

Section 6
Economic and Other Implications of Tobacco Control

Chapter 16
The Impact of Tobacco Use and Tobacco Control
Measures on Poverty and Development

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The Impact of Tobacco Use and Tobacco Control Measures on Poverty and Development

The economic and health consequences of tobacco use are particularly pronounced among the world's poorest populations, who can afford these costs the least. The interrelationships of tobacco use, individuals' economic status, and tobacco control policies are complex and, as an integral part of a comprehensive tobacco control strategy, require careful appraisal. With this aim in view, this chapter examines the following topics:

- The relationship between poverty and tobacco use, including implications for low- and middle-income countries
- The opportunity cost of tobacco use relative to other household expenditures, especially in poor households
- The impact of tobacco use on economic development, including population health and health care costs
- The implications of tobacco control strategies for the poor.

High-income countries have succeeded in curbing tobacco consumption by significantly raising tobacco taxes and prices and by employing the tobacco control strategies described in this monograph. However, today around 80% of smokers worldwide live in low- and middle-income countries, and in most countries, regardless of country income group, tobacco use is more concentrated in low-income populations. Understanding the effects of tobacco on low-income populations is particularly important in reducing tobacco use and its adverse health consequences.

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Introduction

Tobacco caused nearly 100 million premature deaths worldwide in the 20th century—a public health catastrophe that primarily affected high-income countries (HICs).¹ In the 21st century, tobacco is projected to cause 1 billion deaths, with the majority of these deaths expected to occur in low- and middle-income countries (LMICs).¹ Not only has the burden of tobacco use and tobacco-related disease and death shifted from HICs to LMICs, but the tobacco use epidemic has become increasingly concentrated among the poor in countries in all stages of economic development. These developments call for the consideration and careful evaluation of tobacco use and its adverse health and economic consequences as an aspect of the multiple dimensions of poverty and development. This chapter examines these consequences and the ramifications of tobacco control for people in poverty, focusing particularly on LMICs.

The 1999 World Bank report *Curbing the Epidemic: Governments and the Economics of Tobacco Control*² and the 2004 World Health Organization (WHO) report *Tobacco and Poverty: A Vicious Circle*³ drew attention to the growing impact of tobacco use in LMICs and the high burden of tobacco use on the poor, in countries across a range of income levels. Since these reports were published, the evidence linking tobacco and poverty has continued to grow, and the WHO Framework Convention on Tobacco Control (WHO FCTC) has led many countries, including LMICs, to adopt evidence-based tobacco control measures.

The first section of this chapter discusses the evidence on tobacco use patterns by country income group and by the poverty status of people within these countries. The second section describes the association between tobacco use and poverty—in particular, the opportunity cost of tobacco use and the cycle of tobacco use and poverty. Next is a discussion of the impact of tobacco use on economic development within countries and the implications of tobacco control for the United Nations' (UN) Sustainable Development Goals (SDGs).⁴ The fourth section focuses on the equity of tobacco control measures (both tax and non-tax measures) and the impact of these measures on the poor.

Patterns of Tobacco Use, by Poverty and Country Income Group

Poverty is a major determinant of premature mortality and ill health worldwide. Across countries and over time, data have consistently shown a relationship between life expectancy and a country's gross domestic product (GDP).⁵ Major contributors to global morbidity and mortality—such as inadequate sanitation, hunger and malnutrition, and lack of access to medical care—are closely associated with poverty. It has long been understood that even within HICs, socioeconomic position influences the level of exposure to most risk factors for poor health.⁶ The influential Rose and Marmot study⁷ of civil servants in the United Kingdom of Great Britain and Northern Ireland revealed an increasing risk of death with decreasing employment grade, highlighting the importance of examining inequalities within countries as well as across countries.

When the smoking of mass-produced cigarettes increased rapidly in the first half of the 20th century it grew fastest in HICs such as the United States and United Kingdom and across socioeconomic groups. However, as awareness of smoking's health hazards grew, over a period of decades, smoking prevalence steadily dropped among the more educated, higher income populations.⁸ Thus, HICs' use of tobacco products and exposure to secondhand smoke (SHS) have become more concentrated in low-income populations. In HICs, smoking tends to be more prevalent among people with working class jobs, low educational levels, and low incomes.⁹ In 2014, smoking prevalence among U.S. adults (ages 18 years or

older) was highest among people with a General Education Development (GED) certificate (43.0%) and lowest among people with a graduate degree (5.4%). In addition, prevalence was higher among people living below the poverty level (26.3%) than among those at or above this level (15.2%).¹⁰

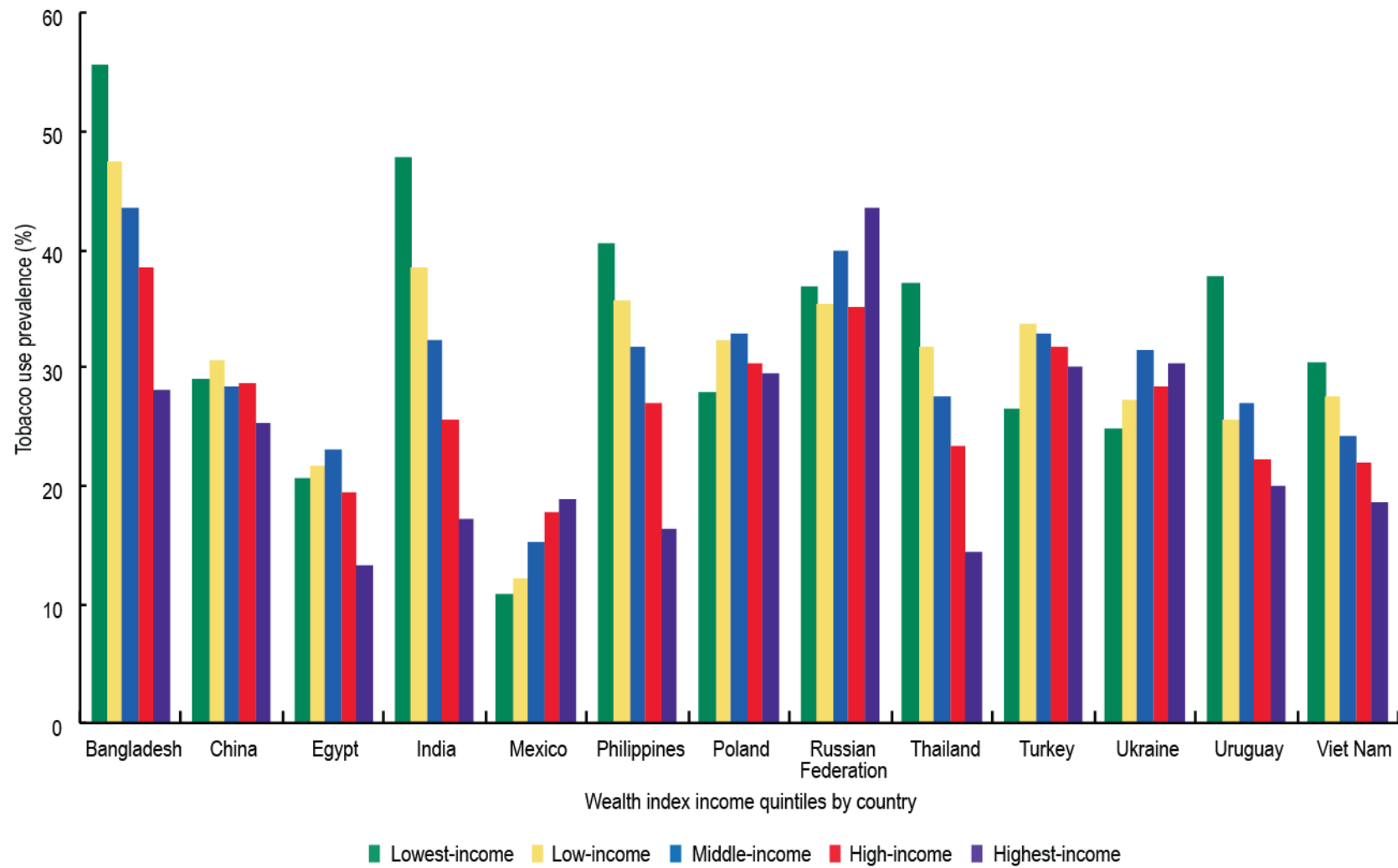
Other studies also point to the disproportionate burden of tobacco on the poor. Using data from the U.S. National Health and Nutrition Examination Survey, researchers found a linear relationship between SHS exposure and blood lead levels in youths and adults.⁸ Youths in households below the poverty line had both higher SHS exposure and higher blood lead levels than youths living above the poverty line. Moreover, youths with SHS exposure had blood lead levels suggestive of the potential for adverse cognitive outcomes.¹¹ Studies from HICs have also suggested that tobacco retailers and retail advertising are more highly concentrated in low-socioeconomic-status (SES) neighborhoods¹² and that low SES and the presence of tobacco retailers are negatively associated with smoking cessation.¹³ Moreover, tobacco product manufacturers have a history of targeting marketing strategies toward low-income and racial/ethnic populations.^{14,15} These findings and others raise concerns about equity in the progress of tobacco control measures in HICs.¹⁶

As described in chapter 2, cigarette consumption and the number of tobacco smokers have risen in LMICs over the past few decades and have simultaneously fallen in HICs. Although tobacco use still accounts for a greater proportion of overall mortality in HICs compared with LMICs, that will change in the future, given current patterns of tobacco use.¹⁷ At present, the majority (around 77%) of the world's approximately 1.1 billion current smokers live in LMICs.¹⁸ An estimated 88 million smokers (8%) live in low-income countries, 318 million (29%) live in lower middle-income countries, and 455 million (41%) live in upper middle-income countries. Less than one-quarter of the world's smokers live in HICs. A large number of smokers—approximately 226 million globally—are living in poverty. This is a very rough estimate derived from national poverty headcount ratios published by the World Bank (see the Statistical Annex for more information). Additionally, many surveys show that people of lower income or lower SES tend to smoke more than the more affluent members of society.

A review of Global Adult Tobacco Survey (GATS) data from 14 GATS countries, primarily LMICs, showed overall high rates of smoking in men, early initiation of smoking in women, and low quit ratios among both men and women, when compared with HICs such as the United States and United Kingdom.¹⁹ The 14 GATS countries are Bangladesh, Brazil, People's Republic of China, Egypt, India, Mexico, Philippines, Poland, the Russian Federation, Thailand, Turkey, Ukraine, Uruguay, and Viet Nam.

In addition to the shift in the burden of tobacco use from HICs to LMICs, tobacco consumption tends to be higher among lower income population segments in many countries (Figure 16.1). In other words, disparities in tobacco use and related health outcomes exist within LMICs as well as HICs. A systematic literature review by WHO²⁰ found a robust association between a higher prevalence of current smoking among adults and lower income, for both men and women. This finding was consistent across three decades of studies, across most geographic regions, and across countries at different income classifications, with an overall odds ratio of smoking of 1.45 (95% confidence interval [CI], 1.35–1.56) in the low-income group compared to the high-income group. The association was stronger for women than men, suggesting that the relationship between smoking and poverty could be stronger among women.²⁰

Figure 16.1 Prevalence of Current Tobacco Use Among Adults Age 15 and Older, by Wealth Quintile, 2008–2010



Note: Data are from the Global Adult Tobacco Survey 2008–2010.

Source: Palipudi et al. 2012.²¹

Numerous studies across many countries have provided evidence that adult smoking prevalence rates are higher among less educated and lower SES populations compared with others (unlike HICs, where historically tobacco use was high across all income groups).²⁰ There are exceptions, however; for example, in Mexico tobacco use is lower among the poor than the rich.²¹ Although, around the world higher SES is associated with a lower probability of smoking, among existing smokers it may be associated with a higher number of cigarettes smoked.²²

A number of factors may explain why low-income populations are more likely to smoke. First, because of literacy and knowledge gaps, the poor are generally less aware of the harmful effects of smoking on health. Second, the many stresses associated with living in poverty play a major role in continued tobacco use. Third, poor people may view smoking as one of the few ways they can reward themselves. As discussed in other chapters, research from HICs has shown that low-income groups have greater SHS exposure (chapter 6), higher exposure to tobacco marketing (chapter 7), and less access to cessation services (chapter 9), all of which contribute to increased smoking prevalence.

Patterns of smoking behavior by SES differ depending on the stage of economic development a country is in.²³ In low-income countries, smoking might be higher in affluent groups because of the cost of purchasing tobacco products, but this pattern appears to reverse as increasing economic development enables poorer segments to gain access to tobacco products. Thus, as low-income countries gradually rise to lower middle-income status through economic development, tobacco consumption would be expected to increase faster among their poorest populations. Preventing such a rise in tobacco use could be especially challenging as poorer populations are increasingly exposed to tobacco product marketing.

Income, Demand, and Tobacco Use

The concept of income elasticity of tobacco demand illustrates the impact of income on tobacco use across populations. Income elasticity is measured as the ratio of the percentage change in tobacco consumption to the percentage change in income. If income elasticity is positive (i.e., a positive correlation between tobacco consumption and income), tobacco is considered a “normal” good, such that poor people consume less tobacco than rich people. If income elasticity is negative, tobacco is considered an “inferior” good, with poor people consuming more than rich people. If income elasticity is positive and greater than 1, a product is considered a “luxury” good. The demand for luxury goods increases with income. However, as their income rises, people may also switch to higher priced tobacco products or brands. For example, in India a rise in income level could result in smokers switching from hand-rolled bidis to machine-made cigarettes.

Existing evidence suggests that income elasticity varies across populations, geographic regions, and over time. Within HICs, such as the United States, the income elasticity of cigarettes has shifted over time: Tobacco was once a normal good (demand for tobacco increased with income) but became an inferior good (demand decreased with income) as smoking has become concentrated in lower income groups.²⁴ In contrast, in LMICs cigarettes might still behave as a normal good, and even within HICs cigarettes may be treated as a normal good among low-income populations.

Guindon and Boisclair²⁵ reviewed multiple scenarios projecting future global tobacco consumption to 2025. Their model suggested that a high positive income elasticity of demand for tobacco products accompanied by a high per capita GDP growth rate leads to exponential increases in the consumption of cigarettes. However, higher income is also associated with increased awareness of the health

consequences of tobacco use, which is likely to counteract the positive effects of income growth on tobacco consumption. The net effect of variation in income on tobacco demand is therefore less clear. Several studies have observed greater income elasticity in the demand for tobacco in lower SES groups, whereas other studies have found no systematic differences in income elasticity across socioeconomic groups. In some instances, income elasticity is negative, although it is not associated with any particular income group.

The literature provides evidence of greater income elasticity for tobacco consumption among lower income populations in some LMICs. According to this evidence, comparable increases in income across different income groups could lead to disproportionately larger increases in tobacco consumption by poor smokers compared to rich smokers in these countries.²⁶ Thus, tobacco is not only an indisputable threat to global health—and consequently a strong force against development—but its effects can increase in magnitude as a country experiences income growth.

Several studies have examined the differential trends in total tobacco expenditures across different income groups, which sometimes appear to result in tobacco control measures having different effects for different segments of the population. For example, Thailand enacted comprehensive tobacco control strategies between 1990 and 2000. The share of tobacco expenditures in total household expenditures did not show any significant decrease in the bottom three income deciles, although the share of expenditures decreased significantly in the upper seven deciles.²⁷ The tobacco control measures' uneven effect across different income groups is reflected in the estimated tobacco expenditure elasticity with respect to income, which was found to be greater than 1 for poor people but less than 1 for wealthier people.

A study from Morocco showed that tobacco expenditures increased more than twofold from the 1960s (1.2%) to 1999 (2.5%).²⁸ A closer look at this increase reveals a disparity in tobacco expenditures—a 4.4-fold increase in rural areas compared with a 2.7-fold increase in urban areas. Since the early 1990s, the poorest population subgroups in rural areas have spent more money on tobacco than their richer urban counterparts. Using 1998-1999 data, this study estimated the expenditure elasticity of tobacco with respect to income at 1.13 for the poorest two income groups and at 0.59 for the richest two income groups, averaging 0.73 for all income groups. This inelastic expenditure pattern for the nation as a whole and the elastic expenditure pattern for the poorest income group imply that an increase in income across all income groups would result in decreased expenditures on tobacco over time at the national level but an increase in such expenditures by the poor.²⁸

In Indonesia the rate of spending on tobacco by the lowest income group rose significantly compared with the middle-income group during the period from 1981 to 1997 (227% in the lowest income group compared with 182% in the middle-income group).²⁹ In Egypt during 1995-1996 and 1999-2000, the share of tobacco expenditures as part of total household expenditures was highest among rural households with lower levels of income and when the head of the household was illiterate, unemployed, or employed in the lowest wage occupations (e.g., construction, trade and restaurants, transportation and storage). Between the two observation periods, the tobacco expenditure share increased significantly for lower SES groups. Tobacco expenditure elasticity was highest for the poorest income quartile in both periods.³⁰

Household tobacco expenditures might increase over time due to income growth, and this effect could be greater for those starting at the lower income levels. However, it is not clear from the studies discussed above whether the greater rate of increase in tobacco expenditures among the poor reflected increased consumption or a shift to higher priced tobacco products. As a result of income growth, those at the lowest income levels might switch to higher priced products that they could not afford previously. In either circumstance, an emphasis on reducing affordability at all levels through significant price increases would be effective in reducing tobacco consumption among poor smokers. See chapter 4 for a detailed discussion of affordability.

Between-country comparisons of tobacco use by the various income groupings of countries and by the SES of people within countries provide strong evidence that the global tobacco use epidemic has shifted toward LMICs and, within LMICs, toward people of lower SES.²⁰ Thus, the economic and health burden of tobacco use appears to be disproportionately larger for the people who are least capable of bearing it. Greater implementation of tobacco control policies in LMICs could play a critical role in flattening the rising curve of tobacco consumption and smoking prevalence, and help reduce the impoverishing impact of tobacco use.

Impact of Socioeconomic Status on Responsiveness to Price

As described in chapter 4, extensive evidence demonstrates that significant increases in tobacco product prices reduce tobacco use. Economic theory predicts that the effects of price on consumption will be larger among lower income consumers than among higher income consumers, with all else remaining constant. A growing number of studies based on data from household or individual-level surveys have examined the effects of price on consumption in high-, middle-, and low-income countries.

Early studies that examined differences in price responsiveness based on differences in income and related characteristics (i.e., education, socioeconomic class) in the United States concluded that smokers in lower socioeconomic groups generally respond more to changes in cigarette prices than smokers in higher socioeconomic groups. For example, Farrelly and colleagues³¹ in 2001 estimated that smokers in U.S. households below the median income level were about four times more responsive to changes in cigarette prices than smokers in higher income households. Similarly, in an application of the rational addiction model (see chapter 4) in 1991, Chaloupka³² found that smokers with lower education levels were more sensitive to price than smokers with higher education levels.

Results are somewhat less consistent in more recent U.S. studies, with some finding little difference in price elasticity of cigarette demand across income groups, and others finding greater elasticity differences, consistent with those from earlier studies. Several researchers—such as Stehr,³³ Colman and Remler,³⁴ and DeCicca and McLeod³⁵—have continued to find that cigarette demand is least inelastic (or more elastic) among the lowest socioeconomic groups and generally becomes increasingly inelastic (or less elastic) as income rises or education increases.

Others have found more mixed evidence. For example, Franks and colleagues,³⁶ using data from the 1984–2004 Behavioral Risk Factor Surveillance System surveys, found that differences by income were more pronounced before the Master Settlement Agreement (MSA) in November 1998 (an agreement between a group of U.S. states and the five largest U.S. tobacco companies regarding tobacco product marketing) than after the settlement. Based on data from before the agreement (1984 to 1996), prevalence elasticities were -0.45 for the lowest income quartile and -0.22 for the remaining three

higher income quartiles. However, according to data from after the MSA (1997 to 2004), neither group was responsive to price, with insignificant price elasticity estimates of -0.14 for the lowest income quartile and -0.07 for the remaining three higher income quartiles.

Farrelly and Engelen³⁷ reached the opposite conclusion using data drawn from the same surveys. However, they limited their pre-MSA sample to the period from 1990 (when most states participated in the survey) through October 1998 and added 2 years to the post-agreement sample (through 2006). Their results showed that demand became more inelastic after the MSA, but, in contrast to Franks and colleagues, these researchers found that the lowest income group was more responsive to price than the other income groups. One possible explanation for the post-agreement differences is the increased availability of low-priced cigarettes from companies that were not signatories to the MSA—particularly companies that did not comply with the escrow and other provisions adopted by states and intended to keep their costs comparable to those of participating companies.³⁸

Other studies have examined differences in price elasticities across socioeconomic groups in other HICs. For example, Townsend and colleagues³⁹ found that smokers in the highest socioeconomic classes in the United Kingdom were much less affected by price than smokers in the lowest socioeconomic classes. Similarly, Siahpush and colleagues⁴⁰ found sharp differences in the price elasticity of smoking prevalence in Australia, with estimates of -0.32 for low-income groups, -0.04 for middle-income groups, and -0.02 for high-income groups.

Since 2000, research on LMICs generally has produced similar findings. Studies have shown that tobacco use among lower income or less educated groups is more responsive to price than tobacco use among higher income or more educated groups. This result is supported by studies in such countries as Bangladesh,⁴¹ China,^{42,43} Indonesia,⁴⁴ South Africa,^{45,46} and Viet Nam.⁴⁷

Findings from a few other countries have been less consistent regarding responsiveness to price and income or education. Studies in some countries found evidence of an inverse U-shaped relationship, with demand less inelastic when moving from the lowest socioeconomic group to higher groups, before becoming more inelastic as SES continues to improve. These results were found, for example, in Myanmar,^{48,49} Nepal,⁵⁰ Thailand,²⁷ and Turkey.⁵¹ No clear pattern was found across income groups in other countries—for example, Egypt³⁰ and Sri Lanka.⁵²

One possible explanation for the mixed evidence from LMICs is the variety of tobacco products and brands available, including those that are inexpensive and highly affordable, allowing users to switch to cheaper options in response to tax and price increases.⁵³ Limited evidence from these countries provides some support for this hypothesis. For example, van Walbeek⁴⁶ found that poor South Africans were more likely than those with higher incomes to switch to cheaper pipe and other tobacco products (e.g., self-rolled cigarettes) in the 1990s when cigarette taxes and prices were rising.

Impact of Tobacco Use on Poverty

Poverty is broadly understood as resource deprivation in which the basic life necessities are not met. The previous section described the association between poverty and smoking prevalence; this section describes how tobacco use can contribute to or exacerbate conditions of poverty.

In the conventional measurement of poverty, a set of minimum human needs, such as food, water, and clothing, is specified. For example, one approach is to define spending more than 75% of income or expenditures on food as “ultrapoverty.”⁵⁴ However, it is important to distinguish between primary poverty and secondary poverty, as defined by British sociologist B. Seebom Rowntree⁵⁵ in the early 20th century. *Primary poverty* refers to a situation in which income or other resources are insufficient to afford the basic necessities of life (i.e., food, water, clothing). *Secondary poverty* is a state in which resources are sufficient to meet basic needs, but these resources are not used effectively. For example, secondary poverty results when a substantial amount of limited household resources are used to support an addictive behavior, such as tobacco or alcohol use, and the remaining funds are insufficient for basic necessities. Many smokers are in secondary poverty because there is not enough income left after tobacco expenditures to cover basic necessities.

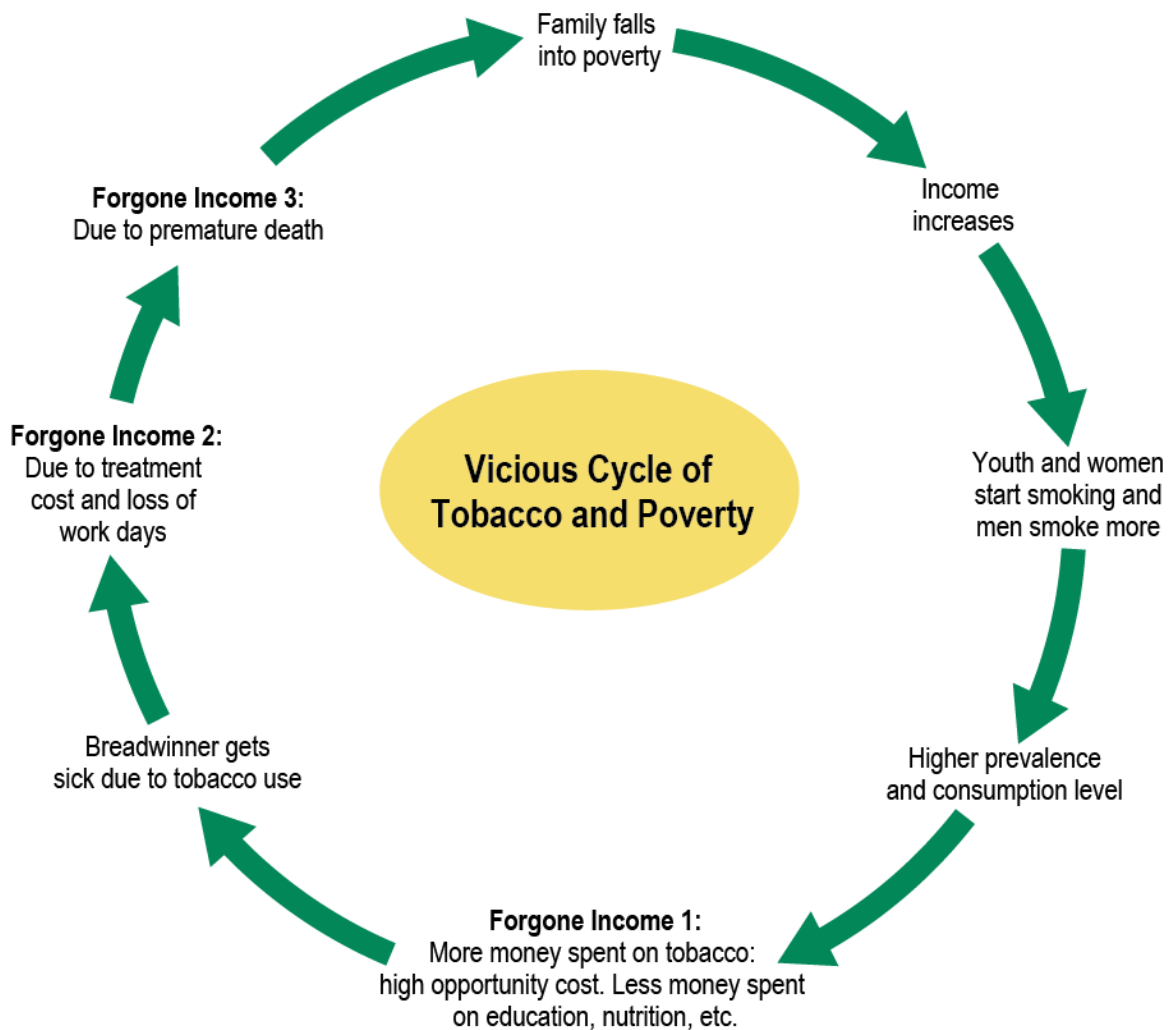
Tobacco use has a variety of negative effects on poor households and contributes to a cycle of poverty. In households with secondary poverty, tobacco expenditures are often a key factor underlying the inability to meet basic necessities. Given the prices of goods and services and the limited income of poor consumers, the purchase of tobacco requires trade-offs in the consumption of basic necessities. The *opportunity cost* of tobacco use in this situation can be defined as the amount of any necessity a poor household forgoes to purchase a tobacco product. Poor households in LMICs spend much of their income on food, leaving limited income for non-food necessities, such as clothing, housing, education, health care, and fuel. Contributing part of their limited income for tobacco expenditures implies a reduced consumption of both food and non-food necessities, causing deprivation and lower standards of living.⁵⁴ “Forgone Income 1” in Figure 16.2 represents the high opportunity cost of tobacco in which the increase in tobacco consumption among the poor is linked to an increase in spending on tobacco and less money spent on basic necessities such as education and nutrition.

Households forgo more income when the principal earner in the family falls ill due to tobacco consumption, incurs costs for treating that illness, and loses productivity and earnings (“Forgone Income 2” in Figure 16.2). These effects can be especially devastating to a family living at or below the poverty line. Because poorer, less educated, and less skilled people often earn their livelihoods through physical labor, the disability caused by tobacco consumption often results in a greater loss of income and food supplies for them than for people with more resources.⁵⁶

In China, for example, Liu and colleagues⁵⁷ demonstrated that excessive medical expenses attributable to smoking could have caused a loss in income and an increase in the poverty rate of 1.5% in urban areas and of 0.7% in rural areas in 1998. This study estimated that excessive medical spending attributable to smoking, in conjunction with direct spending on tobacco by smokers, caused the impoverishment of 30.5 million urban people and 23.7 million rural people in China in 1998. Similarly, John and colleagues⁵⁸ estimated that 15 million people in India live in poverty as the result of tobacco use.

Smokers also have lower earnings than nonsmokers, as shown by studies conducted in several high- and upper middle-income countries, including the United States,^{59–61} Germany,⁶² the Netherlands,⁶³ Canada,⁶⁴ Albania,⁶⁵ and Finland.⁶⁶ Early studies found that the wage gap between smokers and nonsmokers was substantial.⁵⁹ More recent studies have attempted to disentangle the effects of smoking from the underlying characteristics of smokers that may contribute to lower education, reduced investments in human capital, and other factors that would lead to lower wages; these studies report that the wage gap is not as large as that found in earlier studies, but that some gap remains.^{60,61,66}

Figure 16.2 The Cycle of Tobacco Use and Poverty



Premature death of the wage-earning family member from a tobacco-related illness causes a more long-term negative impact on the household income flow (“Forgone Income 3” in Figure 16.2). All three types of forgone income scenarios represented in the figure cause poor households to become poorer, including descent into extreme poverty. Thus, poor smokers and their families may be trapped in the cycle of tobacco and poverty, with one-half of the cycle caused by the high opportunity costs of tobacco use and the other half caused by the burden of ill health from tobacco-related diseases.³

The economic cost of the higher prevalence of tobacco use among the poor, in combination with their often limited access to health care services, results in deteriorated health conditions causing severe health inequality and thus perpetuating the cycle of poverty. WHO noted, “inequalities between and within countries in terms of the risk of infectious diseases now have been extended to inequalities in risk factors for noncommunicable diseases.”^{67,p.15} The delayed effect of greater tobacco use among the poor has already appeared in HICs in the form of higher rates of lung cancer and mortality from chronic respiratory diseases among the poor than among the rich, a pattern expected to emerge in low-income countries as well.⁶⁸

Data show that the poor bear the brunt of the high opportunity cost of tobacco expenditures, as they spend a greater proportion of household income on tobacco products than people who are not poor. Using data from the World Bank Living Standards Monitoring Survey, Djibuti and colleagues⁶⁹ reported that although rich households spend a greater amount of money on tobacco in absolute terms, poor households tend to spend a greater share of their total expenditures on tobacco. Indeed, the fraction of household income or expenditures allocated to tobacco consumption is almost invariably highest among the poorest or second poorest smokers across all country income groups.^{46,50,70} For example, in the United States smokers in the lowest of three income groupings (i.e., low, medium, high) spent 7.7% of their household income on tobacco compared with 1.4% for smokers in the high-income category.³⁴ In Viet Nam the lowest income quintile spent 5.3% of household income on tobacco compared with 3.6% spent by the highest income quintile.⁴⁷ Similarly, in Mexico, the percentage of total expenditures allocated to tobacco was highest in the poorest (first quintile) population, and smoking households in general spent less on food, health, and education than nonsmoking households.⁷¹

Several studies have suggested that looking at how tobacco products “crowd out” spending in other areas reveals a more direct relationship between tobacco expenditures and their impact on spending for such needs as food, health care, and education. On the basis of data from a household sample survey in India for 1999-2000, John⁷² reported that expenditures on tobacco displaced expenditures on the education of children, clean cooking fuels, and entertainment. The reallocation of household resources from basic necessities to tobacco deprives children and women of basic goods and services.

Using data from a nationally representative household survey conducted in China in 2003, Xin and colleagues⁷³ estimated that every five packs of cigarettes consumed per capita per month reduced household spending on education by about 17 yuan per capita per year and reduced spending on medical care by 11 yuan per capita per year. These effects are greatest among low-income rural households. Wang and colleagues⁷⁴ conducted a community-based health insurance study in several poor rural areas in China in 2002 and reported that tobacco expenditures crowded out human capital investment (e.g., education, health), future farm productivity (e.g., farming equipment, seeds), and financial security (e.g., savings, insurance). The authors observed that smokers also tended to drink more alcohol than nonsmokers, and thus took even more money away from the basic needs of all family members. Hu and colleagues⁷⁵ provided evidence from 2002 confirming that smoking households in China spent less on household necessities such as food, housing, and education than nonsmoking households. Thus, tobacco expenditures appear to have a far-reaching impact on the intra-household distribution of resources and on the welfare of other members of smokers’ households.

The opportunity cost of tobacco use is largest for the poorest segment of the population in countries where tobacco use may be associated with food insecurity. In addition to increasing poverty, direct expenditures on tobacco divert funds from basic needs such as food.⁵⁸ For example, it has been estimated that if poor households in Viet Nam reallocated some of what they spent on tobacco to food purchases, about 11.2% of all food-poor, smoking households could have adequate funds to purchase a minimum basic amount of food.⁷⁶ This finding implies that the poorest, at the margin of survival, would benefit most if tobacco expenditures were reallocated to their basic needs.

This diversion of funds can have a direct impact on health outcomes, such as child nutrition. The UN has estimated that, in LMICs, more than 150 million children younger than age 5 are malnourished and underweight; almost half of these children live in South-East Asia,⁷⁷ where tobacco use rates are substantial. In these countries, enhanced tobacco control efforts would help reduce the existing heavy

burden on human capital caused by tobacco use. Based on data collected from 33,000 households in rural Java, Indonesia, from June 1998 through January 2001, Block and Webb⁷⁸ attributed persistent household food insecurity and consequent child malnutrition to the impact of tobacco consumption on allocation of household expenditures. In a similar study using data from Indonesia's national nutrition surveillance system on 175,000 urban slum households, Semba and colleagues⁷⁹ observed that paternal smoking contributed to increased short-term and chronic child malnutrition. The evidence of the diversion of household expenditures from basic necessities to tobacco use in Indonesia was further confirmed by Barber and colleagues.⁸⁰ These authors reported that in 2005, Indonesian households with smokers spent on average 11.5% of their monthly expenditures on tobacco products, compared with 3.2% for education, 2.3% for health, and 11.0% for fish, meat, eggs, and milk combined.

Efroymsen and colleagues⁸¹ reported that in Bangladesh from 1992 to 1996, the average male smoker spent more than twice as much on cigarettes per capita as on clothing, housing, health, and education combined. Moreover, the study showed that the typical poor smoker in Bangladesh could easily add more than 500 calories a day to the diet of at least one child if the resources being used for tobacco were reallocated. With the tobacco cost-shift, nearly 10.5 million malnourished people could be adequately fed, and about 350 (one-half) of the daily malnutrition-related deaths among children under age 5 could be prevented.⁸¹ In a study using data on 77,678 households from the Bangladesh Nutrition Surveillance Project (2005-2006), Best and colleagues⁸² found that parental tobacco use is associated with an increased risk of stunting, underweight, and wasting among children younger than age 5 and that households with tobacco users spent proportionately less per capita on food and other necessities. These authors suggested that tobacco control should be a part of public health strategies to decrease child malnutrition.

Impact of Tobacco Use on Economic Development

The impact of tobacco use on development is assessed through its health and economic consequences for the population of a country. Tobacco use may impair development directly by imposing health care costs for the treatment of illnesses caused by both active smoking and exposure to SHS, and indirectly, through the loss of productivity and working years of life from resulting morbidity and mortality. And while a rapid increase in tobacco consumption might raise GDP in the short-term through both increased private expenditures on tobacco and higher public spending financed by higher tobacco tax revenues, such an increase would be offset by a subsequent rise in morbidity and mortality among middle-aged men and women at the peak of their skills and experience. The impact of tobacco-related illnesses on productivity would thus have an offsetting negative effect on a nation's welfare and economic development.

In LMICs, where health services and health insurance systems are frequently underdeveloped, people receive less formal treatment for illnesses than in HICs. Hence, private and public spending to treat tobacco-related illnesses is low and tends to understate the actual cost to the economies of those countries. In addition, because poor and near-poor people lack the private resources to bear adverse health shocks, they often resort to borrowing or the distress-selling of valuables, which in turn degrades their economic status. In a study of a representative sample of 120,942 households across India, tobacco users and people from households with tobacco users had a higher risk of borrowing and distress-selling of assets during a hospitalization than people who did not use tobacco or live in households with tobacco users.⁸³

The costs of tobacco use may also include the loss of family income due to the premature death of a parent from a tobacco-related illness, and the decreased human capital investments caused by the crowding out of spending on health, nutrition, and education for children. The diversion of household spending away from the educational needs of family members may result in decreased opportunities to obtain a primary education and basic literacy skills, thus perpetuating poverty. Household spending on tobacco instead of the basic necessities of health also contributes to child malnutrition, the stunting of growth, and other health effects, as shown by previously discussed evidence from several countries.

The WHO Framework Convention on Tobacco Control and Sustainable Development Goals

The connection between tobacco control and development has received greater attention in the years since the development and entry into force of the WHO FCTC in 2005. The text of the WHO FCTC acknowledges the impact of tobacco use on development, citing “the devastating worldwide health, social, economic, and environmental consequences”⁸⁴ and the particular burden on LMICs, national health systems, families, and the poor. The WHO FCTC also cites UN conventions on human rights and the protection of vulnerable populations, including the Convention on the Rights of the Child, and requires international cooperation.⁸⁴

As a consequence, the United Nations Development Programme (UNDP) currently works with governments to integrate WHO FCTC implementation into countries’ health and development plans through the United Nations Development Assistance Frameworks, which outline national development priorities agreed to between governments and the UN system. However, the UNDP reported⁸⁵ that most countries’ framework documents were lacking specific commitments to support tobacco control or WHO FCTC implementation. In addition to interference by the tobacco industry, barriers to integrating WHO FCTC implementation into countries’ development plans included deficiencies in: financial and human resources, appreciation of tobacco use as a development issue, national data to support intervention, and coordination among government departments. Among a variety of recommendations, the UNDP noted the importance of engaging in tobacco control activities across multiple sectors, including finance, justice, trade, and education ministries, along with health ministries.⁸⁵

The Millennium Development Goals (MDGs) for the 21st century, a nonbinding set of goals adopted by the UN General Assembly at the Millennium Summit in September 2000,⁸⁶ did not explicitly include tobacco control. However, tobacco control measures are relevant to the achievement of each of the eight MDGs: decreasing poverty and hunger; expanding primary education; promoting gender equality and female empowerment; reducing child mortality; improving maternal health; combating such diseases as HIV/AIDS, malaria, and tuberculosis; ensuring environmental sustainability; and establishing global development partnerships. A WHO-commissioned study outlined connections between tobacco control and the achievement of each of the eight MDGs. To address the impact of tobacco use on development, the study recommended that development organizations and national governments explicitly incorporate tobacco control into their development plans; that tobacco taxation be used more effectively as a revenue-generating mechanism; and that finance ministries and other sectors engage in tobacco control.⁸⁷

Several international aid agencies have acknowledged the importance of tobacco control for development, although related efforts have so far been limited. The European Commission’s development policy focuses on eradicating poverty and has acknowledged the contribution of tobacco use to poverty and disease.⁸⁸ The U.S. Agency for International Development (USAID) has made a

commitment “to curb tobacco production, processing, marketing, and use”^{89,p.3} and has stated that USAID will not support agribusiness activities that contribute to tobacco production, promotion, and use. USAID also says that it may work with local agricultural interests to identify alternative crops in areas where low-income farmers depend on tobacco growing.⁸⁹ The Swedish International Development Cooperation Agency, in its *Health is Wealth* development policy document, identified tobacco use as one of the major health threats contributing to health inequities worldwide, along with environmental problems, abuse of alcohol, use of illicit drugs, traffic injuries, and malnutrition.⁹⁰

The 17 Sustainable Development Goals formally adopted by the UN General Assembly on September 25, 2015, are an effort to build on the MDGs and establish a more comprehensive and detailed set of development targets for 2030.⁴ Strengthening the implementation of the WHO FCTC in all countries is one of the stated targets under goal 3 (Ensure healthy lives and promote well-being for all at all ages), in particular of goal 3.4 “by 2030, reduce by one third premature mortality from noncommunicable diseases.” Tobacco control is also relevant to the achievement of many other SDGs, including goal 1 (End poverty in all its forms everywhere), goal 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture), and goal 10 (Reduce inequality within and among countries). As the UN’s Organisation for Economic and Co-operation and Development (OECD) has recommended, achieving the SDGs and their component parts will require mechanisms that fully engage the “whole government” of each country.⁹¹

Tobacco Control and Equity

Given the heightened burden of tobacco use on the poor in many countries, it is especially important to ensure that tobacco control measures are reaching those who are most affected. If tobacco control measures do not benefit low-income populations as much as they do high-income populations, then this inequity imposes a double burden on those low-income populations, who are already more likely to suffer the effects of tobacco use. Thus, it is important to consider issues of equity in evaluating tobacco control policies and programs.⁹²

Among tobacco control measures, tobacco taxes have received the most attention in terms of equity. A tax system serves equity when it helps redistribute income or resources among people. Requiring wealthier people to pay a greater share of their income as taxes compared to poorer people contributes to the equalization of income; such a tax system is progressive. On the other hand, when the poor have to pay a greater share of their income as taxes, income inequality increases, and the tax system is regressive. Tobacco taxes are often regressive in that the poor, who are more likely to smoke and have less income to spend, pay a larger share of their income as tobacco taxes. Tobacco taxation has sometimes been criticized for imposing a disproportionately greater financial burden on the poor than on the rich through a regressive tax structure.⁹³ This argument has also been used by the tobacco industry as a strategy to oppose tobacco tax increases.⁹⁴ However, the overall progressivity of the fiscal system should be considered, including indirect and direct taxes and transfers (such as food assistance programs, health insurance programs, and other programs that use tax revenues to provide money to low-income populations), and not just the progressivity or regressivity of a single element in that system.

The regressivity of existing tobacco taxes does not necessarily imply that a tobacco tax increase will be regressive. As described above, evidence from many countries shows that lower income populations are generally more responsive to tobacco tax and price increases than higher income populations. Thus, a

tax increase that raises tobacco product prices will have a greater impact on low-income smokers, leading more of them to quit, whereas higher income smokers are less likely to change their behavior and will continue to pay the higher taxes.^{53,95} Moreover, tobacco taxes can contribute to reducing the social inequalities created by tobacco consumption by reducing tobacco use among lower SES populations.⁹⁶ For example, Jha and colleagues⁹⁷ estimated that during the 1990s in Canada, England and Wales, Poland, and the United States, more than half of the difference in male mortality between the top and bottom social strata was attributable to greater risks of tobacco-related mortality at ages 35–69 among the lower social strata.

Evidence demonstrates that an increase in tobacco taxes can in fact work to reduce inequities in tobacco use among adults and young people.^{98,99} For example, a simulation analysis for Bulgaria by Sayginsoy and colleagues¹⁰⁰ showed that a 72% increase in the existing excise tax rate on cigarettes would lower the amount of taxes paid by low- and lower middle-income smokers by 3.5% and raise the amount of taxes paid by upper middle-income and high-income smokers by 10.7% and 24.9%, respectively. In other words, because lower income smokers would be more sensitive to the price increase and therefore more likely to quit, the upper income smokers would pay a larger share of the total tobacco tax revenue after the price increase. Similarly, in Sri Lanka, Arunatilake and Opatha⁵² projected that although the current excise taxes are regressive, price increases would reduce the difference in the share of household income spent on tobacco between the poorest and richest groups. Likewise, in Turkey, Önder and Yürekli¹⁰¹ estimated that before a tax increase, the poorest one-third of households paid 23.8% of total cigarette taxes, the middle one-third paid 33.9%, and the richest one-third paid 42.2%; a 50% excise tax increase would shift the burden of the tax to higher income households, with the corresponding shares falling to 18.9% for the poorest one-third, but rising to 35.5% for the middle group and 45.7% for the richest group.

Inequities could be further reduced by earmarking the revenue increases from higher tobacco taxes for welfare programs for the poor, such as government spending on education, health care, assistance for tobacco cessation, and efforts to build awareness of the health harms of tobacco use (see chapter 5). Examples of tobacco tax revenue dedicated or earmarked for financing health promotion include such programs as VicHealth and Healthway in Australia, and ThaiHealth in Thailand.¹⁰² By allocating disproportionately larger shares of expenditures for the poor, such programs can accommodate tobacco taxes in a progressive fiscal system. These programs can not only compensate for the negative impact of higher taxes on poor smokers but can also benefit low-income nonsmokers. In this way, tobacco taxation can be an equitable solution to both tobacco use and poverty.

In comparison with tax measures, less research has been focused on the equity impact of non-tax measures on the poor in general and in LMICs in particular. Two studies, Farrell and Fuchs¹⁰³ (U.S) and Townsend and colleagues³⁹ (United Kingdom), reported that publicity about the long-term adverse health consequences of smoking tends to have a greater impact on the rich and more educated than on the poor and less educated. A later study by de Walque¹⁰⁴ concluded that the gradual spread of information about the health consequences of smoking in the United States since the mid-1950s led to an earlier and faster decline in smoking prevalence among more educated people. In the United States, educated individuals are less likely to smoke, and smokers who are more educated are also more likely to stop smoking.¹⁰⁵ However, the aggregate welfare gain from the dissemination of information on the health consequences of tobacco use could be greater for the poor than for the rich because of the knowledge gap that is typically seen between these groups.

As described in chapter 8, health warnings are an effective (non-tax) tobacco control measure. Text-only health warnings are expected to have little impact on people who are unable to read, but pictorial health warnings could have a visual impact on individuals of varying literacy/education levels.^{106–109} Studies conducted in Canada, Australia, and the United Kingdom found that warnings have successfully discouraged youths, including the most vulnerable youths, from initiating smoking.¹⁰⁸

Several studies have investigated the differential impact of various tobacco control measures among different socioeconomic groups in European countries.^{110,111} Studies by Monsó and colleagues¹¹² and Varghese and others¹¹³ have shown that responses to smoking cessation interventions differ by SES. Some tobacco control measures may have a greater effect on lower SES smokers than others, reducing inequalities in smoking prevalence and disease burden among different socioeconomic groups. For example, bans on tobacco advertising, promotion, and sponsorship may have a greater impact on populations and racial/ethnic communities that have been specifically targeted by tobacco industry marketing.¹¹⁴ Pictorial health warnings also hold promise for reducing inequities based on education level and SES.¹⁰⁹ But despite the potential of each of these measures to benefit socially disadvantaged groups, Kunst and colleagues¹¹⁰ observed that the measures implemented in European countries disproportionately benefited the upper social groups. These authors recommended that all tobacco control efforts should take into account the socioeconomic inequality represented by the heavier burden of tobacco use and illness that is borne by lower SES groups. Two recent reviews of this literature, one on adults⁹⁸ and another on youth,⁹⁹ found that there is at best mixed evidence for the effectiveness of non-tax tobacco control policies in reducing socioeconomic inequities in tobacco use.

Summary

Tobacco use exacerbates poverty by diverting the limited resources of poor households away from basic needs such as food and shelter, health care, and education. The opportunity costs of tobacco use are greatest for the poor because they have the most difficulty meeting basic household needs. Increases in health care expenditures for treatment of tobacco-related diseases and economic losses due to premature death add additional burdens to other competing issues of the poor and of society as a whole.

An estimated 860 million adult smokers live in LMICs, and approximately 226 million globally are living in poverty. Moreover, the economic and health burdens of tobacco use appear to be greater for LMICs where, by definition, financial resources are more limited than in HICs. The higher concentration of smokers who are poor in low- and lower middle-income countries indicates that the tobacco use epidemic has not spared the poorest of the world's poor.

Typically, a lag of a couple of decades or more occurs between the initiation of smoking at an early age and the resulting illnesses or premature death, often in middle age. Countries at the lower end of the world's economic spectrum, and hence at risk of experiencing the fastest growth in tobacco consumption in tandem with economic development, can anticipate reaching the peak effects of the tobacco use epidemic about halfway into the 21st century. As development gradually transforms low-income countries into lower middle-income countries, their poorest populations will be the most susceptible to the epidemic of tobacco use occurring in the developing world. In HICs, socioeconomic inequality in smoking status has contributed significantly to socioeconomic inequality in health status, an effect likely to be repeated in LMICs unless vigorous preventive actions are taken.

Curtailling tobacco use is increasingly recognized as important for global economic development. The WHO FCTC describes “the devastating worldwide health, social, economic, and environmental consequences” of tobacco use, and the global Sustainable Development Goals adopted in 2015 explicitly include strengthening the implementation of the WHO FCTC as part of SDG goal 3 (Ensure healthy lives and promote well-being for all at all ages). Already, several national development agencies incorporate tobacco control as a development strategy. To give an example of a specific policy goal, research showing that tobacco use crowds out expenditures on food has led to suggestions that strategies to decrease child malnutrition should include tobacco control measures because of their potential to increase family resources to purchase food.

Studies have assessed the implications of tobacco control measures—both tax and non-tax measures—for reducing tobacco-related health inequities between the rich and poor. Tobacco taxes can contribute to reducing health inequities because the poor are generally more responsive to price increases than people who are not poor and because a portion of tax revenues can be earmarked for programs that directly benefit the poor. Other tobacco control strategies discussed in this monograph, including public education efforts, pictorial health warnings, advertising bans, and the provision of free or low-cost cessation services, can also contribute to reducing tobacco use in all socioeconomic groups.

Research Needs

The complex relationships between tobacco use, poverty, and development are now well recognized. However, evidence on how these relationships operate, especially in LMICs, is limited in several areas. Further LMIC-based studies are needed that collect and analyze additional evidence on a wide range of development indicators both within and between countries. Additionally, only limited evidence exists regarding the relationships between poverty, development, and use of tobacco products other than cigarettes. Interaction between economic development and the wider array of tobacco products used in many LMICs should be considered, along with the impact of differences in taxation across this wider variety of tobacco products. The literature on the equity implications of both tax and non-tax tobacco control measures in LMICs is scant. Research to understand how both tax and non-tax measures can contribute to reducing poverty and income inequality will help LMICs avoid repeating the experience of HICs.

Conclusions

1. Tobacco use and its consequences have become increasingly concentrated in low- and middle-income countries and, within most countries, among lower socioeconomic status populations.
2. Tobacco use in poor households exacerbates poverty by increasing health care costs, reducing incomes, and decreasing productivity, as well as diverting limited family resources from basic needs.
3. By reducing tobacco use among the poor, tobacco control policies can help break the cyclical relationship between tobacco use and poverty.
4. Tobacco control efforts that are integrated with other public health and development policies can improve the overall health of the poor and can help achieve the Sustainable Development Goals.
5. Lower income populations often respond more to tobacco tax and price increases than higher income populations. As a result, significant tobacco tax and price increases can help reduce the health disparities resulting from tobacco use.

References

- World Health Organization. WHO report on the global tobacco epidemic, 2008: the MPOWER package. Geneva: World Health Organization; 2008. Available from: http://whqlibdoc.who.int/publications/2008/9789241596282_eng.pdf.
- World Bank. Curbing the epidemic: governments and the economics of tobacco control. Development in practice series. Jha P, Chaloupka FJ, editors. Washington, DC: World Bank; 1999. Available from: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2000/08/02/000094946_99092312090116/Rendered/PDF/multi_page.pdf.
- World Health Organization. Tobacco and poverty: a vicious circle. Geneva: World Health Organization, Tobacco Free Initiative; 2004. Available from: http://www.who.int/tobacco/communications/events/wntd/2004/en/wntd2004_brochure_en.pdf.
- United Nations. Resolution adopted by the General Assembly on 25 September 2015. Transforming our world: the 2030 agenda for sustainable development. UN Resolution A/RES/70/1. Available from: http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E.
- Swift R. The relationship between health and GDP in OECD countries in the very long run. *Health Econ*. 2011;20(3):306-22. doi: 10.1002/hecl.1590.
- Marmot MG, Bobak M, Smith GD. Explanations for social inequalities in health. In: Amick BC III, Levine S, Tarlov AR, Walsh DC, eds. *Society and health*. New York: Oxford University Press; 1995. p. 172-210.
- Rose G, Marmot MG. Social class and coronary heart disease. *Br Heart J*. 1981;45:13-9. doi: 10.1136/hrt.45.1.13.
- Lopez AD, Collishaw NE, Piha T. A descriptive model of the cigarette epidemic in developed countries. *Tob Control*. 1994;3:242-7. doi: 10.1136/tc.3.3.242.
- Barbeau EM, Krieger N, Soobader MJ. Working class matters: socioeconomic disadvantage, race/ethnicity, gender, and smoking in NHIS 2000. *Am J Public Health*. 2004;94(2):269-78. doi: 10.2105/AJPH.94.2.269.
- Jamal A, Homa DM, O'Connor E, Babb SD, Caraballo RS, Singh T, et al. Current cigarette smoking among adults – United States, 2005–2014. *MMWR Morb Mortal Wkly Rep*. 2015;64(44):1233-40. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6444a2.htm>.
- Richter PA, Bishop EE, Wang J, Kaufmann R. Trends in tobacco smoke exposure and blood lead levels among youths and adults in the United States: the National Health and Nutrition Examination Survey, 1999–2008. *Prev Chronic Dis*. 2013;10:E213. doi: 10.5888/pcd10.130056.
- Rodriguez D, Carlos HA, Adachi-Mejia AM, Berke EM, Sargent JD. Predictors of tobacco outlet density nationwide: a geographic analysis. *Tob Control*. 2013;22:349-55. doi: 10.1136/tobaccocontrol-2011-050120.
- Cano MÁ, Wetter DW. Socioeconomic status and smoking cessation: neighborhood context as an underlying mechanism. *Tex Heart Inst J*. 2014;41(3):309-10. doi: 10.14503/THIJ-14-4096.
- Yerger VB, Przewoznik J, Malone RE. Racialized geography, corporate activity, and health disparities: tobacco industry targeting of inner cities. *J Health Care Poor Underserved*. 2007;18(4 suppl):10-38.
- National Cancer Institute. The role of the media in promoting and reducing tobacco use. Tobacco control monograph no. 19. NIH publication no. 07-6242. Bethesda, MD: National Cancer Institute; 2008. Available from: http://cancercontrol.cancer.gov/Brp/tcrb/monographs/19/m19_complete.pdf.
- Gostin LO. Tobacco endgame: the poverty conundrum. *Hastings Cent Rep*. 2014;44(3):10-1. doi: 10.1002/hast.307.
- World Health Organization. Global health risks: mortality and burden of disease attributable to selected major risks. Geneva: World Health Organization; 2009 [cited 2012 Jun 25]. Available from: http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf.
- World Health Organization. WHO report on the global tobacco epidemic, 2015: raising taxes on tobacco. Geneva: World Health Organization; 2015. Available from: http://www.who.int/tobacco/global_report/2015/en.
- Giovino GA, Mirza SA, Samet JM, Gupta PC, Jarvis MJ, Bhala N, et al.; GATS Collaborative Group. Tobacco use in 3 billion individuals from 16 countries: an analysis of nationally representative cross-sectional household surveys. *Lancet*. 2012;380:668-79. doi: 10.1016/S0140-6736(12)61085-X. Errata in: *Lancet*, 2013;382(9887):128, and *Lancet*, 2012;380(9857):1908.
- World Health Organization. Systematic review of the link between tobacco and poverty. Geneva: World Health Organization; 2014. Available from: <http://www.who.int/tobacco/publications/economics/9789241507820/en>.
- Palipudi KM, Gupta PC, Sinha DN, Andes LJ, Asma S, McAfee T; GATS Collaborative Group. Social determinants of health and tobacco use in thirteen low and middle income countries: evidence from Global Adult Tobacco Survey. *PLoS ONE*. 2012;7(3):e33466. doi: 10.1371/journal.pone.0033466.
- Kostova D, Tesche J, Perucic AM, Yürelki A, Asma S; GATS Collaborative Group. Exploring the relationship between cigarette prices and smoking among adults: a cross-country study of low- and middle-income nations. *Nicotine Tob Res*. 2014;16(Suppl 1):S10-5. doi: 10.1093/ntr/ntt170.

23. Bobak M, Prabhat J, Nguyen S, Jarvis M. Poverty and smoking. In: Jha P, Chaloupka F, editors. Tobacco control in developing countries. New York: Oxford University Press; 2000. p. 41-61. Available from: <http://siteresources.worldbank.org/INTETC/Resources/375990-1089904539172/041TO062.PDF>.
24. Kenkel DS, Schmeiser MD, Urban CJ. Is smoking inferior? Evidence from variation in the earned income tax credit. *J Hum Resour.* 2011;49(4):1094-120. doi: 10.2139/ssrn.1961196.
25. Guindon GE, Boisclair DP. Past, current and future trends in tobacco use. HNP discussion paper: Economics of tobacco control paper no. 6. Washington, DC: World Bank; 2003. Available from: <http://smtp.sesrtic.org/tfo/files/articles-studies/6-past-current-and-future-treds-in-tobacco-use-who.pdf>.
26. Guindon GE, Perucic A-M, Boisclair DP. Higher tobacco prices and taxes in South-East Asia: an effective tool to reduce tobacco use, save lives and generate revenue. *Economics of tobacco control papers*; 2003. Available from: <http://www.searo.who.int/tobacco/documents/2003-pub1.pdf?ua=1>.
27. Sarntisart I. An economic analysis of tobacco control in Thailand. HNP discussion paper: Economics of tobacco control paper no. 15. Washington, DC: World Bank; 2003. Available from: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2004/06/01/000265513_20040601172459/Rendered/PDF/289020Santisa1omic11Thailand1whole.pdf.
28. Aloui O. Analysis of the economics of tobacco in Morocco. HNP discussion paper: Economics of tobacco control paper no. 7. Washington, DC: World Bank; 2003. Available from: http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/Aloui-Analysis_of-whole.pdf.
29. de Beyer J, Yürelki AA. Curbing the tobacco epidemic in Indonesia. *Watching Brief. East Asia and the Pacific Region.* Jakarta, Indonesia: World Bank; 2000 May, issue 6. Available from: http://siteresources.worldbank.org/INTINDONESIA/Resources/Human/brief_6-516.pdf.
30. Nassar H. The economics of tobacco in Egypt: a new analysis of demand. HNP discussion paper: Economics of tobacco control paper no. 8. Washington, DC: World Bank; 2003. Available from: <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/Nassar-TheEconomics-whole.pdf>.
31. Farrelly MC, Bray JW, Pechacek TF, Woollery T. Response by adults to increases in cigarette prices by sociodemographic characteristics. *South Econ J.* 2001;68:156-65. doi: 10.2307/1061518.
32. Chaloupka FJ. Rational addictive behaviour and cigarette smoking. *J Polit Econ.* 1991;99(4):722-42. doi: 10.1086/261776.
33. Stehr M. The effect of cigarette taxes on smoking among men and women. *Health Econ.* 2007;16(12):1333-43. doi: 10.1002/hec.1223.
34. Colman G, Remler D. Vertical equity consequences of very high cigarette tax increases: if the poor are the ones smoking, how could cigarette tax increases be progressive? *J Policy Anal Manag.* 2008;27:376-400. doi: 10.1002/pam.20329.
35. DeCicca P, McLeod L. Cigarette taxes and older adult smoking: evidence from recent large tax increases. *J Health Econ.* 2008;27(4):918-29. doi: 10.1016/j.jhealeco.2007.11.005.
36. Franks P, Jerant AF, Leigh JP, Lee D, Chiem A, Lewis I, et al. Cigarette prices, smoking, and the poor: implications of recent trends. *Am J Public Health.* 2007;97(10):1873-7. doi: 10.2105/AJPH.2006.090134.
37. Farrelly MC, Engelen M. Cigarette prices, smoking, and the poor, revisited. *Am J Public Health.* 2008;98(4):582-3. doi: 10.2105/AJPH.2007.132647.
38. Chaloupka FJ. Cigarettes: old firms facing new challenges. In: Tremblay VJ, Tremblay CH, editors. *Industry and firm studies.* Armonk, NY: M.E. Sharpe; 2007. p. 80-118.
39. Townsend JL, Roderick P, Cooper J. Cigarette smoking by socioeconomic group, sex, and age: effect of price, income and health publicity. *BMJ.* 1994;309(6959):923-7. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2541176>.
40. Siahpush M, Wakefield MA, Spittal MJ, Durkin SJ, Scollo MM. Taxation reduces social disparities in adult smoking prevalence. *Am J Prev Med.* 2009;36(4):285-91. doi: 10.1016/j.amepre.2008.11.013.
41. Nargis N, Ruthbah UH, Fong GT. Taxation of tobacco products in Bangladesh: findings from the 2009 ITC Bangladesh Survey. ITC policy evaluation project working paper. Waterloo, Ontario, Canada: University of Waterloo; 2010.
42. Mao ZZ, Yang GH, Ma JM. Adults' demand for cigarettes and its determinants in China. *Soft Science of Health.* 2003;17:19-23. Chinese.
43. Mao ZZ, Sung H, Hu TW, Yang G. The demand for cigarettes in China. In: Hu TW, editor. *Tobacco control policy analysis in China: economics and health.* Singapore: World Scientific Publishing Co.; 2007. p. 125-53. doi: 10.1142/9789812792365_0007.
44. Adioetomo SM, Djutaharta T, Hendratno. Cigarette consumption, taxation, and household income: Indonesia case study. HNP discussion paper: Economics of tobacco control paper no. 26. Washington, DC: World Bank; 2005. Available from: <http://documents.worldbank.org/curated/en/607961468258307588/pdf/317960HNP0Adio1eConsumption01publ1.pdf>.

45. van Walbeek C. The distributional impact of changes in tobacco prices [Ph.D. dissertation]. *S Afr J Econ.* 2002;70(3):258-67. doi: 10.1111/j.1813-6982.2002.tb01304.x.
46. van Walbeek C. The economics of tobacco control in South Africa. [Ph.D. dissertation] Cape Town, South Africa: School of Economics, University of Cape Town; 2005. Available from: <http://tobaccoecon.org/wp-content/uploads/2014/09/van-walbeekcp-the-economics-of-tobacco-control-in-south-africa1.pdf>.
47. van Kinh H, Ross H, Levy D, Nguyen TM, Vu TB. The effect of imposing a higher, uniform tobacco tax in Vietnam. *Health Res Policy Syst.* 2006;4(1):6. doi: 10.1186/1478-4505-4-6.
48. Kyaing NN. Tobacco economics in Myanmar. HNP discussion paper: Economics of tobacco control paper no. 14. Washington, DC: World Bank; 2003. Available from: http://siteresources.worldbank.org/INTMYANMAR/Resources/Tobacco_whole.pdf.
49. Kyaing NN, Perucic AM, Rahman K. Study on poverty alleviation and tobacco control in Myanmar. HNP discussion paper: economics of tobacco control paper no. 31. Washington, DC: World Bank; 2005. Available from: <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/MyanmarTobaccoFinalSm.pdf>.
50. Kariki YB, Dev Pant K, Pande R. A study on the economics of tobacco in Nepal. HNP discussion paper: Economics of tobacco control paper no. 13. Washington, DC: World Bank; 2003. Available from: http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/Karki-AStudy_whole.pdf.
51. Önder Z. The economics of tobacco in Turkey: new evidence and demand estimates. HNP discussion paper: Economics of tobacco control paper no. 2. Washington, DC: World Bank; 2002. Available from: <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/Onder-TheEconomics-whole.pdf>.
52. Arunatilake N, Opatha M. The economics of tobacco in Sri Lanka. HNP discussion paper: Economics of tobacco control paper no. 12. Washington, DC: World Bank; 2003. Available from: <https://openknowledge.worldbank.org/bitstream/handle/10986/13625/288570Arunatilake1The0Economics1whole.pdf?sequence=1>.
53. International Agency for Research on Cancer. Effectiveness of tax and price policies for tobacco control. IARC handbooks of cancer prevention in tobacco control. Vol. 14. Lyon, France: International Agency for Research on Cancer; 2011. Available from: <http://www.iarc.fr/en/publications/pdfs-online/prev/handbook14>.
54. Streeten P. Poverty concepts and measurement. *Bangladesh Dev Stud.* 1990;18(3):1-18.
55. Rowntree BS. Poverty: a study of town life. London: Macmillan; 1901.
56. de Beyer J, Lovelace C, Yürelki A. Poverty and tobacco. *Tob Control.* 2001;10(3):210-1. doi: 10.1136/tc.10.3.210.
57. Liu YL, Rao KQ, Hu TW, Sun Q, Mao ZZ. Cigarette smoking and poverty in China. *Soc Sci Med.* 2006;63(11):2784-90. doi: 10.1016/j.socscimed.2006.06.019.
58. John RM, Sung H-Y, Max WB, Ross H. Counting 15 million more poor in India, thanks to tobacco. *Tob Control.* 2011; 20(5):345-52. doi: 10.1136/tc.2010.040089.
59. Levine P, Gustafson T, Valenchik A. More bad news for smokers? The effect of cigarette smoking on wages. *Ind Labor Relat Rev.* 1997;50:493-509. doi: 10.1177/001979399705000307.
60. Grafova IB, Stafford FP. The wage effects of personal smoking history. *Ind Labor Relat Rev.* 2009;62(3):381-93. Available from: <http://www.jstor.org/stable/25594507>.
61. Hotchkiss JL, Pitts MM. Even one is too much: the economic consequences of being a smoker. FRB Atlanta working paper series 2013-3. Federal Reserve Bank of Atlanta; 2013. doi: 10.2139/ssrn.2359224.
62. Heineck G, Schwarze J. Substance use and earnings: the case of smokers in Germany. IZA discussion paper no. 743. Bonn: Institute for the Study of Labor; 2003. Available from: <http://ftp.iza.org/dp743.pdf>.
63. van Ours J. A pint a day raises a man's pay; but smoking blows that gain away. *J Health Econ.* 2004;23:863-86.
64. Auld M. Smoking, drinking, and income. *J Hum Resour.* 2005;40(2):505-18. doi: 10.3368/jhr.XL.2.505.
65. Lokshin M, Beegle K. Forgone earnings from smoking: evidence from a developing country. World Bank policy research working paper no. 4018. Washington, DC: World Bank Development Research Group; 2006.
66. Böckerman P, Hyytinen A, Kapria J. Smoking and long-term labour market outcomes. *Tob Control.* 2015;24:348-53. doi: 10.1136/tobaccocontrol-2013-051303.
67. World Health Organization. World health statistics, 2007. Geneva: World Health Organization; 2007. Available from: http://www.who.int/gho/publications/world_health_statistics/whostat2007.pdf.
68. World Health Organization. Preventing chronic diseases: a vital investment. Geneva: World Health Organization; 2005 [cited 2011 Feb 13]. Available from: http://www.who.int/chp/chronic_disease_report/en.
69. Djibuti M, Gotsadze G, Mataradze G, Zoidze A. Influence of household demographic and socioeconomic factors on household expenditure on tobacco in six new independent states. *BMC Public Health.* 2007;7:222. doi: 10.1186/1471-2458-7-222.
70. Gruber J, Köszegi B. Tax incidence when individuals are time-inconsistent: the case of cigarette excise taxes. *J Public Econ.* 2004;88(9-10):1959-87. doi: 10.1016/j.jpubeco.2003.06.001.

71. Waters H, Sáenz de Miera B, Ross H, Reynales Shigematsu LM. The economics of tobacco and tobacco taxation in Mexico. Paris: International Union Against Tuberculosis and Lung Disease; 2010. Available from: http://global.tobaccofreekids.org/files/pdfs/en/Mexico_tobacco_taxes_report_en.pdf.
72. John RM. Crowding out effect of tobacco expenditure and its implications on household resource allocation in India. *Soc Sci Med*. 2008;66(6):1356-67. doi: 10.1016/j.socscimed.2007.11.020.
73. Xin Y, Qian J, Xu L, Tang S, Gao J, Critchley JA. The impact of smoking and quitting on household expenditure patterns and medical care costs in China. *Tob Control*. 2009;18(2):150-5. doi: 10.1136/tc.2008.02695.
74. Wang H, Sindelar JL, Busch SH. The impact of tobacco expenditure on household consumption patterns in rural China. *Soc Sci Med*. 2006;62(6):1414-26. doi: 10.1016/j.socscimed.2005.07.032.
75. Hu T-W, Mao Z, Liu Y, de Beyer J, Ong M. Smoking, standard of living, and poverty in China. *Tob Control*. 2005;14:247-50. doi: 10.1136/tc.2004.010777.
76. Guindon GE, McGirr E, Nguyen-Thi-Thu H, Dang-Vu T, Hoang-Van K, Nguyen-Tuan L. Tobacco taxation in Vietnam. Paris: International Union Against Tuberculosis and Lung Disease; 2010. Available from: http://global.tobaccofreekids.org/files/pdfs/en/Vietnam_tobacco_taxes_report_en.pdf.
77. Annan KA. We the children: meeting the promises of the World Summit for Children. New York: United Nations; 2001. Available from: http://www.unicef.org/specialsession/about/sgreport-pdf/sgreport_adapted_eng.pdf.
78. Block S, Webb P. Up in smoke: tobacco use, expenditure on food, and child malnutrition in developing countries. *Econ Dev Cult Change*. 2009;58(1):1-23. doi: 10.1086/605207.
79. Semba RD, Kalm LM, de Pee S, Ricks MO, Sari M, Bloem MW. Paternal smoking is associated with increased risk of child malnutrition among poor urban families in Indonesia. *Public Health Nutr*. 2007;10(1):7-15. doi: 10.1017/S136898000722292X.
80. Barber S, Adioetomo SM, Ahsan A, Setyonaluri D. Tobacco economics in Indonesia. Paris: International Union Against Tuberculosis and Lung Disease; 2008. Available from: <http://www.worldlungfoundation.org/ht/a/GetDocumentAction/i/6567>.
81. Efroymson D, Ahmed S, Townsend J, Alam SM, Dey AR, Saha R, et al. Hungry for tobacco: an analysis of the economic impact of tobacco consumption on the poor in Bangladesh. *Tob Control*. 2001;10(3):212-7. doi: 10.1136/tc.10.3.212.
82. Best CM, Sun K, de Pee S, Bloem MW, Stallkamp G, Semba RD. Parental tobacco use is associated with increased risk of child malnutrition in Bangladesh. *Nutrition*. 2007;23(10):731-8. doi: 10.1016/j.nut.2007.06.014.
83. Bonu S, Rani M, Peters DH, Jha P, Nguyen SN. Does use of tobacco or alcohol contribute to impoverishment from hospitalization costs in India? *Health Policy Plan*. 2005;20(1):41-9. doi: 10.1093/heapol/czi005.
84. World Health Organization. Framework Convention on Tobacco Control. World Health Assembly Resolution 56.1, Preamble. World Health Organization, Tobacco Free Initiative; 2003. Available from: http://www.who.int/tobacco/framework/final_text/en/index2.html.
85. United Nations Development Programme. Development planning and tobacco control: integrating the WHO Framework Convention on Tobacco Control into UN and national development planning instruments. New York: United Nations Development Programme; 2014. Available from: <http://www.undp.org/content/dam/undp/library/HIV-AIDS/HIV%20MDGs%20and%20Development%20Planning/Development%20Planning%20and%20Tobacco%20Control%202014%2003%2012.pdf>.
86. United Nations. The millennium development goals report. New York: United Nations; 2005. Available from: <http://www.un.org/webcast/summit2005/MDGBook.pdf>.
87. Esson KM, Leeder SR. The millennium development goals and tobacco control: an opportunity for global partnership. Geneva: World Health Organization; 2004. Available from: https://extranet.who.int/iris/restricted/bitstream/10665/43111/1/9241562870_eng.pdf.
88. Commission of the European Communities. Health and poverty reduction in developing countries. Communication from the Commission to the Council and the European Parliament [COM (2002) 129 final]. Brussels: Commission of the European Communities; 2002 [cited 2016 Mar 17]. Available from: https://ec.europa.eu/europeaid/sites/devco/files/communication-health-poverty-reduction-developing-countries-com2002129-20020322_en.pdf.
89. United States Agency for International Development. Tobacco policy. Functional Series 200 – Programming policy, ADS chapter 210. 4/23/2013 revision. Available from: <https://www.usaid.gov/sites/default/files/documents/1864/210.pdf>.
90. Swedish International Development Cooperation Agency (SIDA). Health is wealth: policy for health and development. Stockholm: SIDA, Health Division, Department for Democracy and Social Development; 2002. Available from: http://www.sida.se/contentassets/c7e254a778cf45a4957fbbae50ea8b9d/health-is-wealth_792.pdf.
91. Organisation for Economic Co-Operation and Development. Better policies for sustainable development 2016: a new framework for policy coherence. Paris: Organisation for Economic Co-Operation and Development; 2016. Available from: http://www.oecd-ilibrary.org/development/better-policies-for-sustainable-development-2016_9789264256996-en.
92. Brown T, Platt S, Amos A. Equity impact of population-level interventions and policies to reduce smoking in adults: a systematic review. *Drug Alcohol Depend*. 2014;138:7-16. doi: 10.1016/j.drugalcdep.2014.03.001.

93. Remler DK. Poor smokers, poor quitters, and cigarette tax regressivity. *Am J Public Health*. 2004;94(2):225-9. doi: 10.2105/AJPH.94.2.225.
94. Smith KE, Savell E, Gilmore AB. What is known about tobacco industry efforts to influence tobacco tax? A systematic review of empirical studies. *Tob Control*. 2013;22(2):144-53. doi: 10.1136/tobaccocontrol-2011-050098.
95. Warner KE. The economics of tobacco: myths and realities. *Tob Control*. 2000;9:78-89. doi: 10.1136/tc.9.1.78.
96. Ross H, Chaloupka FJ. Economic policies for tobacco control in developing countries. *Salud Publica Mex*. 2006;48(Suppl 1):S113-20. Available from: <http://www.scielo.org.mx/pdf/spm/v48s1/a14v48s1.pdf>.
97. Jha P, Peto R, Zatonski W, Boreham J, Jarvis MJ, Lopez AD. Social inequalities in male mortality, and in male mortality from smoking: indirect estimation from national death rates in England and Wales, Poland, and North America. *Lancet*. 2006;368(9533):367-70. doi: 10.1016/S0140-6736(06)68975-7.
98. Hill S, Amos A, Clifford D, Platt S. Impact of tobacco control interventions on socioeconomic inequalities in smoking: review of the evidence. *Tob Control*. 2014;23:e89-97. doi: 10.1136/tobaccocontrol-2013-051110.
99. Brown T, Platt S, Amos A. Equity impact of interventions and policies to reduce smoking in youth: systematic review. *Tob Control*. 2014;23:e98-105. doi: 10.1136/tobaccocontrol-2013-051451.
100. Sayginsoy Ö, Yürelki AA, de Beyer J. Cigarette demand, taxation, and the poor: a case study of Bulgaria. HNP discussion paper: Economics of tobacco control paper no. 4. Washington, DC: World Bank; 2002. Available from: <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/Sayginsoy-CigaretteBulgaria-whole.pdf>.
101. Önder Z, Yürelki A. Who pays the most cigarette tax in Turkey. *Tob Control*. 2014;25:39-45. doi: 10.1136/tobaccocontrol-2014-051639.
102. Bayarsaikhan D, Muir J. Financing health promotion. Discussion paper no.4. Geneva: World Health Organization; 2007. Available from: http://www.who.int/health_financing/documents/dp_e_07_4-health_promotion.pdf.
103. Farrell P, Fuchs VR. Schooling and health: the cigarette connection. *J Health Econ*. 1982;1(3):217-30. doi: 10.1016/0167-6296(82)90001-7.
104. de Walque D. Education, information, and smoking decisions: evidence from smoking histories in the United States, 1940-2000. *J Hum Resour*. 2010;45(3):682-717. doi: 10.3368/jhr.45.3.682.
105. de Walque D. Does education affect smoking behaviors? Evidence using the Vietnam draft as an instrument for college education. *J Health Econ*. 2007;26:877-95. doi: 10.1016/j.jhealeco.2006.12.005.
106. CRÉATEC + Market Studies. Final report: effectiveness of health warning messages on cigarette packages in informing less-literate smokers. Prepared for Communications Canada. Montreal, Quebec, Canada: CRÉATEC + Market Studies; December 2003. Available from: <http://www.tobaccolabels.ca/wp/wp-content/uploads/2013/11/Canada-2003-Effectiveness-of-Health-Warning-Messages-on-Cigarette-Packages-in-Informing-Less-literate-Smokers-Government-Report.pdf>.
107. Millar, WJ. Reaching smokers with lower educational attainment. *Health Rep*. 1996;8(2):11-19.
108. Hammond D. Health warning messages on tobacco products: a review. *Tob Control*. 2011;20(5):327-37. doi: 10.1136/tc.2010.037630.
109. Cantrell J, Vallone DM, Thrasher JF, Nagler RH, Feirman SP, Muenz LR, et al. Impact of tobacco-related health warning labels across socioeconomic, race and ethnic groups: results from a randomized Web-based experiment. *PLoS ONE*. 2013;8(1):e52206. doi: 10.1371/journal.pone.0052206.
110. Kunst A, Giskes K, Mackenbach J. Socio-economic inequalities in smoking in the EU: applying an equity lens to tobacco control policies. Brussels: EU Network on Intervention to Reduce Socio-Economic Inequalities in Health. Rotterdam: Department of Public Health, Erasmus Medical Center; 2004. Available from: http://old.ensp.org/files/ensp_socioeconomic_inequalities_in_smoking_in_eu.pdf.
111. Platt S, Amos A, Gnich W, Parry O. Smoking policies. In: Mackenbach JP, Bakker M, editors. *Reducing inequalities in health: a European perspective*. London: Routledge; 2002. p. 125-43.
112. Monsó E, Campbell J, Tønnesen P, Gustavsson G, Morera J. Sociodemographic predictors of success in smoking intervention. *Tob Control*. 2001;10(2):165-9. doi: 10.1136/tc.10.2.165.
113. Varghese M, Sheffer C, Stitzer M, Landes R, Brackman L, Munn T. Socioeconomic disparities in telephone-based treatment of tobacco dependence. *Am J Public Health*. 2014;104(8):e76-84. doi: 10.2105/AJPH.2014.301951.
114. Iglesias-Rios L, Parascandola M. A historical review of R.J. Reynolds' strategies for marketing tobacco to Hispanics in the United States. *Am J Public Health*. 2013;103(5):e15-27. doi: 10.2105/AJPH.2013.301256.