World Health Organization ECONOMICS OF TOBACCO TOOLKIT

# Assessment of the Economic Costs of Smoking



WHO Library Cataloguing-in-Publication Data

Economics of tobacco toolkit: assessment of the economic costs of smoking.

1.Smoking - economics. 2.Tobacco use disorder - epidemiology. 3.Health care costs. 4.Tobacco - economics. 5.Smoking - mortality. I.World Health Organization.

ISBN 978 92 4 150157 6

(NLM classification: WM 290)

#### © World Health Organization 2011

All rights reserved. Publications of the World Health Organization are available on the WHO web site (<u>www.who.int</u>) or can be purchased from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: bookorders@who.int).

Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to WHO Press through the WHO web site (<u>http://www.who.int/about/licensing/copyright\_form/en/index.html</u>).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

#### USERS : PLEASE PROVIDE FEEDBACK AND COMMENTS TO

Ayda Yurekli (<u>yureklia@who.int</u>) Anne-Marie Perucic (<u>perucica@who.int</u>)

Tobacco Free Initiative World Health Organization 20 Avenue Appia 1211 Geneva 27 Switzerland Fax. +41 22 791 4832

#### Acknowledgement

Work conducted for WHO by Hai-Yen Sung\*, Wendy Max\*, Vendhan Gajalakshmi\*\*, Ayda Yurekli\*\*\*.

- \* Institute for Health & Aging, School of Nursing, University of California at San Francisco \*\* Epidemiological Research Center, Chennai, Tamil Nadu, India \*\*\*Tobacco Free Initiative, World Health Organization

#### Contents

	oduction	8
	Purpose of this Toolkit	9
	Who Should Use this Toolkit	10
	How to Use this Toolkit	10
II. De	fine the Objectives of the Cost of Smoking Estimation	11
	Reasons for Estimating the Economic Costs of Smoking	
	Potential Uses of the Estimated Costs	
	Economic Framework of Cost Estimation	
	Perspective	
	Scope	
	Cost of Illness Approach	
	Other Macroeconomic Approaches	
	Approach Used in this Toolkit	
	This toolkit will adopt the cost of illness approach, which has been used in	
	majority of cost of smoking studies in the literature	
	Components of the Economic Costs of Smoking	
	Direct Costs of Smoking	
	Indirect Costs of Smoking	
	Definition of Affected Population and Age Selection Definition of Relevant Smoking-Related Diseases	
	Other Considerations	
	Other Types of Tobacco Use	
	Secondhand Smoke Attributable Costs	
	Cigarette-Caused Fire Morbidity and Deaths	
	Summary and Recommendations	
	the delegies lesures of Cost of Cmelling Estimation	01
III. Me	ethodological Issues of Cost of Smoking Estimation Annual Cost Approach versus Lifetime Cost Approach	<b>21</b> 21
III. Me	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach	21 21
II. Me	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach	21 21 22
II. M€	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use?	21 21 22 23
III. M€	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking	21 21 22 23 23
III. M€	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs	21 21 22 23 23 23
II. M€	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs	21 21 22 23 23 23 23
III. Me	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs	21 22 23 23 23 24 24
III. Me	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs Additive versus Subtractive Approach	21 22 23 23 23 24 24
III. Me	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs Additive versus Subtractive Approach Indirect Cost Measures for the Value of Life: Human Capital versus	21 22 23 23 23 24 24 24
III. Me	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs Additive versus Subtractive Approach Indirect Cost Measures for the Value of Life: Human Capital versus Willingness-to-Pay Approach	21 22 23 23 23 24 24 24 24
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs Additive versus Subtractive Approach Indirect Cost Measures for the Value of Life: Human Capital versus Willingness-to-Pay Approach Summary and Recommendations	21 22 23 23 23 24 24 24 24 25
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs Additive versus Subtractive Approach Indirect Cost Measures for the Value of Life: Human Capital versus Willingness-to-Pay Approach Summary and Recommendations	21 21 23 23 23 24 24 24 24 25 25 <b>n 27</b>
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs Additive versus Subtractive Approach Indirect Cost Measures for the Value of Life: Human Capital versus Willingness-to-Pay Approach Summary and Recommendations Stimation Techniques for Smoking-Attributable Fractio What is the Smoking-Attributable Fraction (SAF)?	21 22 23 23 23 23 23 24 24 24 25 25 <b>n 27</b>
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs Additive versus Subtractive Approach Indirect Cost Measures for the Value of Life: Human Capital versus Willingness-to-Pay Approach Summary and Recommendations Stimation Techniques for Smoking-Attributable Fractio What is the Smoking-Attributable Fraction (SAF)? Epidemiological Studies of SAF	21 22 23 23 24 24 24 25 <b>n 27</b> 27 28
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use?	21 22 23 23 24 24 24 25 <b>n 27</b> 28 28
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs Avoidable versus Subtractive Approach Indirect Cost Measures for the Value of Life: Human Capital versus Willingness-to-Pay Approach Summary and Recommendations Stimation Techniques for Smoking-Attributable Fractio What is the Smoking-Attributable Fraction (SAF)? Epidemiological Studies of SAF	
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use?	
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use?	
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs Avoidable versus Unavoidable Costs Additive versus Subtractive Approach Indirect Cost Measures for the Value of Life: Human Capital versus Willingness-to-Pay Approach Summary and Recommendations Stimation Techniques for Smoking-Attributable Fractio What is the Smoking-Attributable Fraction (SAF)? Epidemiological Studies of SAF Smoking Prevalence	
	Annual Cost Approach versus Lifetime Cost Approach	
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use?	
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use? Alternative Economic Measures of the Costs of Smoking Internal versus External Costs Tangible versus Intangible Costs Avoidable versus Unavoidable Costs Additive versus Subtractive Approach Indirect Cost Measures for the Value of Life: Human Capital versus Willingness-to-Pay Approach Summary and Recommendations Stimation Techniques for Smoking-Attributable Fractio What is the Smoking-Attributable Fraction (SAF)? Epidemiological Studies of SAF Data Smoking Prevalence Relative Risk Formula to Calculate the SAF Criticism of Epidemiological Studies Econometric Studies of SAF Data Econometric Approach for Estimating the SAF?	
	Annual Cost Approach versus Lifetime Cost Approach Annual Cost Approach Lifetime Cost Approach Which Approach to Use?	

Formula to Calculate the SAF	
Limitations of Econometric Studies	40
Summary and Recommendations	42

#### V. Estimate the Direct Healthcare Costs of Smoking

Introduction	43
Definition of the Direct Costs of Smoking	43
Steps to Estimate the Smoking-Attributable Healthcare Expenditures (SAE): A	n
Example	14
Step 1: Determine Smoking-Related Diseases, Types of Healthcare	
Costs and Population Subgroups	45
Step 2: Estimate the SAF of Healthcare Expenditures	46
Step 3: Estimate Total Healthcare Expenditures	53
Step 4: Estimate Smoking-Attributable Healthcare Expenditures (SAE	
	54
Case Study: China	55

#### VI. Estimate the Indirect Morbidity Costs of Smoking

59

43

Introduction
Definition of Indirect Morbidity Costs of Smoking
Steps to Estimate the Smoking-Attributable Indirect Morbidity Costs (SAI): An
Example60
Step 1: Determine Smoking-Related Diseases, Types of Healthcare
Costs and Population Subgroups61
Step 2: Estimate the SAF of Indirect Morbidity Costs
Step 3: Estimate Total National Work-Loss Days
Step 4: Estimate the Mean Daily Earnings65
Step 5: Estimate the Smoking-attributable Indirect Morbidity Costs65
Case Study: China

#### VII. Estimate the Indirect Mortality Costs of Smoking

69

84

Introduction
Steps to Estimate the Smoking-Attributable Indirect Mortality Costs (SAMC):
An Example
Step 1: Determine Smoking-Related Diseases and Population
Subgroups70
Step 2: Estimate the SAF of Mortality72
Step 3: Estimate Total Number of Deaths (TDEATH)78
Step 4: Estimate the Present Value of Lifetime Earnings (PVLE)79
Step 5: Estimate the Remaining Life Expectancy
Step 6: Estimate the Smoking-Attributable Mortality Costs80
Case Study: China80

#### VIII. Determine Disease-Specific Mortality Using Verbal Autopsy (VA) Method

IX. Present the Final Results	
Introduction	91
Total Economic Costs of Smoking	
Total Smoking-Attributable Healthcare Costs	91
X. Bibliography	
XI. Appendix I: Existing Relative Risk (RR) Estimates of Mortality from Selected Countries	102
XII. Appendix II: Symptoms/Signs Checklist for Adult Dea	aths
(≥15 Years)	110
XIII. Appendix III: Maternal Deaths	115

## I. Introduction

Tobacco use is the leading preventable cause of death in highincome countries, and increasingly in low- and middle-income countries. Today, tobacco use causes more than five million deaths per year among adults worldwide (Mathers and Loncar, 2006). By 2030, tobacco's annual death toll will rise to more than eight million per year and more than 80% of the world's tobaccorelated deaths will be in low- and middle-income countries (Mathers and Loncar, 2006; Murray and Lopez, 1997; World Health Organization, 2008).

In addition to mortality, tobacco use also causes preventable diseases, poor health, and disability. Numerous epidemiological and laboratory research studies have revealed scientific evidence linking smoking and disease. The 2004 U.S. Surgeon General's Report concluded that cigarette smoking harms nearly every organ of the body (US DHHS, 2004). One efficient way to assess the adverse health effects of smoking on a society is to translate smoking-caused illnesses, premature mortality, and productivity losses into economic terms, a universal marker for measuring the adverse effects of smoking.

Most studies of the economic burden of cigarette smoking have been conducted in the United States and other high-income countries. It was found that annual smoking-attributable healthcare costs account for 6-15% of national healthcare expenditures in the United States and other high-income countries (Warner and Hodgson et al., 1999; World Bank, 1999). Considering both the smoking-attributable healthcare costs and the value of lost productivity caused by smoking-attributable

### 预览已结束, 完整报告链接和二维码如下:



https://www.yunbaogao.cn/report/index/report?reportId=5 28718