

# **HOW TO RAISE AWARENESS OF REGISTERING AS AN ORGAN & TISSUE DONOR IN SASKATCHEWAN**



**PRESENTATION BEFORE  
THE STANDING COMMITTEE  
ON HUMAN SERVICES  
SEPTEMBER 12, 2016**

**FRED HOFMANN**



Our File: 16-520

JUN 14 2016

Mr. Fred Hofmann  
(fphofmann@sasktel.net)

Dear Mr. Hofmann:

Thank you for your email regarding the rate of organ donation in Saskatchewan. I appreciate hearing your story of receiving a life-saving liver transplant in Edmonton and your interest in giving back.

We know that Saskatchewan can do much better. One organ donor can save up to eight lives and one tissue donor can improve the lives of up to 75 people.

On May 19, 2016, I tabled a motion in the Saskatchewan Legislature asking the Standing Committee on Human Services to review Saskatchewan's current approach to organ and tissue donation and to make recommendations to improve the rate of donation. The Committee will hold public hearings to receive representations from interested individuals and groups and report back by November 30, 2016.

As planning is just beginning, I would recommend that you contact the Committee by emailing [committees@legassembly.ca](mailto:committees@legassembly.ca) or by calling 306-787-9930. The province needs more awareness of organ and tissue donation and I am sure you have some valuable insights to share with the Committee.

Again, thank you for writing and expressing your interest in this very important health care topic.

Sincerely,

A handwritten signature in black ink, appearing to read "Dustin Duncan".

Dustin Duncan  
Minister of Health

A green ribbon is tied in a loop, with the text "SASKATCHEWAN HERO" printed across its center.

**SASKATCHEWAN HERO**



**FRED HOFMANN**

## **TOPICS**

### **1. Introduction of Self – History**

### **2. Acknowledge the problem**

- It is a Saskatchewan problem – in Saskatchewan, less than 1% are registered donors

### **3. What do we need to do to increase the numbers**

- I will present the ideas and then go through the handout stopping as needed.
- 

#### **a) Donors are recognized as a HERO**

- Adopt a NEW LOGO – BOLD – DIFFERENT
- Replace the current red dot sticker by incorporating the green awareness ribbon for transplant, along with the Prairie Lily [official flower for Saskatchewan] as well as the word **“HERO”**
- While current standalone link to Saskatoon Health Region, is good website information, not many people are aware of its existence nor know how to access the same. Also, there is currently no registry where people can register as donors – Registration must be available on-line (with follow up acknowledgment to the family of the donor – **see point under Recognition**)
- Establish “prominent in-depth” website – both informational and user-friendly registration (see BC and Alberta Transplant information) – website should include documentation on transplants and development of webpage, Twitter/Facebook accounts and any other social media sites.

## **b) Provide Information to Public**

- Information trade style booths set up in malls, etc., funded by corporate sponsorship – start with 2 then increase to 4 for the province, manned by staff from Canadian Transplant Association (CTA) or various organizations/associations – Heart, Kidney, Lung, Liver, Kinsmen, Lions, throughout the province – (see the BC example)
- TV ad – similar to the SGI crash video - 30 second narrated ad - funded by SaskHealth
- I understand that there is a video in the works for the Kidney transplant and the road to success.
- Decals/bumper stickers on all provincial vehicles (including CVAs, SaskPower, SaskEnergy, SaskTel, etc) **"BE A HERO"** – green awareness ribbon with block lettering.
- Get on board with teams – Patch worn by our provincial sports teams, SJHL, WHA, Rush, Riders – have a game night promoting "BE A HERO" – getting players to sign up from each provincial team
- Lapel pins available for all government officials and staff as well as available by request
- For the public (similar to provincial pins)
- Promotion with "Driver Licence Renewals" issuers

**\*\*\* Here is my Saskatchewan innovative idea ...  
A driver licence is not a right, it is a privilege. Therefore,  
in order to obtain a driver's licence, residents must  
register as organ & tissue donors. Get the Government and  
SGI on side. \*\*\***

In some European countries, organ donation is mandatory.

## **(Continuing with Providing Information to Public)**

- Display posters/promotional brochures in/at:
  - ✓ doctors' offices, medical clinics, Ophthalmologists'/opticians' offices, others in medical fields and drug stores
  - ✓ employers with large volume of employees (ie, provincial unions, mining companies, manufacturers, police/fire departments, provincial/civic/municipal employees, EMTs) others. Make it a challenge to see who can get the most employees signed up.
  - ✓ all hospital waiting rooms, reception, admitting. Not once have I ever been asked if I was an organ or tissue donor. The closest I got was "do you wear a medical alert bracelet?"
  - ✓ all high schools (both Public and Catholic Schools [**NOTE:** Catholic School Board has indicated their agreement to have awareness promotion made available in their schools], Polytechnics, Universities of Regina, Saskatoon and First Nations, Business Colleges, etc.
- Presentation with recipient stories, donor stories and awareness information. (BC has excellent video and Teacher's Guide)

### **c) Recognition (Plaques or Banners etc.)**

- At the Transplant hospital to have a "Saskatchewan Heroes" wall with plaques showing
- Names of organ and tissue donors. Funded by sponsor (drug store chain have indicated an interest to sponsor)
- At Donor's funeral (ie, large green ribbon with wording "Saskatchewan Hero")

#### **d) Other Information to Gain Awareness**

- On-line information through SaskHealth PLUS a Donor Registry for Saskatchewan, and/ or do we step up and development with other province a western Canada registry
- Grant funding for research – need for purchase of warm organ storage machine & additional research – Saving money on reduced dialysis and ambulance transport costs to health regions
- For homecare nursing in post transplant care to keep patients in home vs in the hospital recuperating. They need better communications with doctors. Get rid of faxing information. Equip the nurses with mini pads to photo and email.
- LEAN Boon Doggle. Look further in to continuous improvement – bottom up changes to eliminate bottle neck and wasted TIME – money, example, vending machines, vender managed inventory.
- Should Blood Services be added to the organ and tissue awareness, they already play a role in the kidney transplants matching.
- Blood Services for donors as they also believe in the cause
- Set up department with in SaskHealth, attached to the transplant office purely to increase sign up.

*Thank you to BC Transplant and Alberta Transplant Coordinator at University of Alberta Hospital in Edmonton for the information provided.*



## **HERO**

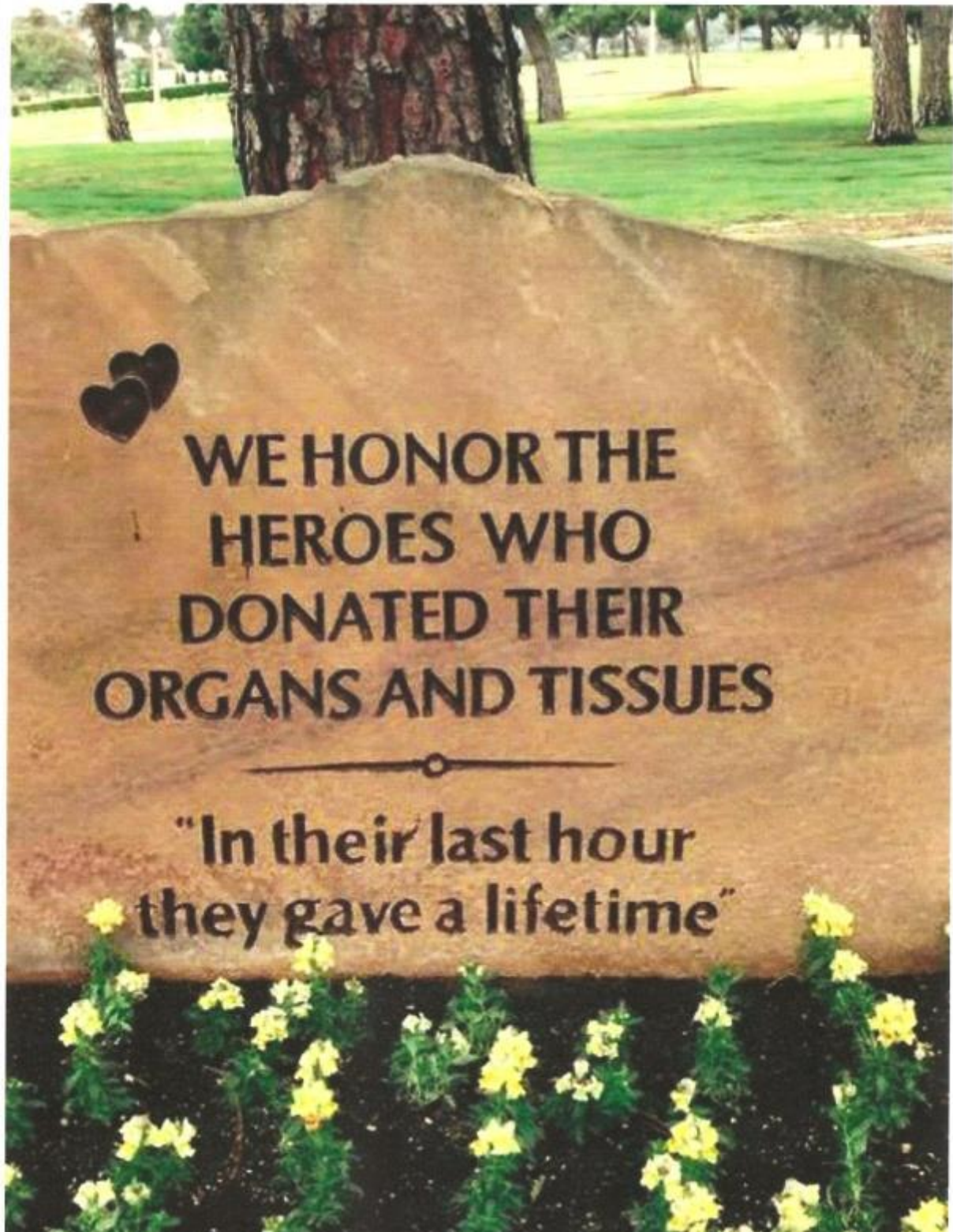
noun, plural heroes;

A person noted for courageous acts or nobility of character:

A person who, in the opinion of others, has special achievements, abilities, or personal qualities and is regarded as a role model or ideal:







**The Saskatchewan Transplant Program was established in 1989 to facilitate organ and tissue donation and transplantation for Saskatchewan residents.**

**Current Website Information**

## ORGAN AND TISSUE DONATION

### Saskatchewan Transplant Program

The Saskatchewan Transplant Program was established in 1989 to facilitate organ and tissue donation and transplantation for Saskatchewan residents. The transplant team includes physicians, surgeons, nurses, social workers, pharmacists and many other healthcare providers who offer services in both Saskatoon Health Region and Regina Qu'Appelle Health Region.

Through the program, individuals can donate or receive amniotic membrane, bone, corneas and kidneys (from both living and deceased donors), as well as ligaments and tendons. When patients need a heart, lung, liver or pancreas transplant, they are placed on the National Organ Wait List (a feature of the Canadian Transplant Registry), which is maintained by Canadian Blood Services. The Wait List allows for organs other than kidneys to be shared between provinces for patients in urgent need of a transplant.

When an organ becomes available, the Saskatchewan Transplant Program works with its affiliates across the country to assist Saskatchewan patients who are being assessed for, or have received, a heart, lung, liver or pancreas transplant. Coordinators are available to answer your questions about organ and tissue donation and transplantation 24 hours a day 7 days a week. Call switchboard at 1-306-655-8000 and ask for the organ and tissue donor coordinator on call.

The Saskatchewan Transplant Program operates two organ and tissue banks: the Tissue and Bone Bank and the Lions Eye Bank of Saskatchewan.

#### ***Tissue and Bone Bank***

This team obtains:

- Bone from living and deceased donors
- Heart valves from deceased donors, in cooperation with Alberta Health Services
- Amniotic membrane from elective C-section deliveries

#### ***Lions Eye Bank of Saskatchewan***

This team obtains corneas from deceased donors for use in sight restoring corneal transplant surgery.

For more information, contact us.

#### **PULMONARY HYPERTENSION CLINIC**

Pulmonary hypertension is a rare condition affecting the arteries of the lungs, and it often results in heart damage. Treatment options include medications and, in severe cases, heart-lung transplant. The Pulmonary Hypertension Clinic is the only specialized clinic of its kind in Saskatchewan. Patients undergo surgery outside of Saskatchewan but are supported within the province by a respirologist, a nurse coordinator and a pharmacist.

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## ORGAN AND TISSUE DONATION

### National Organ and Tissue Donation Awareness Week

This year, National Organ and Tissue Donation Awareness Week (NOTDAW) takes place from April 17 to 24. NOTDAW is an opportunity to learn more about the benefits and life-saving effects of organ and tissue donation.

What many people don't realize is that in our lifetime, we are more likely to need a transplant than we are to become a donor.

Cheryl and Oliver are alive today because of donation.

Unlike many provinces in Canada, Saskatchewan does not have a registry that allows those who support organ and tissue donation to register their consent online.

That's why it's more important than ever to talk to your family about your decision to donate. Sharing this decision with your family makes it possible for your loved ones to honour your wishes after you have died.

It's a discussion that could save lives.

**Offer hope. Talk to your family about organ and tissue donation.**

#### QUICK FACTS:

- Approximately 4,500 Canadians are currently waiting for a lifesaving organ transplant.
- In Saskatchewan, more than 90 people are waiting for a kidney and nearly 70 are waiting for a cornea.
- One organ donor can save eight lives and one tissue donor can improve the lives of 75 people.
- You are six times more likely to need a transplant than to become an organ donor.
- Age doesn't matter: Canada's oldest organ donor was 93.
- Donation will only be considered after every effort has been made to save your life.

#### ORGAN AND TISSUE DONOR STICKER

The red organ and tissue donor sticker on a Saskatchewan Health Services card confirms person's wishes for donation with healthcare providers and loved ones. Stickers are available by calling the Saskatchewan Transplant Program at 1-306-555-5055 in Saskatoon.



**Note:** In Saskatchewan, organ and tissue will not be donated without your family or next of kin's consent, even if the organ and tissue donor sticker is on your health card. Talk to your family about your decision to donate.

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## ORGAN AND TISSUE DONATION

### Offer Hope

When Acacia died at the age of 18, her parents honoured her life by making it possible for other people to continue living. Acacia successfully donated six organs to five people.

When Oliver was 13, his dad saved his life by donating one of his kidneys to his son. Only one year post-transplant, Oliver's dad watched his son win gold in the 2013 summer games in South Africa.

When we support organ and tissue donation, we are given an opportunity to save or improve other people's lives. Sometimes this opportunity presents itself while we are still living through the donation of a non-vital organ (e.g., kidney). Other times we are given an opportunity to offer hope even after our own life has ended.

Learn more about organ and tissue donation. Hear from donors and recipients.

#### ***Talk to your family***

It's important for you and your family to know each other's donation decision. Families who talk about their decision to donate are more likely to honour the wishes of their loved ones should organ and tissue donation be possible after death.

It's a discussion that could save lives.

For more information, contact us.



[Watch Acacia's video \(YouTube\)](#)



[Watch Oliver's video \(YouTube\)](#)

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## ORGAN AND TISSUE DONATION Offer Hope Toolkit

The Offer Hope Toolkit was created to help you, your family and your community to start talking about organ and tissue donation.

Toolkits are available as a downloadable resource or by mail upon request. Printed versions of the toolkit include: Thank You letter, How to Talk to Your Family brochure, Organ and Tissue Donation Myths and Facts, How to Get Involved fact sheet, posters, and organ and tissue donor stickers.

Please take a few minutes to share the information in this toolkit with your family and to place the posters in your workplace, at school or in a community centre.

### **Toolkits include:**

- Thank You letter
- How to Talk to Your Family brochure
- Myths and Facts: Organ and Tissue Donation
- How to Get Involved fact sheet
- Posters - To request a poster call 1-306-655-5054.
  - Acacia's poster
  - Cheryl's poster
  - Oliver's poster
  - Duc's poster
  - Bonnie's poster
  - A Reason to Donate poster
- Videos and stories
  - Acacia's story
  - Cheryl's story
  - Oliver's story
  - Duc's story
  - Bonnie's story
  - Running for Life
- Organ and tissue donor stickers - To request stickers call 1-306-655-5054

Thank you for helping us raise awareness about organ and tissue donation. With your help, we can offer hope to those waiting for a transplant.

For more information, contact us.

### **TO REQUEST A TOOLKIT**

To request a free print version of the toolkit, call 1-306-655-5054.

Posters, brochures and fact sheets are also available for charge as standalone resources upon request.

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## ORGAN AND TISSUE DONATION

### How to Talk to Your Family

#### Talk to your family

If you support organ and tissue donation, it's important to talk to your family about your decision to donate.

#### Why do I need to share my decision with my family?

In Saskatchewan, organs and tissue will not be donated without your family or next-of-kin's consent, even if the organ and tissue donor sticker is on your health card. Ensuring that your loved ones know you support organ and tissue donation will help them make this important decision on your behalf after you have died.

#### When is the right time to start a conversation?

The right time is now, when you are able to have the conversation. A discussion about organ and tissue donation can be incorporated into everyday conversations. For example, when you are:

- Cooking together or sharing a meal.
- Getting life insurance or writing a will.
- Leaving home for school or a trip.
- Waiting for a movie to start.
- Driving to a friend's house.
- Taking a walk in the park.

#### Isn't talking about death too sad for everyday conversations?

Organ and tissue donation isn't just about death, it's about life and the opportunity we have to save or improve other people's lives. Sometimes opportunity presents itself while we are still living through the donation of a non-vital organ (e.g., kidney). Other times we are given the opportunity to offer hope even after our own life has ended through deceased donation.

#### How do I start the conversation?

Starting the conversation may seem difficult, but it doesn't have to be. Here are a few suggestions to get you started:

- Today I was surprised to learn how rare it is for someone to become an organ donor. If I could donate my organs and tissue after I die, I want to do it. What about you?
- I just watched a video about a girl named *Acacia* who saved five people by donating six organs after she died. This has got me thinking about donation, and I'd like to talk to you about what I want.
- I know you have the organ and tissue donor sticker on your health card, but I don't know what you'd want to donate. Can you look at this and let me know?

The decision to support organ and tissue donation is a personal one. Sharing this decision with your family makes it possible for your loved ones to honour your wishes after you have died.

#### Where can I find more information?

For more information about organ and tissue donation, check out the Offer Hope Toolkit or contact us.

#### DID YOU KNOW?

In your lifetime, you are more likely to need a transplant than you are to become a donor.

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## ORGAN AND TISSUE DONATION

### About Donation

#### About organ and tissue donation

The need for organs and tissue for transplants far outweighs the available supply. Becoming an organ or tissue donor is one way you can help alleviate this need, and it may be a decision that's right for you. There are two ways to donate: living donation and deceased donation. Before any choice is made, it's important to talk to your family about your decision to donate.

##### **Living donation**

You can be a living donor by providing a non-vital organ or tissue to a family member or another person in need. Living donation includes:

- **Amniotic membrane** - Donated after elective C-section deliveries, it is used in a number of eye surgery procedures.
- **Bone** - Most donated bone comes from hip replacement surgeries. Many surgical procedures require bone grafts. Bone aids in healing and strengthens and improves function.
- **Kidney** - About 40-50 per cent of kidney transplants in Saskatchewan are made possible through living donors.
- **Liver** - In living-donor transplants, surgeons remove a portion of a donor's liver.

##### **Deceased donation**

Deceased donation happens when organs and tissue are available for transplant after someone has died. Deceased donation includes:

- Bone
- Cornea
- Heart and heart valves
- Lungs
- Liver
- Kidneys
- Pancreas
- Skin
- Tendons and ligaments

Organ and tissue donation is anonymous. However, the Saskatchewan Transplant Program does offer donors and recipients the opportunity correspond in writing through de-identified letters delivered and received through the program.

##### **Fast facts about organ and tissue donation**

- One organ donor can save up to eight lives, and one tissue donor can improve the lives of more than 75 people.
- The first transplant in Saskatchewan, a kidney, took place just over 50 years ago on December 10, 1963.
- Over 800 kidney transplants have been performed in our province since 1963.
- Currently, more than 90 people are waiting for a kidney transplant in Saskatchewan and nearly 70 are waiting for a cornea transplant.
- Approximately 20 to 30 organ transplants take place each year in our province.
- In 2015, there were 10 multi-organ donors and 45 cornea donors in Saskatchewan.
- The oldest person to be an organ donor (kidney) in Canada was 93 years old.

##### **Resources**

Click on the links below to learn more about organ and tissue donation.

Canadian Blood Services  
Canadian Society of Transplantation  
Canadian Transplant Association  
The Kidney Foundation of Canada  
The Transplant Journey Guide Book

#### ORGAN AND TISSUE DONOR STICKER

The red organ and tissue donor sticker on a Saskatchewan Health Services card confirms person's wishes for donation with healthcare providers and loved ones. Stickers are available by calling the Saskatchewan Transplant Program at 1-306-655-5050, Saskatoon.



**Note:** In Saskatchewan, organ and tissue will not be donated without your family or next of kin's consent, even if the organ and tissue donor sticker is on your health card. Talk to your family about your decision to donate.



## ORGAN AND TISSUE DONATION

### Donors and Recipients

#### Hear from donors and recipients

Many people in Saskatchewan are affected by organ and tissue donation. Some are on the transplant wait list, while others have received a life-saving organ or life-enhancing tissue.

##### **Acacia's story**

Acacia Rachael Tisher was 18 when she died and donated six organs to five people. Watch a video about Acacia, read her story or request a poster.

##### **Cheryl's story**

Heart transplant recipient Cheryl Olson calls the woman who made possible her heart transplant in 2008 her heart hero. Watch a video about Cheryl, read her story or request a poster.

##### **Oliver's story**

Kidney transplant recipient Oliver Senger received a kidney from his father four years ago. Watch a video about Oliver, read his story or request a poster.

##### **Duc's story**

Duc Pfliegeru has been on the kidney transplant wait list for the past three years. Watch a video about Duc, read his story or request a poster.

##### **Bonnie's story**

Bonnie Cockrum is an altruistic donor who donated one of her kidneys to a woman she met while at work. Watch a video about Bonnie, read her story or request a poster.

##### **Running for life**

Over 200 organ and tissue donors, recipients and their families gathered at the Transplant Trot in Saskatoon on May 10, 2015. Among them were some of the participants in the 2015 Offer Hope Campaign: Bonnie and Deb, Cheryl and Oliver. Watch a video about the Trot, read a story or request a poster.

For more information, contact us.



A Reason to Donate poster (IPD)

To request a poster call 1-306-650-5454

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## ORGAN AND TISSUE DONATION

### Kidney Transplants

#### Kidney transplant assessment

Patients are referred to the Saskatchewan Transplant program by their nephrologist. The transplant team then completes the necessary assessments to determine if the patient is eligible to receive a kidney. If eligible, this person is placed on a wait list.

#### Options for individuals in need of a kidney transplant

Kidney transplants may originate from living or deceased donors. Healthy individuals wishing to donate a kidney must first be tested and screened based on standard criteria. A donor must be a match with a recipient, and this match requires compatibility between blood types and cell proteins.

The Canadian Transplant Registry, maintained by Canadian Blood Services, provides patients from provincial transplantation programs, like the Saskatchewan Transplant Program, with improved opportunities for a kidney transplant through:

- **Kidney Paired Donation:** This registry facilitates living kidney donations between people with a willing but incompatible donor and another pair of individuals in the same situation.
- **Highly Sensitized Patient Registry:** This national, kidney-donor, organ-sharing registry provides kidney transplant opportunities for hard-to-match highly sensitized patients through access to a larger number of potential donors. Highly sensitized patients are individuals with past exposure to foreign tissue through pregnancy, past transplants or past blood transfusions. These patients are at higher risk of rejecting a kidney, and this increased risk makes it challenging to find a match. This registry, implemented in Saskatchewan in October 2013, allows matches across Canada rather than solely in the province. [Download the factsheet.](#)

#### Post-transplant clinic

After receiving a kidney transplant, patients are supported by the transplant team. Outpatient clinic visits ensure the well-being of patients by monitoring the functioning of the transplanted kidney, and by providing social support and medication management support.

For more information, [contact us](#).

#### KIDNEY WAIT LIST

About 90 people in Saskatchewan are currently waiting for a kidney transplant. On average, they will wait 3 years for a kidney - that's 4 dialysis treatments per week.

Please offer hope by talking to your family about organ and tissue donation.

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## UTUBE VIDEOS ON TRANSPLANTS

<https://www.youtube.com/watch?v=0tYgbtedkss&index=20&list=FLwLLkqDezxP0HKiDdVbJarA>

<https://www.youtube.com/watch?v=qYY2QNoW3Zw>

[https://www.youtube.com/watch?v=HjLK8Q\\_t1Wk](https://www.youtube.com/watch?v=HjLK8Q_t1Wk)

<https://www.youtube.com/watch?v=eBnyUbrYx-k>

<https://www.youtube.com/watch?v=RCfwQzFJfpo>

# **British Columbia**

***Transplant web information site***

## **British Columbia**

Canadian Province

British Columbia, Canada's westernmost province, is defined by its Pacific coastline and mountain ranges. Nature areas like Glacier National Park offer hiking and biking trails, as well as campgrounds. Whistler Blackcomb is a major ski resort that hosted the 2010 Winter Olympics. The scenic Sea-to-Sky Highway links Whistler with Vancouver, a city known for its film industry, at the province's southern U.S. border.

Area: 944,735 km<sup>2</sup>

Capital: Victoria

Flower: Cornus nuttallii

**Population: 4.631 million (Jul 1, 2014)**

Colleges and Universities: University of British Columbia

## **Number of Registrations**

1,021,635

**22.06%**



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## NEWS RELEASE

For immediate release  
June 27, 2016

Provincial Health Services Authority  
BC Transplant  
Ministry of Health

### BC's Organ Donor Registry reaches 1 million

**Vancouver** – BC Transplant celebrated a major milestone today that will help save lives in British Columbia: the 1 millionth registration in the province's Organ Donor Registry.

Burnaby resident Wendy Bertelsen, who signed up at a registration drive where she works, is the 1 millionth British Columbian to register a decision. She was joined by provincial representatives and transplant recipients at a celebration held at Vancouver General Hospital. Bertelsen was presented with a certificate of thanks by liver transplant recipient Joanne Arcardo along with Greg Kylo, Parliamentary Secretary for the BC Jobs Plan to the Minister of Jobs, Tourism, and Skills Training.

Public awareness of organ donation through community outreach, provincial partnerships and online initiatives has contributed to achieving this milestone.

BC Transplant recently partnered with Service BC, making it easy for people to register their decision at any of the 62 Service BC locations. BC Transplant received approximately 60,000 new registrations in 2015/2016. This partnership has led to an increase of more than 23,000 registrations for the year compared to the previous five-year average. Based on the success of this partnership, a similar pilot project is now underway at four ICBC locations and with Canadian Blood Services at blood donor clinics. BC Transplant staff and volunteer recipients also host registration drives at community events across B.C. – like the Canada Day celebrations at Canada Place where the registration team will be on July 1, 2016.

The Organ Donor Registry, established in 1997, was paper-based until 2008 when online registration using a personal computer became possible. A system upgrade in 2016 now makes it possible for people to register online using any computer or mobile device.

The one-millionth registration signals the start of B.C.'s shift to a culture that embraces organ donation as a normal part of end-of-life options. Currently 95% of British Columbians support organ donation and 21% have registered their decision. BC Transplant encourages everyone to register and to talk to their family about their decision so that more lives can be saved through organ donation.

One organ donor can save eight lives – it's never been easier to register at [www.transplant.bc.ca](http://www.transplant.bc.ca) or in person at any Service BC office.



## Quotes

### **Health Minister Terry Lake**

"More organ donors means more people have the chance to recover from an illness and live happy, active lives. We've made it easier for British Columbians to register their decision about organ donation, whether it's at a Service BC location or online. With more options and locations available, we're seeing an increase in the number of registered donors in B.C."

### **Greg Kylo, Parliamentary Secretary for the BC Jobs Plan to the Minister of Jobs, Tourism, and Skills Training**

"Reaching this milestone means hope for the hundreds of British Columbians waiting for a transplant. It's never been easier to register your decision online or in person. I urge everyone to take two minutes now to register – you have the potential to change someone's life forever."

### **Ed Ferre, Provincial Operations Director, BC Transplant, an agency of the Provincial Health Services Authority**

"B.C. has made significant strides in improving organ donation rates in B.C. through new hospital-based donation physicians and coordinators who support the donation process. When we are able to show a family that their loved one was registered, it makes such a difference, as they know they are following through with their loved one's wishes."

### **Wendy Bertelsen, 1 millionth registered donor**

"Organ donation is not something you like to think about, until it directly affects you—that's what happened to me. When a family member became very ill it really hit home. Luckily, she recovered, but not everyone is so lucky. I'm glad I made the decision to register now, you just never know what impact you might have on someone's life."

### **Joanne Arcardo, liver transplant recipient**

"My donor's last act in this world was to pass on life to me. I am so very grateful that they decided to register their decision and in the midst of their tragedy, save my life. They are my heroes."

## Quick Facts

- BC was the first province in Canada to create an official registry to legally record a person's wishes regarding organ donation.
- Established in 1997, the Organ Donor Registry allows people to record a yes or a no decision. Online registration using a personal computer was enabled in 2008 and a recent system upgrade now makes it possible for people to register on any computer or mobile device.
- There are currently 613 people in B.C. waiting for a transplant.
- In 2015, B.C. performed a record-breaking 422 transplants, thanks to the gifts of life from 95 deceased donors and 113 living donors.
- B.C.'s deceased donor rate for 2015 is 20.2 donors per million population – one of the highest rates in Canada.
- Less than one percent of British Columbians die in a way that would enable them to become organ donors.
- Anyone, regardless of their medical history, religion, age, or sexual preference can register their decision in the Organ Donor Registry.

**Learn More:**

- Register your decision at [www.transplant.bc.ca](http://www.transplant.bc.ca) or at any Service BC office
- [Organ donation facts and common misconceptions](#)

*BC Transplant provides provincial oversight for all aspects of organ donation and transplantation in BC, and is an agency of the Provincial Health Services Authority (PHSA). BC's three transplant centres are BC Children's Hospital, St Paul's Hospital and Vancouver Hospital and Health Sciences Centre. Transplant patients receive follow up care at the transplant centres or at one of eight regional clinics close to their home community. More information: [www.transplant.bc.ca](http://www.transplant.bc.ca) or follow us on Twitter @BC\_Transplant.*

*The Provincial Health Services Authority (PHSA) plans, manages and evaluates selected specialty and province-wide health care services across BC, working with the five geographic health authorities to deliver province-wide solutions that improve the health of British Columbians. For more information, visit [www.phsa.ca](http://www.phsa.ca).*

*or follow us on Twitter @PHSAofBC.*

-30-

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Provincial Health Services Authority  
Media pager: 604.871.5699



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[ABOUT US \(/about\)](#)

**BC TRANSPLANT**  
An agency of the Provincial Health Services Authority

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## About BC Transplant

BC Transplant provides oversight for all aspects of organ donation and transplantation across BC.

Funded principally through the BC Ministry of Health, BCT is an agency of the Provincial Health Services Authority (PHSA).



As an agency of the Provincial Health Services Authority (PHSA), BCT supports PHSA's three primary strategic directions:

- 1) Improving quality outcomes and providing better value for patients
- 2) Promoting healthier populations
- 3) Contributing to a sustainable health care system.

### BC TRANSPLANT MISSION:

With Compassion, collaboration and innovation, we will save lives and offer hope through organ donation, transplant and research.

We work to accomplish this mission in the following ways:

- Direct delivery of organ donation activities across BC and inter-provincially; donor management; in-hospital support; organ retrieval.
- Funding regionalized programs for pre-transplant assessment and post-transplant management - in partnership with Health Authorities.
- Policies, professional standards and clinical guidelines for donation and transplant-related activities.
- Management of the province's official Organ Donor Registry.
- Organ donor awareness and education programs
- Meeting regulatory requirements (Health Canada/CSA), and maintaining continuous quality improvement programs.

Register your decision here: <https://transplant.bc.ca/OnlineReg/bcts.asp>  
(<https://transplant.bc.ca/OnlineReg/bcts.asp>)

### IN THIS SECTION

- ▶ [Frequently Asked Questions \(/about-us/faq\)](#)
- ▶ [Career Opportunities \(/about-us/career-opportunities\)](#)
- ▶ [Leadership \(/about-us/leadership\)](#)
- ▶ [Links \(/about-us/links\)](#)
- ▶ [Partners \(/about-us/partners\)](#)
- ▶ [Strategic Direction \(/about-us/strategic-direction\)](#)
- ▶ [BCT Media Kit \(/documents/bct-media-kit\)](#)
- ▶ [Statement of Information Practices \(/about-us/statement-information-practices\)](#)
- ▶ [Terms of Use \(/about-us/terms-use\)](#)

**REGISTER your decision**  
[\(https://register.transplant.bc.ca/\)](https://register.transplant.bc.ca/)

**VERIFY your registration**  
[\(https://register.transplant.bc.ca/\)](https://register.transplant.bc.ca/)

**Become a LIVING DONOR (/be-donor/becoming-living-donor)**  
**VOLUNTEER with us**

**SHARE your transplant story**

[BC Transplant Backgrounder \(/documents/bct-backgrounder\)](#)

Direct patient care is funded by BCT and provided through partnerships with the Health Authorities. All Transplant surgeries in BC take place at one of the three Transplant Centres:

#### TRANSPLANT CENTRES:

- \* [Vancouver General Hospital \(/contact/transplant-centre-contact-information\)](#) (Kidney, Liver, Lungs, Pancreas and Pancreas Islet)
- \* [St. Paul's Hospital \(/contact/transplant-centre-contact-information#st-pauls\)](#) (Kidney, Heart)
- \* [BC Children's Hospital \(/contact/transplant-centre-contact-information#bc-childrens\)](#) (Kidney, Heart)

After surgery, transplant patients are followed for the life of their transplant, and may receive their care at the transplant centre or at one of the seven regional transplant clinics throughout the province:

#### REGIONAL CLINICS:

- \* [Fraser Health Transplant Clinic \(/Regional-transplant-clinics-contact\)](#)
- \* [Kamloops' Royal Inland Hospital \(/Regional-transplant-clinics-contact\)](#)
- \* [Kelowna General Hospital \(/Regional-transplant-clinics-contact\)](#)
- \* [Penticton Regional Hospital \(/Regional-transplant-clinics-contact\)](#)
- \* [Prince George Regional Hospital \(/Regional-transplant-clinics-contact\)](#)
- \* [Trail's Kootenay Boundary Regional Hospital \(/Regional-transplant-clinics-contact\)](#)
- \* [Victoria's Royal Jubilee Hospital \(/Regional-transplant-clinics-contact\)](#)
- \* [Nanaimo Kidney Care & Transplant Clinic \(/contact/regional-transplant-clinic-contact-information\)](#)

#### Contact Us

##### BC Transplant

Email us: [info@bct.phsa.ca](mailto:info@bct.phsa.ca)  
<mailto:info@bct.phsa.ca> Tel: 604-877-2240  
 Toll free: 1-800-663-6189  
 Fax: 604-877-2111

West Tower - Suite 350  
 555 West 12th Ave  
 Vancouver, BC  
 V5Z 3X7

Office hours: 9am to 4pm

##### Join us online:

[Facebook.com/BCTransplant \(https://www.facebook.com/BCTransplant\)](https://www.facebook.com/BCTransplant)  
[Twitter.com/BC\\_Transplant \(http://twitter.com/BC\\_Transplant\)](http://twitter.com/BC_Transplant)  
[Instagram.com/BCTransplant \(http://instagram.com/bc\\_transplant\)](http://instagram.com/bc_transplant)

**RAISE AWARENESS**

**RAISE AWARENESS**  
**(/GET-INVOLVED/RAISE-AWARENESS)**

Start your own awareness campaign in your community!  
 (/get-involved/raise-awareness)

**REQUEST A MINI-CAMPAIGN KIT**

**CAREERS**

We're rate one of BC's Top Employers. Join us to save lives and really make a difference!

**CURRENT OPENINGS**

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**LATEST TWEET**

#DYK there is no age limit to who can register to be an #organdonor? More info at <https://t.co/nNR8IQaaeM> (<https://t.co/nNR8IQaaeM>) <https://t.co/ZUAjVK9HQI> (<https://t.co/ZUAjVK9HQI>)

1 hour 26 min ago

([https://twitter.com/BC\\_Transplant/statuses/770649842007926433](https://twitter.com/BC_Transplant/statuses/770649842007926433))

**FOLLOW US:**

**EMERGENCY NUMBERS** (<http://www.phsa.ca/emergency-numbers>)


**COMPLIMENTS & COMPLAINTS** (<http://www.phsa.ca/about/accountability/public-accountability/patient-care-quality-office/compliments-complaints>)

**HEALTHLINK BC** (<http://www.healthlinkbc.ca/healthindex.asp>)

PHSA improves the health of British Columbians by seeking province-wide solutions to specialized health care needs in collaboration with BC health authorities and other partners. Learn more about our [agencies and services](http://www.phsa.ca/AgenciesAndServices/default.htm) (<http://www.phsa.ca/AgenciesAndServices/default.htm>)

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[GET INVOLVED \(/get-involved\)](#)

[ABOUT US \(/about\)](#)

[Home \(/\)](#) > [About Organ Donation \(/audience/about-organ-donation\)](#)

## Frequently Asked Questions

### Frequently Asked Questions

I currently have an organ donor decal on my CareCard, do I still need to register?

If I register does that mean I will be a donor?

If I am a registered organ donor, will health care providers make every effort to save my life?

Is there an age limit for organ donors?

Can I register if I have a medical condition?

Can a donor still have an open casket funeral?

Are there religious objections to organ donation?

Can I say who I want my organs to go to?

If someone has registered their decision with BC Transplant and their death occurs in another province or in the USA, will their decision stand?

Why did the decal system change?

Can I register my children?

If I have registered, can I change my decision?

Can my family override my decision?

Can I donate my entire body to science as well?

Does this mean I am also registered to be a living donor?

Why don't we have an opt-out or presumed consent system where everyone is a potential donor unless they say otherwise?

What is BC doing to increase organ donation rates?

How does someone become an organ donor?

How can I make a financial donation for transplant?

I'm not eligible to donate blood. Can I still register my decision to be an organ donor?

#### IN THIS SECTION

- ▶ [Register Your Decision \(/be-donor/register-your-decision\)](#)
- ▶ [Verify Registration \(/be-donor/verify-registration\)](#)
- ▶ [Becoming a Living Donor \(/be-donor/becoming-living-donor\)](#)
- ▶ [Deceased Donation \(/be-donor/deceased-donation\)](#)
- ▶ [Frequently Asked Questions \(/be-donor/frequently-asked-questions\)](#)

**REGISTER your decision**  
[/https://register.transplc](https://register.transplc)

**VERIFY your registration**  
[/https://register.transplc](https://register.transplc)

**Become a LIVING DONOR (/be-donor/becoming-living-donor)**

**VOLUNTEER with us**

**SHARE your transplant story**

I just turned 19 years old. Do I need to re-register my decision?

#### NUMBER OF REGISTRATIONS

**1,021,635**

British Columbians have registered their yes or no decision.

[MORE STATS](#)

#### RAISE AWARENESS



#### RAISE AWARENESS

**(/GET-INVOLVED/RAISE-AWARENESS)**

Start your own awareness campaign in your community!

[\(/get-involved/raise-awareness\)](#)

[REQUEST A MINI-CAMPAIGN KIT](#)

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#### LATEST TWEET

#DYK there is no age limit to who can register to be an #organdonor? More info at <https://t.co/nNR8lQaaeM> (<https://t.co/nNR8lQaaeM>) <https://t.co/ZUAjVK9H0I> (<https://t.co/ZUAjVK9H0I>)

2 hours 24 min ago

[https://twitter.com/BC\\_Transplant/statuses/770649842007826433](https://twitter.com/BC_Transplant/statuses/770649842007826433)

#### FOLLOW US:

[EMERGENCY NUMBERS \(http://www.phsa.ca/emergency-numbers\)](http://www.phsa.ca/emergency-numbers)

[COMPLIMENTS & COMPLAINTS \(http://www.phsa.ca/about/accountability/public-accountability/patient-care-quality-office/commitments-complaints\)](http://www.phsa.ca/about/accountability/public-accountability/patient-care-quality-office/commitments-complaints)

[HEALTHLINK BC \(http://www.healthlinkbc.ca/healthlinkbc.aspx\)](http://www.healthlinkbc.ca/healthlinkbc.aspx)

PHSA improves the health of British Columbians by seeking province-wide solutions to specialized health care needs in collaboration with BC health authorities and other partners. Learn more about our [agencies and services \(http://www.phsa.ca/AgenciesAndServices/default.htm\)](http://www.phsa.ca/AgenciesAndServices/default.htm)

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[\(http://www.phsa.ca/\)](http://www.phsa.ca/)



[\(http://www.canadastop100.com/national/\)](http://www.canadastop100.com/national/)




[\(http://www.gov.bc.ca/health/\)](http://www.gov.bc.ca/health/)


**BC Transplant**

Live Life. Pass It On

**ARE YOU**  
*Pre-registered donors are eligible to be on the list.*




transplant.bc.ca

 **TRANSPLANT**

**BC Transplant**

BC Transplant provides oversight for all aspects of organ donation and transplantation across BC.




"I NEVER DREAMED I'D LIVE TO BE AN ADULT. AN ORGAN DONOR CHANGED THAT."


Register to be an Organ Donor at:

OrganDonorBC.ca

1-800-663-8776

 **TRANSPLANT**

transplant.bc.ca

 **TRANSPLANT**



## BC Transplant: Increasing Organ Donation

### Accomplishing the mission:

- Organ donation activities across BC and inter-provincially – donor management, in-hospital support, and organ retrieval
- Regionalized programs for pre-transplant assessment and post-transplant management – in partnership with Health Authorities
- Continuous quality improvement program

transplant.bc.ca



## BC Transplant: Increasing Organ Donation

### Accomplishing the mission:

- Organ donor awareness and education programs
- Meeting regulatory requirements (Health Canada/CSA)
- Policies, professional standards, and clinical guidelines for donation and transplant-related activities

transplant.bc.ca




**BC Transplant**

**"A SAVED MY LIFE,  
MY FAMILY IS FOREVER THANKFUL."**

Organ donation saves lives –  
register your decision today.

transplant.bc.ca

 **TRANSPLANT**


**BC Transplant**

**Direct patient care is funded by BCT and provided through the Health Authorities:**

- **3 transplant centres**
  - St. Paul's (kidney, heart)
  - VGH (Kidney, liver, lungs, pancreas)
  - BC Children's (kidney, heart)
- **8 post-transplant clinics**
  - Prince George
  - Kamloops
  - Kelowna
  - Penticton
  - Trail
  - Fraser Valley
  - Victoria
  - Nanaimo

**LIVE LIFE.  
PASS IT ON.**

transplant.bc.ca


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**BC Transplant**

**Two types of Organ Donation in BC**

- **Living donation**
  - Kidney
  - Liver
- **Deceased donation**
  - Kidney
  - Liver
  - Heart
  - Lungs
  - Pancreas
  - Cornea




transplant.bc.ca

 **TRANSPLANT**

**BC Transplant**

**Living Donation**


- **Kidney**
  - Direct to family member or friend
  - Living Donor Paired Exchange
  - Living Donor Anonymous
- **Liver**
  - Direct to family member or friend
  - Contact VGH Liver Transplant program (604.875.5236)
- **Medical and psycho-social assessment**
  - Ok to say no at any point in the process
- **Contact Kidney Transplant Program**
  - St. Paul's (604.806.9027) or VGH (604.875.5182)



"A GAVE  
ME MY LIFE BACK - NOW WE CAN  
PLAN OUR FUTURE TOGETHER."

Living donation is a life-changing decision. It's important to take time to think about it and talk to your doctor. For more information, visit transplant.bc.ca or call 1-877-875-5236.


transplant.bc.ca

 **TRANSPLANT**

## BC Transplant – Living Kidney Donation

**The Facts:**

- Donors live healthy, normal lives with one kidney.
- The assessment process is confidential. You can gather information without making a commitment to donate.
- At any step in the process, you can choose not to proceed with the donation.
- Non-matching donor and recipient pairs may be able to participate in a national paired exchange.
- The Living Organ Donor Expense Reimbursement program (LODERP) can help donors with some of the costs related to assessment and donation.
- In BC there are an average of 100 living kidney donors each year.




**Interested in donating?**

A step-by-step guide can be found on our website. You can also contact the following locations:

- St Paul's Hospital: Donor Nurse – 604.806.9027 or toll free 1.877.922.9922
- Vancouver General Hospital: Donor Nurse – 604.875.5182 or toll free 1.855.875.5182

transplant.bc.ca




## BC Transplant

**Deceased donation**

- **Less than 1% of British Columbians die in a way that allows them to donate**
  - In a hospital
  - On life support
  - NDD or DCD
  - Organs not recovered if no matching recipient
- **Honouring donors and families**
  - Deceased donation begins with a tragedy
  - Every person/family has a right to be given the choice to donate
  - Donation can help with healing

transplant.bc.ca

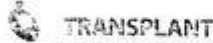


**BC Transplant**

**How are recipients chosen?**

- **It's about the match**
  - Blood type
  - Size
  - Most urgent
  - Time on wait list


transplant.bc.ca



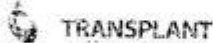
**BC Transplant**

**Organ donation: A normal part of end of life discussions**

- **Register your decision**
  - All organs and tissue
  - Only certain organs
  - No donation
- **How to register**
  - Online at [transplant.bc.ca](http://transplant.bc.ca)
  - Fill out paper form, available at:
    - Service BC Locations
    - ICBC Licensing Centres
    - Re/MAX
    - Download on our website
- **Share your wishes with family**



transplant.bc.ca




**BC Transplant**

**"I NEVER DREAMED I'D LIVE TO  
BE AN ADULT. AN  
CHANGED THAT."**

Organ donation saves lives –  
register your decision today.

transplant.bc.ca

 **TRANSPLANT**


**BC Transplant: FAQ's and Misconceptions**


**Q: If I register does that mean I will be a donor?**  
A: Not necessarily. Only about 1% of people in BC die in a way that would permit them to be an organ donor. You are more likely to need a transplant than you are to become an organ donor.

**Q: Do I have to register if I have a decal on my Drivers Licence or Care Card?**  
A: The sticker is no longer a recognized way to register your decision. The only legal record of your decision is made with your CareCard number on the organ donor registry.

To verify your registration, visit our website.

transplant.bc.ca

 **TRANSPLANT**



### BC Transplant: FAQ's and Misconceptions

**Q: Will they still try to save my life if I'm a registered donor?**

A: Absolutely – donation is only considered after all life saving efforts have been exhausted and it's certain you will not survive.

**Q: Is there an age limit to who can register/donate?**

A: No. BC's oldest donor was 79 years old.

**Q: Why is it so important for me to register my decision?**

A: Contrary to popular belief, only about 20% of people in BC are registered organ donors. Registering your decision provides a record of your end-of-life wishes.

[transplant.bc.ca](http://transplant.bc.ca)



### BC Transplant: FAQ's and Misconceptions

**Q: Can transplant recipients still donate?**

A: Recipients are eligible to be organ donors. Just because you had a kidney transplant doesn't mean you're lungs, liver, heart, pancreas and eyes couldn't save someone's life!

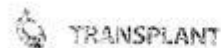
**Q: If am a donor, are my funeral/cremation costs covered?**

A: No. The family is responsible for all funeral and/or cremation costs.

**Q: I think I registered as an Organ Donor a long time ago – but how can I check?**

A: Visit: [transplant.bc.ca](http://transplant.bc.ca) and enter your BC CareCard number. Or, call 1.800.663.6189 (local 604.877.2240) to confirm.

[transplant.bc.ca](http://transplant.bc.ca)




**BC Transplant: FAQ's and Misconceptions**

**Myth: It's against my religion.**  
Truth: Most religions support and encourage donation – for more info check out [www.bctransplant.ca/faq](http://www.bctransplant.ca/faq)

**Myth: I can't have an open casket funeral.**  
Truth: Open casket funeral is still possible.

**Myth: Nobody would want my organs.**  
Truth: Let the specialists decide. One organ donor can impact the lives of many people waiting for transplant – let the experts decide if you're a match.

[transplant.bc.ca](http://transplant.bc.ca)  **TRANSPLANT**

**BC Transplant**

**"MY MEANS  
I CAN WATCH MY SON GROW UP."**


Organ donation saves lives –  
register your decision today.

[transplant.bc.ca](http://transplant.bc.ca)  **TRANSPLANT**

### BC Transplant

#### 2015 Statistics

- 422 transplants - 113 Living Donors / 95 Deceased
- 35 Lung transplants
- 79 Liver transplants
- 271 Kidney transplants - 161 DD, 110 LD
- 15 Pancreas/Kidney, Pancreas, and Pancreas Islet
- 19 Heart transplants
- 21 British Columbians died waiting
- Approximately 562 people in BC are currently waiting for a life-saving transplant.



"A LIVER TRANSPLANT SAVED MY LIFE.  
MY FAMILY IS FOREVER THANKFUL."

Register to be  
an organ donor at  
[transplant.bc.ca](http://transplant.bc.ca)


transplant.bc.ca

TRANSPLANT

### BC Transplant: Raising Awareness

#### Join us in raising Awareness:

- 95% of British Columbians agree with organ donation, yet only 20% have registered their decision.
- Verify/Register your organ donor decision online – now!
- Using your Care Card number:  
[transplant.bc.ca](http://transplant.bc.ca)
- Once registered, share the decision with your family and friends so they know your wishes.




transplant.bc.ca


TRANSPLANT


**BC Transplant: Raising Awareness**


**Get involved!**

- Ask for a free mini-Campaign Kit
- Volunteer with BC Transplant
- Connect with us online:


 [BCTransplant](#)

 [@BC\\_Transplant](#)

 [@BC\\_Transplant](#)



[transplant.bc.ca](#)

 **TRANSPLANT**



# **Alberta**

***Organ, Tissue & eye Donation  
web information site***



Home (/default.aspx) > Program & Service Information (/services/Page9778.aspx) > Organ, Tissue and Eye Donation

## Organ, Tissue and Eye Donation Information for the Public

### Service Listing

#### General Service and Contact Information

- [Organ, Tissue and Eye Donation](http://www.albertahealthservices.ca/services.asp?pid=service&id=2044)  
(<http://www.albertahealthservices.ca/services.asp?pid=service&id=2044>)

For information on how to record your wishes to donate organs and/or tissues after you die, visit the [Organ and Tissue Donation Registry](https://myhealth.alberta.ca/Pages/OTDRHome.aspx)  
(<https://myhealth.alberta.ca/Pages/OTDRHome.aspx>).

### What's New

#### National Organ and Tissue Donor Awareness Week (NOTDAW)

April 18-26, 2016 — NOTDAW is a week to honour organ and tissue donors and their families who have graciously given the previous gift of life and improved health to many individuals who require transplant.

- [Organ, Tissue and Eye Donation - April 2016 Newsletter, NOTDAW](http://www.albertahealthservices.ca/assets/programs/ps-2044-ote-donation-newsletter-2016-04.pdf)  
(<http://www.albertahealthservices.ca/assets/programs/ps-2044-ote-donation-newsletter-2016-04.pdf>)

### About Us

Organ and tissue donation services in Alberta are provided using a collaborative approach by specialized programs located within Edmonton and Calgary. Successful inspections by Health Canada have demonstrated strict adherence to all transplantation safety standards.

## Northern Alberta - Transplant Services - Edmonton Area

#### Human Organ Procurement and Exchange Program (HOPE)

- Coordination of the deceased organ donation process.

#### Comprehensive Tissue Centre (CTC)

- Facilitation of the tissue donation process for both deceased and living tissue donors.
- Accredited by the American Association of Tissue Banks (AATB) and the International Standards Organization (ISO)

#### Clinical Islet Lab (CIL)

- Isolation of insulin-producing islet cells from a donor pancreas, for transplantation

#### Living Organ Donor Programs

- Facilitation of the living organ donation process.

## Southern Alberta Organ and Tissue Donation Program

#### Southern Alberta Organ Donation Program

- Coordination of the deceased organ donation process.

**Lions Eye Bank**

- Facilitation of eye donation
- Accredited by the Eye Bank Association of America (EBAA)

**Southern Alberta Tissue Program**

- Accredited by the American Association of Tissue Banks (AATB)
- Facilitation of the tissue donation process for both deceased and living tissue donors

**Southern Alberta Transplant Program****Living Kidney Donor Program**

- Facilitation of the living kidney donation process.

## FAQs

**About Organ Donation**

- What is the difference between organ donation and tissue donation?
- Who can donate organs and tissues?
- How many people are in need of transplants?
- Which organs and tissues can be transplanted?
- Can I donate organs or tissues while I am still alive?
- Who can I contact for more information on organ and tissue donation?

**Becoming an Organ/Tissue Donor**

- How do I become an organ donor?
- What do I need to do in order to become an organ or tissue donor?
- Are there reasons that I won't be able to be an organ or tissue donor?
- What questions will I have to answer after consenting to organ/ tissue donation?
- What is brain death?
- If someone dies outside of the hospital (i.e., nursing home, private home, or at the scene of an accident) can they still be an organ donor?
- Can I donate my body to science and still be an organ and/or tissue donor?
- Does the fact that an individual has become a donor remain confidential?
- What if I want to donate my body or the body of a family member for medical research purposes?
- Is there a cost to the donor or the donor's family to donate organs/tissues?
- How do families of donors feel about organ donation after they have been through the experience?
- Are any tests required before the organs and tissues can be used?
- What is the risk of contracting HIV or other diseases when receiving donated organs/ tissues?
- What are the religious issues around organ/tissue donation?

**Consent to Donate**

- How is consent for organ/ tissue donation obtained?
- If I have registered to donate organs and tissues, will the quality of my medical care be compromised?
- If I register to donate organs and tissues, will my wishes be carried out?
- Will my family be pressured to make a decision or to donate?
- Why is the family asked to make such a difficult decision at such a stressful time?

## The Donation Process

- How long does the process of organ and tissue donation take?
- What is the role of the HOPE (Donor) Coordinator?
- How are organ recipients chosen?
- Does the removal of organs/ tissues leave visible scars? Will it prevent an open casket funeral or delay the funeral?

## About Organ/Tissue Donation

### What is the difference between organ donation and tissue donation?

Organ donation refers to the removal of an organ (such as the heart, lung, kidney, etc.) from one person for transplantation into another person. Tissue donation refers to the removal of various tissues in the body (such as skin, corneas, bone, etc.) for transplantation into another person's body. There are some important differences between organ and tissue donation:

#### **Organ Donation**

In some cases, an organ donor may be a "living donor", meaning that donating the organ will not harm the donor. For example, when a brother gives one of his two kidneys to his sister or a mother gives a lobe of her liver to her child.

Otherwise, organs can only be donated to another person if both of the following conditions apply:

- There has been severe damage to the brain that is incompatible with life; and
- The donor has been maintained on a ventilator (respirator) until the organ is removed

An organ donor usually dies an unexpected, tragic death following severe injury to their brain. Often this is the result of a motor vehicle accident, spontaneous brain bleeding, or trauma such as a fall.

#### **Tissue Donation**

Nearly everyone can be considered for tissue donation when they die. Tissues do not require the same conditions as organs to survive, so tissue donation is possible after the heart and lungs have stopped working.

Tissues for donation must be removed within 12-24 hours after a natural or tragic death. The donor does not need to be maintained on a ventilator.

### Who can donate organs and tissues?

The criterion for organ and tissue donation is always changing and there may be specific reasons a person is unable to donate. These reasons are often related to a person's medical or social history or certain illnesses they may have. Ultimately, the organs and tissues have to be healthy and the donor must be free from diseases that could potentially be harmful to the recipient.

### Which organs and tissues can be transplanted?

#### **Organs:**

- Heart
- Lungs
- Liver
- Kidney
- Pancreas
- Pancreas Islet Cells
- Small Bowel
- Stomach

#### **Tissue:**

- Cornea
- Sclera (white of the eye)
- Heart Valves

- Skin
- Bone
- Tendons
- Amniotic Tissue

### **How many people are in need of transplants?**

- There are over 4500 Canadians currently waiting for a life saving transplant, and many more are waiting for life enhancing tissue transplants.
- There are over 700 Albertans on the transplant waitlists.

### **Can I donate organs or tissues while I am still alive?**

Yes. Kidneys, part of the liver and part of the lung can be donated. Talk to your family doctor, who will then refer you to a specialist, or call the Living Donor Program for more information.

Living Donor programs exist within both Calgary and Edmonton. The University of Alberta Hospital in Edmonton supports the living donation of the kidney and part of the lung or liver to someone close to them. The Southern Alberta Transplant Program supports living kidney donation.

Living tissue options include donation of the amniotic sac (membrane) following childbirth and donation of the top portion of the thigh bone (femoral head) following a hip replacement.

### **Who can I contact for more information on organ and tissue donation?**

For more information on organ and tissue donation please contact the donation programs in Alberta closest to where you live. You will find this information on the 'contact us' page.

## **Becoming an Organ/Tissue Donor**

### **How do I become an organ donor?**

Organ donation is only possible if the donor has severe damage to the brain that is incompatible with life and has been maintained on a ventilator until the organ is removed. In order to become an organ donor, legal consent is required and routine screening of potential donors is done to prevent any possible risk of transmission of disease to a potential recipient.

### **What do I need to do in order to become an organ or tissue donor?**

- discuss your wishes regarding organ and tissue donation with your family and give them clear directions about what you would like to see done in the event of your death
- you can sign up to be an organ and/or tissue donor by logging onto the [Alberta Organ and Tissue Donation Registry](https://myhealth.alberta.ca/Pages/OTDRHome.aspx) (<https://myhealth.alberta.ca/Pages/OTDRHome.aspx>)
- consider your wishes when renewing or requesting your Alberta Driver's License
- if you are interested in living donation (for kidney, bone marrow or a lobe of the liver), contact your local living donor program, or the Bone Marrow Registry at 1-888-236-6283 or 1-888-2-DONATE ([www.bloodservices.ca](http://www.bloodservices.ca)) (<http://www.bloodservices.ca>)

### **Are there reasons that I won't be able to be an organ or tissue donor?**

There is no age limit for organ donation. The quality of the organ is what is assessed. Livers have been successfully transplanted from donors in their 80's and lungs, liver, and kidneys have transplanted from donors in their 70's.

Absolute contraindications for organ donation are malignancies (other than non-metastasizing brain tumors), and positive HIV status.

For tissue, donor eligibility is between birth and 80 years of age. Absolute contraindications for tissue donation are more restrictive, including but not limited to: infectious diseases such as HIV, Hepatitis B, and Hepatitis C, active sepsis, and certain high risk social behaviors.

**What questions will I have to answer after consenting to organ/ tissue donation?**

The Donor or next-of-kin will be asked to provide answers to a standard Medical/ Social Questionnaire. This questionnaire is used to establish that the organs/ tissues from the donor are safe to transplant into another person. The questions have to do with any illnesses that the donor might have had and whether they were at risk for contracting certain illnesses. For example, did they have a history of intravenous drug use?

**What is brain death?**

When damage to the brain is severe, the brain swells. In the confines of the rigid skull this swelling may stop all blood flow in the brain. With no blood flow, the brain no longer receives oxygen and nutrients essential for survival and therefore dies. Once the brain dies, the body will also die. The individual no longer has the ability to breathe on his/ her own, and must be maintained on a ventilator in an Intensive Care Unit.

Sometimes, the body can be kept functioning for a short period of time through the use of medications and mechanical ventilation, however, the patient has died and the brain has ceased to function. The patient may seem warm to the touch and the heart will continue to beat, but the patient is in fact dead.

Neurological death or "brain death" is usually diagnosed with a series of clinical tests that are performed at least twice by two different physicians experienced in the determination of brain death, and who are not taking care of the intended organ recipients. The tests can tell:

- if there is any ability to breathe without the ventilator;
- if the patient can respond at all to various stimuli; or
- if there is any blood flow to the brain (Brain Perfusion Scan)

It is important to know that once the determination of brain death has been made, the person has died. Brain death is a non-reversible condition and once determined, it is the legal time of death.

**If someone dies outside of the hospital (i.e., nursing home, private home, or at the scene of an accident) can they still be an organ donor?**

No. Organ donation is not an option, but tissue donation is possible depending on the time of death. Organ donation can only be considered when there is a beating heart which supplies blood and oxygen to the vital organs.

**Can I donate my body to science and still be an organ and/or tissue donor?**

No. In order for your body to be used for science, medical education and teaching, it is donated whole and therefore organ donation cannot occur. However, eye donation may still be possible.

**Does the fact that an individual has become a donor remain confidential?**

Legislation in Alberta ensures confidentiality for the donor. However, the donor family may share their decision with friends and relatives, or they may choose to keep it confidential.

**What if I want to donate my body or the body of a family member for medical research purposes?**

If you donate your body to research or science, your organs and tissues cannot be used for transplantation. Arrangements for total body donation must be made prior to death as specific information and registration is required. Arrangements are made through:

- Department of Anatomy at the University of Alberta Anatomical Gift Program (<http://surgery.med.ualberta.ca/AboutUs/Divisions/anatomy/anatomicalgifts/Pages/default.aspx>)
- University of Calgary Body Donation Program (<http://www.fp.ucalgary.ca/bodydonation/>)

**Is there a cost to the donor or the donor's family to donate organs/ tissues?**

There is no cost for organ and tissue donation to the donor or to the donor's family. Alberta Health and Wellness covers all medical expenses. Organ and tissue donation is considered an act of altruistic generosity. It is illegal to sell organs/ tissues in Canada.

**How do families of donors feel about organ donation after they have been through the experience?**

Most families feel that organ donation has helped ease their grief. They recognize that they were given the opportunity to provide the gift of life to another person in an otherwise tragic situation.

**Are any tests required before the organs and tissues can be used?**

A thorough assessment takes place in the ICU to determine the stability of the donor, organ function and risk of disease. Even if the organs were healthy and strong in life, the process of death itself may cause injury, which may deem the organ unsuitable for transplant. To ensure that we transplant the safest organs possible, a review of the medical and social history is undertaken with the family; the questions are similar to the ones asked of all blood donors. A physical examination, laboratory, and diagnostic tests are performed:

- Blood testing to detect the presence of any infectious diseases
- Blood tests to measure liver enzymes and sometimes a biopsy of the liver tissue is done to make sure that the liver is functioning well
- Heart tests such as blood tests, an echocardiogram, or a cardiac angiogram can be done
- A chest x-ray and an oxygen challenge are done to make sure the lungs are healthy.
- Kidney tests include blood work, urine testing and sometimes a biopsy.

**What is the risk of contracting HIV or other diseases when receiving donated organs/ tissues?**

Organs and tissues that are being considered for transplant must undergo extensive testing to ensure the organs are healthy and disease free. While the risk of disease transmission is not zero, the screening performed on organ and tissue donors ensures that the risk is extremely low. Discuss any concerns with your doctor.

**What are the religious issues around organ/ tissue donation?**

Organ and tissue donation is a very individual and personal matter. If you are at all concerned, you should discuss the issue with your own religious leader.

**Consent to Donate****How is consent for organ/ tissue donation obtained?**

For **living donation**, you will sign the consent form for the removal of the organ or tissue yourself.

For **organ donation**, the next-of-kin or immediate family will be contacted by physicians in the intensive care unit. The family will be offered the option of organ and tissue donation.

For **tissue donation**, the next-of-kin will be offered the option of tissue donation or can bring it to the attention of the healthcare provider. This support may be facilitated by healthcare team member such as a doctor, registered nurse, social worker, or representative of the Office of the Medical Examiners office.

***A family member must sign an organ donation consent form, even if the person has registered to donate.***

**If I have registered to donate organs and tissues, will the quality of my medical care be compromised?**

Absolutely not. All possible medical interventions will be exhausted and every effort will be made to save your life before donation is even considered.

**If I register to donate organs and tissues, will my wishes be carried out?**

Although registering on [Alberta Organ and Tissue Donation Registry \(https://myhealth.alberta.ca/Pages/OTDRHome.aspx\)](https://myhealth.alberta.ca/Pages/OTDRHome.aspx) is legally binding, your next-of-kin is still requested to sign consent in order for donation to proceed. For that reason, it is very important to discuss your wishes with your family and let them know what you would want in the event of a sudden loss or tragedy. Family members will feel better about their decision if they know the wishes of the person in advance.

**Will my family be pressured to make a decision or to donate?**

No. Organ and tissue donation is recognized as an altruistic and very personal gift. Families are presented with the options of what may be possible and then given the choice of what they want to do.

- For **tissue donation**, the next-of-kin will be offered the option of tissue donation or can bring it to the attention of the healthcare provider. This support may be facilitated by healthcare team member such as a doctor, registered nurse, social worker, or representative of the Medical Examiners office.

***A family member must sign an organ donation consent form, even if the person has signed the back of their Alberta Personal Health Card.***

Legal consent is required in order for donation to proceed. The decision to donate is a personal one, and a clear legal consent is required from the next-of-kin. The family largely drives the donation decision, and can choose to donate all organs and tissues, specific organs or tissues, or none. They also can choose what purposes the organs and tissues can be used for: transplant, scientific research and/or medical education.

**Why is the family asked to make such a difficult decision at such a stressful time?**

Unfortunately, when it comes to organ and tissue donation, timing is very important. This is why it is so important for people to discuss their wishes with regard to organ and tissue donation with their family. Family members will feel better about their decision if they know the wishes of the person in advance.

**The Donation Process****How long does the organ and tissue donation process take?**

The time it takes to complete the organ and tissue donation process may vary, but it can take up to 24-36 hours to complete.

**What is the role of the HOPE (Donor) Coordinator?**

The Donor Coordinators are specially trained Registered Nurses that are responsible for:

- coordinating all of the organ donations in their area and collaborating with the Eye and Tissue Programs
- providing education about organ and tissue donation to members of the public and healthcare professionals
- playing an ongoing role in organ donation research
- providing follow-up support and communication with donor families
  - The Coordinator can be contacted at any time after the donation to provide support and answer questions regarding the experience. The Coordinator can also put you in touch with other care professionals as required.
  - Limited information about the condition of the organ and tissue recipients can be given. Sometimes no information is available as tissues from one person may go to many different recipients and the transplantations may not be done right away as with organ donation



**How are organ recipients chosen?**

Patients requiring transplants are matched to an available organ based on a number of factors: blood group, height, weight, medical urgency (sickest first), length of time on the waiting list, and geographical location. Medical specialists in the transplantation field choose recipients to "best match" the available organ.

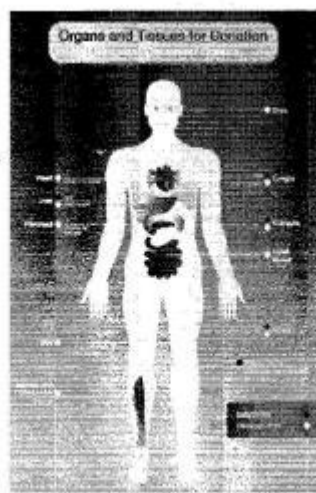
**Does the removal of organs/ tissues leave visible scars? Will it prevent an open casket funeral or delay the funeral?**

The surgery to remove organs and tissues is done with the same care as any other surgery. Everything possible is done to ensure that the dignity of your family member is maintained and that his or her body is treated with respect. All areas that are disturbed in the removal of the organs/ tissues are reconstructed. This is especially important in situations such as eye tissue donation. In these cases, the eye area is reconstructed so that you cannot tell that surgery has been done. As a general rule, you can expect that the body of your family member will be released for the funeral 24-48 hours after the death.

In most cases, there are no visible signs that prevent an organ or tissue donor from having an open casket funeral if desired.

**Fast Facts**

- Only 1-2% of deaths are potential organ donors.
- Almost everyone can be a potential tissue donor.
- There will never be any cost to your family or estate if you donate organs or tissues.
- In most cases, there are no visible signs that prevent an organ or tissue donor from having an open casket funeral if desired.
- During the surgery, organs and tissues are removed very carefully and incisions are closed with the same care provided during regular surgery.
- Most major religions respect the individual's right to make a personal decision regarding organ and tissue donation. Discuss the possibility with your spiritual advisor.
- Remember that there is a greater chance you will require an organ transplant than there is of becoming an organ donor.
- There are over 4,500 Canadians, including more than 700 Albertans, on the waiting list for an organ transplant.
- Make your wishes known to your family. Record your wishes on the [Alberta Organ and Tissue Donation Registry](https://myhealth.alberta.ca/Pages/OTDRHome.aspx) (<https://myhealth.alberta.ca/Pages/OTDRHome.aspx>) and/or have donation wishes noted on your Alberta Driver's License.



*One organ and tissue donor can save up to 8 lives and enhance as many as 75 more*

**Education**

Alberta Health Services donation programs support education and awareness related to organ and tissue donation. In-services are available for health care professionals and the general public.

**Public**

- Civic groups
- Associations
- Church groups
- Corporate awareness events
- Universities and colleges
- High schools

Educating our communities about the importance of organ and tissue donation is critical to saving lives. By learning the facts, individuals are empowered to not only make a decision regarding donation, but to communicate this wish to other family members.

To book an in-service, please contact your local program (<http://www.albertahealthservices.ca/info/service.aspx?id=2044>).

## Health Care Professionals

- Physicians, Fellows, Residents
- Nursing
- Allied Health
- Health Care Professional Students
- Professional Associations

Potential areas of focus include:

- New employee orientation
- Legislative requirements for donation
- Opportunity for donation as a part of optimal end of life care
- Donor management to optimize organ potential
- Peri-operative management of the organ donor

We are also able to customize presentations.

Should you wish to learn more or request education related to organ and tissue donation, please contact the donation program nearest to your area (<http://www.albertahealthservices.ca/info/service.aspx?id=2044>).

## Donation Process

### Organ Donation

1. Death is confirmed and the patient is maintained on organ support in the Critical Care Unit.
2. The family is offered the option of organ & tissue donation as part of optimal end of life care.
3. If the family wishes to proceed with donation, the Donor Coordinator speaks with them to review the donation process, obtain consent, and complete a medical/social history.
4. Blood samples are taken and a series of diagnostic tests are done to determine suitability for transplant.
5. Organs are matched with recipients through a national transplant waiting list using a standardized allocation process.
6. Once recipients are located, the donor is taken to the operating room where the organs are recovered and sent to the appropriate recipient centers for transplantation.
7. If the donor is also an appropriate candidate for tissue donation, tissue recovery follows organ recovery.
8. The donor is released to the family's chosen funeral home.

### Tissue Donation Process

1. Death is confirmed.
2. The family is offered the option of tissue donation as part of optimal end of life care.
3. If the family requires additional information or wishes to proceed with donation, the Donation Professional is contacted by the relevant Health Care Provider to speak directly with the family.
4. If the family wishes to proceed with donation, the Donation Professional obtains consent and completes a medical/social history.
5. The tissue program(s) review medical records, assess the donor, and determine suitability for donation.
6. The donor is taken to the operating room for tissue recovery. Corneas may be recovered in the operating room, at the bedside, or in the morgue.
7. The tissues are processed and stored for future use.
8. The donor is released to the family's chosen funeral home.

### Financial Contributions

Health care touches people at every stage of life. It is the support of generous residents like you that enhances the education, research, and health-care services in our province.

Local health foundations work in communities across Alberta to gather community support and develop partnerships. These dedicated groups are committed to helping build excellence and innovation within our system.

A gift to Alberta Health Services is an investment in the health of your community. Support can be directed specifically to the location and area of health care that you are passionate about.

The Alberta Organ, Tissue, and Eye Donation Programs would like to sincerely thank all who have made financial donations. The generosity of financial donors has helped to enhance the quality of the Organ and Tissue Donation in Alberta.

Contributions are utilized in many different ways including ongoing staff development, public education, awareness activities, and equipment within our program.

## Donations

### Southern Alberta

**Generously accepted c/o:**

Southern Alberta Organ & Tissue Donation Program  
Foothills Medical Center  
1403 - 29th Street NW  
Calgary, AB T2N 2T9

Contributions to the Southern Alberta Organ and Tissue Donation Program can also be made via the [Calgary Health Trust](https://secure.calgaryhealthtrust.ca/sslpage.aspx?pid=359) (<https://secure.calgaryhealthtrust.ca/sslpage.aspx?pid=359>).

### Northern Alberta

**Generously accepted c/o:**

Human Organ Procurement and Exchange Program (HOPE) and/or  
Comprehensive Tissue Centre (CTC)  
Room 9423, Aberhart Building  
11402 University Avenue  
Edmonton, AB T6G 2J3

Contributions to the Edmonton Donation and Transplant Programs can also be made via the [University of Alberta Hospital Foundation - Donate Now](https://www.universityhospitalfoundation.ab.ca/sslpage.aspx?pid=354) (<https://www.universityhospitalfoundation.ab.ca/sslpage.aspx?pid=354>) page.

(<http://myhealth.alberta.ca>) (/info/Page12630.aspx)  
(/topics/Page11975.aspx)

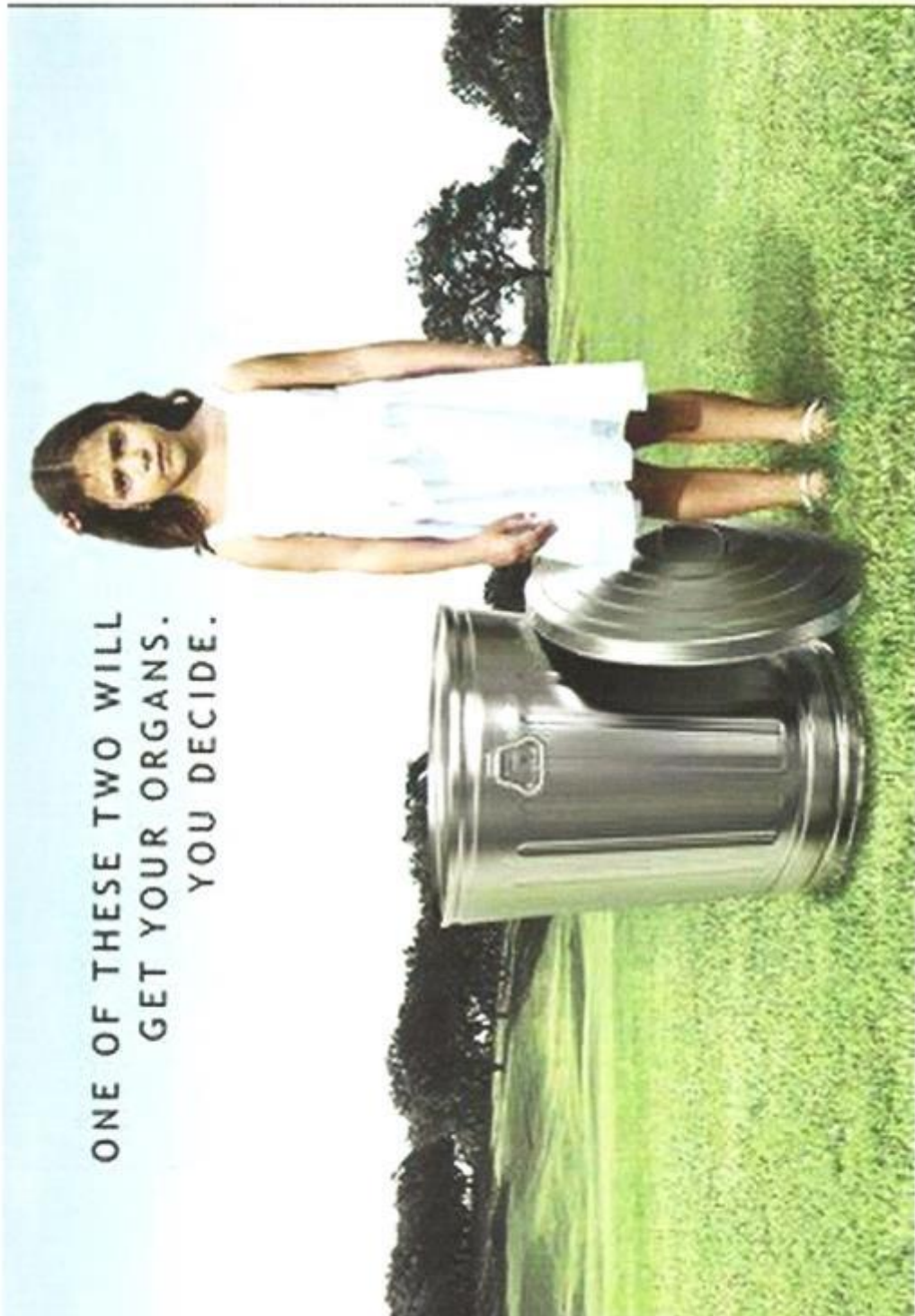
(<http://www.albertahealthservices.ca/blogs/plh/>) (/news/apple.aspx)

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## **Examples**

**Eye catching posters for  
organ & tissue donation  
promotional use in  
hospital waiting rooms,  
doctor office patient rooms  
& waiting room in clinics**

ONE OF THESE TWO WILL  
GET YOUR ORGANS.  
YOU DECIDE.





Gift a life

menschenwürdigen und menschenverträglichen Lebensbedingungen

*The greatest* **HERO**  
I never knew  
*was the* **ORGAN DONOR**  
who saved  
**My LIFE.**

BE A HERO. BE AN ORGAN DONOR.



YOU ARE 6 TIMES  
MORE LIKELY TO  
NEED A TRANSPLANT  
**THAN BE A DONOR.**



# **Research**

**Yiqang Luo MD, PhD, FRCSC**

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**Yigang Luo MD, PhD, FRCSC**

**Pancreatic Surgery & Transplant Surgery**

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Ellis Hall, Rm 161, 103 Hospital Drive, Saskatoon, SK S7N 0W8 Canada  
Tel: (306) 844 1087 Fax: (306) 844 1522 Email: yil872@mail.uesask.ca

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August 10, 2016

Mr. Frederick Hofmann  
PO Box 1809  
Warman, SK S0K 4S0

Tel: 306 249 5864

Dear Fred,

I wish you are continuously doing well and enjoying the summer.

I am attaching some information regarding my research regarding suboptimal kidney grafts rescue with innovative normothermic perfusion technique. Purpose of this study is to expand present usage rate of cadaveric kidney grafts by preservation and repair of the suboptimal grafts which used to be discarded in the past. Success of the research will bring the kidney transplant up by 15-30% and reduce postoperative complications, such as delay graft function (60% in donors of circulation death), primary non-function (up to 6% in extended criteria donors). We have achieved encouraging preliminary results from our study over last two years.

Thank you for promoting organ transplantation. I really appreciate your support on transplant research, which will certainly be benefit our patients in Saskatchewan.

Very best regards,

Sincerely,



Yigang Luo, MD, PhD, FRCSC



Canadian Institutes  
of Health Research

Instituts de recherche  
en santé du Canada

PROTECTED WHEN  
COMPLETED

Appl. # 365562

### Application Details

**Funding Opportunity:**

Project Scheme: 2016 1st Live Pilot (2016-03-01)

**Applicant:**

Surname

Luo

Given Names

Yigang

Participant Type

Independent Researcher - Mid  
Career Investigator

Institution

University of Saskatchewan

Faculty

College of Medicine

Department

General Surgery

Telephone

306-844-1087

Fax

306-844-1522

E-mail

yll872@mail.usask.ca

**Title:**

Preservation of Kidney Graft with Normothermic Perfusion for Transplantation

Primary location where research to be conducted: University of Saskatchewan

Faculty: College of Medicine

Department: General Surgery

Institution which will administer project funds (Institution Paid):

University of Saskatchewan

**Budget:**

Total Requested Amount: \$290000



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### Lay Title and Lay Abstract

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**Lay Title:**

Using An Innovative Technique to Improve The Success of Kidney Transplants

**Lay Abstract:**

Kidney transplantation has been very successful in the treatment of end-stage kidney failure patients with more than 80% of patients surviving for more than 10 years with a good quality of life. Each year, about 3000 Canadians need a kidney transplant. Each successful transplantation saves \$31000 - 54000/year in costs related to chronic kidney failure care. However, due to the shortage of donors, only 1/3 of chronic kidney failure patients receive kidney transplantation, while the other 2/3 either become too sick to receive a transplant or die on the waiting list.

Traditionally, kidney grafts are kept at 4°C before implantation and kidney function is not assessed prior to implantation. A new technique is proposed to keep a kidney graft alive using blood to mimic normal human body conditions and prevent premature organ deterioration. Assessment of kidney function prior to implantation is especially important to detect poor grafts and avoid post-transplant complications, e.g., non-functioning (5%) or delayed functioning (68%) in high risk donor transplants. Kidney grafts using this new technique can be optimized by proper treatments to recover function prior to implantation. These cutting edge enhancements will make suboptimal, previously un-useable organs become useable and thus significantly increase the number of organs available for transplantation by more than 20%. We have done a preliminary study on this new technique in pigs with good results. Our present project is to perfect this technique for clinical use. We will perform this normal body temperature whole blood perfusion in comparison with normal body temperature acellular perfusion for kidney transplantations using a pig kidney transplantation model, leading to clinical application of the innovative technique. This innovative technique is expected to significantly increase the number of kidneys available for transplantation while avoiding poor outcomes for recipient.



## Complete Summary

**Broad Goal:** Our ultimate goal is to improve patients' quality of life and reduce healthcare costs through the development of an innovative technique that could revolutionize current kidney transplantation practice.

**Overview:** Two-thirds of Canadian kidney transplant candidates could not have the transplant because of donor shortage[26]. To expand the limited donor pool, DCD (donation after circulation death) and ECD (extended criteria donor) donors were used, which unfortunately resulted in up to 68% DGF (delay graft function) and 5% PNF (primary non-function), because of warm ischemia injury[5-7]. In addition, up to 20% donor kidneys are discarded each year due to unpredictable graft function[26]. Neither traditional cold static preservation nor recent cold machine perfusion could reliably assess preserved kidney function and recover unpredictably suboptimal grafts before implantation[8-13]. Normothermic perfusion was studied but so far it was only preliminarily used for clinical pre-transplant conditioning with 60 min perfusion[22-23, 27-28, 39]. No functional assessment was attempted.

**Rationale:** In order to rescue high risk unpredictable kidney grafts and safely use them in transplantation, our approach is to establish an *ex vivo* normothermic perfusion system during graft preservation, where the high risk grafts can be preserved, assessed, repaired under close-to-normal physiological condition and functionally ensured before implantation. This technique is innovative in that the kidney will be perfused with blood *ex vivo* at normal body temperature to mimic normal physiological conditions *in vivo*. Our group did normothermic blood perfusion on warm-ischemia porcine kidneys and showed its advantage in functional assessment over cold machine perfusion (Fig 1&2). Brasile et al. showed normothermic acellular perfusion was better than cold perfusion on canine[39]. It is important to compare these two techniques and introduce the best one into clinical practice.

**Core Expertise:** We bring together experts in transplant surgery, nephrology, pathology, clinical perfusion, physiology and pharmacology, cell biology, veterinary medicine, and statistics. Material supports in part will be from Medtronic and Sorin Group, Canada. Recently, our group conducted a whole blood normothermic perfusion study on warm ischemia pig kidneys for up to 20 hrs, with cold machine perfusion as a control. Graft function with normothermic perfusion was superior.

**Research Aims:** Three aims will be implemented to drive forward the successful clinical application of this cutting edge technique. Aim 1 (n=20) in 2 groups is to perfect our perfusion technique by optimizing the perfusion circuit and management, based on our recent perfusion study, and compare our normothermic whole blood perfusion with normothermic acellular perfusion. The techniques are verified on pig kidney transplant model; Aim 2 (n=10) is to test the selected innovative technique on clinical discarded kidneys; and Aim 3 (n=10) clinical kidney transplantation with suboptimal kidneys preserved, assessed and recovered under this novel innovative technique.

**Expected Outcomes:** The results will promote a revolutionary change in the concept of organ preservation from simple cold static preservation to real-time assessment and, to the opportunity of repair[18]. The success of this innovative technique will prepare at least 20% more kidney grafts for transplantation, while preventing PNF and DGF ( $\approx$  5% and 68% in DCD).



### Complete Application - Quality of the Idea

Our ultimate goal is to improve patients' quality of life and reduce healthcare costs through the development of an innovative technique that could revolutionize current kidney transplantation practice.

Shortage of kidney donors hinders the full application of successful kidney transplantation. On the other hand, usage of suboptimal organs leads to untoward complications in up to 68% of transplant recipients due to unpredictable kidney function[5-7]. Traditional 4°C preservation cannot keep procured kidney viable for long due to energy requirement of tissues[10]. Neither function assessment nor treatment of a graft can be done during cold preservation[8-13].

Sixty minutes of normothermic perfusion was attempted for pre-conditioning in kidney transplantation[22]. However, to date, normothermic kidney perfusion for a prolonged period of time for purposes of preservation, assessment and recovery, has not been reported clinically.

Our objectives: To rescue high risk unpredictable kidney grafts and safely use them, i.e., more kidneys available for transplant (increase of >20%) with lower complications, our approach is to establish an ex vivo normothermic perfusion system during preservation, where the high risk grafts can be assessed, treated and recovered under near-normal physiological condition before implantation.

Normothermic whole blood perfusion on warm ischemia pig kidneys with functional assessment, was undertaken by our group(Fig 1&2). Our preliminary results showed improved functional assessment in normothermic perfusion for at least 12 hrs with perfusion up to 20hrs. It is crucial to refine this technique, confirm its advantages in a live kidney transplantation model, and introduce it clinically.



## Complete Application - Importance of the Idea

Healthcare costs for a dialysis patient are about \$60,000/yr. Kidney transplantation(KT) provides a much better prognosis, with double or triple life expectancy as compared to patients on dialysis[3]. Each year, about 3000 Canadians require a KT. However, as the shortage of donors, only 1/3 of them receive a KT[4]. Due to the uncertainty of kidney graft function, about 20% available grafts are actually discarded[26]. To expand the limited donor pool, Expanded Criteria Donor (ECD) and Donation after Circulation Death donor (DCD) kidneys were used but unfortunately resulted in a higher rate of complications. Delayed graft function(DGF) and primary non-function( PNF) occurred in up to 68% and 5% of recipients respectively because of suboptimal conditions[9], particularly warm ischemia, even though the number of grafts increased by over 20% [7, 8]. In patients with PNF, re-transplantation has to be considered, whereas for patients with DGF, a decrease of long-term graft survival of 40% is expected[9].

Traditionally a kidney graft was preserved at a static 4°C[10]. Recently, cold machine perfusion (MP) was popularized [11]. Although most enzymes of normothermic animals show a 1.5 to 2.0 fold decrease in activity for every 10°C decrease in temperature [12], the metabolic rate is still not zero at 4°C. Organ/cells are still using energy at a lower rate while the energy production does not keep up even at a low temperature. This imbalance of energy supply causes energy-linked cell membrane pumps dysfunction, cell osmotic instability and swelling. Calcium influx forms calcium-calmodulin complexes, causing cytoskeletal/mitochondrial damage and cell necrosis [12]. Therefore, a kidney graft, cannot be safely preserved in cold for long, usually less than 24 hrs. MP was developed to overcome this limitation, it has not yet to provide compelling benefits in regard to high risk grafts[13,14,15].

To date, there is no reliable preservation, assessment and recovery system for clinical suboptimal kidney grafts, though many studies were performed[22-23, 27-28, 14-15, 19-23, 39]. Our group did normothermic whole blood perfusion on porcine warm-ischemia kidneys with functional assessment, showing advantage over cold machine perfusion control(Fig 1&2). Brasile et al. demonstrated normothermic acellular perfusion was better than cold perfusion on canine[39]. It is important to compare these two techniques and introduce the best one into clinical practice.

The results of this project will promote a revolutionary change in the concept of organ preservation from simple cold static preservation to real-time assessment and to the opportunity of repair[18]. This will not only prepare at least 20% more kidney grafts for transplantation by re-conditioning suboptimal grafts, but also eliminate PNF and DGF by allowing for functional assessment during preservation. Increasing transplant grafts will shorten transplant waiting-list and thus reduce morbidity and mortality before transplantation. Therefore, both post-transplant and pre-transplant complications will be reduced; the outcome of kidney transplantation will be more predictable and optimized. This will certainly benefit our health system and patients, both economically and clinically. Academically, this project will add new knowledge to ex vivo organ perfusion regarding circuit, perfusate, management and assessment, which will not only benefit kidney perfusion but also other organ perfusion such as the liver.





## Complete Application - Approach

### SPECIFIC AIMS

1. The best ex vivo perfusion technique.
2. Clinical suboptimal kidney preservation and recovery.
3. Clinical kidney transplantation with recovered suboptimal kidney.

### INNOVATION

1. Long warm-ischemia of kidney for preservation and recovery study.
2. Whole blood perfusate in the experimental group.
3. Physiological circuit with side branch at inflow and open free drainage at outflow.
4. Enhanced anticoagulation with tissue plasminogen activator (TPA, Anlira, 7768 Service Center Drive, West Chester, OH 45069 USA) and Congrelor (antiplatelet agent, newly available in 2015, The Medicines Company, 8 Sylvan Way, Parsippany, NJ 07054 USA).
5. Injury assessment with Nephrocheck (newly available in 2015, Astute Medical, Inc., 3550 General Atomics Court Building 02/620, San Diego, CA 92121 USA)[30].
6. The first clinical use of normothermic perfusion for kidney preservation, assessment and recovery.

### AIM 1: THE BEST EX VIVO PERFUSION TECHNIQUE

#### Preliminary study

Our group studied ex vivo warm ischemia pig kidney with normothermic perfusion using whole blood against cold machine perfusion as the control for up to 20 hours. Our results showed significantly improved functional assessment in the normothermic perfusion group [Fig 1&2, unpublished data].

#### Rational

1. It is crucial to verify our preliminary findings on live kidney transplant model.
2. Our group showed whole blood normothermic perfusion was better than cold acellular machine perfusion (Fig 2); Brasile et al. in a dog kidney transplant model showed an advantage of acellular warm perfusion over cold perfusion [39]. It is rational to do a head-to-head comparison of these two techniques on pig transplant model so as to find the best technique.
3. Warm ischemia injury is the major cause of DCD donor kidney dysfunction. We use a 60-min warm ischemia kidney in our study. Sixty minutes is considered longer than the usual DCD donor warm ischemia time.
4. Other than primates, the pig is considered the animal most close to human in physiology and anatomy [41]. As a large animal research model, study on pigs is necessary before introduction of the novel technique into clinical practice.
5. Ten kidneys in each group are planned based on predicted 10% benefit difference between the groups on statistic analysis; 30-40kg body weight means easier range for anesthesia and surgical management; and female pigs are chosen because access to the abdominal wall is easier anatomically.

#### Groups

Group 1 (n=10): Five pairs of kidneys are perfused with KPS-1 (standard kidney preservation solution, One Pierce Place Suite 475W, Itasca IL 60143, USA) plus O<sub>2</sub>, pyridoxylated bovine hemoglobin (6g/dl) (Ezon, Inc., Piscataway, NJ) and nutrients at temperature of 34-37°C.



### Complete Application - Approach

Group 2(n=10): Five pairs of kidneys are perfused with whole blood but other conditions are the same as Group 1 without bovine hemoglobin. Anticoagulation management is enhanced in this group with high dose heparin, TPA and Congrelor.

#### Methods

**Animals and Preparation:** Thirty 12-16wk-old healthy female pigs(Large White, Prairie Swine Center), weighing 30-40kg, are fasted overnight but have free access to water. Already in the stable, pigs are pre-medicated with Xylazine 2mg/kg, Ketamine 5mg/kg, and Hydromorphone 0.1mg/kg, (IM) 20 minutes prior to surgery. Ten pigs are used as kidney donors, 20 pigs are used as recipients.

**Anesthesia:** is induced with propofol (IV, 2-4mg/kg) administered to effect. Pigs are intubated with a cuffed endotracheal tube and anesthesia is maintained with isoflurane in 100%.

#### Ex vivo Perfusion:

**Procurement[17]:** Under sterile conditions, through abdominal midline incision, both kidneys with related renal vein, artery and ureter are exposed and isolated after bowels are mobilized away from the surgical field. Heparin 1000u/kg IV is given before clamping of kidney artery. The kidneys are kept at body temperature for 60 minutes warm ischemia, before being flushed with 500 ml 4°C HTK solution(Essential Pharmaceuticals, LLC, 100 Princeton South Corporate Center, Suite 140 Ewing NJ 08628, USA) through an aorta cannula and drained by a vena cava cannula, cooled with surface ice sludge, and removed intactly. The donor pig is euthanized with overdose of anesthesia after its blood donation during kidney warm ischemia time.

#### Ex Vivo Kidney Perfusion Technique[17]:

Ex vivo kidney perfusion circuit(Fig 1): consists of a centrifugal pump(Bio-pump 550, Medtronic, Minneapolis, MN, USA), a venous reservoir with filter and membrane oxygenator(Sorin Group USA, Arvada, CO, USA), ¼ inch polyvinylchloride tubing, heat/cooling exchanger. The hardware includes a flow controller, a TX50P (Medtronic, Minneapolis, MN, USA), flow transducer and a temperature probe (Cole-Parmer Canada Inc., Montreal, QC Canada). Multiple Alaris infusion pumps(Carefusion, Mississauga, Canada) are incorporated into the system. Both kidneys from one donor pig in a cluster are connected to the primed circuit through aorta and freely drained from vena cava with a cannula. The rest of circuit is set up as follows: the outflow of the graft vena cava/renal vein is collected in the perfusion chamber, which is then drained to a reservoir with oxygenator/filter and a cool/heat-exchanger. The outflow of the reservoir is drawn by a biopump into the tubing connected to graft aorta from which the perfusate flows into kidney graft by renal artery. A flow controller, TX50P flow transducer and a temperature probe are all connected on the tube between biopump and graft aorta.

**Perfusate:** In volume of 1000ml, blood used in Group 2 is collected from donor pigs after fully heparinized with 1000u/kg heparin; KPS-1 is used for Group 1.

**Perfusion management[16, 17]:** Perfusion time is 12 hrs. Perfusion mean arterial pressure is 50-70mmHg. Creatinine (Sigma) is added to all perfusate to 3mg/dl. Verapamil 5 mg is added into the circuit at beginning of perfusion. Dexamethasone(8mg q4h) and Mannitol(250mg pm q4h for UOP <20ml/h) are added to the circuit. Caripul 100ng/min (GSK, Mississauga, ON, Canada) is infused into the arterial arm of the circuit. Mixed gas (5% CO<sub>2</sub> and 95% O<sub>2</sub>) is given through oxygenator to maintain PO<sub>2</sub> ≥100mmHg, O<sub>2</sub>Sat 100%. Adjustment of gas flow and sodium bicarbonate 8.4% normalize pH(7.35-7.45). Glucose 5% and Insulin R keep glucose between 6-10 mmol/L. Sodium and potassium are replaced with NaCl or KCl accordingly to



### Complete Application - Approach

maintain within 135-145 mEq/L and 3.5 - 4.5 mEq/L respectively. Aminolean, a nutrient solution, 500ml with 8.4% sodium bicarbonate 25 ml, insulin, Humulin-R, 100iu at 7ml/hr, is infused continuously. Ringer's solution replaces urine output in each group. Blood is used to maintain Hct 20-30% in Group 2, where when the perfusion starts, TPA 15 mg is infused into the circulation and then, every 4 hrs; Cangrelor 80mcg/min is infused continuously, ACT(Activated Clotting Time) is maintained as 1000 sec with heparin (10u/ml perfusate). For Group 1, pyridoxylated bovine hemoglobin (6 g/dl) (Ezon, Inc., Piscataway, NJ) is supplemented to the circulation.

#### Transplantation:

Transplant grafts: are the perfused kidney grafts. After 12hrs perfusion, all the grafts are flushed with cold HTK and transplanted to the recipients.

Transplant surgery[38]: Recipient pig in supine position is prepped and draped. A jugular vein catheter is placed under sterile condition with the outer end behind the pig's ear. Through a midline incision, a transplant is performed in situ after native kidneys are removed. Ureter anastomosis is over a double-J stent (6Fr). Prophylactic antibiotic, Ancef 2gm IV q8h for 48 hrs; Heparin 5000u SC q12h for 7 days, are started at the beginning of anesthesia.

Post-transplant care: All animals are taken care of in humane conditions, in accordance with the principles contained in the Care of Experimental Animals, a Guide for Canada, Canadian Council on Animal Care. After recovery from anesthesia, the pigs are allowed to drink water and eat food. Post-operative pain control is maintained with Carprofen (Rimadyl) at 2mg/kg, sc, immediately post-surgery and then daily. Fentanyl patch 75 microgram is applied the day before surgery and maintained for 72 hrs. When blood sampling, the recipient pig is sedated with Midazolam, 0.2mg/kg, IM, as needed.

CBC and serum electrolytes are checked daily for 3 days. Animal's general well-being is observed closely. Any possible complications, such as infection, bleeding or urine leak should be attended by a veterinarian timely. Recipient pigs are kept alive for 30 days. At the end of 30 days or when animal becomes moribundly ill, euthanasia is undertaken with overdose of anesthesia agent.

#### Data collection:

Circuit stability: Perfusion pressure, flow and perfusate temperature are recorded every 30min in each group. Perfusate gas(ABG's), electrolytes and glucose are monitored every 30min. ACT is checked every 30min in Group 2.

Graft function: is monitored with hourly urine output by catheter collection, Cr clearance and FENa(Fractional Excretion of Sodium). O<sub>2</sub> consumption is calculated based difference of O<sub>2</sub> contents in arterial and venous blood and blood flow.

Graft injury: Pre-and post-perfusion graft weight and size are recorded. Graft color and texture are observed hourly. Core biopsies are scheduled at the beginning and the end of 12 hrs of perfusion for ATP/ADP(Abcam, AB 83355 USA), PAS histology (scored as Torras J, et al[33]) and electronic microscopy. Urine is sampled at the beginning of perfusion and then every 6 hrs for urine analysis(UA), endothelin-1(R&D Systems, Inc. 614 McKinley Place NE Minneapolis, MN 55413) and NephroCheck.

Transplant kidney: 1. UA daily; 2. Kidney function such as urine output, Cr clearance and FENa, is checked at POD 1 and then every 3 days. 3. DGF and PNF: If kidney graft does not function immediately but gradually starts functioning within one week, delay graft function is considered. If kidney graft does not



## Complete Application - Approach

function for one week or shorter when pig is euthanized due to acute renal failure, primary non-function is diagnosed. 3. When animal dies or is euthanized, autopsy is performed and kidney graft is sampled for histology and electronic microscopy; graft weight and size are recorded.

### **Aim 2: CLINICAL SUBOPTIMAL KIDNEY PRESERVATION AND RECOVERY**

Rational: to verify the optimal technique in clinical setting.

Ten clinical discarded kidney grafts are perfused for 12 hrs using the optimal preservation perfusion protocol identified in Aim 1. No transplantation is performed in Aim 2.

Data collection is the same as Aim 1.

### **Aim 3: CLINICAL TRANSPLANTATION WITH RECOVERED SUBOPTIMAL KIDNEYS**

Rational: to introduce the novel technique in clinical practice.

Ten clinical suboptimal kidney grafts are perfused using Aim 1 selected technique for 12 hrs and then transplanted into kidney transplant candidates.

Kidney is transplanted into the iliac fossa with ureter stent as is the clinical standard. All patients are under standard clinical management[40].

Specific postoperative observation: Urine output is monitored hourly for 3 days; serum Creatinine and urine analysis are tested daily. Transplant graft biopsy is taken according clinical judgement.

### **STATISTICS**

Initial descriptive statistics will be done to summarize the data. A student's t-test or the Wilcoxon rank sum test will be used for continuous variables. ANOVA analysis with Tukey's multiple testing adjustment will be used to compare group mean differences. Kaplan-Meier and Cox hazard regression will be used for graft survival and pig survival analysis. A P-value of <0.05 is considered significant. All analysis will be performed using SAS version 9.4.

### **ETHICS**

No ethical issues are foreseen for animal study. Pigs have been used for experimental study for a long time as the pig's anatomy and physiology are similar to those of a human[41]. As a large animal research model, study on pigs is necessary before introduction of a novel technique into clinical practice. All pigs are under humane care. Stress and pain will be controlled to the lowest possible degree. Appropriate general anaesthesia during surgery with tracheal intubation and sedation will be employed. Euthanasia will be properly conducted at the end of experiment and when the animal is moribundly ill. For human study, it is justified to use suboptimal grafts when every preclinical study has certified its benefit to the patients, especially for those patients who are losing their venous site for dialysis.

### **CHALLENGES**

Most of the perfusion/transplant steps have been used in our former studies[4, 16-17, 24-25, 31, 37-38].

Aim 1, ex vivo perfusion:



### Complete Application - Approach

1. Potential over anti-coagulation can cause bleeding. Since this is an ex vivo system with free drainage into reservoir bleeding should not jeopardize graft survival. The medications used for anti-coagulation have a half-life (4-6min). Once ex vivo perfusion is finished and the kidney graft is transplanted onto a recipient, the anticoagulants should be metabolized quickly. Therefore, over anti-coagulation is not expected in recipients.
2. Although side-branch perfusion to the kidney is more physiological and less mechanical injury to kidney grafts is expected, the perfusion flow may become too low. Therefore in the distal aorta tubing beyond the grafts a flow controller is applied to maintain proper resistance and facilitate perfusion flow to the grafts.
3. Although our ultimate goal is to perfuse a kidney graft ex vivo for a longer time, this present project is set to only 12hrs perfusion because normothermic perfusion has shown advantages over cold perfusion at 12 hrs in our preliminary study. It is justified to use 12 hrs of perfusion as an initial attempt to verify the advantages of this novel normothermic preservation technique on a live transplant model.

#### Aim 1, transplantation:

1. Surgical complications especially urine leak should be kept at the lowest level. A surgical magnifying glasses is used for accurate surgery; a double J ureter stent is left across the ureter anastomosis.
2. Post-transplant urine output and blood sampling; biological cage is used for collecting urine; jugular catheter is inserted for postoperative blood sampling.
3. Pre- and post-operatively pigs are housed together with other pigs, so as to avoid depression.
4. Sterile technique is stringent to avoid infection. Creatinine solution for functional test is filtered.
5. We keep recipients for 30 days to assess delayed graft function recovery.

Aim 2 & 3: A major challenge is to justify its benefit to the patients. Detailed discussion and explanation to donor family in Aim 2 and to patients and families in Aim 3, is warranted. The clinical transplant policy will be modified accordingly. In the case of primary non-function, patient management is decided by the transplant team regarding whether or not to remove the graft. An ethical committee should be consulted during this project. No transplant will be performed if poor function is found on perfusion.

#### TIMELINE AND DELIVERABLES:

1. Year 1-2: Aim 1 animal studies are completed. This aim identifies the superior perfusion/preservation/recovery technique.
2. Year 3: Aim 2 clinical discarded kidney perfusion study is completed. This aim describes the preliminary feasibility and effectiveness of the novel technique.
3. Year 4-5: Aim 3 further verifies the novel preservation technique clinically with kidney transplantation. The innovative technique is introduced in clinical practice.

**KNOWLEDGE TRANSLATION:** Other than publishing papers and advancing medical knowledge academically, our target is to introduce the useful technique into clinical practice as soon as possible. Dr. Shoker, our major knowledge user as Saskatchewan Transplant Program Director will promote this much-needed new technique in Saskatchewan by modifying present transplant policy timely.



## Complete Application - Expertise, Experience and Resources

As a collaborative team involving the College of Medicine, the Western College of Veterinary Medical Center and the Prairie Swine Center, with partial support from LivoNova (Sorin Group), Canada and Medtronic, Canada, our combined research experiences totals more than 150 years.

### Expertise:

Yigang Luo, MD, PhD, FRCSC, nominated principle investigator, started his organ perfusion experiences in the early 1990's in Cambridge, UK, where for the first time the mechanism of hyperacute rejection was delineated with a pig heart blood perfusion model[24-25]. In the late 1990's, he conducted pig liver and kidney whole blood normothermic perfusion, which for the first time confirmed that a hDAF transgenic pig could avoid hyperacute rejection with much better function[16-17]. In 2015, Dr. Luo with the present team, performed whole blood normothermic perfusion on warm-ischemia pig kidneys for the first time up to 20 hours with functional assessment[Fig 1&2]. Dr. Luo has close to 80 publications including 2 book chapters.

Ahmed Shoker, MD, FRCPC, principle investigator and knowledge user, is our senior transplant nephrologist and Saskatchewan Transplant Program director, who is actively involved in a variety of research in ischemia and transplantation. Dr. Shoker has more than 110 publications. He will be in charge of our ischemia injury assessment and knowledge use.

Mark W. Rosen, MPS, BSPE, CCP, CPC, Senior Clinical Perfusionist, Co-Chair Transfusion Medicine Committee, Saskatoon Health Region, has more than 20 years experiences in clinical perfusion. He will be in charge of our perfusion circuit.

Barbara Ambros, DVM, DVSc, Dipl ECVA, is an associate professor at the Western College of Veterinary Medicine. Having experiences in quite a number of animal research, she assisted us to set up the normothermic pig kidney perfusion model in 2015. She will be in charge of perioperative animal care including anesthesia.

Banerjee, Tama, MD, FRCPC, is a kidney transplant pathologist at the University of Saskatchewan. She will assist in pathological reviews.

### Experiences[4, 16-17, 24-25, 31-32, 35-36, 39]:

Members of our team have vast experience in transplant and ex vivo pig organ normothermic perfusion, including heart, liver and kidney, since the 1990's. In recent years, we did a rat kidney ex vivo perfusion study on ischemia injury. We were the first group to use cold machine perfusion for living donor kidney graft preservation. In 2015, we established a pig model of normothermic kidney perfusion with whole blood[Fig 1&2].

### Facilities:

Prairie Swine Center has supplied high-quality pigs for research both locally and nationally over more than 20 years.

The Western College of Veterinary Medicine, one of only four veterinary medical centers in Canada, has well-facilitated operating rooms, an intensive care unit, imaging facilities, and a laboratory and pathology department. Other than the above hardware, the people in the Veterinary Medical Center are extremely collaborative. We have received extensive support from them to develop our normothermic pig kidney perfusion model. This is an excellent site for our study including ex vivo perfusion and kidney transplantation.

Saskatchewan : Some 50 suboptimal donors are unused each year. As such, this will provide us with an excellent source of organs for our project. The Saskatchewan Health Research Foundation funded \$40000 to our normothermic kidney perfusion project in 2015. Local authorities are fully supportive.



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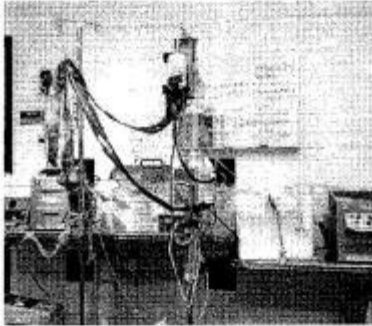




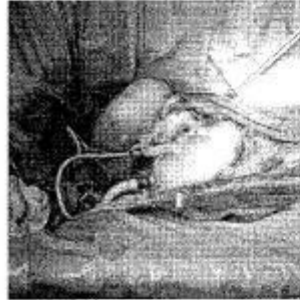
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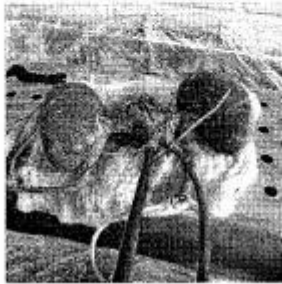
Fig 1. Our normothermic perfusion system for kidney graft preservation and recovery



### The normothermic perfusion system



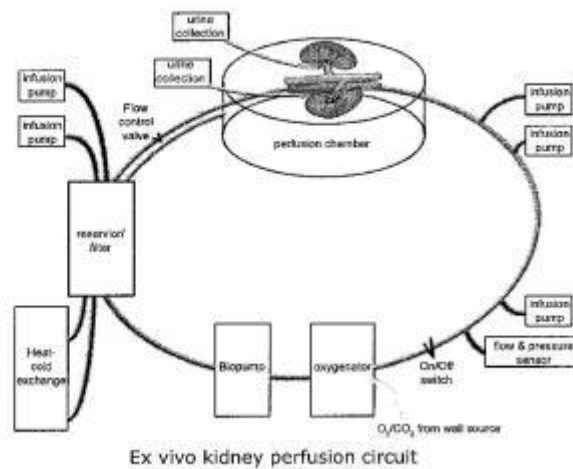
### Cold machine perfusion control



### Normothermic perfusion with whole blood



### Normothermic perfusion with urine production

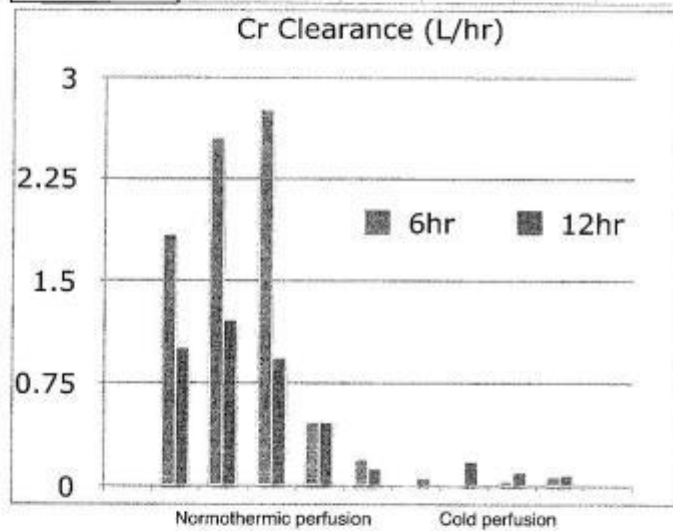
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Yigang Luo, Preservation of Kidney Graft with Normothermic Perfusion for Transplantation. Complete Application.

Fig 2. Our preliminary results of normothermic perfusion on warm ischemic pig kidneys.

Exp: normothermic perfusion n=5, Con: cold machine perfusion n=4

	Exp					Con				P
Pigs	P2L	P3R	P3L	P5R	P7R	P4R	P4L	P6R	P6L	
1 <sup>st</sup> 6h Cr Clearance (L/hr)	1.84	2.55	2.77	0.46	0.19	0.02	0.02	0.04	0.07	0.00001
2 <sup>nd</sup> 6h Cr Clearance (L/hr)	1.01	1.22	0.94	0.46	0.13	0.06	0.18	0.11	0.08	0.01103



2/2



***Electronically Signed: F.P. Hofmann***