First Year Costs for the Most Common Cancer Diagnoses in Ontario

2011 Annual CAHSPR Conference

Wednesday May 11th 2011

Claire de Oliveira, MA PhD
Authors/Collaborators

- Claire de Oliveira, University Health Network
- Karen Bremner, University Health Network
- Reka Pataky, BC Cancer Agency
- Nadia Gunraj, Institute for Clinical Evaluative Sciences
- Kelvin Chan, Sunnybrook Health Sciences Centre
- Winson Cheung, BC Cancer Agency
- Paulos Teckle, Canadian Centre for Applied Research in Cancer Control, BC Cancer Agency
- Lawrence Paszat, Institute for Clinical Evaluative Sciences
- Shabbir Alibhai, University Health Network, University of Toronto
- Gary Naglie, Baycrest, University of Toronto
- Jeffrey Hoch, St. Michael’s Hospital, Cancer Care Ontario, Canadian Centre for Applied Research in Cancer Control, University of Toronto
- George Tomlinson, University Health Network, University of Toronto
- Stuart Peacock, Canadian Centre for Applied Research in Cancer Control, BC Cancer Agency, University of British Columbia
- Murray Krahn, University Health Network, THETA, University of Toronto
Background

• Cancer is one of the leading causes of death in Canada, with costly implications for patients and governments

• First year after cancer diagnosis is a period of intensive treatment and high cost

• Understanding how health care resources are spent on cancer treatment is important to policy makers and health researchers to make future decisions

Objective

• Estimate first year costs for patients diagnosed with one of the 21 most common cancers in Ontario between 1997 and 2007
Methods

Cohort Selection: Ontario Cancer Registry

– Included:
  • patients assigned a single, valid ICD-O topography code corresponding to a primary cancer diagnosis
  • patients with no second cancer diagnosed within 90 days of the initial cancer diagnosis
  • patients who survived ≥30 days after the initial diagnosis

– Excluded:
  • patients with missing, unusual or incorrect histology codes
Final sample (for this analysis):
  • N = 336,164 patients (who survived the first year and beyond)

Patients were classified into one of the following 21 cancers (22nd category - all other tumour sites combined):

<table>
<thead>
<tr>
<th>brain</th>
<th>head and neck</th>
<th>ovary</th>
</tr>
</thead>
<tbody>
<tr>
<td>female breast</td>
<td>leukemia</td>
<td>pancreas</td>
</tr>
<tr>
<td>cervix</td>
<td>liver</td>
<td>prostate</td>
</tr>
<tr>
<td>colorectal</td>
<td>lung</td>
<td>renal</td>
</tr>
<tr>
<td>corpus uteri</td>
<td>lymphoma</td>
<td>testis</td>
</tr>
<tr>
<td>esophagus</td>
<td>melanoma</td>
<td>thyroid</td>
</tr>
<tr>
<td>gastric</td>
<td>multiple myeloma</td>
<td>urinary bladder</td>
</tr>
</tbody>
</table>
Costing of Resources

- **Deterministic linkage:**
  - Activity Level Reporting System (ALR) (data from Cancer Care Ontario)
  - New Drug Funding Program (NDFP) (data from Cancer Care Ontario)
  - CIHI Discharge Abstract Database (DAD)
  - National Ambulatory Care Reporting System (NACRS)
  - Ontario Drug Benefit Plan (ODB)
  - Ontario Home Care Administrative System (OHCAS)/Home Care Database (HCD)
  - Continuing Care Reporting System (CCRS)
  - Ontario Health Insurance Plan (OHIP)
<table>
<thead>
<tr>
<th>Resource</th>
<th>Source of Cost</th>
<th>Resource</th>
<th>Source of Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemotherapy</td>
<td>OHIP; NACRS</td>
<td>Same day surgery/other ambulatory procedures</td>
<td>DAD; NACRS</td>
</tr>
<tr>
<td>Other chemo drugs</td>
<td>NDFP</td>
<td>Emergency room visits</td>
<td>OHIP; NACRS</td>
</tr>
<tr>
<td>Radiation therapy</td>
<td>ALR; Earle et al. cost estimates</td>
<td>Home care</td>
<td>OCHAS/HCD</td>
</tr>
<tr>
<td>Diagnostic tests</td>
<td>OHIP</td>
<td>Continuing care</td>
<td>CCRS</td>
</tr>
<tr>
<td>Prescription drugs (outpatient)</td>
<td>ODB</td>
<td>Long-term care</td>
<td>ODB flag; MOHTLC cost estimate</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>DAD</td>
<td>Physician services</td>
<td>OHIP</td>
</tr>
</tbody>
</table>
Results

Figure 1 – Most common cancer diagnoses within age groups
Results

Figure 2 – Mean Cost of Care for the 1st Year after Diagnosis by Cancer Site
# Overall Breakdown of Resources (for all cancers):

<table>
<thead>
<tr>
<th>Resource</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemotherapy (all drugs)</td>
<td>31%</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>27%</td>
</tr>
<tr>
<td>Physician services</td>
<td>12%</td>
</tr>
<tr>
<td>Long-term care</td>
<td>6%</td>
</tr>
<tr>
<td>Radiation therapy</td>
<td>5%</td>
</tr>
<tr>
<td>Prescription drugs</td>
<td>5%</td>
</tr>
<tr>
<td>Home care</td>
<td>5%</td>
</tr>
<tr>
<td>Continuing care</td>
<td>3%</td>
</tr>
<tr>
<td>Same day surgery/other</td>
<td></td>
</tr>
<tr>
<td>amb. proc.</td>
<td>3%</td>
</tr>
<tr>
<td>Diagnostic tests</td>
<td>2%</td>
</tr>
<tr>
<td>Emergency room visits</td>
<td>1%</td>
</tr>
</tbody>
</table>
Conclusions

• 1\textsuperscript{st} year mean costs of cancer care in Ontario are substantial and vary by tumour site
• Esophageal and pancreatic cancers among most expensive cancers in the first year
• Cancers with high 5-year relative survival ratio (thyroid and melanoma) have lowest mean cost
• Chemotherapy makes up 1/3 of mean costs during the 1\textsuperscript{st} year of care as does hospitalization
• All other resources make up remaining 1/3
• Results in agreement with previous studies for patients aged 65+ in the US.
Policy implications:
- useful in planning for future health care budgets and setting priorities for allocating resources
- improve quality of future cancer-related economic evaluations by providing accurate estimates of 1st year cancer costs

Next steps:
- determining length of phases of care (initial care, continuing care and terminal care phases)
- estimating net cancer-related costs for each phase through matching
Next Steps

Figure 3 – Mean monthly costs for breast cancer by survival time
Overview of project:

- Parallel analyses conducted in British Columbia, under the auspices of the Canadian Centre for Applied Research in Cancer Control

- Other analyses/products:
  - Evaluation of Trends in First Year Cancer Costs
  - 5-year Cancer Costs
  - Lifetime Cancer Costs
  - Contribute to the improvement of costing methods in Ontario
Thank you

**Acknowledgments:**
This study was funded by a project grant from the Canadian Cancer Society Research Institute (grant #20200).

**Contact information:**
Claire de Oliveira, MA PhD
cdeoliv@uhnresearch.ca