



# The Costs of Smoking

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# Why Do We Study the Cost of Smoking?



- ✓ To highlight the economic impact of smoking behavior in order to efficiently allocate limited resource.
- ✓ To draw attention of donor community: tobacco drains at least US\$1436 billion/year – 1.8% of world's GDP from the global economy (Goodchild et al, 2016)
- ✓ To win a lawsuit? \$ value of healthcare costs was an important part of the damage claims against the tobacco industry in the 1998 Master Settlement Agreement



# Who is Interested in the Cost of Smoking?



- Society - government, academics (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 & money is exchanged; e.g. goods and services in healthcare)

## Indirect or productivity costs:

reduction in potential resources (due to premature morbidity or mortality; no money is exchanged)



# Examples of Direct costs (1)



## • Direct healthcare costs

- Hospital services (e.g. inpatient, outpatient)
- Outpatient services (e.g. primary care doctor visits)
- Prescription & non-prescription drugs
- Long-term care (e.g. nursing homes)



## Examples of Direct costs (2)



- **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)



# Examples of Indirect Costs

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



# Other Classification of Costs



(1)

**External costs:** Costs that smokers imposed on others without compensation (e.g. costs related to second-hand smoke).

**These costs constitute a rationale for taxation.**

**Internal costs:** Costs paid for by smokers (and their families) incurred as a result of smoking. Part of internal costs could be counted as external costs (e.g. costs of cigarette purchases for smokers who would like to quit but are unable to do so; smokers who reveal time-inconsistent preferences).

**These costs relate to utility from smoking. Taxes can correct internalities for addictive substances such as tobacco products.**





# Other Classification of Costs (2)



## Tangible costs

Existing resources are diminished. These resources have a market price (e.g. costs of treatment for smoking-related illness or reduced access to healthcare for others due to the diversion of limited resources).

## Intangible costs

Do not reduce resources, are difficult to value (e.g. pain and suffering).



# Other Classification of Costs (3)



## Gross healthcare costs of smoking

Actual expenditures for additional healthcare provided across a given time period because of smoking by the population (**smoking attributable fraction**): prevalence-based approach, reflects historical trend in smoking

## Net healthcare costs of smoking

Additional costs across the full lifespan of a smoker, compared with costs for that same person as a hypothetical non-smoker (**“Death Benefit”** argument): incidence-based approach



# The Death Benefit Issue: Life-time Costs of Smoking



## The argument is:

- Smokers do not live as long as non-smokers on average.
- Over their lifespan, healthcare costs of smokers are not greater than for non-smokers, but expenditures are more rapid (*Not true if all medical costs and productivity losses are considered*).
- Smokers pay the same into retirement and other systems compared with non-smokers, but will take out less due to their shorter lives (*Not true: 1/2 of smokers die in productive age, thus contribute less*).
- Therefore, non-smokers and governments benefit from their premature deaths: the so-called “death benefit” argument (*Not true, also because the value of money and future treatment costs need to be taken into account*).



# The Death Benefit Case Study



**Philip Morris study of smoking in the Czech Republic (2001).**

State budget perspective (narrow focus).

PM: Net benefit \$150 million due to tax income (smokers & industry) and premature deaths.

- 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 PM study, **smoking costs** the government **13 times more** than what is saved.

**Hana Ross: "Critique of the Philip Morris study of smoking in the Czech Republic". Nicotine & Tobacco Research, Volume 6, Number 1 (2004) 1–9.**



# Approaches to Estimate the Health Care Costs of Smoking (1)



**A bottom-up approach** identifies all of the resources that are used to provide a service and assigning a value to each of those resources. These values are summed and linked to a unit of activity (e.g. a day in hospital) to derive a total unit cost (e.g. annual treatment cost for a lung cancer patient)

**A top-down approach** entails dividing the total expenditure for a given area (e.g. total costs of treating lung cancer in the whole country) by total units of activity (e.g. # of lung cancer patients served) to derive a unit cost.



# Approaches to Estimate the Health Care Costs of Smoking (2)



**Additive approach** calculates health care costs for each disease and then applied SAF (epidemiological approach).



# Calculating SAF



$$SAF_{ij} = \frac{P \times (RR_{ij} - 1)}{P \times (RR_{ij} - 1) + 1} \times 100\%$$

- P = percentage of ever smokers (current plus former smokers)
- $RR_{ij}$  = relative risk of developing a particular tobacco-related disease i or having an event i (such as incurring disability days) for ever smokers compared to never smokers (RR for deaths are often used as a proxy)



# Approaches to Estimate the Health Care Costs of Smoking (3)



**Subtractive approach** expenditures of smokers are compared to expenditures of “nonsmoking smokers” (regressional analysis).





# Calculating SAF of Healthcare Costs of Smoking (Econometric or Subtractive Approach)



1. Predict individual total annual healthcare costs for all diseases regardless of smoking status
2. Predict the excess healthcare costs for smokers by subtracting the predicted total health care costs for “hypothetical nonsmoking smokers”

The approach considers confounding factors (e.g. other risk behavior among smokers).

Can be done when a detailed health care utilization survey with data on risk factors is available.



# How to Estimate Productivity Loss Due to Morbidity (Indirect Costs) - Human Capital Approach



Estimate number of days out of work due to smoking-related hospitalization, outpatient care, sick days

Adjust for unemployment level

Number of days lost per disease x SAF  
×  
median daily salary

=

**Monetary value of lost productivity due to smoking-related morbidity**



# How to Estimate Productivity Loss Due to Premature Death (Indirect Costs) - Human Capital Approach



Estimate number of lives lost due to smoking

Present value of productive years lost  
 $\times$   
median salary

How many lives under 65 years?

**Monetary value of lost productive years due to smoking**

=



# Summary (1)



- Costs of smoking are subject to multiple classification.
- Understanding this classification is important for defining research objectives and for critical evaluation of research results.
- The majority of studies focus on the healthcare costs of smoking, because they are of most interest to policy makers and are easier to quantify.
- However, healthcare costs constitute only a fraction of the total costs of smoking.
- Not all costs pertaining to smoking-related diseases can be attributed to smoking.



## Summary (2)



- 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 admit underestimating the true costs of smoking.
- The conservative estimates of gross smoking costs in most countries in which studies have been conducted concluded that smoking costs society 0.1 - 1.1% of GDP, or 6 - 15% of total health costs. Estimates of net smoking costs vary, most conclude that smoking also increases net social costs.
- These costs will be increasing in the future due to the trend in healthcare spending.



**Thank you!**

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