The Costs of Smoking

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Why Do We Study the Cost of Smoking?

- To assess the economic impact of smoking behavior on:
  - Society (macro economy)
  - Individuals (economy of a household)
  - State budget (public finances)
  - Business/employers

- Perspective of each entity will determine what will be included in the costs

- Societal perspective is most comprehensive
Classification of Costs

- **Direct costs**: reduction in existing resources (existing resources are diminished; e.g., goods and services in health care)
  - “Direct health care costs” (e.g., medicines)
  - “Direct non-health care costs” (e.g., transportation to clinic, time of family members providing care)

- **Indirect or productivity costs**: reduction in potential resources (due to premature morbidity or mortality)

Examples of Direct Costs

- **Direct health care costs**
  - Hospital services (e.g., inpatient, outpatient)
  - Outpatient services (e.g., primary care doctor visits)
  - Prescription and nonprescription drugs
  - Long-term care (e.g., nursing homes)

- **Other direct costs**
  - Transportation costs to receive medical care
  - Time of family members spent providing care
  - Food expenses connected to medical care
  - Fire
  - Welfare provisions (sick pay, disability pay)
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Examples of Indirect Costs

- Production losses resulting from:
  - Premature death
  - Sickness
  - Other reduced productivity (e.g., time spent smoking, reduced health status of smokers)

Other Classification of Costs

- **External costs:** costs that smokers imposed on others without compensation (e.g., costs related to secondhand smoke)
  - These costs constitute the rationale for taxation

- **Internal costs:** costs paid for by smokers (and their families) incurred as a result of smoking (e.g., costs of cigarette purchases for smokers who would like to quit and are unable to do so)
  - These costs relate to utility from smoking
  - Taxes can correct internalities for addictive substances such as tobacco products
Other Classification of Costs

- **Tangible costs:** existing resources that are diminished
  - These resources have a market price (e.g., costs of treatment for smoking-related illness or reduced access to health care for others due to the diversion of limited resources)

- **Intangible costs:** do not reduce existing resources, are difficult to value (e.g., pain and suffering)

Other Classification of Costs

- **Avoidable costs:** these costs can be avoided if the most efficient health policies were implemented and maintained over an extended period of time (e.g., cessation)

- **Unavoidable costs:** costs which are currently borne relating to past abuse, and costs incurred by the proportion of the population who will continue to smoke
What Are Health Care Costs Attributable to Smoking?

- Incidence-based approach:
  - Net health care costs of smoking: additional costs across the full lifespan of a smoker, compared with costs for that same person as a hypothetical nonsmoker ("Death Benefit" argument)

- Prevalence-based approach:
  - Gross health care costs of smoking: actual expenditures for additional health care provided across a given time period because of smoking by the population (smoking attributable fraction)

Lifetime Costs of Smoking: The Death Benefit Issue

- The argument is:
  - Smokers, on average, do not live as long as nonsmokers
  - Over the lifespan of smokers, health care costs are not greater than costs for nonsmokers, but expenditures are more rapid
  - Smokers pay the same into retirement and other systems compared with nonsmokers (not if smokers die in productive age)
  - Therefore, nonsmokers and governments benefit from their premature deaths—the so-called "Death Benefit" argument
  - But the value of money and future treatment costs need to be taken into account
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The Death Benefit Issue: Case Study

- Philip Morris study of smoking in the Czech Republic (2001)
  - State budget perspective (narrow focus)
  - Results
    - Net benefit of $150 million due to tax income (smokers and industry) and premature deaths
    - Included health care costs, lost income tax, paid sick leave, and property loss due to fire (but not all costs)


Critique

- Not included: costs imposed on families (lost income, out-of-pocket costs of treatment, costs for buying cigarettes) and lost productivity due to illness
- Implies that the value of a retired person’s life is zero
- Taxes do not represent a new value but an income redistribution (taxes can be collected from different products; tobacco does not need to be consumed in order to collect taxes)

- If taxes are left out from the Philip Morris study, smoking would cost the government 13 times more than what it would save

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Smoking Attributable Fraction (SAF)

- **SAF**: the fraction of health care costs resulting from smoking
- Method of estimating the excess health care costs (prevalence-based approach)
  - Estimate total or disease-specific costs
  - Reduce the total costs in three steps
    1. Eliminate nonsmokers
    2. Eliminate diseases among smokers not caused by smoking
    3. Subtract average health care costs for the population

Calculation of SAF

<table>
<thead>
<tr>
<th></th>
<th>Lung cancer</th>
<th>No lung cancer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoker</td>
<td>140</td>
<td>4,860</td>
<td>5,000</td>
</tr>
<tr>
<td>Never smoker</td>
<td>20</td>
<td>4,980</td>
<td>5,000</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>9,840</td>
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- Of lung cancer cases, 140 out of 160 occur in smokers
  - $140/160 = 87.5\%$
- First reduction of total costs is by 87.5\%
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- How much extra disease? Only 120 out of the 140 cases in smokers are attributable to smoking (since 20 nonsmokers also got lung cancer)
  - \( \frac{120}{140} = 85.7\% \)

- Second reduction of total costs is by 85.7%

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Calculation of SAF

- How much extra health care costs?

- Example
  - In 1987, average cost for lung cancer patient = $15,000
  - In 1987, average health care cost per person = $700
  - $15,000 - $700 = $14,300
  - $14,300 / $15,000 = 95.3%

- Third reduction of total costs is by 95.3%
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### Calculation of SAF

- Assume total lung cancer expenditures in 1987: $2.4 million
- First reduction by 87.5% to include only smokers: $2.1 million
- Second reduction by 85.7% to count only the cases among smokers, taking into account the nonsmoking population: $1.8 million
- Third reduction by 95.3% to count only excess health care costs: $1.7 million
- Smoking-attributable fraction:
  - $1.7 million/$2.4 million = 71.5%

### Global Evidence on Health Care Costs from Smoking

- Studies using the prevalence-based approach
  - Annual (gross) health care costs represent 0.1% to 1.1% of GDP, or 6% to 15% of total health costs
- Studies using the incidence-based approach
  - Differences in lifetime costs are smaller than annual costs
  - Most studies consider only health care costs, not the other internal, external, and intangible costs
  - Best studies do suggest that there are net lifetime costs

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Research Evidence on Health Costs: Europe

- Costs of smoking in EU25 countries
  - Method: prevalence-based approach contrasting results of two approaches
    - SAF of direct and indirect costs for treatment of respiratory and heart diseases in EU15 and extrapolation to EU25
    - Extrapolation of direct and indirect costs of smoking in Germany
  - Results: smoking costs EU25 1.04% to 1.39% of GDP, or €211 to €281, per capita per year


Cost of workplace smoking in Ireland

- Method: macro-level estimates of smoking-related excess absenteeism, reduced productivity, and foregone output arising from premature mortality are combined with data on average income and employment rate; no health care costs
  - Results: €1,237 million to €1,886 million (1.1% to 1.7% of Irish GDP in 2000)

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Research Evidence on Health Costs: Europe

- Cost of workplace smoking in Scotland
  - Method: micro-level estimates of smoking-related excess absenteeism, reduced productivity, and cost of fire hazards are combined with data on average income and employment rate; no health care costs
  - Results: €437 million to €652 million (0.51% to 0.77% of Scottish GDP in 1997)


Research Evidence on Health Costs: Europe

- Net (lifetime) health care costs in Denmark
  - Method: incidence-based approach
  - Results: direct and indirect lifetime health costs were 66% and 83% higher in ever smokers than in never smokers for men aged 35; for women, these estimates were 74% and 79%, respectively

Health Care Costs from Smoking: Taiwan

- **Methods**: prevalence-based approach to calculate SAF of costs on medical care and loss of productivity due to premature death

- **Results**: 6.8% of total health costs attributable to smoking
  - The total smoking attributable cost was U.S. $1.79 billion in 2001


Health Care Costs from Smoking: Korea

- **Method 1**: disease-specific approach
  - Direct and indirect costs of treating cancer and cardiovascular, respiratory, and gastrointestinal diseases attributable to smoking using the population attributable risk (PAR)

- **Method 2**: all-causes approach
  - Compare the differences in direct and indirect costs between smokers and nonsmokers for all conditions and types of disease

- **Results**: 0.6% to 0.8% of GDP using disease-specific approach and 0.8% to 1.2% of GDP using all-causes approach

**Health Care Costs from Smoking: Hong Kong**

- Method: active and passive SAF is linked to mortality; hospital admissions; outpatient, emergency, and general practitioner visits for adults and children; use of nursing homes and domestic help; time lost from work due to illness and premature mortality in the productive age
  - Work time lost was valued at the median wage

- Results: productivity losses due to active and passive smoking HK$1,773 billion per year; total direct health care and long-term care costs HK$3,572 billion per year; about 28% health care cost due to passive smoking; about 50% of all costs fall on public sector; government revenue from tobacco duty is only HK$2.5 billion per year


**Summary**

- Costs of smoking are subject to multiple classification

- Understanding these classifications is important for defining research objectives and for critical evaluation of research results

- The majority of studies focus on the health care costs of smoking because they are of most interest to policy makers and are easier to quantify

- However, health care costs constitute only a fraction of the total costs of smoking

- Not all costs related to smoking-related diseases can be attributed to smoking
### Summary

- There is a delay factor between the onset of smoking and costs imposed on the smoker, his/her family, and society.

- Most studies have limitations and underestimate the true costs of smoking.

- The conservative estimates of smoking costs in most countries in which studies have been conducted range from 0.1% to 1.1% of GDP, or 6% to 15% of total health care costs.

- These costs will be increasing in the future due to the upward trend in health care spending.