

# The Organ Donation & Transplant System Journey

## Reflections from Canada

**Sam D. Shemie**

NHSBT BTS Harrogate March 7<sup>th</sup> 2019



**McGill University Health Centre, Montreal  
Children's Hospital, MUHC Research Institute**  
*Division of Critical Care*



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**McGill University**  
*Professor of Pediatrics*



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**Canadian Blood Services**  
*Medical Director, Deceased Donation*

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# **Influences & Disclosures**

- 1. Full time pediatric ICU physician**
- 2. ECMO specialist & former ECMO team medical director**
- 3. Trauma team leader**
- 4. Research and health policy program in organ replacement during critical illness, deceased organ donation and death determination**
- 5. Medical advisor for deceased donation at Canadian Blood Services, a non-profit, government funded organization to develop best practices in organ donation & coordinate the donation & transplant system in Canada**
- 6. No industry funding**
- 7. No transplant society funding**





Dan Harvey



Alex Manara



Dale Gardiner

# Canada vs. UK ODT

## Envy & Jealousy on the Journey to a Similar Place

**Sam D. Shemie**

**NHSBT BTS Harrogate March 7<sup>th</sup> 2019**





2018



**Deceased Donors PMP**

**24.1**  
**(39% cDCD)**

**23.8**  
**(26% cDCD)**

**Living Transplant PMP**

**16.0**

**14.1**

**Deceased Transplant PMP**

**61.8**

**72**

**Total Transplant PMP**

**77.8**

**81.7**







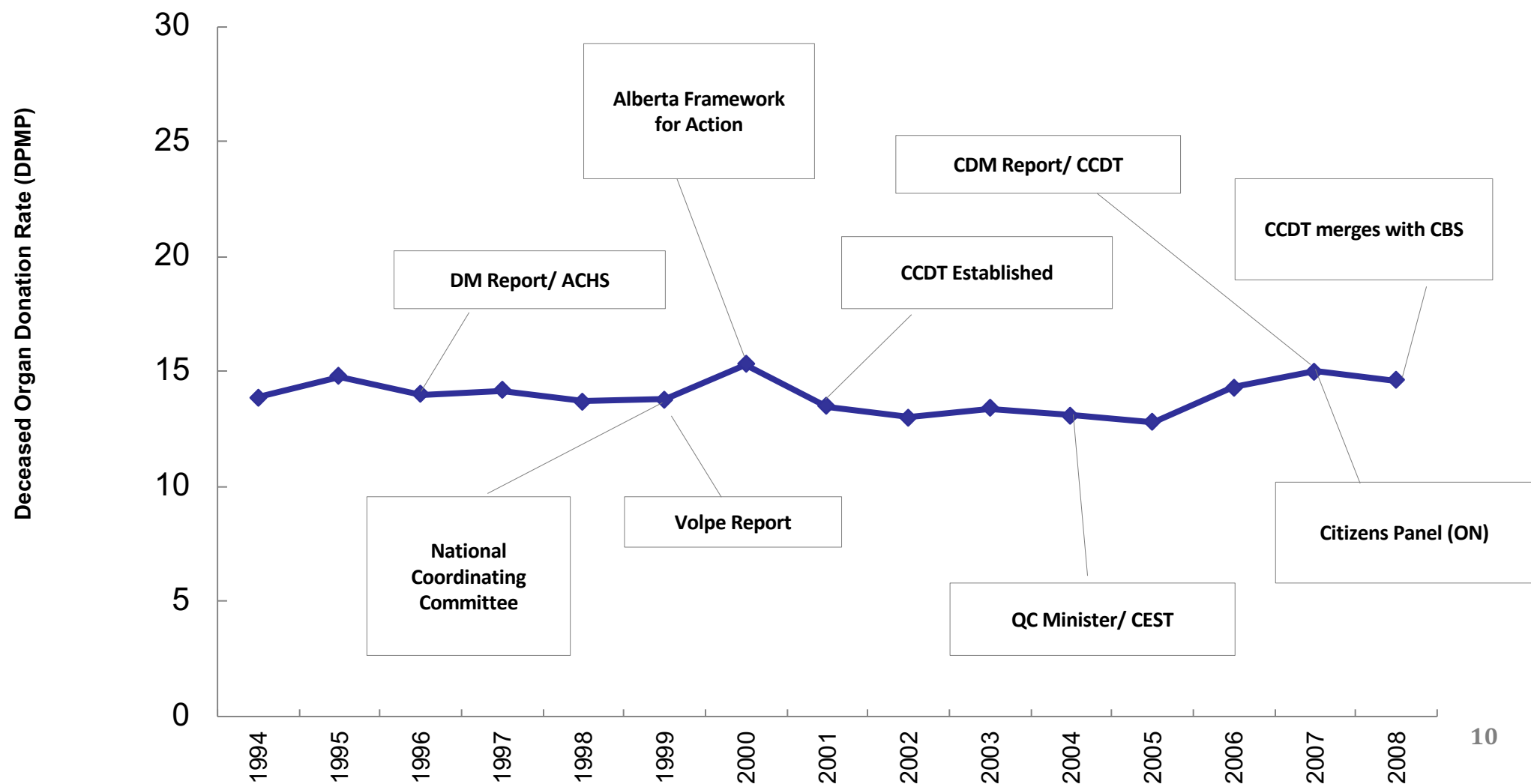






# Overview of the Canadian System

# Canada: The need for ODT re-design was recognized, but little improvement seen: 1994-2008



## Special Feature

doi: 10.1111/j.1600-6143.2008.02314.x

# Deceased Organ Donation in Canada: An Opportunity to Heal a Fractured System

**J. S. Gill<sup>a,\*</sup>, S. Klarenbach<sup>b,c</sup>, E. Cole<sup>d</sup>  
and S. D. Shemie<sup>e,f</sup>**

<sup>a</sup>*Division of Nephrology, University of British Columbia,  
St. Paul's Hospital, Vancouver, BC, Canada*

<sup>b</sup>*Division of Nephrology, University of Alberta, Edmonton,  
AB, Canada*

<sup>c</sup>*Institute of Health Economics, Edmonton, AB, Canada*

<sup>d</sup>*Division of Nephrology, University of Toronto, Toronto  
General Hospital, Toronto, ON, Canada*

<sup>e</sup>*Division of Pediatric Critical Care, McGill University,  
Montreal Children's Hospital, Montreal, QC, Canada*

<sup>f</sup>*Faculty of Arts, University of Ottawa, ON, Canada*

\*Corresponding author: John S. Gill,  
jgill@providencehealth.bc.ca

## Introduction

The Canadian organ donation and transplantation (ODT) system continues to be indicted for poor deceased organ donation performance. Recently, Canadian Blood Services (CBS) was given the mandate to oversee organ donation and transplant activity in Canada. How this new national organization will improve deceased organ donation performance within the existing Canadian transplant system is yet to be defined. We review the structure of the existing Canadian system, and identify issues that we believe are barriers to improving deceased organ donation. We then review the current status of deceased organ donation in Canada, directly compare Canada's organ donation performance to that of the United States and provide additional international comparisons. Finally, we identify key changes

## **Saving Lives**

**Historically in Canada, the organ donor was an orphan in health care**



**Transplanters**

**Intensive Care**

**Pro-Con Debate**  
**Toronto Critical Care Medicine Symposium**  
**1999**

**Sam Shemie, Canada**

**“ICU’s should take responsibility for organ donation”**

**Malcolm Fisher, Australia**

**“It’s not our fucking problem”**





# A Canadian Health Care System?

Canada has 13 different health care systems



Plus

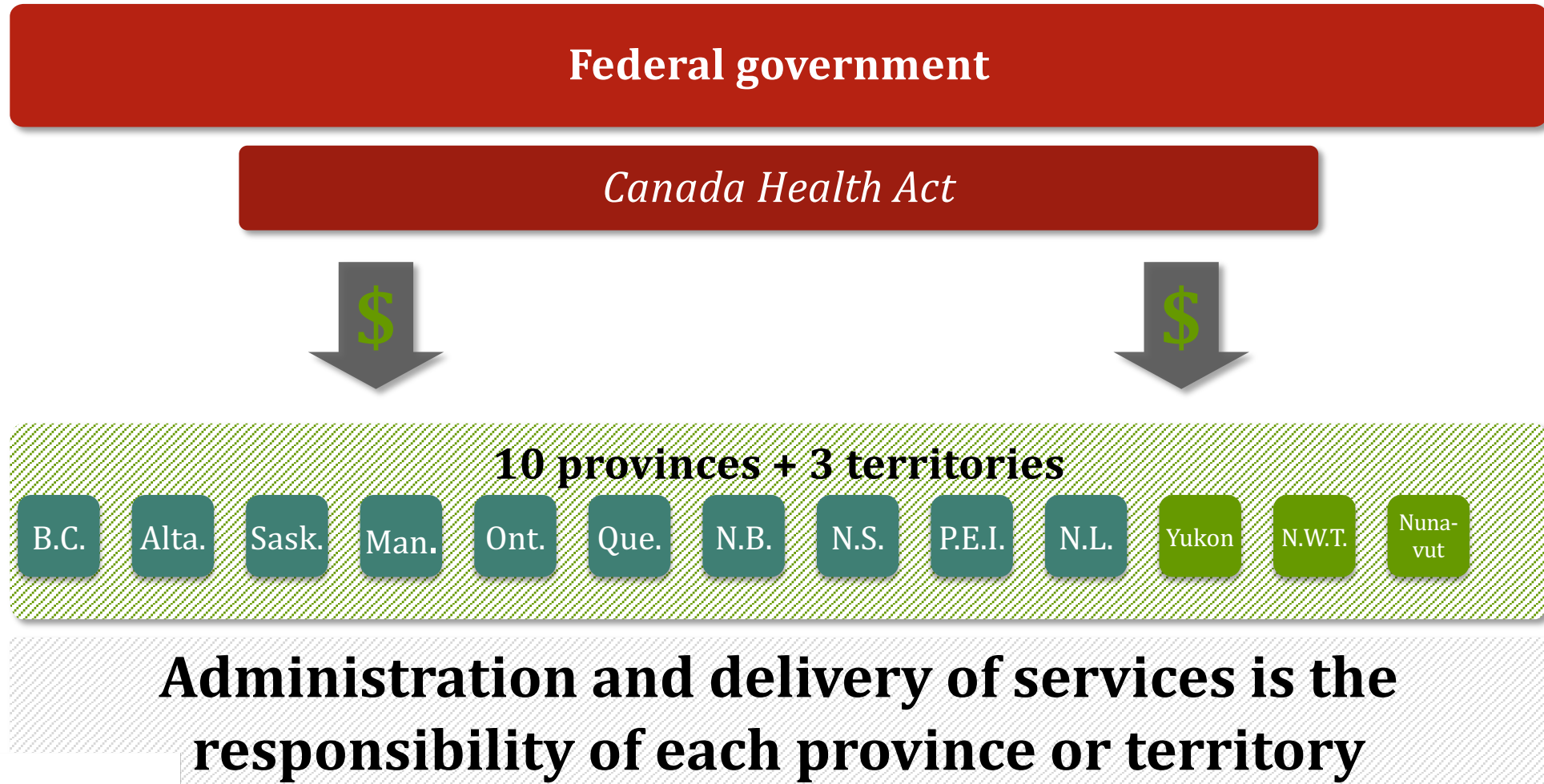
Aboriginal  
Healthcare

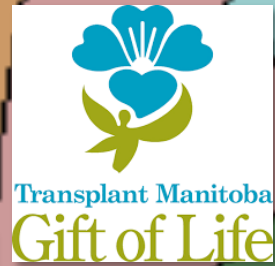
Veteran health care

Provinces and territories of Canada



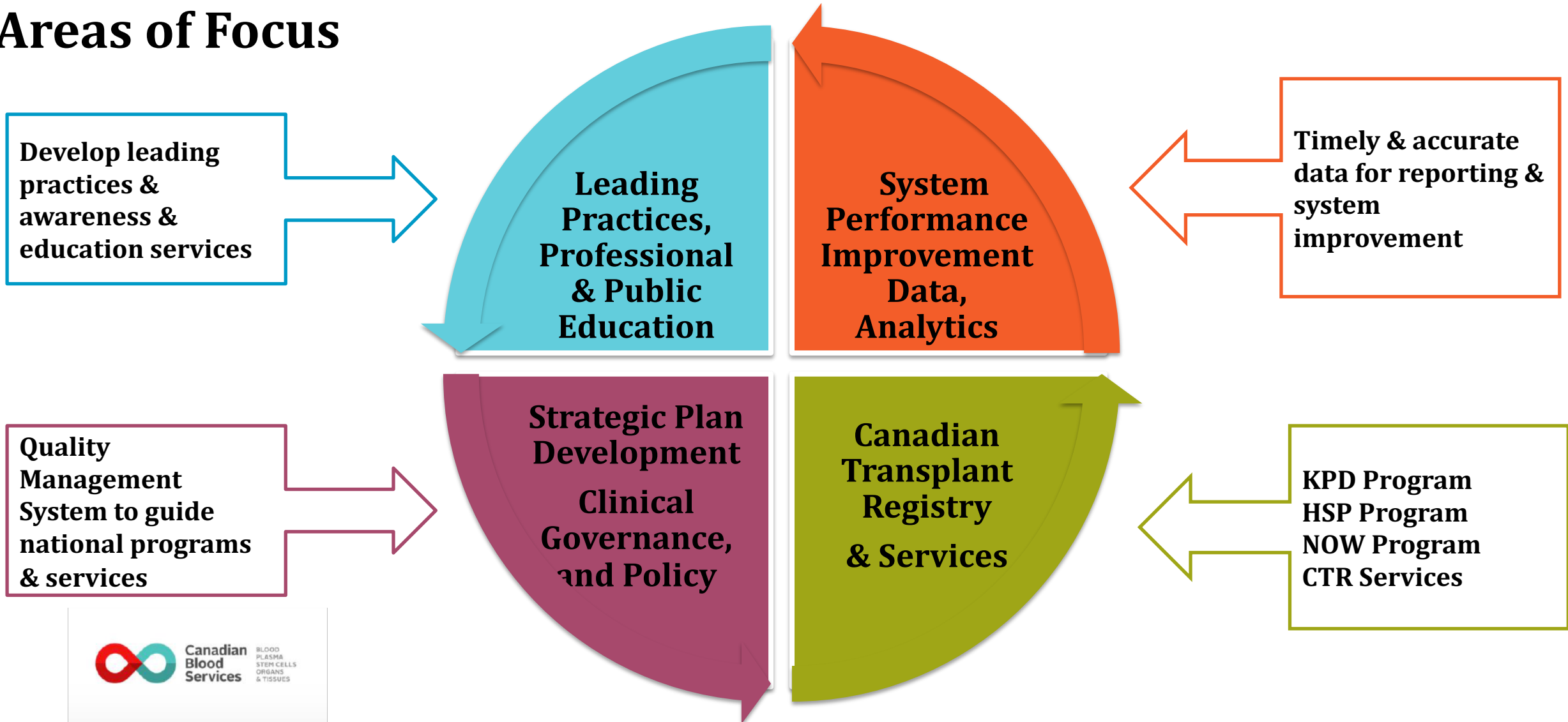
# Canada's organ donation and transplantation system





# Canadian Blood Services: National coordination for ODT in all provinces & territories since 2008

## Areas of Focus



# Collaborative Effort in Canada

UK

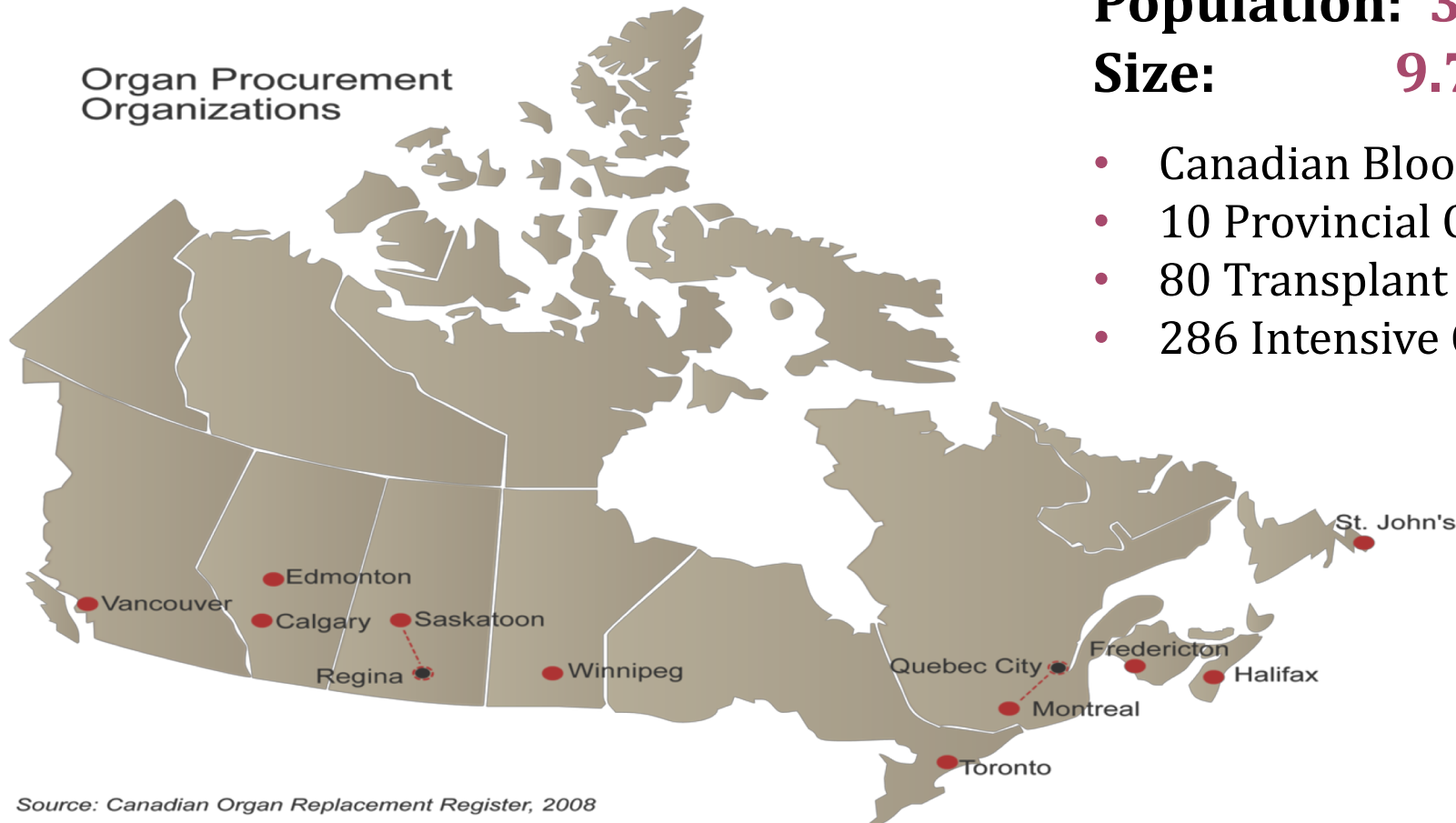
67 million people

243,000 square km

Population: 35.5 million Canadians

Size: 9.7 million square kilometers

- Canadian Blood Services
- 10 Provincial Organ Donation Organisations
- 80 Transplant Programs
- 286 Intensive Care Units/Emergency Departments



Source: Canadian Organ Replacement Register, 2008

## 2016 Statistics

- 758 deceased donors
- 545 living donors
- 2903 transplants
- 4541 waiting list
  - 260 deaths





**Blood and Transplant**

**ANNUAL REPORT ON  
THE NATIONAL ORGAN RETRIEVAL SERVICE  
(NORS)**





**40x geographic area**  
**Half the population**



**Rush Hour**  
**Traffic**



**Bathroom**  
**“The Loo”**





# System Performance in Deceased Donation

# Elements of High Performing Donation Systems

1. **System-wide** donor coordinators & donation physicians
2. **Potential donor audit to review to identify missed donation opportunities**
3. On line intent-to-donate registries, legal authorization to proceed with donation vs **opt out**
4. Legislated mandatory referral (standardized clinical triggers)
5. Implementation of leading practices- DBD, DCD
6. Professional education
7. **Timely performance data, data transparency**
8. ICU/transplant/**surgical retrieval**/hospital capacity
9. ODO funding
10. **National coordinating authority**





**The Journey from  
“Its not our fucking problem”  
to  
“It’s our job”**



# Deceased Donation: Canadian Strategies

## 1. ICU engagement and ownership

- Partnership with Canadian Critical Care Society, Canadian Association of Critical Care Nurses
- Communities of Practice

## 2. Professionalization of donation services

- Nurse coordinators, ICU donation physicians

## 3. Research to inform health policy & practices

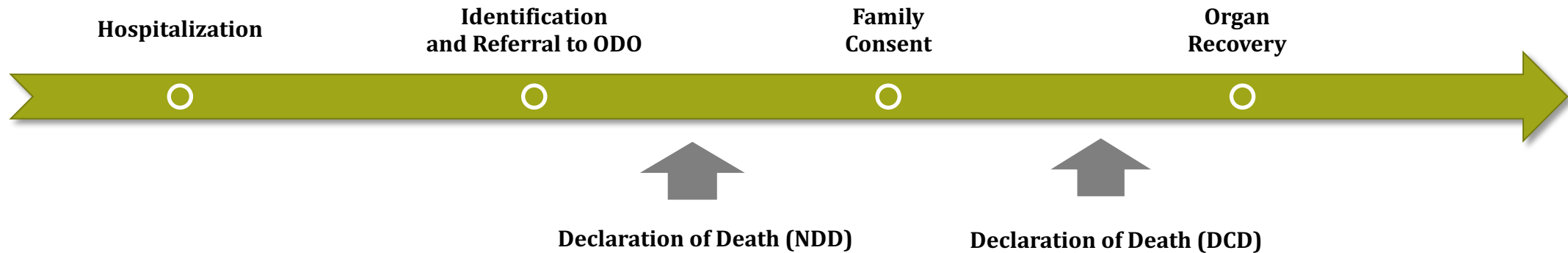
- CBS, Canadian Critical Care Trials Group, Canadian National Transplant Research Network, independent

## 4. *National* leading practice guidelines for each step of donor process

- best available evidence
- consensus process
- embedded knowledge translation
- peer reviewed publication

# Deceased Donation Leading Practices 2003-2019

**n = 18**



- ✓ **Death Determination**, NDD, DCD (2003, 2005, 2007, 2012)
- ✓ Donor Management (2004)
- ✓ **Controlled DCD (2005)**
- ✓ **Donation Physician Specialists** (2011, 2015)
- ✓ System OTDT Ethics (2011)
- ✓ End-of-life Family Conversations/ Consent (2014)

- ✓ Pediatric DCD (2014-16)
- ✓ Death Audits/Medical Record Review (2015-17)
- ✓ Donor ID&R System Accountability (2015-17)
- ✓ ECMO-CPR-organ donation (2016-18)
- ✓ OD Conscious Competent Patient (2016-18)
- ✓ DCD Quality Assurance (2016-18)
- ✓ Donor Management CPG update (2016-18)
- ❖ **DCD Heart Donation and Transplantation** (2018)

# Building a Community of Experts Enhanced Focus on 'Donation Medicine'



## ORGAN AND TISSUE DONATION AND TRANSPLANTATION

### Report on the Consultation

### "Donation Physicians in a Coordinated OTDT System"

February 21 - 22, 2011  
Whistler, British Columbia

CMAJ

COMMENTARY

## Improving the process of deceased organ and tissue donation: a role for donation physicians as specialists

Sam D. Shemie MDCM, Shavaun MacDonald MD, on behalf of the Canadian Blood Services  
— Canadian Critical Care Society Expert Consultation Group\*

The disparity between the demand for transplants and organ availability has been identified as a worldwide public health concern. In Canada, donation rates and access to transplantation differ between provinces, and deceased donation rates have remained stagnant and rank well below other countries with advanced transplantation services.<sup>1</sup> At the end of 2011, there were 4543 Canadians on transplant waiting lists. In 2010, 16% of transplant candidates waiting for a kidney, pancreas or both died while on the wait list; this figure was 19% for lung transplant candidates, 22% for liver transplant candidates and 24%

group of intensivists, is available at all times to provide direct donor care in all intensive care units. In coordination with the local organ-procurement organization, their role includes evaluation and diagnosis of brain death, donor management and communication with the transplant team.

In contrast, in the UK, donation physician specialists (referred to as clinical leads for organ donation<sup>4</sup>) promote donation through the provision of knowledge, leadership, education and administrative guidance. They do not attend to every donor, but they work closely with the nurse donor coordinators who provide direct donor care.

**Competing interests:** None declared.

This article has been peer reviewed.

\*For the list of members see Appendix 1, [www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.130050/-/DC1](http://www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.130050/-/DC1).

**Correspondence to:** Sam Shemie, [sam.shemie@mcgill.ca](mailto:sam.shemie@mcgill.ca)

**CMAJ 2013. DOI:10.1503/cmaj.130050**

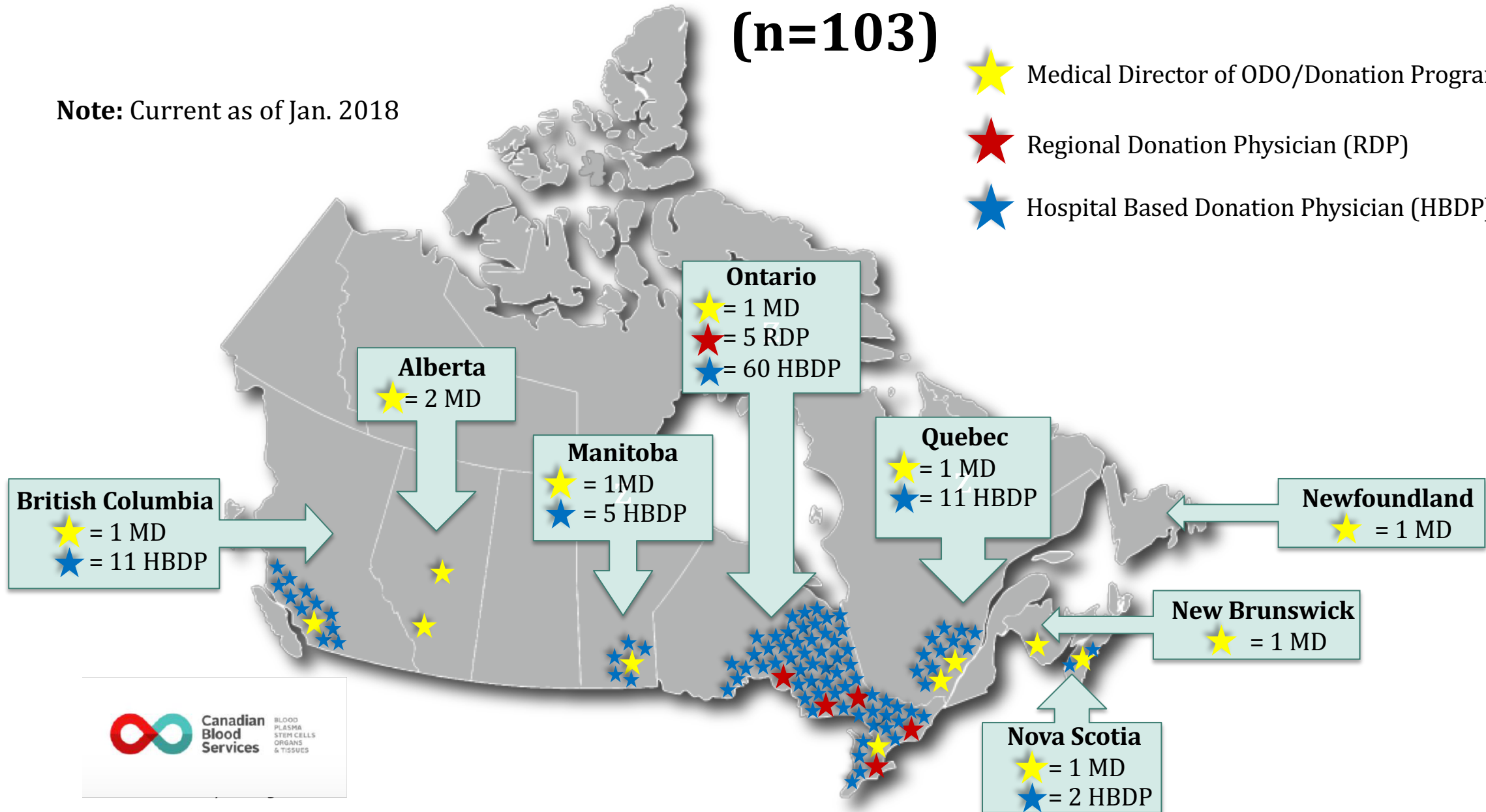




# Implementation of Donation Physicians in Canada (n=103)

**Note:** Current as of Jan. 2018

- ★ Medical Director of ODO/Donation Program (MD)
- ★ Regional Donation Physician (RDP)
- ★ Hospital Based Donation Physician (HBDP)



# Donation Physician Network (DPN)

## Donation Physician Network August 2017 Newsletter



## Welcome

We are excited to launch our monthly Donation Physician Network Newsletter.

Canadian Blood Services established the national Donation Physician Network in April, building on successful initiatives started to support provincial donation physicians.

Our vision is to build a national community of donation-focused physicians committed to enhancing deceased donation activity in Canada. The Network will serve as a forum for members to collectively champion leading practices in donation, support research collaboration, share knowledge and build expertise.

The success of this Network relies on everyone's active participation - yes, we are talking about you! Building community capacity requires that we leverage our internal expertise to learn from each other, forge strong working relationships and collectively share resources. With this strong foundation we can problem solve and foster innovation and creativity as we enhance and further deceased donation activity in Canada.



National Deceased Donation Professional Education Curriculum

eLearning – Proof of concept



Canadian Blood Services  
*it's in you to give*

HOME COURSE CATALOGUE ABOUT US FAQs CONTACT US LOGIN



Canadian Clinical Guide to Organ Donation  
What Does It Take To Save Up To Eight Lives?

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[Disclaimer](#) | [Privacy](#)

My Courses

Canadian Clinical Guide to Organ Donation

Module	Status
Course Overview	<a href="#">Review Material</a>
Identification and Referral	Unavailable
Neurological Determination of Death	<a href="#">Review Material</a>
Management of a Neurological Donor	Unavailable
Donation after Circulatory Death	Unavailable
Communication	Unavailable

Neurological Determination of Death

Course Status: Lesson Introduction

enter course

my marks

course outline





# Professional Education

## Upcoming Events



critical care  
canada

CCCF Deceased Donation Symposium ☛ October 3 - 4, 2017

### PROGRAM



TUESDAY, OCTOBER 3, 2017

TIME	SESSION
12:00 - 12:45	<b>MID-DAY PLENARY</b> Moderators: Sonny Dhanani, Andrew Baker <b>Death of the Dead Donor Rule? Pro-con Debate</b> Robert Truog - Sam Shemie
12:45 - 13:30	<b>BREAK</b>
13:30 - 15:00	<b>CONCURRENT 1</b> <b>Deceased Donation I</b> Moderators: Stephen Beed, Sean Keenan <ol style="list-style-type: none"><li>1. Canadian and Provincial Deceased Donation Data Update- Damon Scales</li><li>2. Deceased Donation Data in the UK - Paul Murphy</li><li>3. Organ Donation in MAID/Conscious Competent Patients - Mike Sharpe</li><li>4. Donor Identification and Referral: How early is too early? Debate: Andreas Kramer, Andrew Healey</li><li>5. Q &amp; A Time</li></ol>
15:00 - 15:30	<b>BREAK</b>
15:30 - 17:00	<b>CONCURRENT 2</b> <b>Deceased Donation II</b> Moderators: Jeff Singh, George Isaac <ol style="list-style-type: none"><li>1. Organ Donation challenges in the UK - Paul Murphy</li><li>2. Donation Support Physician On Call: What would you do? Sonny Dhanani (chair) Panelists: Andrew Healey, Matthew Weiss, Stephen Beed, Paul Murphy, Joe Pagliarello</li><li>3. Q &amp; A Time</li></ol>
17:00 - 18:30	<b>Reception</b> (Deceased Donation Stream and invited guests only)



Leading Science. Leading Practice.

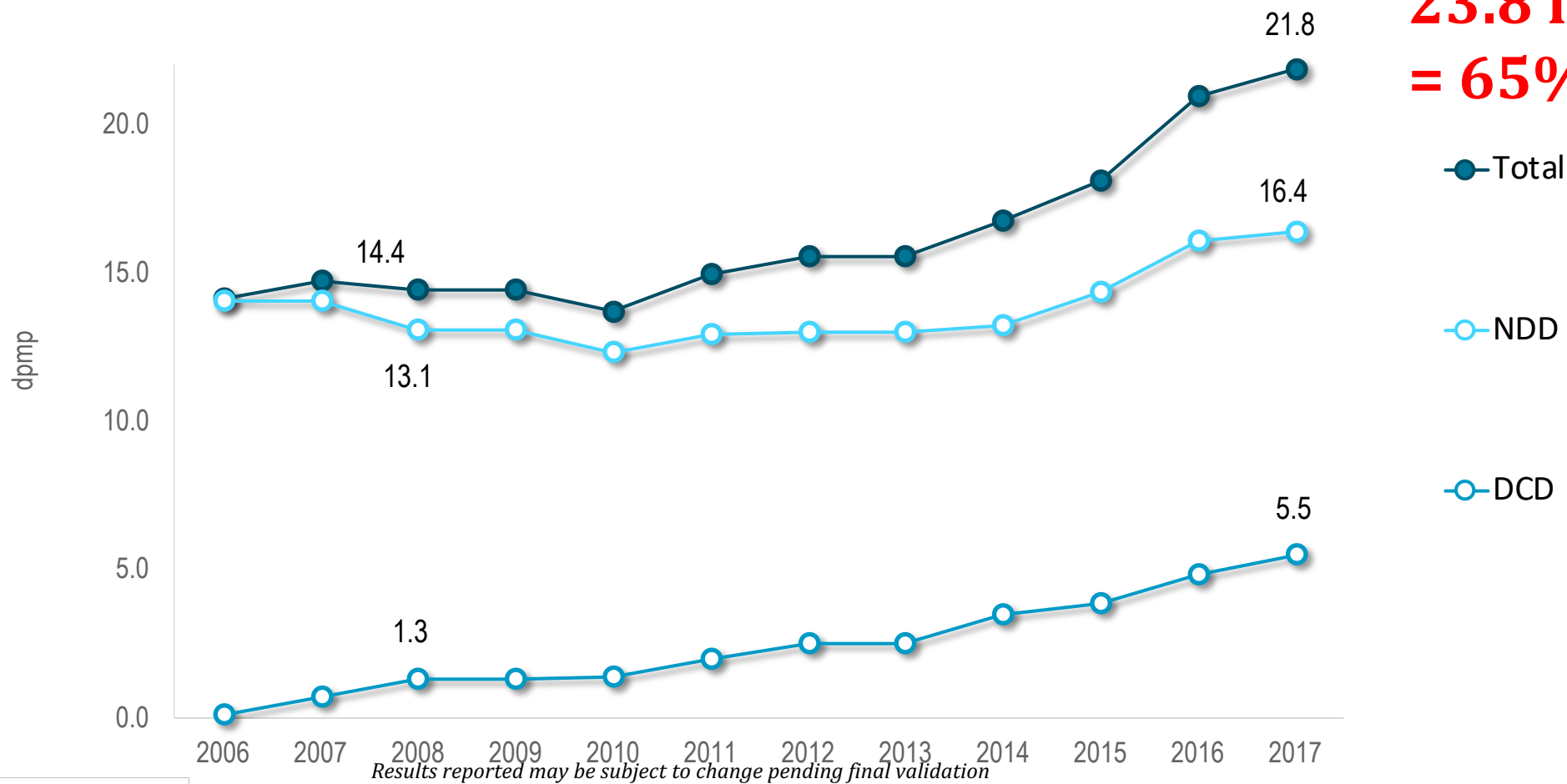
October 1-4, 2017 ☛ Sheraton Centre, Toronto

## NEW: TRANSPLANT MINI-SYMPOSIUM

TIME	SESSION
7:00 - 8:00	<b>SUNRISE BREAKFAST</b> – (by invitation only) <b>Ask the Experts</b> Moderators: Mike Hartwick, Brian Kavanagh Panel: Robert Truog, Paul Murphy, Sam Shemie, Sonny Dhanani
8:00 - 8:30	<b>MORNING PLENARY</b> Moderators: Sam Shemie and Andreas Kramer <b>DCD in the United Kingdom</b> Paul Murphy
8:30 - 10:00	<b>CONCURRENT</b> <b>DCD Heart Donation and Transplant Mini-Symposium:</b> <b>Resuscitating the Heart after Death</b> Moderators: Sam Shemie, Andrew Baker <ol style="list-style-type: none"><li>1. DCD heart donor management and transplantation - the Papworth in situ NRP/exvivo program Stephen Large</li><li>2. DCD heart donor management and transplantation - the Australian ex-vivo program Peter MacDonald</li><li>3. Research directions in DCD hearts Darren Freed</li></ol>
10:00 - 10:30	<b>BREAK</b>
10:30 - 12:00	<ol style="list-style-type: none"><li>4. Bioethical Perspectives in DCD heart donation Robert Truog</li><li>5. DCD heart donation Panel: Andrew Baker, Robert Truog, Brian Kavanagh, Paul Murphy</li></ol> <b>MODERATED DISCUSSION</b>

# *Deceased donation rate by donor type, 2006 – 2017*

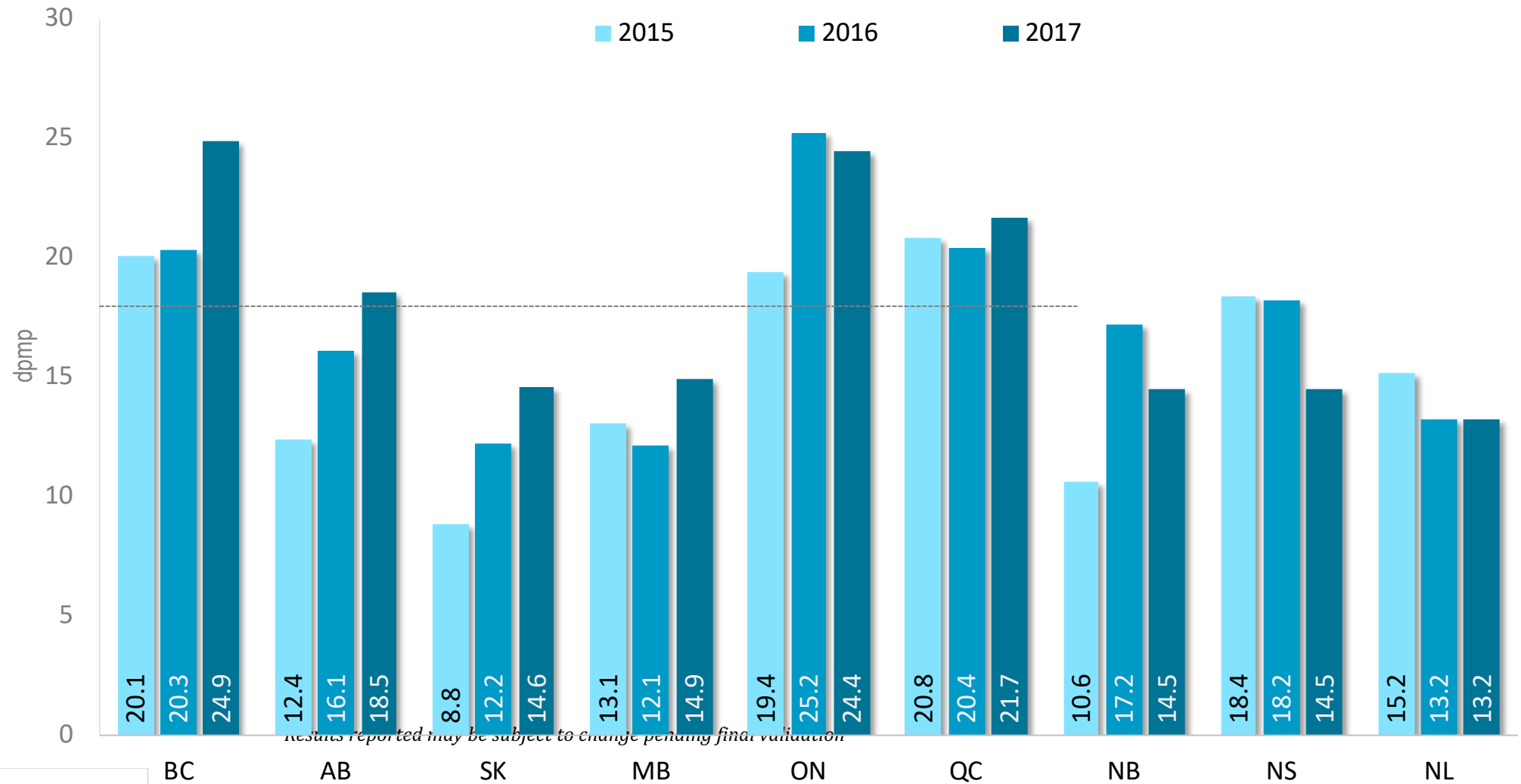
## *(dpmp)*



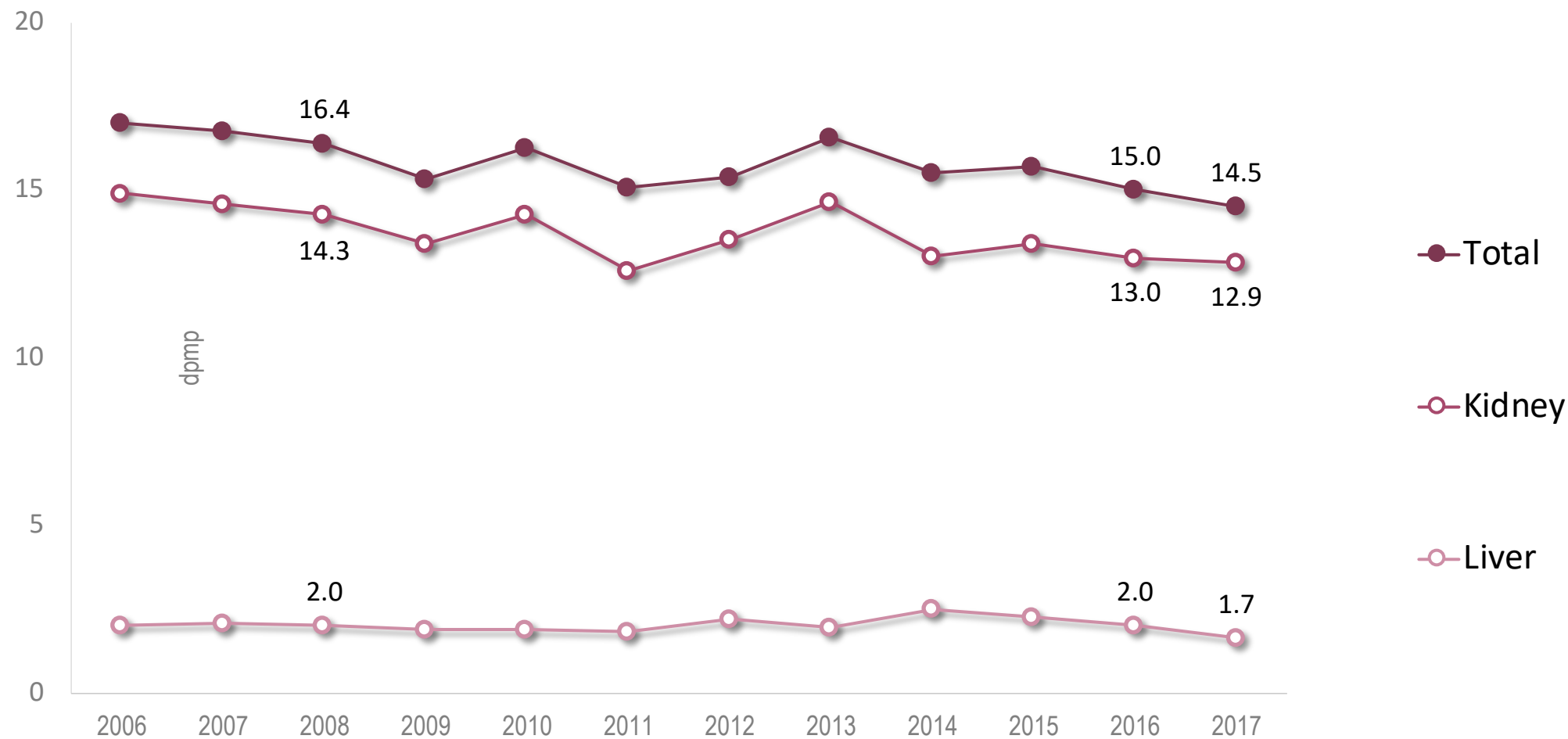
**23.8 in 2018**  
**= 65% increase**



# *Deceased donation by province, 2016 – 2017 (dpmp)*

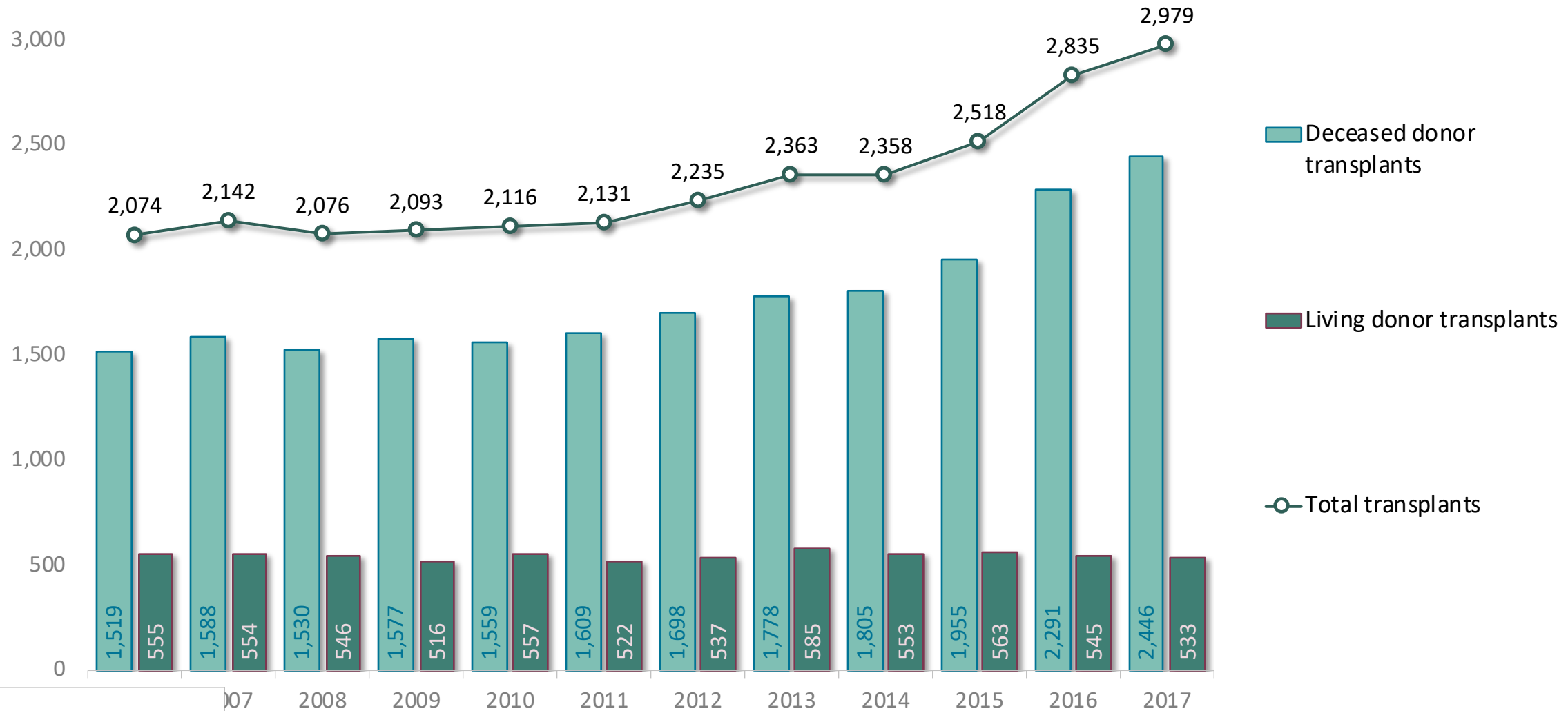


# Living donation rate in Canada 2006-2017 (dpmp)



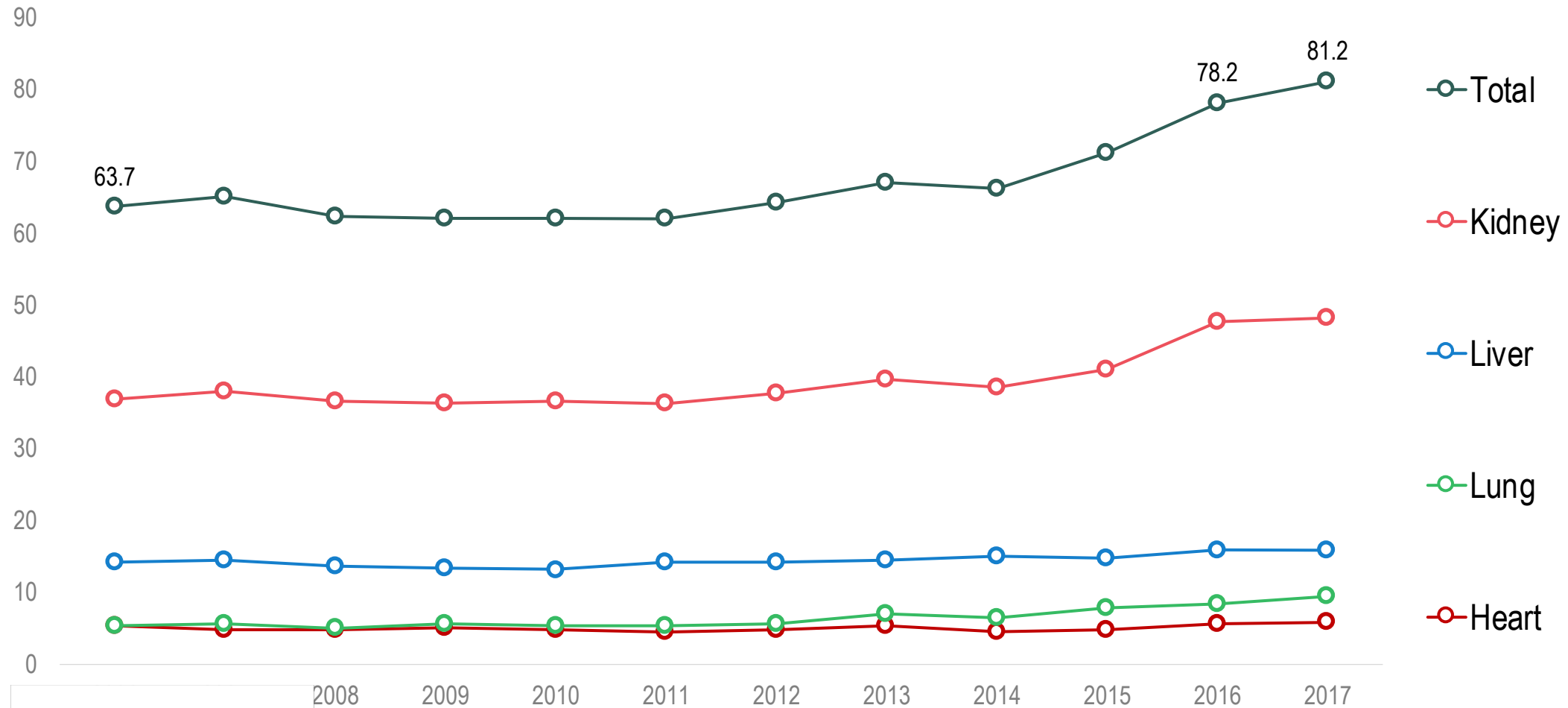
# Number of solid organ transplants in Canada by donor type

## 2006–2017 (44% increase)

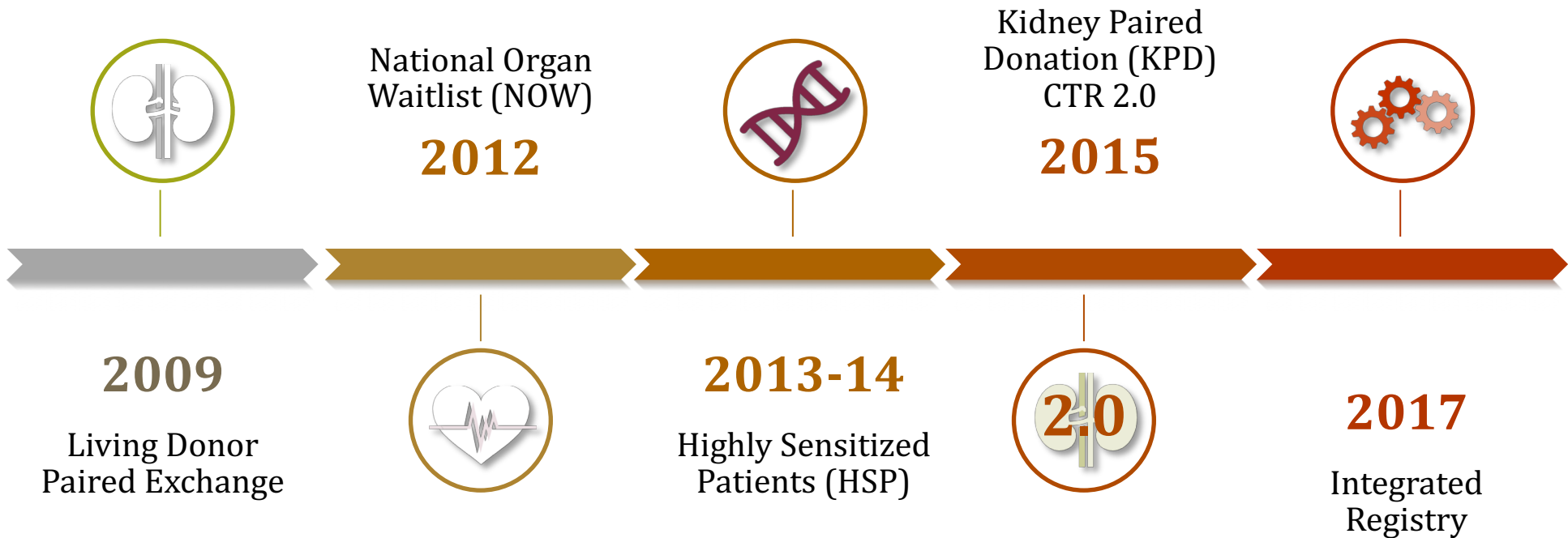


# *Transplants PMP in Canada by organ type, 2006–2017*

**81.2 TMP** (72 deceased, 14.2 living)



# Canadian Transplant Registry Timeline



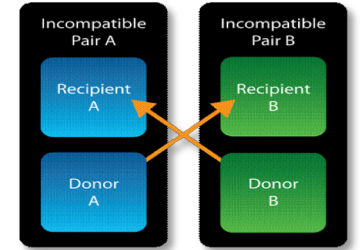


# National Programs

### *Kidney Paired Donation (KPD) - Launched 2008*

- KPD creates transplant opportunities for a recipient who has an incompatible living donor

• **>637 transplants completed**



### *National Organ Waitlist (NOW) – Launched 2012*

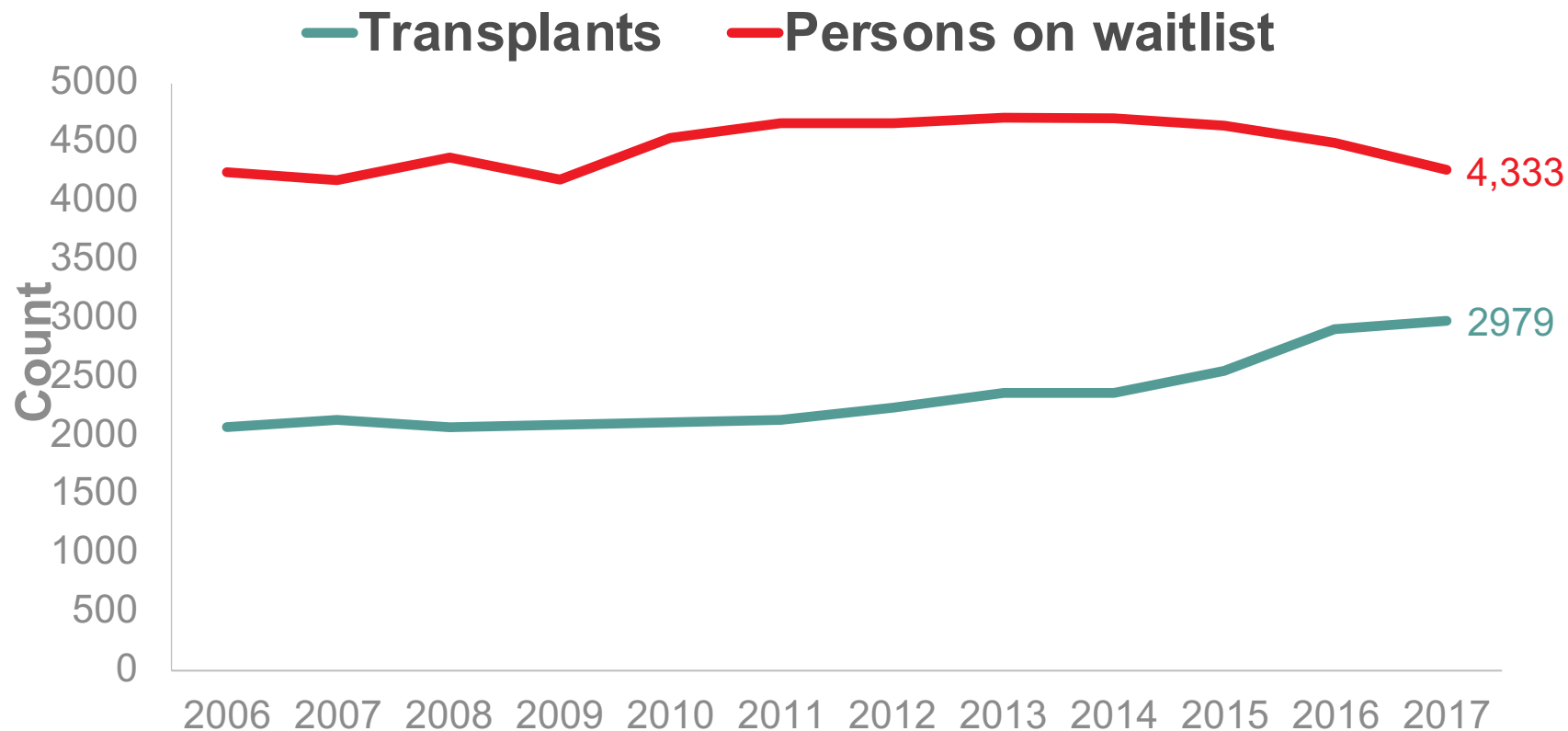
- Real-time, on-line national listing of patients waiting for heart, lung, liver, pancreas, small bowel and multi-organ transplants
- Replaced paper-based London Health Sciences Waitlist
- > 750 patients currently active on the wait-list

### *National Kidney Allocation for Highly Sensitized Patient (HSP) – Launched 2013*

- Highly sensitized patients comprise ~ 20% of provincial waitlists, but historically receive <1% of available donor organs
- There is a national agreement to share kidneys for highly sensitized kidney patients

• **>503 transplants complete**

# Transplants vs. people waiting for transplants in Canada, 2006-2017



**2,979**

Transplants including multi-organ transplants

**4,333**

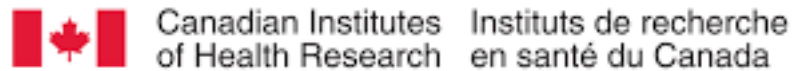
Patients on Canada's organ transplant waitlists at year-end

**242**

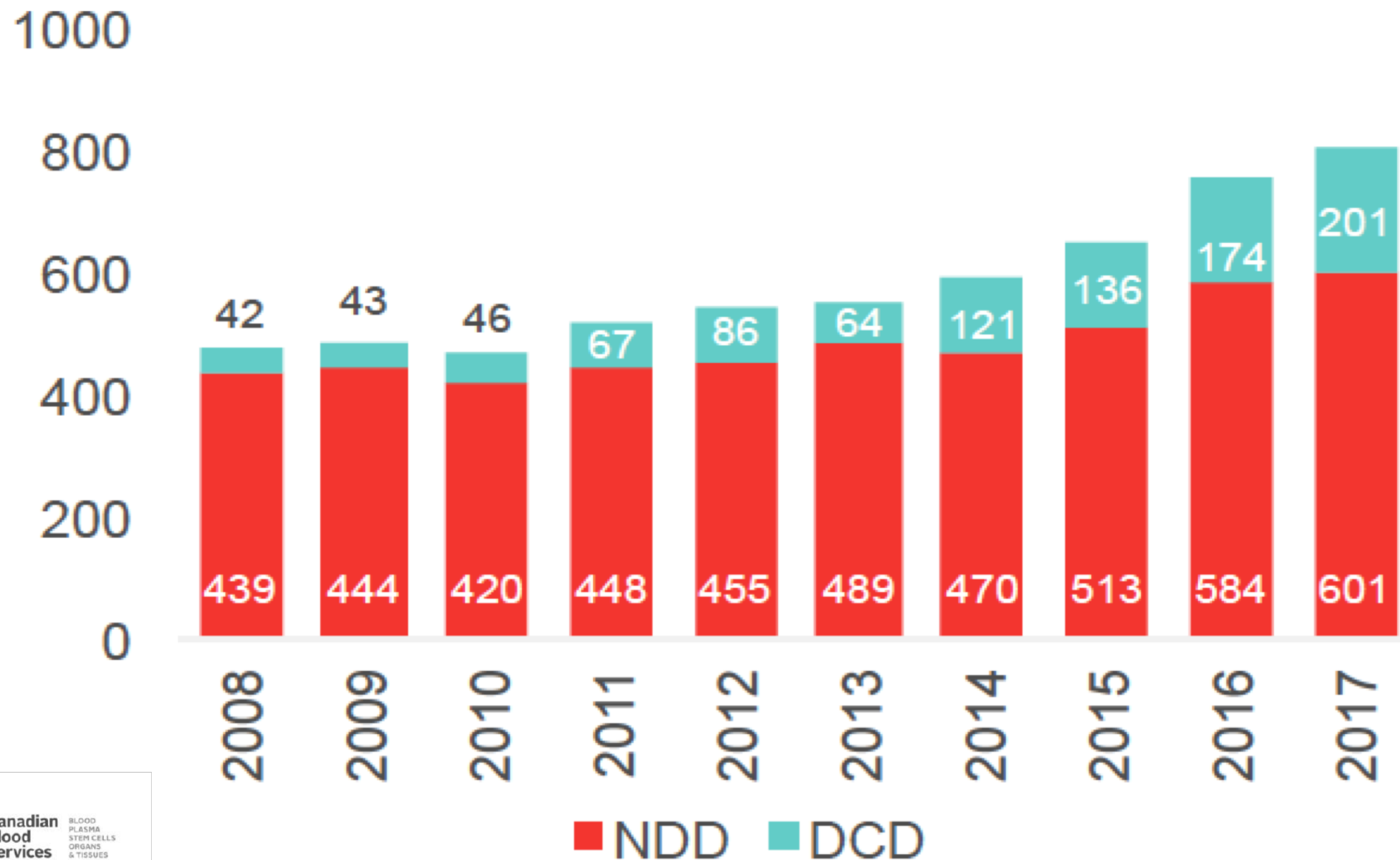
Patients died while on waitlist

Data source: CBS System Progress Report 2017

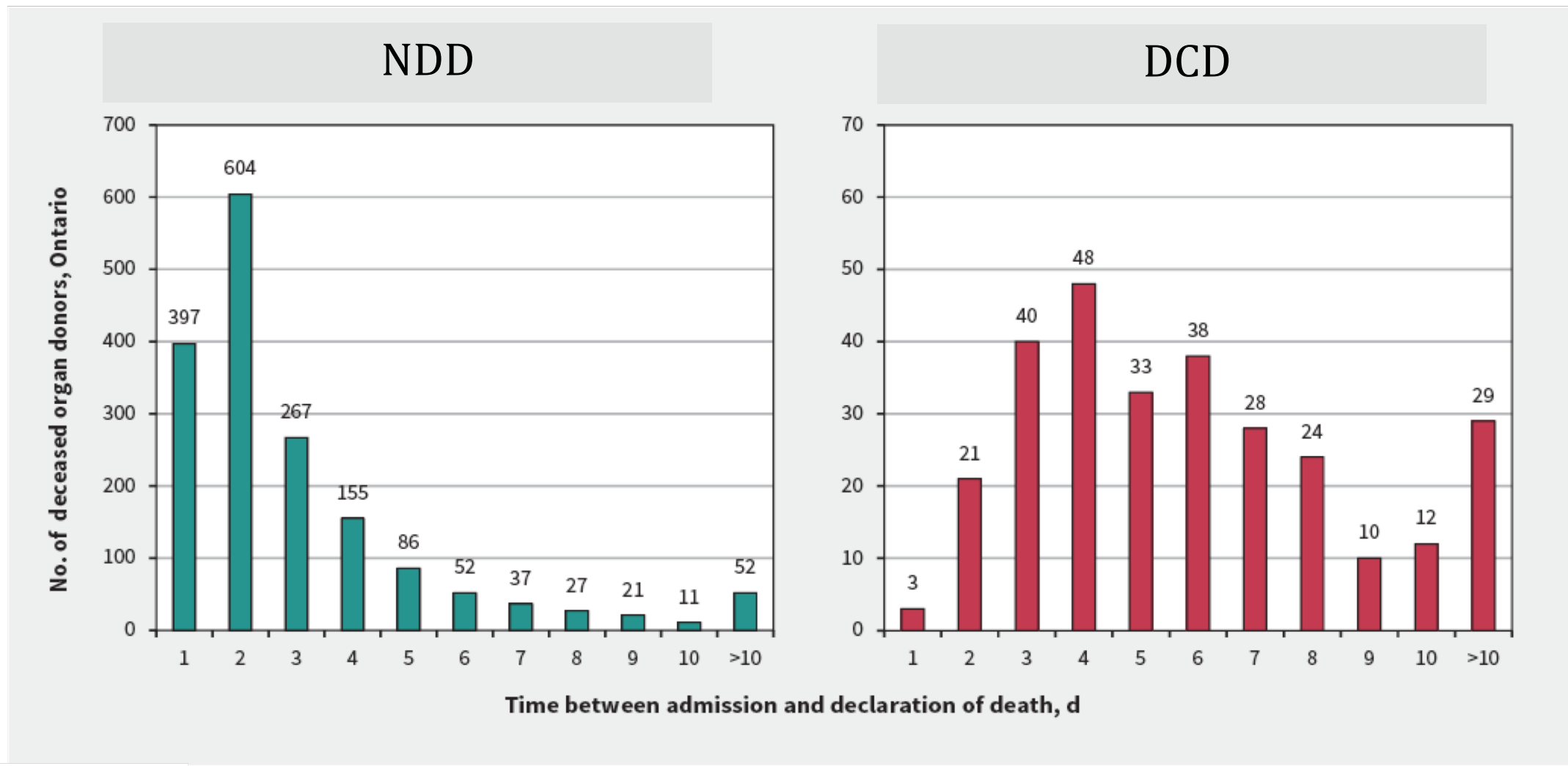
# Canadian Research in Deceased Organ Donation



## Deceased donation by donor type, 2008 – 2017



# Time from admission-death: DCD does not 'steal' from brain death





Incidence of neurologic death among patients with brain injury: a cohort study in a Canadian health region

Andreas H. Kramer MD MSc, David A. Zygun MD MSc, Christopher J. Doig MD MSc, Danny J. Zuege MD MSc

ABSTRACT

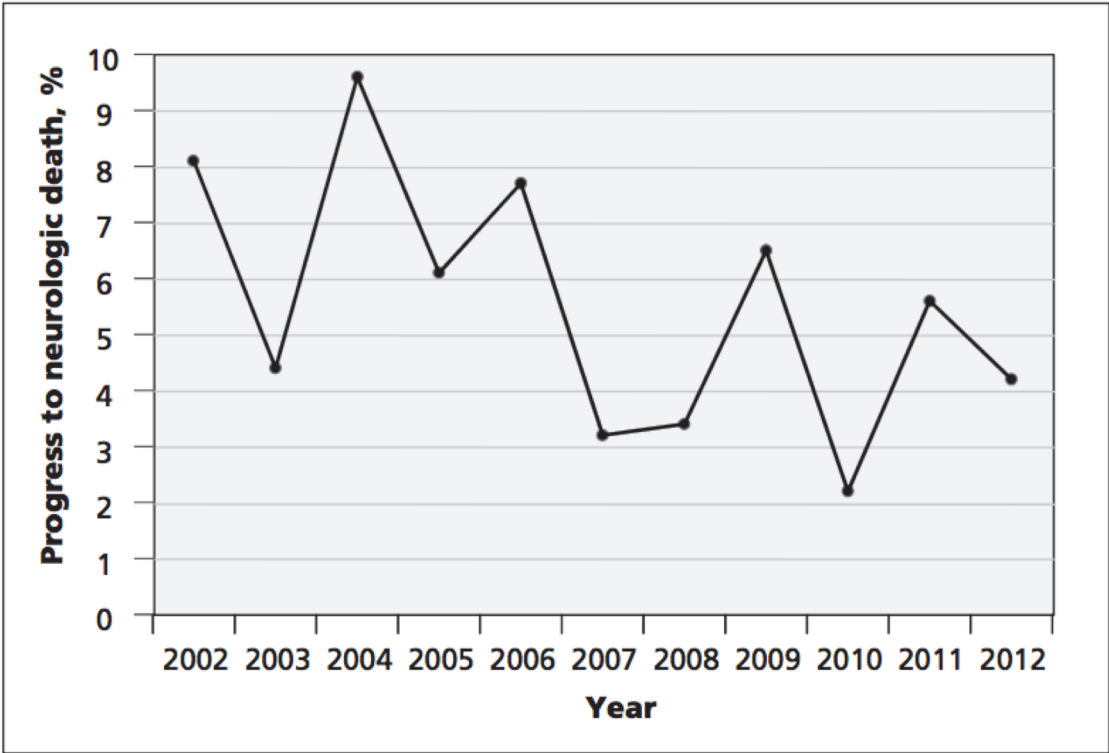
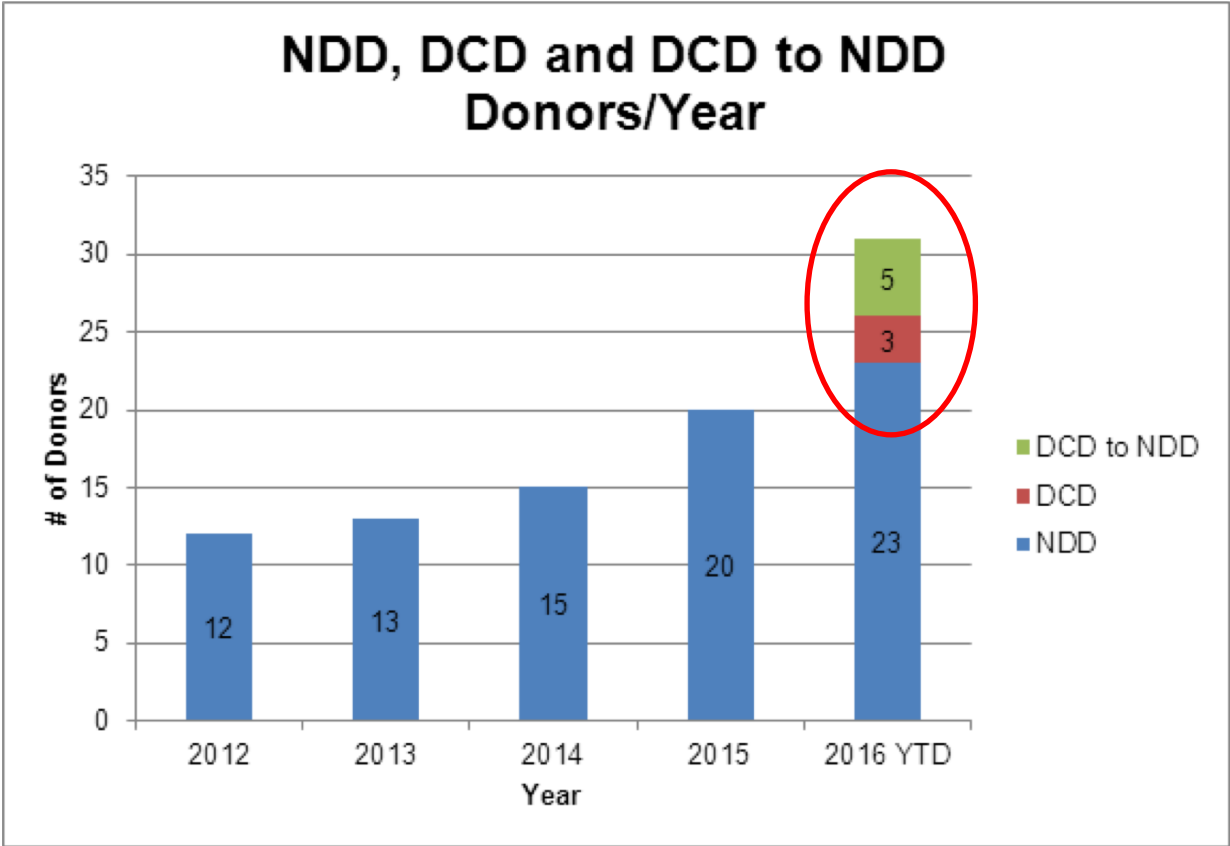


Figure 1: Proportion of neurocritical care patients in Calgary intensive care units who progressed to neurologic death from Jan. 1, 2002, to June 30, 2012. Cochrane–Armitage trend test:  $p = 0.01$ .

Calgary Experience:  
1. Decreasing Incidence of Brain Death?  
2. DCD drives DBD



March-Nov 2016 at one site (Foothills Medical Center)

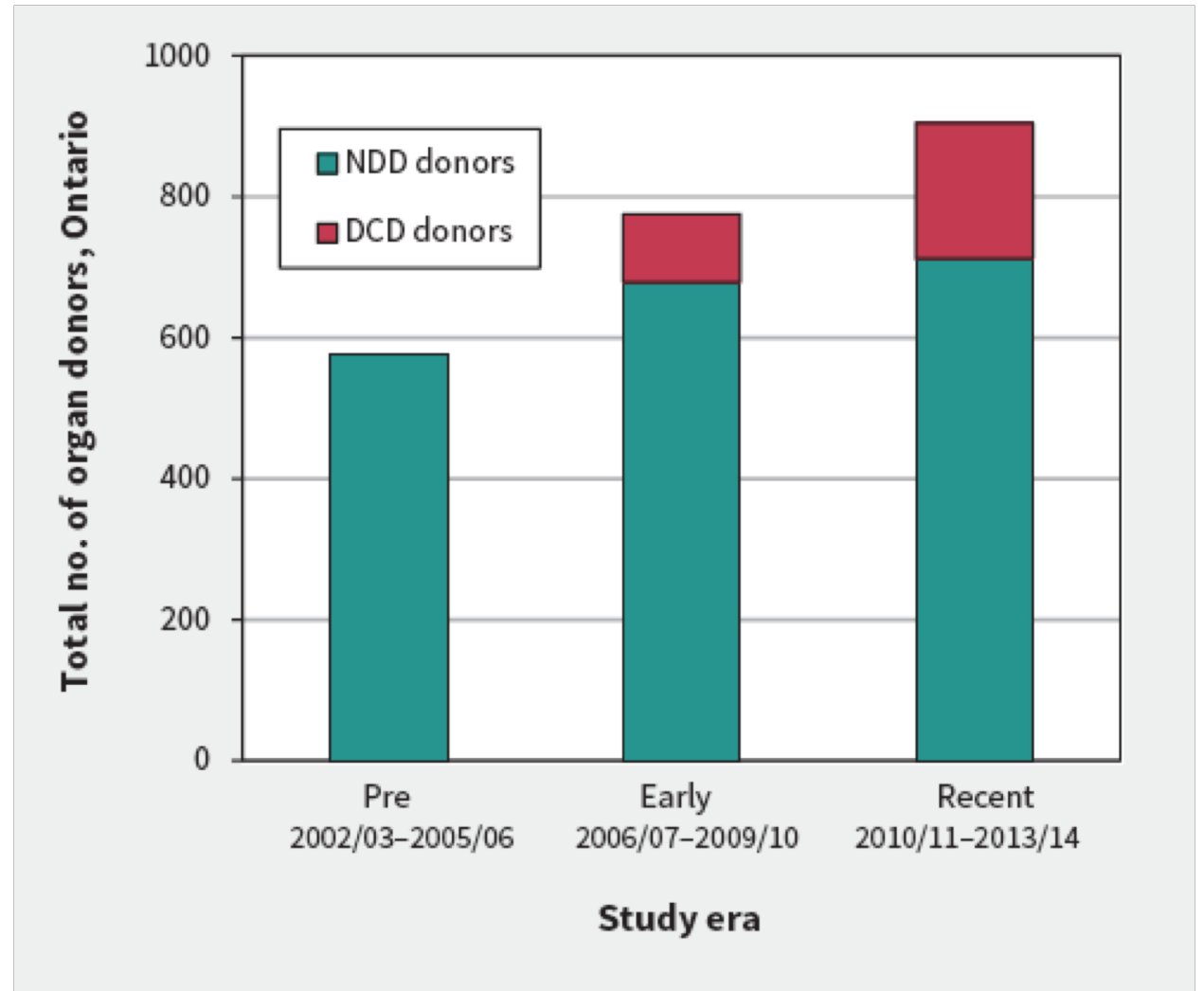
Andreas Kramer, with thanks

# Effect of DCD on organ transplants

## RESEARCH

### Effect of organ donation after circulatory determination of death on number of organ transplants from donors with neurologic determination of death

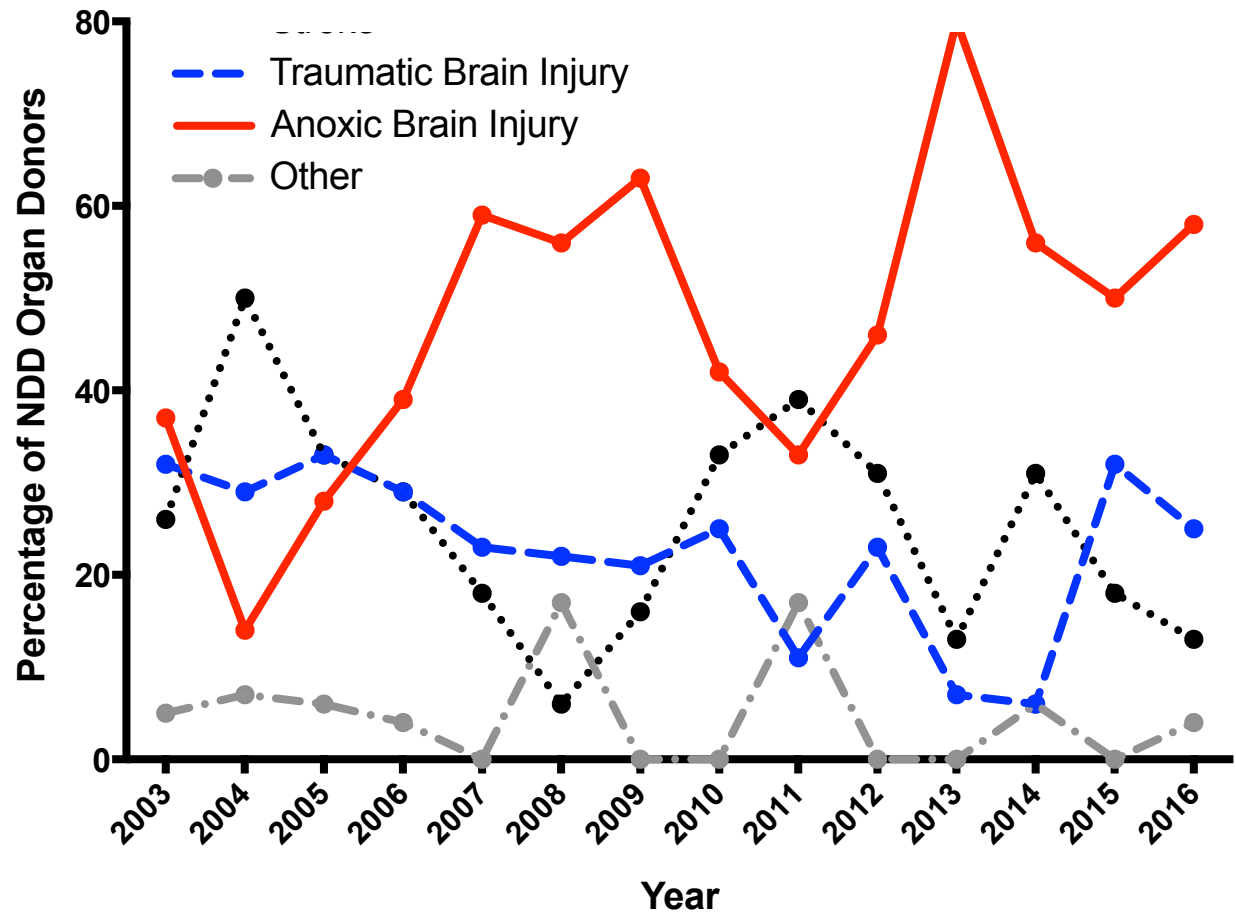
Vivek Rao MD PhD, Sonny Dhanani MD, Janet MacLean RD MBA, Clare Payne RN, Elizabeth Paltser MSc, Atul Humar MD, Jeffrey Zaltzman MD



# Anoxic Brain Injury after Resuscitated Cardiac Arrest = #1 Etiology for Deceased Donation

## NDD Anoxic Brain Injury in Calgary

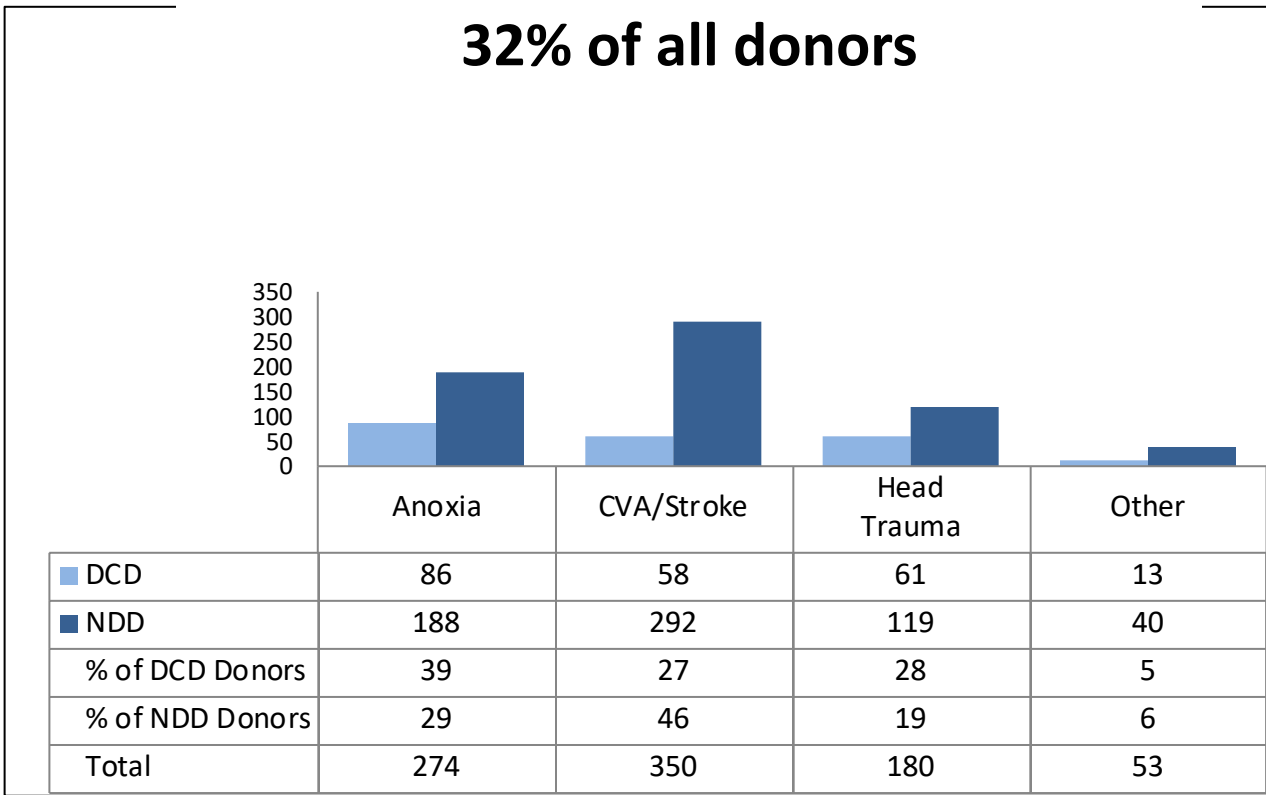
2003-2014 n=226



## Anoxic Brain Injury in Ontario

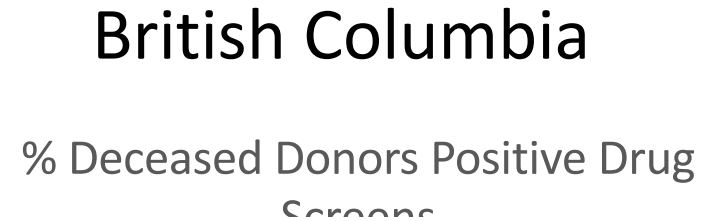
39% of DCD donors

32% of all donors

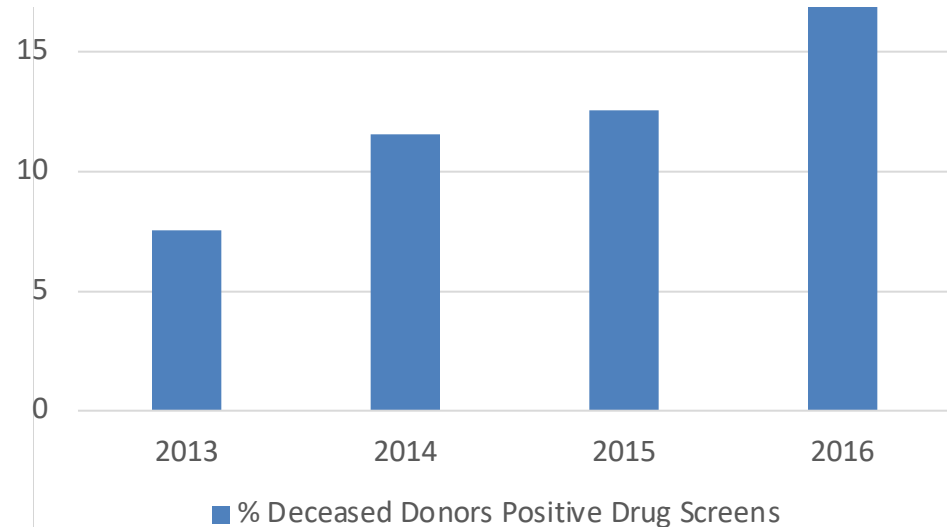
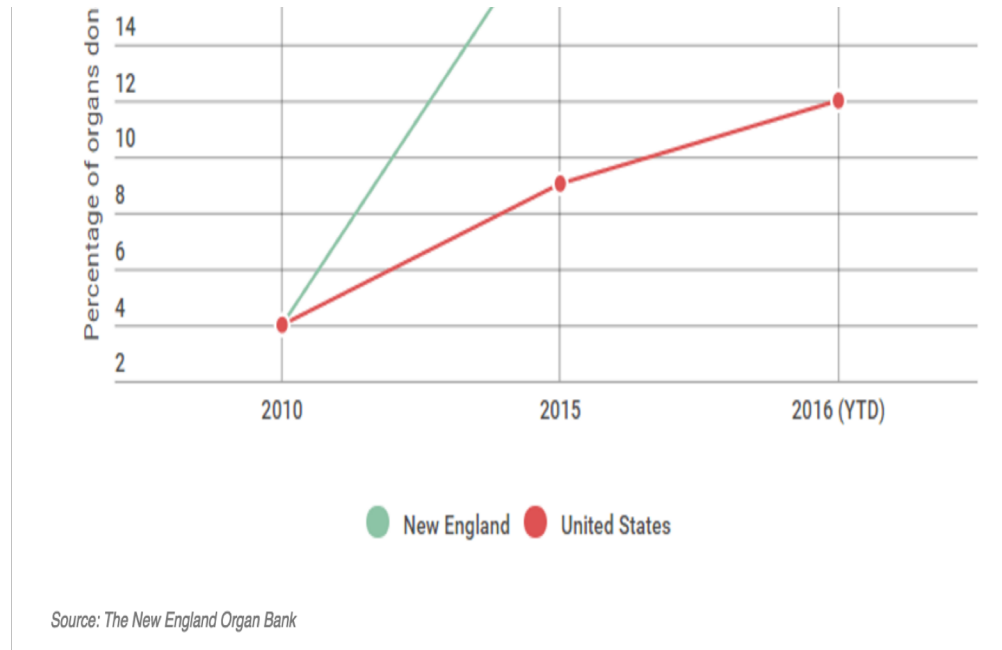


TGLN, Sonny Dhanani, with thanks  
Total DCD Donors – 218  
Total NDD Donors – 639  
for the four leading causes of death.  
\*Apr 1, 2012 – Sep 30, 2015

# Organ Donation & the Opioid Epidemic



**Any increases in cardiac arrest & CPR interventions will attempt to save life 1st and increase deceased donation 2nd**



With thanks, BC Transplant

RESEARCH

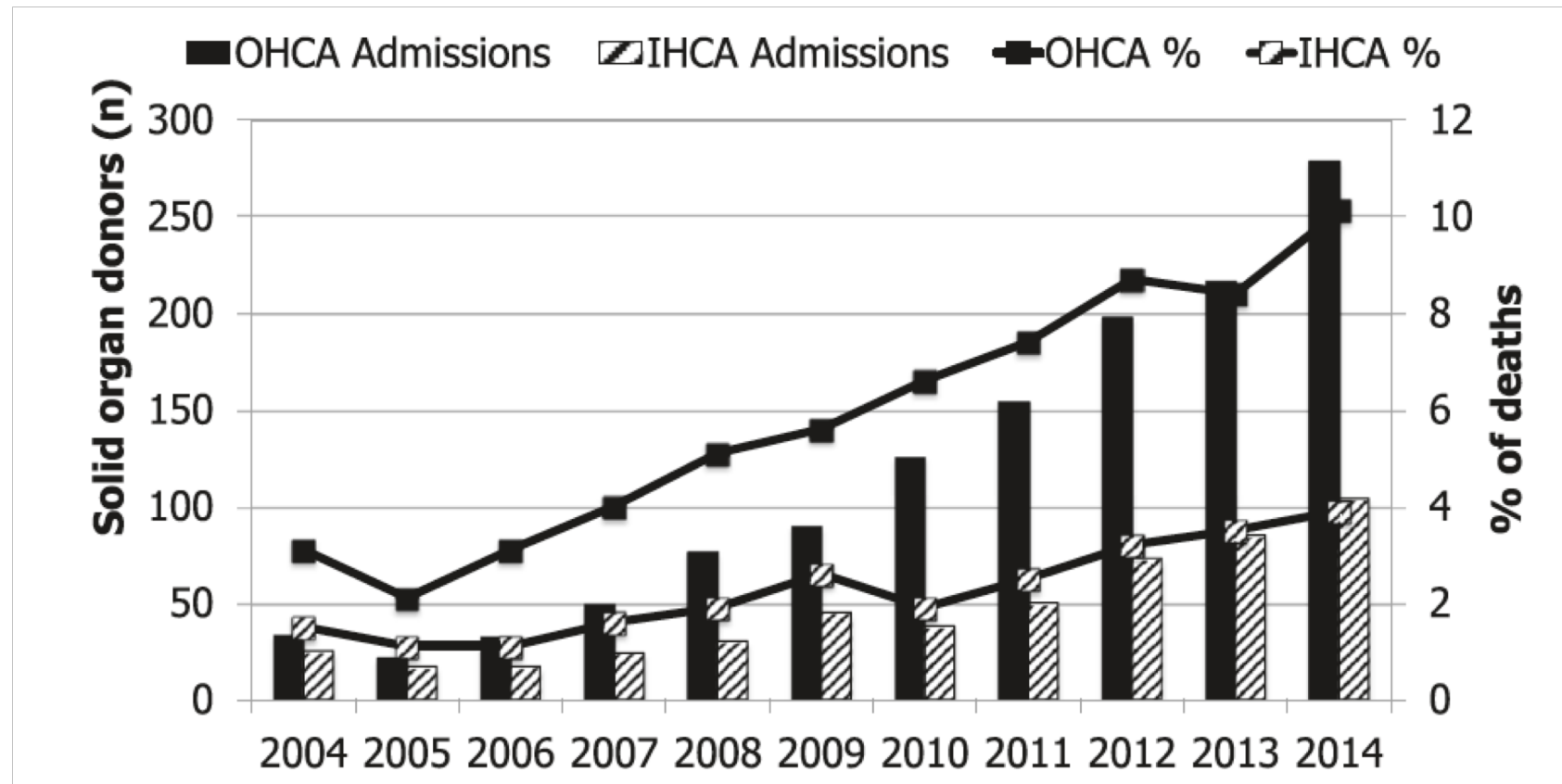
Open Access



# Increasing survival after admission to UK critical care units following cardiopulmonary resuscitation

J. P. Nolan<sup>1,2\*</sup>, P. Ferrando<sup>3</sup>, J. Soar<sup>4</sup>, J. Bengert<sup>5</sup>, M. Thomas<sup>6</sup>, D. A. Harrison<sup>3</sup> and G. D. Perkins<sup>7,8</sup>

## Organ Donation after CPR





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# Opportunities and Barriers for ECPR in Canada

May 4, 2016, Toronto, Ontario

Meeting Report

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Canadian Journal of Cardiology 34 (2018) 146–155

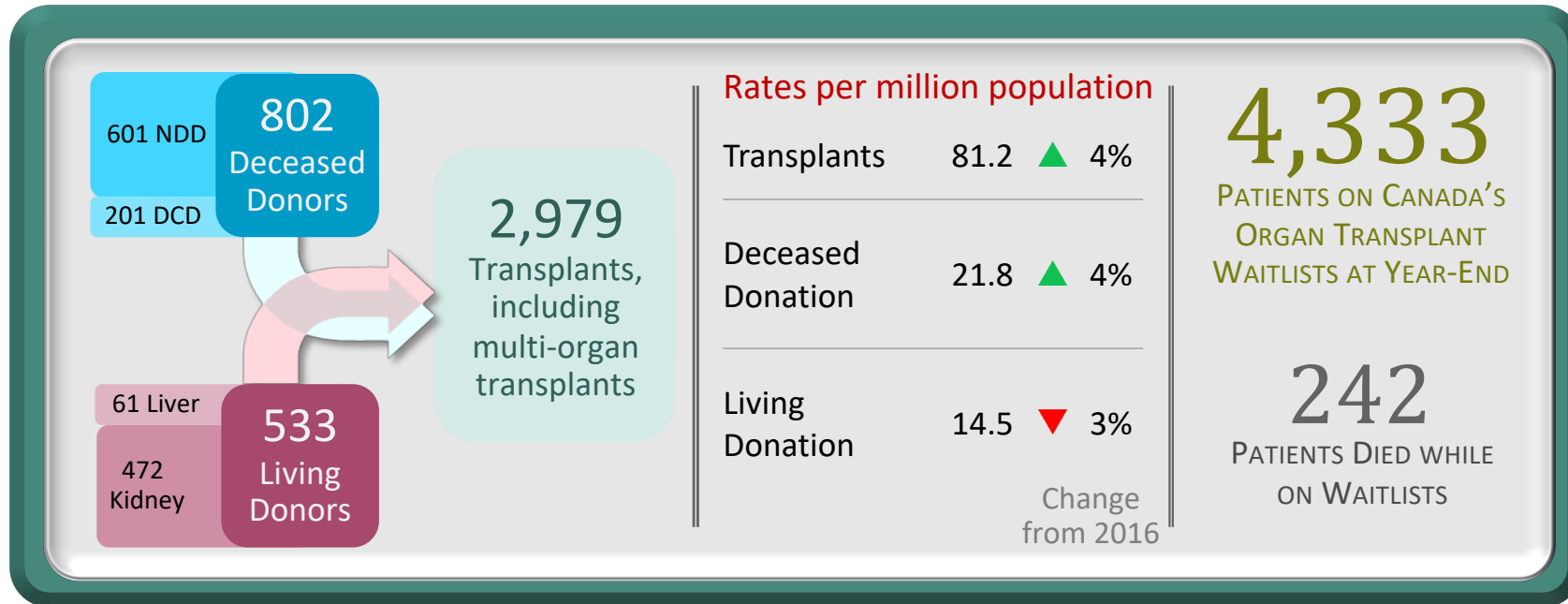
## Review

# Extracorporeal Cardiopulmonary Resuscitation for Refractory Out-of-Hospital Cardiac Arrest: The State of the Evidence and Framework for Application

Brian Grunau, MD, MHSc,<sup>a,b</sup> Laura Hornby, MSc,<sup>c</sup> Rohit K. Singal, MD,<sup>d,e</sup>  
Jim Christenson, MD,<sup>a,b</sup> Ivan Ortega-Deballon, PhD, LLB, NP,<sup>f,g</sup> Sam D. Shemie, MD,<sup>h</sup>  
Jamil Bashir, MD,<sup>h,i</sup> Steve C. Brooks, MD, MHSc,<sup>j</sup> Clifton W. Callaway, MD, PhD,<sup>k</sup>  
Elena Guadagno, MLIS,<sup>l</sup> and Dave Nagpal, MD<sup>m,n</sup>

<sup>a</sup>Department of Emergency Medicine, University of British Columbia, Vancouver, British Columbia, Canada; <sup>b</sup>St Paul's Hospital, Vancouver, British Columbia, Canada

# Overview of 2017 Canadian National Performance Results



**82% of all transplants are from deceased donors  
Predicated on death determination**