territories*** States and territories should undertake laboratory costing studies to determine costs associated with processing and cryopreservation of cells for transplant, to enable episodic cost allocation and accurate representation of laboratory costs in the NHCDC. ***IHACPA Role:*** Support	a. Utilise information that many HSC laboratories are already collecting. b. Collaboration between states and territories on costing models, as there are some already in existence.

❖ *Denotes data-based insight*

Haematopoietic Stem Cell: Service Accreditation

Recommendation 13: Supporting Evidence

Finding 13.1 - Labs and clinical facilities with FACT/JACIE accreditation have a substantial administrative burden to establish and maintain accreditation. It is not currently possible to distinguish FACT accreditation in national data sets.

- Most paediatric units (in addition to some adult units) maintain or are in the process of being accredited as FACT and/or JACIE accreditation in order to improve clinical outcomes and participate in international clinical trials.
- The FACT/JACIE haematopoietic progenitor cell standard focusses on cellular therapies from a clinical outcomes perspective.
- This accreditation means that there is a standardised approach to clinical processes for HSCT; however, this requires an additional investment of clinician and administrative time.
- The reported benefits of accreditation include but are not limited to; improved clinical outcomes and a reduced average LOS.
  - Hospitals reported that costs of accreditation were absorbed within current funding and rarely account for the regulatory requirements of cell therapy laboratories in their cost modelling. The process of achieving compliance, particularly with FACT/JACIE accreditation, imposes a significant administrative and resource burden that is not required in non-accredited sites.

Given the variability in local approaches, associated increase in costs are inconsistently captured within the NHCDC, often being spread across multiple patient episodes, most commonly haematology patients. Often, hospitals reported they are not allocated.

Recommendation	Implementation Considerations
Recommendation 13 *IHACPA & States and Territories* States and territories should report costs associated with FACT/JACIE accreditation to ensure the inputs for NHCDC modelling enables supporting resources to maintain accreditation and quality patient care. IHACPA should assess whether the costing guidelines are sufficiently detailed to support accreditation cost allocation. ***IHACPA Role:*** Review and Support	a. Jurisdictions should review the cost impacts of accreditation in consultation with FACT/JACIE accreditation bodies and accredited sites. b. Costs of accreditation should be reported in the NHCDC. c. IHACPA should review costing guidelines, to identify opportunities to improve guidance and enable more granular costing of accreditation.

Tissue: Transplantation

Recommendation 14: Supporting Evidence

Finding 14.1 - Tissue transplant episodes, particularly for bone and skin, are difficult to identify in national admitted patient data sets due to limited coding detail. This is further complicated by a large proportion of activity occurring in the private sector.

- There are challenges in identifying the following factors associated with tissue transplant activity:
  - Domestic or imported tissue – it is unclear if a tissue product is derived from either local or imported sources.
  - Processed and unprocessed – Tissue can be processed, unprocessed, or a mix from multiple donors. The current classification system lacks the detail needed to distinguish these types. This limits the ability to identify key cost drivers, particularly within the tissue bank.
  - Living or deceased donors – ACHI Thirteenth Edition has 2 new codes for procurement of skin distinguished by living and posthumous donor (96275-20 / 96275-21 [1634]).
  - Full, split, composite thickness skin – Skin grafts vary by depth: split-thickness, full-thickness, and composite, each with different compositions, uses, and healing processes. This variation complicates classification and identification, particularly in data sets where graft type may not be explicitly recorded or consistently coded.

Recommendation	Implementation Considerations
Recommendation 14 *The Australian Government* The Australian Government should, with states and territories, create a nationally agreed data set to enable the identification of the type and source of tissue products being transplanted. ***IHACPA Role:*** Endorse	a. The creation of a data set for the purpose of identifying and tracking the source of tissue products for cost identification purposes should be led by the Australian Government. This activity falls outside the remit of IHACPA as an independent government agency that provides evidence-based price determinations and pricing advice. b. IHACPA should investigate linkage of the new national data set to patient episodes, to determine whether the source of tissue has a material impact on cost of the transplant episode.

Tissue: Banking

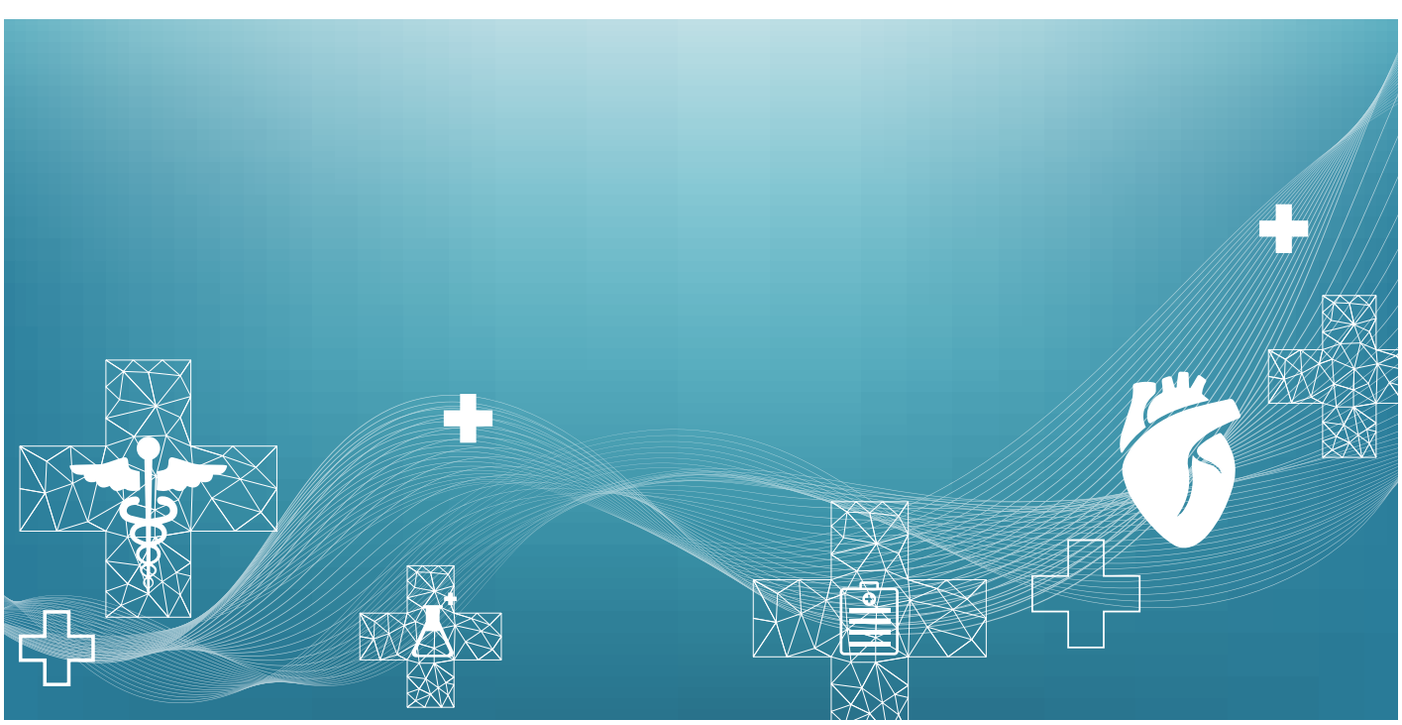
Recommendation 15: Supporting Evidence

Finding 15.1 - Supply of tissue from tissue banks is reimbursed on a fee-for-service basis, though the scope of costs recovered varies between jurisdictions, based on the extent of centrally allocated funding.

- Tissue banks generally operate on a fee-for-service model, with cost recovery being the primary means of funding of state tissue banks.
- Hospitals receive an invoice from the tissue supplier (whether it be from a state tissue bank, or domestic and foreign private suppliers).
- Consultations confirmed that these costs are consistently attributed to transplant recipient episodes on an individual basis, usually allocated to the NHCDC "Prosthesis" cost bucket.
- There is variability in the costs incurred (and recovered) by tissue type and tissue bank under these arrangements. The cost associated with tissue supply generally includes retrieval (if performed by tissue banks), lab storage of specimens, tissue processing and testing, and transport to the recipient hospital.
- There is limited visibility of the costs recovered by domestic private and foreign tissue suppliers.
- There was one example where storage costs were borne by the tissue bank rather than forming part of cost recovery. However, most states and territories reported that the tissue banks are cost-neutral through recovering all costs. Where all costs are not being recovered, it is likely that remaining costs are offset by centrally allocated funding.

Where additional funding is provided, states and territories concurred that the remaining costs of operating state-based tissue banks are held centrally and not included in NHCDC submissions.

Recommendation	Implementation Considerations
Recommendation 15 ***The Australian Government, States and Territories (with a tissue bank)*** The Australian Government should, with states and territories, conduct a review of the funding and cost modelling of tissue banks, in alignment with relevant federal and state and territory legislative requirements, to support the understanding of the true cost of tissue supply, and consider a national approach to tissue donation and transplantation. ***IHACPA Role:*** Endorse	a. Recognise the variability in the funding and governance of state-based tissue banks impacts variability in the price of tissue included in the NHCDC. b. States should ensure that centrally held tissue bank costs are included in NHCDC, avoiding duplication however with the costs reimbursed through the supply of tissue. c. IHACPA can provide evidence of the downstream impacts of the current cost input process to the NHCDC, however, further engagement on this recommendation is limited by IHACPA's legislated remit. d. The outcomes of the ALRC Review may impact the cost recovery of human tissue products. e. The DoHDA should have a role in the review as the manager of the Prescribed List and the ongoing Part B Reforms work proposed.



Appendix A

Table 7: Data collected by solid organ, tissue and cell entities

Reporting entity	Data/information collected
Clinical Registries	
ANZOD Registry – collect and reports on all deceased organ and tissue donations across Australia and New Zealand.[134]	• Deceased organ donation activity. • Deceased organ donation pathway, including actual donation eventuated and the outcomes (including specific organs donated and transplanted). • Deceased organ donor profile, including detailed description of organ donor demographic characteristics, including gender, age, ethnicity, pre-existing medical conditions and virology screening assess prior to deceased organ donation. • Deceased organ transplant waiting lists. • Number of eye donors and supplied grafts.
ANZLKD Registry – collects data on living kidney donors across Australia and New Zealand.	• Living kidney donor activity by donor country. • Donors in the ANZKX by donor country. • Transplant recipient activity by country of donation and country of transplantation. • Living kidney donor profile, including detailed description of kidney donor demographic characteristics, including gender, age, ethnicity and pre-existing medical conditions. • Living kidney donor's yearly follow-up details including blood pressure, protein/blood test levels whether the donor was alive.
ANZDATA Registry – a clinical quality registry that collects outcome data for people living with ESKD.[135] ANZDATA provides infrastructure for most of the other clinical registries, ensuring greater efficiency.	• Outcomes of treatment of those with end-stage kidney failure including incidence and prevalence of and mortality in kidney failure with replacement therapy by dialysis and transplantation. • Detailed transplanting hospital outcome data including graft failure rates post-transplant and mortality post-transplant. • Detailed dialysis hospital outcome data including mortality ratios.
ANZLITR Registry – collects data on outcome data of patients with acute or ESKD and/or intestinal failure.[136]	• Liver and intestinal transplant activity data. • Liver waiting list activity by paediatric, adult and time on the waiting list. • Machine perfusion of deceased donor livers. • Patient survival and other outcome data including graft outcomes, causes of patient death and cancer after transplantation.
ANZIPTR Registry – collects data on islet and pancreas transplants performed in Australia and New Zealand.[137]	• Pancreas transplant recipient demographic data, operative data, outcome data including survival rates and surgical data. • Pancreas donor demographic data including donor and recipient location. • Waiting list data including patient waiting list flow, new referrals received and patient characteristics for those active on the waiting list.

[134] ANZOD. (2024).ANZOD Annual Report 2024. Available from: https://www.anzdata.org.au/report/anzod-annual-report-2024/ (accessed 9 December 2024).

[135] ANZDTR. (2024). Reports. Available from: https://www.anzdata.org.au/anzdata/publications/reports/ (accessed 9 December 2024).

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Reporting entity	Data/information collected
Clinical Registries	
ANZTCT Registry – records details of bone marrow, peripheral blood and cord blood stem cell transplants and other cellular therapies including CAR T-Cells throughout Australia and New Zealand	• Transplant activity, trends and outcomes for autologous and allogeneic HSCTs performed in Australia and New Zealand. • Monitoring of outcomes, best clinical practice and development of guidelines.
ANZETD Registry – gathers information from all eye and tissue banks across Australia and New Zealand as well as the EBAANZ.[138]	• Eye and tissue donation and transplantation activity, by deceased and living donor and by tissue type. • Unique tissue donor by month, jurisdiction, donor type, gender and age range. • Eye donors by month, jurisdiction, gender and age range. • Tissue donations by month, jurisdiction, donor type (deceased or living) and gender • Tissue and eye tissue grafts implanted by month and tissue type.
Australian Corneal Graft Registry – records information on all human corneal transplants across Australia.	• Donor demographic data, how the donor cornea was collected and stored before the surgery. • Recipient demographic data and the type of operation performed. • Outcome data including graft survival, patient's vision, any complications or additional treatments received by the patient since the graft (until the graft fails, the patient has died, or patient is lost to follow-up).
Search Registries	
AODR – a national register for people to record their decision about becoming an organ and tissue donor for transplantation after death	• Statistics on number of legally valid consent and intent registrations by age group, state and gender.[139]
Stem Cell Donors Australia – recruits and maintains a diverse pool of HSC donors.[140]	• Unrelated HSC donor demographic characteristics including age, gender, and ethnicity. • Donation and transplantation activity, including proportion of patients depending on overseas donors.
Banks	
Eye and tissue banks across Australia	• NSW (Hunter New England Bone Bank, NSW Bone Bank, Rachel Forster Bone Bank, Sydney Heart Valve Bank), Vic (Barwon Health Bone Bank, Donor Tissue Bank of Vic, Lions Eye Donation Service), Qld (Qld Tissue Bank), SA (Eye Bank of SA, SA Tissue Bank), WA (Lions Eye Bank WA, PlusLife), ACT (DonateLife).[141] • Eye and tissue donation and transplantation activity, by deceased and living donor and by tissue type. • Eye and tissue donor demographic characteristics including age and gender.
Cord blood banks	• AusCord inventory (comprised of BMDI Cord Blood Bank, Queensland Cord Blood Bank and the Sydney Cord Blood Bank). • Cord blood samples and relevant donor demographic/health data.[142,143]

[138] ANZETD. (2025). ANZETD Register. Available from: https://www.anzdata.org.au/anzetd/ (accessed 20 February 2025).

[139] Australian Research Data Commons. (2025). Australian Organ Donor Register (AODR) Statistics. Available from: https://researchdata.edu.au/australian-organ-donor-aodr-statistics/3516519 (accessed 23 June 2025).

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[141] ANZETD. (2024). Eye and Tissue Donation in Australia Monthly Report - November 2024. Available from: https://www.anzdata.org.au/wp-content/uploads/2024/12/20241219_Eye_Tissue_Monthly_Report_2024November.pdf (accessed 20 February 2025).

[142] Klamer, G. et al. (2022). Abstract 26 HLA Analysis of the Australian Cord Blood Banks: How Diverse Are Donors? Stem Cells Translational Medicine, 11(1): S31.

[143] AusCord. (2025). About AusCord and Public Cord Blood Banking. Available from: https://www.schn.health.nsw.gov.au/sites/default/files/2023-11/auscord-iq-003_v02_about_auscord_and_public_cord_blood_banking.pdf (accessed 23 June 2025).

Table 8: Summary of key changes between ICD-10-AM/ACHI (10th to 13th editions)

	Previous editions (Tenth to Twelfth)	Proposed Thirteenth edition
ICD-10-AM changes	Z52.8 Donor of other organs and tissues. This encompasses: Small intestine, Large intestine, Lung, Heart and Lung, Pancreas/Islets	Additional specificity provided to ICD-10-AM codes for procurement episodes under Z52.8 including: Z52.81 chondrocyte donor, Z52.82 Limbal cell donor, Z52.83 Lung donor (excluding with heart), Z52.84 Heart and Lung Donor, Z52.85 Intestine donor, Z52.86 Pancreas Donor
	No multi-organ donor ICD-10-AM code (with the exception of Heart and Lung donor)	Addition of new ICD-10-AM codes including: Z52.88 Donor of multiple organs and tissues (excluding heart and lung), Z52.89 Donor of other organs and tissue
	Insufficient granularity for ICD-10-AM codes for transplant status	Additional specificity provided to ICD-10-AM codes for transplant episodes under Z94.8 including: Z94.81 Bone marrow transplant status, Z94.82 Intestine transplant status, Z94.83/4 pancreas transplant/islet transplant status, Z94.85 Stem cell transplant status, not elsewhere classified
	Lack of specificity transplant codes for when a procedure abandoned after initiation	Creation of codes to identify when a procurement episode was attempted but abandoned after initiation including: Z53.31 Living donor organ procurement attempted but not completed, Z53.32 Posthumous organ procurement attempted but not completed
	VAD is not directly coded as a diagnosis or procedure in the current system (international evidence US – Canada Z51.81 Assistance in Dying)	New code Z51.7 Supervision of VAD substance administration, signed in addition to the underlying cause
	There is ongoing uncertainty and inconsistency in classifying complications related to transplants, particularly in distinguishing between general procedural complication codes (T81–T85) and transplant-specific codes (T86)	New edition will clarify that only transplant failure and rejection are to be classified to T86, with all other complications to be coded under T81–T85, supported by revised guidelines in ACS 1904.
	No specific Aortic Valve donation ACHI/ICD-10-AM code to distinguish between heart and lung donation	Not specified in new edition
	No specific procedure code to specify partial liver resection/ procurement specifically for transplant	Not specified in new edition

	Previous editions (Tenth to Twelfth)	Proposed Thirteenth edition
ACHI code changes	Absence of uterus transplant and allogeneic procurement of uterus ACHI codes	For uterus transplant: Assign first 90436-00 [1273] Other procedures on uterus for uterine transplant, with: 88000-02 / 88000-02 [8888] [Transplantation of uterus] For allogeneic procurement of uterus: Assign a code from block [1268] Abdominal hysterectomy or [1269] Vaginal hysterectomy as appropriate for the procurement of a uterus. This was activated by a placeholder code as part of transition to the ICD-10-AM/ACHI/ACS Twelfth Edition.
	Ability to isolate whether a patient receives an ECD	Not specified in new edition
	Ability to isolate whether a patient has received a kidney/liver from live or deceased donor	Not specified in new edition
	Ability to isolate donor factors on bone marrow	Not specified in new edition
	Lack of specific codes for islet transplantation to specify conditions such as TPIAT and Islet Cell Transplantation Disorders (allogeneic)	Introduction of islet procurement ACHI codes: 96275-13 Procurement of islet cells for transplantation, living donor, 96275-14 Procurement of islet cells for transplantation, posthumous donor, Introduction of 96276-04 Allogeneic transplantation of islet cells, 96276-05Autologous transplantation of islet cells
	Lack of specificity to whether a skin or bone graft procured is from a living or deceased donor, or whether it is specifically used for transplantation	Addition of new codes including: 96275-21 Procurement of skin for transplantation, posthumous donor, 96275-20 Procurement of skin for transplantation, living donor, 96275-18 Procurement of bone for transplantation, posthumous donor, 96275-17 Procurement of bone for transplantation, living donor, No current definition of whether skin or bone transplant recipients are receiving a processed, unprocessed, live or deceased graft.
	No specific amniotic stem cell transplant stem cells	Addition of new codes including: 96276-06 Transplantation of amniotic stem cells, 96276-07 Transplantation of adipose-derived stem cells, 14203-02 Living tissue implantation, not elsewhere classified
	No ACHI codes that differentiate between living and 3D printed prosthetic skull flap (40600-02 Cranioplasty with skull flap)	Not specified in new edition
AR-DRG	Activity pertaining to posthumous organ procurement is submitted via the APC NMDS on a best endeavours basis	Posthumous Organ Procurement is proposed to be a pre-MDC because of the inherent high cost of the posthumous organ procurement activity, and because these episodes are more appropriately classified according to the intervention than by principal diagnosis.

Appendix B

Solid Organ Donation and Transplantation

Deceased Donation – Supplementary Findings (SF)

SF1 - There are multiple definitions related to determination of death across state legislations.

- The determination of death for donation is legislated in each state and territory via the Human Tissue, Death or Transplantation and Anatomy Acts. The Jurisdictional Human Tissue/Death Acts state that a person has died when there has occurred:
  a. Neurological Determination of Death: irreversible cessation of all function of the person's brain, or
  b. Circulatory Determination of Death: irreversible cessation of circulation of blood in the person's body.
- The diagnosis of death is defined clinically by the guidelines of the Australia and New Zealand Intensive Care Society.
- In Australia, the clinical determination of death for organ, cell and tissue donation purposes recognises both Donation by DNDD and DCDD. DCDD and DNDD are defined by the ANZOD registry as:
  - **DCDD:** Donation, for the purpose of transplantation, occurs after death has been determined to have occurred, on the basis of the absence of circulation (and of other vital signs).
  - **DNDD:** Donation, for the purpose of transplantation, occurring after neurological determination of death and before cessation of circulation.
- In hospital systems, the date of death and time is confirmed from the medical record based on the certifying doctor's documentation.
- Mortality coding (cause of death) is the responsibility of each state and territory's Registrar of Births, Deaths and Marriages which have a legislated responsibility to register deaths. The ABS processes this information, including applying ICD-10-AM coding to produce statistical outputs.
- The ANZOD registry consistently captures both potential and actual donation events and has the following definition:
  - **Actual deceased organ donor:** A person for whom the organ retrieval procedure commenced in the operating room (with surgical incision) for the purpose of transplantation. This includes donors who may have been deemed medically unsuitable during surgery or after the removal of organs.
  - **Intended Deceased Organ Donor:** A person for whom the donation workup was initiated as evidenced by both:
    - Formal written consent undertaken, including consent for donation of specific organs and/or tissues, and
    - Blood for tissue typing sent with allocation of a donor ID; but donation did not proceed.

SF2 - The reporting of care type 9 episodes is only required on a best endeavours basis which may contribute to data quality issues.

- There is some inconsistency in the allocation of care type 9 episodes across state and territories, as it is required on a best endeavours basis only. From episodes submitted, the following discrepancies have been identified:
  - Episodes assigned a care type 9 but not assigned an appropriate ACHI or ICD-10-AM procurement code.
  - Instances where live organ donor ACHI codes or transplant ACHI codes have been used with a care type 9.
  - The following data shows evidence of inconsistent care typing in APC data sets between 2017-18 to 2022-23:
    - ❖ There is evidence of posthumous procurement ACHI codes under acute episode. Approximately 2% of all posthumous procurement ACHI codes were linked to an acute episode (care type 1), 60% of these episodes were recorded in NSW.
    - ❖ Further discrepancies were found when comparing ANZOD registry annual volumes to IHACPA activity data sets, where variances in classification were most pronounced for NSW (33% variance), higher than national average (15% variance). This is predominantly driven by a higher proportion of deceased donor ACHI codes associated with care type 1 in NSW, compared to other states and territories.

SF3 - Electronic Management Systems (EMSs) have limitations in their ability to manage records against a deceased patient.

- Hospitals identified that the limited functionality of EMSs restricts the accurate and timely recording and coding of posthumous care episodes.
  - Electronic medical records and theatre systems (e.g. Surginet) were reported to not be designed to document procedures for deceased patients, preventing real-time data entry for posthumous interventions.
  - The point at which death occurs during an admission impacts system capability, often requiring retrospective modifications to capture post-death activity.
  - Organ retrieval activities are frequently recorded after the event, with associated costs commonly misallocated to the preceding care episode due to system constraints.

❖ *Denotes data-based insight*

SF4 - There is variability in the clinical setting for death which impacts the attribution of costs.

- For DNDD, death is determined in the ICU, while for DCDD, it may occur in the ICU or in the anaesthetic bay of the operating theatre, leading to variability in cost attribution. This can result in either combined ICU and theatre costs or theatre-only costs allocated to the posthumous episode.

SF5 - Non-transplant states that rely on travelling retrieval teams may have higher LOS for potential donors.

❖ Variability in the duration of ventilation was noted in the NT and Tas. This may be due to donor hospital resourcing for suitability assessment or reliance on visiting retrieval teams.

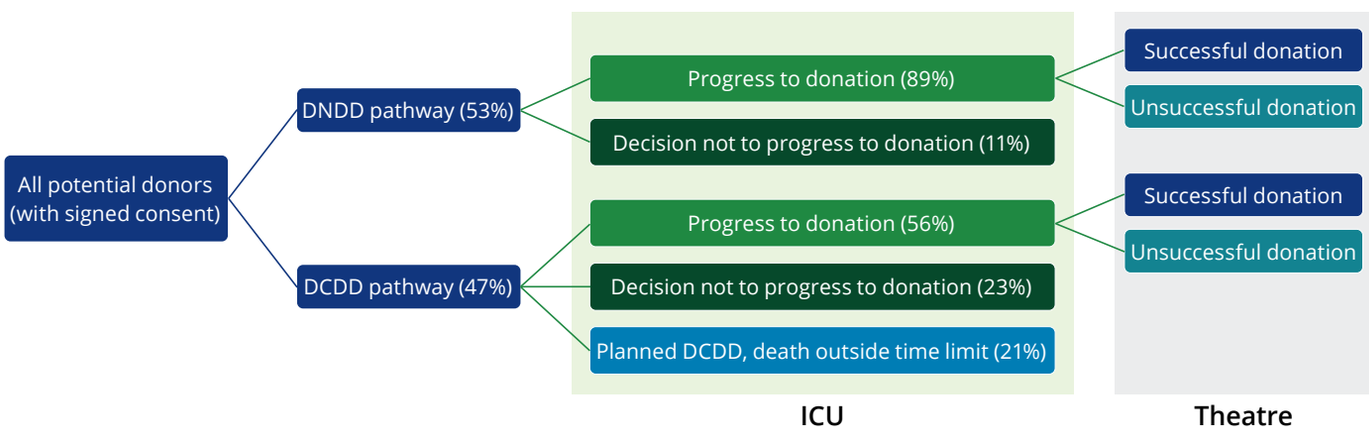
SF6 - DCDD and ECDs are becoming more prevalent.

- Deceased donation rates in adults are increasing, due in-part to the greater use of ECD and DCDD donors supported by the use of organ machine perfusion.
- It was reported that DCDD represented 20-30% of actual donations, with the proportion increasing in recent years. Some specialist hospitals deliver a higher share of DCDD donations than others. This correlates with rising use of machine perfusion for organ preservation.
- DCDD and ECDs often require significant preparatory work, even in cases which do not proceed to donation. This includes instances where DCDD donors do not meet the criteria for death or where ECD donors are excluded intraoperatively due to clinical deterioration or adverse findings.
- Clinicians reported the increasing need to consider ECD (to include potential donors with multiple comorbidities) to meet demand for organ transplant. The evolution and availability of machine perfusion has assisted with the growth in the use of ECD. There is no mechanism to identify ECDs in national data sets.
- Current coding and classification systems do not capture donor complexity, limiting the granularity of data capture for the associated costs of donation and posthumous episodes.

SF7 – There are varying resource profiles depending on whether the donor progresses to donation or whether they are on a DCDD pathway.

- Of all the potential donors that had signed consent and began workup for donation, 53% were on a DNDD pathway and 47% on a DCDD pathway.
- There are differences in the proportion of intended donors to actual donors by pathway (summarised in Figure 11). This can be summarised below:
  - For the DNDD pathway, 11% of episodes did not proceed to donation. The primary reasons of not proceeding to donation were medical contraindications identified during assessment (55%), absence of suitable recipients (19%), and other factors (26%).
  - The DCDD pathway has a higher non-progression rate, with 42% of episodes not proceeding. Around half (53%) were due to similar reasons as DNDD, while the remaining 47% were intended DCDD cases where death occurred outside the required timeframe for donation.

Figure 11: Schematic of donors proceeding and not proceeding to donation, by death pathway



Source: Deloitte (2025) and DonateLife Activity Data Report (2024)

- There is a considerable difference in the resources required for DCDD and DNDD intended donor cohorts:
  - Patients who progress to donation (Group A) will incur costs of ICU, theatre and retrieval team irrespective of whether the donation is successful or unsuccessful.
  - For intended donors via the DNDD pathway and those in the DCDD cohort (Group B) that do not proceed due to medical contraindications and similar reasons, the donation process (workup and coordination) is almost always discontinued without the retrieval team being mobilised and no donor hospital operating theatre and staff on standby. Patients who do not progress to theatre will incur costs related to ICU and medical suitability assessment.
  - For DCDD cohort (Group C), where the Potential Donor dies outside the time limit, the retrieval team will have been mobilised to the donor hospital and the donor hospital operating theatre will be on standby. Patients in this cohort will incur the total amount of ICU costs and some theatre costs and retrieval team costs (including travel).

SF8 - VAD donors are emerging, with alternative clinical pathways unable to be captured by current clinical coding and AR-DRG classifications.

- Clinicians reported VAD is an emerging pathway to organ and tissue donation, noting its potential to increase the total number of donors.
- Where a patient is admitted for administration of medication for VAD purposes, the underlying condition as the principal diagnosis is assigned. Standards state not to assign codes from block '*[1920] - Administration of pharmacotherapy*' even when administration of the VAD substance is the principal reason for admission in an admitted episode of care. Z51.7 Supervision of VAD substance administration is coded as an additional diagnosis for these patients. This code negates the assignment of a pharmacotherapy code as it is inherent.
- The clinical pathway to progress to donation is distinctly different from traditional deceased donor pathways. This involves:
  - Consent and commencement of donation workup that can occur up to months prior (see Figure 8). This workup may occur in the non-admitted setting, which prevents the assignment of a Z00.5 ICD-10-AM code as a diagnosis to indicate examination of potential donation.
- For ICD-10-AM Thirteenth Edition (implemented 1 July 2025) admitted VAD episodes will be assigned new code Z51.7 and could also possibly be assigned Z00.5 ICD-10-AM code as per existing practice for potential deceased donors (where they are admitted). However, specific guidelines on the classification of donors on a VAD pathway are yet to be developed. Implementation of any guidance for this pathway would require further policy and planning, given VAD clinical pathways take place in both admitted and non-admitted settings.

Living Donation – Supplementary Findings

SF9 - Few hospitals currently operate standalone living donor clinics for pre-donation care, with most living donor care delivered through general transplant/nephrology non-admitted services.

- Several facilities indicated that living donors are commonly seen in non-admitted clinics coded as transplant clinics, rather than dedicated living donor services. There is currently no Tier 2 code specific to living kidney donor non-admitted clinics. It is likely that these episodes incur higher diagnostic cost due to donor workup. However, this cannot be substantiated in data collection.
- Some hospitals highlighted plans to establish living donor clinics to resolve this issue. One hospital reported an intention to establish a standalone living kidney donor clinic, which was to be supported by philanthropic funding and would also offer appointments outside of standard working hours to better accommodate donor needs.
- The recording of education and counselling discussions for living donors was reported as variable across hospitals consulted. This activity is often conducted by 'donor coordinators' through a range of media; phone call, email, in-person, group or individual.

Retrieval – Supplementary Findings

SF10 - There are 2 distinct types of retrieval service (cardiothoracic and abdominal), with each requiring specialised skillsets.

- Cardiothoracic and abdominal organs are retrieved by separate, dedicated teams that must travel to and from the donor hospital, also accompanied by donor coordinators from DonateLife (i.e. 3 teams working concurrently on one potential donor case).
  - Cardiothoracic retrieval teams:
    - Cardiothoracic organs are usually retrieved by the team which will transplant them, though the organs may be sent interstate on occasion.
    - These organs are the most time sensitive and require care surgical care and strict logistical management from the retrieving team at the implanting hospital.
    - Often cardiothoracic organs require machine perfusion to with specialist perfusionists to ensure optimisation of donor organs.
  - Abdominal retrieval teams:
    - The abdominal team composition includes lead surgeon (who may occasionally be local), assistant surgeon, perfusionist, instruments, and fluids. This team will typically travel from their home hospital.
    - Abdominal organs are commonly retrieved by the abdominal transplant team for the liver or pancreas. However, kidneys are usually allocated to different transplant hospitals.

  - Kidney-only donations may involve surgical teams local to the donor, but arrangements for support staff and resources (e.g. assistant, perfusion coordination, fluids and instrument trays) can vary considerably.
- Multi-organ retrievals:
  - Multi-organ donation, involving both cardiothoracic and abdominal organ retrieval, is common practice. Due to surgical specialisation, 2 distinct teams are required, with minimal crossover in retrieval expertise between the cardiothoracic and abdominal disciplines.

SF11 - There are variations in clinical practice driven by patient factors and capacity/capability of the retrieving team.

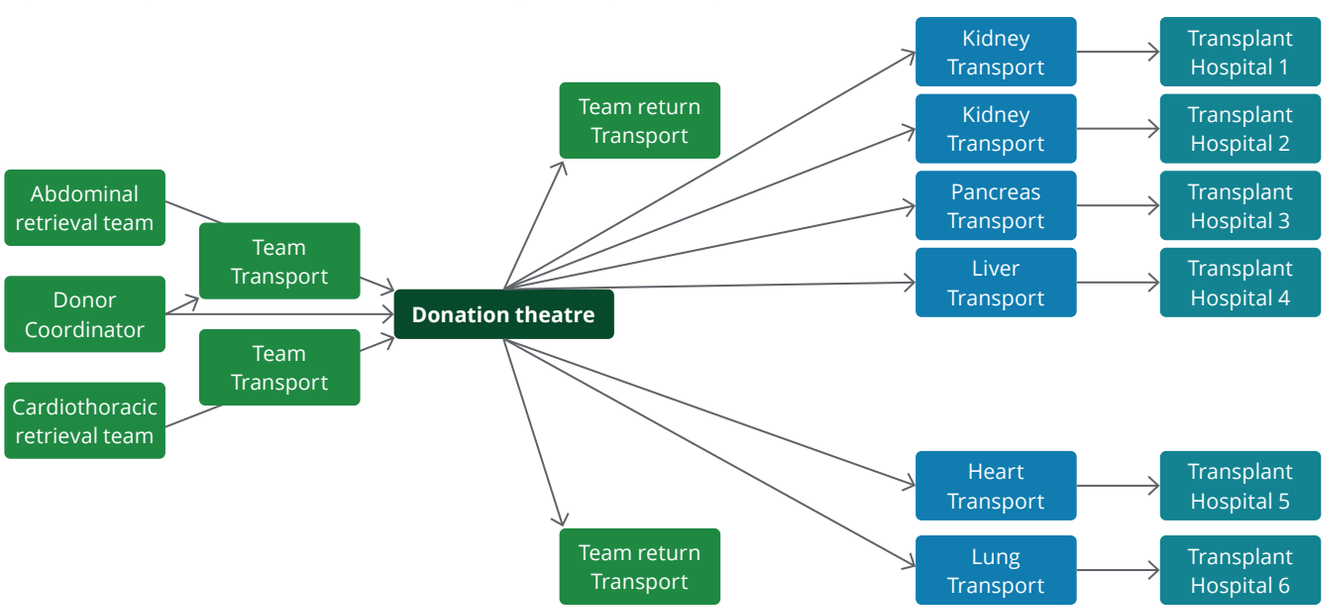
- Depending on team capability and availability/ability to provide machine perfusion on explanted organs, some teams can accommodate ECD. There are also specialised retrieval services that can facilitate DCDD retrievals.
  - Several hospitals highlighted that organ retrieval, especially involving DCDD, were primarily undertaken by a small number of highly skilled surgeons. They highlight the importance of maintaining these specialised skills and emphasised how fragile the system is, due to the dependence on a limited number of clinicians.
- DCDD donors require greater coordination and travel logistics, with variable conversion rates of successful donations (approximately two-thirds proceed). Donor coordinators were noted to always be from the donor's home state, but travel and attendance requirements vary between DCDD and DNDD cases.
- For complex procedures like split liver retrievals, which affects whole case duration, specialist teams from major transplant centres often travel interstate to provide the required capability.
  - For split livers in SA and WA, a team will travel from NSW, Vic or Qld.
  - There is no classification currently that can distinguish between split liver and whole liver retrieval.
- It is common for paediatric facilities not to have a dedicated retrieval service, often relying on adult retrieval teams to perform both retrieval and transplant surgeries.

SF12 - Retrieval surgeons are employed under a variety of models.

- Varying employment models for retrieval teams impact the degree to which costs are accurately reflected in NHCDC data sets.
  - Surgeon costs may be reported across multiple specialties (even unrelated to transplant such as General Surgery), leading to inconsistent inclusion in transplant cost centres.
  - Some surgeons are employed partially or fully through university budgets, meaning that a proportion of their salary is funded externally to the hospital and not allocated in NHCDC.
  - Some states provide compensation for retrievals on a case-by-case basis through statewide budgets that are not reallocated to the NHCDC.
  - The costs for surgeons performing opportunistic retrieval are fully absorbed by the LHN when there is no transplant service for specific organs e.g. heart/lung retrieval in SA.

SF13 - Transport-related expenses form a significant and highly variable component of retrieval costs.

Figure 12: Representation of retrieval team and organ transport arrangements



Source: Deloitte (2025)

a. Variability in retrieval team transport

- Metropolitan area retrievals use a range of transport modes including personal vehicles, hospital cars, police escort and taxis. Ground transport, particularly within close metropolitan distances, is rarely documented or reimbursed. These lower-cost journeys are infrequently captured and allocated to a transplant episode.
- Regional or interstate retrievals often require the use of air transport for the retrieval teams. Air transport costs vary significantly depending on the mode used, (i.e. chartered jets compared to commercial flights) and can add up to more than $70,000 per retrieval.
- Some retrieval services negotiate directly with air transport providers due to high retrieval volumes. Government jets have been made available for transport in some states.
- The use of machine perfusion for explanted organs can also drive higher transport costs. Some machines (excluding Xvivo perfusion) are too large to fit in small, chartered planes and sometimes require an additional perfusionist, necessitating the use of large planes at a higher cost.

b. Variability in organ transport

- Organ transport methods vary based on urgency, distance, and organ-specific requirements.
  - For urgent or interstate transfers of organs with short ischaemic times, commercial or courier jets are frequently used.
  - Where retrieval and transplant occur within the same city, and the organ can tolerate longer ischaemic times, road transport via ambulance or courier (with cold perfusion on ice) is standard.
- Transport practices differ by organ type:
  - Hearts, lungs, livers and pancreases are transported by retrieval teams using car, taxi, or air transport.
  - For interstate transplants involving non-renal organs, livers and lungs may be sent by commercial jet or courier, although lungs are often collected by the receiving team using air transport. Kidneys are typically transported in a general-purpose cooler box via taxi or courier.

c. Variability in billing and costing practices for transport

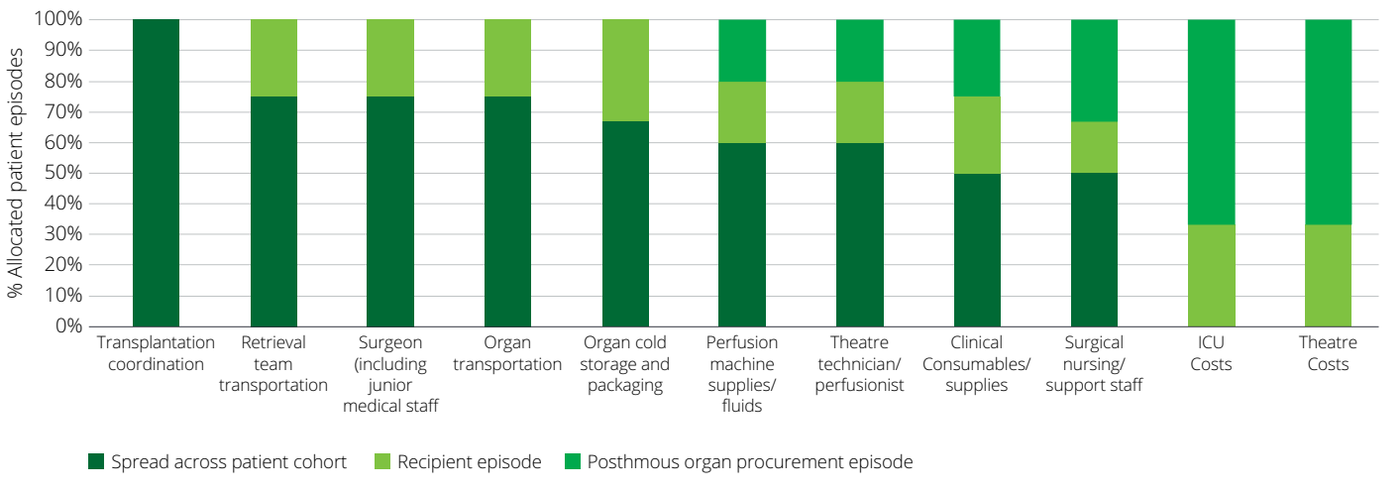
- Costs for air transport are usually the responsibility of the retrieval team, but there is variability in how and where these expenses are allocated.
- Transport costs are often not directly visible in NHCDC costing data and may be spread as overhead across multiple cost centres and multiple patients (transplant or speciality department e.g. nephrology).
- Cross-charging arrangements are in-place, but not always nationally consistent. Hospitals generally reported that the transplanting hospital receives an invoice for organ transport costs (for flight or courier), irrespective of the organ's origin. However, some business managers expressed a degree of uncertainty about which team bears the cost of organ transport.
  - Some facilities report they incur costs for both sending and receiving organs, with some sites and jurisdictions recovering costs for retrievals.
  - Invoices for air transport may also be sent directly to transplant units (where the transplant unit differs from the site of the retrieval team).
  - The extent to which these costs are allocated into the NHCDC is unclear.

SF14 - There is inconsistent application of the costing guidelines related to retrieval of solid organs for donation.

- Under the AHPCS Version 4.2 Costing Guidelines (CG7.3.6), the costs for retrieval and transplantation, including staffing, medical supplies, pharmacy, goods and services, transport, organ cold storage and transplantation service costs, should be allocated to the recipient episode under care type 1 (acute care).
- The AHPCS specify that cost allocation should consider where additional time may be required for organ transport and the mode of transport, especially high-cost flights for external retrievals.
- In practice, there are multiple iterations of how retrieval costs are allocated, such as:
  - Spread across transplant episodes (likely to be most common) as an overhead or posthumous organ procurement episode (e.g. where the retrieving hospital is the same as the transplanting hospital).
  - Spread across specialist cost centres (e.g. Nephrology, Cardiology).
  - Not assigned to any patient episode or assigned to a virtual patient group.
- Retrieval costs are variably allocated within NHCDC cost buckets; sometimes in ward medical, operating theatre or ward clinical supplies. This limits:
  - The ability to compare accurate cost profiles across facilities.
  - In scenarios where the retrieval team is retrieving from its home hospital, all costs of retrieval are allocated to the posthumous episode.

- There is no mechanism to cost organ retrievals that do not progress but teams still travel (i.e. DCDD or ECD).
- In multi-organ retrievals, where up to 6 different recipients receive organs from the same donor, these costs cannot feasibly be allocated to a patient episode. In these circumstances the costs are held by the hospital retrieval team and not allocated at a patient episode.
- Based on 4 retrieval services that returned costing methodology surveys; retrieval costs were rarely allocated to the recipient episode. Costs were predominantly spread across patient cohorts, including the retrieving hospital's transplant patient episodes or specialty patient cohort e.g. nephrology for kidney retrievals. ICU and theatre costs associated with retrieval were more likely to be allocated to the posthumous organ procurement episode.

Figure 13: For the following retrieval costs, are these costs incurred by your service/ if so – what patient episode are they allocated to?



Source: Deloitte survey (2025)
Hospitals (n = 3-4, depending on cost bucket) - 11 retrieval services returned the costing methodology survey. Hospitals expressed uncertainty and lack of visibility of internal retrieval cost allocations.

Figure 14: Summary of issues relating to costing of retrieval services.

01

Separation of retrieval and transplant locations

- Retrieval services may be centralised at a single site that retrieves organs for multiple sites.
- Retrieval costs cannot always be allocated to the transplant episode due to interactions between donation, retrieval and transplanting hospitals e.g., multi-organ retrievals are often transplanted at different hospitals.

02

Misalignment between national costing standards and local practice

- National costing standards (CG7.3.6 and 7.3.7) recommend allocating all retrieval costs to the recipient, but local practices and system limitations can prevent consistent application, resulting in varying cost allocation methods.

03

Data and system limitations

- Statewide identifiers and patient tracking systems vary in effectiveness and limit ability to track patients.
- Different feeder system, coding outcomes and cost allocation mechanisms lead to variability in cost allocation mechanisms.

04

Inconsistency of invoicing and cost recovery mechanisms

- Formal invoicing and cost recovery processes between states and territories or facilities are unclear from current costing data.
- Without these mechanisms, costs incurred by one state/territory or facility may not be recovered or properly allocated.

05

Service capability and practices

- Variability in clinical practices and capabilities for organ retrieval exists across different regions.
- Differences in local capabilities, such as having trained surgeons available for retrievals, affect how retrieval activities are conducted and costed.

Source: Deloitte (2025)

SF15 - Some retrieval teams conduct retrievals on behalf of other transplant hospitals, while others primarily receive organs. This imbalance ('net effect' issue) complicates the distribution of retrieval team costs.

❖ Around 20% of kidneys are transported interstate, but the national allocation system maintains a net cross-border flow balance (±5–10 retrievals).

- A similar pattern is observed for liver transplants, although monitoring is less specific. In contrast, heart and lung transplants are more imbalanced.
- Stakeholders noted the existence of 2 groups:
  - Net retrievers: Facilities that perform a higher proportion of organ retrievals, including on behalf of other transplant hospitals within the same jurisdiction. States with a disproportionate number of net retrievers will have higher retrieval-related costs, which are allocated directly to their own transplant patients or a spread across multiple transplant patients, resulting in observed greater transplant episode cost. These states may receive less funding to perform this service via the ABF model.
  - Net transplanters: Facilities that primarily accept organs retrieved by other services. As retrieval costs are typically absorbed by the originating retrieval service, these centres may report lower patient-level episode costs.

❖ This net effect cannot be explicitly quantified in data. Limited visibility of these costs affects hospitals' ability to effectively understand the required funding for retrieval services, and adequately allocate hospital budgets to support them.

SF16 - There is no mechanism to identify the surgical activity related to unsuccessful or non-implanted organs.

- Retrieval services carry the cost for non-retrieval episodes and for non-viable organs, with no patient encounter for allocation. There are several reasons for non-retrieval including:
  - Intended DCDD which do not proceed.
  - DNDD or DCDD where the donor is discovered to be not medically suitable within the operation.
  - Discovering within surgery a previously unknown feature that makes the organ not suitable for transplant (though other organs may still be transplantable).
  - DNDD Donor cardiac arrest before the team can operate.
- Hospitals conducting frequent DCDD or interstate retrievals (affecting a longer ischemic time for the organ) usually bear higher costs. Retrieval teams attending a DCDD episode often incur higher costs, arising from the unique challenges associated with DCDD organ retrieval; particularly as unsuccessful donations and retrievals which occurs in at least 30% of attempted retrievals of DCDD organs.
- Without the ability to capture retrieval costs with a specific transplant episode, the financial burden of unsuccessful retrievals is spread across all recipient episodes or retrieval hospitals. This results in:
  - Distorted cost profiles: recipients of successfully transplanted organs are allocated a disproportionate share of costs through inflated averages.
  - Unequal allocation of costs: states and territories or centres specialising in DCDD retrievals will have additional costs due to unsuccessful retrievals.

SF17 - The current use of machine perfusion varies across jurisdictions, influenced by organ-specific requirements, facility capacity and differing service delivery models.

- Organ perfusion can be leveraged across multiple organ types (e.g. kidneys, livers, hearts, and lungs) with the approach refined to the specific preservation and functional needs of each organ (Figure 15).

Figure 15: Summary of organ perfusion machines and transport mode by organ type

	Perfusion	Organ Transport
Heart	1. Standard – **static cold storage** *(DNDD)* 2. Ex-situ **normothermic MP*** *(DCDD)* 3. Ex-situ **HOPE** *(DNDD, possibly for DCDD in future)*	**1. Ice-box;** transport = road or chartered jet **2. Normothermic MP** from donor hospital to transplant hospital; transport = road or chartered jet **3. HOPE** from donor hospital to transplant hospital; transport = road, chartered jet, commercial flight
Lungs	1. Standard – **static cold storage** *(DNDD, DCDD)* 2. Ex-situ **HOPE** *(possibly in future for DNDD, DCDD)*	**1. Ice-box;** transport = road or chartered jet **2. Normothermic MP** from donor hospital to transplant hospital; transport = road or chartered jet **3. HOPE** from donor hospital to transplant hospital; transport = road, chartered jet, commercial flight
Liver	1. Standard – **static cold storage** *(DNDD, DCDD)* 2. Ex-situ **normothermic MP** *(DNDD, DCDD)* 3. Ex-situ **HOPE** *(DNDD, DCDD)*	**1. Ice-box;** transport = road or chartered jet **2. Ice-box** from donor hospital to transplant hospital; transport = road or chartered jet. Normothermic MP applied at transplant hospital. **3. HOPE** from donor hospital to transplant hospital; transport = road or charter jet.
Kidney	1. Standard – **static cold storage** *(DNDD, DCDD)* 2. Ex-situ **normothermic MP** *(DNDD, DCDD)* 3. Ex-situ **HOPE** *(DNDD, DCDD)*	**1. Ice-box;** transport = road or commercial flight **2. Ice-box** from donor hospital to transplant hospital; transport = road or commercial flight. Normothermic MP applied at transplant hospital and mostly only in research trials. **3. HOPE** from donor hospital to transplant hospital OR ice-box from donor hospital to transplant hospital with HOPE applied at transplant hospital; transport = road or commercial flight.

*MP = Machine Perfusion
Normothermic Machine Perfusion (MP) uses oxygenated blood
HOPE = Hypothermic Oxygenated machine perfusion
Source: Deloitte (2025) and the OTA (2025).

- There is increasing interest among retrieval and transplant specialists in the use of organ machine perfusion (both normothermic and hypothermic) to:
  - Enable greater use of ECD donors and longer ischaemic times, expanding the donor pool and transport options.
  - Improve logistical flexibility and organ function assessment, allowing better scheduling and real-time evaluation.
  - Reduce post-transplant complications, enhancing patient outcomes and reduced average length of stay (ALOS).
- The adoption of these machines varies by facility. Out of 16 formal organ retrieval services within Australia, approximately 60% reported use of organ perfusion machines.
- One health service reporting using machine perfusion for over half of their retrievals, while others have reported not using it at all, with a lack of viable funding source cited as a primary factor in the decision to use or not.
- There is also growing interest in normothermic-regional perfusion techniques, signalling a potential shift in future donation/retrieval practices.
- There are current legislative restrictions on the use of in-situ regional perfusion systems that are widely employed in the United States, European Union and United Kingdom. These may be permitted in the future, depending upon any changes to the definitions of death emanating from the current Australian Law Reform Commission (ALRC) Review of Human Tissue Laws (expected in 2026).

SF18 - Challenges in acquiring perfusion capital and consumables, variation in activity data capture and inconsistent costing practices contribute to limitations in current national funding streams for machine perfusion.

- Machine perfusion is a continually evolving technology in Australia, bringing with it several challenges including:
  - Costs of use: The consumable costs associated with machine perfusion are substantial, reported to be up to $60,000 per use (inclusive of fluids and other disposable components). The use of perfusion also carries a significant operating cost due to the need for additional perfusionist/staffing and in some instances, the need for larger planes for transportation.
  - Cost of capital: The optimal capital investment and utilisation strategy has yet to be resolved. Capital costs are out-of-scope for NHRA funding.
  - Operational: The dominant technology choices, best practice protocols and best setting for perfusion are yet to be established.
- Perfusion machines are funded through a combination of sources, with notable variability across hospital services and jurisdictions. The purchasing of organ perfusion was reported to be through various means, including:
  - Philanthropic Contributions: Nearly all facilities with perfusion machines indicated reliance on some extent of philanthropic funding.
  - State Government Funding: Several statewide retrieval programs are supported by direct state funding to acquire and operate machine perfusion systems.
  - Leasing Arrangements: Some services opted to lease perfusion equipment due to financial constraints preventing outright purchase, or the preferred commercial model of the supplier.

  - Clinical Research: A number of programs reported using clinical research grants or budgets to procure perfusion systems.
- Data capture (of both activity and costing) is challenged, impacting the effectiveness of current funding streams. In the absence of clear reimbursement pathways, hospitals risk absorbing high up-front and ongoing costs, creating inequity in access to advanced technologies.
- Hospitals identified the need for sustainable and innovative funding models to support wider adoption of perfusion machines.

Transplantation – Supplementary Findings

SF19 - The admitted episode for transplantation varies in resources depending on organ type, clinical complexity, and donor characteristics. These variations are mostly appropriately accounted for in hospital costing, however, there are some exceptions.

- Intraoperative and post-operative resource needs vary across organs and complexity but are usually captured in existing costing systems.
- Due to limitations in recording activity specifically related to the organ, several costs are unable to be allocated to the transplant recipient episode and are likely spread across a non-specific cohort of patients. These include:
  - Back-table organ preparation and organ perfusion are often undertaken by separate surgical teams. These costs are not captured due to data and system limitations (not able to attach activity or costs in the absence of a patient Medical Record Number (MRN). Some facilities have attempted to use an organ identifier to link back table activity and cost appropriately.
  - Organ preparation which occurs in a separate theatre or with the use of machine perfusion systems. This may be several hours before a recipient arrives for transplantation surgery.
  - Direct costs incurred in the preparation for an organ to arrive (e.g. labour, consumables)
  - Opportunity costs as a result of preparing for an organ to arrive (e.g. delayed theatre listings, inefficient use of theatre time). Though these will not be allocated in the NHCDC, they would be reflected more generally in cost profiles (e.g. inefficiencies that contribute to an overall higher cost of service delivery).

SF20 - The timing of organ retrieval and subsequent transplant influences the overall cost of the transplant episode.

- Transplant procedures often take place outside of standard working hours due to the unpredictable timing of organ retrievals.
- Surgeons must remain on standby, with delays contributing to overtime costs and, in some cases, uncaptured resource use depending on employment arrangements.
- Night-time retrievals, though slightly more expensive, are preferred for kidney transplants due to better alignment with retrieval team availability and less access to theatres during the day.
- Morning retrievals are noted to be associated with lower direct costs of retrieval but can increase overall transplant episode costs. This is due to transplant surgeries often being pushed into after-hours periods, leading to overtime for surgical teams, disruption of routine theatre schedules and ac, and the cancellation of elective procedures or non-admitted clinics.
- Liver transplants are noted to be increasingly performed late at night.
- These timing challenges are closely linked to the broader donation and retrieval cycle. Limited availability of donor hospital operating theatres during the day often delays retrieval to after-hours, which results in transplants occurring overnight or early the following morning as well as the need to have a backup recipient admitted.

SF21 - The use of transplant cost centres is variable and often dependent on the size and structure of the transplant unit. This contributes to variability in allocation of costs to transplant episodes.

- In most cases, major transplant units reported the use of a transplant cost centre, usually organ specific (e.g. Liver Transplant Cost Centre).
- However, there is evidence of variability, where some costs are being allocated across speciality or broader unit cost centres. In some instances, surgical and medical transplant costs may be attributed to non-transplant units, depending on hospital cost centre structure.

SF22 - There is no information collected on donor organ factors that are reported to impact the cost profile of transplant recipient episodes.

- Factors relating to the condition of the donor are reported to impact the recipient's transplant episode in a number of ways, including the likelihood of complications and differing post-transplant recovery outcomes. This may result in a longer LOS, a greater chance of readmission following initial discharge and higher utilisation of ICU.
- Donor factors that may influence recipient care profile include:
  - Whether the organ was retrieved from a DCDD or whether the organ was an ECD (e.g. donation from a hepatitis C patient)
    - Stakeholders noted that there are some metrics used by clinical teams to determine organ quality. For example, KDPI (Kidney Donor Profile Index) measures the quality of the donor kidney. EPTS (Estimated Post-Transplant Survival) measures recipient complexity, and each score determines the recipients risk of dying.

- Blood Group ABO incompatible (ABOi) or HLA incompatible transplants – transplant recipients typically incur higher costs due to the need for intensive pre-transplant desensitisation, specialised immunosuppression protocols, and increased risk of post-operative complications requiring extended care.
- Whether the organ was a live or deceased donor (for kidney and, less commonly, liver). Transplants from living donors generally incur lower costs per admitted episode than those from deceased donors, due to elective scheduling, shorter hospital stays and reduced logistical expenses.

- Donor factors are not currently represented in coding and classification of transplant recipient episodes, however they contribute to variability in the resources required for the care of transplant patients.

SF23 - The increased complexity of paediatric transplants leads to higher costs for these services.

- Paediatric transplants are generally more expensive than adult transplants due to the increased complexity and intensity of care required across the pre-, intra-, and post-operative phases:
  - More specialised surgical and anaesthetic staff are often required for all paediatric transplant types, including paediatric surgeons, intensivists, and nursing teams with advanced training.
  - Longer hospital and ICU LOS are common due to increased monitoring needs, slower recovery, and greater risk of complications. Most commonly, paediatric transplants encounter significantly longer LOS pre-transplant than adult transplants.
  - Underlying conditions in paediatric patients are often more variable, complex or rare, with many children being more acutely unwell at the time of transplant, requiring extensive pre-transplant workup and post-operative management. This is also the case for complex adolescent patients that are transplanted in adult setting.

Table 9: Current cost-price variance (price less cost) for statewide transplantation services (FY23)

Organ		National	NSW	VIC	QLD	SA	WA
Kidney *Paediatric (AR-DRG L10A)*	% episode in-scope cost > price	**76%**	44%	91%	80%	100%	100%
	Mean % in-scope cost price variance	**-24%**	0%	-28%	-26%	-49%	-42%
Kidney *Adult (AR-DRG L10A – 30% L10b – 70%*	% episode in-scope cost > price	**45%**	42%	42%	59%	43%	50%
	Mean % in-scope cost price variance	**-2%**	-1%	0%	-13%	12%	-4%
Liver *Paediatric (AR-DRG H09Z)*	% episode in-scope cost > price	**61%**	38%	75%	73%		
	Mean % in-scope cost price variance	**-22%**	-14%	-22%	-29%		
Liver *Adult (AR-DRG H09Z)*	% episode in-scope cost > price	**47%**	24%	98%	42%		
	Mean % in-scope cost price variance	**-14%**	19%	-40%	-25%		
Heart *Paediatric (AR-DRG F22Z – 30% F23Z – 70%)*	% episode in-scope cost > price	**83%**		83%			
	Mean % in-scope cost price variance	**-18%**		-18%			
Heart *adults (AR-DRG F22Z – 3% F23Z – 97%)*	% episode in-scope cost > price	**39%**	44%	46%	31%		19%
	Mean % in-scope cost price variance	**6%**	3%	4%	2%		24%
Lung *Paediatric (AR-DRG E03Z)*	% episode in-scope cost > price	**67%**	-	-			
	Mean % in-scope cost price variance	**-54%**	-	-			
Lung *adults (AR-DRG E03Z)*	% episode in-scope cost > price	**35%**	58%	26%	23%		46%
	Mean % in-scope cost price variance	**0.8%**	-10%	5%	14%		-10%

Source: NHCDC Acute (2022-23)
Note: Cost-price variance is calculated as price less cost. A positive value indicates price is on average higher than cost, while negative indicates cost is on average higher than price

- For Nationally Funded Centre paediatric transplant episodes, future consideration is required to evaluate the most effective pricing mechanism for low volume and highly variable cost profiles.

SF24 - Admitted cardio-thoracic transplant care is becoming more complex, with greater reliance on bridging procedures such as ECMO (primarily for lung) and Left Ventricular Assisted Device (LVAD) (heart) prior to transplant.

- Bridging therapies are often lengthy and resource-intensive, especially for paediatric patients who may remain hospitalised for months prior to transplant.
- ECMO use in lung transplant patients can be used pre- and post-transplant, both incurring substantial costs and longer LOS than non-ECMO transplants.
  - Current AR-DRG grouping does not adequately adjust for the significant variance between ECMO and non-ECMO transplants. All ECMO + Lung transplant DRGs are allocated to the lung transplant AR-DRG (E03Z Lung or Heart-Lung Transplant).
    - ❖ According to the NHCDC Acute Data Set (2022-23), the cost per episode is substantially higher, averaging $361,457 for ECMO-supported transplants, compared to $178,811 for non-ECMO transplants.
    - ❖ On average, the price of ECMO without a lung transplant $218,315, whilst ECMO with a lung transplant is $286,619.
- All heart transplant patients who received an LVAD in a previous or same admission as a heart transplant are grouped to the LVAD AR-DRG (F2ZZ). All heart transplant patients who receive a LVAD explant in same admission are grouped to the heart transplant AR-DRG (F23Z).
  - Paediatric patients generally have long pre-transplant admission LOS due to the scarcity of donor hearts which are suitably sized. Unlike adults, children with LVADs typically cannot be discharged home during this period. Paediatric patients can remain in hospital under a 'statistical discharge', splitting the stay into 2 episodes or remaining under the same admission.
  - Use of a post-transplant LVAD may also signal a high-risk donor heart and poor early transplant function, making it as much a marker of complexity as a driver of extended LOS and cost.
- Hospitals reported variation in use of long-term implantable devices (e.g. LVAD) with some hospitals primarily used lower cost, short-term percutaneous devices such as Impella ®. As NWAU price weights reflect average DRG costs, sites using short-term devices may be more likely to have a positive cost price variance, while those favouring long-term devices could face a negative cost price variance.

SF25 - There is growing use of high-cost therapies across the continuum of transplant care which, for the most part, are allocated to specific patients in hospital costing systems.

In general, transplant episodes have 5-20% of total costs attributed to pharmacy costs.

- Transplant patients require high-cost medications for immunosuppression during the peri-transplant period. Examples may include Basiliximab, Belatacept, Intravenous Immunoglobulin (IVIG), Thymoglobulin, and Rituximab. Majority of these medications are allocated at the patient level.
  - Eculizumab is used infrequently but carries a high cost for some patients with post-transplant antibody mediated rejection.
  - One hospital reported that in the early post-transplant period, if high costs drugs (e.g. Basiliximab) are given during working hours the costs are assigned directly to the patient episode. Whilst out-of-hours dispensing is not always allocated to the patient as it will be dispensed with no patient label.
  - Imlifidase has been previously provided free of charge by the manufacturer on an individual case by case basis for many highly sensitised patients pre-transplant but may soon become available for use in Australia.
- There is variability in the mode of supply for post-transplant medication. Some hospitals continue to dispense high cost therapies long-term, while others transition patients to collecting medication from community pharmacies.
  - For transplant patients receiving lifelong medications, some hospitals reported dispensing and courier of prescriptions, with costs of delivery either borne by the hospital or patient. These postage expenses are commonly allocated as an overhead. A large portion of pharmacy dispensing activity falls outside the 30-day window for linking to NAP events, resulting in unlinked activity categorised as either dead-ended or allocated to virtual patient episodes.
- Imprest medications are medications stored within drug rooms on hospital wards. Stakeholders reported that these medications were more frequently utilised in transplant patients compared to individuals with other conditions. Imprest medications were variably allocated to patient episodes, often spread across non-transplant admitted episodes, e.g. renal or dialysis patients. Although, these imprest medications were noted to not contribute significantly to the overall pharmacy cost profile.

❖ Paediatric pharmacy costs are, on average, higher and constitute a greater proportion of total costs compared to adult patients e.g. pharmacy is 14% of total cost for paediatric kidney transplants patients compared to 11% for adults. There may also be additional resources required for the preparation of paediatric medications outside of normal working hours.

❖ Hospitals reported that higher paediatric pharmacy costs are driven by the use of compounded liquid medications, which are not covered by the Pharmaceutical Benefits Scheme (PBS). Some PBS medications may also only be approved for adults.

Finding SF26 - There is poor visibility of pancreatic islet transplant activity in current activity data sets and laboratory costs are not accurately reflected in NHCDC submissions.

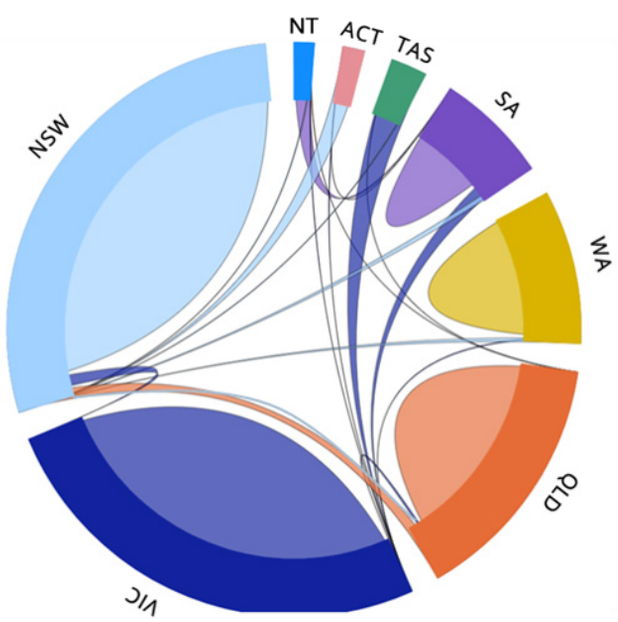
- Pancreatic and islet cell processing is conducted at 2 primary facilities in Australia: Westmead Hospital in NSW and St Vincent's Hospital in Melbourne, Vic. Both centres operate under NFC arrangements.
- Under the current classification system, there is no specific ACHI procedure code available to identify either allogeneic or autologous pancreatic islet transplants. This has been addressed in the revised ICD-10-AM Thirteenth Edition, where appropriate codes have been introduced.
- Stakeholders noted that the transition from NFC arrangements to ABF is likely to disproportionately impact pancreatic islet transplantation services. This is largely due to the inconsistent and incomplete allocation of costs related to islet processing laboratories within NHCDC data.
- Costs associated with pancreatic/islet cell processing, including labour and consumables, are often either omitted from NHCDC submissions or distributed across hospital overheads. In some instances, these costs are embedded in hospital or research budgets and fall outside the scope of the NEP calculation. This occurs when these costs are allocated to out-of-scope cost buckets, or in NFC-funded episodes recorded against an out-of-scope funding source.

Regional, Remote and Interstate Patients – Supplementary Findings

SF27 - Patients may need to travel interstate for transplant care for low volume, highly specialised transplants. There is variability on the model of reimbursement for patient travel and accommodation costs.

- The flow of patients and donors across state borders is small and usually for specific purposes. Patients may cross borders to travel to national transplanting centres, especially paediatric patients for cardiac transplants and WA/SA patients for some specialised organ transplants. All NT, Tas and ACT patients cross borders for all transplant services, and all donors from those states and territories are retrieved by surgical retrieval teams from other states and territories. Adult and paediatric patients from Northern NSW are commonly transplanted in QLD.
- In states and territories where paediatric patients receive pre-transplant workup (in absence of a transplant centre), patients will travel to the transplanting hospital via commercial flight. They could in some cases also travel for a pre-transplant workup activities.
  - There are variations in who funds this travel. If the home facility organises travel, they will fund the travel. If the transplanting facility organises travel, they will fund the travel and will potentially be cross-charged. However, there is no standardisation in this process.
- As presented in Figure 16, NSW, Vic, Qld and WA maintain high levels of self-sufficiency, performing all major transplant types (kidney, heart, lung, and liver). As depicted, interstate transfers for residents of Vic states are rare.

Figure 16: Chord diagram showing transplant patient travel, 2017-18 to 2023-24



Source: APC data (2017-18 to 2023-24).
Note: Chords between states/territories indicate patient/s whose state of residence differs from state of transplantation. The colour and thickness of the chord correspond to the state of residence and patient volume, respectively.

Non-Admitted Care – Supplementary Findings

SF28 - Costing practices for education and awareness sessions are variable.

- Education sessions for transplant recipients and potential donors are often delivered in group formats, involve MDT input from nurses, doctors, physiotherapists, and pharmacists, and are routinely offered to transplant candidates and their families.
- Sessions serve as the entry point for living donor workup in kidney donation pathways and require coordination and delivery resources, with delivery frequency ranging from monthly to quarterly depending on the program.
- These sessions are recorded in some instances but are unable to be allocated to a patient/episode of care as they do not constitute a non-admitted episode.

SF29 - HLA sensitisation testing is a routine component of transplant assessment. The funding model and capture of costs is variable across jurisdictions.

- HLA Antigen typing is performed pre-transplant to enter a patient onto the waiting list.
- Regular HLA Antibody typing is required every 1-3 months, depending on the organ, to maintain current detailed antibody data to use for compatibility testing using the 'virtual crossmatch'.
- Blood sampling for HLA testing can be conducted in different settings, including local pathology or in hospital. Commonly, the costs are borne by the transplanting hospital for waitlisted patients in the system (the potential exception being a privately referred admitted patient).
- For kidney waitlist patients, it is common for bloods to be drawn for HLA antibody testing to occur during dialysis appointments. The cost of HLA testing may be accounted for in the pathology cost bucket for the dialysis episode (there is a 63% increase in pathology costs for linked transplant-waitlist dialysis episodes).
- Post-transplant, HLA Ab testing for donor specific antibodies is performed to monitor for, or in some cases to help diagnose, rejection episodes.
- There is variability in the provider of HLA tissue typing by jurisdiction.
  - Lifelood (for NSW, Vic and SA). Services are funded through either block funding agreement or fee-for-service, depending on jurisdiction.
  - Statewide Pathology Service (WA and Qld).
- Most states and territories captured costs of HLA typing centrally (i.e. pathology expenses charged) and allocated into NHCDC. However, some hospitals reported inconsistencies with the allocation at a patient level, often reporting it is spread across all patient episodes, transplant patient episodes or clinical specialty episodes (e.g. renal dialysis).

SF30 - There are variable models of care for post-transplant follow up.

- There is a greater proportion of patients being serviced by telehealth, particularly in states and territories with large regional populations or without transplant units. Proportion of telehealth transplant clinics has increased significantly since the COVID-19 pandemic which forced the creation of telehealth support.
  - ❖ Between 2017-18 and 2021-22, in person clinic service events decreased 38%, whilst telehealth service events increased by 1220%.
  - ❖ By state of residence, the highest proportion of service events using telehealth was in Tas (49%), followed by WA (32%).
- There is considerable variation in the use of resources across transplant clinics which is not consistently reflected in costing or activity data. A small number of centres run high-intensity clinics within 30 days post-discharge, involving frequent reviews, tests (e.g. biopsies, serology), and medication (e.g. IV infusions) to support early discharge. These differ markedly from standard, lower-intensity follow-up clinics.

SF31 - Paediatric to adult transition care is resource intensive and inconsistently captured.

- Clinics transitioning a patient from a paediatric to adult transplant services require extensive resource consultation and scheduling, often occurring over a period of multiple years.
- This may include several clinics being held by adult hospitals in a paediatric setting as well as education services on script management, medical management. This activity is generally captured in paediatric activity with adult resources provided 'in kind'.
- There is limited allied health supports for adolescent patients that transition in adult settings.

❖ *Denotes data-based insight*

Haematopoietic Stem Cell Donation – Supplementary Findings

SF32 - Donation of PBSC via apheresis can occur in the non-admitted or admitted setting. There is poor visibility of donation activity in the non-admitted setting.

- The stem cell donation procedure requires surgery for bone marrow procurement or apheresis for peripheral blood procurement. The latter can occur in both the non-admitted and admitted setting.
- Bone marrow is retrieved via surgical extraction from the pelvis (ACHI 13700-00).
- PBSC are retrieved by non-surgically extracting from the blood, often achieved with 4 or 5 courses of pharmaceuticals administered over several days before cells are collected via apheresis. There are several procedure codes that can be used to identify these procedures, including:
  - Apheresis of stem cells without cryopreservation (ACHI 13750-04 Apheresis of stem cells without cryopreservation).
  - Apheresis with cryopreservation for longer term storage before use (ACHI 13750-05 Apheresis of stem cells with cryopreservation).
  - For cryopreservation – (ACHI 13760-00/01) can identify in-vitro processing of bone marrow or blood. These codes are assigned as additional codes to either apheresis category code or assigned in addition to HSCT.
  - Donor haemapheresis – collection of blood products for transfusion following apheresis (ACHI 13755-00).
- Within the current Tier 2 classification, there is no mechanism to identify apheresis activity for potential bone marrow donors.
  - ❖ There is state variation in the use of ACHI classification of apheresis of stem cells with or without cryopreservation, with donation episodes in NSW lower than other states, accounting for only 9% of caseload, despite representing 29% of transplant volumes. Consultation with NSW hospitals highlighted that majority of donation episodes via apheresis occur within outpatient settings, potentially contributing to this variance. The procedure may instead occur in a transplant clinic (20.01), haematology clinic (20.10/40.48) or pathology clinic (30.05).
  - ❖ Within other states and territories, it is likely that there is a variation of admitted and non-admitted apheresis episodes. For episodes with in-vitro processing of bone marrow or blood, 95% of total episodes were coded in Qld settings.
  - ❖ According to the NHCDC Acute Data Set in 2022-23, the average cost of apheresis with cryopreservation ($7,077) is greater (7.5% higher) than apheresis without cryopreservation ($6,584). The higher cost of cryopreservation is driven by the increased proportion of allocated costs to the pathology cost bucket, which averages a cost of $1,100 for cryopreservation procedures compared to $708 without per episode. Notably, laboratory costs (which were found to not be recorded accurately) would likely form part of this cost profile. Cryopreservation is predominantly used for autologous HSCTs (indicated by ACHI codes 13760-00 or 1376-01 for in-vitro processing can also be assigned if documented) and was noted to be most prevalent during COVID-19.

SF33 - Funding for donor travel arrangements is varied depending on donor type and state/territory of recipient.

- For overseas donors to an Australian resident: BMTP, administered by the DoHDA, provides funding up to $12,000 AUD per recipient to cover travel costs.
  - This may include funded travel of the donor to Australia, or funded stem cell collection and transport to Australia.
  - Some stakeholders reported that BMTP will cover all associated costs for unrelated overseas donors, whereas only travel costs will be funded for related overseas donors – leaving hospitals to absorb assessment and collection costs.
- For donors who live in the same state as the recipient: state/territory-based schemes may subsidise donor travel if the donor lives regionally. Otherwise, the hospital may be invoiced for donor expenses.
  - For example, the VPTAS supports rural patients who travel more than 100 km to donate.
- For interstate related donors: donor travel costs to recipient state rely on state/territory schemes if available. Otherwise, there may be out-of-pocket for the donor or absorbed by the hospital.
  - For example, VPTAS covers interstate donors who are donating to a Victorian, whereas IPTAAS (NSW) does not cover interstate donors.

Haemopoietic Stem Cell Transplantation – Supplementary Findings

SF34 - The consistent use of transplant cost centres is rare; instead, most resources associated with transplant are in services such as haematology or oncology.

- Many facilities do not have a formal pre-transplant referral non-admitted clinic for HSC recipients. Instead, patients are reviewed in existing haematology/oncology clinics.
- Pre-transplant conditioning is provided as an admitted procedure for patient receiving an allogeneic transplant. However, autologous transplants, particularly for myeloma patients, conditioning begins as a non-admitted treatment with patients typically admitted a few days later for further care.
- It is common for transplant-related activities for both autologous and allogeneic HSC transplants to be captured within other specialist unit activity. For example, admitted episodes related to pre-transplant conditioning are often captured as single-day chemotherapy admissions and recorded as haematology service events, rather than being directly attributed to transplant preparation activity. This may contribute to under-representation of transplant activity in hospital records and costing data.

❖ *Denotes data-based insight*

SF35 - Non-patient facing pre- and post-organ transplant activity, including education, coordination and scheduling, are inconsistently captured and rarely costed to cell and bone marrow recipient episodes.

- Non-patient facing activity, such as group education, coordination and scheduling activities are common for both haematologists and transplant coordinators in pre- and post-transplant care. These are rarely captured or costed to transplant activity or episodes by facilities.
- Haematologists reported that many are paid for non-clinical time through research or other external funding sources. Despite this allocation towards non-clinical time, there is an increasing proportion of time towards clinical responsibilities which may not be reflected in NHCDC costing submissions.

Tissue Donation and Transplantation – Supplementary Findings

SF36 - Tissue donation can occur independently or as part of multi-organ donation. In both cases, the impact on donor hospital resources is minimal.

Multi-organ donor:

- In some states and territories, DonateLife will assist with arranging consent for tissue donation. Where consent is not managed by DonateLife, it is arranged by the tissue bank.
- Tissue donation rarely occurs in the same theatre as organ donation, though occasionally eye tissue or a heart for heart valve donation will be collected in the theatre. In most cases, the tissue retrieval happens after the donor surgery in the mortuary (or in some states, a special purpose clean room).
- Heart valve retrieval can occur in the event of an attempted whole heart retrieval when the heart is unsuitable for transplantation (performed by the cardiothoracic retrieval team). Valves are retrieved for processing and storage by the heart valve bank.

Tissue-only donor:

- Consent for tissue-only donation is arranged by the tissue bank. Unless the donor was intended to be a multi-organ donor, but donation did not progress.
- Tissue donation may occur in the mortuary, clean room or in the community (e.g. funeral home or, less commonly, nursing home).
- One hospital reported that the lack of an on-site morgue means most tissue donations occur out-of-hours in theatre, sometimes taking up to 8 hours, or transferred to a statewide retrieval service. These procedures, often managed by a separate team, are not reliably captured in activity data.
- Tissue retrieval may be performed by donation specialists funded by DonateLife who are trained in tissue retrieval, or more commonly by trained tissue bank staff.

SF37 - Tissue donation is only captured in national data sets where it is part of multi-organ donation.

- There is a discrepancy between volume of tissue donation recorded in admitted data compared to volume of tissue transplantation. This is consistent with that most donation activity occurs outside of the admitted space (e.g. mortuary) and/or that tissue is imported into the country.
- Recorded episodes of tissue donation in an admitted episode were commonly observed when tissues were retrieved concurrently with solid organs. All tissue donation episodes linked to posthumous care (care type 9) also include a documented solid organ donation ACHI procedure code.
- Hospitals reported that data is primarily collected on paper by donation specialists, making it difficult to integrate with patient records or use for reporting. While a tissue storage section has been added to the hospital records system (SurgiNet), it is not donation-specific and requires further staff training to be used effectively.

Limitations of our work

General use restriction

This report is prepared solely for use of the IHACPA. This report is not intended to and should not be used or relied upon by anyone else and we accept no duty of care to any other person or entity. The report has been prepared for the purpose of developing a schema to provide an overview of the organ and tissue donation and transplantation journey, from a data capture, costing and funding perspective dated June 2025. You should not refer to or use our name or the advice for any other purpose.

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