Trends in income-related inequality: a focus on smoking and COPD hospitalizations
Erin Pichora, Mohamed Kharbouch, Christine Boyes, Geoff Hynes, Jean Harvey
May 25, 2015
Outline

• Project Overview

• Methodology & Results
  – Smoking, 18+ years
  – COPD hospitalization, <75 years

• Discussion:
  – Reducing inequalities in smoking and COPD hospitalization
CIHI’s Trends in Income-related Health Inequalities Project

• This project examines:
  – The extent to which income-related inequalities in health and factors affecting health (16 indicators) have changed over time in Canada and in the provinces.
  – Examples of promising interventions for reducing income-related inequalities in health and factors affecting health.

• This presentation will focus on 2 indicators:
  – Smoking (18+ years)
  – COPD hospitalizations (<75 years)
Why Examine Trends in Income-Related Health Inequality?

• Income-related health inequalities are large and have a substantial impact on the health of Canadians

• Recognized internationally through Rio Declaration on the Social Determinants of Health, adopted in 2011

• Increasing federal, provincial and local level analysis documenting the extent of inequalities
  – E.g., CIHI 2013 Health Indicator report - 15 indicators reported by neighborhood income level’

• Have health inequalities have changed over the past decade?
Methods – General Approach

• Rates by income quintile
  – Over time
  – By sex
  – At the national and provincial levels

• Inequality measures comparing the rates in the lowest (Q1) and highest (Q5) income quintiles:
  – Rate Difference (RD): Q1-Q5 – absolute measure
  – Rate Ratio (RR): Q1/Q5 – relative measure

• Quantify change over time
  – Non-overlapping confidence limits from 1st and last time point
Methods – Smoking (18+ years)

• Indicator: Proportion of Canadians age 18 or older who currently smoke cigarettes daily or occasionally
• Source: Canadian Community Health Survey (CCHS), Statistics Canada
• Income variable: Self-reported adjusted income

• RATIONALE
  – Smoking is a leading cause of premature death in Canada
    • Leading cause of COPD, as well as other conditions
  – Overall rates have been declining over the past decade
  – Association with socio-economic status is well established
Smoking (18+yrs), Canada, 2003-2013

Rates over time
- Remained unchanged in lowest income level
- Improved in highest income level
Smoking (18+yrs), Canada, 2003-2013

Inequality increased on both scales

- Rate ratio (Q1/Q5): increased from 1.53 to 1.91
- Rate difference (Q1-Q5): increased from 10.2 to 13.8 percentage points

Rates over time
- Remained unchanged in lowest income level
- Improved in highest income level
Smoking (18+yrs) Canada, 2003-2013, by sex

**Men**

<table>
<thead>
<tr>
<th>Year</th>
<th>Q1 (Lowest Income)</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5 (Highest Income)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>32.2 %</td>
<td>20.5 %</td>
<td>35.5 %</td>
<td>17.7 %</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009-2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011-2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Women**

<table>
<thead>
<tr>
<th>Year</th>
<th>Q1 (Lowest Income)</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5 (Highest Income)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>27.1 %</td>
<td>24.7 %</td>
<td>17.3 %</td>
<td>12.0 %</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009-2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011-2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Inequality Over Time**

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate Ratio</th>
<th>Rate Difference</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>1.57*</td>
<td>11.6*</td>
<td>↑</td>
</tr>
<tr>
<td></td>
<td>(95% CI)</td>
<td>(95% CI)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.45–1.69)</td>
<td>(9.6–13.7)</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>2.01*</td>
<td>17.9*</td>
<td>↑</td>
</tr>
<tr>
<td></td>
<td>(1.78–2.27)</td>
<td>(14.7–21.1)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate Ratio</th>
<th>Rate Difference</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>1.57*</td>
<td>9.9*</td>
<td>↑</td>
</tr>
<tr>
<td></td>
<td>(95% CI)</td>
<td>(95% CI)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.44–1.72)</td>
<td>(8.1–11.7)</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>2.05*</td>
<td>12.6*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.76–2.39)</td>
<td>(10.0–15.3)</td>
<td></td>
</tr>
</tbody>
</table>
Methods – COPD Hospitalization (< 75 years)

• Indicator: Inpatient treatment at general hospitals for those younger than 75 years, expressed separations per 100,000

• Source: Discharge Abstract Database (DAD) and Hospital Morbidity Database (HMDB), Canadian Institute for Health Information

• Income variable: Neighborhood-level income

• RATIONALE
  – COPD is a chronic lung disease and leading cause of morbidity/mortality in Canada
  – COPD is largely attributable to smoking
  – Lower hospitalization rates are desirable and reflect better access to effective primary care, as well as lower COPD prevalence
COPD Hospitalization (<75 years), 2001-2012

Rates over time
- Worsened in the lowest income quintile
- Improved in highest income quintile
Inequality increased on both scales

- Rate ratio (Q1/Q5): increased from 2.6 to 3.1
- Rate difference (Q1-Q5): increased from 128 per 100,000 to 150 per 100,000

Rates over time
- Worsened in the lowest income quintile
- Improved in highest income quintile
COPD Hospitalization (<75 years), 2001-2012

**Men**

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2012</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate Ratio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(95% CI)</td>
<td>2.73*</td>
<td>3.32*</td>
<td>(2.59–2.88)</td>
</tr>
<tr>
<td>Rate Difference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(95% CI)</td>
<td>142*</td>
<td>159*</td>
<td>(134–149)</td>
</tr>
</tbody>
</table>

**Women**

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2012</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate Ratio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(95% CI)</td>
<td>2.51*</td>
<td>2.91*</td>
<td>(2.38–2.65)</td>
</tr>
<tr>
<td>Rate Difference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(95% CI)</td>
<td>117*</td>
<td>142*</td>
<td>(111–124)</td>
</tr>
</tbody>
</table>
Recap Key Findings

- **Increased inequality** for smoking (18+) and COPD hospitalization (<75 years)
- Increases were observed for both men in women
- The gaps widened because rates tended to improve (decrease) in the highest income level, but remain the same or worsen in the lowest income level
What could be the impact of reducing these inequalities?

Hypothetical Scenario –

What if Canadians in the bottom 4 income quintiles experience the same indicator as those in the highest income quintile?
What could be the impact of reducing inequalities?

Hypothetical Scenario –

What if Canadians in the bottom 4 income quintiles experience the same indicator as those in the highest income quintile?

- 45% overall rate reduction
- 18,700 fewer hospitalizations
- ~$150M in system savings

- 27.5% overall rate reduction
- 1.6 million fewer smokers
Approaches for reducing overall smoking and COPD hospitalization rates

**Smoking Prevalence**
- Prevention
- Cessation

**Smoking cessation programs**

**Price increases (e.g., tax increases)**

**Advertising bans**

**Educational media campaigns; warning labels**

**Smoke-free policy**

**COPD Hospitalization Rates**
- Prevention
- Management

**Self-management**

**Early detection**

**Smoking cessation programs**

**Vaccination**

**Pulmonary rehabilitation**

**Multidisciplinary care**
Approaches for reducing overall smoking and COPD hospitalization rates

**Smoking Prevalence**
- Prevention
- Cessation

**Smoking Cessation Programs**

**COPD Hospitalization Rates**
- Prevention
- Management

**Self-management**

**Early detection**

**Smoking cessation programs**

**Educational media campaigns; warning labels**

**Price increases (e.g., tax increases)**

**Advertising bans**

**Multidisciplinary care**

**Vaccination**

**Pulmonary rehabilitation**
Approaches for reducing income-related smoking inequalities

• Overall paucity and challenges of gathering evidence
  – Multi-faceted population-level approaches to tobacco control
  – Need for new methodologies

• Increases in tobacco price – pro-equity effect

• Mainstream smoking cessation programs – negative equity effect in population and in patients with chronic disease
  – Unless programs are tailored and/or targeted to lower SES populations (e.g., Yes, I quit; UK NHS Stop Smoking)
Example from Canada

• Coverage of smoking cessation aids and strength of smoking cessation programs vary by province (CPAC, February 2015)

• In 2012, NFLD and NB were the only two provinces that did not provide coverage for nicotine replacement therapies (NFLD Medical Association)

• In March 2014, NFLD increased taxes by 3 cents per cigarette and 6 cents per gram of fine-cut tobacco
  – Estimated to yield increased revenue of 17 million, of which $712,000 would be allocated to subsidize smoking cessation products for people living on low incomes.
Questions or Comments?

CPHI TEAM cphi@cihi.ca
Erin Pichora epichora@cihi.ca
www.cihi.ca

Thank You
Trends in Income-Related Health Inequalities: Report Organization and Indicator Selection

Section 1: Structural factors: a focus on income

INCOME
- After-tax income

INTERACTIONS
- University participation by income and sex
- Unemployment by educational attainment and sex

ABORIGINAL STATUS
- Income and unemployment

Inequality trend:
- Increasing
- Persisting
- Decreasing

Section 2: Intermediary factors influencing health

MATERIAL CIRCUMSTANCE
- Core Housing Need
- Household Food Insecurity

EARLY LIFE
- Small for Gestational Age (SFGA)
- Children Vulnerable in Areas of Early Development

BEHAVIOURAL & BIOLOGICAL
- Smoking
- Obesity

HEALTH SYSTEM
- Influenza Immunization for Seniors
- Chronic Obstructive Pulmonary Disease (COPD) Hospitalization, Canadians Younger than Age 75

Section 3: Health & Well-Being Outcomes

INJURY
- Fall Injury Hospitalization for Seniors
- Motor Vehicle Injury Hospitalization

CHRONIC DISEASE
- Mental Illness Hospitalization
- Alcohol-Attributable Hospitalization
- Hospitalized Heart Attack
- Diabetes

WELL-BEING
- Self-Rated Mental Health

MORTALITY
- Infant Mortality

Disaggregated by income and sex over time