Assessment of New Healthcare Technologies In Canada

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Disclosures:

Ad Boards and consulting contracts

Astellas, Astra Zeneca, Boehringer-Ingelheim, Becton Dickinson, BMS, Celgene, Gilead, Lilly, Roche, Takeda Canada
Health-care spending
As % of GDP

- United States
- Germany
- Switzerland
- Canada
- Japan
- Sweden
- Britain
- OECD average

Sources: OECD; Bureau of Economic Analysis; Centres for Medicare and Medicaid Services; Health Affairs

Economist.com
Growth in Healthcare Spending in Canada

Total Health Expenditure in Constant 1997 Dollars

Year

Billions


20 40 60 80 100 120 140
Major Categories of Healthcare Expenditure in Canada

Where is most of the money being spent?

- **Hospitals**: 30% of health spending, $63.5 billion (2.1% growth)
- **Drugs**: 16% of health spending, $33.9 billion (0.8% growth)
- **Physicians**: 15% of health spending, $33.3 billion (4.5% growth)

Growth has outpaced that for hospitals or drugs since 2007.

*Source: Canadian Institute for Health Information, National Health Expenditure Trends, 1975 to 2014.*
Soaring Cost of Oncology Drug Prices, a Major Concern
Rising Drug Costs plus Increasing Volumes Result in Large Budget Impact
Assessing New Cancer Drugs in Canada

• **Health Canada**
  – Evaluates quality of manufacturing, efficacy and safety
  – Enables manufacturer to market drug

• **Pan-Canadian Oncology Drug Review (pCODR)**
  – Established in 2007
  – Evaluates clinical benefit and cost-effectiveness
  – Takes account of patient values
  – Considers feasibility of implementation
  – Integrated with CADTH
Pan-Canadian Oncology Drug Review (pCODR)

Industry Submission

pCODR

Clinical Guidance Panel

Economic Guidance Panel

pan Canadian Expert Review Committee (pERC)

Patient Advocacy Group(s)

Provincial Advisory Group
## pCODR’s Deliberative Framework

<table>
<thead>
<tr>
<th>Clinical Benefit</th>
<th>Patient Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net clinical benefit</td>
<td>Increased survival</td>
</tr>
<tr>
<td>Disease specific context</td>
<td>Improved quality of life</td>
</tr>
<tr>
<td>Magnitude and type of benefit</td>
<td>Better disease control</td>
</tr>
<tr>
<td>Level of uncertainty</td>
<td>Less treatment related toxicity</td>
</tr>
<tr>
<td></td>
<td>More choice</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost-effectiveness</th>
<th>Feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental cost-effectiveness</td>
<td>Practical issues: chair time</td>
</tr>
<tr>
<td>Appropriate comparator</td>
<td>Specific patient criteria</td>
</tr>
<tr>
<td>Economic model used</td>
<td>Drug wastage</td>
</tr>
<tr>
<td>Projection of survival benefit</td>
<td>Line of therapy</td>
</tr>
<tr>
<td>Time horizon</td>
<td>Scope creep</td>
</tr>
</tbody>
</table>
Pan-Canadian Oncology Drug Review

- Makes an initial recommendation,
  - publicly posted for feedback.
  - If no negative feedback from stakeholders, rapid conversion
- Final Recommendation may be to fund, to not fund or fund with conditions; commonly “fund conditional on improved cost-effectiveness”;
- A clear rationale is provided for all decisions
Strengths of the pCODR Process

Broad stakeholder engagement

- Manufacturers
- Patients – registered patient advocacy groups
- Clinical experts – 11 disease site Clinical Guidance Panels; 12 of 16 members of expert review committee (pERC) are oncologists
- Health economics experts - Economics Guidance Panel and 2 members of pERC
Strengths of the pCODR Processes

Multiple Opportunities for Stakeholder Input:

• Manufacturer has opportunity to engage before submission through pre-submission meetings; approach to economic evaluation discussed
• Manufacturers can review the clinical and economic guidance reports to identify factual errors
• All stakeholders can comment on the initial pERC recommendation
• pERC recommendation includes advice on implementation issues raised by provincial advisory
Strengths of the pCODR Processes

High Level of Transparency

• Recommendations are written in a standardized fashion
• Both initial and final recommendations are posted along with feedback from all parties
• With the exception of confidential prices, all information contributing to the funding recommendation must be disclosed in the posted recommendation
## Mapping the ASCO and ESMO Frameworks to Canadian Deliberative Framework

<table>
<thead>
<tr>
<th>Clinical Benefit</th>
<th>Patient-Based Values</th>
<th>Economic Evaluation</th>
<th>Adoption Feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ASCO</td>
<td>ESMO</td>
<td>ASCO</td>
</tr>
<tr>
<td><strong>Effect</strong>*</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Safety</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Burden of Illness</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Need</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
</tbody>
</table>

- Experience with disease
- Experience with drug
- Cost effectiveness
- Drug Cost
- Budget Impact
- Implementation

*Please note: Effect includes quality of life data*
The cost-effectiveness ratio \((CE)\) is the incremental cost of an intervention divided by its incremental benefits, as given by the formula:

\[
\text{Cost-Effectiveness} = \frac{\text{Cost}^1 - \text{Cost}^2 (\Delta C)}{\text{Effectiveness}^1 - \text{Effectiveness}^2 (\Delta E)}
\]

Effectiveness usually measured as survival gain in years
Defining Cost-effectiveness

- ICER = $\frac{\Delta C}{\Delta E}$
- To be cost-effective: ICER < Willingness to Pay (WTP)
- WTP varies by jurisdiction
- WHO “reasonable” upper threshold may be up to 3X the GDP per capita per unit of valuation
- NICE (UK) £ 20-30,000/QALY
- CADTH/pCODR (Canada) ≈ $100,000 CDN/QALY
- US not used
Approval Conditional on an Acceptable ICER?

• To improve ICER
  – $\Delta C$: ↓ cost
  – $\Delta E$: ↑ outcome (not possible)

• Increase WTP: ↑ budget (limited capacity, but possible for rare tumours, tumours with few treatment options)

• Negotiation of price: Pan-Canadian Pricing Alliance (PCPA)
The Challenge Ahead for HTA: Immuno-oncology Drugs

• Patient values
  – Survival – tail on the survival curve
  – Urgency to gain access to new promising therapy
  – Choice versus risk
• Determining Cost-effectiveness
  – Estimating the area under the curve (uncertainty)
  – What time horizon to use?
Nivolumab versus Docetaxel in Advanced Squamous NSCLC

Brahmer J et al. NEJM 2015 (July 9); 373: 123-35
IO drugs appear to deliver more clinical benefit... but also much more cost

• Nivolumab $28.78/mg
  – 3 mg/kg Q2 weeks = $12,068/ month
    $145,050 / year
• Pembrolizumab $51.79/mg
  – 2mg/kg q2weeks $16,700/month
    $200,400 / year
  – 10 mg/kg q2 weeks $83,500/month
    $1,002,000/ year
# Evaluating the Cost-effectiveness of IO Drugs

**A Hypothetical Example**

<table>
<thead>
<tr>
<th></th>
<th>Drug A (IO Agent)</th>
<th>Drug B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td>Long Tail</td>
<td>No Tail</td>
</tr>
<tr>
<td><strong>Effect (survival)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• At 2-year</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>• From 2-4 years</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Cost (per year)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cost per patient</td>
<td>$500,000</td>
<td>$100,000</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td><strong>Average cost per patient</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• At 2-year</td>
<td>$592,500</td>
<td>$95,000</td>
</tr>
<tr>
<td>• At 4-year</td>
<td>$692,500</td>
<td>$95,000</td>
</tr>
<tr>
<td><strong>Incremental cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• At 2-year</td>
<td>$15,800 per life-year gained</td>
<td></td>
</tr>
<tr>
<td>• At 4-year</td>
<td>$12,043 per life-year gained</td>
<td></td>
</tr>
</tbody>
</table>
In the Immediate Future

• Cost-effectiveness may be insufficient to make funding decisions, certainly at provincial level (the payer)
• Greater need to consider the budget impact
Conclusions

• Healthcare resources are finite
• The growth in healthcare expenditures is consuming a large percentage of resource in publicly funded systems and is becoming unsustainable
• New health technologies in Canada must have a clinically meaningful benefit, be valued by patients and providers and demonstrate cost-effectiveness to be publicly funded
Thank you

Questions?