



# The Organ Referral Characterisation Database (ORCHARD)

IMPACT REPORT

Centre for  
Organ ●  
Donation  
Evidence

## **Acknowledgements and Disclaimers**

The analysis presented in this report was undertaken by members of the Collaborative Centre for Organ Donation evidence (CODE) team. The interpretation is theirs alone.

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This research was led by Professor Angela Webster and Professor Kate Wyburn and supported by the Organ and Tissue Donation Service (OTDS) and the NSW Ministry of Health.

The projects using the ORCHARD database were undertaken by (in alphabetical order): Rachel B Cutting, Nicholas Chang, Nicole L De La Mata, James A Hedley, Patrick J Kelly, Brenda M Rosales, Imogen K Thomson, Karen MJ Waller.

Collaborators on projects within ORCHARD were (in alphabetical order): Elena Cavazzoni, Philip Clayton, Caroline Curtin, Danielle Fisher, Daniel Hirsch, Patrick Kelly, Michael O'Leary, William Rawlinson, Karen Waller, , Melanie Wyld.

This report was written by Rachel B Cutting, Brenda M Rosales, and Angela C Webster.

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Capacity building and impact synopsis *as of 6 March 2026*

<b>Outputs</b>	<b>Number of direct ORCHARD outputs</b>	<b>Number of indirect ORCHARD outputs</b>
<b>Manuscripts</b>	<b>4</b>	<b>16</b>
Published	3	10
In press/prep	1	6
<b>Clinical guidelines</b>	<b>0</b>	<b>2</b>
<b>Conferences</b>	<b>18</b>	<b>36</b>
<b>Students</b>	<b>4</b>	<b>9</b>
HDR (current and past)	1. Rachel Cutting 2. James Hedley 3. Imogen Thomson 4. Karen Waller	1. James Hedley 2. Brenda Rosales 3. Imogen Thomson 4. Karen Waller
HDC		5. Yanan Zha 6. Jack Marsden 7. Nicholas Chan
Other		8. Claire Johnston 9. Fred Wu

**Ethics:** Ethics approval for the Organ Referral Characterisation Database (ORCHARD) was granted by the University of Sydney Human Research Ethics Committee. HRC reference number: 2014/HE001021. Date received: 27 November 2014. Latest approval and protocol version: 6 August 2025, version 2.

**Building capacity:** The ORCHARD study was established in 2010 in partnership with the NSW Organ and Tissue Donation Service and the NSW Transplant Advisory Committee to strengthen research and evaluation capabilities in organ donation across New South Wales.

The NSW Ministry of Health supported this work and the establishment of SAFEOD to further develop local data linkage and biovigilance capability. Clinicians, service leaders, researchers, operational staff, and transplanting hospitals contributed to the study design, data interpretation and translation of research findings of this program.

Through ORCHARD, the CODE team has supported four HDR students (three funded by the National Health and Medical Research Council postgraduate

scholarship scheme) across medicine, nursing, science, biostatistics and economics, and three higher-degree-by-coursework students, undertaking a Master of Public Health, Master of Biostatistics and post graduate Medicine.

**Impact:** ORCHARD-associated work has been presented at 55 national and international conferences, produced 20 peer-reviewed publications to date, and informed Australian and New Zealand clinical guidelines in deceased organ donation and transplant and shifted the discussion of disease transmission risks from morbidity/mortality to missed opportunity in the international evidence base and clinical practice[1-3].

**Funding:** CIs Professor Angela Webster and Prof Kate Wyburn received \$642,869 in 2016 from the NSW Ministry of Health to support the development of ORCHARD and for its inclusion in the NSW Biovigilance in Organ Donation Public Health Register. In 2019, this collaboration was awarded \$369,182 (#1171364) from the NHMRC Partnership Grant to develop the SAFEOD study, in partnership with Kidney Health Australia, and the NSW Organ and Tissue Donation Service. The NSW Organ and Tissue Donation Service committed \$203,000 in-kind support, Kidney Health Australia committed \$40,000 in-kind support and The NSW Ministry of Health committed \$120,000 cash and \$40,000 in-kind support over four years.

## Invited Speaker Presentations

This program of work has resulted in several invitations for study members to present at national and international conference. These include:

1. 2023 Australia and New Zealand Society of Nephrology (ANZSN) “*Data for equity in transplant access and outcomes*” by Angela Webster
2. 2023 Transplantation Society of Australia and New Zealand (TSANZ) “*Supporting evidence-based decisions for using donors with a prior history of cancer*”, by Angela Webster
3. 2023 Royal Society of Medicine, United Kingdom “*Data integration and synthesis for equitable kidney care*”, by Angela Webster
4. 2022 Transplantation Society of Australia and New Zealand (TSANZ) “*Donor-derived infections and malignancies*”, by Angela Webster
5. 2017 DonateLife Forum “*Safety and Biovigilance in Organ Donation: a retrospective cohort study using data linkage of existing data sets in NSW, Australia (SAFEBOOD study)*”
6. 2016 Transplantation Society of Australia and New Zealand (TSANZ) “*Additional opportunities for transplanting organs from donors with brain malignancies? A retrospective cohort study of the NSW Organ and Tissue Donation Service organ donor referral register*”, Rebecca Hancock, Kate Wyburn, Michael O’Leary, Angela Webster

## Direct ORCHARD outputs published

### Characteristics and Donation Outcomes of Potential Organ Donors Perceived to Be at Increased Risk for Blood-borne Virus Transmission: An Australian Cohort Study 2010-2018.

**Publication:** Waller KMJ, De La Mata NL, Rosales BM, Hedley JA, Kelly PJ, Thomson IK, O'Leary MJ, Cavazzoni E, Ramachandran V, Rawlinson WD, Wyburn KR, Webster AC. 2022. Characteristics and Donation Outcomes of Potential Organ Donors Perceived to Be at Increased Risk for Blood-borne Virus Transmission: An Australian Cohort Study 2010-2018. *Transplantation*. 2022 Feb 1;106(2):348-357. doi: [10.1097/TP.0000000000003715](https://doi.org/10.1097/TP.0000000000003715)

**Summary:** From a total of 5,749 organ donation referrals, 624 (10.9%) were classified as increased risk due to known hepatitis B, hepatitis C or HIV infection, or behavioural risk factors. These donors were generally younger and had fewer comorbidities. However, many were declined solely because of perceived risk, often before confirmatory testing. Donors with hepatitis C who proceeded to donation had fewer organs retrieved. Improved testing and acceptance practices could increase donor utilisation.

**Impact:** Initiated a program of work around clinical perceptions, testing and consistency of BBV donors in Australia and produced the first robust estimates of BBV residual risks in Australian donors that test negative for BBV. This program of work informed the Transplantation Society of Australia and New Zealand (TSANZ) Clinical Guidelines for Organ Transplantation from Deceased Donors[1].

#### **Presentations:**

1. 2019 Connecting Donation and Transplantation, the Organ and Tissue Authority Conference  
*Transplantation Direct*. 2019. 5(S4).
2. 2018 NSW Organ and Tissue Donation Service, Research Meeting
3. 2017 The Transplantation Society of Australia and New Zealand (TSANZ) Annual Scientific Meeting  
*Transplantation Direct*. 2017. 3(S14)
4. 2017 DonateLife Forum
5. 2016 Transplantation Society of Australia and New Zealand (TSANZ)  
*Transplantation Direct*. 2016. 2(1-49)

## **Epidemiology and Comorbidity Burden of Organ Donor Referrals in Australia: Cohort Study 2010-2015.**

**Publication:** Thomson IK, Rosales BM, Kelly PJ, Wyburn K, Waller KMJ, Hirsch D, O'Leary MJ, Webster AC. 2019. Epidemiology and Comorbidity Burden of Organ Donor Referrals in Australia: Cohort Study 2010-2015. *Transplant Direct*. 2019 Oct 17;5(11):e504. doi: [10.1097/TXD.0000000000000938](https://doi.org/10.1097/TXD.0000000000000938). PMID: 31773057; PMCID: PMC6831119.

**Summary:** Among 4,440 organ donation referrals, median age was 55 years, and common comorbidities included hypertension, diabetes, and cardiovascular disease. Referral rates increased over time, predominantly driven by older donors and those with higher comorbidity burden. Many referrals did not proceed to donation, largely due to medical unsuitability or contraindications. The study highlights the growing complexity of donor profiles and the need for targeted strategies to optimise donor assessment and increase donation rates. Understanding referral patterns and health burden can inform policy and improve organ donation practice.

**Impact:** Informed NSW OTDS of the high proportion of donors with high co-morbidity burden who were unlikely to proceed to donation, and the associated workload. An inability to identify where key medical suitability decisions were made using historic data was also discussed. NSW OTDS subsequently updated its data capture systems to provide comprehensive details around medical suitability decisions and consent.

**Presentations:** This study was presented at the following conferences:

1. 2019 Connecting Donation and Transplantation, the Organ and Tissue Authority conference  
*Transplantation Direct, 2019. 5(S4).*
2. 2018 NSW Organ and Tissue Donation Service, Research Meeting
3. 2017 DonateLife Forum
4. 2016 Australia and New Zealand Society of Nephrology (ANZSN)  
*Nephrology, 2016. 21(S2)*

**Awards:** Imogen and Angela were awarded the 2016 Mentor-Mentee Award by The Transplantation Society to present this work at the bi-annual international congress in Madrid, Spain.

## Weekend Effect: Analysing Temporal Trends in Solid Organ Donation

**Publication:** Hedley, J.A., Chang, N., Kelly, P.J., Rosales, B.M., Wyburn, K., O'Leary, M., Cavazzoni, E. and Webster, A.C. (2019), Weekend effect: analysing temporal trends in solid organ donation. ANZ Journal of Surgery, 89: 1068-1074. <https://doi.org/10.1111/ans.15015>

**Summary:** This retrospective cohort study analysed all potential deceased organ donor referrals to the NSW OTDS from 2010 to 2016 to determine whether there was a “weekend effect” i.e. a reduction in donation outcomes for referrals made on weekends compared with weekdays. Of 3,496 referrals, 694 (20%) progressed to organ procurement. While there were fewer referrals on weekends, the likelihood of progression to donation, family consent, and meeting medical suitability criteria did not differ significantly between weekend and weekday referrals after adjustment for hospital clustering. The authors conclude that, in this Australian setting, organ donation processes operate consistently throughout the week, contrasting with findings from some US studies.

**Impact:** US studies suggested poorer weekend outcomes in organ transplantation. This study demonstrated that those findings do not apply to Australia. The Australian organ donation system functions consistently across weekdays and weekends. It has been cited twice, with two mentions.

**Presentations:** This study was presented at the following conferences:

1. 2018 Organ and Tissue Donation Service, Research Meeting
2. 2018 The Transplantation Society of Australia and New Zealand (TSANZ) Annual Scientific Meeting  
*Transplantation Direct*, 2018. 4(8S)
3. 2018 The Transplantation Society (TTS)  
*Transplantation*, 2018.102(Suppl 7)

## Direct ORCHARD continuing work

### Temporal trends in deceased organ donation request and consent rates in New South Wales, Australia: a cohort study

**Investigators:** Rachel Cutting, James Hedley, Nicole De La Mata, Trishala Sharma, Brenda Rosales, Kate Wyburn, Michael O’Leary, Angela Webster

**Summary:** Consent can be understood as a two-step process: first, whether the senior next-of-kin is approached and asked to consent (request), and second, whether consent is given. Measuring temporal trends is complicated by differences in definitions by jurisdiction and lack of published research accounting for changes in donor and system-level factors. NSW is the most populous and demographically diverse state in Australia and is broadly nationally representative. In Australia, the consent rate for organ donation fell from 61% in 2019 to 50% in 2024. While this decline has been attributed to service disruptions during the COVID-19 pandemic (March 2020–October 2023), it is unclear whether these rates represent a sustained decline. Internationally, NSW consent rates remain lower than those reported in the UK (58.8% in 2024-2025) and Spain (approximately 80-84% in 2024). We aim to examine temporal trends in request and consent rates among potential deceased organ donors in NSW from 1 January 2016 to 31 December 2023.

**Presentations:** This study was presented at the following conferences:

1. 2025 Organ Donation Congress/17th Biennial Congress of International Society for Organ Donation Professionals
2. 2025 Transplantation Society of Australia and New Zealand (TSANZ): Annual Scientific Meeting  
*Transplantation Direct. 2025. 11(Suppl).*
3. 2025 Donation and Transplant Conference
4. 2025 Faculty of Medicine and Health, Higher Degree by Research conference,

**Awards:** Rachel was awarded the NHMRC postgraduate research scholarship for this work.

## Indirect ORCHARD outputs published

The ORCHARD database was included in a NSW Public Health Register for *Biovigilance in Organ Donation*, supported by the NSW Ministry of Health and in partnership with the NSW Organ and Tissue Donation Service and Kidney Health Australia. We used the linked transplant registry and hospital and health outcomes data in all SAFEOD studies to assess disease transmission in NSW. Findings from the ORCHARD study also informed two systematic reviews on blood-borne virus transmission.

1. **Waller KMJ**, De La Mata N, Hedley JA, Sharma T, Davies R, Garrett E, White S, Rawlinson W, Stelzer-Braid S, Wyburn K, Webster AC. Transmission Risk of Intentional Transplantation of Kidneys From Donors With Active Hepatitis B to Recipients Without Active Hepatitis B: A Systematic Review and Meta-Analysis. *Transplantation*. **2025**. doi: 10.1097/TP.0000000000005575. Epub ahead of print. PMID: 41427832. **Presented at 2024 TSANZ**
2. **Rosales BM**, Hedley J, De La Mata N, Cavazzoni E, Vajdic CM, Thompson JF, Kelly PJ, Wyburn K, Webster AC. Transmission and Non-transmission of Melanoma From Deceased Solid Organ Donors to Transplant Recipients: Risks and Missed Opportunities. *Transplantation*. **2024** Jul;108(7):1623-1631. doi: 10.1097/TP.0000000000004961. **Presented at 2021 ANZSN, 2023 TSANZ, 2023 DonateLife Conference & won the 2020 Sydney Health Research Partners Clinical Research Award. Brenda was funded by the NHMRC postgraduate scholarship.**
3. **Thomson IK**, Hedley J, Rosales BM, Wyburn K, O'Leary MJ, Webster AC. Potential organ donors with primary brain tumours: missed opportunities for donation and transplantation identified in Australian cohort study 2010-2015. *ANZ J Surg*. **2022** Nov;92(11):2996-3003. doi: 10.1111/ans.18037. Epub 2022 Sep 21. PMID: 36129448; PMCID: PMC9826272. **Presented at 2020 TSANZ, 2020 TTS, Awarded 2020 TTS Mentor-Mentee Award.**
4. **Waller KMJ**, De La Mata NL, Wyburn KR, Hedley JA, Rosales BM, Kelly PJ, Ramachandran V, Shah KK, Morton RL, Rawlinson WD, Webster AC. Notifiable Infectious Diseases Among Organ Transplant Recipients: A Data-Linked Cohort Study, 2000-2015. *Open Forum Infect Dis*. **2022** Aug 3;9(8):ofac337. doi: 10.1093/ofid/ofac337. PMID: 35937651; PMCID: PMC9348761. **Presented at 2020 IPDLN, 2020 ANZSN, 2020 TTS and won the 2021 TSANZ Early Career Researcher Award.**
5. **Hedley JA**, Kelly PJ, Waller KMJ, Thomson IK, De La Mata NL, Rosales BM, Wyburn K, Webster AC. Perceived Versus Verified Cancer History and Missed Opportunities for Donation in an Australian Cohort of Potential Deceased Solid Organ Donors. *Transplant Direct*. **2022** Jan 13;8(2):e1252. doi: 10.1097/TXD.0000000000001252. PMID: 35047659; PMCID: PMC8759621.

*Presented at 2020 TSANZ, 2020 IPDLN and 2021 ESOT. James was funded by the NHMRC postgraduate scholarship.*

6. **Hedley JA**, Vajdic CM, Wyld M, Waller KMJ, Kelly PJ, De La Mata NL, Rosales BM, Wyburn K, Webster AC. Cancer transmissions and non-transmissions from solid organ transplantation in an Australian cohort of deceased and living organ donors. *Transpl Int.* **2021** Sep;34(9):1667-1679. doi: 10.1111/tri.13989. PMID: 34448264. *Presented at 2021 TSANZ, 2021 ESOT. James was funded by the NHMRC postgraduate scholarship.*
7. **Waller KMJ**, De La Mata NL, Hedley JA, Rosales BM, O'Leary MJ, Cavazzoni E, Ramachandran V, Rawlinson WD, Kelly PJ, Wyburn KR, Webster AC. Characteristics and Donation Outcomes of Potential Organ Donors Perceived to Be at Increased Risk for Blood-borne Virus Transmission: An Australian Cohort Study 2010-2018. *Transplantation.* **2022** Feb 1;106(2):348-357. doi: 10.1097/TP.0000000000003715. PMID: 33988336. *Presented at 2020 ISODP, 2020 IPDLN*
8. **Waller KMJ**, De La Mata NL, Wyburn KR, Hedley JA, Rosales BM, Kelly PJ, Ramachandran V, Rawlinson WD, Webster AC. New blood-borne virus infections among organ transplant recipients: An Australian data-linked cohort study examining donor transmissions and other HIV, hepatitis C and hepatitis B notifications, 2000-2015. *Transpl Infect Dis.* **2020** Dec;22(6):e13437. doi: 10.1111/tid.13437. Epub 2020 Aug 27. PMID: 32767859. *Presented at 2020 ISODP, 2020 IPDLN and 2020 TSANZ. Cited in TSANZ Clinical Guidelines[1].*
9. **Waller KM**, De La Mata NL, Kelly PJ, Ramachandran V, Rawlinson WD, Wyburn KR, Webster AC. Residual risk of infection with blood-borne viruses in potential organ donors at increased risk of infection: systematic review and metaanalysis. *Med J Aust.* **2019**;211(9). *Cited in TSANZ Clinical Guidelines[1]*

## Indirect ORCHARD continuing work

### Maximum gains from potential donors forgone for deceased organ donation and transplant: a population-based data-linkage study, 2015-2023

**Investigators:** Brenda Maria Rosales, Patrick Kelly, Rachel Davies, Rachel Cutting, James Hedley, Nicole De La Mata, Melanie Wyld, Elena Cavazzoni, Kate Wyburn, Angela Webster

**Summary:** Missed opportunities for deceased organ donation do exist among potential donors forgone due to biovigilance concerns. We sought to estimate the potential gains from accepting donors with tolerable biovigilance risk who are currently declined due to this clinical risk aversion. We found, over a 5-year period, 13% of potential donors were forgone because of clinical risk aversion, but in 2022 this dropped to 4%. Many of these donors foregone would have otherwise been of ideal age, with standard neurological determination of death, and with few or no comorbidities. Accepting all these donors could have increased the deceased organ donor pool by up to 33%, and increased donation rates to 22.4 per million population. Our future work will extend these estimates to the potential benefit to transplant recipients.

**Presentations:** This study was presented at the following conferences:

1. 2025 Transplantation Society of Australia and New Zealand (TSANZ)
2. 2025 Transplantation Society of Australia and New Zealand (TSANZ)
3. 2025 Organ Donation Congress/17th Biennial Congress of International Society for Organ Donation Professionals
4. 2025 Australasian Epidemiological Association

**Awards:** Brenda Rosales was awarded the TSANZ Early Career Researcher Award for this work.

## **Cancer transmission in deceased donor organ transplantation: an Australian population-based linkage study of donor referral data**

**Investigators:** Brenda Rosales, Claire Johnston, James Hedley, Nicole De La Mata, Elena Cavazzoni, Claire Vajdic, Sarah White, Patrick Kelly, Kate Wyburn, Angela Webster

**Summary:** Cancer transmission risks from deceased organ donors to recipients may be overestimated, and there is often hesitancy in accepting potential donors with a history of cancer, regardless of actual risk. Using linked deceased organ donation (2010-2018) and cancer registry data (1976-2018), we estimated the transmission risk for Common Cancers (breast, prostate, colorectal) in deceased donors and identified missed opportunities for donation. In this period, there were 165 cancer histories verified in 993 deceased donors, with one high-risk breast, six minimal-to-high-risk prostate, and no colorectal cancers. Organs from these seven donors were transplanted in 11 recipients (ten kidneys, one liver) with no evidence of “Proven/Probable” cancer transmission after a median 6-year follow-up. Additionally, 169/3,588 (5%) potential donors were forgone for a suspected Common Cancer transmission risk. Of these, 6/169 (4%) had no cancer verified, and 39/169 (23%) had cancer verified of minimal-to-low-risk. Accepting these 45 additional donors would have increased donations by 5%. A balanced review of transmission and non-transmission events in organ donation, as well as improved decision support, could inform current risk assessments and improve donation rates.

**Presentations:** This study was presented at the following conferences:

1. 2024 Transplantation Society of Australia and New Zealand
2. 2025 The European Society of Organ Transplantation (ESOT)

## Effect of deceased donor type on kidney recipient post-transplant health service utilisation

**Investigators:** Nicholas Chan, Heather Baldwin, Nicole De La Mata, James Hedley, Brenda Rosales, Michael O’Leary, Elena Cavazzoni, Patrick Kelly, Kate Wyburn, Melanie Wyld, Angela Webster.

**Summary:** The use of expanded criteria donors (ECDs) has increased availability of deceased donor kidneys, however evidence is limited regarding post-transplant healthcare utilisation. We examined post-transplantation health service use for deceased donor kidney transplant recipients by donor type. We included 1498 donor-recipients, 573 (38%) DNDD-SCDs, 497 (33%) DNDD-ECDs, 260 (17%) DCDD-SCDs and 168 (11%) DCDD-ECDs. We found ECD recipients had higher post-transplant healthcare resource utilisation with higher rates and frequency of readmission, while DCDD recipients had longer post-transplant length of stay and higher delayed graft function rates.

**Presentations:** This study was presented at the following conferences:

1. 2024 Australian and New Zealand Society of Nephrology, by Nicholas Chan

## References

1. Transplantation Society of Australia and New Zealand. *Clinical Guidelines for Organ Transplantation from Deceased Donors*. Version 1.15 [cited 2026 6 March]; Available from: <https://tsanz.com.au/clinical-guidelines>.
2. Pascual, J., *Breaking Barriers: Widening the Donor Pool to Embrace In Situ or Thin-invasive Localized Melanomas*. *Transplantation*, 2024. **108**(7): p. 1488-1489.
3. Sigler, R. and N. Law, *Minding the gap: How transplant infectious disease can help close the organ donation gap*. *Transpl Infect Dis*, 2024. **26 Suppl 1**: p. e14383.