Organ donation: Performance improvement, measurement and KPIs

Transplant Donation Global Leadership Symposium
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Australian Organ and Tissue Authority
Focus on

1) Outcome measures
2) Process measures
3) Use international and Australian examples
Consider the following questions

1) What’s the KPI for?
2) How is the KPI calculated?
3) What practices influence the KPI and what is our target?
4) Is using a particular KPI going to help us in achieving our goals?
Outcome measures
Outcome measures: Absolute number

- Number of deceased donors
- Number of organ transplant recipients
International example:
Absolute numbers

WORLDWIDE ACTUAL DECEASED DONORS 2010

- United States: 7943
- Brazil: 1934
- France: 1538
- Spain: 1502
- Italy: 1298
- Germany: 1296
- UK: 1015
- Argentina: 583
- Canada: 495
- Portugal: 323
- Australia: 302
- Netherlands: 227
- Belgium: 221
- Czech: 206
- Austria: 196
- Croatia: 135
- Sweden: 118
- Norway: 102
- Finland: 92
- Denmark: 73
- Israel: 60
### Australian example: Absolute numbers

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of deceased donors</th>
<th>Number of transplant recipients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average 2000-08</td>
<td>205</td>
<td>681</td>
</tr>
<tr>
<td>2009</td>
<td>247</td>
<td>799</td>
</tr>
<tr>
<td>2010</td>
<td>309</td>
<td>931</td>
</tr>
<tr>
<td>2011</td>
<td>337</td>
<td>1,001</td>
</tr>
<tr>
<td>2012</td>
<td>354</td>
<td>1,049</td>
</tr>
<tr>
<td>2013</td>
<td>391</td>
<td>1,121</td>
</tr>
<tr>
<td>2014</td>
<td>378</td>
<td>1,108</td>
</tr>
<tr>
<td>2015</td>
<td>435</td>
<td>1,241</td>
</tr>
</tbody>
</table>

Source: Australia and New Zealand Organ Donation Registry (ANZOD). www.anzdata.org.au
Outcome measures: Absolute number

- Number of deceased donors
- Number of organ transplant recipients

**Strengths:** easy, robust, useful for trends

**Limitations:** doesn’t account for size of the region / donor pool; not very useful for comparing different regions with different populations
Outcome measure: per million population (pmp)

- Deceased donors pmp (dpmp)
- Organ transplant recipients pmp (trpmp)
International example:

(pmp)
## Australian example:
### Rates per million living population

<table>
<thead>
<tr>
<th>Year</th>
<th>Performance measures (pmp)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Donors pmp</td>
</tr>
<tr>
<td><strong>Average 2000-08</strong></td>
<td>10.2</td>
</tr>
<tr>
<td><strong>2009</strong></td>
<td>11.4</td>
</tr>
<tr>
<td><strong>2010</strong></td>
<td>14.0</td>
</tr>
<tr>
<td><strong>2011</strong></td>
<td>15.1</td>
</tr>
<tr>
<td><strong>2012</strong></td>
<td>15.6</td>
</tr>
<tr>
<td><strong>2013</strong></td>
<td>16.9</td>
</tr>
<tr>
<td><strong>2014</strong></td>
<td>16.1</td>
</tr>
<tr>
<td><strong>2015</strong></td>
<td>18.3</td>
</tr>
</tbody>
</table>

Outcome measure: per million population (pmp)

- Deceased donors pmp (dpmp)
- Organ transplant recipients pmp (trpmp)

**Strengths:** easy, robust, useful for trends and comparisons

**Limitations:** doesn’t account for size of donor pool; ‘donors pmp’ doesn’t account for non-utilisation (organ discards); doesn’t take into account transplant outcome (graft, recipient survival)
Outcome measure: adjust for donor pool

• Donors per number of:
  – total deaths; hospital deaths; deaths from particular causes
### International example:

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of deaths / Year</th>
<th>Deceased Donors per Year</th>
<th>% Donors/death/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>9,087,133</td>
<td>411</td>
<td>0.005</td>
</tr>
<tr>
<td>Japan</td>
<td>1,192,230</td>
<td>79</td>
<td>0.007</td>
</tr>
<tr>
<td>China</td>
<td>10,086,355</td>
<td>2,766*</td>
<td>0.027</td>
</tr>
<tr>
<td>Lithuania</td>
<td>40,491</td>
<td>31</td>
<td>0.077</td>
</tr>
<tr>
<td>Germany</td>
<td>914,453</td>
<td>864</td>
<td>0.094</td>
</tr>
<tr>
<td>Arabia Saudi</td>
<td>91,260</td>
<td>89*</td>
<td>0.098</td>
</tr>
<tr>
<td>South Korea</td>
<td>325,135</td>
<td>446</td>
<td>0.137</td>
</tr>
<tr>
<td>Colombia</td>
<td>245,100</td>
<td>346</td>
<td>0.141</td>
</tr>
<tr>
<td>Sweden</td>
<td>91,890</td>
<td>166</td>
<td>0.181</td>
</tr>
<tr>
<td>Slovenia</td>
<td>22,368</td>
<td>47</td>
<td>0.210</td>
</tr>
<tr>
<td>Italy</td>
<td>622,969</td>
<td>1,381</td>
<td>0.222</td>
</tr>
<tr>
<td>UK</td>
<td>557,598</td>
<td>1,309</td>
<td>0.235</td>
</tr>
<tr>
<td>Australia</td>
<td>159,129</td>
<td>378</td>
<td>0.238</td>
</tr>
<tr>
<td>USA</td>
<td>2,598,971</td>
<td>8,610</td>
<td>0.331</td>
</tr>
<tr>
<td>Spain</td>
<td>429,641</td>
<td>1,851*</td>
<td>0.431</td>
</tr>
</tbody>
</table>

(*) Data 2015

Courtesy Marti Manyalich

Demographic Information 2014

www.irodat.org
All this is very interesting and helps us understand different outcomes between regions, but what is our real goal?
Goal: To optimise our donation and transplantation outcomes given our donor pool.
Adjust for ‘true’ donor pool

- Can use a hospital level audit of deaths
- Detect all potential donors
- Request, consent and conversion rates
- Definitions are crucial!
Potential donor

- A patient who is **medically suitable** to donate organs for transplantation and has potential to do so either through donation after **neurological determination of death** (brain death) or **circulatory determination of death** (DCD).
Severe Neurological Injury
Potential Brain Dead Donors
Imminent Brain Death
Confirmed and Probable Brain Death
Potential donor pool – deaths in hospital
Severe Neurological Injury

Potential Brain Dead Donors

Imminent Brain Death

Confirmed and Probable Brain Death

Potential donor pool – deaths in hospital

Easy to identify at medical record audit - objective
Severe Neurological Injury
Potential Brain Dead Donors
Imminent Brain Death
Confirmed and Probable Brain Death

Potential donor pool – deaths in hospital

Difficult to be certain if a potential donor at medical record audit - subjective

Easy to identify at medical record audit - objective

Potential DCD Donors
Severe Neurological Injury
Potential Brain Dead Donors
Imminent Brain Death
Confirmed and Probable Brain Death

Potential donor pool – deaths in hospital

Significant potential to increase donation
Rates of request, consent, conversion

• Tension between using criteria that are:
  o Exact, robust, objective, narrow
    (e.g. confirmed BD)
  OR
  o Inclusive, broad, subjective, debatable
    (e.g. imminent BD; potential DCD)

  Underestimate the donor pool and overstate performance; may not focus attention on areas where there is the most potential to increase donation

  Captures fuller potential donor pool; variable interpretation and inclusion leads to less valid comparisons in performance
Eligible Death for Organ Donation (USA):

A patient ≤70 years old legally declared brain dead with none of:

Active infections:
- Bacterial: Tuberculosis; Gonorrhea; Syphilis; Chlamydia; Lyme disease; Active non-venereal syphilis; see sepsis below under General.
- Viral: HIV; Rabies; Acetaminophen intoxication; Acute EBV; Acute SARS; Acute West Nile Virus.
- Fungal: Active infection with Cryptococcus, Aspergillus, Histoplasma, Coccidioides; Active candidemia or invasive yeast.
- Parasites: Active infection with Trypanosoma cruzi (Chagas'), Leishmania, Strongyloides, or Malaria (Plasmodium sp).
- Prion: Creutzfeldt-Jacob Disease.

General:
- Aplastic Anemia; Agranulocytosis; Extreme Immaturity (<500 grams or gestational age of <32 weeks);
- Current malignant neoplasms except non-melanoma skin cancers such as BCC and SCC and primary CNS tumors without evident metastatic disease; A history of melanoma; Hematologic malignancies- Leukemia, Hodgkin's Disease, Lymphoma, Multiple Myeloma;
- Multi-system organ failure (MSOF) due to overwhelming sepsis or MSOF without sepsis defined as 3 or more systems in simultaneous failure for a period of 24 hours or more without response to treatment or resuscitation; Active Fungal, Parasitic, Viral, or Bacterial Meningitis or encephalitis.

OPOs also audit referrals and missed donor opportunities using broader criteria and use this information internally.
Australian example: DonateLife Audit of Deaths

- Undertaken in 78 hospitals capturing most organ donation potential in Australia (~ 97% of actual donors)
- All deaths aged between 28 days and 80 years in ICU and ED, or within 24 hours of transfer from ICU/ED if irrecoverable brain injury
- Seeks to capture brain dead and non-brain dead potential donors
- Retrospective medical record review, data entered into a web-based tool
National performance and targets

OTA targets: 100% request, 75% consent, 70% conversion

Data for potential donors with probable or confirmed brain death (excluded are those with imminent brain death and potential DCD donors)
Audit case review meeting in Victoria

• Peer review of real cases of possible missed donor opportunities including patients without brain death. Goal is to drive clinician practice change.
Process measures
Process measures

• Also useful driving practice change
• Processes measured should be relevant to desired outcomes
## Quality Indicators: DBD & DCD

<table>
<thead>
<tr>
<th>Name of Indicator</th>
<th>Expected result</th>
<th>Evaluation approach</th>
<th>Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FUNCTIONAL ORGANIZATION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Donation process procedures</td>
<td>Yes/100%</td>
<td>Structure</td>
<td>DBD/DCD</td>
</tr>
<tr>
<td>2. Proactive identification donors protocol</td>
<td>Yes/100%</td>
<td>Structure</td>
<td>DBD/DCD</td>
</tr>
<tr>
<td>3. Donation team fulltime availability</td>
<td>Yes/100%</td>
<td>Structure</td>
<td>DBD/DCD</td>
</tr>
<tr>
<td><strong>KEY DONATION PERSON (KDP) AND DONATION TEAM REQUIREMENTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Donation team members with ICU background</td>
<td>50%</td>
<td>Structure</td>
<td>DBD/DCD</td>
</tr>
<tr>
<td>5. Dedicated time Key Donation Person (KDP)</td>
<td>Yes/100%</td>
<td>Structure</td>
<td>DBD/DCD</td>
</tr>
<tr>
<td><strong>DOCUMENTATION AND REGISTRIES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Documentation of the steps of donation process</td>
<td>100%</td>
<td>Process</td>
<td>DBD/DCD</td>
</tr>
<tr>
<td>7. Patient / family opposition</td>
<td>&lt;10%</td>
<td>Outcome</td>
<td>DBD/DCD</td>
</tr>
</tbody>
</table>
International example:

<table>
<thead>
<tr>
<th>Name of Indicator</th>
<th>Expected result</th>
<th>Evaluation approach</th>
<th>Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DONOR IDENTIFICATION AND REFERRAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Identification of all possible donors in ICU</td>
<td>75%</td>
<td>Process</td>
<td>DBD</td>
</tr>
<tr>
<td>9. Uncontrolled in-hospital DCD donor identification</td>
<td>100%</td>
<td>Process</td>
<td>DCD</td>
</tr>
<tr>
<td>10. Controlled DCD donor identification</td>
<td>100%</td>
<td>Process</td>
<td>DCD</td>
</tr>
<tr>
<td>11. Existence of controlled DCD donation protocols</td>
<td>100%</td>
<td>Structure</td>
<td>DCD</td>
</tr>
<tr>
<td>12. Referral of DBD possible donors</td>
<td>100%</td>
<td>Process</td>
<td>DBD</td>
</tr>
<tr>
<td><strong>DONOR EVALUATION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Discarded organs documented</td>
<td>100%</td>
<td>Process</td>
<td>DBD / DCD</td>
</tr>
<tr>
<td>14. Evaluation of Brain-Dead donors</td>
<td>100%</td>
<td>Process</td>
<td>DBD</td>
</tr>
<tr>
<td><strong>DONOR TREATMENT / MAINTENANCE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Donor management</td>
<td>90%</td>
<td>Process</td>
<td>DBD</td>
</tr>
<tr>
<td>16. Unexpected cardiac arrest</td>
<td>3%</td>
<td>Outcome</td>
<td>DBD</td>
</tr>
<tr>
<td>17. DCD organ donor preservation</td>
<td>85%</td>
<td>Process</td>
<td>DCD</td>
</tr>
</tbody>
</table>
Australian example: Clinical Practice Improvement Program

<table>
<thead>
<tr>
<th>Four safety and quality domains</th>
<th>Twelve components which are key contributors to best practice donation outcomes and which align with the four domains of quality and safety</th>
<th>Key performance indicators (KPIs) for each component against which performance and progress will be measured over time</th>
</tr>
</thead>
</table>

Clinical Practice Improvement Program
## Clinical Practice Improvement Program

<table>
<thead>
<tr>
<th>QUALITY AND SAFETY DOMAIN</th>
<th>COMPONENTS</th>
</tr>
</thead>
</table>
| **Clinical effectiveness** | 1. Organ, eye and tissue donation is considered in all end-of-life situations and pursued where appropriate  
2. Organ, eye and tissue donation is discussed at regular ICU meetings and other clinical forums, including local hospital review of all actual and potential donor cases  
3. Organ, eye and tissue donation policies/procedures/guidelines are drafted and incorporated into standard hospital/unit policy and procedure manuals  
4. GIVE trigger implementation is reviewed annually and feedback used to inform ongoing use and education  
5. DonateLife Audit is implemented fully and consistently according to the DonateLife Audit Guide |
| **Workforce/Professional development** | 6. Hospital-based teams are established to work together to identify and resolve issues that impact donation performance in the hospital  
7. Senior clinician/executive organ, eye and tissue donation champion(s) is/are identified to provide hospital leadership in organ, eye and tissue donation  
8. DonateLife Network hospital-based staff undertake regular organ, eye and tissue donation professional training to maintain clinical currency  
9. Annual performance and development reviews of DonateLife Network hospital-based staff by the SMD or delegate are held according to local position descriptions and performance processes |
| **Risk Management** | 10. Serious adverse events related to organ, eye and tissue donation are reported within existing hospital, DonateLife Agency, jurisdictional and national systems, as appropriate |
| **Consumer Participation and Satisfaction** | 11. Potential donor family experience of donation is a structured and supportive process (regardless of whether donation proceeds)  
12. DonateLife Week and other community education and awareness events are undertaken and reported |
Hospital Activity Plan

Each DonateLife hospital has developed a local hospital activity plan which outlines actions to be taken to embed the components of the CPIP in hospital practice.
What practices influence the KPI and what’s the target?
Organs transplanted per donor: 2014

A high ratio may mean:
- Excellent donor maintenance and high transplant unit uptake of offered organs, *(good)* OR
- An over-reliance on standard criteria donors with ‘untapped’ ECD & DCD donor pool potential *(poor)*

Optimal OTPD rate?

Source: IRODaT Preliminary Numbers 2014 (August 2015)
Australian example:
Actual / Attempted controlled DCD rate

A high ratio may mean:
- Excellent death prediction and donor selection (good)
OR
- Too conservative and not attempting enough cases (poor)

Optimal “conversion” of attempted to actual DCD rate?

Transplant Outcomes

• Patient and graft survival
• Publically reported, especially if by transplant unit – a negative driver (encouraging conservatism)?
Primary Deceased Donor Kidney Grafts
Graft Survival - Australia

Years post transplant

0.60 0.70 0.80 0.90 1.00

2012-2013
2010-2011
2008-2009
2006-2007
Actual Survival All Hearts: Australia

Survival by Cutler-Ederer life tables, comparisons by log rank Cox-Mantel

ANZCOTR 2013
Transplant Outcomes

• What are some other measures?
  – Patient survival that includes both patients transplanted and waiting list patients not transplanted?
  – Number of transplant recipients * patient or graft survival, adjusted for population
Goal:
To maximise the health outcomes of all those who might benefit through transplantation from the available donor pool
Conclusions

- There is no perfect performance measure
- Understand how the measure is derived and what practices influence it
- Ideally have measures that act as positive drivers, rather than disincentives
Thank you