Organ Donation in Pediatric ICU
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Focus on Pediatric DCD

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Conflicts of Interest

No financial conflict of interest with the subject matter of this talk
#1 Projected vs. Actual (*Adult*)
#2 Projected (*Pediatric*)
#3 Our experience
#4 Our framework
#5 Definitions of success
#6 Why we do it …
DCD - Adult Donation …

… *Predicted Impact*
# Estimated Supply of Organ Donors After Circulatory Determination of Death: A Population-Based Cohort Study

## Table 2. Annual Potential for Total and Optimal Controlled Donors After Circulatory Determination of Death in a Donor Service Area

<table>
<thead>
<tr>
<th></th>
<th>Optimal DCDD</th>
<th>All Potential DCDD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DNDD Identified in DSA</td>
<td>DCDD Identified in 50-Hospital Sample</td>
</tr>
<tr>
<td>Eligible donors</td>
<td>683 (632-736)</td>
<td>52 (39-68)</td>
</tr>
<tr>
<td>Donors likely to have cancer</td>
<td>371 (334-411)</td>
<td>35 (24-49)</td>
</tr>
<tr>
<td>Donors likely to have had ≥1 organ transplanted</td>
<td>324 (290-361)</td>
<td>33 (23-46)</td>
</tr>
</tbody>
</table>

*Halpern et al, JAMA 2010*
DCD - Adult Donation ...

... *Actual Impact*
Organ donation after cardiac death: donor and recipient outcomes after the first three years of the Ontario experience

Le don d’organes après un décès cardiaque: les devenirs des donneurs et des réciipients après les trois premières années de l’expérience ontarienne

Roberto Hernadez-Alejandro, MD · William Wall, MD · Anthony Jevnikar, MD · Patrick Luke, MD · Michael Sharpe, MD · David Russell, MD · Azeem Gangji, MD · Edward Cole, MD · Sang Joseph Kim, MD, PhD · Marcus Selzner, MD · Shaf Keshavjee, MD · Dianne Hebert, MD · G. V. Ramesh Prasad, MD · Andrew Baker, MD · Greg Knoll, MD · Robyn Winterbottom, BSc · Guiseppe Pagliarello, MD · Clare Payne, BSc · Jeff Zaltzman, MD

<table>
<thead>
<tr>
<th>2009</th>
<th>NDD n</th>
<th>DCD n</th>
<th>TOTAL n</th>
<th>%DCD</th>
<th>2008 Census (1,000 s)</th>
<th>Donors/ Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia</td>
<td>32</td>
<td>0</td>
<td>32</td>
<td>0</td>
<td>4,114</td>
<td>7.8</td>
</tr>
<tr>
<td>Alberta</td>
<td>37</td>
<td>1</td>
<td>38</td>
<td>2.6</td>
<td>3,290</td>
<td>11.5</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>14</td>
<td>0</td>
<td>14</td>
<td>0</td>
<td>970</td>
<td>14.4</td>
</tr>
<tr>
<td>Manitoba</td>
<td>14</td>
<td>0</td>
<td>14</td>
<td>0</td>
<td>1,114</td>
<td>12.6</td>
</tr>
<tr>
<td><strong>Ontario</strong></td>
<td>181</td>
<td>37</td>
<td>218</td>
<td>17</td>
<td>12,160</td>
<td>17.9</td>
</tr>
<tr>
<td>Quebec</td>
<td>133</td>
<td>5</td>
<td>138</td>
<td>3.6</td>
<td>7,546</td>
<td>18.3</td>
</tr>
<tr>
<td>Atlantic*</td>
<td>33</td>
<td>0</td>
<td>33</td>
<td>0</td>
<td>2,283</td>
<td>14.5</td>
</tr>
<tr>
<td>CANADA</td>
<td>444</td>
<td>43</td>
<td>487</td>
<td>8.9</td>
<td>32,000</td>
<td>15.2</td>
</tr>
<tr>
<td>USA**</td>
<td>7,101</td>
<td>920</td>
<td>8,021</td>
<td>11.1</td>
<td>303,500</td>
<td>26.4</td>
</tr>
</tbody>
</table>

Halpern et al … Predicted 14-24%

Canada Overall Avg. <4%
DCD ...

... Impact on Pediatric Donation
MSICU/CICU deaths 2002–2004
(N = 254)

Brain dead
21 (8.3%)

Referred
17 (6.7%)

Organ donation
8 (3.1%)

Donation declined
9 (3.5%)

Not referred
4 (1.6%)

NDD = 8 (Actual)
DCD = 14 (Projected)

Durall et al, Pediatrics 2007
Our Context ........

Beds: 400+
Acute Care Areas: 4
ICU: 2,000/year
All DCD since March 2008
Considered for DCD since March 2008

- DCD 22
  - Requested 22 (100%)
    - Consented 20 (91%)
      - Donated 10 (50%)
        - Organs 23
    - Refused 2 (8%)
      - No Donation 10 (50%)

- No Request 0 (0%)

3 – Time criteria
1 – Coroner Refusal
6 – No Recipient
<table>
<thead>
<tr>
<th>Organ</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lungs</td>
<td>3</td>
</tr>
<tr>
<td>Livers</td>
<td>5</td>
</tr>
<tr>
<td>Kidney</td>
<td>7 (14)</td>
</tr>
<tr>
<td>Pancreas</td>
<td>1</td>
</tr>
</tbody>
</table>
What are the trends?
<table>
<thead>
<tr>
<th>Year</th>
<th>Referrals</th>
<th>Approached</th>
<th>Consented</th>
<th>Donated</th>
<th>Organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>2009</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>2010</td>
<td>7</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2011</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>22</td>
<td>19</td>
<td>10</td>
<td>23</td>
</tr>
</tbody>
</table>
Relative Contributions

DCD vs. NDD?
## DCD vs. NDD

<table>
<thead>
<tr>
<th>Year</th>
<th>Donated–DCD</th>
<th>Donated-NDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2010</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2011</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>
What’s our framework?
Donation after cardiocirculatory death in Canada

Sam D. Shemie, Andrew J. Baker, Greg Knoll, William Wall, Graeme Rocker, Daniel Howes, Janet Davidson, Joe Pagliarello, Jane Chambers-Evans, Sandra Cockfield, Catherine Farrell, Walter Glannon, William Gourlay, David Grant, Stéphan Langevin, Brian Wheelock, Kimberly Young, John Dossetor*

Key Elements? - Content

Key Elements? – Hospital Policy
Policies on Donation After Cardiac Death at Children’s Hospitals
A Mixed-Methods Analysis of Variation

Armand H. Matheny
Antommartia, MD, PhD
Karen Trotochaud, RN, MN, MA
Kathy Kinlaw, MDiv
Paul N. Hopkins, MD, MSPH
Joel Frader, MD, MA

Context  Although authoritative bodies have promulgated guidelines for donation after cardiac death (DCD) and the Joint Commission requires hospitals to address DCD, little is known about actual hospital policies.

Objective  To characterize DCD policies in children’s hospitals and evaluate variation among policies.


Table 2. Qualitative Analysis of Donation After Cardiac Death Policies (continued)

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of Policies/Total (%) [95% CI]</th>
<th>( \kappa ) Value (^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declaration of death</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specify criteria or tests</td>
<td>61/73 (84) [73-91]</td>
<td>0.66</td>
</tr>
<tr>
<td>Electrocardiogram</td>
<td>44/61 (72) [59-83]</td>
<td>0.60</td>
</tr>
<tr>
<td>Pulselessness</td>
<td>42/61 (69) [56-80]</td>
<td>0.50</td>
</tr>
<tr>
<td>Palpation sufficient</td>
<td>10/42 (24) [12-39]</td>
<td>0.84</td>
</tr>
<tr>
<td>Do not specify method</td>
<td>8/42 (19) [9-34]</td>
<td>b</td>
</tr>
<tr>
<td>Apnea</td>
<td>35/61 (57) [44-70]</td>
<td>0.71</td>
</tr>
<tr>
<td>Unresponsiveness</td>
<td>23/61 (38) [26-51]</td>
<td>0.88</td>
</tr>
</tbody>
</table>

\( \kappa \) value of \( \geq 0.80 \) indicates very good agreement; \( \kappa \) value of \( 0.60-0.80 \) indicates good agreement.

\(^a\) Calculated in a small number of cases due to nonresponse.

\(^b\) Agreements determined not to be significant.

... 40% don’t specify apnea
## Important Trends in PICU

<table>
<thead>
<tr>
<th>Year</th>
<th>Admissions</th>
<th># Brain Dead</th>
<th>% Brain Dead</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>1704</td>
<td>10</td>
<td>0.6%</td>
</tr>
<tr>
<td>2006</td>
<td>1746</td>
<td>5</td>
<td>0.3%</td>
</tr>
<tr>
<td>2007</td>
<td>1699</td>
<td>16</td>
<td>0.9%</td>
</tr>
<tr>
<td>2008</td>
<td>1865</td>
<td>18</td>
<td>1.0%</td>
</tr>
<tr>
<td>2009</td>
<td>2018</td>
<td>10</td>
<td>0.5%</td>
</tr>
<tr>
<td>2010</td>
<td>1935</td>
<td>14</td>
<td>0.7%</td>
</tr>
</tbody>
</table>
Accountability cuts Both Ways.........
Non-utilization of hearts and lungs after consent for donation: a Canadian multicentre study

[La non-utilisation des cœurs et des poumons d’adultes consentant au don d’organes : une étude multicentrique canadienne ]

Karen Hornby BScN,* Heather Ross MD FRCP,† Shaf Keshavjee MD FRCS,‡ Vivek Rao MD FRCS,† Sam D. Shemie MD§
123 Potentially Transplantable Hearts

123 Potential

107 Consented

95 Offered

42 Transplanted

16 NOT Consented

12 NOT Offered

53 NOT Transplanted

?? Management or Logistics: 20 Hearts

?? Imagination + Determination +
+ Organization + Research……16+12+53 = 81 Hearts

Hornby, Ross, Keshavjee & Shemie CJA, 2006
What are the ideal statistics?

• Conversion rate....

• Consent rate.....

• Organ loss rate.....

• Declaration rate.....
Consent rate.....

- Be VERY careful of ‘perfection’
  - Beyond limitations of just ‘trying’ harder!
  - Approximates to published norms
  - Far lower than ALL published norms

Competence, Systems Issues, Education, Opportunity
Consent rate.....

Next of Kin:  Informed, Enabled
Physicians & Nurses:  Informed, Educated, Alert, Present
Procurement Agency:  Organized, Competent

Family, Caregivers, Coordinator = a Unit

All conditions met....100% consent success
Collaboration - Our Data I

Potential Donors

Collaborative Approach

Consented

Yes

No

22

7

19

2

86%

29%

Unpublished Data
Our definition of success in DCD?

#1 – 100% identification, approach

#2 – Consent by qualified personnel

#3 – Adherence to processes

Important differences to NDD (e.g. donor management)
#1 Projected vs. Actual (Adult)

#2 Projected (Pediatric)

#3 Our experience

#4 Our framework

#5 Definitions of success

#6 Why we do it …
Why do we do it? (please use the keypad)
<table>
<thead>
<tr>
<th>Question</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why do we do it? (please use the keypad)</td>
<td></td>
</tr>
<tr>
<td>Maximize numbers of organs?</td>
<td></td>
</tr>
<tr>
<td>Maximize positive consents?</td>
<td></td>
</tr>
<tr>
<td>Increase revenue?</td>
<td></td>
</tr>
<tr>
<td>Guidelines say we should?</td>
<td></td>
</tr>
<tr>
<td>It’s a good thing to do?</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Thank you