Person-Centered Costing
Using Administrative Data

THETA Rounds

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Overview

1. Why cost estimation
2. Levels of cost estimation
3. How to approach cost estimation?
4. Costing health services: methodology
5. Some examples
6. Other issues
7. What we can and can’t do
Why cost estimation?

- Enable summative combination across health system resource use of different types (e.g. hospital, rehabilitation, home care) weighted by resource intensity.
- Measure health system burden for different populations weighted by intensity of resource consumption ~ Cost of Illness.
- Efficiency analysis of providers and system in providing care
- Cost effectiveness evaluation of interventions in the health care system analyses (observational or modeling).
- Assist in decisions particularly as they relate to rationing resources/funding.
- Understand and compare health system spending.
Levels of cost estimation

MACRO:
OECD comparisons
• Where does the health system spend money? (Hospitals, physicians, home care, long term care)
• What is total spending and cost per case?
• System of Health Accounts (SHA)

WHO:
• What is the cost burden of non-communicable disease?
• Add up costs from SHA for patients admitted to hospital with X disease or treated by physicians for X disease.
Levels of cost estimation

MESO:
• How much do different hospitals spend?
• How much do different hospitals spend on the same types of patients?
• How does spending vary across physicians?

Often applied in pay-for-performance schemes (efficiency incentives).
Levels of cost-estimation

MICRO:
• Track individual health care spending
• Track who is paying for what
  • Patient – patient journals of costs
    • Can include time, out of pocket costs (co-pay, parking, private services), work-time/wages lost, etc.
  • Private insurer
    • Paid directly to provider or reimbursed to patient
  • Public insurer
    • Paid directly to provider or reimbursed to patient

• How much does patient X with condition Y cost?
How to approach cost estimation?

MICRO:
- Cost is simply = Use/Consumption x price
- Measure Use/Consumption (prospectively or through administrative databases)
- Determine appropriate price
How to approach cost estimation?

MICRO
Determine appropriate price

- Needs to match use/consumption as closely as possible
- E.g. visit to a physician:
  - Direct costs associated with physician time, any disposable supplies used during visit, other providers (e.g. nurses)
  - Indirect costs associated with office overhead and space, durable equipment, reception
  - Fixed and Variable dimensions to both Direct and Indirect costs
How to approach cost estimation?

MICRO
Determine appropriate price
  – **Needs to match use/consumption as closely as possible**
  – Direct versus Indirect (overhead) Costs
  – Fixed versus Variable Costs
  – Can get very refined about this if the need arises (e.g. contrast cost of outpatient vs inpatient surgery)

  – Today use/consumption associated with encounters with health care providers paid by the Ontario Ministry of Health and Long Term Care
    and tracked using health administrative data

**Hereafter I focus on Ontario government spending**
How to approach cost estimation?

MICRO:
• Public insurer
  • Paid directly to provider or reimbursed to patient
• How is the provider paid
  • Hospitals may be case-based or global budget
  • Cases may be weighted
  • Physicians may receive Fee-for-service or capitation payments, bonuses
  • Supplies and services may be independent (outpatient pharmaceuticals and equipment) or bundled (pharmacy within hospitals)
How to approach cost-estimation?

• Top – down : Allocation of provincial budget to individuals who use the service
  ≈ allocation of hospital budget or physician capitation fee to individuals who use the service

• Bottom – up : Pricing individual’s use of health care system resources to determine overall health resource utilization

• A little bit of both...
How to approach cost-estimation?

• Top – down : Used to obtain prices where unit-level prices are not available:
  • Allocation of hospital (acute, rehabilitation, complex continuing care, mental health) budget to individual cases
  • Allocation of home care case-management and service costs to individual visits
  • Allocation of primary care physician capitation and salary payments to individual patients
How to approach cost-estimation?

• Bottom-up: Individual service utilization \( \times \) price

• Price:
  – Depends on type of service, provider, setting (including technology), duration and intensity:
    • Visit: physician, home care, outpatient
    • Testing/Treatment: Medication, Diagnostic test
    • Stay: inpatient (acute, rehabilitation, nursing home)
    • Patient costs and informal care
  – Costing depends on funding model and resource utilization:
    • E.g. physicians are paid on a per-visit basis = price (note: AFP; FHT)
    • Hospitals are paid on a global budget basis -> need distribution of global budget to patient to get price. (top-down)
How to approach cost estimation?

Hospitals:
• What is the unit of use/consumption?
  • Case-mix adjusted episode (discharge)
• What is the price for a case-mix adjusted episode?
  • There is no ‘price’ in the economic sense – use cost
  • Case-costing hospitals have patient-specific case costs derived using patient-level cost tracking within hospital (OCCI)
  • This is the most accurate cost available
  • But it is not representative of all hospitals because it is derived from a small number of hospitals (10 historically and 28 today)
How to approach cost estimation?

• What is the price for a case-mix adjusted episode?
  • CIHI uses data from case-costing hospitals to develop relative weight for different cases within a hospital. Measures the relative resource consumption of a given case, defined by age, diagnoses, and procedures.
  • Called the Resource Intensity Weight (RIW)
  • Applicable to all hospitals
  • Can calculate the average cost per RIW = Cost Per Weighted Case (CPWC) for any hospital (or for any grouping of hospitals)
  • RIW becomes the measure of use/consumption
How to approach cost estimation?

• How generic or specific does the price/unit cost need to be?

• Depends on the question:
  • For questions concerning a hypothetical patient who could be treated anywhere in the health system we want the unit cost to be as generic as possible.
  • For comparisons between specific patients & providers, we would want the unit cost to be as specific as possible.
  • For most policy questions – generic is more useful.
How to approach cost estimation for utilization with administrative data?

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Database</th>
<th>Unit</th>
<th>Weight</th>
<th>Unit Cost</th>
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<tr>
<td>Acute Hospitalization</td>
<td>DAD</td>
<td>Weighted Case</td>
<td>RIW</td>
<td>Cost Per Weighted Case (CPWC)</td>
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<td>Same Day Surgery</td>
<td>NACRS</td>
<td>Weighted Case</td>
<td>CACS RIW</td>
<td>Cost Per Weighted Case (CPWC)</td>
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<tr>
<td>Emergency Department</td>
<td>NACRS</td>
<td>Weighted Visit</td>
<td>CACS RIW</td>
<td>Cost Per Weighted Visit (CPWV)</td>
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<tr>
<td>Ambulatory Visits</td>
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<tr>
<td>Rehabilitation Hospital</td>
<td>NRS</td>
<td>Weighted Case</td>
<td>RCW</td>
<td>Cost Per Weighted Case (CPWC)</td>
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<td>Complex Continuing Care Hospital</td>
<td>CCRS</td>
<td>Weighted Day</td>
<td>CMI</td>
<td>Cost Per Weighted Day</td>
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<tr>
<td>Long Term Care Facility</td>
<td>CCRS</td>
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<td>Cost Per Diem</td>
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<td>Mental Health</td>
<td>OMHRS</td>
<td>Weighted Day</td>
<td>SCIPP CMI</td>
<td>Cost Per Weighted Day</td>
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<td>Cost Per Visit</td>
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<td>Pharmaceutical</td>
<td>ODB</td>
<td>Visit</td>
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<td>ODB Fee</td>
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<tr>
<td>Laboratory Testing</td>
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</tbody>
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1. Brief episodes and hospital visits
2. Longer term episodes
3. Ambulatory Encounters/visits
Acute Inpatient Care: CPWC & Case Cost

- **Case Cost** of patient $i$ at hospital $j$ in a given year $y$ is given by:
  \[
  Case\ Cost^j_i(y) = RIW_i(y) \times CPWC^j_i(y)
  \]

  **Note**: Depending on the research objective, $CPWC^j_i$ can be calculated at the hospital, regional or provincial level.

- **Cost per Weighted Case (CPWC)** at hospital $i$ in a given year $y$:
  \[
  CPWC^i(y) = \frac{\text{Total Acute Care Costs}^i(y)}{\text{Total Weighted Cases}^i(y)}
  \]
  where Total Weighted Cases for all patients $i=1 \ldots N$ at hospital $j$ are given by $\sum_{i=1}^{N} RIW_i$.
3.2 Complex Continuing Care

**Utilization data:** Continuing Care Reporting System (CCRS)

**Case-Mix Costing**

- Continuing care patients are classified into 44 Resource Utilization Groups (RUG-III) based on their clinical condition, physical and cognitive functioning and treatment in the last 14 days.
- Each of the RUG-III has an associated Case Mix Index (CMI) that approximates the per day cost of caring for a resident in that RUG group relative to the average resident.
- CIHI calculates each CMI based on average resource use per day for each RUG, including health care provider wage rate and staff time.
- Starting 2010, Case-Mix methodology will be adopted in the Long-term Care (34 RUG groups).
• **Note:** CCC patients are assessed every quarter with CCRS assessment including their CMI score.

• Multiple CMIs can be associated with patient’s stay in CCC. This needs to be properly reflected in cost calculation.

![Graph showing CCC utilization over time](image-url)
Complex Continuing Care: CRWPD, Case Cost

- **Case Cost** of patient \(i\) at hospital \(j\) in year \(y\) is given by:

\[
\text{Case Cost}_{i}^{j} = \sum_{t=1}^{T} \text{CMI}_{it}^{j} \times \text{LOS}_{it}^{j} \times \text{CRWPD}_{jy}^{y}
\]

\(\text{LOS}_{it}^{j} = \text{time from last assessment (t) to next assessment/discharge (t+1)}\)

\(\text{CRWPD}_{jy}^{y} = \text{year-specific cost per RUG-weighted patient day}\)

**Note:** Depending on the research objective, CRWPD can be calculated at the hospital, regional or provincial level.

- **Cost per RUG-Weighted Patient Day (CRWPD) in hospital \(j\):**

\(\text{CRWPD}_{j}^{i} = \text{Total CCC cost}^{i} / \text{Total RUG-weighted patient days}^{i} (\text{RWPD})\)

where RWPD for all patients \(i=1..N\) at hospital \(j\) are given by

\[
\text{RWPD}_{j}^{i} = \sum_{i=1}^{N} \sum_{t=1}^{T} \text{LOS}_{it}^{j} \times \text{CMI}_{it}^{j}
\]
Visits: Physician and Home Care

Utilization data: OHCAS, HCD, OHIP

Costing
- Fee-for-service physician visits:

  \[ \text{Visit/Procedure Cost} = \text{OHIP fee (indexed by Billing Code)} \]

Home Care Visit Cost = Provincial average cost per visit by service type

\[ \text{Visit Cost}_j = \text{average cost per visit by service type } j \]

or \[ \text{Visit Cost} = \text{No. of Hours} \times \text{Provincial average cost per hour for shifts (nursing shift, homemaking, respite)} \]
Other Physician and Home Care Costs

Primary Care Physician Capitation Payments

\[ \text{Case Cost}_i = \text{Capitation}(t) \times \text{Multiplier}^{\text{age}}_{\text{sex}} \]

*Capitation* \((t)\) is the monthly base capitation payment specific to each type of Physician Model (FHN, FHO, FHG, CCM)

*Multiplier* includes age-sex specific multiplier plus any additional (e.g. comprehensive care multiplier, old-age multiplier etc)

But need to determine use/consumption by identifying that patient \(i\) is in Model X (FHN, FHO etc) in month \(t\) (CAPE database)
What do we have?

Health sector costs identified in the administrative data for any combination of following services:

- Inpatient Acute
- Inpatient Mental Health
- Inpatient Rehabilitation
- Inpatient Complex Continuing Care
- ED visits
- Same Day Surgery
- Oncology and Dialysis outpatient
- Long Term Care Home
- Home Care
- Assistive Devices
- OHIP FFS
- OHIP non-FFS
- OHIP non-physician
- OHIP Laboratory
- Pharmaceuticals (ODB and NDFP)

Total ≈ $30.5 of $42 B health system spending
What are we missing?

• Non-attributable Health System Costs (public health, community mental health, etc.)
• Indirect and technology costs for ambulatory clinic visits in hospitals and diagnostics (MRI, CT)
• Alternative Funding Programs for physicians in hospitals (we do have ED; Medical and Radiation Oncology)
• Other sources where we do not have a patient-specific measured unit of use/consumption (e.g. blood tests)
How can we use this data?

3 examples:

• Understand health care system spending
• Understand types of health care spending for individuals with a particular condition
• Understand total costs for individuals with a particular condition
The Concentration of Health Care Spending:

Little Ado (yet) About Much (money)

Walter P Wodchis

Peter Austin, Alice Newman, Ashley Corallo, David Henry
Institute for Clinical Evaluative Sciences

CAHSPR
Montreal, May 30, 2012
Most people are healthy throughout their lives and incur their highest costs later in life. This is borne out in higher average costs for just about every sequential age.

*note increase at age 65 in spending attributable to ODB coverage at age 65
Total spending is a composite of both average spending for a given population (here by age) and the number of people in that group.

* Note dip in spending at in ages 62-64 attributable to larger birth cohorts in 1946-47 relative to 1948-49 (first years of baby boom) and increase in costs for medication (ODB) claims at age 65
On average, health care spending is highly concentrated with the top 5% of the population (ranked by cost) accounting for 66% of expenditure.
Identifying Target Populations for Integrated Care

Walter P Wodchis
December 11, 2012
MOHLTC High User Discussion

Leveraging the Culture of Performance Excellence in Ontario’s Health System

HSPRN is an inter-organization Network funded by the Ontario Ministry of Health and Long Term Care
Identifying Target Populations For Integrated Care

Total health system cost 1 year following index
Average cost = $35,935; Total System Cost: $1,400,689,862

Physician cost (5.2%): $1,909.62 (94.3% users)
HC cost (6.1%): $3,732.60 (56.9% users)
LTC cost (7.1%): $19,700.03 (12.4% users)
CCC cost (10.3%): $33,296.85 (10.7% users)
Rehab cost (10.5%): $21,230.81 (17.2% users)
Acute care cost (20.9%): $17,961.13 (40.3% users)
ED cost (0.3%): $201.49 (55.1% users)
Index hospitalization AC cost (36.1%): $12,517.29 (100% users)
Pharma cost (3.5%): $1,454.29 (82.9% users)
Identifying Target Populations For Integrated Care

Average 1-year costs after discharge from acute care in 2007/08 for 3 target populations: Different Trajectories
Most patients survive and most money is spent on patients who survive
Identifying Target Populations For Integrated Care
2\textsuperscript{nd} year Total system Costs (1,000,000s)
Ontario Chronic Disease Model

Murray Krahn and Colleagues
in collaboration with
Health Quality Ontario (Les Levin and Colleagues)
Ontario Chronic Disease Model

Average cost per patient by 5 subgroups of the diabetes cohort (FY2006-2010), during each the 90-day period from their individual index date to the maximum follow-up date

- Average cost by cohort who died at 355-360* days (N=94)
- Average cost by cohort who died at 715-720* days (N=82)
- Average cost by cohort who died at 1075-1080* days (N=59)
- Average cost by cohort who died at 1435-1440* days (N=36)
- Average cost by cohort who died at 1795-1800* days (N=2)
Ontario Chronic Disease Model

Average cost per patient of 5 subgroups of the CHF cohort (FY2006-2010), during each of the 90-day period from their individual index date to the maximum follow-up date.
Current Applications

- e.g. Cost of illness for chronic diseases (ICES derived cohorts)
Other Issues

• Use of provider-specific versus provincial average costs (e.g. hospital-specific costs)
  – Provincial average costs are applicable for a ‘hypothetical’ patient where the primary interest is in evaluating care without attention to prescribing the specific location of care.
  – More generalizable, less reflective of actual practice.
  – Provide specific costs are useful for evaluating actual care costs and/or comparing costs across organizations (or networks).
Other Issues

• **Approach to discounting over time**
  – Using year-specific costs and discounting using health services specific CPI
  – Using constant-year cost and/or weighting factors (e.g. same weighted acute cost and/or same RIW)

• **Implications**
  – Year-specific costs and discounting reflect real allocation and utilization in year of practice and are consistent with economic guidelines. Other approaches are relevant for evaluating hypothetical practice in selected year.
Other Issues

• Appropriate discount rates
  – Provider-type inflation factors
  – Medical care basket price inflation
  – Overall health care spending inflation

• Economic evaluation guidelines would recommend medical-care basket price inflation. Calculated provider-type inflation factors (increases in weighted revenue) are difficult due to changes in activities (apportioning price versus intensity change). Similarly, overall health care spending inflation may arise from new services as well as changes in price.
Implementation at ICES

%getcost is a new ICES macro that will enable the user to calculate costs using these techniques and current/appropriate prices based on provincial average spending.

It has been implemented for all healthcare utilization databases that ICES has access to.

It is a very valuable but also very resource-intensive program. Only start to use this if you know how the results will be interpreted and used. Don’t do this for ‘another piece of information’ if it won’t be an important component of the research project.
Implementation at ICES

• Use of provider-specific versus provincial average costs (e.g. hospital-specific costs). Average provides a representative cost for a hypothetical patient.

• Hospital-specific costs could be calculated and are closer to the actual costs for a given patient because they account for differences in funding to hospitals over time. They still are not specific to the individual patient – only OCCI (case costing) data are patient-specific.

• We recommend using year-specific RIWs where possible to capture both changes in health technology and prices (rather than standardizing to the same RIW).

• Standardizing costs across years can be done by discounting, using health-care specific CPI.
What we can and can’t do

• We CAN have a standardized method for attaching prices to administrative data
• We CAN’T obviate the need for project-specific/intervention-specific costing.
• The methods we have developed are appropriate primarily for costing patients in a cohort analysis and represent the costs of the ministry of health and long term care.
• The methods we have developed capture ALL costs for patients regardless of the specific reason for treatment. They are NOT disease/condition-specific. Incremental/attributable costs require comparisons to equivalent patients.
• Projects looking to measure incremental costs (e.g. costs associated with 55 new inpatient stroke beds in a region or hospital) or costs for substituting NP for GP for diabetic management require different techniques.
Additional Slides
Detailed costing across sectors
3.1 Acute Same Day Surgery Visit Price

Prior to April 2003
- Utilization: DAD-SDS
- Price: Cost per Weighted Case based on DAD (same as inpatient)
- DAD SDS-RIW

Starting April 2003
- Utilization: NACRS
- Price: Cost per Weighted Case based on NACRS
- CACS-RIW*
  (Comprehensive Ambulatory Classification System)

Case Cost of patient \( i \) at hospital \( j \) in a given year \( y \) is given by:

\[
Case \ Cost_{i,j}(y) = RIW_{i}(y) \times CPWC_{j}(y)
\]

*NACRS uses variable \( CACSWeightyyyy \) for 2002-2005; \( RIWyyyy \) from 2006-onwards
3.1 Acute Emergency Department Visit

**Utilization data:** National Ambulatory Care Reporting System *(NACRS)*

**Costing**

*Option 1: Average Visit cost* = MOHLTC average ED visit cost (MOHLTC FIM website) This approach does not adopt case-mix patient weighting system.

\[
\text{Cost per Visit} = \frac{\text{Total ED Costs}}{\text{Total ED Visits}}
\]

*Option 2: ED visits priced as part of other Ambulatory Services, such as same day surgeries and high-cost ambulatory clinics. This approach adopts case-mix patient weighting system (Grouper: CIHI).*
3.1 Acute Emergency Department Visit

Option 2:
Utilization data: National Ambulatory Care Reporting System (NACRS)

Prices: Case-Mix Costing using Comprehensive Ambulatory Classification System (CACS)

- Patients in CACS are grouped according to principal procedure, main diagnosis and visit disposition data from NACRS.
- Each patient $i$ at hospital $j$ is assigned CACS Resource Intensity Weight (CACS RIW)

$$\text{Visit Cost}_{i,j}(y) = CACS \text{ RIW}_{i}(y) \times \text{CPWV}^j(y)$$

$CPWV^j =$ cost per weighted visit at hospital $j$ in year $y$
3.1 Acute Ambulatory Visit Price

- Physician fee-for-service payments included in OHIP

- Additional indirect costs? (clinic space and staff)
3.1 Inpatient Rehabilitation

Utilization data: National Rehabilitation System (NRS)*
*Cautions with this database – duplicate records for each stay

Case-Mix Costing

• In 2006 JPPC Rehab Technical Working Group recommended a case mix classification tool for adult inpatient rehabilitation activity.

• Using the case mix classification tool patients are first assigned to one of 21 broad Rehabilitation Groups (RG) and then classified into one of 83 Rehabilitation Patient Groups (RPG) according to:
  - Rehab Client Code
  - Motor FIM score
  - Cognitive FIM score
  - Patient’s age.

• Each patient in each RPG receives Rehab. Cost Weight (RCW);
3.1 Inpatient Rehabilitation: deriving cost weights (RCW)

Weights are not provided in NRS – need to calculate individually.

1) Provincial mean cost per episode=Total Rehab Costs/Total episodes

2) For each Rehab Patient Group (RPG) calculate:
   RPG mean episode cost=RPG cost per day x RPG mean length of stay

3) Calculate Rehab Cost Weight (RCW):
   RCW=RPG mean episode costs/Mean cost per episode

Outliers (patients with the LOS beyond the trim points)
1) Short-term (LOS < 3 days): RCW=0.0675 (FY 2009)
   Does not vary by Rehabilitation Group (RG)

2) Long-term: Per diem RCW = RCW + (LOS-Trim)*PDW
   (Varies by Rehabilitation Group)
3.1 Inpatient Rehabilitation: CPWRC, Case Cost

- **Case cost** of patient $i$ at hospital $j$ for a given year $y$ is given by:
  \[
  \text{Case Cost}_{i,j}(y) = RCW_{i,j}(y) \times CPWRC_{j}(y)
  \]

  *Note: Depending on the research objective, CPWRC can be calculated at the hospital, regional or provincial level.*

- **Cost per Weighted Rehabilitation Case (CPWRC)** for hospital $j$.
  \[
  CPWRC_{j} = \frac{\text{Total Rehab Costs}_{j}}{\text{Total Weighted Cases}_{j}}
  \]

  where Total Weighted Cases for all patients $i=1...N$ at hospital $j$
  \[
  \sum_{i=1}^{N} RCW_{i}
  \]
# 3.1 Inpatient Rehabilitation

## Provincial Average CPWRC

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<tbody>
<tr>
<td>IR Cost Per Weighted Rehabilitation Case</td>
<td>$12,611</td>
<td>$12,964</td>
<td>$13,327</td>
<td>$13,690</td>
<td>$14,063</td>
<td>$14,447</td>
<td>$14,841</td>
<td>$15,245</td>
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## Hospital Specific CPWRC

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<tr>
<th>Year</th>
<th>Facility #</th>
<th>Facility Name</th>
<th>LHIN</th>
<th>Cost</th>
<th>$</th>
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</thead>
<tbody>
<tr>
<td>2007-2008</td>
<td>613</td>
<td>TORONTO West Park</td>
<td>TORONTO CENTRAL</td>
<td>CPWRC</td>
<td>20,698</td>
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<tr>
<td>2007-2008</td>
<td>666</td>
<td>GUELPH St Joseph's Health Centre</td>
<td>WATERLOO WELLINGT</td>
<td>CPWRC</td>
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<tr>
<td>2007-2008</td>
<td>674</td>
<td>HAMILTON St Joseph's</td>
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<tr>
<td>2007-2008</td>
<td>704</td>
<td>LEAMINGTON District Memorial</td>
<td>ERIE ST. CLAIR</td>
<td>CPWRC</td>
<td>5,526</td>
</tr>
</tbody>
</table>
3.2 Complex Continuing Care: CRWPD, Case Cost

- **Case Cost** of patient $i$ at hospital $j$ in year $y$ is given by:

  \[
  \text{Case Cost}_{ij}^y = \sum_{t=1}^{T} CMI_{it}^j \times LOS_{it}^j \times CRWPD_{jy}^y
  \]

  $LOS_{it}^j = $ time from last assessment ($t$) to next assessment/discharge ($t+1$)

  $CRWPD_{jy}^y = $ year-specific cost per RUG-weighted patient day

  **Note:** Depending on the research objective, CRWPD can be calculated at the hospital, regional or provincial level.

- **Cost per RUG-Weighted Patient Day (CRWPD)** in hospital $j$:
  
  $CRWPD_{j} = \frac{\text{Total CCC cost}_i}{\text{Total RUG-weighted patient days}_i} (RWPD)$

  where RWPD for all patients $i=1..N$ at hospital $j$ are given by

  \[
  RWPD_{j} = \sum_{i=1}^{N} \sum_{t=1}^{T} LOS_{it}^j \times CMI_{it}^j
  \]
3.2 Complex Continuing Care

- Provincial Average CRWPD

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</thead>
<tbody>
<tr>
<td>CCC Cost per RUG-Weighted Patient Day</td>
<td>$360</td>
<td>$389</td>
<td>$417</td>
<td>$435</td>
<td>$452</td>
<td>$468</td>
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- Hospital Specific CRWPD

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<tr>
<th>Year</th>
<th>Facility #</th>
<th>Facility Name</th>
<th>Facility Type</th>
<th>LHIN</th>
<th>Cost</th>
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<tbody>
<tr>
<td>2007-08</td>
<td>714</td>
<td>LONDON St Joseph's</td>
<td>Teaching</td>
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<td>CRWPD</td>
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3.2 Mental Health

**Utilization data:** Ontario Mental Health Reporting system (OMHRS)

**Case Mix Costing**
- Methodology similar to CCC.
- **Difference:** Phase-based weighting approach. Resource intensity of a typical OMHRS episode is divided into 3 phases.

![Fig.1: Resource Phases and Weighting SCIPP Groups](image-url)
3.2 Mental Health

• Starting October 1, 2005 Ontario Mental Health Reporting System (OMHRS) was implemented to assess patients in MH beds using Minimum Data Set for MH (MDS-MH) on admission, discharge, or every 92 days for patients with longer stays.

• Some MH patients are still in inpatient acute beds (DAD).

For patients in DAD

• Use Ontario Case Cost Initiative cost for CMG+ group

For patients in OMHRS

• Patients are classified according to the System for the Classification of In-Patient Psychiatry Grouping Methodology (SCIIPP).

• Based on his/her SCIIPP group and treatment phase, the patient is assigned SCIIPP Case Mix Index (CMI) that approximates his/her per day resource utilization.

• SCIIPP CMIs are used to calculate SCIIPP-Weighted Patient Days (SWPD) and to estimate Cost per SWPD (CSWPD).
3.2 Mental Health: Case Cost, CSWPD

- **Case Cost** of patient $i$ at hospital $j$ in year $y$ is given by:

  $$
  \text{Case Cost}_i^j = \sum_{t=1}^{T} CMI_{it}^j * LOS_{it}^j * CSWPD_y^j
  $$

  $LOS_{it}^j = \text{time from last assessment (t) to next assessment/discharge (t+1)}$

  $CSWPD_y^j = \text{year-specific cost per SCIPP-weighted patient day}$

**Note**: Depending on the research objective, CRWPD can be calculated at the hospital, regional or provincial level.

- **Cost per SCIPP-Weighted Patient Day (CSWPD)** in hospital $j$:

  $$
  \text{CSWPD}_i^j = \frac{\text{Total MH cost}_i^j}{\text{Total SCIPP-weighted patient days}_i^j} \text{ (SWPD)}
  $$

  where RWPD for all patients $i=1..N$ at hospital $j$ are given by

  $$
  \text{SWPD}_i^j = \sum_{i=1}^{N} \sum_{t=1}^{T} LOS_{it}^j * CMI_{it}^j
  $$
3.3 Home Care

Home Care Utilization: <2005 Ont. Home Care Admin. System (OHCAS)
≥2005 Home Care Database (HCD).

Costing
• Each record in HCD represents a single visit/service provided.
  \[ \text{Visit Cost} = \text{Provincial average cost per visit by service type} \]
  \[ (\text{Visit Cost} = \text{CCAC}-\text{specific average cost per visit by service type}) \]

• **Exception:** respite, in-home support, shift nursing (per hour), case management cost.
  Visit cost for a patient receiving respite, in-home support and shift nursing services:
  \[ \text{Visit Cost} = \text{No. of Hours} \times \text{Provincial average cost per hour} \]
  \[ \text{Case Management cost} = \text{Case management fee} \times (\text{days of HC service}/365), \]
  where days of HC service are assumed to be (discharge-admission) or 365 days.
3.3 Physician Care: Office & In-Hospital

Utilization data: OHIP

Costing

• Fee-for-service physician visits:
  \[ \text{Visit/Procedure Cost} = \text{OHIP fee} \text{ (indexed by Billing Code)} \]

• Non fee-for-service physician visits:
  \[ \text{Option 1} \]
  – Imputation for shadow billing (AFP) / non fee-for-service physicians when fee-paid is zero:
  \[ \text{Visit/Procedure Cost} = \text{median amount reimbursed for a given fee code} \]
  \[ \text{Option 2} \]
  – Allocate capitation to patient
3.3 Physician Care: Office & In-Hospital

Utilization data: OHIP

Costing
• Non fee-for-service physician visits

**Option 2**
• Allocate capitation to patient:
  1. Identify physician roster at end of month*
  2. Identify physician total capitation payment at end of month (physician payment database)
  3. Per-patient capitation = total capitation / number of enrolled patients
  4. Add per-patient capitation to patients’ OHIP costs in month
3.2 Long Term Care Home (LTC) prior to 2010/11

Utilization data: 1) <2003 : Ont. Drug Benefit (ODB) / OHIP.
   » Date of entrance is determined as the first of a minimum 2 consecutive LTC flags.
   » Date of exit – 2 non LTC-flagged drug claims.

2) 2003/04+ : Client Profile Database (CPR0) provides date of admission to LTC

Costing

• **MOHLTC per-diem funding**
  
  \[ \text{MOHLTC per diem} = \text{NPC} + \text{PSS} + \text{RF} + \text{OA} - \text{Resident Basic Co-Pay}. \]

  where NPC – nursing and personal care, PSS – program and support services, RF – raw food, OA – other accommodation

• Case Cost for patient \( i \):

  \[ \text{Case Cost}_i = \text{LOS}_i \times \text{MOHLTC per diem funding} \]

*Note:* Level-of-Care (LOC) funding from the MOHLTC adjusts facility-based payments by a case-mix index based on Level of Care adjustment (derived from chart audits completed during annual facility audits). We do not observe the results of these adjustments and thus are not able to account for them in LTC cost calculation.
3.2 Long Term Care Home (LTC) from 2010/11

Utilization data: 1) Continuing Care Reporting System (CCRS LTC)

Costing
• New weighting system from 2010/11 RUG-III.
Nearly the same as RUG-III from CCRS but different algorithm and only 34 categories.

• Case Cost of patient $i$ in LTC Home on a given year $y$ is given by:
  \[ Case\ Cost_i = \sum_t \{CMI_{it} \cdot LOS_{it} \cdot CRWPD-LTC_y \} \]

• Only provincial average Cost per RUG-Weighted Patient Day (CRWPD-LTC) at this time
3.3 Prescription Drugs

**Utilization data:** Ontario Drug Benefit (ODB) > 65 yrs

**Costing**

*Case cost = Total amount paid to the pharmacy by the MOH*  
*+ dispensing fees*

- + ? Dispensing fees
- + ? Copayment (deductible):
3.3 Laboratory Prices

We need to work on this

1 Labs/Clinics component
   • Do not currently have information on.

2 Physician component
   From CIHI report on physician compensation (2004-2005):
   • Approximately 50% of all laboratory services are funded through OHIP and therefore are included in the National Physician Database (NPDB) file submissions. The remaining 50 percent are funded via Public Health (1%) and Hospital global budgets (49%).
   • Information on Radiology services is not available.
## Provincial Case/Visit Costs

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