# Contents

## Introduction to Fourth Edition

## Notice and Acknowledgements

### Notice

### Acknowledgements

## Contact Details

### Organ Donation Services

### Eye Donation Services

### Tissue Donation Services

## 1. Organ and Tissue Donation Criteria

### Organ Donation

### Tissue and Eye Donation

### Donor Referral/Information Required

### Specific Organ Criteria

## 2. Brain Death

### Brain Stem Anatomy and Function

### Brain Death

### Guidelines for Certification of Death

### Clinical Testing of Brain Stem Function

### Certification of Brain Death When Clinical Criteria Cannot Be Met

### Determination of Brain Death in Infants and Children

### Legal Certification of Brain Death

### Further Information

## 3. Legal Requirements

### The Deceased

### Next of Kin Consent

### Coroner’s Consent

### Designated Officer’s Consent

## 4. Approaching and Supporting Families

### Guidelines for Approaching the Family

### Family Questions and Answers

### Support for the Donor Family

### Support for the Hospital Staff

## 5. Religious and Cultural Beliefs

### Further Reading

## 6. Donor Management Guidelines

### Medical Management of the Potential Donor

### Medical Management of the Potential Organ Donor

### Donor Screening

### Donor Investigations

### General Nursing Care

### Further Reading

### Paediatric Management Guidelines

## 7. Logistics of Coordinating Organ Donation

### State Donor Coordinator

### Time Frames

### Procurement Surgery

## 8. Information for Anaesthetic Staff on Management of the Multi-Organ Donor

### Background

### Peri-operative Donor Management

## 9. Information for Operating Theatre Staff on Procurement Requirements

### General Theatre Requirements

### State-specific Theatre Requirements

### Preliminary Dissection

### Nephrectomy Requirements

### Hepatocystectomy Requirements

### Intestinal Requirements

### Pancreaticojejunostomy Requirements

### Cardiectomy Requirements

### Pneumonectomy Requirements

### Heart Valve Donation

### Corneal/Whole Eye Donation

### Bone Donation

### Skin Donation

## 10. Coordinator Roles Within Australia

### The State Donor Coordinator

### The Recipient Coordinator

### The Tissue Bank Coordinator

### The Eye Donation Coordinator

## 11. Tissue Donation

### Tissue Banks

### Donor Suitability

## 12. Whole Eye/Corneal Donation

### Eye Banks

### Consent for Eye Donation

### Donor Suitability

## 13. Donation After Cardiac Death

### Categories of DCD Donors

### Medical Criteria for DCD Donors

### General Considerations for DCD

### DCD and Coronial Jurisdiction

### References

## Appendix A – The Role of Tissue Typing in Transplantation

### HLA Typing, Screening and Cross-matching

### Allocation of Donor Organs

### Resources

## Appendix B – Donor Registries

### Australia and New Zealand Organ Donor Registry

### Australian Organ Donor Register

## Appendix C – Further Information

### Resources

### National Organisations

### State Donation Services

### Eye and Tissue Banks

### Websites

## Appendix D – Legal Requirements

### Brain Death

### Consent Legislation
Welcome to the fourth edition of the National Guidelines for Organ and Tissue Donation being launched in 2008. In conjunction with the Transplantation Society of Australia and New Zealand (TSANZ), the Australasian Transplant Coordinators Association (ATCA) is pleased once again provide to health care professionals the most up to date protocols and procedures in this specialised area.

In order to continue to provide accurate and current information, ATCA has called upon the invaluable skill of Coordinators across Australasia in updating and modifying the Guidelines to reflect expert practices from throughout the sector. I would like to extend my thanks and gratitude to this committee and its Chair, Nina Klein, for their diligence, as well as, their meticulous attention to detail.

This edition includes areas on donation after cardiac death (DCD), the use of the hormone package and the management of paediatric donors. It continues to highlight the subtle nuances of each State and Territories practices whilst maintaining a nationally cohesive approach to donation.

These Guidelines will once again be available on CD-ROM or electronically via the ATCA Website and I would encourage anyone working in the area of organ and tissue donation or those with an interest in the field to familiarise themselves with them, as this will provide consistency in practice and engender external confidence in the expert practices and specialised role Donor Coordinators play in organ and tissue donation.

Aimee Cunningham
President
Australasian Transplant Coordinators Association

March 2008
NOTICE AND ACKNOWLEDGEMENTS

NOTICE

Organ donation and transplantation has been taking place in Australia since the mid 1960s. The Australasian Transplant Coordinators Association (ATCA) aims to promote an increased awareness of contemporary issues surrounding organ and tissue donation among health professionals of all disciplines. In publishing this manual, ATCA aims to provide an up to date and easy to read resource, which can be accessed at the clinical level.

Readers are advised that rapid changes take place within individual transplant unit policies and State guidelines. This document needs to be used in conjunction with the guidance of State Donation Services and State Donor Coordinators.

ACKNOWLEDGEMENTS

This manual has been revised using resources provided by the Australasian Transplant Coordinators Association Inc, Australian and New Zealand Intensive Care Society and the Transplantation Society of Australia and New Zealand:

• National and State Legislative Acts (see Appendix D)
• Australian and New Zealand Intensive Care Society – ANZICS Statement on Death and Organ Donation. 3rd Edition 2008
• The Transplantation Society of Australia and New Zealand – National Organ Allocation Protocols. August 2002
• Queenslanders Donate – Guidelines on Organ and Tissue Donation in Queensland
• Australasian Tissue Banking Forum
• Eye Bank Association of Australia and New Zealand.

We thank the above groups for their consent to use these resources in this manual.

The Review Sub-Committee extends particular thanks to:

Dr. Helen Opdam, Intensive Care Unit, Austin Hospital – VIC, for her contribution to Chapter 6, Donor Management Guidelines.

Dr. Phil Sargent, Director of Intensive Care and Dr. Bruce Lister, Intensivist, Mater Children’s Hospital – QLD for their contribution to Chapter 6, Paediatric Management Guidelines.

Mr Lindsay Holder, Senior Scientist, Victorian Transplantation and Immunogenetics Service, ARCBS for his contribution to Appendix A, The Role of Tissue Typing in Transplantation


Special thanks to the ATCA Guidelines Review Sub-Committee

Chair:
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Ms Holly Northam – ACT
Ms Alana Cresswell – QLD
Ms Angela McInnes – QLD
Ms Kathy Hee – SA
Ms Heylen Laver – SA
Ms Denyse Norman – WA
Ms Melissa Smith – WA
Ms Lee Wood – NT

Government legislation cited in this manual is accessible on State Government websites.

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Email: secretary@atca.org.au
Website: www.atca.org.au
## CONTACT DETAILS

### ORGAN DONATION SERVICES

State Donation Services can be contacted through the following 24-hour contact numbers. General contact details for each agency are given in Appendix C.

**Australia**

<table>
<thead>
<tr>
<th>State</th>
<th>Phone</th>
<th>Organisation</th>
</tr>
</thead>
</table>
| NSW   | (02) 9963 2801 | LifeGift, NSW/ACT Organ Donation Service  
Australian Red Cross Blood Service  
153 Clarence Street  
Sydney NSW 2000 |
| VIC/TAS | (03) 9347 0408 | LifeGift, Victorian Organ Donation Service  
Australian Red Cross Blood Service  
538 Swanston Street  
Carlton VIC 3053 |
| QLD   | (07) 3240 2111 | Queenslanders Donate  
Princess Alexandra Hospital  
Ipswich Road  
Woolloongabba QLD 4102 |
| WA    | (08) 9346 3333 | DonateWest  
6th Floor Albert Facey House  
469 Wellington Street  
Perth WA 6000 |
| SA    | (08) 8378 1671 | South Australian Organ Donation Agency  
Ground Floor  
165 Grenfell Street  
Adelaide SA 5000 |
| ACT   | (02) 6244 3071 | ACT Organ and Tissue Donation Service  
The Canberra Hospital  
Yamba Drive  
Garran ACT 2605 |
| NT    | (08) 8922 8888 | Northern Territory Organ Donation Agency  
LifeNet NT  
Royal Darwin Hospital  
PO Box 41326  
Casuarina NT 0811 |
| NZ    | 0011 64 9 630 0935 | Organ Donation New Zealand  
PO Box 99–431  
Newmarket Auckland  
New Zealand |

### EYE DONATION SERVICES

The eye donation services listed provide a 24-hour on-call service and can be contacted as follows:

**Australia**

<table>
<thead>
<tr>
<th>State</th>
<th>Phone</th>
<th>Organisation</th>
</tr>
</thead>
</table>
| NSW/ACT | (02) 9362 7111 | NSW Lions Eye Bank  
Sydney Eye Hospital  
Macquarie Street  
Sydney NSW 2000 |
| VIC/TAS | (03) 9625 1265 | Lions Corneal Donation Service  
Royal Eye and Ear Hospital  
32 Gibson Street  
East Melbourne VIC 3002 |
| QLD | (07) 3240 2111 | Queensland Eye Bank  
Princess Alexandra Hospital  
Ipswich Road  
Woolloongabba QLD 4102 |
| WA | (08) 9346 3333 | DonateWest  
6th Floor Albert Facey House  
469 Wellington Street  
Perth WA 6000 |
| SA | (08) 8204 4928 | Eye Bank of South Australia  
Department of Ophthalmology  
Flinders Medical Centre  
Bedford Park SA 5042 |
| NZ | 0011 64 9 373 7537 | New Zealand National Eye Bank  
Department of Ophthalmology  
School of Medicine  
Private Bag 92019 AUCKLAND |
# Tissue Donation Services

The tissue donation services listed provide a 24-hour on-call service and can be contacted as follows:

<table>
<thead>
<tr>
<th>Australia</th>
<th>WA</th>
<th>SA</th>
<th>ACT</th>
</tr>
</thead>
</table>
| **NSW**   | Phone: (02) 9350 2361  
 NSW Bone Bank  
 2nd Floor, Clinical Service Building  
 St. George Public Hospital  
 Kogarah NSW 2217  
 Phone: (02) 8382 3271  
 Sydney Heart Valve Bank  
 St. Vincent’s Hospital  
 Darlinghurst NSW 2010 | Phone: (08) 9346 3333  
 Donate West  
 6th Floor Albert Facey House  
 469 Wellington Street  
 Perth WA 6000 | For all tissue referrals contact:  
 Phone: (08) 8378 1671  
 South Australian Organ Donation Agency  
 Ground Floor  
 165 Grenfell Street  
 Adelaide SA 5000 |
| **VIC/TAS** | For all tissue referrals contact:  
 Phone: (03) 9684 4444  
 Donor Tissue Bank of Victoria  
 Victorian Institute of Forensic Medicine – Coronial Services Centre  
 57–83 Kavanagh Street  
 Southbank VIC 3006 | For all tissue referrals contact:  
 Phone: (02) 6244 3071  
 ACT Organ and Tissue Donation Service  
 The Canberra Hospital  
 Yamba Drive  
 Garran ACT 2605 | |
| **QLD**   | Phone: (07) 3139 4000  
 Queensland Heart Valve Bank  
 The Prince Charles Hospital  
 Rode Road  
 Chermside QLD 4032  
 Phone: (07) 3121 2626  
 Queensland Skin Bank  
 Queensland Tissue Transplant Services  
 Block 7  
 39 Kessels Road  
 Coopers Plains QLD 4108 | | |
This chapter discusses various criteria for organ and tissue donation. The types of organs and tissues that can be donated will depend on the cause of death, the age of the donor, past medical history and the current function and pathology of these organs and tissues.

**ORGAN DONATION**

**Donation after brain death**

Patients who have suffered irreversible loss of brain function (brain death) but still have an intact cardiovascular system, are potential donors of heart, lungs, liver, pancreas, intestines, stomach and kidneys.

Organ donation after brain death can only occur when the patient has died in the intensive care or emergency department setting and is still maintained by mechanical ventilation.

Organ donation cannot take place until death has been confirmed and authorisation has been obtained.

**Donation after cardiac death**

Donation after cardiac death or non-heart-beating donation is a procedure that makes it possible for individuals who do not fulfil the criteria for brain death, to donate organs. For further information please refer to Chapter 13.

**General organ donor medical criteria for donation after brain death**

Everyone is considered individually but the patient must have:

- suffered irreversible loss of brain function (brain death)
- been maintained on a ventilator with intact circulation

**Exclusion criteria for organ donation**

- Human Immunodeficiency Virus (HIV)
- current neoplastic disease other than primary brain tumours and non-malignant skin cancers.

All brain dead patients should be referred to the State Donor Coordinator for advice regarding medical suitability.

Contacting the State Donor Coordinator for advice does not constitute an obligation or formal referral for organ donation.

**TISSUE AND EYE DONATION**

Tissue and eye donation is possible after brain death and cardiac death. Unlike organs, tissues do not require an intact cardiovascular system to be viable for transplantation. Therefore, all hospital and coronial deaths are considered potential tissue donors. Tissues can be retrieved up to 24 hours after circulation ceases. Patients may be eligible to donate heart valves, bone, skin and eye tissue.

For further information please refer to Chapters 11 and 12.
At the time of potential donor referral, it is helpful to have patient charts available, as additional information may be required.

- Patient’s name and sex
- Age and date of birth
- Blood group (if available)
- Status of brain death testing (time of death if available)
- Potential exclusion criteria (if known)
- Past medical history
- Blood results (if available)
- Cause of death
- Course of treatment throughout admission
- Family details and needs.

Variations in age limits apply to all solid organs for donation. Listed are the current general age limits for most states. However, these limits are guidelines only, please refer all potential organ donors to the State Donation Service.

- Heart donor – age up to 60 years
- Heart/lung and single lung donor – age up to 65 years
- Liver donor – age up to 80 years
- Pancreas donor – age up to 50 years
- Pancreas islet cell donor – age up to 70 years
- Intestines/stomach – age up to 55 years
- Kidney donor – age up to 80 years.

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**DONOR REFERRAL/INFORMATION REQUIRED**

**SPECIFIC ORGAN CRITERIA**
This chapter includes information on basic anatomy of the brain and cranial nerves, causes and diagnosis of brain death, and clinical confirmation of brain stem death.

**Brain Stem Anatomy and Function**

The brain stem is made up of the midbrain, pons, and medulla oblongata. They are connected via the reticular formation. These structures are responsible for control of vital functions of the body including respiration. The brain stem is positioned between the spinal cord and cerebrum.

### The Midbrain

The midbrain is a segment of the upper brain stem lying between the diencephalon and the pons. It serves as the pathway for the cerebral hemispheres and the lower brain and as the centre for auditory and visual reflexes. Cranial nerves III and IV nuclei are located in the midbrain.

### The Pons

The pons serves as a bridge between the midbrain and the medulla and contains spinothalamic tracts and part of the reticular formation (which regulates conscious state). It also contains pathways for the corticospinal tract, which connect to the cerebellum. Many other pathways pass through the pons connecting higher cerebral regions with lower levels of the nervous system.

The pons contains the fourth ventricle and controls respiratory function. Cranial nerves V through to VIII have nuclei in the pons.

### The Medulla Oblongata

The medulla is continuous with the spinal cord and level with the foramen magnum. Part of the fourth ventricle is located in the medulla. Cranial nerves IX through to XII emanate from the medulla.

### Cranial Nerves

The 12 pairs of cranial nerves are part of the peripheral nervous system. Besides having a name, each nerve is allocated a Roman numeral based on the descending order in which the cranial nerves and their nuclei attach to the central nervous system (CNS).

**Brain Death**

In Australia and New Zealand, brain death is defined as irreversible cessation of all function of the brain. Brain cells are the most sensitive cells of the body to a lack of blood and oxygen supply. When brain tissue is severely damaged from direct trauma, stroke, haemorrhage or lack of oxygen (as occurs with cardiac arrest), it swells inside the rigid skull. The swelling may become so severe that the intracranial pressure rises to a point where it occludes the arteries supplying blood to the brain, causing secondary brain damage and brain death.

This process may occur very quickly if the brain injury is massive. If so, compression and death of the brainstem quickly cause breathing to cease and cardiac standstill to occur shortly after. If the process occurs more slowly and the patient is ventilated, the heart will continue to beat because its pacemaker operates independently of brain function. In this way, oxygenated blood and nutrients continue to be circulated to the organs and tissues. Blood pressure may become unstable requiring drug therapy for support, as the regulating effect of the brain is lost.
Brain death is established by:

**Irreversible coma + Irreversible loss of brain stem reflexes and respiratory centre function**

**OR**

**Demonstration of cessation of intracranial blood flow**

Brain death is commonly caused by:

- spontaneous intracranial haemorrhage

**Guidelines for Certification of Death**

The Australian and New Zealand Intensive Care Society (ANZICS) Statement (2008) recommends the following timeframes for certification of death:

- Minimum of 4 hours of observation and mechanical ventilation during which the patient has unresponsive coma (GCS 3), with pupils non-responsive to light, absent cough/tracheal reflex and no spontaneous breathing efforts.

- The legal time of death is at the completion of the second set of tests or when the second doctor (other than the radiologist involved) confirms the absence of blood flow.

Note: The legislation in some states allows for the radiologist to certify brain death.

**Clinical Testing of Brain Stem Function**

Preconditions for declaring brain death

In accordance with the ANZICS Statement (2008), prior to clinical testing of brain stem function the following preconditions must be satisfied:

- confirmation that the cause of brain injury leading to a state of deep coma and the clinical signs of brain death are clear, unequivocal and irreversible
- normotension – MAP >60 mmHg
- exclusion of coma caused by sedative drug effects (self administration or otherwise)
- exclusion of electrolyte, metabolic or endocrine causes for coma
- exclusion of hypothermia – core temperature must be 35°C or greater
- confirmation of intact neuromuscular conduction
- it must be possible to examine at least one ear and one eye
- ability to perform apnoea testing. This may be precluded by severe hypoxic failure or a high cervical spinal cord injury.

Clinical testing

The photos are not of a real patient, and were made for demonstration purposes only.

- head injury:
  - motor vehicle accidents
  - recreational and industrial accidents
  - gunshot, assault etc

- cerebral anoxia/ischaemic injury [e.g., asphyxiation, cardiac arrest due to asthma, drug overdose, hanging, drowning, meningitis, carbon monoxide poisoning or uncommonly, primary cardiac arrest due to arteriosclerotic heart disease]

- primary cerebral tumour (less common).
4. Vestibulo-ocular reflex – no eye movement in response to cold water test (cold caloric) – cranial nerves III, IV, VI & VIII. At least 50ml of ice cold water is instilled into each ear canal after ensuring the external auditory canal is free of wax and debris. Observe eye movements for a minimum of 60 seconds.

5. No gag response to stimulation of posterior pharynx – cranial nerves IX & X.

6. No cough/tracheal response to bronchial suctioning – cranial nerve X.

Note: Only if all the above reflexes are absent, proceed with testing for apnoea.

7. Apnoea test – no spontaneous respiratory activity is observed during controlled apnoea test with oxygen insufflation, through and well beyond an arterial pCO₂ that would have been expected to stimulate the respiratory centre (> 60 mmHg) and an arterial pH of >7.30.

The following do NOT preclude determination of brain death:

- Spinal reflexes
- Sweating, blushing, tachycardia
- Normal blood pressure without the need for pharmacological support
- Absence of diabetes insipidus.

Certification of Brain Death When Clinical Criteria Cannot Be Met

Imaging

Radionuclide imaging, magnetic resonance imaging (MRI), or CT angiography can also be used to demonstrate the absence of blood flow to the brain. If the preconditions for clinical diagnosis and confirmation of brain death cannot be satisfied, 3 or 4 vessel radiocontrast angiography, by direct injection or digital subtraction, may be used to demonstrate absent intracranial blood flow. Blood flow should be absent from both the vertebrobasilar and supratentorial circulations. A radionuclide examination reliably demonstrating absence of brain stem and cerebral perfusion can also be used for this purpose.

Ideally, four hours of observation of coma and absence of those brainstem responses that can be assessed should precede the investigation.

Situations where demonstration of absent blood flow through radiological imaging is required are:

- no clear cause for coma
- possible metabolic or drug effect
- cranial nerves cannot be adequately tested (i.e. facial trauma, perforated eardrum, glass eye)
- cervical vertebral or cord injury
- cardiovascular instability or severe hypoxaemic respiratory failure precluding the apnoea test.
Certification of brain death must still be declared by two medical practitioners, generally not including radiologist who performed the investigation. Refer to the section on legal certification of brain death and the ANZICS Statement (2008).

Determinaon of Brain Death in Infants and Children

The determination of brain death in children should follow the same criteria as that recommended for adults. However, all current international guidelines recommend an increasingly cautious approach with decreasing age.

Special considerations in newborn infants

For newborns, a prolonged period of observation before initial clinical testing commences is recommended. ANZICS recommends that a 24 – 48 hour minimum period for observation is sufficient prior to commencing brain death testing. It is also recommended that the two sets of clinical tests be separated by a defined minimum period of 24 – 48 hours.

Premature newborns

< 36 weeks – The uncertainty surrounding determination of brain death in this population is such that no international guidelines currently address this problem.

ANZICS Recommendations

Children over 30 days old

The criteria for determination of brain death are the same as those in adults.

Term newborns (≥36 weeks post-conception)

A clinical determination of brain death can be made in the first 30 days of life, but should be approached with more caution. The minimum period of observation prior to first clinical testing is 48 hours after birth. Two clinical examinations should be performed, separated by a minimum interval of 24 hours.

Premature newborns (<36 weeks post-conception)

Clinical determination of brain death cannot be done with certainty.

Cerebral blood flow studies

Cerebral blood flow studies should be undertaken if the preconditions (see Section 2.2) cannot be met or clinical testing is precluded by gestational age. Demonstration of absent cerebral blood flow is sufficient to make a diagnosis of brain death. However, preservation of some intracranial blood flow in brain dead infants and children has been widely reported. A repeat study will usually show loss of intracranial blood flow within 48 hours.

(The above information has been resourced directly from the ANZICS Statement on Death and Organ Donation 3rd Edition 2008).
LEGAL CERTIFICATION OF BRAIN DEATH

The following should be read in conjunction with the ANZICS Statement and local State/Territory legislation (see Appendix D).

In general, confirmation of brain death must be certified by two medical practitioners, each of whom has more than 5 years experience and has independently carried out a clinical examination of the person.

Neither medical practitioner can be:

• the medical practitioner who is attending the person who is to be the recipient of tissue from the body of the donor
• the Designated Officer who gives an authority for donation to proceed following family authorisation
• the medical practitioner who is proposing to remove tissue from the body of a deceased person.

Variations and interpretations exist within State legislation in relation to the diagnosis and certification of brain death.

It is important to refer to State/Territory legislation for further detail on jurisdictional requirements. Links to legislation are provided in Appendix D, which also includes information on relevant legislation in each State/Territory.

FURTHER INFORMATION

Refer to local State legislation for legal criteria concerning brain death declaration, see Section 3 – Legal Requirements.

Further Reading

This chapter outlines processes for consent to donation. Some variations within State/Territory legislation exist concerning the process of consent by the deceased, the family, the role of the Coroner and Designated Officer (please refer to Appendix D).

The process of consent for organ and tissue donation involves:
1. the deceased
2. next of kin
3. Coroner (if applicable)
4. Designated Officer

**THE DECEASED**

The deceased’s wishes under State/Territory legislation must be ascertained (if known) where possible, through either the hospital staff or State Donor Coordinator. If an individual expressed an objection to donation either in writing, verbally or registered an objection on the Australian Organ Donor Register this may impact on donation proceeding. Please refer to the local State Donation Service for further information.

**NEXT OF KIN CONSENT**

Where a person’s wishes are known [e.g. through registration on the Australian Organ Donor Register (AODR) or by some other means] every effort is made to carry out those wishes. However, it is recommended practice for hospital staff to talk about the deceased person’s decision with their relatives to ensure that the deceased person had not changed his or her mind. This is also an opportunity to address any concerns that relatives may have.

It is important to distinguish the legal next of kin before obtaining consent for organ and tissue donation.

When a person’s wishes are not known, hospital staff are encouraged to speak with the relatives about the families wishes on organ donation on behalf of the deceased.

**CORONER’S CONSENT**

In cases where a coronial inquiry is necessary, any removal of organs and tissues requires the prior consent of the Coroner. The Coroner should be informed precisely which organs and tissues have been authorised for transplantation and research.

An official “statement of identification” of the deceased must occur in all coronial cases. It is preferable that this takes place in the hospital, when the family is present and available. It is recommended that staff refer to State legislation and hospital policy regarding those who must be in attendance when the identification is made [i.e. police/medical staff].
The Designated Officer of the hospital must give authorisation for organ donation to occur. This person is generally an appointed registered medical practitioner or medical superintendent/administrator.

The Designated Officer may consent in writing to the removal of organs and tissues as long as:

- death has been certified according to state legislation
- the donor had not objected to organ and tissue donation prior to death
- the senior available next of kin had no objection to organ and tissue donation and have authorised donation, and
- consent from the Coroner has been obtained in applicable cases.

If the next of kin cannot be located after reasonable efforts or the person has no next of kin, the Designated Officer may give or deny permission for organ donation to proceed, on behalf of the deceased.
The way donor families are approached about the possibility of donating their loved ones’ organs and tissue is of the utmost importance and should be done with great sensitivity.

Where the deceased had previously expressed a wish to donate and the next of kin are aware of this, the conversation is a formality acknowledging that, in these circumstances the person’s last wish can be carried out. It may be a comfort to the donor’s family to realise that the deceased has been able to help others to live and to lead healthier lives.

The confirmation of death by brain death criteria will not come as new information to relatives if adequate, clear and consistent information has been given progressively through the patient’s hospital admission and the relatives have been informed throughout of the poor prognosis. It is vital that families are kept informed of the prognosis of their relative’s illness.

It is essential that families and next of kin acknowledge that the patient has died before donation is discussed.

Important elements of the discussion about organ donation that have been shown to reduce the stress on a family during this difficult time include:

1. That the requestor ensures that the family acknowledge that their relative has died and time is given to the family to comprehend that information, BEFORE the request for donation occurs.
2. A private environment to ensure respect and confidentiality for the family during their grief. This conversation should never be conducted in a public place (i.e. corridor or waiting room) with other relatives present.
3. Diagrams, CT and other visual images can aid the family’s understanding.
4. Sensitivity to family’s emotional, psychological, spiritual, cultural and religious needs are paramount.
5. If available, the involvement of the Donor Coordinator may be helpful. He or she can directly answer questions that the family may have regarding any aspect of donation.

Some families will raise the issue independently – this should be acknowledged and it should be made clear that this will be discussed further at an appropriate time.

The individual discussing organ donation with families should be experienced and preferably have undertaken ADAP training.

### GUIDELINES FOR APPROACHING THE FAMILY

1. Sit down with the family in a quiet, private area where the family may express their grief and where they can be left to discuss the request together if necessary.
2. The bedside nurse caring for the patient should be invited and encouraged to attend the family discussion as a support person for the family, and in order to reinforce or clarify information given at the bedside later.
3. The team member who is leading the discussion should ensure that all members of the team are introduced to the family, including their roles.
4. Briefly, review events up until the present time, reinforcing the time of death. Do not be afraid to use the word ‘dead’. Ensure the information given is adequate and clearly understood. Provide the opportunity for questions at any time. Avoid the use of medical terminology.
5. Allow time for the family to process the news of their relative’s death and to ask any questions they may have. Where possible offer the family private time together, before moving onto the discussion about organ donation.
6. Open the discussion about organ donation by asking if the deceased (use their name) had ever discussed their wishes regarding donation, or indicated their intent or consent to be an organ donor either on their driver’s licence or on the Australian Organ Donor Register (AODR). Allow the discussion to continue and provide the opportunity for questions. Advise them that the State Donor Coordinator will access the AODR to ascertain the wishes of the deceased if the family do not know.
7. Allow time for private family discussion.
Brain death

Question – How is brain death different from cardiac death?

Answer – Cardiac death occurs when the heart stops beating. The person will have no pulse and will look lifeless.

Death also occurs when the brain and brainstem stop working completely – this is called brain death. Injuries that may cause the brain to die include accidents where there is trauma to the head, bleeding into the brain, infections, or a long period of time without oxygen. Even though the heart may still be beating and all other organs may still be working, brain death is death. The person cannot ever recover because the brain – once dead – can never be repaired.

When a person suffers a brain injury and coma, he or she will be connected to a machine called a ventilator. The ventilator artificially pushes oxygen into the lungs, causing the chest to rise and fall as if the person were breathing.

A person who has died as a result of brain death will look very different to a person who has died from cardiac death. The heart will continue to beat because it is being supplied with oxygen. The skin will continue to be pink and warm because the beating heart circulates blood and oxygen. This is why it can be difficult to understand that someone who is pink, warm and appears to be asleep is dead.

Question – What causes the brain to die?

Answer – When any part of the body is injured it swells. The brain is no different. An injured finger or ankle can keep swelling because there is nothing to restrict it. The brain, however, is contained within the rigid skull that limits how much it can expand. As the brain swells, pressure builds up within the skull. It is this increased pressure that causes many damaging and permanent effects:

- blood and therefore oxygen stop flowing to the brain because the blood vessels get squashed
- brain cells also die and cannot regrow or recover as other cells in the body do. When the brain cells die, it is irreversible
- swelling causes the brain to push down on the brainstem. The brainstem is where the spinal cord and brain join at the back of the neck. When this happens vital brain stem functions, which are necessary for life, stop.

It is important to note that with the establishment of the AODR the wishes of the deceased can be easily accessed (provided the deceased had registered their intentions). To ascertain this information, contact the local State Donation Service.

Family questions and answers

Listed below are some questions commonly asked by donor families.

Brain death

Question – How is brain death different from cardiac death?

Answer – Cardiac death occurs when the heart stops beating. The person will have no pulse and will look lifeless.

Death also occurs when the brain and brainstem stop working completely – this is called brain death. Injuries that may cause the brain to die include accidents where there is trauma to the head, bleeding into the brain, infections, or a long period of time without oxygen. Even though the heart may still be beating and all other organs may still be working, brain death is death. The person cannot ever recover because the brain – once dead – can never be repaired.

When a person suffers a brain injury and coma, he or she will be connected to a machine called a ventilator. The ventilator artificially pushes oxygen into the lungs, causing the chest to rise and fall as if the person were breathing.

A person who has died as a result of brain death will look very different to a person who has died from cardiac death. The heart will continue to beat because it is being supplied with oxygen. The skin will continue to be pink and warm because the beating heart circulates blood and oxygen. This is why it can be difficult to understand that someone who is pink, warm and appears to be asleep is dead.

Question – What causes the brain to die?

Answer – When any part of the body is injured it swells. The brain is no different. An injured finger or ankle can keep swelling because there is nothing to restrict it. The brain, however, is contained within the rigid skull that limits how much it can expand. As the brain swells, pressure builds up within the skull. It is this increased pressure that causes many damaging and permanent effects:

- blood and therefore oxygen stop flowing to the brain because the blood vessels get squashed
- brain cells also die and cannot regrow or recover as other cells in the body do. When the brain cells die, it is irreversible
- swelling causes the brain to push down on the brainstem. The brainstem is where the spinal cord and brain join at the back of the neck. When this happens vital brain stem functions, which are necessary for life, stop.
It is the brain stem that controls:
- breathing
- heart rate
- blood pressure
- body temperature.

People who are brain dead cannot and will never breathe of their own accord. They will never be aware of who or what is around them. They will never feel pain, or hope or joy or laughter, they cannot hear, talk, smell, cough or swallow.

A person who is brain dead will never recover. The person has died.

**Question** – How can the doctors tell when a person’s brain has died?

**Answer** – Critically ill people are under constant observation by the specialist medical team caring for them. All patients are closely monitored for changes in their condition. However, there are a number of physical changes in pupil reaction, heart rate, blood pressure and body temperature that are experienced when the brain dies. These changes, together with the loss of other natural responses such as breathing, coughing and blinking, cause doctors to suspect that brain death has occurred. Tests are then done to find out whether or not the brain is working.

**Question** – If a person is brain dead, why does the heart still beat?

**Answer** – The heart will beat independently of brain function for some time. This is because it has its own natural pacemaker. It will stop within a very short time, regardless of any treatment that could be given.

**Question** – If the heart still beats but the brain is dead, what is the time of death?

**Answer** – The time of death is when the doctor completes the second set of brain death tests or confirms death by cerebral angiography/perfusion scan. This is the medical and legal time of death, which will be recorded in the person’s medical record and on the death certificate.

**Question** – Why does my relative’s hand move, if he is dead?

**Answer** – Reflex movements may continue in a person who has died, because these reflexes come from the spinal cord, which is still receiving a blood supply. These movements are involuntary and do not involve the brain at all. This is similar to the reflex movement of a tapped knee. Reflex movements are not related to pain or any brain function.

**Question** – What happens next, after a person is confirmed to be brain dead?

**Answer** – Once death has been confirmed, members of the medical team will speak with the family to determine if their relative had any special wishes regarding organ donation.

If the person did wish to be a donor and the family supported the decision, then everything possible will be done to make sure those wishes are fulfilled. The family then has the opportunity to spend time at the bedside with the person who has died.

Once the operation is over the family is given time and space to spend with their relative if they wish. This is certainly encouraged and can be arranged by the State Donor Coordinator and hospital staff.

If the person did not wish to be a donor then the doctor will speak with the family about removing the ventilator from the person’s body. Soon after the ventilator is removed from the person, the heart will stop beating due to lack of oxygen. Once again, families may wish to spend time together at the bedside of their relative once the ventilator has been removed.

**Organ and tissue donation**

**Question** – How does the surgical team remove the organs and tissues?

**Answer** – The person’s body is always treated with the utmost respect and dignity. Retrieval is a surgical operation performed in an operating theatre by some of Australia and New Zealand’s leading surgeons.

**Question** – Is the person’s body disfigured?

**Answer** – No. There is a surgical incision, which is closed and covered with a dressing, as in any operation. The appearance of the person will remain the same.

**Question** – If organ and tissue donation occurs, can funeral arrangements proceed normally?

**Answer** – Organ and tissue donation does not interfere or delay funeral plans, including open coffin services.

**Question** – Is there any cost to the family when organ donation occurs?

**Answer** – There is no charge to the family for donation or for any care given after death has been certified.

**Question** – Some members of our family are religious. What are religious opinions about organ and tissue donation?

**Answer** – Most major religions support organ and tissue donation as an act of caring and will leave the decision to the individual. People with concerns should discuss them with their religious advisor.
In Australia and New Zealand, families who are approached about donating their deceased relative’s organs and tissues are offered follow-up support. All State Donation Services provide a bereavement aftercare program. These services are in addition to any other support offered by an individual hospital.

The general bereavement services provided by all State Donation Services are as follows.

**In hospital**
- Information and support from the State Donor Coordinator and the ICU Team
- Hospital services – social worker/pastoral care/chaplaincy
- Interpreter service if required
- Understanding Brain Death and Organ Donation – Living Beyond Loss booklet, Talking to children about death booklet, Coroner’s information booklet (if applicable)
- Handprints and locks of hair
- Viewing of the donor after retrieval surgery. This is facilitated by the most appropriate person for the family in the circumstances (State Donor Coordinator and/or ICU staff).

**One day to six weeks post donation**
- Initial follow up phone call by the State Donor Coordinator, at a time negotiated by both parties, (usually within 24–48 hours), with information regarding outcome
- Written information is sent to donor families containing:
  - Letters of thanks and details of the outcome of the organ donation from the State Donor Coordinator
  - Bereavement booklets In Reflection and Coping with Grief
  - Offer of a Reflection rose bush/plant voucher
  - Commemorative rose lapel pin for each family member
  - The offer of independent professional counselling and bereavement services if family members feel that they may benefit from it
  - Information for the donor family regarding recipient correspondence and confidentiality.

**Ongoing support – one year onwards**
- Ongoing communication that is initiated by donor family
- Provide support and ongoing recipient updates
- Forwarding of donor family and recipient correspondence
- Information on annual thanksgiving service (every donor family is sent an invitation)
- Anniversary card from the State Donor Coordinator.

**Further reading**

**Support for the donor family**

Support and care of hospital staff both in ED, ICU and OT is offered by the State Donor Coordinator during and following the donation process. The needs of staff working within individual areas and involved in the particular aspects and stages of the donation process vary considerably as do individual responses to death.

**Support for the hospital staff**

The general support services provided by all State Donation Services include:
- Follow-up professional correspondence regarding the donation outcome
- Debriefing
- Case – reviews
- Professional education.
Everyone should be given the opportunity to consider organ and tissue donation regardless of their religious or cultural background. This chapter provides information on a range of religious and cultural groups, including each group’s particular stance with regard to donation and transplantation.

**Anglican**

**Donation:** Acceptable  
**Transplantation:** Acceptable  
**Discussion:** The offering of life to and for others reflects the Christian principle of interdependence within the human community. The role of hospital Chaplains as members of the professional team is vital in maintaining the spiritual and human dimensions of the organ transplant process.

**Australian Aboriginal**

**Discussion:** There exists a wide range of beliefs within the many individual communities of the Aboriginal and Torres Strait Islander population. The most important consideration is that full discussion and consultation be carried out with the family and community.

**Baha’i Faith**

**Donation:** Acceptable  
**Transplantation:** Acceptable  
**Discussion:** Baha’i law leaves organ donation up to the decision of the individual or the family, and also allows people to donate their bodies to science as long as the remains are buried and not cremated. Within the Baha’i teachings there is nothing which would forbid a Baha’i to “bequest his eyes to another person or to a hospital, on the contrary it is a noble thing to do.”

**Baptist**

**Donation:** Acceptable  
**Transplantation:** Acceptable  
**Discussion:** Organ donation is encouraged and supported as it is seen as an act of charity. However, the church leaves the decision to donate up to the individual.

**Brethren**

**Donation:** Encouraged  
**Transplantation:** Acceptable  
**Discussion:** The Church of the Brethren’s Annual Conference in 1993 developed a resolution on organ and tissue donation, supporting and encouraging donation – “We have the opportunity to help others out of love for Christ, through the donation of organs and tissues”.

**Buddhism**

**Donation:** Individual choice/matter of conscience  
**Transplantation:** Individual choice/matter of conscience  
**Discussion:** Buddhists believe that organ and tissue donation is a matter of individual conscience and place high value on acts of compassion. Reverend Gyomay Masao, President and Founder of the Buddhist temple of Chicago, says “We honour those who donate their bodies and organs to the advancement of medical science and to saving lives.” The importance of letting loved ones know your wishes is stressed. Many families will not give permission to donate unless they know their loved one wanted to be a donor. “Buddhists have no reservations on this subject as organ donation conforms perfectly with our teachings.” However the Tibetan Buddhists believe that consciousness remains in the body for three days, so the body cannot be touched. The Mahayanist Buddhists believe that even though one has stopped breathing at the time of death, consciousness may remain in the body for up to 3 years, depending on the individual’s karma. If however, one is involved in a fatal car accident, then they believe that consciousness abruptly and instantly leaves the body at the time of death.

**Catholic Church**

**Donation:** Acceptable  
**Transplantation:** Acceptable  
**Discussion:** “To donate one’s organs is an act of love that is morally licit, so long as it is free and spontaneous.” “Transplantation presupposes a prior, explicit, free and conscious decision on the part of the donor or someone who legitimately represents the donor, generally the closest relatives. It is a decision to offer, without reward, a part of one’s own body for the health and well being of another person. We should rejoice that medicine, in its service of life has found in organ transplantation a new way of serving the human family”. (Pope John Paul II in an address to the Society of Organ Sharing, Rome, 20 June, 1991). “I am confident that social, political and educational leaders will renew their commitment to fostering a genuine culture of generosity and solidarity. There is a need to instill in people’s hearts, especially in the hearts of the young, a genuine and deep appreciation of the need for brotherly love, a love that can find expression in the decision to become an organ donor.” (Address of John Paul II to the 18th International Congress of the Transplantation Society, August 2000).
Christian Scientists

**Donation:** Individual decision  
**Transplantation:** Individual decision  
**Discussion:** The Church of Christ Scientist does not have a specific position regarding organ donation. Christian Scientists rely on spiritual instead of medical means of healing. They are free, however, to choose whatever medical form of treatment they desire – including transplantation.

Church of Jesus Christ of Latter-day Saints (Mormons)

**Donation:** Individual decision  
**Transplantation:** Individual decision  
**Discussion:** The Church of Jesus Christ of Latter-day Saints believes the decision to donate is an individual one made in conjunction with family, medical personnel and prayer. Jerry Cahill, Director of Public Affairs for the Mormon Church, says, “Mormons must individually weigh the advantages and disadvantages of transplantation and choose the one that will bring them peace and comfort. The Church does not interpose any objection to an individual decision in favour of organ and tissue donation.”

Episcopal

**Discussion:** The Episcopal Church passed a resolution in 1982 that recognises the life-giving benefits of organ, blood and tissue donation. All Christians are encouraged to become organ, blood and tissue donors “as part of their ministry to others in the name of Christ, who gave His life that we may have life in its fullness”.

Greek Orthodox Church

**Donation:** Acceptable  
**Transplantation:** Acceptable  
**Discussion:** The Greek Orthodox Church has no objection, whether doctrinal or moral, to the transplantation of organs on medical advice. The reception and donation of organs for this purpose reveal a profound act of loving solidarity and sacrifice among human persons. It is for this reason that the utmost care and respect should be shown at all times and at every phase of this service. Donation of the entire body for experimentation or research is not consistent with tradition.

Gypsies

**Donation:** Generally opposed  
**Transplantation:** Generally opposed  
**Discussion:** Gypsies are a people of different ethnic groups without a formalized religion. Gypsies believe that for one year after a person dies, the soul retraces its steps. All of the parts of the body must be intact because the soul maintains a physical shape.

Hinduism

**Donation:** Acceptable  
**Transplantation:** Acceptable  
**Discussion:** The Hindu religion is based on the “Law of Karma” and reincarnation. The soul lives forever, is immortal and gets reborn in a new physical form. This act is an individual decision. H.L. Trivedi, in Transplantation Proceedings, stated that, “Hindu mythology has stories in which the parts of the human body are used for the benefit of other humans and society. There is nothing in the Hindu religion indicating that parts of humans, dead or alive, cannot be used to alleviate the suffering of other humans.”

Islam/Muslim

**Donation:** Acceptable  
**Transplantation:** Acceptable  
**Discussion:** In 1983, the Moslem Religious Council initially rejected organ donation by followers of Islam, but it has reversed its position, provided donors consent in writing prior to death. The organs of Moslem donors must be transplanted immediately. The religion strongly believes in the principle of saving human life. The majority of the Moslem scholars belonging to various schools of Islamic Law have invoked the principle of priority of saving lives and have permitted organ transplants as a necessity to procure that noble end. Organ donation and organ transplantation are allowed in Islam in the case of necessity. “Islam has a great concern and respect for human life and promotes the preservation and prolongation of such life. In this respect, organ donation has become acceptable to most jurists and is practiced in many Muslim countries.” It should be noted that Muslims are not a homogenous group and that diversity of opinion exists but the majority of Muslims would subscribe to this particular view.

Jehovah’s Witness

**Donation:** Individual decision  
**Transplantation:** Individual decision  
**Discussion:** According to the Watchtower Society, the legal corporation for the religion, Jehovah’s Witness do not encourage organ donation, but believes it is a matter for individual conscience. Although the group is often assumed to ban transplantation because of its taboo against blood transfusion, it does not oppose donating or receiving organs. All organs and tissues, however, must be completely drained of blood before transplantation. “Regarding the transplantation of human tissue or bone from one human to another, this is a matter for conscientious decision by each one of the Jehovah’s Witnesses.”
Religious and cultural beliefs

Judaism

**Donation:** Individual decision  
**Transplantation:** Individual decision  
**Discussion:** In principle Judaism broadly supports and encourages donation. According to Rabbinical Council (Orthodox), “if one is in the position to donate an organ to save another life, it’s obligatory to do so, even if the donor never knows who the beneficiary will be”. The basic principle of Jewish ethics – “the infinite worth of the human being” – also includes donation of corneas, since eyesight restoration is considered a life-saving operation. In 1991, the Orthodox approved organ donations as permissible, even required, from brain-dead patients. Orthodox Judaism views each case of donation as an issue to be determined by a Rabbinical Court on its merits. Both the Reform and conservative movements also have policy statements strongly supporting donation. The valve of pikuach nefesh (the saving of life) which is at the core of organ donation is a principle shared by the entire community, regardless of denominational affiliation. In Judaism, there is no prohibition against organ donation. On the contrary, there is a positive commandment – “Thou shalt not stand idly by” – to save the life of another person. Although Jewish burials must take place as quickly as possible, this must take a back seat to saving a life (pikuach nefesh) in the event of organ donation. Judaism draws a distinction in the case of donating organs and tissues in order to save a life. The saving of a life is the most important of human activities, this is an over-riding principle. Given the complicated issues, and the number of factors that need to be taken into account, it would always be advisable for the parties involved to speak to their Rabbi if circumstances permit.

Lutheran Church

**Donation:** Individual decision  
**Transplantation:** Individual decision  
**Discussion:** The Lutheran Church does not oppose organ or tissue donation. The church believes that the decision to donate one’s organs and/or tissues should be left up to the individual.

Maori

**Donation:** Individual decision  
**Transplantation:** Individual decision  
**Discussion:** Maori people must be treated as individuals. Some will think traditionally, others will reject tradition, but the majority will lie somewhere in between. The most important consideration is that full discussion and consultation be carried out with the family and members of their land.

Protestant

**Donation:** Individual decision  
**Transplantation:** Individual decision  
**Discussion:** Protestants encourage and endorse organ donation. The Protestant faith respects an individual’s conscience and a person’s right to make decisions regarding his or her own body. Rev James W. Rassbach of the Board of Communication Services, Missouri-Synod, says “We accept and believe that our Lord Jesus Christ came to give life and came to give it in abundance. Organ donations enable more abundant life, alleviate pain and suffering and are an expression of love in times of tragedy.”

Pentecostal

**Donation:** Individual decision  
**Transplantation:** Individual decision  
**Discussion:** Pentecostals believe that the decision to donate one’s organs and tissues should be left up to the individual.

Presbyterian Church

**Donation:** Individual decision  
**Transplantation:** Individual decision  
**Discussion:** Presbyterians encourage and support donation. They respect a person’s right to make decisions regarding their own body. During their General Assembly in 1995, they wrote of their strong support of donation and commented that they “encourage members and friends to sign and carry universal donor cards....”

Reformed Church of Australia

**Donation:** Acceptable except in dependant minors  
**Transplantation:** Acceptable  
**Discussion:** There is no biblical or principle objection to donation and transplantation for therapeutic purposes.

Religious Society of Friends (Quakers)

**Donation:** Acceptable  
**Transplantation:** Acceptable  
**Discussion:** The rights of all individuals must be respected and free, informed consent be obtained from the next of kin. The giving of human organs makes possible a richer life and alleviation of suffering of others.

Salvation Army

**Donation:** Acceptable  
**Transplantation:** Acceptable  
**Discussion:** Policy document currently being revised. It is essential that the rights of all individuals are respected and that free and informed consent be obtained from the next of kin. The giving of human organs makes possible a richer life and alleviation of suffering of others.
**Seventh Day Adventist Church**

**Donation:** Encouraged  
**Transplantation:** Encouraged  
**Discussion:** Although transplant procedures are carried out at many Seventh Day Adventist health care institutions around the world, the church has made no formal declaration regarding organ donation and transplantation.

**Shinto**

**Donation:** Not acceptable  
**Transplantation:** Acceptable to some  
**Discussion:** In Shinto, the dead body is considered to be impure and dangerous, and thus quite powerful. “In folk belief context, injuring a dead body is a serious crime...” according to E. Namihirain his article, ‘Shinto Concept Concerning the Dead Human Body’. “To this day it is difficult to obtain consent from bereaved families for organ donation...the Japanese regard it in the sense of injuring a dead body.” Families are often concerned that they not injure the itia – the relationship between the dead person and the bereaved. For this reason organ donation is often unacceptable to the Shinto religion.

**Uniting Church in Australia (Synod of Victoria)**

**Donation:** Acceptable  
**Transplantation:** Acceptable  
**Discussion:** Recommend that members of the Uniting Church are encouraged to volunteer to become organ donors and that those who are willing to become organ donors take appropriate action to make their wishes known. Most important of all is to have frank and specific discussions within the family, so that other members of the family, specifically next of kin, understand the wishes of the person or persons concerned and are prepared to see that these wishes are carried out when the opportunity arises; taking action to make these wishes known in some durable written format.

**Wesleyan Church**

**Discussion:** The Wesleyan Church supports donation as a way of helping others. They believe that God’s “ability to resurrect us is not dependent on whether or not all our parts were connected at death.” They also support research and in 1989 noted in a task force on public morals and social concerns that “one of the ways that a Christian can do good is to request that their body be donated to a medical school for use in teaching.”


**Further Reading**

This chapter provides information on the medical management of the donor, including paediatric patients.

Time is critical in the management of the potential organ donor. Progressive physiological instability ensues after brain death and attempts should be made to minimise the time between brain death and organ retrieval. Careful supportive treatment of the potential donor is essential if an optimal outcome of transplanted organs is to be achieved.

After death has been confirmed, the focus of medical management changes from ensuring brain perfusion to maintaining good organ perfusion.

**MEDICAL MANAGEMENT OF THE POTENTIAL DONOR – QUICK REFERENCE GUIDE**

**Referral**
- Refer all potential organ donors to the local State Donation Service, even if uncertain of medical suitability. Criteria for suitability change over time and vary according to recipient circumstances.

**Medical management**
- Maintain MAP > 70mmHg: maintain euvoalaemia, if required administer inotropic agents (e.g. noradrenaline)
- Maintain adequate organ perfusion (monitor urine output, lactate), consider invasive haemodynamic monitoring
- Monitor electrolytes (Na+, K+) every 2 to 4 hours and correct to normal range
- Suspected diabetes insipidus (UO>200 ml/h, rising serum sodium): administer DDAVP (e.g. 4 mcg IV in adults) and replace volume loss with 5% dextrose
- Treat hyperglycaemia (actrapid infusion): aim blood glucose 5 to 8 mmol/L
- Keep temp >35 C. Pre-emptive use of warming blankets etc is advised as hypothermia may be difficult to reverse once it has developed
- Provide ongoing respiratory care (frequent suctioning, positioning/turning, PEEP, recruitment manoeuvres)
- Maintain haemoglobin >80 g/L

**Hormone replacement therapy**
The use of hormonal replacement therapy remains controversial. Some centres use it in the setting of persistent haemodynamic instability (despite volume resuscitation and low dose inotropes) and/or if cardiac ejection fraction <45%. Typical regimes include:
- triiodothyronine (T3): 4 mcg IV bolus, then 3 mcg/h by IV infusion
- arginine vasopressin (AVP): 0.5 to 4.0* U/h to maintain MAP 70 mmHg
- methylprednisolone: 15 mg/kg IV single bolus.

* Most protocols recommend a dose of 0.5 to 4 U/h, although it has been suggested that Vasopressin doses greater than 2.4 U/h may cause regional ischaemia.
Brain death is associated with physiological instability, which may progress over hours or days. Timely confirmation of brain death, referral to the State Donation Service and procurement of organs will minimize the loss of donors due to cardiac arrest and maximise the number of organs suitable for transplantation.

The approach to managing potential organ donors is similar to that of other patients within the ICU. The aim is to maintain normal physiology and the usual spectrum of monitoring and interventions should be employed. Awareness of the specific perturbations that may occur in brain death will help with the institution of timely and appropriate treatment.

Medical suitability for organ donation

All patients in which brain death has been confirmed, or who have a catastrophic injury to the brain with the clinician’s and the family’s intent to withdraw life support, should be considered to be potential organ donors. The patient must be medically suitable to donate organs for transplantation. Criteria for suitability change over time and vary according to recipient circumstances. It is thus preferable for all potential donors to be referred to the State Donation Service who will be able to advise on current criteria.

Absolute contraindications to organ donation are few. They include HIV or CJD infection, active malignant disease or a history of malignancy that poses a high risk for transmission irrespective of the apparent disease-free period (e.g. melanoma, choriocarcinoma).

Patients with a past malignancy and a long cancer-free interval represent a small risk of transmission and patients with a past malignancy and a long cancer-free period (e.g. melanoma, choriocarcinoma). Those with treated bacterial infection (including meningococcal infection), infection with Hepatitis B or C virus, or risk factors for HIV or viral Hepatitis may also be suitable organ donors and should be referred to the State Donation Service for careful exploration of the risk to potential recipients.

Acute organ dysfunction, in particular acute renal failure in a potential donor with prior normal renal function, is not a contraindication to donation. Older persons (e.g. up to 80 years of age) and those with a history of hypertension and diabetes mellitus are also often suitable.

Medical management of the potential donor

Cardiovascular

Autonomic storm – The period of brain herniation with brainstem compression may be accompanied by an intense sympathetic surge resulting in marked hypertension, tachycardia (or reflex bradycardia = Cushing reflex) and/or arrhythmias. This is usually of short duration but can result in cardiac ischaemia and myocardial necrosis, ECG changes and cardiac dysfunction.

Management: This is usually self-limited and no treatment is required. If antihypertensives are used, short-acting agents are preferable (e.g. esmolol, sodium nitroprusside) as longer-acting agents may exacerbate subsequent hypotension. It is unknown whether ablating the hypertension and tachycardia protects the heart and other organs from catecholamine-mediated injury.

Arrhythmias – Atrial and ventricular tachy- and brady-arrhythmias may occur. These are more likely to occur the longer the time interval between brain death and organ procurement.

Management: Maintain normal serum electrolyte concentrations, blood pressure, volume state and temperature. Standard therapy may be administered for atrial and ventricular arrhythmias (e.g. amiodarone, cardioversion). In the event of cardiac arrest, advanced cardiac life support may result in recovery of cardiac function and successful transplantation. Bradycardia is usually resistant to atropine whereas adrenaline, isoprenaline or pacing may be effective.

Hypovolaemia – This may be pre-existing or be due to polyuria secondary to diabetes insipidus (DI) and/or hyperglycaemic osmotic diuresis.

Management: Intravenous fluids to optimise volume state. Competing requirements for optimisation of organ function may produce conflicting strategies for fluid replacement. Higher rates of lung procurement are associated with a minimally positive fluid balance, whereas liberal fluid administration optimises kidney function. Early determination of the suitability for transplantation of specific organs facilitates the development of focused medical management strategies (e.g. more aggressive fluid therapy when lung donation is contraindicated).

Hypotension and/or low cardiac output – Hypovolaemia, loss of sympathetic outflow resulting in vasodilatation, cardiac dysfunction (pre-existing, sequelae of brain death).

Management: Aim for a MAP >70mmHg. Optimise volume state, start inotropic drugs. In Australia and New Zealand more than 90% of brain-dead donors receive inotropic support and noradrenaline is used in 85% of donors who require them. Other agents used include dopamine, dobutamine, adrenaline, metaraminol and vasopressin. Although there is a paucity of evidence to guide the choice of agent in terms of optimising organ perfusion and recipient outcome, this high prevalence of noradrenaline use is in the setting of a low incidence of failed physiological support and low rates of primary non-function in liver grafts and delayed function in kidney transplants. Consider hormonal therapy (especially if persistent haemodynamic...
instability and/or echocardiography demonstrates an ejection fraction <45%, see below)14-16. High inotrope requirements do not preclude successful donation and recent series have suggested limited or no relationship between inotrope dose in the donor and recipient outcome15,17,18. Nonetheless, inotrope doses should be minimised wherever possible and most donors can be managed successfully using low doses along with fluid resuscitation.

**Metabolic derangement**

Serum electrolytes should be monitored in the potential donor every 2 to 4 hours to guide fluid replacement and electrolyte supplementation. Electrolytes should be maintained within the normal range.

**Diabetes insipidus (DI)** – In approximately 80-90% of brain-dead potential donors, deficiency of antidiuretic hormone (also called ADH, arginine vasopressin, AVP, vasopressin) from the posterior pituitary results in polyuria, hypernatremia and hypovolemia19.

**Management:** DDAVP (desmopressin; 1-desamino-8-D-arginine vasopressin) or vasopressin (arginine vasopressin, AVP) should be administered early in DI. DDAVP is usually given as an IV bolus 2 to 4 mcg (paediatric dose: 0.25 to 2 mcg20-21) every 2 to 6 hours, or as required. Vasopressin is given as an IV infusion at a dose of 0.5 to 2.0 U/h (paediatric dose: 0.002 to 0.04 U/kg/h22-24). Fluid volume loss should be replaced with intravenous 5% glucose or with sterile water via a central venous catheter if there is resistant hyperglycaemia. Polyuria can be marked (e.g. > 1 L/h) resulting in hypovolaemia and attempts to replace the free water loss through the administration of large volumes of fluid may result in hyperglycaemia and hypothermia. These physiological derangements may be avoided by the prompt administration of DDAVP or vasopressin when DI is first suspected (e.g. urine output > 3ml/kg/h and a rising serum sodium), rather than awaiting confirmation from urinary/serum osmolarities/electrolytes.

**Hypernatraemia** – Pre-existing due to treatment for raised intracranial pressure, secondary to DI.

**Management:** As above. Donor hypernatremia is associated with worse recipient renal and liver function10,25.

**Hyperglycaemia** – Due to infusion of glucose-containing solutions, increases in the levels of counter-regulatory hormones and peripheral resistance to insulin. May cause osmotic diuresis and electrolyte abnormalities.

**Management** Administer an IV infusion of short-acting insulin (e.g. actrapid) to maintain blood glucose ~ 5 to 8 mmol/L. Use sterile water via a central venous catheter, rather than 5% dextrose, if intravenous free water is required.

**Hypothermia** – Loss of hypothalamic thermoregulation, inability to conserve heat by vasoconstriction or generate it by shivering and reduced heat production renders the brain-dead individual poikilothermic (body temperature varies with ambient temperature). The tendency to become hypothermic is exacerbated by exposure and cold fluid administration. Adverse effects include cardiac dysfunction, arrhythmias, coagulopathy and a leftward shift of the oxyhemoglobin dissociation curve, with reduced oxygen delivery to tissues. Temperatures <35°C preclude or delay the declaration of brain death through clinical brain death testing.

**Management:** Hypothermia is easier to prevent than reverse. Use warming blankets, humidification and heating of inhaled gases and warmed intravenous fluids if large volumes are required.

**Role of hormonal therapy**

Conflicting evidence exists with regard to the occurrence and clinical significance of hypothalamic-pituitary-adrenal/thyroid dysfunction in brain death. Some animal and human evidence suggests that depletion of thyroid hormone and cortisol may contribute to haemodynamic instability after brain death26-28, and that exogenous hormone therapy may improve haemodynamics and transplantation outcome29-32. However, other studies have failed to establish the presence of endocrine dysfunction after brain death33-36, or improvements with hormone replacement37,38. At best, the implementation of protocols incorporating hormonal resuscitation, along with other measures (e.g. donor management by dedicated physicians, pulmonary artery catheterisation, aggressive fluid resuscitation, early use of vaspressors) have been reported to result in improved haemodynamic stability and utilisation of organs, but it is unknown which component(s) of these protocols is responsible for improved outcome39,40. Current recommendations are that hormone-replacement should be considered for haemodynamically unstable potential donors requiring more than modest doses of inotropes and/or those with an ejection fraction of less than 45%14-16.
Hormonal resuscitation regimens that have been used include 14,16,20,22,41:

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<td>Arginine vasopressin (AVP)</td>
<td>0.5 - 4.0 U/h*</td>
<td>0.02 - 0.06 U/kg/h</td>
</tr>
<tr>
<td>Tri-iodothyronine (T3)</td>
<td>4 mcg IV bolus, then 3 mcg/h</td>
<td>0.05 - 0.2 microgram/kg/h</td>
</tr>
<tr>
<td>Methylprednisolone</td>
<td>15 mg/kg IV single bolus</td>
<td>15 mg/kg IV single bolus</td>
</tr>
</tbody>
</table>

*Most protocols recommend a dose of 0.5 to 4 U/h, although it has been suggested that vasopressin doses greater than 2.4 U/h may cause regional ischaemia2.

**Respiratory**

Atelectasis and pulmonary oedema – Atelectasis and pulmonary oedema (fluid overload, cardiac dysfunction, neurogenic) may result in deterioration of the donor’s cardiopulmonary status and failure of donor maintenance or of lung suitability for transplantation.

Management: Careful respiratory management including frequent suctioning, positioning and turning, ventilatory techniques that reduce atelectasis (e.g. PEEP, recruitment manoeuvres) and optimal fluid management can increase the rate of lung procurement and successful transplantation45. Any decision regarding the suitability of a potential donor’s lungs should be made only after all therapies to optimise lung function have been exhausted, and in consultation with the lung transplant unit via the State Donor Coordinator.

A retrospective review of lung donors found an association between steroid administration (methylprednisolone 15 mg/kg) and increased donor lung oxygenation and procurement43.

Anaemia/coagulopathy – Anaemia is commonly due to bleeding and may be exacerbated by coagulopathy and dilution from fluid administration. Coagulopathy may occur secondary to substances released from necrotic brain inducing fibrinolysis (especially in traumatic brain injury), or dilution from bleeding and fluid administration, and it may be worsened by hypothermia.

Management: Blood transfusion, coagulation factors and platelets may be required to correct severe anaemia or coagulopathy. Procurement should be expedited if there is a worsening coagulopathy.

**Nutrition**

Continuing enteral feeding in the potential donor up until the time of organ procurement might have beneficial effects on organ function in transplant recipients through restoring energy reserves, reducing cytokine generation, and protecting against ischaemia and reperfusion injury44.

**Conclusions**

With attentive and careful management, most potential organ donors should be able to be supported to the time of organ procurement. Optimal medical management is required in order to maximise the number of organs suitable for transplantation in each donor and to produce the best transplantation outcomes. Advice regarding the medical management of potential donors is available at all times from the local State Donation Service.

Prepared by: Dr. Helen Opdam, Intensive Care Specialist, Austin Hospital, Melbourne, Australia; Medical Consultant, LifeGift, Victorian Organ Donation Service, ARCBS.
References


Donor management guidelines

**DONOR SCREENING**

After obtaining consent from the next of kin, blood can be drawn for tissue typing and serology screening. It is the responsibility of the State Donor Coordinator to:

- organise transport of the bloods to the specified testing facility
- give advice on how the bloods need to be labelled and transported.

All blood tubes require labels containing the donor’s name, unit record number, date of birth, time and date the blood was drawn.

Please see below for general donor screening requirements.

**Serology tests** – pre-dilution/transfusion sample is required. Serum is collected from admission bloods. If unobtainable then serology can be collected in standard 2 x 8ml-serum clot activator tubes.

- HIV I and II
- HTLV 1 antibody
- Hepatitis B sAg
- Hepatitis B sAb
- Hepatitis B Core Ab
- Hepatitis C sAb

**NAT screen** (nucleic acid test) – this is not routinely performed on all donors. This testing is currently only available through the Australian Red Cross Blood Service (ARCBS). If this testing is required, the State Donor Coordinator will facilitate the process.

- HIV NAT Screen (VIC and NSW routinely test)
- HCV NAT Screen (VIC and NSW routinely test)

**Tissue typing** – tissue typing is required for cross matching of thoracic and abdominal organs and allocation of kidneys. Collected in 8–18 x 10ml ACD tubes (depending upon blood group).

**Blood group** – blood group for ABO, Rhesus factor and antibody screen will also be required prior to sending tissue-typing samples.

Blood group A or AB may require blood group subtyping to determine the A1 or A2 status. The State Donor Coordinator will facilitate this process if required.

**DONOR INVESTIGATIONS**

Following referral of a potential donor to the State Donor Coordinator and the completion of donor serology and tissue typing, the State Donor Coordinator may request further investigations to be undertaken to help expedite the donation process and alleviate lengthy time frames for the donor family. These investigations include:

- blood group (if unknown)
- bloods – full blood count, urea/creatinine, electrolytes, clotting factors, liver function tests, amylase, HbA1C, cardiac enzymes/troponin, serum lactate
- ABG [after 30 mins with FiO₂ 1.0% and 5cm PEEP] this may require repeating at varying intervals
- ECG
- chest x-ray
- transthoracic echo
- bronchoscopy – this is state specific and can be performed either in ICU or donor theatre.

The State Donor Coordinator is available at any time to discuss the above investigations with the medical and nursing staff caring for the potential donor and family.
Donor management guidelines

General Nursing Care

Good general nursing care will maximise the chance of organs and tissues being suitable for transplantation.

Eye care will influence corneal/whole eye donation. Repositioning, chest physiotherapy, general hygiene and mouth care will influence the suitability of lungs for transplantation.

As with any potential donor, the State Donor Coordinator should be contacted if there are significant changes in stability, oxygenation or inotropic requirements.

Note:
In the event that the potential donor is eligible for intestinal transplantation the State Donor Coordinator will advise the hospital staff accordingly regarding the following donor preparation:

Bowel prep:

• to be administered as soon as logically possible following family consent for donation and donor eligibility, then 1 hour prior to donor surgery

• mixture of Nystatin 30ml and Gentamycin 80mg, followed by a flush of 200ml water via NGT.

(Concentration – add an extra 6ml of Nystatin to a full 24ml bottle of Nystatin, add 1 ampoule of 80mg/2ml Gentamycin to bottle. Total volume in bottle will be 32ml. Close lid and shake well. Administer via NGT, flush with 200ml water)

• for donor <35kg, half the recipe (i.e. 15ml Nystatin with 40mg Gentamycin followed by 100ml water flush).

Further Reading


**Principle**
Guidelines for pediatric patients who may become organ donors are much the same in terms of management and suitability as for adult organ donors. It is important, however, to consider variations in management aims. Dose and delivery of medication will depend upon the age and weight of the potential pediatric donor.

**Haemodynamic management**
Adequate fluid management is the foundation of donor management. Normovolemia should be the aim to facilitate adequate BP. Monitoring with a central venous line, arterial blood pressure monitoring and continuous ECG monitoring is necessary.

Adequate BP may be achieved and maintained as follows:
- **Restore blood pressure and circulating blood volume as necessary to maintain a MAP of:**
  - 3–12 months >55 mmHg
  - 1–5 years >65 mmHg
  - 5–12 years >75 mmHg
  - >12 years >80 mmHg
- **Optimise intravascular volume as guided by CVP and restore circulating blood volumes with boluses.** The choice of replacement fluid should be based upon fluid lost.
- **Maintain Hb ~ 10 g/L**
- **Inotropes such as adrenaline and noradrenaline should be weaned off where possible.**
- **Some centres now use arginine vasopressin as a replacement.** It should be given as a continuous infusion no greater than 0.02 units/kg/hr. This is simplest to prepare as vasopressin 1 unit/kg in a 50ml syringe running at 1ml/hr. In addition, low dose adrenaline 0.1mcg/kg/min may be required, to titrate to normal MAP based on age [above].
- **Insulin infusions may be used per local ICU protocol to maintain euglycaemia.**

**Hypertension**
Hypertension is not uncommon during herniation and is usually self limiting. It may be necessary to decrease inotrope infusions. The use of first hydralazine or SNP and then a beta-blocker (i.e. metoprolol) if tachycardia is associated with the hypertension may be considered on a case by case basis.

**Respiratory management**
Respiratory management is much the same as for adults, aiming to ventilate to normocarbia with:
- **Vt 6–8 ml/kg**
- **FiO₂ to maintain PaO₂ > 80mmHg**
- **PEEP 5–10 cm H₂O**
- **Peak inspiratory pressures <35mmHg.**

Strict asepsis and physiotherapy, suctioning and repositioning is extremely important in contributing to viable lungs for transplantation.

Consider also arterial blood gases, with frequency and results to be discussed with the State Donor Coordinator.

A broad spectrum antibiotic should also be considered.

**Metabolic/endocrine management**
Anticipate and prevent hypothermia and prolonged exposure. Actively warm as necessary. Regular and frequent serum electrolyte levels should be done as electrolyte derangement is not uncommon. Polyruga secondary to diabetes insipidus may cause electrolyte fluctuations that must be treated appropriately.

Hypernatraemia Na >155mmol/L is particularly significant as it is associated with poor liver and kidney transplant outcomes.

Polyuria may be reduced with the use of arginine vasopressin as part a hormone package, however, when this hormone therapy is not being utilised, DDAVP (either IV or intranasal) is traditionally used to treat diabetes insipidus.

Consider an insulin infusion with a sliding scale to maintain euglycaemia.

**General nursing care**
Good general nursing care will maximise the chance of organs and tissues being suitable for transplantation.

Eye care will influence corneal donation. Repositioning, general hygiene and mouth care will influence the suitability of lungs for transplantation.

As with any potential donor, the State Donor Coordinator should be contacted if there are significant changes in stability, oxygenation or inotropic requirements.
The average time frames for coordinating the organ and tissue donation process, from the time of arrival at the donor hospital to completion of procurement surgery includes:

- renal only donation 6–12 hours
- multi-organ donation 16–24 hours.

The first half of the coordination process can take around 9–17 hours. The time will vary and is dependent on:

- donor family needs
- needs of the donor hospital intensive care unit
- tissue typing/cross matching of suitable recipients

Time frames for procurement surgery are between 3 and 7 hours depending on which organs are being retrieved.

It is the responsibility of the State Donor Coordinator to establish the time that the donor will be taken to theatre for organ retrieval.

Transplant teams are expected to make every effort to meet the requirements of the donor hospital but sometimes there are unavoidable delays and the timing is anything but convenient.

The altruism of the donor and/or donor family should be respected and anaesthetic staff of appropriate experience need to make themselves available to provide appropriate care. Good care of the donor may be reflected in good organ function in up to 7 recipients.

Negotiation and flexibility are necessary to accommodate the needs of the hospital and donor family.
8 INFORMATION FOR ANAESTHETIC STAFF ON MANAGEMENT OF THE MULTI-ORGAN DONOR

This chapter includes information on the role of the anaesthetist in organ procurement, haemodynamic management of the donor, drugs required for the procedure and the retrieval process.

BACKGROUND

Most anaesthetic staff are rarely involved in organ retrieval operations. Retrieval teams do not routinely provide an anaesthetist. They rely on the staff of the donor hospital to provide one.

The primary role of the anaesthetist is to ensure optimal perfusion and protection of the organs during surgery by optimising the donor’s haemodynamic status and gas exchange until cross clamping of the aorta. Common complications of brain death include hypovolaemia, hypothermia and autonomic dysfunction. Inotropic and volume supports are usually required. After cross clamp the anaesthetist will cease ventilation.

The following guidelines are designed to assist anaesthetic staff in pre-operative and intra-operative management as well as give a brief description of the operative procedure. The specific drugs used intra-operatively can be discussed with the State Donor Coordinator and relevant retrieval teams.

The State Donor Coordinator will contact the anaesthetist and operating theatre staff to arrange a suitable theatre time and advise which teams will be attending. Time is not usually a problem provided the donor is stable in cardiovascular terms, but every effort is made to expedite the process. If the donor family requests the procedure to occur with minimum delay, the ICU is under pressure regarding bed space or the donor is unstable, then an earlier theatre starting time may be requested.

In all cases, a State Donor Coordinator will be present.

PERI-OPERATIVE DONOR MANAGEMENT

General

The altruism of the donor has the potential to save the lives of multiple recipients. Thus, there are several patients on the table, not just one. Meticulous anaesthetic management by experienced personnel is required and justified.

Organ procurement is major surgery. Brain protection therapy is no longer required. Attention to organ perfusion is now the goal. The residual effects of brain protection therapy (e.g. dehydration) may need to be corrected.

Brain death results in:

- unstable haemodynamics, hypothermia, diabetes insipidus
- persisting spinal reflexes, both neuromuscular and autonomic
- ECG changes, arrhythmias and decreased myocardial compliance – these occur early and complete cardiac standstill will eventually occur.

Cardiovascular management

Donors may be dehydrated from attempts to control intracranial pressure or from diabetes insipidus. Urine output is often high because of diabetes insipidus but may be low if DDAVP has been given. Crystalloid and colloid fluids may be required to restore intravascular volume. MAP should be maintained between 60 and 70 mmHg. If fluid loading alone is used the heart often becomes quite distended. Inotropes and vasoconstrictors are often required. Circulatory failure during the procedure is common if temperature falls below 35°C. Some instability should be anticipated during placement of slings around the IVC and aorta and during handling of the heart and vessels in the chest.

Brain dead donors do not have intact homeostasis for thermoregulation, renal function or cardiovascular reflexes.
Respiratory management

Ventilate to end tidal CO₂ of 30–35 mmHg. Give oxygen or oxygen/air with low PEEP to maintain full expansion of the lungs after the pleural cavities have been opened. Neurogenic pulmonary oedema is poorly understood. Conventional treatment with PEEP and diuretics may not be appropriate, as PCWP (if measured) is often low. Vasodilators are usually effective and either GTN or sodium nitroprusside at a dose of 0.5 mcg/kg/min can be used.

Fluid management

When intravascular volume has been fully restored there may be a dilutional anaemia. It is desirable that Hb be maintained >80 g/l for the liver but the decision to transfuse should be discussed with the surgical teams. When the donor is reasonably stable and the procedure nearly complete, it may be better to accept a low Hb rather than add potential risks of transfusion.

The largest operating room available should be used subject to other needs of the donor hospital. A large number of staff may be present and crowding can make the procedure more difficult for all staff involved. The State Donor Coordinator, retrieval teams, scrub nurse and anaesthetist should check the legal documentation in the medical record prior to commencement of the procedure.

Equipment

Monitoring is likely to include ECG, oximetry, two invasive pressures (arterial and CVP), capnography and temperature. The arterial cannula is preferably placed in the left radial artery as this provides access to the brachiocephalic artery. The brachio-cephalic artery is divided at the time of lung retrieval. Along with this, preparation for perfusion of the liver can include ligation of the iliac arteries and/or distal aorta. It is preferable that the femoral artery not be used. If femoral IV access is being utilised consider a radial insertion prior to theatre. Although invasive monitoring is not essential, it should be used if available as donors may become unstable at any stage of the procedure.

A diathermy will be required and at least 2 suction sets are required for the surgical field. Suction reservoirs need to have capacity for at least 15 litres.

Positioning

Check body positioning with transplant teams – these are the possible positions they may choose:

- arms by the side
- arms outstretched 90-degree angle.
- arms hyperextended and taped above head.

Supine with both arms hyperextended above the head gives best access for both the surgical teams and the anaesthetist. Usual concerns about traction on structures of the axilla do not apply. The anaesthetist needs access to the IV, the CVC may need to be slightly withdrawn for ligation of the SVC and access to the arterial line for sampling.

Medication administration

A long acting muscle relaxant of the anaesthetist’s choice is given prior to the surgical procedure, after consultation with the retrieval team.

Check with the State Donor Coordinator before administering inotropes and vasoconstrictors that may be required to maintain acceptable circulatory parameters.

When dissection is complete, heparin 300 units/kg (20,000 to 25,000 units) is administered and the various intravascular cannulae are placed for organ perfusion. The surgeon will advise the anaesthetist when to administer the heparin.

Chlorpromazine may be used for its alpha blocking properties to ensure renal blood flow after implanting and to aid liver protection. It should only be given immediately before circulatory arrest is initiated because of the profound hypotension. Surgeons will
advise the anaesthetist if and when to administer the chlorpromazine. Chlorpromazine may be given when lungs are not being retrieved.

If lungs are also being retrieved then a prostacyclin infusion may be used for the pulmonary circulation. This is supplied by the cardiothoracic retrieval team. If prostacyclin is used, then chlorpromazine is usually not required.

Most states use methylprednisolone and a broad-spectrum antibiotic. The timing of administration varies, commonly it is administered in the Intensive Care Unit or at the commencement of donor surgery.

Medications summary – quick guide

The State Donor Coordinator will indicate specific use and doses:

- muscle relaxant
- methylprednisolone 1g (administered either in ICU or at commencement of donor surgery)
- broad spectrum antibiotic (e.g. timentin at commencement of donor surgery)
- heparin 20,000 – 25,000 units (prior to placement of cannula)
- chlorpromazine 50 – 250mg (just prior to cross clamp when lungs are not being retrieved)
- prostacyclin infusion is used instead of chlorpromazine if lungs are being procured.

SURGICAL OUTLINE

An abdominal midline incision is made for procurement of the liver, intestines/stomach, kidneys and pancreas. This is extended upwards when heart and lung procurement is to be carried out. A sternotomy may still be required even if the thoracic organs are not to be donated as it allows more direct access to the liver and supra hepatic cava. The usual sequence of events is for the liver or pancreas team to commence mobilisation and dissection of the liver, intestines/stomach, pancreas and kidneys. The portal vein and iliac artery are prepared for cannulation and the abdominal aorta and IVC slung. It is important to note that some states only perfuse the abdominal organs through the aorta. This stage may take approximately 1–2 hours.

If biopsies for liver and kidney are being considered, they may be taken at this time.

If the pancreas is to be retrieved, the surgeon may ask for approximately 60mls of aqueous betadine to be instilled via the nasogastric tube.

The thoracic organs require little mobilisation but it is helpful to maintain neuromuscular blocking because the diaphragm may twitch when the phrenic nerve is stimulated if diathermy is used to resect the pericardium. A cannula is placed in the ascending aorta for administration of cardioplegia and if lungs are being procured, a cannula is placed in the pulmonary artery for delivery of pneumoplegia.

If the lungs are to be retrieved, the perfusionist may ask for 300ml of donor blood to be removed. This is used as part of the pneumoplegic solution. Sometimes a bronchoscopy is performed prior to lung removal. In these cases a respiratory physician may attend and bring the necessary equipment, or donor hospital equipment may be sought.

When the heart, but not the lungs, is being procured, the cardiac surgeon will usually ask the anaesthetist/cardiac anaesthetist/technician to deliver the cardioplegia. If the patient has a central line in situ, the anaesthetist needs to withdraw the line as directed by the surgeon. The cardioplegia is run briskly, immediately after the aorta is cross-clamped. It is important NOT to have a time delay as this may lead to a period of warm ischaemia, which is critically important to avoid.

When the abdominal team has completed its dissection, they will stand aside while the cardiac team opens the pericardium and performs as much dissection as is necessary prior to cross-clamp. The thoracic team arrives last and leaves first.

Heparin is then given as requested by the surgeon, prior to cannulation. When all the cannulae are in place, the surgical teams confirm that they are ready to perfuse the organs. It is at this point that slight withdrawal of the central line to allow ligation of the SVC may be required. The IVC is clamped above the diaphragm and the liver team may open the clamp on their IVC cannula to siphon venous blood into a collecting bag.

When the heart is empty, the aorta is cross-clamped and all the perfusion fluids are run in quickly at this point, the object being to not have a period of warm ischaemia. The IVC is opened to allow release of the cardioplegia returning from the coronary sinus. Pneumoplegia is also commenced and the left appendage is incised to allow efflux of pneumoplegia, which flows from the pulmonary artery through the lungs and back into the left atrium.
Lung inflation is maintained while the pneumoplegia is infused. There are (at least) two schools of thought as to the gas with which the lungs are inflated. One prefers air or air/oxygen mix to minimise absorption atelectasis and avoid the theoretical risk of oxygen toxicity. Another idea is that the oxygen in alveolae contributes to cell survival during the ischaemic interval and so prefers use of 100% O₂. It is therefore best to ask the retrieval team of their preference.

For lung donors, prior to infusion of pneumoplegia, the lungs are ventilated with air and during the infusion, the lungs are held at mid-inspiration. This is most readily done by placing a chest drain clamp across the endotracheal tube. The pneumoplegia infusion is commenced and the tip of the left atrium incised to allow free efflux of the return from the pulmonary veins. Infusions of the preservation solutions are usually administered by members of the visiting donor team. At times, assistance is required from the hospital staff.

The time of cross clamp (just prior to perfusion) is noted. This is documented by the State Donor Coordinator and retrieval teams, and records the beginning of ischaemic time. This is not the legal time of death, the legal time of death is documented as the second set of brain stem testing or completion of perfusion studies.

There is still some final dissection and removal work to be performed but the clinical role of the anaesthetist is now complete. The organs are removed in order of heart/lung bloc followed some minutes later by the liver, intestines/stomach, pancreas, kidneys and extra vessels. Sections of spleen and lymph nodes may be removed for retrospective tissue typing. The surgical incision is closed and dressed and aesthetic appearance is restored.

The State Donor Coordinator will confirm whether lines can be removed or need to stay in situ for coronial post mortem.

If eye and tissue removal is to occur (i.e. heart valves, eye tissue, bone and skin) this may follow the retrieval of solid organs, either in the operating theatre or later in the mortuary or tissue bank.

The State Donor Coordinator will generally stay in theatre, time permitting, and help prepare the body so that the family can have a viewing if they wish. This is often the most difficult time when all the surgical teams have left and silence returns to the operating suite.

The surgeons visiting the donor hospital are privileged to be invited and are thankful for the staff’s help. Understanding the role of surgeons and anaesthetist is essential for optimal donor care and the best outcome for the recipients.

A State Donor Coordinator will coordinate all aspects of the donation process in both the ICU and operating theatre.
## General Theatre Requirements

The State Donor Coordinator will communicate with the nurse in charge of the operating room regarding which retrieval teams are involved.

<table>
<thead>
<tr>
<th>Staffing: (Section A)</th>
<th>Anaesthetist</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anaesthetic nurse</td>
</tr>
<tr>
<td></td>
<td>Scrub nurse</td>
</tr>
<tr>
<td></td>
<td>Circulating nurse</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Furniture and equipment: (Section B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard theatre set up plus:</td>
</tr>
<tr>
<td>Extra trolleys x 2 (for back table perfusion)</td>
</tr>
<tr>
<td>Extra drip stands x 2</td>
</tr>
<tr>
<td>Multi-bottle suction units x 2 (with spare containers) – large</td>
</tr>
<tr>
<td>Sterile splash bowls for perfusion trolleys x 5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drapes: (Section C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major drapes</td>
</tr>
<tr>
<td>Waterproof sheets</td>
</tr>
<tr>
<td>Gown bundles x 3/gloves</td>
</tr>
<tr>
<td>Plastic aprons</td>
</tr>
</tbody>
</table>

### Sterile extras:

- Small sponges [4 packets]
- Raytec [2 packets]

### Have available:

- Sterile light handle x 2
- Sucker tubing x 2
- TUR giving set
- Donation giving set
- Sterile bowel bag x 3 bags per organ
- 0 Mersilene ties
- 2/0 Mersilene ties
- Blades No. 10, 15 and 23
- Medium ligaclips
- 500ml bags cold saline x 4

### Instruments:

- Laparotomy tray
- Arterial tray
- Large Balfour Dayne retractor
- Mallet
- Sterile saw

**Crushed ice** to be supplied by donor hospital, if unavailable please discuss this with the State Donor Coordinator.
### State-Specific Theatre Requirements

**New South Wales/Australian Capital Territory**

#### State Donor Coordinator supplies:
Eskies for corneas, heart valves, kidneys, spleen for research and pancreas for research.

#### Heart/lung retrieval:

**Donor hospital provides:**

<table>
<thead>
<tr>
<th>Theatre set-up</th>
<th>Extras</th>
</tr>
</thead>
<tbody>
<tr>
<td>General requirements</td>
<td>3 x Crilewood/ Mayo Hegar needle holders 229mm</td>
</tr>
</tbody>
</table>

#### Abdominal retrieval:

**Donor hospital provides:**

<table>
<thead>
<tr>
<th>Theatre set-up</th>
<th>Extras</th>
</tr>
</thead>
<tbody>
<tr>
<td>General requirements</td>
<td>Section E Unsterile ice chips</td>
</tr>
<tr>
<td>Section A</td>
<td></td>
</tr>
<tr>
<td>Section B</td>
<td></td>
</tr>
<tr>
<td>Section C</td>
<td></td>
</tr>
<tr>
<td>Section D</td>
<td></td>
</tr>
</tbody>
</table>

**Retrieval team brings with them donor suitcase (large):**

<table>
<thead>
<tr>
<th><strong>Donor tray</strong></th>
<th><strong>Heart/lung sutures/equipment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x Glover clamp</td>
<td>2 x 4/0 prolene DA</td>
</tr>
<tr>
<td>1 x Small Debakey clamp</td>
<td>1 x nylon tapes</td>
</tr>
<tr>
<td>1 x Haugh Nagel clamp</td>
<td>1 x pulmonary artery vent</td>
</tr>
<tr>
<td>1 x Semb clamp</td>
<td>3 x cardioplegia lines</td>
</tr>
<tr>
<td>1 x Harrah clamp</td>
<td>1 x 3-way tape</td>
</tr>
<tr>
<td>1 x Morse retractor</td>
<td>1 x aortic root needle</td>
</tr>
<tr>
<td>1 x long probe</td>
<td>3 x 0 silk</td>
</tr>
<tr>
<td>1 x O’Shaughnessy right angle forceps</td>
<td>1 x silk tie</td>
</tr>
<tr>
<td>1 x Roberts clamp</td>
<td>1 x extension line</td>
</tr>
<tr>
<td>1 x Mayo scissors</td>
<td>1 x bulb syringe</td>
</tr>
<tr>
<td>1 x Needle holder</td>
<td>1 x 0 mersilk</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Other items</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3/0 silk TS1 x TR60G</td>
<td></td>
</tr>
<tr>
<td>Linear stapler</td>
<td></td>
</tr>
<tr>
<td>2 x TR60G reloads</td>
<td></td>
</tr>
<tr>
<td>1 x saw blade</td>
<td></td>
</tr>
<tr>
<td>3 x donor bags</td>
<td></td>
</tr>
<tr>
<td>3 x bowel bags</td>
<td></td>
</tr>
<tr>
<td>1 x Pulmonary Artery vent</td>
<td></td>
</tr>
<tr>
<td>1 x Aortic Root needle</td>
<td></td>
</tr>
<tr>
<td>2 x Snuggers</td>
<td></td>
</tr>
<tr>
<td>2 x Yellow Garbage bags</td>
<td></td>
</tr>
<tr>
<td>1 x Mayo scissors</td>
<td></td>
</tr>
</tbody>
</table>

**Cardioplegia/ pneumoplegia/ accessories/esky**

<table>
<thead>
<tr>
<th><strong>DCD Intubation tray/ equipment</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x Greenspex laryngoscope handle</td>
<td></td>
</tr>
<tr>
<td>2 x Laryngoscope blade (single use)</td>
<td></td>
</tr>
<tr>
<td>1 x Magills Forcep (sterile)</td>
<td></td>
</tr>
<tr>
<td>1 x Trachy tape</td>
<td></td>
</tr>
<tr>
<td>1 x Endotracheal tube, sizes 7Fr, 8Fr, 9Fr</td>
<td></td>
</tr>
</tbody>
</table>

**Procurement set (total 28 items)**

<table>
<thead>
<tr>
<th><strong>Surgicare pack x 2</strong></th>
<th><strong>(1 spare)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x skin clips</td>
<td>1 x perfusion set</td>
</tr>
<tr>
<td>2 x syringes 20ml</td>
<td>1 x infant feeding tubes 5FG</td>
</tr>
<tr>
<td>1 x Finocchietto rib spreader</td>
<td>1 x infant feeding tubes 8FG</td>
</tr>
<tr>
<td>1 x mallet</td>
<td>3 x draw string bags</td>
</tr>
<tr>
<td>1 x Liebsche chisel</td>
<td>2 x sponge bags (containing 5 each)</td>
</tr>
<tr>
<td>1 x Dennis Brown sucker</td>
<td>1 x cable ties 15 pack</td>
</tr>
<tr>
<td>1 x approximating forceps</td>
<td>2 x maxi vessel loops</td>
</tr>
<tr>
<td>1 x Laeys scissors</td>
<td>8 x foot bags</td>
</tr>
<tr>
<td>1 x Mayo curved scissors</td>
<td></td>
</tr>
<tr>
<td>1 x Metzenbaum scissors</td>
<td></td>
</tr>
<tr>
<td>1 x Roberts scissors</td>
<td></td>
</tr>
<tr>
<td>1 x DeBakey 20cm x1</td>
<td></td>
</tr>
<tr>
<td>2 x DeBakey 20cm Chunky clamps</td>
<td></td>
</tr>
<tr>
<td>1 x DeBakey 15cm x1</td>
<td></td>
</tr>
<tr>
<td>1 x Geralds forceps x 1</td>
<td></td>
</tr>
<tr>
<td>1 x Needleholder 15cm</td>
<td></td>
</tr>
<tr>
<td>2 x line clamps</td>
<td></td>
</tr>
<tr>
<td>1 x curved Debakey clamp 23cm</td>
<td></td>
</tr>
<tr>
<td>1 x Glover vascular</td>
<td></td>
</tr>
<tr>
<td>1 x DeBakey curved</td>
<td></td>
</tr>
<tr>
<td>1 x DeBakey angled</td>
<td></td>
</tr>
<tr>
<td>1 x Laeys 20cm</td>
<td></td>
</tr>
<tr>
<td>Stryker saw (sterile)</td>
<td></td>
</tr>
<tr>
<td>2 x perfusion sets (spare)</td>
<td></td>
</tr>
<tr>
<td>3 x Bard max core biopsy instruments x 3</td>
<td></td>
</tr>
<tr>
<td>2 x TCR 75 x1 and refills x 2 for pancreas procurement</td>
<td></td>
</tr>
</tbody>
</table>

**Suture pack**

| 1 x silk SA 10 | |
| 1 x 5/0 prolene B890H | |
| 2 x 2/0 vicryl ties on a liga reel J205G | |
| 1 x IPDS loop TPI 2880 | |
| 1 x cable gun | |
| 1 x bone wax W810 | |
| 1 x Stryker saw blade | |

**For split liver**

| 1 x short non stick diathermy | |
| 5/0 prolene sa 8890 | |
| 5 x surgicel | |
| 6/0 prolene da 8706 | |
| 6/0 prolene da 8706 | |
| Fine Laeys | |
| 2 x ligaclip applic(disp) cat TIM20 | |

**Small suitcase containing**

<table>
<thead>
<tr>
<th>Saw console and lead</th>
<th>Box of spares and saw blades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spare retractor blades</td>
<td></td>
</tr>
<tr>
<td>Esky containing sterile ice and large sterile container</td>
<td></td>
</tr>
</tbody>
</table>
### Victoria/Tasmania

#### State Donor Coordinator supplies:
Eskies for kidneys/pancreas/intestines/stomach/heart for valves (if applicable)

#### Heart/lung retrieval:

<table>
<thead>
<tr>
<th>Donor hospital provides:</th>
<th>Retrieval team brings with them donor suitcase:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theatre set-up</strong></td>
<td><strong>Heart/lung sutures/equipment</strong></td>
</tr>
<tr>
<td>General requirements</td>
<td>1 x 1 SoftSilk ties S317 (open)</td>
</tr>
<tr>
<td>Section A</td>
<td>6 x 2 SoftSilk Atr VS 845 (open 4)</td>
</tr>
<tr>
<td>Section B</td>
<td>2 x 4/0 Surgipro VP 8557H (open)</td>
</tr>
<tr>
<td>Section C</td>
<td>1 x nylon tape (avail)</td>
</tr>
<tr>
<td>Section D</td>
<td>1 x 18fr venous return catheter (open)</td>
</tr>
<tr>
<td></td>
<td>1 x 1 SoftSilk Atr VS 845 (open 4)</td>
</tr>
<tr>
<td></td>
<td>2 x 4/0 Surgipro VP 8557H (open)</td>
</tr>
<tr>
<td></td>
<td>1 x nylon tape (avail)</td>
</tr>
<tr>
<td></td>
<td>1 x 18fr venous return catheter (open)</td>
</tr>
<tr>
<td></td>
<td>1 x pneuoplegia set (open)</td>
</tr>
<tr>
<td></td>
<td>1 x Sams cardioplegia set (open)</td>
</tr>
<tr>
<td></td>
<td>1 x transparent cardioplegia set (open)</td>
</tr>
<tr>
<td></td>
<td>1 x 850x500mm donor organ bags (open 3 initially)</td>
</tr>
<tr>
<td></td>
<td>3 x 250x250mm donor organ bags (open 3 initially)</td>
</tr>
<tr>
<td></td>
<td>1 x Sams cardioplegia set (open)</td>
</tr>
<tr>
<td></td>
<td>6 x 1 SoftSilk ties S306 (open)</td>
</tr>
<tr>
<td></td>
<td>2 x 4/0 surgipro VP 8577 (open)</td>
</tr>
<tr>
<td></td>
<td>1 x Sams cardioplegia set (open)</td>
</tr>
<tr>
<td></td>
<td>1 x transparent cardioplegia set (open)</td>
</tr>
<tr>
<td></td>
<td>3 x 250x250mm donor organ bags (open)</td>
</tr>
<tr>
<td></td>
<td>1 x 18g whistle tip catheter (open)</td>
</tr>
<tr>
<td></td>
<td>1 x clear plastic bag (yellow biohazard sticker stuck on for used donor tray)</td>
</tr>
<tr>
<td></td>
<td>1 x 250x250mm donor organ bags (open)</td>
</tr>
<tr>
<td></td>
<td>3 x 250x250mm donor organ bags (open)</td>
</tr>
<tr>
<td></td>
<td>1 x cytoscopy irrigation set (open)</td>
</tr>
<tr>
<td></td>
<td>1 x clear garbage bag with biohazard sticker (for donor tray)</td>
</tr>
<tr>
<td></td>
<td>1 x clear garbage bag with biohazard sticker (for donor tray)</td>
</tr>
<tr>
<td></td>
<td>1 x clear garbage bag with biohazard sticker (for donor tray)</td>
</tr>
<tr>
<td></td>
<td>1 x clear garbage bag with biohazard sticker (for donor tray)</td>
</tr>
</tbody>
</table>

#### Extra requirements

- Flexible bronchoscope
- Sterile internal defibrillator paddles
- Laparotomy tray
- 2 x 73/4 DeBakey dissecting forceps
- 1 SoftSilk ties S317 (open)
- 6 x 2 SoftSilk Atr VS 845 (open 4)
- 2 x 4/0 Surgipro VP 8557H (open)
- 1 x nylon tape (avail)
- 1 x 18fr venous return catheter (open)
- 1 x pneuoplegia set (open)
- 1 x Sams cardioplegia set (open)
- 1 x transparent cardioplegia set (open)
- 1 x 850x500mm donor organ bags (open 3 initially)
- 3 x 250x250mm donor organ bags (open 3 initially)
- 1 x Sams cardioplegia set (open)
- 6 x 1 SoftSilk ties S306 (open)
- 2 x 4/0 surgipro VP 8577 (open)
- 1 x Sams cardioplegia set (open)
- 1 x transparent cardioplegia set (open)
- 3 x 250x250mm donor organ bags (open)
- 1 x 18g whistle tip catheter (open)
- 1 x clear plastic bag (yellow biohazard sticker stuck on for used donor tray)
- 1 x 250x250mm donor organ bags (open)
- 3 x 250x250mm donor organ bags (open)
- 1 x cytoscopy irrigation set (open)
- 1 x clear garbage bag with biohazard sticker (for donor tray)
- 1 x clear garbage bag with biohazard sticker (for donor tray)
- 1 x clear garbage bag with biohazard sticker (for donor tray)

#### Blood tubes
1 x EDTA
2 x serum tubes preferably with gel
1 x 2oz sterile specimen pot
4 x sodium heparin tubes

#### Drugs
4 x amps monosodium L aspirate 14mmol/10ml
2 x amps sodium bicarbonate 8.4% in 10ml

#### Drugs
1 x bottle tham 3.5g/100ml in 500ml bottle
5 x amps calcium chloride 740mg/5ml
5 x amps GTN 50ml/10ml
4 x amps monosodium L aspirate 14mmol/10ml
2 x amps sodium bicarbonate 8.4% in 10ml
1 x Endotracheal tube, sizes 7fr, 8fr, 9fr

#### Extras (not to be opened unless required (purple courier bag))
- 2 x 18g whistle tip catheters
- 3 x 250x250mm donor organ bags
- 1 x PI 30, 30-4.8 staple
- 1 x PI 30, 30-4.8 reload units
- 1 x Sams cardioplegia needle
- 2 x 18fr venous return catheter
- 1 x pneumoplegia
- 1 x transparent cardioplegia set
- 1 x M/F 180cm monitoring line
Abdominal retrieval:
(Usually the liver transplant surgeons also perform the nephrectomy)

Donor hospital provides:

<table>
<thead>
<tr>
<th>Theatre set-up</th>
<th>Extras</th>
</tr>
</thead>
<tbody>
<tr>
<td>General requirements</td>
<td>1 x arterial tray</td>
</tr>
<tr>
<td>Section A</td>
<td>1 x general abdominal tray</td>
</tr>
<tr>
<td>Section B</td>
<td>1 x abdominal retractor</td>
</tr>
<tr>
<td>Section C</td>
<td>1 x Finochette chest retractor</td>
</tr>
<tr>
<td>Section D</td>
<td>2 x buckets unsterile ice chips</td>
</tr>
</tbody>
</table>

Retrieval team brings with them liver donor case:

Folder with donor OP forms
Drawstring bags x 15
Headbands x 2
Safety glasses x 1
Specimen carrier bags x 12
Clamps x 2
Liver Balfour Doyen retractor
Spike Dialysis x 3
Surgical marker x 1

Cannulas
Arterial 22fr x 3
Arterial 20fr x 3
Portal Jostra 12fr x 3

Blood tubes
Pink tops x 12
White tops x 12
Purple tops x 4
Blue tops x 4

Storage and preservation equipment
Transport Esky ¾ full ice
Cell saver reservoir when taking blood
4-5 1 litre bags of sterile frozen saline

When perfusing with UW – 4-5 litres of UW/4 litres of Ross
When perfusing with HTK – 10 litres of HTK solution

Note: Pneumatic sternal saw is bought to the donor hospital by the liver unit on request by the hospital or surgeon.

This is the only sterile equipment bought with the liver transplant team, all other sterile equipment is supplied by the donor hospital.
Queensland

Abdominal retrieval:

Donor hospital provides:

<table>
<thead>
<tr>
<th>Theatre set-up</th>
<th>General requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Section A</td>
</tr>
<tr>
<td></td>
<td>Section B</td>
</tr>
<tr>
<td></td>
<td>Section C</td>
</tr>
<tr>
<td></td>
<td>Section D</td>
</tr>
</tbody>
</table>

Retrieval team brings with them:

**Instruments:**
- Complete donor instrument tray
- Chest and abdominal retractors
- Sternal saw (battery operated)
- Spare battery
- Sterile extra’s
- Drugs and fluids
- Eskies for abdominal organs

**Instrument tray:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 7” needle holders</td>
<td></td>
</tr>
<tr>
<td>1 x 7” vascular needle holder</td>
<td></td>
</tr>
<tr>
<td>5 x Roberts artery forceps</td>
<td></td>
</tr>
<tr>
<td>5 x Heiss artery forceps</td>
<td></td>
</tr>
<tr>
<td>2 x Lahey right angle clamps</td>
<td></td>
</tr>
<tr>
<td>2 x tube clamps</td>
<td></td>
</tr>
<tr>
<td>3 x Debakey clamps</td>
<td></td>
</tr>
<tr>
<td>10 x Cyles artery clamps</td>
<td></td>
</tr>
<tr>
<td>1 x small 5” right angle clamp</td>
<td></td>
</tr>
<tr>
<td>5 x curved mosquito artery forceps</td>
<td></td>
</tr>
<tr>
<td>2 x baby Debakey clamps</td>
<td></td>
</tr>
<tr>
<td>2 x 9” Metzenbaum scissors</td>
<td></td>
</tr>
<tr>
<td>3 x straight Mayo scissors</td>
<td></td>
</tr>
<tr>
<td>2 x Metzenbaum scissors</td>
<td></td>
</tr>
<tr>
<td>1 x Potts his scissors</td>
<td></td>
</tr>
<tr>
<td>6 x towel clips</td>
<td></td>
</tr>
<tr>
<td>1 x hammer</td>
<td></td>
</tr>
<tr>
<td>4 x Tibbs cannulae</td>
<td></td>
</tr>
<tr>
<td>1 x No 5 BP handle</td>
<td></td>
</tr>
<tr>
<td>1 x No 3 BP handle</td>
<td></td>
</tr>
<tr>
<td>3 x long Debakey forceps</td>
<td></td>
</tr>
<tr>
<td>3 x short Debakey forceps</td>
<td></td>
</tr>
<tr>
<td>2 x 6” toothed forceps</td>
<td></td>
</tr>
<tr>
<td>1 x 6” plain forceps</td>
<td></td>
</tr>
<tr>
<td>1 x Debakey gerald non-toother forcep</td>
<td></td>
</tr>
</tbody>
</table>

**Sterile extras**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x Double Downs tubing</td>
<td></td>
</tr>
<tr>
<td>1 x Bahnson cannula size 30</td>
<td></td>
</tr>
<tr>
<td>1 x Bahnson cannula size 22</td>
<td></td>
</tr>
<tr>
<td>2 x angled cannulae sizes 10 and 12</td>
<td></td>
</tr>
<tr>
<td>2 x IV giving sets</td>
<td></td>
</tr>
<tr>
<td>1 x 50 ml catheter tip syringe</td>
<td></td>
</tr>
<tr>
<td>1 x 20 ml syringe</td>
<td></td>
</tr>
<tr>
<td>1 x portal cannula – size 8 tipped</td>
<td></td>
</tr>
<tr>
<td>1 x portal cannula – size 8 belled</td>
<td></td>
</tr>
<tr>
<td>1 x portal cannula – size 10 tipped</td>
<td></td>
</tr>
<tr>
<td>1 x portal cannula – size 10 belled</td>
<td></td>
</tr>
<tr>
<td>1 x portal cannula – size 12 tipped</td>
<td></td>
</tr>
<tr>
<td>1 x portal cannula – size 12 belled</td>
<td></td>
</tr>
<tr>
<td>2 x peanuts</td>
<td></td>
</tr>
<tr>
<td>1 x diathermy</td>
<td></td>
</tr>
<tr>
<td>2 x scratchy’s</td>
<td></td>
</tr>
<tr>
<td>1 x saw blade (spare)</td>
<td></td>
</tr>
<tr>
<td>2 x arterial slings</td>
<td></td>
</tr>
<tr>
<td>2 x skin staplers</td>
<td></td>
</tr>
<tr>
<td>1 x 85 cm x 55 cm opsite</td>
<td></td>
</tr>
<tr>
<td>2 x haemoclips (selection of sm, med, large)</td>
<td></td>
</tr>
<tr>
<td>8 x drawstring bags</td>
<td></td>
</tr>
<tr>
<td>1 x specimen jars (6)</td>
<td></td>
</tr>
<tr>
<td>1 x 6” plain forceps</td>
<td></td>
</tr>
<tr>
<td>1 x No. 10 blade</td>
<td></td>
</tr>
<tr>
<td>1 x No. 15 blade</td>
<td></td>
</tr>
<tr>
<td>1 x pressure cuff (in box)</td>
<td></td>
</tr>
<tr>
<td>Argyie chest tubes – sizes 12, 16 &amp; 20</td>
<td></td>
</tr>
</tbody>
</table>

**Suture box**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 4/0 prolene</td>
<td></td>
</tr>
<tr>
<td>2 x 5/0 prolene</td>
<td></td>
</tr>
<tr>
<td>2 x 6/0 prolene</td>
<td></td>
</tr>
<tr>
<td>2 x 7/0 prolene</td>
<td></td>
</tr>
<tr>
<td>2 x 2/0 chromic G123</td>
<td></td>
</tr>
<tr>
<td>4 x 2/0 linen ties</td>
<td></td>
</tr>
<tr>
<td>4 x 3/0 silk ties</td>
<td></td>
</tr>
<tr>
<td>4 x 4/0 silk ties</td>
<td></td>
</tr>
<tr>
<td>2 x 2 marsilk ties</td>
<td></td>
</tr>
<tr>
<td>3 x 1 nylon A999</td>
<td></td>
</tr>
<tr>
<td>2 x bone wax</td>
<td></td>
</tr>
<tr>
<td>1 x nylon tape</td>
<td></td>
</tr>
<tr>
<td>2 x vessel loops</td>
<td></td>
</tr>
</tbody>
</table>

**Perfusion solutions**

- 6 x UW solution (7 if pancreas involved)
- 3 x cold normal saline (not sterile)
- 2 x cold normal saline (sterile)
- 3 x frozen normal saline (sterile)
- 10 x HTK solution

**UW drugs** (per litre)
- 15 mgs dexamethasone
- 40 units Insulin

**Drugs for anaesthetist**
- 25,000 units of heparin
- 250 mgs chlorpromazine

**Extras**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 x pink needles 19g</td>
<td></td>
</tr>
<tr>
<td>10 x orange needles 25g</td>
<td></td>
</tr>
<tr>
<td>6 x 2.5 ml syringes</td>
<td></td>
</tr>
<tr>
<td>6 x 10 ml syringes</td>
<td></td>
</tr>
<tr>
<td>6 x insulin syringes</td>
<td></td>
</tr>
<tr>
<td>Biohazard bags</td>
<td></td>
</tr>
<tr>
<td>10 x alco wipes</td>
<td></td>
</tr>
<tr>
<td>2 x bungs</td>
<td></td>
</tr>
<tr>
<td>1 x marking pen</td>
<td></td>
</tr>
</tbody>
</table>
Queensland (cont.)

Heart/lung retrieval team:

<table>
<thead>
<tr>
<th>Instrument tray:</th>
<th>Sterile extras:</th>
<th>Sutures:</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x bags cardioplegia</td>
<td>1 x aortic root cannula</td>
<td>1 x 4/0 Prolene 8521H (aortic pursestring)</td>
</tr>
<tr>
<td>3 x bags frozen saline</td>
<td>2 x cardioplegia giving set (Baldwin)</td>
<td>1 x 2/0 Silk CR-8 C-012D (pericardial stays)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x surgical blade (size 11)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x adult nylon tape</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x 3-way tap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x interlink extension set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x stapler p130 P/N 490 it</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – 6 x donor bags (500x500)</td>
</tr>
<tr>
<td>Instrument tray:</td>
<td>Esky – packed and filled with ice</td>
<td></td>
</tr>
<tr>
<td>1 x Semb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x 23 cm curved scissors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 x forceps</td>
<td>3 x bags cold saline</td>
<td></td>
</tr>
<tr>
<td>1 x Snugger introducer (Stylet)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x vascular x-clamp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 cm curved scissors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snugger tubing x 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lungs: (include)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 x extra bags frozen saline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 x extra bags cold saline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x extra esky</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 x boxes prostacycline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x pack pneumoplegia (partially made)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x bronchoscope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x pulmonary arterial cannula</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sutures:

| 1 x 4/0 prolene 8521 (pulmonary pursestring) |                                            |
Western Australia

Heart/lung retrieval:

Donor hospital provides:

Theatre set-up
General requirements
Section A
Section B
Section C
Section D

Retrieval team brings with them:

Instruments:
1 x cardiectomy tray
1 x Halls sternal saw
1 x Hodge West sternal retractor
Left-handed NH (set) surgeon preference

Heart procurement bag:
2 x ethibond excel ties no 2
1 x blade no. 23
1 x blade no. 15
2 x polyester tapes
1 x 4/0 prolene DA (small needle) cardioplegia pursestring
1 x 4/0 prolene DA (big needle) emergency suture
2 x 0 ticron T5 - pericardial stay sutures
1 x needlemat [small]
1 x Nelaton catheter 16g (orange) snugger for pursestring
1 x aortic root cannula
1 x Bentley cardioplegia giving set
1 x medium ligaclip
1 x pneumoplegia giving set
1 x medium ligaclip
1 x needlemat (small)
1 x proximate reload linear stapler TL30
2 x proximate refill cartridges TL30

Extras
1 x aortic root cannula
1 x pulmonary artery vent cannula DLP medtronic
1 x nelaton catheter 16g (orange)
1 x medium ligaclip
2 x 0 ticron T5
1 x nylon tape
1 x polyester tape
1 x 4/0 prolene DA (big needle)
1 x 4/0 prolene DA (small needle)

Fluids:
Ross solution
UW Solution
Cardioplegia
Pneumoplegia
Perfusion giving sets
Frozen IV Hartmanns*
Frozen IV normal Saline*
Ice chips*

Heart and lung procurement bag:
3 x ethibond excel ties no 2
1 x blade no. 23
1 x blade no. 15
2 x polyester tapes
1 x nylon tape
2 x 4/0 prolene DA (small needle) cardioplegia pursestring
pneumoplegia pursestring
1 x 4/0 prolene DA (big needle) emergency suture
2 x 0 Ticron T5 pericardial stay sutures
1 x Nelaton catheter 16g (orange) snugger for pursestring
1 x diathermy extension blade
1 x pulmonary artery vent cannula DLP medtronic
1 x Bentley cardioplegia giving set

Drugs for anaesthetist
Dosages to be discussed on a case-by-case basis at time of retrieval with State Donor Coordinator and/or retrieval surgeon.
Heparin 25,000 units to 50,000 units
Methylprednisolone
Broad-spectrum antibiotic
Mannitol

Other items:
Eskies
6 x large plastic bags for contaminated/ used instruments

* Discuss with the State Donor Coordinator regarding availability at donor hospital.
**Western Australia (cont.)**

**Abdominal retrieval:**

**Donor hospital provides:**

<table>
<thead>
<tr>
<th>Theatre set-up</th>
<th>Extras</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General requirements</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Section A</strong></td>
<td></td>
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<tr>
<td><strong>Section B</strong></td>
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<tr>
<td><strong>Section C</strong></td>
<td></td>
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<tr>
<td><strong>Section D</strong></td>
<td></td>
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</tbody>
</table>

**Retrieval team brings with them:**

<table>
<thead>
<tr>
<th>Instruments:</th>
<th>Sutures:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major tray</td>
<td>0 silk ties</td>
</tr>
<tr>
<td>1 x mallet</td>
<td>3/0 silk ties</td>
</tr>
<tr>
<td>1 x Finnochetti retractor</td>
<td>2 ethibond ties</td>
</tr>
<tr>
<td>1 x Hodge West retractor</td>
<td>0 ethibond ties</td>
</tr>
<tr>
<td>1 x Ronald Edwards retractor</td>
<td>0 silk ties</td>
</tr>
<tr>
<td>1x Durham Barr retractor</td>
<td>2/0 vicryl ties</td>
</tr>
<tr>
<td>1 x Castro needleholder</td>
<td>3/0 vicryl ties</td>
</tr>
<tr>
<td>1 x large Balfour Doyen</td>
<td>6/0 prolene ties</td>
</tr>
<tr>
<td>1 x Halls sternal saw</td>
<td></td>
</tr>
<tr>
<td>(State Donor Coordinator will arrange delivery)</td>
<td></td>
</tr>
<tr>
<td>1 x Gerbode chest retractor</td>
<td></td>
</tr>
<tr>
<td>1 x Lloyd Davies scissors</td>
<td></td>
</tr>
<tr>
<td>1 x Potts scissors</td>
<td></td>
</tr>
<tr>
<td>1 x Gilles forceps</td>
<td></td>
</tr>
<tr>
<td>1 x Book Walter (open on request)</td>
<td></td>
</tr>
<tr>
<td>1 x double action bone cutter (open on request)</td>
<td></td>
</tr>
<tr>
<td>1 x Deavers, large</td>
<td></td>
</tr>
<tr>
<td>1 x Deavers, med</td>
<td></td>
</tr>
<tr>
<td>1 x Glover clamps</td>
<td></td>
</tr>
<tr>
<td>1 x Satinsky, Ige</td>
<td></td>
</tr>
</tbody>
</table>

**Sterile stock**

- 1 x long diathermy tip
- 1 x teflon/ steel diathermy tip
- 1 x Christabel Saunders diathermy forceps
- 1 x scratch pad
- 1 x Tru/cut biopsy
- Nelaton catheters 1 each 20fg, 18fg, 16fg, 14fg, 8fg.
- Foley catheters 16fg and 14fg
- ICC drains 2 x 28fg, 2 x 32fg (open on request)
- Perfusion catheters – dependent on surgeon
- 12 x bowel bags (3 per organ)
- 2 x bone wax
- 6 x specimen containers (yellow top)
- 2 x jugs
- 8 x IV normal saline
- 50 ml catheter tip syringe

* Discuss with the State Donor Coordinator regarding availability at donor hospital.
<table>
<thead>
<tr>
<th>Instrumentation:</th>
<th>Plastic box containing:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x chemical indicator</td>
<td>6 x 1 ml syringe</td>
</tr>
<tr>
<td>1 x mallet</td>
<td>6 x 2 ml syringe</td>
</tr>
<tr>
<td>1 x Finochietto rib retractor large (screw in handle)</td>
<td>6 x 5 ml syringe</td>
</tr>
<tr>
<td>1 x Finochietto rib retractor small (screw in handle)</td>
<td>1 x 10 ml syringe</td>
</tr>
<tr>
<td>2 x Gigli saw handles (screws x 2)</td>
<td>1 x 20 ml syringe</td>
</tr>
<tr>
<td>2 x Gigli twisted wire saw</td>
<td>Drug box (blue lid)</td>
</tr>
<tr>
<td>1 x Zenker clamp</td>
<td>2 x white top blood tubes</td>
</tr>
<tr>
<td>1 x Harrington-Mixter thoracic clamp</td>
<td>5 x Heparin 5000 u/s per ml</td>
</tr>
<tr>
<td>2 x Lahey's forceps</td>
<td>1 x Timentin 3 g</td>
</tr>
<tr>
<td>1 x Debackey forceps 10&quot; (250mm)</td>
<td>1 x Methyl prednisolone 1 g</td>
</tr>
<tr>
<td>1 x Debackey forceps 8&quot; (200mm)</td>
<td>6 x Dexamethasone 8 mg</td>
</tr>
<tr>
<td>Tapes red, yellow, blue (Instruments supplied only when requested)</td>
<td>1 x Actrapid</td>
</tr>
<tr>
<td>SARNs aortic cannula</td>
<td>2 x sterile water 10 ml</td>
</tr>
<tr>
<td>2 x each size 20, 22, 24 gauge</td>
<td>1 x donor pack adaptor</td>
</tr>
<tr>
<td>Nelaton catheters</td>
<td>Alcohol swabs</td>
</tr>
<tr>
<td>2 x each size 8, 10, 12, 14, 18 gauge</td>
<td></td>
</tr>
<tr>
<td>2 x No 5 short infant feeding tube</td>
<td></td>
</tr>
<tr>
<td>2 x TURP giving sets</td>
<td></td>
</tr>
<tr>
<td>2 x 6 Fennel pressure bags</td>
<td></td>
</tr>
<tr>
<td>White cloth tape x 1 roll</td>
<td></td>
</tr>
<tr>
<td>Plastic box containing</td>
<td>In front zipped compartment</td>
</tr>
<tr>
<td>4 x yellow top specimen pots</td>
<td>Contact number for State Donor Coordinator</td>
</tr>
<tr>
<td>2 x sterile liver mounts</td>
<td></td>
</tr>
<tr>
<td>Plastic box containing</td>
<td>Contents of liver donor kit</td>
</tr>
<tr>
<td>12 x drawstring intestinal bags (3 for liver; 3 for kidneys; 3 extra)</td>
<td>3 x liver transplant information sheets</td>
</tr>
<tr>
<td>10 x 21 gauge needles</td>
<td>Reference list for liver donor tray</td>
</tr>
<tr>
<td>5 x 23 gauge needles</td>
<td>Perfusion protocol</td>
</tr>
<tr>
<td>5 x 27 gauge needles</td>
<td>Pink folder for State Donor Coordinator</td>
</tr>
<tr>
<td></td>
<td>2 x rolls of sealing tape</td>
</tr>
<tr>
<td>Liver Donor Tray (if requested by State Donor Coordinator)</td>
<td></td>
</tr>
<tr>
<td>Perfusion fluids</td>
<td>6 x 8 UW solution</td>
</tr>
<tr>
<td>6 x 4 cold Hartman’s</td>
<td></td>
</tr>
<tr>
<td>8 frozen Hartman’s</td>
<td>Eskys</td>
</tr>
<tr>
<td>2 x small blue hard eskies (SDC may request more for retrieval of pancreas islets &amp;/or heart valves)</td>
<td></td>
</tr>
<tr>
<td>For Pancreatic Procurement</td>
<td>2 x sterile two-layer storage containers</td>
</tr>
<tr>
<td>2 x sterile PFC (Perfluorodecalin solution)</td>
<td>2 x sterile water 10 ml</td>
</tr>
<tr>
<td>2 x oxygen suction tubing</td>
<td></td>
</tr>
</tbody>
</table>
Northern Territory

State Donor Coordinator supplies:

Two eskies (26 L)

Red toiletry bag – containing medications including mannitol, timentin, chlorpromazine, methyprednisolone, and heparin.

Perfusion fluids: 6 Hartmann’s (frozen)
6 Hartmann’s (chilled)
7 Ross

Retrieval teams will provide perfusionist.

Heart/Lung teams to bring own perfusion fluids.

Heart/lung retrieval team supplies:

This is dependent upon retrieval team.

Abdominal retrieval team supplies:

This is dependent upon retrieval team.

Donor Hospital supplies:

Theatre set up
General Requirements – Section A, B, C, D

Mersilene ties are not available in NT.
Sternal saw to be supplied by retrieval team when retrieving from Alice Springs Hospital.
**PRELIMINARY DISSECTION**

State variations in operative procedure exist.

A long midline incision extending from the supra sternal notch to the symphysis pubis provides sufficient exposure of and access to the heart, lungs and abdominal viscera.

**NEPHRECTOMY REQUIREMENTS**

**Retrieval team:**
- 1 surgeon
- 1 – 2 surgical assistants
- 1 State Donor Coordinator

**Retrieval time:** Approximately 2 hours

**When kidneys only are being removed:**

In all States and Territories please have available a set-up as outlined in General Requirements. The State Donor Coordinator will provide eskees in all cases and in some states the State Donor Coordinator will also provide perfusion fluid.

**Operative procedure:**
- Midline incision
- Mobilise ascending colon, small bowel, mesentery and duodenum
- Identify right kidney, ureter, IVC, aorta
- Sling aorta and IVC below the inferior mesenteric artery
- Mobilise the sigmoid and left colon and identify left ureter and kidney
- Sling the aorta at the level of the Crus and the IVC above the renal veins
- Tie off distal aorta with 2 mersilk and cannulate the aorta ready for perfusion
- Kidneys may then be removed en bloc or separately

**Packaging:** Kidneys are perfused with Ross or UW solution and triple bagged. Bags contain perfusion fluid and sterile slush. The kidneys are then packaged in eskees with crushed ice covering the organs.

**HEPATECTOMY REQUIREMENTS**

**Retrieval team:**
- 1 surgeon
- 2 surgical assistants
- 1 State Donor Coordinator and/or perfusionist

**Retrieval time:** 3–4 hours, split liver retrieval may take longer

The procedure begins and ends the same as for a regular multi-organ donor. Prior to cardiac dissection, the liver may be split in situ. This is like performing a resection, while keeping the vessels intact and unclamped. It involves dissection of the porta-hepatis, and then transaction of the liver parenchyma (with diathermy). The procurement then goes as normal. On the back table, the two segments will need to have some vessels sutured with 5/0 and 6/0 prolennes.
The split procedure adds around 1.5 to 2 hours to the procedure.

NB: The liver retrieval surgeon may also perform the nephrectomy.

**Theatre requirements:** The State Donor Coordinator will notify the operating room of the attending retrieval teams. Refer to section “Information for Operating Theatre Staff on Procurement Surgery” regarding what the retrieval team will bring with them.

**Operative procedure:**
- Midline incision with median sternotomy
- Divide falciform ligament and mobilise the liver
- Divide the bile duct, open gall bladder and irrigate with cold normal saline
- Divide gastro-duodenal artery and identify and mobilise coeliac artery and portal vein
- Divide splenic and left gastric artery vessels and sling aorta at Crus
- Cannulate splenic vein for perfusion
- Sling the IVC below the liver
- Aortic cannulation and IVC tied off
- Perfuse liver and remove to back table for further perfusion of portal and arterial systems

NB: The iliac arteries and veins above the bifurcation are removed for extension grafts in the recipient operation. Abnormal anatomy of the liver may increase retrieval time.

**Split liver retrieval:**
When the donor is of exceptionally high quality, the teams will consider the split procedure. A split procedure involves removing the liver in two pieces for transplant into a child and an adult. The child receives the left lateral section (segments II and III). Generally the liver is removed and split at the recipient hospital. If the split is performed in situ, the surgery time extends to 4-6 hours.

**Packaging:** Liver is perfused with UW solution and triple bagged. Bags contain perfusion fluid and sterile slush. The liver is then packaged in an esky with crushed ice covering the organ.

**INTESTINAL REQUIREMENTS**

**Retrieval team:**
- 1 surgeon
- 2 surgical assistants
- 1 State Donor Coordinator
- 1 perfusionist

**Retrieval time:**
- 4 – 6 hours

**Theatre requirements:** The State Donor Coordinator will notify the operating room of the attending retrieval teams. Refer to section “Information for Operating Theatre Staff on Procurement Surgery” regarding what the retrieval team will bring with them.

**Operative procedure:**
- Midline incision and median sternotomy
- Exploration of liver and small bowel
- Mobilise stomach
- Wrap spleen
- Mobilise colon, staple terminal ileum
- Divide retroperitoneal attachments, intestine to superior mesenteric artery
- Mobilise duodenum, mobilise spleen to caeliac axis
- If isolated intestine – mobilise SMA and SMV
- Divide left triangular ligament
- Cannulate for arterial perfusion
- Divide IVC and bleed out into chest
- Create aortic patch SMV and CAx
- Remove liver, pancreas, duodenum, spleen and small intestine on block
- If isolated intestine – divide SMA/SMV and remove small intestine, then remove liver
- Iliac artery and vein removed for grafting
• Thoracic aorta to arch removed (+/- carotid artery)

**Packaging:** Intestines/stomach is perfused with UW or Ross solution and triple bagged. Bags contain perfusion fluid and sterile slush. The intestines/stomach is then packaged in an esky with crushed ice covering them.

**Note:** Intestinal donation may commonly consist of removal of stomach along with intestines.

### Pancreatectomy Requirements

**Retrieval team:**
1 surgeon
2 surgical assistants
1 State Donor Coordinator
1 perfusionist

**Retrieval time:**
3 – 4 hours

**NB:** The pancreas retrieval surgeon may also perform the nephrectomy.

**Theatre requirements:** The State Donor Coordinator will notify the operating room of the attending retrieval teams. Refer to section “Information for Operating Theatre Staff on Procurement Surgery” regarding what the retrieval team will bring with them.

### Operative procedure:

- Midline incision
- Divide the gastro-colic omentum, ligate short gastric vessels
- Sling the aorta at the Crus of diaphragm
- Mobilise the spleen
- Pancreas is then mobilised in continuity with the spleen
- Divide the middle colic vessels and superior mesenteric artery and vein below the level of the inferior border of pancreas
- Divide the bile duct and common hepatic artery
- Wash out the second part of the duodenum (via the nasogastric tube) with aqueous betadine
- Divide the duodenum in the first and third parts with a GIA stapler
- Cannulate the aorta and perfuse
- Pancreas removed with spleen attached
- Spleen separated off pancreas on the back table

**NB:** Iliac artery and vein at the bifurcation are taken for extension grafts in the recipient operation.

**Packaging:** Pancreas is perfused with UW or Ross solution and triple bagged. Bags contain perfusion fluid and sterile slush. The pancreas is then packaged in an esky with crushed ice covering the organ.

### Cardiectomy Requirements

**Retrieval team:**
1 surgeon
1 surgical assistant
+/- perfusionist

**Retrieval time:**
1 hour

**NB:** Cardiectomy usually performed as a multi-organ procedure.

**Theatre requirements:** The State Donor Coordinator will notify the operating room of the attending retrieval teams. Refer to section “Information for Operating Theatre Staff on Procurement Surgery” regarding what the retrieval team will bring with them.

### Operative procedure:

- Median sternotomy
- Pericardial stay sutures (O silk)
- Aorta taped
• 1 silk ties placed around the SVC
• 1 silk ties placed around the Azygous vein
• Azygous vein ligated and divided
• Cardioplegia purse string (4/0 prolene)
• SVC ligated and divided
• IVC clamped to occlude any inflow
• Aorta clamped (angled Debakey Clamp)
• Cardioplegia infused
• Heart excised (venting through (R) superior pulmonary vein and IVC).

Packaging: Heart is perfused with cardioplegia solution and triple bagged. Bags contain perfusion fluid and sterile slush. The heart is then packaged in an esky with crushed ice covering the organ.

PNEUMONECTOMY REQUIREMENTS

Retrieval team: 1 surgeon
1 - 2 surgical assistant
+/- respiratory physician

Retrieval time: 1½ hours

NB: In most cases, the heart and lungs are removed en bloc. These will be the first organs removed in multi-organ retrieval. They are usually separated on the back table.

Theatre requirements: The State Donor Coordinator will notify the operating room of the attending retrieval teams. Refer to section “Information for Operating Theatre Staff on Procurement Surgery” regarding what the retrieval team will bring with them.

Operative procedure:

• Median sternotomy
• Aorta taped
• 1 silk ties placed around innominate vein and artery
• Innominate vein and artery ligated and divided
• Trachea taped
• 1 silk ties placed around Azygous vein
• Azygous vein ligated and divided
• Cardioplegia purse string (4/0 prolene) on aorta with orange snare and haemostat

• Pneumoplegia purse string (4/0 prolene) on pulmonary artery with orange snare and haemostat
• Cardioplegic needle inserted into aorta
• Pneumoplegic catheter inserted into pulmonary artery
• SVC ligated and divided
• Aorta cross-clamped (angled Debakey clamp)
• Cardioplegia and pneumoplegia infused, left atrial appendage and IVC vented
• Heart and lung bloc excised as one
• Tracheal division between Harrah clamps completes the resection
• Heart/lung bloc is rinsed in cold sterile saline
• Heart/lung bloc is packed into a large bowel bag x 3.

NB: If the organs are to be transplanted separately, these may be divided on the back table.

Packaging: Lungs are perfused with pneumoplegia or perfadex solution and triple bagged. Bags contain perfusion fluid and sterile slush. They are then packaged in eskies with crushed ice covering the organ.
**Heart Valve Donation**

**Retrieval team:** Procurement of the heart valves can be carried out by a cardiac/thoracic surgeon or registrar. In some instances, the kidney or liver transplant surgeon will do so if requested. When the whole heart is retrieved the tissue bank will ensure wherever possible that the unused portion of the heart is returned to the deceased, at the family's request.

**Retrieval time:** 20 minutes

**Theatre requirements:**

- 3 x sterile plastic bags
- 1 x esky

**Operative procedure:**

Care must be taken not to cut the trachea as this will contaminate the heart tissue.

The heart is removed with as much ascending aorta and left and right pulmonary arteries as possible. Corneal/whole eye donation.

**Other items or special requirements may be required if organ donation does not accompany this procedure. The State Donor Coordinator can clarify these requirements with the relative tissue bank.**

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**Corneal/Whole Eye Donation**

**Retrieval team:** Personnel from the State Eye Bank

**Retrieval time:** 30 – 60 minutes

**Operative procedure:** Slight variation occurs from State to State but, generally, whole eyes are removed and a prosthesis is inserted. Some centres may suture the eyelids closed with 5/0 silk suture. Whatever the variations in procedure, the donor is always restored to his or her normal appearance.

NB: Corneas/whole eyes are removed at the end of the multi-organ retrieval procedure. This procedure may also take place later in the mortuary or tissue bank.

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**Bone Donation**

**Retrieval team:** Personnel from the State Bone Bank

**Retrieval time:** 1 – 4 hours this includes reconstruction time.

**Theatre requirements:** The retrieval team will bring all necessary equipment.

**Operative procedure:** The bone retrievals are performed in standard operating theatres/mortuary working with accepted sterile techniques. Extreme care must be exercised in order to avoid contamination of the retrieved specimens with normal skin flora. Bone usually retrieved includes hemi-pelvis, both tibiae, both femurs and both humeri.

- The limbs are prepared using iodine and alcohol solutions
- The limbs are draped with sterile, impervious disposable drape sheets
- The skin is incised, with each incision being extended far enough both proximally and distally to allow for adequate exposure of the bones to be retrieved (both upper and lower limbs)
- Swabs may be taken for contamination testing or bone chips are taken for both histological and contamination testing
- As each joint is entered, two pieces of capsule and a swab of joint fluid is taken
- As each bone is retrieved, it may be cut to desired specifications or left whole
- As each bone is retrieved, two pieces of bone are taken for microbiological and histopathological examination
- Bone is wrapped immediately upon retrieval. Each bone is double bagged, then wrapped in a sterile cestrafeld and passed to the circulating nurse, who will fasten the package securely with tape and label with the donor number, type of bone and date
- The cosmetic appearance of the donor is maintained using biodegradable materials.
- Wounds are closed neatly using continuous stitching and a dressing is applied. The post-operative appearance of a standard orthopaedic operation should be achieved before the donor is formally covered with a linen drape.

NB: Bone is removed at the end of a multi-organ retrieval procedure. This procedure may also take place later in the mortuary or at the tissue bank.
**SKIN DONATION**

**Retrieval team:** Personnel from the State Tissue Bank  
**Retrieval time:** 1 hour

**Operative procedure:** Slight variation occurs from State to State but, generally, skin retrieval is carried out as a normal skin grafting operation.

- A thin layer of skin, 0.5mm thick, is taken from non-visible areas – legs, especially thighs and the back, which leaves a white shiny surface
- The grated areas are then dressed (surgeon preference)
- Skin is usually retrieved less than 24 hours after cardiac death.

NB: This procedure may take place later at the tissue bank or in the mortuary.
State Donor Coordinators provide a 24-hour on call service to hospitals throughout Australia. Recipient Coordinators are linked with organ transplant programmes based at transplanting hospitals and deal directly with those awaiting transplantation.

In addition, tissue banks are also located in some States. Each tissue bank has Coordinators to facilitate “tissue only” donation. When there is a multi-organ and tissue donor, the State Donor Coordinators liaise with the Tissue Bank Coordinators throughout the donation process, so that families are only approached once about donation.

The State Donor Coordinator

The State Donor Coordinator’s primary role is to ensure that the wishes of the deceased regarding donation are carried out. Their practical role is to coordinate all the tasks involved that will allow the donation to proceed. This includes liaising with the donor family, ensuring legal requirements are met and coordinating various organ retrieval teams involved with the procurement of organs and tissues. The aim is to achieve this in minimal time and with least inconvenience to the donor family and the local hospital. Active participation in the donor process requires the State Donor Coordinator to have close cooperation from the donor family, donor hospital and the retrieval teams.

The State Donor Coordinator receives referrals and enquiries from clinicians in the hospital setting who may have identified a potential organ donor. They are able to assess medical suitability of the donor in consultation with the transplanting teams. They also deal with interstate and New Zealand referrals and retrieval of organs for transplantation.

The State Donor Coordinator attends all hospitals across their State/Territory for an initial discussion with the family regarding the option of donation. Together with the surgical teams they attend every retrieval in their State/Territory. They assist in the operating theatre with the drug regimen and administration. They may be responsible for perfusion of abdominal organs. Support is provided to all staff involved and the donor family. The State Donor Coordinator is responsible for documentation of the procedure and completing further information required by the Coroner.

The State Donor Coordinator facilitates viewing of the deceased post-operatively and helps prepare the body according to the family wishes. The State Donor Coordinator communicates with the donor family and the staff involved with care of the donor to provide information regarding the donation outcome.

If requested, support/follow-up for donor families can be arranged through recognised bereavement care specialists.

Some Queensland, New South Wales and Northern Territory hospitals also have Regional and Area Coordinators. The Regional/Area Coordinator works in close collaboration with the State Donor Coordinator and provides immediate onsite care. In these facilities, the Regional/Area Coordinator is available to manage donation issues. This includes communicating with donor families and ICU staff (medical/nursing and allied health. The role also includes ensuring all legal requirements have been met and overseeing the organisation of the retrieval process at a local level.

The State Donor Coordinators along with Regional/Area Coordinators play a pivotal role in the education of all health care professionals, e.g. Medical, Nursing and Allied Health, regarding all aspects of brain death and the organ and tissue donation process.

The Recipient Coordinator

The role of the Recipient Coordinator involves pre-transplant assessment, collation and recording of test results and provision of ongoing support and information for the potential recipient and their family.

The Recipient Coordinators liaise closely with the State Donor Coordinator when a referral of donation is made. Once the decision has been made to transplant one of their recipients with an organ from a particular donor, the Recipient Coordinator is responsible for organising their recipient and surgical team with the timing of the transplant. Their roles vary, depending on which transplant team and organ they are involved with, however some Recipient Coordinators attend the donor operation and assist with perfusion of organs. All teams must work together to ensure the best outcome for all involved.

The practical role of the Recipient Coordinator varies in different units, but all have an educational role with the recipients and their families, as well as acting as a resource for information for the community.
Coordinator roles within Australia

The Tissue Bank Coordinator

Coronial system

The role of the Tissue Coordinator within a coronial system is to identify and assess potential tissue donors, and offer the opportunity of donation to the next of kin of recently deceased persons within 12 - 24 hours of the death.

The Tissue Coordinator reviews each death reported to the Coroner and when a potential donor is identified, assesses each case according to age, time and cause of death, circumstances of the death and past medical and social history. Pathologist and Coroner’s permission is obtained in each instance to ensure tissue donation does not compromise the investigation surrounding the death. The Coordinator then ensures the senior available next of kin is approached to offer the opportunity to donate tissue for transplantation. Communication with the family requires extreme sensitivity, and must meet all legal and ethical requirements. Whether or not the family chooses to donate, support and information is offered about the procedures surrounding coronial death and investigation.

The Tissue Coordinator is responsible for documentation of the approach to next of kin, consent and donor assessment. Follow-up communication and support to the donor family is facilitated by the Coordinator. Families requiring bereavement counselling are referred to specialists in the field.

The Eye Donation Coordinator

The role of the Eye Donation Coordinator is to:

- Identify and assess potential eye/corneal donors, according to time, cause of death and medical and social history.
- Approach the family offering the opportunity to donate eyes/corneas for transplantation.
- To provide family support through the donation process and afterwards to provide feedback, support and follow-up.
- To coordinate all tasks to enable eye/corneal donation to proceed. This includes all legal and quality requirements.
- To perform the surgery of donation, process, assess and distribute ocular tissue to ophthalmic surgeons (not all Coordinators will perform donation surgery).
- Promote and encourage eye donation and act as an information resource, both within the hospital and the general community.

The Tissue Coordinator plays an educative role and acts as a resource person for information about tissue donation and transplantation.

State Donor Coordinators

In some states the State Donor Coordinator or Regional/Area Coordinator is involved in approaching the next of kin in coronial and non-coronial cases. Once consent is obtained, the donor is referred to the appropriate Tissue Bank.

Hospital-based social workers

In other instances social workers are involved in approaching next of kin. Once consent is obtained, the donor is referred to the appropriate Tissue Bank or hospital department.

Living donors

Bone donors may be living or cadaveric. The live donor program allows patients undergoing hip replacement surgery to donate their head of femur, which is routinely removed during surgery and otherwise discarded. This process requires the cooperation of the Orthopaedic Surgeon to facilitate the consent, medical and social screening, and retrieval process. The bone is held in quarantine for 180 days at, which time a second test for AIDS and Hepatitis C is completed.
Every year, many Australians receive a second chance and improved quality of life through the transplantation of donated tissue. Tissue donation can make the difference between seeing and not seeing, mobility and never walking again or recovery from trauma or disease. Heart tissue transplantation is life saving for children. Tissue transplantation is made possible through tissue banks, which receive and prepare tissue for transplantation.

### Tissue Banks

In Australia tissue banks are required to be licensed by the Therapeutic Goods Administration (TGA) and are audited for compliance with the Code of Good Manufacturing Practice, Human Blood and Tissues.

Tissues that can be retrieved include heart valves, musculoskeletal, skin and eye tissue. Unlike organs, tissues do not require an intact cardiovascular system to be viable for transplantation. People who have suffered circulatory death can potentially be a tissue donor within 12–24 hours of death.

### Donor Suitability

The exclusion criteria for tissue donation are more stringent than for organ donation due to license by the TGA. In some jurisdictions a full autopsy that includes the brain is required if certain tissues are to be donated. If an autopsy is required the family must be fully informed.

All potential donors are screened to exclude any pathology, diseases or risk behaviour that may present a risk to the recipient. Screening includes medical records review, completion of a medical/social history questionnaire by next of kin, and testing of a donor blood sample for mandatory infectious diseases (HIV, HBV, HCV, HTLV and syphilis). The blood testing must be performed by a TGA-licensed laboratory, and if the donor has been transfused intravenously within 48 hours of death a pre-transfusion blood sample may be required if haemodilution has occurred.

The selection of potential donors should be discussed with the regional tissue bank as their selection criteria may vary slightly:

#### General medical exclusion criteria for tissue donors

- Non-medical injected drug use including intravenous, intramuscular, and subcutaneous injections
- Active or past history of slow virus disease
- Presence of malignancy (exceptions exist for primary CNS tumours, basal cell carcinomas)
- Risk of prion-associated disease
- History or presence of serious illness of unknown aetiology
- History of multi-system autoimmune disease or systemic diseases with severe effects on the organs/tissue to be transplanted (collagen diseases, vasculitis)
- Heavy irradiation to the area of tissues being removed
- Toxic substances in potentially toxic amounts in tissues to be collected.
- Exposures to poisons, heavy metals, and other toxins
- Recent history of immunisation with viable vaccines
- CINI with the exceptions to the list for presence of malignancy.

#### Social exclusionary criteria

Certain social behaviours may put the donor at risk of HIV, Hepatitis B, Hepatitis C. People who may not donate for these reasons include:

- persons who have injected drugs for non-medical reasons
- persons who have had sex in exchange for money or drugs
• inmates of correctional systems or individuals who have been incarcerated for more than 72 consecutive hours during the previous 12 months
• persons who within 6 months of donation have undergone tattooing/ piercing.

Tissue-specific exclusion criteria
There may also be specific exclusion criteria for each tissue type. These can be discussed with the tissue bank at the time.

Who can be a heart valve donor?
All patients from newborn to 60 years of age with no history of cancer should be considered as potential donors.

Heart tissue grafts can be used for:
• treatment of adults and children with heart disease
• replacement of diseased or defective heart valves
• reconstruction of congenital abnormalities in children.

Who can be a skin donor?
Patients up to 70 years of age with no history of cancer and whose skin is in good condition can be skin donors. Skin can be donated within 24 hours of (circulatory) death. A very thin layer of skin (1/1600 of an inch thick) is removed using a dermatome from the back of the donor’s torso and legs.

Allograft skin can be used for:
• treatment of burns
• chronic unhealed wounds
• decubitus ulcers
• traumatically denuded areas.

Who can be a musculoskeletal donor?
Bone is donated by patients who are undergoing total hip replacement surgery, and from donors up to 65 years of age who have expressed their willingness to become organ/tissue donors in the event of death.

Musculoskeletal tissue grafts (bone, tendons, ligaments) can be used for orthopaedic, neurosurgical and plastic surgery to replace damaged bone and aid growth.

Consent, retrieval, processing, storage and distribution of tissue grafts
Different arrangements are in place in each State for tissue retrieval. Once a potential donor is identified, the Tissue Donor Coordinator should liaise with their regional tissue bank to discuss the suitability of the potential donor, and how retrieval will be achieved. Generally, after retrieval, the tissue is taken to the tissue bank for processing according to their specific protocols.

Once processed, tissue may be stored in defined conditions for up to 5 – 10 years before it is used in transplantation.

After all testing results and retrieval and processing information is available, the responsible person in the tissue bank will decide whether the tissue is suitable for transplantation. If it is deemed suitable, the tissue will then be supplied by the tissue bank to surgeons in response to their specific requests.

Resources
Australasian Tissue Banking Forum
www.atbf.org.au/
Whole eye/corneal donation

Every year more than 1,000 Australians and New Zealanders enjoy a renewed and improved quality of life through the transplantation of donated eye tissue. Donation of eyes and the transplantation of corneas and other ocular tissues can literally mean the difference between blindness and sight to a recipient.

In Australia and New Zealand the most common reason for requiring a transplant is keratoconus, the loss of the smooth rounded shape of the cornea meaning that light cannot be regularly focussed into the eye. Most people requiring a transplant for this condition are under 45 years of age. Other problems that may require a transplant include a clouding over and loss of transparency in the cornea in later life, herpes virus infection of the eye, accidental injury to the eye, corneal scarring due to other trauma, hereditary or congenital corneal clouding, or severe bacterial infection.

Data from the Australian and the New Zealand corneal transplant registries indicate that the one-year graft survival for all conditions is 91%. Transplantation for keratoconus has an even higher success rate (98% at one year and 90% at 10 years).

**Eye Banks**

Six eye banks across Australia and New Zealand are responsible for managing the process of eye donation. Working closely with hospitals, coronial services, tissue banks and Organ Donation Services, eye banks cover all aspects of donation including donor transplant coordination services, the evaluation of donor medical history to assess donor risk and the surgical procedure of donation. The eye banks also facilitate eye donation through hospital development and professional in-service programs and the provision of trained staff to approach families to offer the option of donation, ensuring the families of potential donors are supported and informed about all aspects of the donation.

All eye banks are members of Eye Banks Australia and New Zealand (EBANZ), which annually releases Medical Standards for Eye Donation and Ocular Tissue Banking. In addition, each eye bank is required to operate under the regulatory and licensing system of the Therapeutic Goods Administration.

**Consent for Eye Donation**

For eye donation consent to be informed, it should contain the following elements:

- permission for removal of ocular tissue either as whole eyes, or as corneas only
- information as to the tissues that can potentially be used for transplantation, or research (if applicable)
- the purposes for which these tissues will potentially be used
- information concerning the process
- the requirement for blood testing of the donor to test for infectious viral diseases
- the possible requirement for further medical information to be obtained, and permission for this e.g. from GP, specialist
- information concerning potential unsuitability of tissue, and uses for which permission is given in these instances e.g. research, return of tissue, disposal – permission for use of tissue for research, clinical training or education should be obtained as a separate signed consent
- information on follow-up and notification of outcome
- that there shall be no cost to the donor and/or their family for any expenses relating to donation
- ability and time for person to ask questions and receive clear answers.
DONOR SUITABILITY

All potential donors are screened to exclude any pathology, diseases or risk behaviour that may present a risk to the health or well being of the recipient.

Death criteria and time from death

- Eye tissue does not require an intact cardiovascular system to be viable for transplantation. People who have suffered circulatory death can potentially be eye donors.
- Acceptable time intervals from death to donation may vary according to the circumstances of death, the interim means of storing the body and method of corneal preservation. Maximum times vary from 12 – 24 hours. The regional eye bank should be contacted as soon as possible following death in regard to donor suitability.

Age

- The lower limit for donation is two years.
- There is no definite relationship between quality of donor tissue and advanced age. Do not assume the donor is too old – the regional eye bank should be contacted in regard to donor suitability.

Blood tests

Mandatory tests are:
- HIV-1 and HIV-2 antibody
- HCV antibody
- HBV surface antigen.

In addition, if the donor has received intravenous infusions within 48 hours of death, a pre-transfusion blood sample may be required if plasma dilution has occurred. The regional eye bank will be able to advise on specific cases.

Eyes and corneas

Permission must be specific for removal of ocular tissue either as whole eyes, or as corneas only. Some eye banks offer the service of cornea removal only but the preference is for whole eyes. Please contact your regional eye bank for further information.

Medical exclusion criteria

General

- Death from unknown cause – but suitable if the death certificate or autopsy report is only pending an unresolved differential cause of death where all the alternatives are not contraindications.

Infectious disease

- Acquired immune deficiency syndrome (AIDS)
- Encephalitis – active, viral, or encephalitis of unknown origin
- Hepatitis – active, viral
- Human T-cell lymphotropic virus (HTLV-1 or HTLV-2)
- Human immunodeficiency virus (HIV-1 or HIV-2) – clinical diagnosis or seropositive
- Leprosy – active
- Malaria – active
- Meningitis – active, viral, or meningitis of unknown origin
- Progressive multifocal leukoencephalopathy
- Rabies
- Reye’s syndrome
- Rubella, congenital – but past acute infection is not a contraindication
- Smallpox – recognisable signs or symptoms within the last 14 days
- Subacute sclerosing panencephalitis
- Syphilis - active
- Tuberculosis – active
- Typhoid – active

Where active is listed, past resolved infection may be acceptable.

Infection

- Active systemic viraemia
- Active systemic fungaemia

Infectious disease – high risk

Human immunodeficiency virus (HIV) or Hepatitis high risk (any potential donor that exhibits one or more of the following):

- persons who have performed intravenous, intramuscular or subcutaneous non-prescribed drug use within the previous 12 months (or where history or examination gives cause to suspect non-medical intravenous drug use)
- men and women who have engaged in sex for money or drugs within the previous 12 months
- men who have had sex with another man in the previous 12 months
• persons who have received human-derived blood clotting factors (e.g. for haemophilia) in the previous 12 months
• any person who has had sex in the previous 12 months with any of the above four categories
• persons who have had close contact with another person having viral Hepatitis within the previous 12 months, except for Hepatitis A
• persons who have had sex in the previous 12 months with a person known or suspected of having HIV or any Non-A viral Hepatitis
• recipient of blood or other human-derived transfusion/infusion product outside Australasia within the previous 12 months
• persons with tattooing, body piercing or scarification, or acupuncture within the previous 12 months in a non-licensed Australasian facility or non-Australasian facility (piercing done at home should be assessed by the eye bank)
• children <13 years of a mother with HIV or AIDS, or at high risk of infection from HIV, but only if the child shows evidence of infection
• incarceration within a prison within the previous 12 months (assessed by eye bank if involves only remand of less than 7 days, or where the incarceration was in a facility not described as a prison)
• unexplained jaundice or hepatomegaly (Note: hepatomegaly was in a facility not described as a prison)
• known exposure within the previous 12 months, by percutaneous inoculation, contact via a mucous membrane or non-intact skin, to blood from a person with known or suspected HIV, or Hepatitis B or Hepatitis C infection
• persons who have had gonorrhoea or syphilis within the previous 12 months or have been treated for one of these diseases in the previous 12 months.

Human immunodeficiency virus (HIV) high risk where the following cannot be explained by other disease processes (any potential donor that exhibits one or more of the following):

• in the previous 12 months, unexplained weight loss, night sweats, blue or purple spots on the skin or mucous membranes typical of Kaposi’s sarcoma, unexplained lymphadenopathy lasting >1 month, unexplained temperature >38.6°C for >10 days, unexplained persistent diarrhoea, unexplained persistent cough or shortness of breath, or opportunistic infections.

Malignancy
• Hodgkin’s disease
• Leukaemia
• Lymphoma
• Lymphomatoid granulomatosis
• Lymphosarcoma
• Myeloma
• Myeloproliferative disease
• Polycythaemia vera – primary (secondary polycythaemia is acceptable)

Neuro-degenerative
• Chronic idiopathic demyelinating polyneuropathy
• Creutzfeldt-Jakob disease (CJD) or prion disease of any type
• Amyotrophic lateral sclerosis (Motor neurone disease)
• Multiple sclerosis
• Huntington’s chorea
• Guillian – Barre syndrome

Neuro-degenerative – high risk^5
• Persons who have been diagnosed with dementia or any degenerative or demyelinating disease of the central nervous system or other neurological disease of unknown aetiology
• Blood relatives of persons diagnosed with CJD of any type
• Recipients of human pituitary-derived growth hormone from 1963 to 1985
• Recipient of human-derived dura mater tissue at any time

Eye disorders and surgery^4
• Ocular/intraocular infection – active inflammation giving rise to clinically diagnosed endophthalmitis (keratitis, conjunctivitis, retinitis, choroiditis, iritis, uveitis, vitreits, scleritis) at the time of death
• Malignant tumours of the eye and anterior segment e.g. retinoblastoma, melanoma, adenocarcinoma
• Corneal disorders including keratoconus, keratoglobus, dystrophy
• Corneal opacity, scarring, or pterygium, which involves the central optical area of the corneal button (may be considered for posterior lamellar procedures)
• Corneal surgery e.g. radial keratotomy, laser refractive surgery; photorefractive keratectomy (PRK) or laser in situ keratomileusis (LASIK)
Notes

1. Donors with bacterial endocarditis and bacterial meningitis may be suitable depending on the case and if organ culture storage of corneas is performed with concomitant microbiological testing.

2. Where active is used this normally means current at time of death and confirmed by clinical examination, serological or confirmatory testing.

3. Localised non-systemic infections and infective processes that have clinically resolved may be considered. Each case needs to be assessed by the eye bank. Generalised bacteraemia is not contraindicated if organ culture storage of corneas is performed with concomitant microbiological testing.

4. Close contact is defined as sexual contact or contact which may result exchange of body fluids, which includes living in the same household.

5. Recipients of synthetic growth hormone or duramater are acceptable.

6. Dementia resulting from cerebrovascular disease, brain tumour, or trauma, and toxic- or metabolic-induced dementia may be acceptable.

7. Defects or disorders of the eye should be assessed by the eye bank so that the importance can be considered. Many defects or disorders, and many surgeries on the eye e.g. for cataract removal, glaucoma, retinal therapy are not contraindications, where corneal tissue is screened by endothelial microscopy. They should not be considered contraindications to donation but the cornea must be assessed for suitability for the intended surgical procedure.

Care of eyes

Eyes should be gently closed to prevent drying of the cornea and the preferred method is that they are lightly taped. It is desirable to have the head slightly elevated. Use liquid tears as necessary to prevent drying of the cornea.

Resources

Eye Bank Association of Australia and New Zealand.
Categories of DCD Donors

The International Maastricht Conference on DCD donors designated four categories of donors for DCD organs:7

i. The patient is dead on arrival – not considered potential organ donors in Australia; however the person may be considered as a potential tissue donor.

ii. Unsuccessful resuscitation – either in the emergency department, ICU or on the wards. This has some logistical difficulties. However, the person is potentially able to donate tissue.

iii. Withdrawal of treatment – those patients, usually in ICU who will not survive, but do not fulfill brain death criteria.

Such patients would have severe neurological trauma, severe cardiac or respiratory disease or a primary brain tumour in the terminal phase of their illness. Active treatment is withdrawn following family discussion and cardiac arrest is imminent.

This category is the most likely group for organ donation. The consent process can proceed in much the same way as for heart beating donors. Family discussion about the possibility of organ donation occurs prior to the withdrawal of treatment. It should, however, occur after the family has already agreed that withdrawal of treatment is the best option in the circumstances.

iv. Cardiac arrest in a brain dead patient – when arrangements for organ donation are in progress, but cardiac arrest occurs before planned organ procurement surgery, then this category can be considered.

Organs that can be retrieved from DCD donors are:

- lungs
- livers
- pancreas
- kidneys.

In Australia protocols concerning DCD from Category 3 and 4 patients are being developed and reviewed. Currently liver, lungs, pancreas and kidneys are retrieved using DCD techniques in NSW, VIC, and SA.
MEDICAL CRITERIA FOR DCD DONORS

Please refer to the State Organ Donor Coordinator for state specific information.

The usual exclusion criteria for organ donors apply such as HIV and neoplastic diseases.

The potential donor must:

- have death certified generally within 60–90 minutes of cessation of ventilatory support where the patient has not fulfilled brain death criteria. Each state has specific criteria – refer to the State Donor Coordinator.
- be ventilator dependent (category iii and iv).

Organ-specific criteria are as follows:

Kidneys
- 12–65 years – age and weight are dependent on individual units. For patients under 12 years and <15kg and patients >65 years old, refer to State Donor Coordinator.
- Terminal creatinine < 300

Livers
- <45 years
- Terminal Alanine aminotransferase (ALT) < 400

Pancreas
- 10–45 years

Lungs
- 12–55 years

GENERAL CONSIDERATIONS FOR DCD

- Availability of organ retrieval team and equipment at short notice.
- Access to the operating room at a prearranged time and at reasonably short notice.

DCD AND CORONIAL JURISDICTION

There are some special considerations for DCD in a Coroner’s case. In some states the Coroner is unable to give consent for organ donation prior to death because the patient does not come under coronial jurisdiction until after death has occurred. For the same reason, police identification cannot occur at this time.

Each State will have a defined process when coronial consent is required for donation to proceed. The State Donor Coordinator should be contacted regarding specific arrangements.

REFERENCES

Tissue typing involves the identification of antigens that occur on the surface of human leucocytes. These are known as human leucocyte antigens (HLAs). HLAs are also expressed on the surface of most other cells of the body but are most easily identified on the lymphocytes.

As part of the pre-transplant work-up, potential transplant recipients are:

- HLA typed, firstly by molecular methods, using extracted DNA then by serological typing on a separate sample to confirm the initial typing. 40ml of blood collected in acid citrate dextrose (ACD yellow cap) tubes is required for a full HLA A, B, DR and DQ typing.

- Screened for pre-formed antibodies to HLA antigens (or panel reactive antibodies – PRA). These antibodies are detected in the patient's serum using a combination of serological and solid phase methods, which also disclose the presence of auto antibodies.

PRA are expressed as the percentage of a panel of pre-typed lymphocytes to which the patient's serum reacts. Antibody specificities, if any, may also be defined and used to predict crossmatch outcome. Screening is performed regularly to detect changes in sensitisation. Screening results are sent to the physicians, transplant centres and clinics as part of the monthly waiting list reports and screening histories are available for any patient on request.

Autoantibodies (antibodies to the patient's own HLA antigens) can produce false positive crossmatches and need to be neutralised in these patients' crossmatch sera using DTT. Where autoantibodies are detected, three-monthly tests are performed to check for their continued presence.

The serum samples sent for screening are also used for cross-matching against potential donors. The most recent sera for all active transplant patients are distributed as a monthly set, usually in the second week of each month to laboratories in Adelaide, Brisbane, Melbourne, Perth and Sydney to enable prospective cross matches to be performed on donors from these States. Due to financial constraints, serum is not sent to New Zealand for prospective cross-matching but when logistics allow, donor blood will be sent to the east coast of Australia.

Serological techniques are used to perform HLA A, B, DR and DQ typing on deceased donors and to perform cross-matching on all potential recipients of the appropriate ABO blood group.

Kidneys are allocated using the NOMS (National Organ Matching Service) computer allocation algorithm which generates an allocation score for all eligible patients, based primarily on the degree of matching at the HLA A, B, and DR loci, and secondarily on such factors as waiting time and degree of sensitisation. T lymphocyte (Class 1) cross-matches are read for the 20 patients with the highest matching score and those with negative cross-matches are eligible for transplant.

Heart, lungs and liver are allocated primarily according to factors such as ABO blood group, size compatibility and urgency. Donor lymphocyte cross matches for Class 1 and Class 2 (i.e. T and B cell) are also performed and provided to the appropriate Coordinators along with Donor HLA typing for consideration prior to transplant.

Similarly, kidney/pancreas, pancreas islet and liver/intestine allocations are made on a case by case basis due to the small number of recipients. Donor HLA typing and Class 1 and 2 crossmatches are performed prospectively and provided to the appropriate Coordinators prior to transplant.

Resources

APPENDIX B – DONOR REGISTRIES

AUSTRALIA AND NEW ZEALAND ORGAN DONOR REGISTRY

The Australia and New Zealand Organ Donor Registry (ANZODR) is a joint venture of the Australasian Transplant Coordinators Association Incorporated (ATCA Inc.) and the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA).

The Registry commenced in May 1989. The data is collected by the State Donor Coordinators during the organ donation and retrieval process.

The purposes of the Registry are to:

- maintain a complete record of donated organs and tissue retrieved and transplanted in Australia and New Zealand from multi-organ donors
- relate organ donor characteristics and terminal management to subsequent outcome of organ transplantation
- identify demographic factors, such as age, gender, religion, ethnic/racial group
- facilitate education and public awareness activities regarding organ donation
- distribute widely the results of data tabulation and analysis to all relevant groups.

The exchange of data between the ANZODR and other transplant Registries allows transplant-recipient survival to be linked to donor factors.

Annual reports are posted to all State Donor Coordinators, transplant units, Recipient Coordinators and Departments of Health in Australia. Anyone who would like to be added to the mailing list should contact:

ANZODR Registry
The Queen Elizabeth Hospital
Woodville Road, Woodville SA 5011

or access the website:

www.anzdata.org.au

AUSTRALIAN ORGAN DONOR REGISTER

The Australian Organ Donor Register (AODR) is a national database of details on individuals who have registered their decision in regards to donation of organs and tissues in the event of their death. The database is managed by Medicare Australia within the Australian Government Department of Health and Ageing.

AODR

The process of recording one’s wishes to donate on the Australian Organ Donor Register is simple and straightforward.

Completion of the registration form, either by returning the tear-off portion from pamphlets or registering at any Medicare office or via the internet site, ensures a person’s decision about organ and tissue donation will be recorded.

Inclusion on the AODR is voluntary. It is possible for individuals to choose which organs and tissues they wish to donate.

The Australian Organ Donor Register works with existing State registers to ensure that individual wishes are recorded.

Drivers Licence

Most Australian States, except NSW and SA no longer have the facility to record consent on driver’s licenses.

AODR contact details

Registration, changes to details or a change to donor intentions on the AODR can be made by contacting:

- 1800 777 203 (freecall)
- www.medicareaustralia.gov.au
- Local Medicare office.
APPENDIX C – FURTHER INFORMATION

For further information on issues surrounding organ and tissue donation in Australia, please refer to the following:

RESOURCES


NATIONAL ORGANISATIONS

Australasian Transplant Coordinators Association (ATCA)
Email: secretary@atca.org.au
Website: www.atca.org.au

The Transplantation Society of Australia and New Zealand (TSANZ)
Website: www.tsanz.com.au

Australian and New Zealand Intensive Care Society (ANZICS)
Website: www.anzics.com.au
**STATE DONATION SERVICES**

**New South Wales**
LifeGift, NSW/ACT Organ Donation Service  
Australian Red Cross Blood Service  
153 Clarence Street  
Sydney NSW 2000  
Telephone: [02] 9229 4003  
Fax: [02] 9229 4413  
Email: organdonor@arcbs.redcross.org.au  
Website: www.organdonor.com.au

**Victoria/Tasmania**
LifeGift, Victorian Organ Donation Service  
Australian Red Cross Blood Service  
538 Swanston Street  
Carlton VIC 3053  
Telephone: [03] 9349 4762 or 1300 133 050  
Fax: [03] 9349 2730  
Email: lifegift@arcbs.redcross.org.au  
Website: www.organdonor.com.au

**Queensland**
Queenslanders Donate  
Princess Alexandra Hospital  
Ipswich Road  
Woolloongabba QLD 4102  
Telephone: [07] 3240 2350  
Fax: [07] 3240 2999  
Email: queenslanders_donate@health.qld.gov.au  
Website: www.health.qld.gov.au/queenslandersdonate

**Western Australia**
DonateWest  
6th Floor Albert Facey House  
469 Wellington Street  
Perth WA 6000  
Telephone: [08] 9222 0222  
Fax: [08] 9222 0220  
Email: donatewest@health.wa.gov.au  
Website: www.donatewest.health.wa.gov.au

**South Australia**
South Australian Organ Donation Agency  
Ground Level  
165 Grenfell Street  
Adelaide SA 5000  
Telephone: (08) 8207 7117  
Fax: (08) 8207 7102  
Website: www.organdonation.sa.gov.au

**Australian Capital Territory**
ACT Organ and Tissue Donation Service  
The Canberra Hospital  
Yamba Drive  
Garran ACT 2605  
Telephone: (02) 6244 3071  
Fax: (02) 6244 2405  
Email: organ.donation@act.gov.au  
Website: www.health.act.gov.au

**Northern Territory**
Northern Territory Organ Donation Agency – LifeNet NT  
Royal Darwin Hospital  
PO Box 41326  
Casuarina NT 0811  
Telephone: (08) 8922 8786  
Fax: (08) 8922 8733  
Email: lifenetnt.ths@nt.gov.au  
Website: www.nt.gov.au/health

**New Zealand**
Organ Donation New Zealand  
PO Box 99–431  
Newmarket Auckland  
Telephone: 0011 6496300935  
Fax: 0011 6496236490  
Email: donornz@adhb.govt.nz  
Website: www.donor.co.nz

**EYE AND TISSUE BANKS**

**New South Wales**
Lions NSW Eye Bank  
Sydney Eye Hospital  
Macquarie Street  
Sydney NSW 2000  
Telephone: [02] 9382 7288  
Website: Nil

NSW Bone Bank  
2nd Floor, Clinical Service Building  
St. George Public Hospital  
Kogarah NSW 2217  
Telephone: [02] 9350 2361  
Website: Nil

Sydney Heart Valve Bank  
St. Vincent’s Hospital  
Darlinghurst NSW 2010  
Telephone: [02] 8382 3271  
Website: Nil
Victoria/Tasmania

Lions Corneal Donation Service
Royal Eye and Ear Hospital
32 Gibson Street
East Melbourne VIC 3002
Telephone: (03) 9929 8708
Website: http://cera.unimelb.edu.au/lcds/

Donor Tissue Bank of Victoria
Victorian Institute of Forensic Medicine – Coronal Services Centre
57–83 Kavanagh Street
Southbank VIC 3006
Telephone: (03) 9684 4444
Website: www.vifm.org

Queensland

Queensland Eye Bank
Princess Alexandra Hospital
Ipswich Road
Woolloongabba QLD 4102
Telephone: (07) 3240 2111
Website: www.health.qld.gov.au/queenslandersdonate

Queensland Heart Valve Bank
The Prince Charles Hospital
Rode Road
Chermside QLD 4032
Telephone: (07) 3139 4000

Queensland Bone Bank
Queensland Tissue Transplant Services
Block 739
Kessels Road
Coopers Plains QLD 4108
Telephone: (07) 3131 2626

Queensland Skin Bank
Queensland Tissue Transplant Services
Block 739
Kessels Road
Coopers Plains QLD 4108
Telephone: (07) 3131 2626

Western Australia

The Lions Eye Bank
1st Floor, Lions Eye Institute
2 Verdun Street
Nedlands WA 6009
Telephone: (08) 9381 0770 or (08) 9381 0771
Website: Nil

Perth Bone and Tissue Bank Inc.
Perth Orthopaedic Institute
PO Box 1125
Nedlands WA 6909

Hollywood Private Hospital
Gate 3, Verdun Street
Nedlands WA 6009
Telephone: (08) 9386 9300
Website: www.bonebank.uwa.au

Royal Perth Hospital Heart Valve Bank
Research Centre
North Block, Royal Perth Hospital
Wellington Street
Perth WA 6000
Telephone: (08) 9224 3124
Website: Nil

South Australia

Eye Bank of South Australia
Department of Ophthalmology
Flinders Medical Centre
Bedford Park SA 5042
Telephone: (08) 8204 4928
Website: Nil

Australian Capital Territory

ACT Bone Bank
The Canberra Hospital
Yamba Drive
Garran ACT 2605
Telephone: 02 6244 3071
Website: Nil

New Zealand

New Zealand National Eye Bank
Department of Ophthalmology
University of Auckland
Private Bag 92019
Auckland
Telephone: 0011 649 373 7537
Email: eyebank@auckland.ac.nz
Website: www.eyebank.org.nz

New Zealand Bone Bank
New Zealand Blood Service
Private Bag 92 071
Auckland Mail Centre
Auckland
Telephone: 0011 649523 5733 ext.. 7823
Website: Nil

New Zealand Heart Valve Bank
Level 1 Starship Hospital
Park Road, Grafton Private Bag 92024
Auckland
Telephone: 0011 649 307 4949 Ext. 25111
Email: hvlab@adhb.govt.nz
Website: Nil
WEBSITES

The links offered are provided for the interest of our readers. The links have been added because the content was deemed to offer appropriate information associated with organ and tissue donation.

However, it should be noted that the content found through these links is not created, controlled or approved by ATCA and no responsibility is taken for the consequences of viewing or using such content.

**Australian**

Australian Organ Donor Register  
www.medicareaustralia.gov.au/organ

Australian and New Zealand Intensive Care Society  

Australia and New Zealand Dialysis and Transplant Registry  
www.anzdata.org.au/

Australasian Transplant Coordinators Association  
www.atca.org.au

Australasian Donor Awareness Programme and Training  
www.adapt.org.au/

Australian College of Critical Care Nurses  
www.acccn.com.au

Kidney Health Australia  
www.kidney.org.au

National Health and Medical Research Council  
www.nhmrc.health.gov.au

The Transplantation Society of Australian and New Zealand Inc.  

**International**

Donor Action  
www.donoraction.org

European Transplant Coordinators Organization  
www.etco.org.au/

International Transplant Coordinators Society  
http://med.kuleuven.be/itcs/home.html

North American Transplant Coordinators Organization  
www.natco1.org/

UK Transplant  
www.uktransplant.org.uk

United Network for Organ Sharing  
www.unos.org

TransWeb: All About Transplantation and Donation  
www.transweb.org/

Transplant Nurses Association  
www.tna.asn.au/
APPENDIX D – LEGAL REQUIREMENTS

**Brain Death**

Minor variations and interpretations exist within State legislation in relation to the diagnosis and certification of brain death.

Local State legislation should always be referred to for clarification on this area. This section should also be read in conjunction with the ANZICS Statement on Death and Organ Donation, 3rd Edition 2008.

See below for details and links to legislation websites.

**New South Wales**

Death certification based on brain function criterion requires documentation by two medical practitioners who have practiced medicine for 5 years within the past 8 years. One of the two practitioners must be a Designated Specialist.

The Human Tissue Act 1983 and the Anatomy Act 1977 authorise the governing body of each hospital, to appoint Designated Specialists for the purposes of certifying brain death.

Medical specialists with the following qualifications are automatically eligible for appointment as Designated Specialists (Human Tissue Regulations 2000):

- Fellow of the Australian and New Zealand College of Anaesthetists
- Fellow of the Royal Australasian College of Physicians
- Fellow of the Royal Australasian College of Surgeons
- Fellow of the Royal Australian College of Obstetricians and Gynaecologists
- Fellow of the Joint Faculty of Intensive Care Medicine of the Australian and New Zealand College of Anaesthetists and the Royal Australasian College of Physicians


**Victoria/Tasmania**

Where the respiration or the circulation of the blood of the deceased is being maintained by artificial means, two registered medical practitioners – neither of whom is the Designated Officer or the registered medical practitioner or authorised person removing tissue and each of whom has been for a period of not less than five years a registered medical practitioner – have each certified in writing:

- that he or she has carried out a clinical examination of the person while the respiration or the circulation of the blood of that person was being maintained by artificial means; and
- that, in his or her opinion, at the time of examination, irreversible cessation of all function of the brain of the person had already occurred.


**Queensland**

The confirmation of brain death must be certified by two medical practitioners, each of whom has carried out a clinical examination of the person and one of whom is a specialist in:

- neurology/neurosurgery
- anaesthetics
- intensive care
- cardiology
- internal medicine
- thoracic medicine
- paediatrics
- general surgery
- emergency medicine
- paediatric surgery.

And neither of whom is:

- the medical practitioner who is attending a person who is to be the recipient of tissue from the body of the donor
- the Designated Officer who is giving authority for donation to proceed following family authorisation, or
- a medical practitioner who is proposing to remove tissue from the body of a deceased person.


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Minor variations and interpretations exist within State legislation in relation to the diagnosis and certification of brain death. Local State legislation should always be referred to for clarification on this area. This section should also be read in conjunction with the ANZICS Statement on Death and Organ Donation, 3rd Edition 2008.
Western Australia

There is no definition of death in Western Australian legislation.

The following information is taken directly from the Human Tissue and Transplant Act 1992, Amendment 1997.

"Where the respiration and the circulation of the blood of a person are being maintained by artificial means, tissue shall not be removed from the body for the purpose or a use as specified in subsection (1) unless 2 medical practitioners (each of whom has carried out a clinical examination of the person, each of whom has been for a period of not less than 5 years a medical practitioner and one of whom holds specialist qualifications in general medicine, neurology or neurosurgery or has such qualifications * as are accepted by the Executive Director) have declared that irreversible cessation of all function of the brain has occurred.

* In Western Australia, two medical practitioners must certify confirmation of brain death, each of whom has carried out a clinical examination of the person, each of whom has been for a period of not less than 5 years a medical practitioner and one of whom is a specialist in:
  - general medicine
  - neurology
  - neurosurgery
  - intensive care
  - emergency medicine
  - anaesthetics
  - nuclear medicine
  - radiology.

Neither practitioner must be:
  - a medical practitioner proposing to remove tissue from the body of a deceased person (surgeon);
  - the Designated Officer authorising the donation of organs and tissue; or
  - a medical practitioner attending the person who is to be a recipient of organs and tissue removed from the body of the donor.

(* Certification of brain death in accordance with ANZICS Statement includes those with specialist qualifications in intensive care, emergency care, anaesthetics, nuclear medicine or radiology).


South Australia

The following should be read in conjunction with the Australian and New Zealand Intensive Care Society (ANZICS) Statement and the Transplantation and Anatomy Act 1983.

Two medical practitioners must certify the confirmation of brain death, each of which carried out a clinical examination of the person. The doctors carrying out the tests must have more than 5 years experience as a medical practitioner.

Neither of these doctors can be:
  - the Designated Officer who is giving authority for donation to proceed following family authorisation, or
  - the medical practitioner who is proposing to remove tissue from the body of a deceased person.


Australian Capital Territory

Two medical practitioners, each of whom has been a medical practitioner for not less than 5 years and one of whom is a specialist neurologist or neurosurgeon or has the other qualifications that are prescribed, have each certified in writing:

  - that he or she carried out appropriate tests on or in relation to the person while the respiration and the circulation of the blood of that person were being maintained by artificial means; and
  - that, in his or her opinion, at the time of the tests, irreversible cessation of all functions of the brain of the person had already occurred.

Any period during which a person who is a medical practitioner practised as a medical practitioner, however described, under the law in force in a place outside Australia shall be taken into account in calculating the period of 5 years referred to in that subsection.

One of the medical practitioners who can certify brain death must be a specialist neurologist or neurosurgeon or have one of the following qualifications:

  - Fellow of the Royal Australasian College of Physicians, Intensive Care (FRACP, Intensive Care) or
  - Fellow of the Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists (FFICANZCA).

Northern Territory

When organs are to be removed for transplantation, there needs to be two medical practitioners (with not less than 5 years experience) and one being a medical specialist (defined as an anaesthetist, a general surgeon, neurologist, neurosurgeon or physician) who undertake the brain stem tests. Neither of these two doctors can be involved with the transplantation of organs in any way. These tests are carried out between two and twelve hours apart and the time and date of each test needs to be documented. The time and date documented after the second set of tests signifies the time of death on the death certificate.

Designated Officer’s consent

The role of a Designated Officer is to authorise the removal of tissue from a body for transplantation or other therapeutic, medical or scientific purposes, the performance of non-coronial post mortem examination and the release of a body for anatomical examination. The governing body of a hospital may, in writing, appoint such persons considered necessary to be a Designated Officer. A Designated Officer must not act in any case in which they have a personal interest or clinical involvement.

Any person may be appointed as a Designated Officer, such as staff specialists or visiting medical officers, chief resident medical officers, medical administrators, director of nursing, deputy-directors of nursing, senior nurse managers or senior administration managers.

Victoria/Tasmania


The process of consent occurs in the following order:

1. The deceased (if known by family or registered on the AODR)
2. Next of kin
3. Coroner’s (if applicable)
4. Designated Officer

Next of kin consent

It is important to distinguish the legal next of kin before obtaining consent.


“Senior available next of kin” means [in order of priority];

a) in relation to a child (under 18 years of age):
   (i) where a parent of the child is available: a parent of the child

CONSENT LEGISLATION

Variations and interpretations exist within relation to information on legislation concerning organ and tissue donation, consent by the deceased, the family, and the role of the Coroner and Designated Officer. Please refer to your local State legislation for clarification on this area. See below for details and links to legislation websites.

New South Wales

Human Tissue Act 1983 and Human Tissue Regulation 2005

www.legislation.nsw.gov.au

Next of kin consent

(As per NSW Health Policy Directive 2005_341)

Order of seniority for an adult is a spouse/de facto, son or daughter (18 years or over), parent, or sibling (18 years or over).

Order of seniority for a child is parents, sibling (18 years or over) or guardian. However, where the child is a state ward, no one is able to consent.

The Human Tissue Act 1983 allows a senior available next of kin to authorise another person, in writing, to exercise his or her functions. This ‘authorised person’ or delegate can then give written consent.

Coroner’s consent

Coronial permission is required if the death is examinable by the Coroner. The authority to remove tissue cannot be given without the permission of the Coroner and the Coroner’s forensic pathologist. The hospital medical officer is to complete Form A and/or B as applicable.

In the case of organ and tissue donation, the Organ Donation Service NSW/ACT Donor Coordinator will obtain permission from the duty Coroner and forensic pathologist. The Donor Coordinator will advise the hospital if coronial consent has been granted, withheld or restrictions applied.

Police identification (Police Form P79A) of the patient with an appropriate person who has known the deceased in life must occur before organ retrieval.

Designated Officer’s consent

The role of a Designated Officer is to authorise the removal of tissue from a body for transplantation or other therapeutic, medical or scientific purposes, the performance of non-coronial post mortem examination and the release of a body for anatomical examination. The governing body of a hospital may, in writing, appoint such persons considered necessary to be a Designated Officer. A Designated Officer must not act in any case in which they have a personal interest or clinical involvement.

Any person may be appointed as a Designated Officer, such as staff specialists or visiting medical officers, chief resident medical officers, medical administrators, director of nursing, deputy-directors of nursing, senior nurse managers or senior administration managers.

Victoria/Tasmania


The process of consent occurs in the following order:

1. The deceased (if known by family or registered on the AODR)
2. Next of kin
3. Coroner’s (if applicable)
4. Designated Officer.

Next of kin consent

It is important to distinguish the legal next of kin before obtaining consent.


“Senior available next of kin” means [in order of priority];

a) in relation to a child (under 18 years of age):
   (i) where a parent of the child is available: a parent of the child
(ii) where a parent of the child is not available: a brother or sister of the child who has attained the age of 18 years and who is available or

(iii) where no person referred to in sub-paragraph (i) or (ii) is available, a person who was the guardian of the child immediately before the death of the child and who is available.

b) in relation to any other deceased person:

(i) where the person, immediately before his death, had a spouse or domestic partner and that spouse or domestic partner is available

(ii) where the person, immediately before his death, did not have a spouse or domestic partner or the spouse or domestic partner is not available, a son or daughter of the person who has attained the age of 18 years and who is available

(iii) where no person referred to in sub-paragraph (i) or (ii) is available but a parent of the person who has attained the age of 18 years and is available

(iv) where no person referred to in sub-paragraph (i), (ii) or (iii) is available, a brother or sister of the person who has attained the age of 18 years and is available.

“Spouse” of a person means a person to whom the person is married.

“Domestic partner” means an adult person (>18yrs age) to whom the person is not married but with whom the person is in a relationship as a couple, where one or each of them provides personal or financial commitment and support of a domestic nature for the material benefit of the other, irrespective of their genders and whether or not they are living under the same roof, but does not included a person who provides domestic support and personal care to the person (a) for fee or reward; or (b) on behalf of another person or an organisation (including a government or government agency, a body corporate or a charitable or benevolent organisation).

Coroner’s consent

The death must be reported to the Coroner for investigation, by the treating consultant/registrar when:

• the person died unexpectedly
• the person died from an accident or injury
• the person died in a violent or unnatural way
• the person died during or as the result of an anaesthetic
• the person was ‘held in care’ immediately before they died
• a doctor has been unable to sign a death certificate giving the cause of death or

• the identity of the person who has died is not known.

In cases involving the Coronal Service, any removal of organs or tissue requires prior consent of a Coroner, which may be given subject to express conditions as stated in the Human Tissue Act 1982 and Coroner’s Act 1995. It is always advisable that the State Donor Coordinator prior to obtaining coronial consent ensures that the intensive care unit doctor has reported the death to the Coroner first.

Designated Officer’s consent

The Designated Officer of the hospital must give authorisation for organ donation to occur. Designated Officer in relation to a hospital means:

• a registered medical practitioner of the time being appointed under Section 4 to be a Designated Officer for that hospital or

• where, in relation to a hospital, there is not such person, the medical superintendent of the hospital or, while s/he is absent from or not on duty at the hospital, a person acting in his or her place.

Designated Officer’s authority to remove tissue

Under the Human Tissue Acts of Victoria and Tasmania, before a Designated Officer may authorise the removal of tissue from a body of a person who has died for the purpose of transplantation or other therapeutic, medical or scientific purposes, enquires as are reasonable in the circumstances must be made by the Designated Officer to:

• ascertain the existence and whereabouts of the next of kin
• ascertain if they know whether the deceased has expressed a consent or objection to being an organ donor
• if the deceased had expressed no wish, ascertain from the senior available next of kin, whether s/he consents or does not object to removal of organs and tissues
• determine that the two medical practitioners performing the certification, had not less than five years experience, and have each certified in writing:
  – that he or she carried out a clinical examination of the person while the expiration or the circulation of the blood of that person was being maintained by artificial means and
  – that in his or her opinion, at the time of examination, irreversible cessation of all function of the brain of the person had already occurred
• determine that coronial consent is required and if so, has been granted.
Queensland

Queensland Transplantation and Anatomy Act 1979 and Regulation 2004


“An Act to make provision for and in relation to the removal of human tissues for transplantation, for post-mortem examinations, for the definition of death, for the regulation of schools of anatomy, and for related purposes”.

Next of kin consent

“Tissue” means:
- an organ, blood or part of:
  - a human body or
  - a human foetus; or
- a substance extracted from an organ, blood or part of:
  - a human body or
  - a human foetus.

“Senior available next of kin” means:
- a spouse (including a married or de facto partner of the same or opposite sex)
- or an adult son or daughter
- or a parent
- or an adult brother or sister.

If the deceased person is a child, son or daughter does not apply and guardian appears as last on the list. The senior available next of kin must be 18 years of age or over.

If the deceased person has more than one current spouse (e.g. a separated married spouse and a current de facto), the most recent spouse is the senior available next of kin for the purpose of consent.

As per the amendment to Acts Interpretation Act 1954 (effective April 1, 2003) “spouse” includes a de facto partner. “De facto partner” means:

1. either one of two persons who are living together as a couple on a genuine domestic basis but who are not married to each other or related by family
2. in deciding whether two persons are living together as a couple on a genuine domestic basis, any of their circumstances may be taken into account, including, for example, any of the following circumstances:
   - the nature and extent of their common residence
   - the length of their relationship
   - whether or not a sexual relationship exists or existed
   - the degree of financial dependence or interdependence, and any arrangement for financial support
   - their ownership, use and acquisition of property
   - the degree of mutual commitment to a shared life, including the care and support of each other
   - the care and support of children
   - the performance of household tasks
   - the reputation and public aspects of their relationship

3. no particular finding in relation to any circumstance is to be regarded as necessary in deciding whether two persons are living together as a couple on a genuine domestic basis
4. two persons are not to be regarded as living together as a couple on a genuine domestic basis only because they have a common residence
5. For subsection (1):
   - the gender of the persons is not relevant and
   - a person is related by family to another person if the person and the other person would be within a prohibited relationship within the meaning of the Marriage Act 1961 (Cwlth), section 23B, if they were parties to a marriage to which that section applies
6. in an Act enacted before the commencement of this amendment, a reference to a spouse includes a reference to a de facto partner as defined in this section unless the Act expressly provides to the contrary.

Coroner’s consent

As per the Coroners Act 1958, a Coroner is by virtue of the person’s office and without further appointment or other authority and while the person holds or occupies or performs the duties of that office:

- every person who at any time holds or occupies under the Crown in right of this State the office of:
  - stipendiary magistrate or acting stipendiary magistrate or
  - being also a justice of the peace and public service officer, clerk of the court or acting clerk of the court.
**Designated Officer’s consent**

The medical superintendent of a hospital and his or her nominees (being medical practitioners) appointed by the medical superintendent in writing are, for the purposes of this Act, Designated Officers for that hospital.

The persons or body having the control and management of a hospital may, in writing, appoint persons to be, for the purposes of this Act, Designated Officers for that hospital.

The role of the Designated Officer is to ensure that:

- death has been certified
- the donor had not objected to donation prior to death
- the senior available next of kin have authorised the consent for organ and/or tissue donation in writing
- consent from the Coroner has been obtained in applicable cases.

In accordance with the Transplantation and Anatomy Act 1979, when the Designated Officer is satisfied all legal aspects have been met he or she is required to authorise (signature required on consent form) the donation.

**Western Australia**

In Western Australia, the legislation dealing with donation of organs and tissues after death is defined in the Human Tissue and Transplant Act 1997.

www.slp.wa.gov.au/statutes/swan.rst

For the purposes of the Act, “tissue” includes an organ or part of the human body or a substance extracted from, or from a part of, the human body.

**Next of kin consent**

In the case of an adult, the senior next of kin in priority order is:

- the de facto spouse or spouse regardless of gender
- a son or daughter over the age of 18 years
- a parent
- a brother or sister over the age of 18 years.

In the case of a donor who has not reached the age of 18 years, the senior next of kin in priority order is:

- the de facto spouse or spouse regardless of gender
- a parent
- a sibling who is over the age of 18 years
- a guardian of the child.

Amendment to Acts Interpretation Act 1984 (Effective 2002)

**De facto partners**

The Human Tissue and Transplant Act 1982 was amended by Part 12 of the Acts Amendment (Lesbian and Gay Reform) Act 2002. This amendment allows for the de facto partner of the deceased to be recognised as the next of kin. Indications of a de facto partner are defined in section 13A of the Interpretation Act 1984 as follows:

- the length of the relationship between the two people
- whether the two persons have resided together
- the nature and extent of common residence
- whether there is, or has been, a sexual relationship between them
- the degree of financial dependence or interdependence, and any arrangements for financial support, between them
- the ownership, use and acquisition of their property (including property they own individually)
- whether they care for and support children
- the reputation, and public aspects, of the relationship with them

It does not matter whether:

- the persons are of different sexes or the same sex; or
- either of the persons is legally married to someone else or in another de facto relationship.

**Coroner’s consent**

Coroners Act 1996 (Coroners Amendment Bill 2004), Coroners Regulations 1997, Anatomy Act 1930

In cases where the Coroner has jurisdiction to investigate a death or hold an inquest, the removal of tissue cannot proceed unless the Coroner has first given consent.

The Coroner must be informed of and given the option of a coronial post mortem in the following instances:

- cause of death unknown
- death not due to natural causes
- death due to violence or injury
- death whilst an involuntary patient of a psychiatric facility, detention centre or prison
- reasonable suspicion of the above apply
- death during or following surgery where death was not anticipated.

The State Donor Coordinator contacts the Coroner’s representative to discuss the circumstances of death and the tissue suitable for donation. The deceased must have official identification before commencement of retrieval.
The Donor Coordinator shall document the date and time of the coronial consent, the Coroner’s representative, and the prescribed conditions and directives which shall ensure the coronial investigation is not impeded.

A consent and direction may be given orally by the Coroner, and if so given shall be confirmed in writing and filed in the Donate West donor record.

The Donor Coordinator shall advise the Coroner’s representative in writing of:

- consent outcome
- tissue retrieved
- outcome of processing and transplantation
- personnel involved in tissue retrieval.

**Designated Officer’s consent**

Section 3(1) a “Designated Officer” in relation to a hospital, means the person who is the Designated Officer for the hospital in accordance with Section 4.

In Western Australia a Designated Officer is a medical administrator or medical practitioner nominated by the Executive Director of Public Health, and subject to the Coroner’s jurisdiction. The Designated Officer may under the Act, ‘delegate’ his or her duties. Appointed in writing, hospital medical administrations will hold a list of current authorised designated and delegated officers. All nominees must be medical practitioners.

The role and authority of the Designated Officer is defined in the Human Tissue and Transplant Act 1982 (Amendment 1997). A Designated Officer for a hospital may, subject to and in accordance with Part 111 Section 22, authorise the removal of tissue from the body of a person who has died in hospital or whose dead body has been brought into the hospital:

- for the purpose of transplantation of the tissue to the body of a living person or
- for use of the tissue for other therapeutic purposes or for medical or scientific purposes.

The role of the Designated Officer is to ensure that:

- the death has been certified, including correct documentation of brain death if applicable for organ donation
- the deceased person during his or her lifetime expressed the wish for, or consented to, donation of tissue after death, and had not revoked that consent
- the deceased had not objected to donation

- where the person had not expressed an opinion of donation nor objected to donation, the senior available next of kin has given written or witnessed verbal consent for organ and/or tissue donation
- where applicable, consent from the Coroner has been sought and obtained.

In accordance with the Act when the Designated Officer is satisfied all legal aspects have been met, the Designated Officer is required to authorise (sign, print name, date and time of signature) the donation.

Under Section 22 (4) of the Act, the senior available next of kin of a person may advise a Designated Officer at any time when a person is unconscious before death, of consent to donation of organs and/or tissue after death. The Designated Officer cannot act on this advice until certification of death is confirmed.

**South Australia**

Transplantation and Anatomy Act 1983


**Next of kin consent**

Under South Australia’s law, for organ donation to occur all that is required from the potential donor or the senior available next of kin is a lack of objection to the donation.

Authorisation to proceed with organ/tissue donation is sought from the senior available next of kin (SANOK).

The AODR should be routinely accessed to ascertain the potential donor’s wishes prior to speaking with the SANOK [AHMC Recommendations].

Senior available next of kin:

- a spouse (not including a de facto partner)
- a son or daughter over the age of 18 years
- a parent
- a brother or sister aged 18 years or over.

For a child next of kin means (in order of priority)

- the child’s parents
- a brother or sister who is aged 18 years or over, or
- a child’s legal guardian (such as a person who was appointed by a court or a foster carer).

**Coroner’s consent**

Where the circumstances of a person’s death require the involvement of the Coroner, as specified under the Coroner’s Act 2003, the consent of a Coroner as defined by the Act must be sought before organ/tissue donation can occur.
The Coroner may:

- give verbal consent to the removal of organs/tissues for transplantation – this must be confirmed in writing at a later date
- place restrictions on the organs/tissues that can be removed for transplantation.

**Designated Officer’s consent**

A Designated Officer for a hospital is a medical practitioner who is appointed by the Minister, in writing. The Designated Officer may, in writing, authorise organ/tissue donation as long as:

- death has been certified
- the donor had not objected to organ/tissue donation prior to death
- the senior available next of kin had no objection to organ/tissue donation
- consent from the Coroner has been obtained in applicable cases.

If the donor has no next of kin, or they are unable to be contacted after reasonable efforts have been made, the Designated Officer may authorise the removal of organs or tissue for transplantation. This can only occur if the Designated Officer is satisfied that the donor had no objection to organ/tissue donation during their lifetime (after reasonable enquiries have been made).

**Australian Capital Territory**


**Senior next of kin**

“Senior available next of kin” means:

**a) for a dead child:**

(i) if a parent of the child is available, the parent or
(ii) if a parent of the child is not available, an adult brother or sister of the child who is available, or
(iii) if no-one mentioned in subparagraph (i) or (ii) is available – someone who was the child’s guardian immediately before the child’s death and who is available, and

**b) for any other dead person:**

(i) if the person was, immediately before his or her death, party to a domestic partnership and the person who was then his or her domestic partner is available, the domestic partner; or
(ii) if the person was, immediately before his or her death, party to a domestic partnership but the person who was then his or her domestic partner is not available, an adult son or daughter of the dead person who is available, or
(iii) if the person was not, immediately before his or her death, party to a domestic partnership, an adult son or daughter of the dead person who is available, or
(iv) if no-one mentioned in subparagraph (i), (ii) or (iii) is available but a parent of the dead person is available, the parent, or
(v) if no-one mentioned in subparagraph (i), (ii), (iii) or (iv) is available, an adult brother or sister of the dead person who is available

“Domestic partner” and “domestic partnership” are defined in the Legislation Act 2001, Section 169, which states that references to domestic partner and domestic partnership:

1. In an Act or statutory instrument, a reference to a person’s “domestic partner” is a reference to someone who lives with the person in a domestic partnership and includes a reference to a spouse of the person
2. In an Act or statutory instrument, a domestic partnership is the relationship between two people, whether of a different or the same sex, living together as a couple on a genuine domestic basis.

Example of indicators to decide whether two people are in a domestic partnership:

- the length of their relationship
- whether they are living together
- if they are living together, how long and under what circumstances they have lived together
- whether there is a sexual relationship between them
- their degree of financial dependence or interdependence, and any arrangements for financial support, between or by them
- the ownership, use and acquisition of their property, including any property that they own individually
- their degree of mutual commitment to a shared life
- whether they mutually care for and support children
- the performance of household duties
- the reputation, and public aspects, of the relationship between them.
Coroner’s consent

In circumstances where the Donor Coordinator has a patient referred for organ and tissue donation who is:

- declared brain dead
- is expected to have brain death declared or
- when a patient has been declared dead
- is expected to be declared dead using cessation of heart beating definition of death
- where there is an expectation that the Coroner will have jurisdiction over the case.

In these cases, it is preferable to provide the Coroner’s officer with advance notice that organ or tissue donation may be requested. This is to allow for adequate consideration of the case and to enhance evidence collection for the Coroner, which may then allow for donation to be approved following the declaration of death.

The Coroner’s officer can be contacted on: 0413 009 547 (24 hours). His or her role is to liaise with the duty Coroner (there are nine Coroners). He or she will also liaise with the anatomical pathologist, who provides recommendations to the Coroner, as required.

The Coroner’s officer should be alerted to the case and the possibility that organ and /or tissue donation could be considered.

There may be some deaths where injury has been sustained interstate, and in these cases the Coroner and police may wish to clarify the situation. The final decision is made by the Coroner in the jurisdiction where the death has occurred. It is therefore the ACT Coroner’s responsibility to provide consent in all cases pertaining to death occurring in the ACT.

Ideally, whether the Coroner is likely to provide consent should be established prior to discussion with the family about organ and tissue donation.

In some circumstances of suspicious injury causing death, the Coroner may consider having a forensic pathologist present. The arrangements for this occur between the Australian Federal Police and Victoria. They may request to have the forensic pathologist present in the operating theatre to allow for the procedure to go ahead. This obviously involves bringing the Victorian forensic pathologist to the ACT. This requires early notification of the Coroner of the situation.

Supporting documentation required includes:

- Coroners Checklist
- Coroners Consent Forms (Form 4:(i–iii)
- ATCA Donor Referral Forms [document all contact].

Designated Officer’s consent

Under Part 1 Section 5 (page 4) of the Act, the Minister, in writing, appoints a medical practitioner to be Designated Officer for a public hospital.

For a private hospital, the persons that have control of a hospital may, in writing, appoint a medical practitioner as Designated Officer for that hospital.

Note that in other States/Territories the Designated Officer can be someone other than a medical practitioner.

The role of the Designated Officer in an organ or tissue retrieval situation (as per Part 3 Section 27 1–3 (pages 18–19 of the Act) is to authorise in writing for the removal of tissue if:

- the person had expressed the wish to donate
- the person had not withdrawn the wish or revoke consent
- the senior available next of kin has no objection to the donation.

Under Part 3 Section 27 4 (page 19) of the Act, the senior next of kin may make it known to a Designated Officer at any time when the person is unconscious before death that they have no objection to donation, after the death of the person. However, the Designated Officer shall not act on such an indication if the person recovers consciousness.

Under Part 3 Sect 30 1 b, c and d (pages 21–22) of the Act, the Designated Officer shall not give authority for tissue removal in brain death situations unless:

- two medical practitioners – each of whom has been for not less than 5 years a medical practitioner and one of whom is a specialist neurologist or neurosurgeon or has other prescribed qualifications (see below) – have EACH certified in writing that he or she carried out appropriate tests on the person (as per the ANZICS Statement).

As per the Transplantation and Anatomy Regulations 2001 Subordinate Law 2001 No 38, other qualifications as prescribed qualifications are:

- Fellow of the Royal Australasian College of Physicians, Intensive Care
- Fellow of the Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists.
Northern Territory

Human Tissue Transplant Act 1979 (amended 1997)


Next of Kin Consent

The Human Tissue Act 1979 specifies that the wishes of the deceased are paramount. The family should be asked about what the deceased wished, rather than what they wish (in the first instance). If the wishes of the deceased are unknown, then the senior available next of kin makes the decision.

The “senior next of kin” in relation to a child (under 18 years of age) is the first in order of priority of the following persons who is available at the time:

- a parent of a child
- a brother or sister (who has attained the age of 18 years) of the child
- a guardian of the child.

The “senior next of kin” in relation to any other person, is the first in order of priority of the following persons who is available at the time:

- the spouse of the person (including de facto spouse)
- a son or daughter (who has attained the age of 18 years) of the person
- a parent of the person
- a brother or sister (who has attained the age of 18 years) of the person.

Where a deceased person is survived by a person who, although not married to the deceased person was, at the time of the death of the deceased person living with them as that person’s husband or wife on a permanent and bona fide domestic basis, that surviving person shall be taken to have been married to the person, or to have been the spouse of the deceased before his or her death.

Coroner’s consent

In cases involving a coronial investigation, any removal of organs or tissues requires prior consent of the Coroner, which may be given subject to expressed conditions as stated in the Act.

Designated Officer’s consent

In the Act, the Designated Officer is also referred to as the person in charge of the hospital. These individuals are legally required to consent to any removal of organs or tissues within the hospital and to make enquiries as are reasonable in the circumstances. The Designated Officer or person in charge of the hospital must:

- determine whether the deceased person during his or her lifetime had expressed a wish for, consented to or made an objection to becoming an organ donor
- ascertain the existence and / or whereabouts of the next of kin, and
- determine whether the senior available next of kin of the deceased person has an objection to the removal of tissue from the body of the deceased person.

The Designated Officer must also determine that at the time of examination, irreversible cessation of all function of the brain of the person had already occurred, and that of the two medical practitioners performing the certification, one was a certified specialist and both have at least five years experience.