Costs of Cervical Cancer Treatment: Estimates from Ontario, Canada

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Agenda

• Cervical cancer epidemiology
• Methodology
• Results
• Discussion
Background

- Cancer is leading cause of death in Canada
- Direct cost: $4 billion
- Cervical cancer is the third most common female cancer worldwide
- Second leading cause of cancer death in Canadian women 20-44
Cohort Selection

Cervical cancer cases in the Ontario Cancer Registry linked to administrative databases held at the Institute for Clinical Evaluative Sciences (ICES)

Accrual Window: 2007-2010

Max Follow-up Date:
- December 31st, 2010 or date of death

Look-back Window

Observation Window:
- Collect cost data

Index Event:
- Cervical cancer diagnosis
## Data Sources

### Database
- Ontario Health Insurance Plan claims database
- Canadian Institute for Health Information (CIHI) Discharge Abstract Database
- CIHI National Ambulatory Care Reporting System
- CIHI Same Day Surgery
- CIHI Continuing Care Reporting System
- CIHI National Rehabilitation Reporting System
- Home Care Database
- Ontario Drug Benefit
- Ontario Mental Health Reporting System

### Resources
- Physician services, diagnostic tests, lab tests
- Inpatient hospital admissions
- Cancer clinic visits, emergency department visits
- Same-day surgeries
- Complex continuing care services
- Hospital admissions for rehabilitation services
- Home care services
- Prescription drugs to eligible patients
- Admissions for mental health stays
### Analyses

#### Arithmetic Mean

\[ \hat{\mu} = \frac{1}{n} \sum_{i=1}^{n} M_i \]

#### Simple Weighted Estimator

\[ \hat{\mu}_{WT} = \frac{1}{n} \sum_{i=1}^{n} \frac{\Delta_i M_i}{\hat{K}(T_i)} \]

#### Improved Estimator

\[ \hat{\mu}_{IMP} = \frac{1}{n} \sum_{i=1}^{n} \frac{\Delta_i M_i}{\hat{K}(T_i)} + \frac{1}{n} \sum_{i=1}^{n} \frac{(1 - \Delta_i)\{M_i - \overline{M(C_i)}\}}{\hat{K}(T_i)} \]

\[ \overline{M(C_i)} = \frac{\sum_{j=1}^{n} I(X_j \geq M_j(C_j))}{\sum_{j=1}^{n} I(X_j \geq C_i)} \]
Study Cohort

N = 784
Mean age = 49.3
254 deaths in study period

- 71% caused by cervical cancer
1-year costs by vital status

Survived ≥ 1 year: $31,195
Died within 1 year: $63,016
Overall: $35,700

Legend:
- Other
- Physician
- Tertiary care
- Other hospital
- Inpatient
- Cancer clinic
Breakdown of 1-year costs

Survived ≥ 1 year

- Cancer clinic: 41.5%
- Inpatient: 22.2%
- Other hospital
- Tertiary care
- Physician
- Other

Died within 1 year

- Inpatient: 49.3%
- Other hospital
- Tertiary care
- Physician
- Other

16.9%
Mean annual costs

Year 1

Year 2

Year 3

Arithmetic mean
Simple weighted estimator
Improved estimator
Mean cumulative costs

- Arithmetic mean
- Simple weighted estimator
- Improved estimator

Year 1
Years 1-2
Years 1-3
Limitations

• No staging data
• Unable to compare costs across treatments
• Overall healthcare costs vs. incremental cancer costs
Conclusions

• Greatest cost accumulation in first year after diagnosis

• Patients that died had much higher costs

• Cancer clinic and hospital admissions were two largest drivers of cost
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