Funding the Canadian Research Hospital: Barbarians at the Gate

Bob Bell, MDCM, MSc, FRCSC, FACS
Four Hospitals

1,310 beds
332,232 inpatient days
982,192 clinic visits
91,781 ED visits

$1.8 B Revenue
$310 M External Research Funding
~15,000 employees, 1,200 MDs
$150 M from our Foundations
Global Firsts

1922 | First use of radiation to cure early-stage Hodgkin’s disease
1961 | Discovery of blood-forming stem cells
1983 | First successful single lung transplant
1992 | Improved peritoneal dialysis technique developed to allow home dialysis
1995 | Discovery of genes linked to Alzheimer’s disease
1999 | Identification of brain cells that control pain
2001 | Discovery of protein that fuels growth of Hodgkin’s lymphoma
2008 | First transplant using donor lungs repaired ex vivo
2009 | Demonstrated that Deep Brain Stimulation is safe and may improve memory in patients early Alzheimer’s disease
2012 | Discovery of a promising new drug that reduces brain damage due to stroke
2003 | Genetic test designed to determine if chemotherapy will be an effective treatment for colon cancer
2003 | Identification of brain cells that control pain
Research Hospital Power of Convergence

- Sid Kennedy and Andres Lozano - unlikely collaborators
- Identification of “sadness” locus in brain
- Treatment of refractory depression using deep brain stimulation
- New therapy with enormous potential market currently in Phase III trial
Innovation in Lung Transplant: Ex Vivo Lung Conditioning

- 70% of potential lungs from organ donors are damaged
- UHN research showed that ex vivo treatment can “reclaim” half of discarded lungs
- Following first patient applied in > 70 further cases
- Has doubled lung transplant rates
Treatment of Ischemic Brain Damage by Perturbing NMDA Receptor–PSD-95 Protein Interactions

Michelle Aarts,1* Yitao Liu,2,3,4* Lidong Liu,2,3,4 Shintaro Besshoh,5 Mark Arundine,1 James W. Gurd,5 Yu-Tian Wang,2,3,4 Michael W. Salter,3,6† Michael Tymianski1,6,7†

N-methyl-D-aspartate receptors (NMDARs) mediate ischemic brain damage but also mediate essential neuronal excitation. To treat stroke without blocking NMDARs, we transduced neurons with peptides that disrupted the interaction of NMDARs with the postsynaptic density protein PSD-95. This procedure dissociated NMDARs from downstream neurotoxic signaling without blocking synaptic activity or calcium influx. The peptides, when applied either before or 1 hour after an insult, protected cultured neurons from excitotoxicity, reduced focal ischemic brain damage in rats, and improved their neurological function. This approach circumvents the negative consequences associated with blocking NMDARs and may constitute a practical stroke therapy.
Representative MRI, Placebo, 24 hours
Representative MRI, NA-1, 24 hours
Safety and efficacy of NA-1 in patients with iatrogenic stroke after endovascular aneurysm repair (ENACT): a phase 2, randomised, double-blind, placebo-controlled trial

The Lancet Neurology,
Volume 11, Issue 11,
Pages 942 - 950,
November 2012
History of Public Hospitals Care

- Saskatchewan, in 1947, was the first province to establish public, universal hospital insurance

- 1957 the Government of Canada passed legislation to share in the cost of these services

- By 1961, all 10 provinces and two territories had public insurance plans that provided universal access to hospital services
Canada Health Act, 1984

- Provinces have constitutional right to provide health care services

- Canada Health Act establishes criteria and conditions related to insured health care services - the national standards - that the provinces and territories must meet in order to receive the full federal cash transfer contribution

- Goal: to ensure that all residents of Canada have reasonable access to medically necessary insured services without direct charges.
Health Care and Canada

For each of the following items, do you tend to agree or disagree that they would result in a fundamental change to the nature of Canada? [follow-up question: is direction of change negative or positive?]

- Eliminating public health care
  - Negative: 87%
  - Positive: 13%

- Abandoning English and French as Canada’s two official languages
  - Negative: 79%
  - Positive: 20%

- Eliminating peacekeeping operations for the Canadian military
  - Negative: 80%
  - Positive: 20%

- Canada becoming closer with the US than it is now
  - Negative: 59%
  - Positive: 40%

- Not having a national publicly financed broadcaster like the CBC
  - Negative: 81%
  - Positive: 18%

- Growing proportion of visible minorities
  - Negative: 45%
  - Positive: 52%

- Cutting ties with the monarchy
  - Negative: 53%
  - Positive: 46%

Source: Environics & CROP for CRIC, Portraits of Canada, 2005 (N=3200)
Demand & Cost

Health Care Spending

- 31%
- 42%
- 21%
- 14%

Canadian Healthcare Costs

Total Health Expenditure as a Percentage of GDP 2008

- United States: 16.0%
- France: 11.2%
- Switzerland: 10.7%
- Austria: 10.5%
- Germany: 10.5%
- CANADA: 10.4%
- Belgium: 10.2%
- Netherlands: 9.9%
- Portugal: 9.9%
- New Zealand: 9.8%
- Denmark*: 9.7%
- Sweden: 9.4%
- Iceland: 9.1%
- Spain: 9.0%
- Australia*: 8.5%
- Norway: 8.5%
- Finland†: 8.4%
- Japan*: 8.1%
- Slovak Republic: 7.8%
- Hungary: 7.3%
- Luxembourg: 7.2%
- Czech Republic: 7.1%
- Poland: 7.0%
- Korea: 6.5%
- Turkey: 6.0%
- Mexico: 5.9%


*Data from 2007
†Data from 2006
Increase in Canadian Health Care Costs

(Includes Inflation)

Ontario’s Action Plan For Health Care

Better Value for Money

• Hold hospital base funding to 0% growth
• Shift investments to greatest value and benefit
• Improve quality through specialization

New Health System Funding Reform
Health System Funding Reform
Moving to patient focused funding in Hospitals* over three years

- Approximately 30 targeted Quality-Based Procedure groups will be phased in over three years, with funding mitigations applied.

- A full 40% HBAM allocation will be provided in Year One, but funding mitigations will be applied over a three year period to minimize impacts throughout transition.

* A similar concept will be applied to Community Care Access Centres and Long-Term Care Homes, but with different grouping methodology and proportions of quality based funding.

** Year 2 and 3 quality-based procedures to be finalized
# HBAM Cost Module - UHN

<table>
<thead>
<tr>
<th>HBAM Module</th>
<th>2010/11</th>
<th></th>
<th>% Efficient (Inefficient)</th>
<th>2011/12</th>
<th></th>
<th>% Efficient (Inefficient)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Expected</td>
<td></td>
<td>Actual</td>
<td>Expected</td>
<td></td>
</tr>
<tr>
<td>Acute/Day Surgery</td>
<td>6,930</td>
<td>6,812</td>
<td>-1.7%</td>
<td>6,458</td>
<td>6,838</td>
<td>5.6%</td>
</tr>
<tr>
<td>ER</td>
<td>7,790</td>
<td>6,353</td>
<td>-22.6%</td>
<td>6,658</td>
<td>6,659</td>
<td>0.0%</td>
</tr>
<tr>
<td>Mental Health IP</td>
<td>523</td>
<td>523</td>
<td>0.0%</td>
<td>529</td>
<td>529</td>
<td>0.0%</td>
</tr>
<tr>
<td>Rehab</td>
<td>20,745</td>
<td>20,777</td>
<td>0.2%</td>
<td>20,051</td>
<td>20,671</td>
<td>3.0%</td>
</tr>
<tr>
<td>CCC</td>
<td>411</td>
<td>474</td>
<td>13.3%</td>
<td>417</td>
<td>476</td>
<td>12.4%</td>
</tr>
</tbody>
</table>
Case Mix Groups and RIWs

- Based on Ontario 2006/07 case cost data, using CMGs and RIW weighted cases reduces cost difference between teaching from 92% for simple cost per case to 28% for cost per RIW weighted case.
- What accounts for the teaching “premium”
Results of Analysis – Teaching Hospitals

• 14.2% of all RIW Weighted Cases in Teaching hospitals are for Acute Care Transfers
• All of the Non-Typical case categories have higher than average Costs per RIW-Weighted Case
• The RIWs don’t adequately reflect the true costs of Transfers and other Non-Typical cases
Results of Analysis – Community Hospitals

- Results are similar for community hospitals
  - All of the Non-Typical case categories have higher than average Costs per RIW-Weighted Case
- Impact of under-weighting Transfers and other Non-Typical cases is less for community hospitals, since only 6% of their RIW weighted cases come from Transfers and less than 25% from all Non-Typical categories

<table>
<thead>
<tr>
<th>Case Category</th>
<th>Percent of Weighted Cases</th>
<th>Cost per RIW-Weighted Case</th>
<th>Relative Cost per RIW-Weighted Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-Typical</td>
<td>75.1%</td>
<td>$4,304</td>
<td>97.0%</td>
</tr>
<tr>
<td>1-Outlier</td>
<td>8.4%</td>
<td>$4,947</td>
<td>111.5%</td>
</tr>
<tr>
<td>2-Transfer</td>
<td>6.0%</td>
<td>$4,846</td>
<td>109.2%</td>
</tr>
<tr>
<td>4-Death</td>
<td>10.5%</td>
<td>$4,735</td>
<td>106.7%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>100.0%</td>
<td>$4,436</td>
<td>100.0%</td>
</tr>
<tr>
<td>All Non-Typical</td>
<td>24.9%</td>
<td>$4,833</td>
<td>109.0%</td>
</tr>
</tbody>
</table>
In 2006/07, the cost per RIW-weighted case for acute care transfers was $1,500 higher than for “typical” cases.

UHN has been receiving insufficient weighted case credit for non-typical cases, which contributes to their overall high cost per RIW-weighted case.
Admissions to Critical Care – Results

- Teaching hospital inpatients with a critical care stay had a cost per RIW-weighted case almost $1,600 (31%) higher than inpatients with no critical care stay.
- Critical care cases in community hospitals also had cost per RIW-weighted case 33% higher than inpatients with no critical care stay.
  - E.g. for both teaching and community hospitals, Joint Replacement patients with critical care stay have 41% higher cost per RIW-weighted case.
- The weighted case assignment provides insufficient weight to reflect the higher costs of the critical care patients that are 50% more likely to be found in teaching hospitals.
Patients with history of receiving specialized care at a teaching hospital will bypass other hospitals in order to return to “their hospital”.

“Community of Care”
Costs for Local UHN Primary Level Inpatients vs. Patients from Outside Toronto

- Primary level inpatients at UHN who live outside Toronto have average costs 22.3% higher than Toronto residents

<table>
<thead>
<tr>
<th>CMG</th>
<th>CMG Name</th>
<th>Average Inpatient Case Cost</th>
<th>Ratio of Outside to Local Patient Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>294</td>
<td>Esoph/Gastro/Misc Digest Dis</td>
<td>$4,026.33 $4,123.31</td>
<td>102.4%</td>
</tr>
<tr>
<td>281</td>
<td>G.I. Hemorrhage</td>
<td>$3,495.45 $4,293.10</td>
<td>122.8%</td>
</tr>
<tr>
<td>143</td>
<td>Simple Pneumonia &amp; Pleurisy</td>
<td>$4,983.95 $6,177.44</td>
<td>123.9%</td>
</tr>
<tr>
<td>237</td>
<td>Arrhythmia</td>
<td>$3,536.16 $4,471.81</td>
<td>126.5%</td>
</tr>
<tr>
<td>818</td>
<td>Complication Of Treatment</td>
<td>$5,296.15 $6,152.87</td>
<td>116.2%</td>
</tr>
<tr>
<td></td>
<td>All Primary Cases</td>
<td>$3,812.03 $4,660.57</td>
<td>122.3%</td>
</tr>
</tbody>
</table>
Cost per RIW Weighted Case Differences for UHN Patients from Toronto & From Outside Toronto

- Patients who travel to UHN from outside Toronto have higher costs than local residents, particularly for Primary, Secondary patients.
- Results support hypothesis that patients who bypass community hospitals to come to a teaching hospital for care are more complex (and costly) than RIW weighted cases give credit for.

### University Health Network

<table>
<thead>
<tr>
<th>Level of Care</th>
<th>Cost per RIW-Weighted Case</th>
<th>Ratio of Local to Non-Local</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local Resident</td>
<td>Non-Local Resident</td>
</tr>
<tr>
<td>Primary</td>
<td>$5,482</td>
<td>$6,894</td>
</tr>
<tr>
<td>Secondary</td>
<td>$5,504</td>
<td>$5,913</td>
</tr>
<tr>
<td>Tertiary</td>
<td>$5,972</td>
<td>$6,249</td>
</tr>
<tr>
<td>Quaternary</td>
<td>$5,532</td>
<td>$5,481</td>
</tr>
<tr>
<td>Total</td>
<td>$5,673</td>
<td>$5,877</td>
</tr>
</tbody>
</table>
E.g. UHN Cancer Patients – Primary Level Inpatient Admissions by Patient Residence

• In 2006/07, UHN inpatients with a prior history of treatment at PMH, who were admitted as a “Primary level” inpatient to UHN had an average cost per RIW-weighted case of $6,257
• Patients who lived outside Toronto (and bypassed other hospitals to return to UHN) had an average cost per RIW-weighted case of $6,965, $1,000 higher than the average cost per RIW-weighted case of $5,962 for patients living in Toronto
In 2006/07, there were 258 patients admitted in the Simple Pneumonia & Pleurisy CMG at UHN

- 45% of the Toronto resident admissions had previously been an Oncology or Transplant patient @ UHN

- 91% of the non-Toronto admissions had previously been an Oncology or Transplant patient at UHN

- Prior Oncology and Transplant admissions had higher cost per RIW weighted case