Australian and New Zealand Paired Kidney Exchange Program

Protocol 6: Guidelines for Surgery, Packaging and Transport

DonateLife

Australian + New Zealand Paired Kidney Exchange Program

Guidelines for Surgery, Packaging and Transport

Introduction

The purpose of this document is to inform **transplant centres performing donor nephrectomies** of the Kidney Preparation and Packaging Protocol for the ANZKX Program.

This Protocol must be followed by participating transplant centres in order to maintain optimal organ quality and recipient outcomes.

Packaging and transport – General principles

Process

The choice of surgical technique used for the donor nephrectomy will be that which is ordinarily used at the donor hospital. Prior to confirmation of a potential exchange occurring, the kidney transplant donor and recipient surgeons are required to complete the ***ANZKX Surgical Check List (Form 11)***. Direct communication between the donor and recipient surgeon is encouraged if there are any issues regarding anatomy, preferred side of nephrectomy or other surgical issues.

Approximately two weeks prior to surgery, the ANZKX Coordination Centre will send information to participating units confirming the surgical date, donor anaesthetic start time, side of donor nephrectomy and perfusion solution. **This information, including the documented side of nephrectomy, should be double checked by donor and recipient surgeons at this time.**

Planning for the Transportation of Kidneys

In the ANZKX Program, kidneys will be transported between the donor and recipient transplant hospitals.

Designated ANZKX transport boxes and labels (ANZKX Transport Pack) will be supplied to each transplant centre. Distribution of ANZKX Transport Packs to all donor and recipient participating centres will occur prior to the first and subsequent exchange surgeries for transplant centres.

The ANZKX Coordination Centre and transplant centres will ensure that an ANZKX Transport Pack is available for transportation of the kidney. Further supplies to replenish stock will be provided on request. A transport courier will be used to transport all kidneys between transplant hospitals.

Surgery and Preparation of the Kidney

Dissection of the donor vessels in the hilum of the kidney on the back table should not be undertaken by the donor surgeon. This will be the responsibility of the recipient transplant surgeon.

It is particularly important that dissection of the ureter is NOT performed. The peri-ureteric tissue must be preserved, as this contains the vascular supply to the ureter. Removing this risks devascularisation of the ureter and post-transplant ureteric complications.

Examples of kidneys with the peri-ureteric tissue kept intact are shown at the top of the next page. It is particularly important to maintain the area of tissue outlined in green in figures 1 and 2.

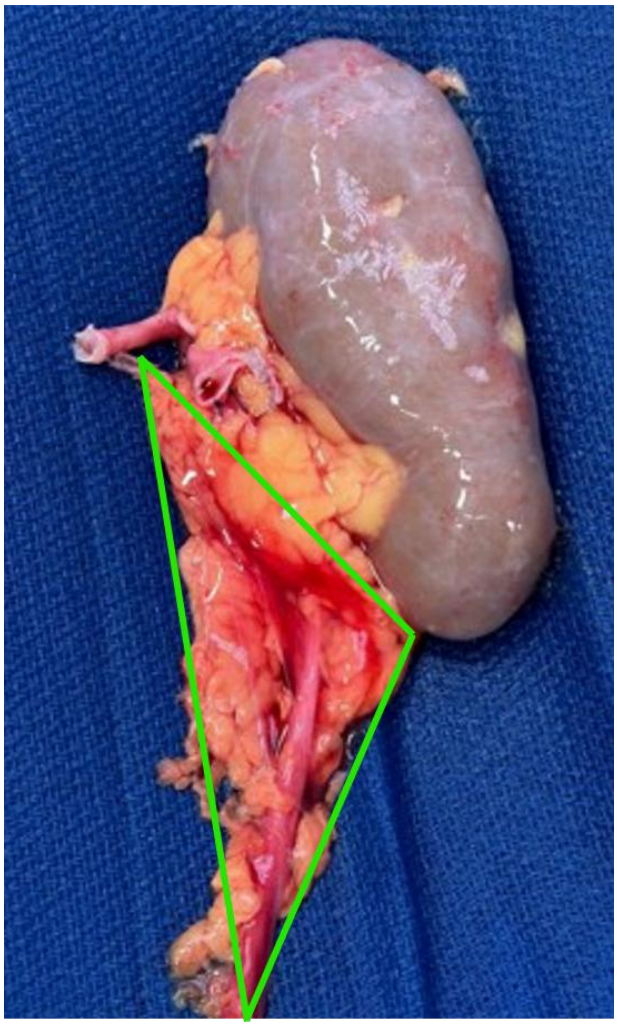


Figure 1. Donor kidney illustrating peri-ureteric tissue intact and peri-nephric fat removed. It is important that the tissue in the area indicated is left intact by the donor surgeon.

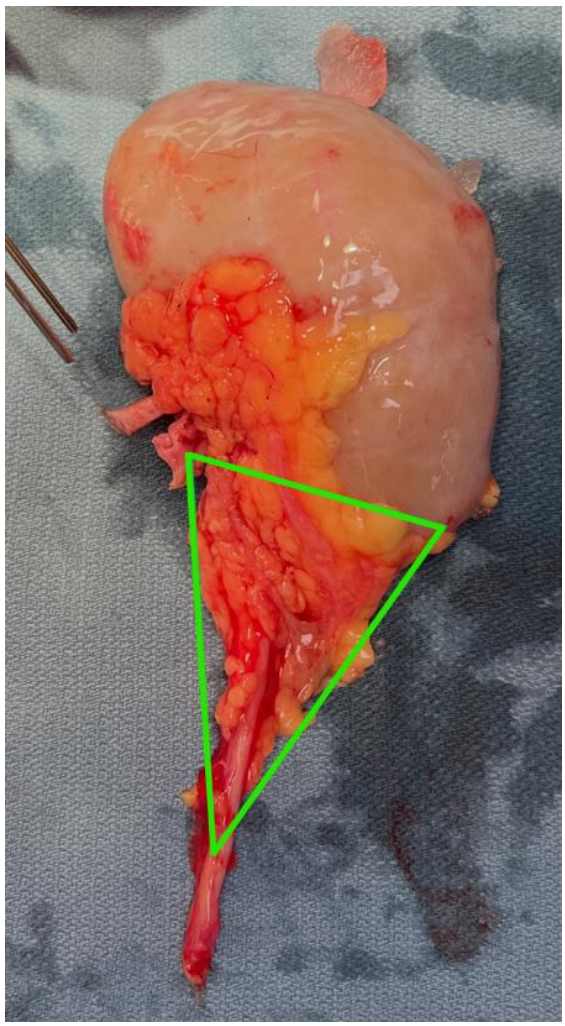


Figure 2. This donor kidney example highlights the area between the ureter, the renal hilum, and lower pole of the kidney. This is the classic 'Golden Triangle' which should not be dissected.

The donor surgeon should ensure completeness of the perfusion of the kidney by external examination of the parenchyma. To enable assessment of complete perfusion of the kidney, the donor surgeon will remove sufficient peri-renal fat tissue but will not dissect donor vessels.

Perfusion of the Donor Kidney

The donor surgeon or a transplant recipient surgeon is responsible for perfusion and packaging of the kidney. It is important that this person is experienced in kidney perfusion and packaging.

There is no single mandatory perfusion solution to be used for the transport of kidneys within the ANZKX Program. However, for exchanges with an anticipated cold ischaemic time of greater than 10 hours, UW solution is preferred. This is usually the case for trans-Tasman exchanges and for those between centres on the east and west coast of Australia.

UW solution should also be used if this requested by the recipient surgeon.

The final choice of perfusion solution will be negotiated between donor and recipient surgeon at the time of completion of the donor Surgical Checklist.

The addition of heparin to the perfusion solution is not mandatory but can be requested by the donor or recipient surgeons via the surgical checklist.

The protocol/method for perfusion is documented under the *Perfusion and Packaging of kidney* section (see page 11).

Post nephrectomy, the donor surgeon should call the recipient surgeon. This should be done each time but is particularly important if there are any anatomical issues that may be of concern. Information on any significant technical or anatomical problem is also to be documented on the Living Kidney Donation Report by the donor surgeon.

Packaging of the Donor Kidney

Packaging of the kidney for transportation will be as for deceased donor kidneys. Specifically, the kidney is placed in three thick sterile plastic bags (e.g. bowel bags).

- The inner bag will contain the donor kidney and approximately 500ml of perfusion solution.
- The middle bag will contain 300 to 500ml of sterile cold saline or ice.
- The outer bag will contain only the two inner bags. No solution is required in the outer bag.

Cold storage for transportation will be provided by a transportable single-use box (filled with non-sterile wet ice).

The box must be placed in the transport bag provided. The transport bag will be used by all transplant centres. It will allow the kidney box to be more easily transported; is already screen printed with relevant logos and labelling, contains a dedicated sleeve for address labels and documentation to travel with the organ.

ANZKX Labelling and Documentation

The transport bag has been printed with the DonateLife/ANZKX logo. Specific address labels marked “Urgent Delivery” will be provided by the ANZKX Coordination Centre identifying the bag’s contents and destination, with the contact details of the sending and receiving renal transplant coordinators.

The “Urgent Delivery” Label stating “Human Kidney for Transplant” is only used for exchanges within Australia. The “Urgent Delivery” label is placed in the top sleeve of the dual compartment that is located on the inside lid of the transport bag, so that the label is visible from the top of the bag when closed.

The ***ANZKX Living Kidney Donation Report (Form 14)*** will be forwarded with the donor kidney. This document has de-identified donor and recipient details, with sections to be completed by donor and recipient centres. De-identified Donor NAT, Blood Group, CMV, EBV, syphilis and strongyloides results will also accompany the kidney. These documents will be placed in the ANZKX “Exchange details” envelope provided and inserted in the internal dual-compartment document sleeve located on the inside lid of the transport bag.

Transport Carrier

Transportation of the live donor kidney will be organised by the ANZKX Program Coordinator in close collaboration with renal transplant coordinators at the relevant transplant centres. The procedure will be fully coordinated in discussion with the transplant centres involved.

All kidneys will be transported by a transport courier which will undertake door to door delivery by the fastest possible means and to a designated person (e.g. the renal transplant coordinator) at the recipient transplant centre. The renal transplant coordinator, surgeon or delegate will also be responsible for verifying the kidney delivered is the correct one for the recipient, and that all documentation is attached and complete. Transport costs will be funded in Australia and New Zealand as per agreed funding arrangements.

Packaging resources

An ANZKX Transport Pack including a single use transport box and other transport items will be supplied to the transplant centre. There are different single use transport boxes used for exchanges within Australia and trans-Tasman exchanges. The packs are to be designated for ANZKX use only and kept in a safe and accessible area, e.g. the renal transplant coordinator's office. After each exchange, the ANZKX Coordination Centre will replenish stock of transport packs as required upon advisement from the local transplant centre, to ensure readiness for the next exchange. **Please note the transport bags are multiple use items, and as such, should be retrieved from theatres at the completion of surgery.**

The ANZKX transport pack will contain the following items:

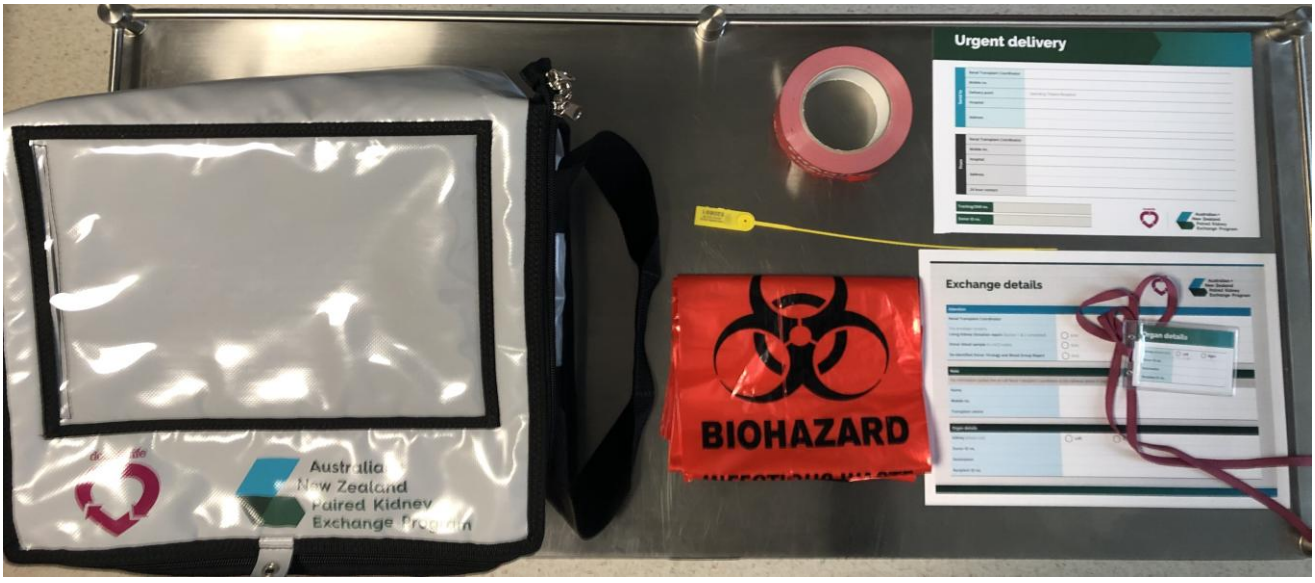
- Outer transport bag cover. Smaller bag for trans-Tasman exchanges (see figure 4).
- Single use transport box. Smaller orange coloured box for trans-Tasman exchanges.
- Heavy-duty clear plastic bag for lining empty box – for exchanges within Australia (see figure 3).
- Red biohazard bag x 1 (lines the empty box) plus an extra red biohazard or other clear plastic bag x 1 for trans-Tasman exchanges (see figure 4).
- Clear plastic insert tag with ribbon and insert for labelling of sealed kidney bag.
- Transport tape to seal the box.
- ANZKX “Exchange details” envelope and “Urgent delivery” label. For exchanges within Australia the “Urgent delivery” label will also state “Human Kidney for Transplant” (see figure 3).
- Cable zip tie to seal the transport bag. Please use the yellow security cable tie for trans-Tasman exchanges (see figure 4).

Standard packaging supplies to be provided by the transplant centre are as follows:

- Perfusion solution – 1L solution x 2 bags.
- Heparin.
- Bowel bags x 3.
- Non-sterile crushed ice.
- Sterile cold saline.

Figure 3. For Exchanges within Australia (*see below*)

Figure 4. For Trans-Tasman Exchanges Between Australia & New Zealand (*see below*)



Pre-exchange process during fortnight prior to agreed date

ANZKX Program Coordinator

- Notify transplant teams of the live donor/recipient pairs confirmed for an exchange.
- Coordinate date of transplants acceptable to centres and donor/recipient pairs.
- Email surgical plan, confirming Left or Right kidney, perfusion solution and heparin requirement
- Identify responsible renal transplant coordinator at each site that will oversee coordination of surgical timelines.
- Identify the transplant recipient surgeon on site (if applicable) who will assist with donor kidney packaging.
- Identify a transplant nephrologist who will be available if required on the day of exchange
- Obtain logistical and operative details pertaining to the day of exchange (refer to ***ANZKX Day of Exchange Details form 12).***

Local Transplant Centre

- Ensure ANZKX transport box and contents are available.
- Confirm surgical plan including Left or Right kidney, perfusion solution and heparin requirement.
- Check surgical schedules (date & time) are in place.
- Check donor NAT has been performed according to ANZKX protocol.
- Ensure de-identified donor NAT, ABO, CMV/EBV, syphilis and strongyloides results are available.

ANZKX Program Coordinator (confirms)

7–2 days prior to surgery

- Renal transplant coordinators who will be present at kidney retrieval and implant.
- ANZKX transport packs have been received by each centre and are ready for use.
- Anaesthetic start times and anticipated pick-up time for organs.
- Name of recipient transplant surgeon who will be present in theatre to assist with packaging (if applicable).
- Name of transplant nephrologist available on the day of surgery (if required).
- Flight itinerary for organs (as applicable).
- Consignment Notes for Organ Transport have been received by centres.
- Couriers responsible for pickup and delivery.
- Hospital pickup and delivery points and designated contacts at each hospital.
- Contingency plan and emergency contact details.

1 day prior to surgery

- All the above is in place.
- Donor/recipient pairs are fit for surgery (i.e. not affected by acute illness, consent not withdrawn).
- Email communication strategy.

Day of exchange process – Local renal transplant coordinators

Kidney Retrieval

Designated renal transplant coordinators (or delegates) at each transplant centre will be present in the operating theatre and responsible for the following duties:

Communication

- Relay the following information via text message to the ANZKX Coordination Centre as required:
  - Time donor arrived in theatre or anaesthetic bay.
  - Any delay in scheduled anaesthetic start time.
  - Time of anaesthetic induction.
  - Time of knife to skin.
  - Time of cross clamp of donor kidney.
  - Time of handover of the kidney to the courier/OBC.

The ANZKX Coordination Centre must be immediately notified if:

- The donor becomes acutely ill at any stage and surgery must be aborted.
- The kidney may be removed earlier than expected.
- There are surgical issues that may impact on kidney suitability or readiness for transport.
- Any unexpected findings during surgery.
- Kidney removed is visibly damaged.
- Delayed or non-arrival of courier.

Documentation

Ensure the donor documentation is completed appropriately and accompanies the kidney. Complete sections 1 and 2 of the ***ANZKX Living Kidney Donation Report (Form 14)***.

Form 14

ANZKX Living Kidney Donation Report

Once this form is completed it should be returned via email to ANZKXProgramCoordinators@mh.org.au

SECTION 1: Completed by the Transplant Coordinator or Surgeon present at retrieval			
Date of Retrieval		Donor Initials	
		National Reference Number	
Donor Hospital		Donor Blood Group	
Donor Surgeon		Donor Date of Birth	
Time of Artery cross-clamp		Renal Transplant Coordinator	
Left or Right Kidney		Time Kidney on ice	
No. of arteries		Perfusion fluid / Heparinisation used	☐ UW ☐ HTK ☐ 10000u ☐ None
SECTION 2: Completed by the donor surgery team			
Abnormal findings or damage (short vein/ureter etc.)? ☐ Yes ☐ No			
Comments:			
Kidney checked for complete perfusion *(external examination of parenchyma)* ☐ Yes			
Recipient surgeon telephoned post-nephrectomy and advised re any issues ☐ Yes			
Surgeon performing kidney perfusion			
Donor Surgeon signature:			

Packaging and transport of kidneys

- Correct packaging of kidney.
- Address label and “Exchange details” envelope completed with the following items inserted into the envelope:
  - Completed sections 1 & 2 of the ***ANZKX Living Kidney Donation Report (Form 14)***.
  - De-identified donor NAT, Blood Group, CMV/EBV, syphilis and strongyloides results.
- The envelope is then inserted into the document sleeve on the inside lid of the transport bag.
- Delivery of the transport box is dispatched to an awaiting courier.

Kidney Delivery

1. Meet courier at designated hospital delivery point. For e.g. Operating theatre reception.
2. Ensure incoming ***ANZKX Living Kidney Donation Report (Form 14)*** sections 1 & 2 are complete. If not, contact renal transplant coordinator at retrieval centre for details, prior to delivering kidney to theatre.
3. Kidney is checked and verified with implanting surgeon or delegate as correct for the intended recipient.

4 At the end of the procedure, ensure that section 3 of the ***ANZKX Living Kidney Donation Report (Form 14)*** has been completed by the transplanting surgical team.

SECTION 3: Completed by the Transplanting Surgical team			
Date of Transplant		Recipient Initials	
Recipient Hospital		National Reference Number	
		Recipient Blood Group	
		Recipient Date of Birth	
Transplanting Surgeon		Kidney Side ✓	Left ☐ Right ☐
Time Kidney off ice		Time of Reperfusion	
No Problems Identified ✓	☐		

Problems Identified *(Please complete if problems were identified & forward relevant images if available)*		
Packaging / Transportation	✓	**Provide diagram below if appropriate:**
Insufficient preservation fluid in bags	☐	
Damaged packaging	☐	
Other (please specify below)	☐	
Technical / Anatomical Problem	✓	
Peri-nephric fat not removed adequately	☐	
Incomplete perfusion of kidney	☐	
Damaged artery (s)	☐	
Damaged vein	☐	
Damaged ureter / insufficient length	☐	
Non identified abnormal anatomy	☐	
Non identified pathology	☐	
Other (please specify below)	☐	
Inadequate Paperwork	✓	
Labelling	☐	
Donor documentation	☐	
Recipient documentation	☐	
Comments:		
Recipient surgeon signature:		

5 Email the ***ANZKX Living Kidney Donation Report (Form 14)*** to the ANZKX Coordination Centre within 2 working days of the procedure.

The ANZKX Coordination Centre must be immediately notified if:

- The recipient becomes acutely ill at any stage and surgery must be aborted.
- The wrong kidney is delivered.
- Inadequate/Incorrect documentation.
- Kidney not received by the expected time.
- Transport box damaged and/or packaging inappropriate.
- Kidney looks visibly damaged when removed from packaging.

Perfusion and packaging of kidney

The donor surgeon or assisting surgeon is responsible for perfusion and packaging of the kidney as described in the following steps.

Kidney Perfusion

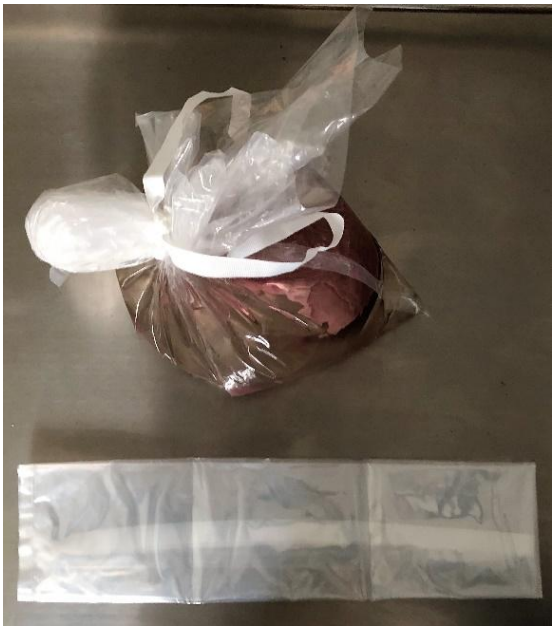
1. Donor kidney is flushed at 100cm H_20 pressure with at least 500ml of perfusion solution (refrigerator temperature = 4 degrees if UW solution is used) until venous effluent is clear of blood. The final flush will be performed with either no heparin, 10,000 or 20,000U heparin per litre of perfusate, as previously determined by the recipient surgeon.
2. Surgeon will ensure completeness of perfusion by external examination of the parenchyma.

Please note any preparation of donor kidney vessels will be the responsibility of the recipient surgeon and is not to be undertaken by the donor surgeon.

Kidney Packaging

Please note: Steps 1–3 are performed as a sterile procedure by the surgeon or assistant. 3 bowel bags and perfusion fluid are required.

1. First bowel bag (inner bag) – kidney in 500ml preserving fluid. (**NO ICE AS PER BELOW**)



2 Inner bag placed in 2nd bowel bag (middle bag) containing 300-500ml cold sterile normal saline solution or ice.

3 Middle bag placed in 3rd bowel bag (outer bag). No solution is required between 2nd and 3rd bag.

4 Completed “Organ details” label is inserted into clear plastic tag and tied around the neck of the sealed outer bag as per below.

5 Transport box is lined with a heavy-duty plastic bag and 2/3 filled with crushed ice. Sealed kidney is placed upon the ice in the centre of the box, with label facing upwards. Ice is then placed around the kidney, leaving the label uppermost and visible and ensuring the kidney is stable. No ice covers the label.

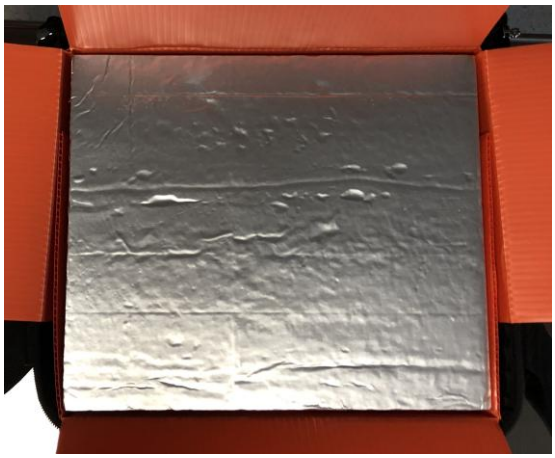
Australian Transport Box (*see below*)

Trans-Tasman Transport Box (*see below*)

6 The neck of the plastic liner bag is secured with any remaining ties from the bowel bags. The organ and ice should be completely enclosed within the plastic liner. Ensure the polystyrene lid is placed back before the cardboard box is secured and sealed with transport tape See images below.

Australian Transport Box (*see below*)

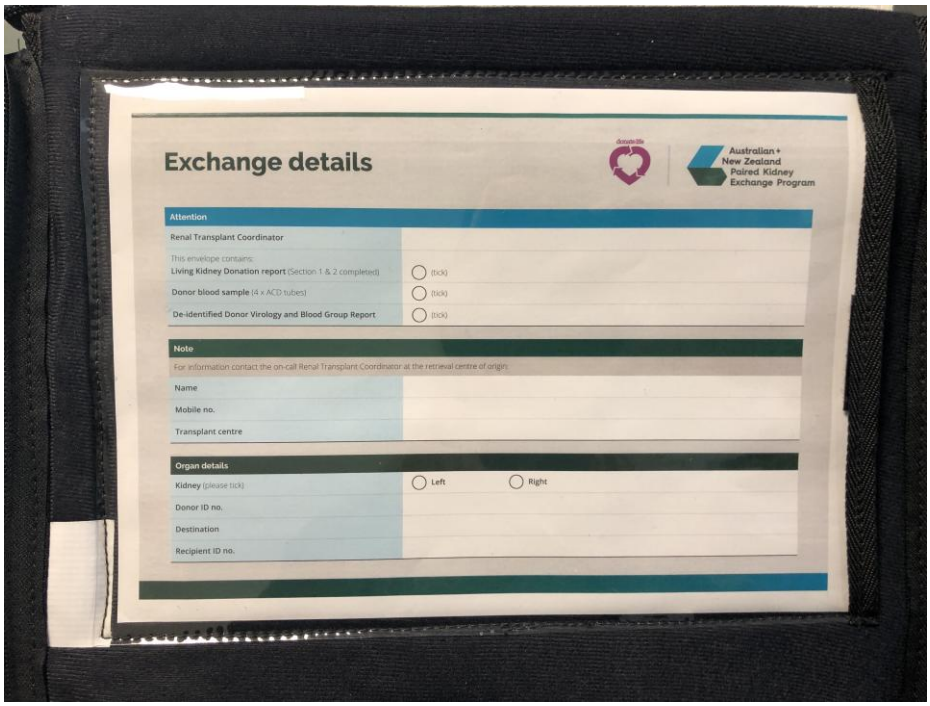
Trans-Tasman Transport Box (*see below*)



DonateLife

Australian + New Zealand Paired Kidney Exchange Program

7 The completed ***ANZKX Living Kidney Donation Report (Form 14)*** and de-identified NAT results, ABO blood group, CMV/EBV, syphilis and strongyloides results are placed in the ANZKX "Exchange details" envelope and inserted into the designated section located on the underside of the lid of the transport bag.



8 The ANZKX "Urgent delivery" label with completed destination details and contact numbers of both sending and receiving renal transplant coordinators are inserted into the designated section on the top/lid of the transport bag.

Australian Transport Box Label (*see below*)

Trans-Tasman Transport Box Label (*see below*)

9 Zip the top of the transport bag closed and bring the zipper pull tags to the front, in line with the eyelets, and secure with the cable tie. The yellow security cable ties are only used for trans-Tasman exchanges. The security cable tie number should be documented on the “Urgent delivery” label on the top of the transport bag. The courier/transport connote is then to be inserted in the clear pocket sleeve at the front end of the transport bag, below the cable-tied zippers.

Australian Transport Box White Cable Tie (*see below*)

Trans-Tasman Transport Box Yellow Security Cable Tie (*see below*)

Post-exchange

The ***ANZKX Living Kidney Donation Report (Form 14)*** must be returned to the ANZKX Coordination Centre within 2 working days of the procedure, along with any supporting documents and/or photos if available. This document and any feedback provided will contribute to monitoring the ANZKX Program and will assist in identifying opportunities for improvements to the packaging and transport procedures.

The ANZKX Program Coordinator will collect data on the outcome of the transplants and the logistical processes undertaken.

Issues identified will be reported to and addressed by the ANZKX Program in consultation with the RTAC/ANZKX Clinical Oversight Subcommittee (RACOS), the Renal Transplant Advisory Committee (RTAC) of the Transplantation Society of Australia and New Zealand (TSANZ) and the Australian Organ and Tissue Authority (OTA).

VERSION CONTROL			
Version	**Date**	**Author**	**Comments**
V 1.0	Jul 2019	ANZKX Team	AKX transitioned to ANZKX.
V 1.0	Feb 2021	ANZKX Team	Reviewed no changes.
V 1.0	Nov 2021	ANZKX Team	Reviewed no changes.
V 2.0	Aug 2026	ANZKX Team	- Protocol name updated to “Guidelines for Surgery, Packaging and Transport”. - General content checked, edited and updated. - New section added regarding surgery and preparation of the donor kidney, including pictures. - New images added illustrating the updated version of the ANZKX Living Kidney Donation Report form. - DonateLife logo updated.