Assessing cost of illness related to tobacco

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Outline

- Reasons for estimating economic cost of tobacco
- Framework
  - Perspective
  - Components of the economic cost of smoking
    - Direct cost
    - Indirect cost
    - Intangible cost
  - Approach
    - Prevalence- VS incidence-based COIs
  - Definition of affected population
  - Definition of relevant smoking-related diseases
- Methods
  - Smoking-Attributable Fraction (SAF)
    - What is SAF?
    - How to calculate SAF?
  - Estimate the direct health care costs of smoking
  - Estimate the indirect morbidity cost of smoking
  - Estimate the indirect mortality cost of smoking
Cost-of-illness (COI) analysis

The objective of Cost-of-illness (COI) analysis is to evaluate the economic burden illness impose on society as a whole in terms of the consumption of health care resources and production losses.

- the economic cost of illness represented the economic benefits of a health care intervention that eradicated such illness
Cost of illness related to tobacco

- The total economic costs of smoking represent a significant loss for the whole economy
  
  Developed countries
  - Australia: 2.1% - 3.4% of GDP
  - Canada: 1.3% - 2.2% of GDP
  - The US: 1.4% - 1.6% of GDP

Low- and middle-income countries
- Rarely documented while the prevalence of smoking has been increasing rapidly

Lightwood & Collin et al 2000
Cost of illness related to tobacco

COI related to tobacco in Asia

- **China** – Yang L et al (2011): Economic cost of smoking accounted for 0.7% of GDP in 2008
- **Singapore** – Quah E et al (2002): Social cost of smoking in 1997 ranged from S$673 Million to S$839 Million
- **Thailand** – Leartsakulpanitch J et al (2007): Total smoking-attributable out-of-pocket medical costs accounted for 0.48% of GDP in 2006
- **Vietnam** – Ross et al (2007): Inpatient health care cost attributable to smoking representing 0.22% of GDP in 2005
- **Korea** – Kang HY et al (2003): Economic cost of smoking accounted for 0.59% to 0.78% of GDP.
- **Hong Kong** – McGhee SM et al (2006): Cost of smoking was USD532 Million for active smoking and USD 156 Million for passive smoking in 1998

Lightwood & Collin et al 2000
Due to differences in healthcare system and patterns of smoking-related diseases, economic burden of smoking must be tailored to country-specific situations!
Assessing cost of illness related to tobacco: Why?

Potential use of COI related to tobacco
- To draw policy maker, legislators interest on the impact of smoking
- To guide health policy and health planning for tobacco control initiative
- To provide an economic framework for tobacco control program evaluation
World Health Organization
ECONOMICS OF TOBACCO TOOLKIT

Assessment of the Economic Costs of Smoking
Perspective of COI study

- Perspective
  - Microeconomic perspective: The impact of smoking on household, firms, etc
  - Macroeconomic perspective: Aggregate impact of smoking across all economic agents to derive societal assessment
Component of costs
What are the type of costs?

- Direct Costs
  - The monetary value of goods and services consumed as a result of smoking and smoking-related illness, and for which a payment is made.

Examples: Health care cost (hospitalization, physician services, nursing home care, medical supplies), cost of cigarette, transportation cost, property losses from fires caused by smoking.
What are the type of costs?

- **Indirect Costs**
  - Morbidity costs represent the value of lost productivity by persons who are ill or disabled from smoking related disease
  - Mortality cost: smokers have an increased probability of dying from a number of diseases that have been causally linked to smoking. The value of the lives lost is known as mortality cost
    - **Human capital approach** – the value of life is based on assigning a monetary value to a life according to what an individual produces – wage/income
    - **Willingness to pay approach** - the value of life is based on what somebody would pay to avoid illness and death
What are the type of costs?

- Intangible costs
  - Some of the economic costs resulting from smoking are intangible and more difficult to quantify such as pain and suffering of sick smokers and their families, and the negative impact of smoking odors on others.
  - Although pain and suffering can be assessed by using the willingness to pay approach, intangible costs have rarely been estimated in previous cost of smoking studies.
Internal cost VS External cost

- **Internal cost** - Cost borne by smokers
  - Cost of purchase tobacco product
  - Medical care cost
  - Cost related to productivity loss

- **External cost** - Cost not borne by smokers themselves
  - The increased healthcare costs that might result from the second-hand smoke exposure of a nonsmoker
  - Health care cost of smokers that are subsidized by nonsmoker through insurance payments
  - Cost spending on public program
Internal cost VS External cost

Which cost should be taken into account?

- External costs should be taken into account in policy decision
  - Smokers can make their own decision regarding their behavior
- However, if smokers are unable to quit smoking due to factors beyond their control (including the addictive nature of nicotine), then both internal and external costs can be considered
Definition of affected population

- People of all ages are affected by smoking but in different ways
  - Adult smokers- health and productivity-related impacts of exposure to tobacco
  - Non smoking spouse/children-exposed to second hand smoker
  - Unborn children-exposed to mother ‘s smoking
  - Men VS Women are usually studied separately because the health impacts of smoking are different by gender

- It is important that we identify the population of interest at the beginning because it will help determine the framework of the study
Definition of relevant smoking-related diseases

- A number of diseases have been causally linked to smoking
- A landmark 25th Anniversary Report of the US Surgeon General (US DHHS, 1989) identified 26 diseases that are known as smoking related causes of death, which were based on a review of the literature and CPS-II data (American Cancer Society Cancer Prevention Study II)
### Table 2.1. Smoking-Related Causes of Death (US DHHS, 2004)

<table>
<thead>
<tr>
<th>Disease</th>
<th>ICD-9 Codes</th>
<th>ICD-10 Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Malignant Neoplasms:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lip, oral cavity, pharynx</td>
<td>140-141, 143-149</td>
<td>C00-C14</td>
</tr>
<tr>
<td>Esophagus</td>
<td>150</td>
<td>C15</td>
</tr>
<tr>
<td>Stomach (gastric)</td>
<td>151</td>
<td>C16</td>
</tr>
<tr>
<td>Pancreas</td>
<td>157</td>
<td>C25</td>
</tr>
<tr>
<td>Larynx</td>
<td>161</td>
<td>C32</td>
</tr>
<tr>
<td>Trachea, lung, bronchus</td>
<td>162</td>
<td>C33-C34</td>
</tr>
<tr>
<td>Cervix, uteri</td>
<td>180</td>
<td>C53</td>
</tr>
<tr>
<td>Kidney and renal pelvis</td>
<td>189</td>
<td>C64-C65</td>
</tr>
<tr>
<td>Urinary bladder</td>
<td>188</td>
<td>C67</td>
</tr>
<tr>
<td>Acute myeloid leukemia</td>
<td>205.0</td>
<td>C92.0</td>
</tr>
<tr>
<td><strong>Cardiovascular Diseases:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>410-414, 429.2</td>
<td>I20-I25</td>
</tr>
<tr>
<td>Cerebrovascular disease (stroke)</td>
<td>430-438</td>
<td>I60-I69</td>
</tr>
<tr>
<td>Atherosclerosis</td>
<td>440</td>
<td>I70</td>
</tr>
<tr>
<td>Aortic aneurysm</td>
<td>441</td>
<td>I71</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>443.1-443.9</td>
<td>I73</td>
</tr>
<tr>
<td>Arterial embolism and thrombosis</td>
<td>444</td>
<td>I74</td>
</tr>
<tr>
<td><strong>Respiratory Diseases:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic bronchitis, emphysema</td>
<td>491-492</td>
<td>J41-J43</td>
</tr>
<tr>
<td>Chronic airways obstruction</td>
<td>496</td>
<td>J44</td>
</tr>
<tr>
<td><strong>Reproductive Effects:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low birth weight</td>
<td>765</td>
<td>P07</td>
</tr>
<tr>
<td>Respiratory distress syndrome – newborn</td>
<td>769</td>
<td>P22</td>
</tr>
<tr>
<td>Other respiratory conditions – newborn</td>
<td>770</td>
<td>P23-P28</td>
</tr>
<tr>
<td>Sudden Infant Death Syndrome</td>
<td>798.0</td>
<td>R95</td>
</tr>
</tbody>
</table>
COI Approach

Prevalence-Based approach or annual cost approach

- This approach sums the excess cost of smoking related diseases and deaths incurred by current smokers and former smokers compared to never smokers in a year representing a result of smoking-related illness manifested during that year but caused by cumulative exposure to tobacco over many years in the past.

- The costs of illness should be assigned to the years in which they are borne or are directly associated:
  - Direct cost and cost of productivity losses resulting from illness are assigned to the years in which they occur.
  - Lost expected future earnings resulting from premature mortality are assigned to the year of death.
COI Approach

Incidence based approach or Lifetime cost approach

- This approach estimates the excess costs expected to occur as a result of smoking-related illness in a group of current smokers compared to never smokers over their life time OR the excess lifetime costs per smokers compared to a never smoker if he/she continues to smoke throughout life at the same level as present.

- To estimate the lifetime cost longitudinal, data on healthcare cost of smokers and never smokers over their lifetimes, as well as their survival rates are need.
  - This approach is rarely used in the cost of smoking due to the difficulty in getting the data.
Which approach to use?

- If the objectives are to understand the economic impact of smoking on a particular payer in a given year, to determine how to allocate national budgets – Prevalence based approach

- If the objective is to look at the cost-effectiveness of alternative tobacco control strategies over a long time horizon – incidence based approach
In this workshop we will focus on the prevalence-based approach
Method: Smoking-attributable Fraction (SAF)

What is SAF?
SAF is the proportion of health services utilization, health care cost, death or other health outcome measures that can be attributable to smoking.

Once the SAF is determined, it can be multiplied by the corresponding total measure of interest to derive the smoking attributable measure.
Method: Smoking-attributable Fraction (SAF)

Example:
SAF for lung cancer incidence = 80%
Total number of lung cancer patients in 2013 = 1,000
Average annual cost of treatment of lung cancer/person = 200,000 Baht

Smoking attributable lung cancer treatment in 2013
= 0.8*1,000*200,000 Baht
Estimation techniques for smoking-attributable fraction

- To calculate SAF, two data elements are needed
  - Smoking prevalence (current, former, smoker) categorized by gender
  - Relative risk (RR):
    - \( RR_i = \frac{\text{Disease } i \text{ incidence in smoker}}{\text{Disease } i \text{ incidence in nonsmoker}} \)

**Example:** incidence of lung cancer in smoker was 20 per 1,000 persons for current smoker and was 1 case per 1,000 persons for never smoker

\[
RR_{\text{lung cancer}} = \frac{20}{1,000} = 20
\]

A current smoker is 20 times as likely to develop lung cancer as a never smoker.
Estimation techniques for SAF

\[
SAF_i = \frac{P_e \times (RR_{ie} - 1)}{P_e \times (RR_{ie} - 1) + 1} \times 100\%
\]

\[
\frac{[P_n + P_e \times RR_{ie})] - 1}{[P_n + P_e \times RR_{ie}]} \times 100\%
\]

where the subscript i = lung cancer or a particular tobacco-related disease i

\(P_e\) = percentage of ever smokers (current plus former smokers) or the smoking impact ratio (SIR)

\(P_n\) = percentage of never smokers, which equals \((1 - P_e)\)

\(RR_{ie}\) = relative risk of developing lung cancer or a particular tobacco-related disease i or having an event i (such as incurring disability days) for ever smokers compared to never smokers

WHO. Assessment of the Economic costs of smoking: Economics of tobacco toolkit. 2011
Estimation techniques for SAF

If prevalences and Relative risk data are available separately for current and formal smoker

- \( SAF_i = SAF_{ic} + SAF_{if} \) (Calculate \( SAF_i \) separately for men and women)

\[
SAF_{ic} = \frac{P_c \times (RR_{ic} - 1)}{P_c \times (RR_{ic} - 1) + P_f \times (RR_{if} - 1) + 1} \times 100%
\]

\[
SAF_{if} = \frac{P_f \times (RR_{if} - 1)}{P_c \times (RR_{ic} - 1) + P_f \times (RR_{if} - 1) + 1} \times 100%
\]

\[
SAF_i = \frac{P_c \times (RR_{ic} - 1) + P_f \times (RR_{if} - 1)}{P_c \times (RR_{ic} - 1) + P_f \times (RR_{if} - 1) + 1} \times 100%
\]

\[
= \frac{[P_n + P_c \times RR_{ic} + P_f \times RR_{if}] - 1}{[P_n + P_c \times RR_{ic} + P_f \times RR_{if}]} \times 100%
\]

where
- \( P_c \) = prevalence of current smokers
- \( P_f \) = prevalence of former smokers
- \( P_n \) = percentage of never smokers, which equals \((1 - P_c - P_f)\)
- \( RR_{ic} \) = relative risk of developing a particular tobacco-related disease \( i \) (such as lung cancer) or occurring an event \( i \) (such as
Example: SAF calculation

For male,

prevalence of current smoker = 35%
Prevalence of former smoker = 20%
RR of dying from lung cancer (Current VS nonsmoker) = 27.48
RR of dying from lung cancer (Former VS nonsmoker) = 8.8

Please calculate the SAF for lung cancer death (SAF_{lung cancer death})

\[
SAF_i = \frac{P_c \times (RR_{ic} - 1) + P_f \times (RR_{if} - 1)}{P_c \times (RR_{ic} - 1) + P_f \times (RR_{if} - 1) + 1} \times 100\%
\]

Total SAF_{lung cancer death} = \left[ \frac{0.35(27.48-1)+0.2(8.8-1)}{0.35(27.48-1)+0.2(8.8-1)+1} \right] = 91.5\%
Example: SAF calculation

For male,

prevalence of current smoker = 35%

Prevalence of former smoker = 20%

RR of dying from lung cancer (Current VS nonsmoker) = 27.48

RR of dying from lung cancer (Former VS nonsmoker) = 8.8

Please calculate the SAF for lung cancer death in current smoker and former smoker

\[
\text{SAF Current smoker}_{\text{lung cancer death}} = \frac{0.35(27.48-1)}{0.35(27.48-1) + 0.2(8.8-1) + 1} \times 100% = 78.4%
\]

\[
\text{SAF Former smoker}_{\text{lung cancer death}} = \frac{0.2(8.8-1)}{0.35(27.48-1) + 0.2(8.8-1) + 1} \times 100% = 13.2%
\]
What to consider?

- Types of tobacco use: In addition to cigarettes, tobacco is consumed in other forms
  - Hand-rolled flavored cigarettes
  - Clove-flavored cigarettes: Kretek
  - Pipes
  - Smokeless tobacco
  - Chewing tobacco

While methodology is similar, however, caution should be made as RRs need to be specific to the form in which tobacco is consumed.
Think about your countries!!
See excel worksheet
Estimate the direct health care costs of smoking

4 Methods to estimate SAF depending on what RR data available

<table>
<thead>
<tr>
<th>Method</th>
<th>RR calculation</th>
<th>Data required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical cost ratio approach</td>
<td>RR is calculated by using medical cost data</td>
<td>disease specific annual treatment cost per person stratified by smoking status</td>
</tr>
<tr>
<td>Utilization ratio approach</td>
<td>RR is calculated by using healthcare utilization data</td>
<td>annual health care utilization per person stratified by smoking status</td>
</tr>
<tr>
<td>Disease incidence ratio</td>
<td>RR is calculated by using disease incidence data</td>
<td>separate disease incidence rates for smoker and never smoker</td>
</tr>
<tr>
<td>approach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mortality ratio approach</td>
<td>RR is calculated by using mortality data</td>
<td>Separate population death rates by underlying cause of death for smokers and never smokers</td>
</tr>
</tbody>
</table>
Methodology: Direct health care cost calculation

Prevalence of Smoking + Relative Risk for disease i (RR i) = \( SAF_i \)

\( SAF_i \) = Total number of patients with disease i attributable to smoking in a given year

Total number of patients with disease i in given year \( \times \) Relative Risk for disease i (RR i)

Total number of patients with disease i attributable to smoking in a given year \( \times \) Average HC cost of patients with disease j (Baht/person /year)

HC cost of disease i attributable to smoking in a given year \( \times \) Total number of patients with disease i attributable to smoking in a given year

Total HC cost attributable to smoking in a given year
Estimate the direct health care costs of smoking

<table>
<thead>
<tr>
<th>Disease</th>
<th>Male</th>
<th></th>
<th></th>
<th></th>
<th>Female</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SAF\textsubscript{c}</td>
<td>SAF\textsubscript{f}</td>
<td>SAF\textsubscript{i}</td>
<td>THE</td>
<td>HC cost attributable to Smoking</td>
<td>SAF\textsubscript{c}</td>
<td>SAF\textsubscript{f}</td>
<td>SAF\textsubscript{i}</td>
<td>THE</td>
</tr>
<tr>
<td>A</td>
<td>X</td>
<td>Y</td>
<td>X+Y</td>
<td>Z</td>
<td>(X+Y)Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THE = Total national health care expenditure for disease \( i \) by gender

<table>
<thead>
<tr>
<th>Disease</th>
<th>Male</th>
<th></th>
<th></th>
<th></th>
<th>Female</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SAF\textsubscript{i}</td>
<td>Total number of patients</td>
<td>Annual treatment cost for each patient</td>
<td>HC cost attributable to Smoking</td>
<td>SAF\textsubscript{i}</td>
<td>Total number of patients</td>
<td>Annual treatment cost for each patient</td>
<td>HC cost attributable to Smoking</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>X+Y</td>
<td>A</td>
<td>B</td>
<td>(X+Y)A*B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Estimate the indirect morbidity cost of smoking

- Indirect morbidity cost – economic value of lost productivity by persons who are sick or disable due to smoking-related diseases
- The lost productivity is measured by work-loss days and/or disability day
Estimate the indirect morbidity cost of smoking

1. Define disease
2. Calculate SAF for each disease (SAF$_i$)
   
   For example: SAF for CHD
3. Estimate Total national work-loss day for each disease (A$_i$) - from survey, however, the total number of hospitalization days may be used as a proxy measure for work-loss day
4. Estimate the mean daily earning or salary (B) = Per capita GNP/365
5. Estimate the smoking attributable indirect morbidity cost for each disease (SAF$_i$ A$_i$ B)
Estimate the indirect morbidity costs of smoking

3 Methods to estimate SAF depending on what RR data available

<table>
<thead>
<tr>
<th>Method</th>
<th>RR calculation</th>
<th>Data required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work-loss ratio approach</td>
<td>RR is calculated by using work-loss day data</td>
<td>disease specific annual work-loss day per person stratified by smoking status</td>
</tr>
<tr>
<td></td>
<td>RR(_i) = average annual work loss days per employed smokers for disease (_i) / average annual work loss days per employed never smokers for disease (_i)</td>
<td></td>
</tr>
<tr>
<td>Disease incidence ratio approach</td>
<td>RR is calculated by using disease incidence data</td>
<td>separate disease incidence rates for smoker and never smoker</td>
</tr>
<tr>
<td>Mortality ratio approach</td>
<td>RR is calculated by using mortality data</td>
<td>Separate population death rates by underlying cause of death</td>
</tr>
</tbody>
</table>
Example: Estimate the indirect morbidity costs of smoking

Cost of productivity loss due to hospital related absenteeism
The cost of hospital-related absenteeism was also calculated using the human capital approach. To estimate the cost of productivity loss due to hospital related absenteeism, the number of days that inpatients and outpatients with obesity-related conditions were absent from work in 2009 as a result of their obesity was multiplied by the average daily wage. Outpatient absentee data was obtained from the CHEM database; inpatient absentee data was obtained from the COHI database. The calculation was based on the assumption that the average outpatient visit took 0.5 days. The average daily wage was calculated by dividing Thailand’s 2009 GDP per capita [36] by the number of working days in the same year.

Thavorncharoensap M et al, 2014
Estimate the indirect mortality cost of smoking

Indirect mortality cost - the value of lives lost due to smoking-caused premature mortality

- Determine the smoking–related disease
- Estimate the SAF of mortality – (disease-specific RR mostly derived from CPS-II study, which is the largest and most recent prospective study of smoking, diseases, and mortality in the US)
- Estimate the total number of death for each disease (TDEATH)- For countries with national vital statistics system this can be easily obtained. Moreover, WHO has routinely published mortality data (total annual number of death, and gender for 0-12, 15-59, 60+) for all member countries in selected year.
- Estimate the present value of life time earning (PVLE):
- Estimate the indirect mortality cost of smoking for disease i (SAMC_{ij})
Methodology: premature mortality cost

1. **Prevalence of smoking** (P)

2. **Relative Risk of death for disease i (RR i)**

3. **SAF_j**

4. **Total number of deaths due to disease i by age and gender in a given year**

5. **Discounted Present value of lifetime earning (Baht/person)**

6. **Total number of deaths due to disease i attributable to smoking (by age and gender)**

7. **Cost of premature mortality due to disease i attributable to smoking in a given year**

8. **Total cost of premature mortality attributable to smoking in a given year**

Using human capital approach, discount rate 3%
Estimate the indirect mortality cost of smoking

\[ PVLE_{ag} = \text{present discounted value of lifetime earnings for a person of age } a \text{ and gender } g \]

\[ \text{MAX} \sum_{n=a}^{\text{Max}} \frac{\text{Workforce participation for gender } g \text{ and age } n \times \text{mean annual earnings of gender } g \text{ and age } n}{(1 + \text{discount rate})^{n-a}} \]

Where

\( a = \text{age of the person at death} \)

\( \text{Max} = \text{Maximum age group (e.g. age 85)} \)

\( g = \text{gender of the person} \)
Estimate the indirect mortality cost of smoking

\[ \text{SAMC}_{ij} = \text{SAF}_{ij} \times \sum_{a=\text{MIN}a}^{\text{MAX}a} (\text{TDEATH}_{ija} \times \text{PVLE}_{ja}) \]

where
\( \text{SAF}_{ij} \) = smoking-attributable fraction of death from disease i for population subgroup j
\( \text{TDEATH}_{ija} \) = total number of deaths from disease i for population subgroup j (note that death data are usually available only by gender and age) whose age at death is within the 5-year age group “a”
\( \text{PVLE}_{ja} \) = total discounted present value of lifetime earnings for population subgroup j whose age is within the 5-year age group “a”
\( \text{MIN}a \) = minimum age group
\( \text{MAX}a \) = maximum age group (e.g., age 85+)
Example: final presentation

<table>
<thead>
<tr>
<th>Disease</th>
<th>Health care cost (Million baht)</th>
<th>Cost of premature mortality (Million baht)</th>
<th>Cost of productivity loss due to hospital-related absenteeism (Million baht)</th>
<th>Total cost (Million baht)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>663.8</td>
<td>2,722.8</td>
<td>1,302.6</td>
<td>1,247.6</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>521.5</td>
<td>549.1</td>
<td>761.6</td>
<td>273.3</td>
</tr>
<tr>
<td>Stroke</td>
<td>98.9</td>
<td>99.6</td>
<td>1,236.1</td>
<td>564.5</td>
</tr>
<tr>
<td>Colon and rectal cancer</td>
<td>188.0</td>
<td>189.3</td>
<td>203.5</td>
<td>119.0</td>
</tr>
<tr>
<td>Hypertension</td>
<td>31.4</td>
<td>146.4</td>
<td>26.5</td>
<td>26.1</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>46.3</td>
<td>113.6</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Gall bladder</td>
<td>11.5</td>
<td>101.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Endometrial cancer</td>
<td>-</td>
<td>42.3</td>
<td>-</td>
<td>2.8</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>-</td>
<td>36.6</td>
<td>-</td>
<td>99.3</td>
</tr>
<tr>
<td>Obesity</td>
<td>3.8</td>
<td>4.6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>0.9</td>
<td>2.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pulmonary embolism</td>
<td>1.8</td>
<td>5.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Depression</td>
<td>0.8</td>
<td>1.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,568.7</td>
<td>4,015.1</td>
<td>3,531.0</td>
<td>2,333.2</td>
</tr>
</tbody>
</table>
Useful readings

- WHO. Assessment of the Economic costs of smoking: Economics of tobacco toolkit. 2011
- Collins DJ, Lapsley HM. The social costs of smoking in Victoria in 2008/9 and the social benefits of public policy measures to reduce smoking prevalence. 2011
Thank you!

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