

PART 2.

MECHANISMS AND CONTEXT UNDERLYING SOCIAL INEQUALITIES IN CANCER

CHAPTER 11.

The economics and control of tobacco, alcohol, food products, and sugar-sweetened beverages

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Introduction

Tobacco use, alcohol consumption, and high body mass index (BMI) are major risk factors for many noncommunicable diseases (NCDs) and injuries, including cancers.

Tobacco use is responsible for 7 million deaths per year (WHO, 2017b), including 1.5 million from cancer (Lim et al., 2012). Of the 1 billion smokers worldwide, 80% are located in low- and middle-income countries (LMICs), where often the health system does not have the capacity to treat smoking-related diseases. Alcohol consumption is responsible for 3.3 million deaths per year (GBD 2016 DALYs and HALE Collaborators, 2018), including 337 000 from cancer (Stewart and

Wild, 2014). Mortality due to alcohol is affected both by the total volume consumed and by the pattern of drinking, and higher levels of harm are seen in men than in women. Excess calorie intake, including through consumption of sugar-sweetened beverages (SSBs) and calorie-dense foods, combined with low levels of physical activity, contribute to a high BMI. Overweight and obesity are responsible for 2.8 million deaths per year; currently, 1.9 billion adults and almost 400 million children are overweight or obese. The prevalence of overweight and obesity is rapidly increasing in LMICs.

In 2016, tobacco use, alcohol consumption, and high BMI were responsible for 7%, 4%, and 6%, respectively, of all disability-adjusted

life years lost (GBD 2016 Risk Factors Collaborators, 2017). Of all disability-adjusted life years lost due to cancer, tobacco use was responsible for 20%, alcohol consumption for 7%, and high BMI for 5%. Given that 40% of all disability-adjusted life years lost due to cancer were explained by the sum of the most important known risk factors, these three risk factors are by far the most important modifiable risk factors to modulate to prevent cancer (GBD 2016 Risk Factors Collaborators, 2017).

The use of tobacco and consumption of alcohol and SSBs generate costs that are not borne by the consumer but rather by others. These negative externalities include exposure to second-hand smoke and injuries and deaths as a result of

alcohol-related road traffic accidents, violence, and fetal alcohol syndrome. Because of these externalities, the market price paid by the consumer does not reflect the true cost and thus a market failure occurs, which creates an economic motivation for intervention in the market. In addition to the market failure related to price, there are also information market failures in that consumers often poorly understand the health consequences of the use of tobacco or consumption of alcohol or SSBs, which are exacerbated when use or consumption is initiated at a young age or if the product is addictive. Furthermore, in many places where there is significant public funding for health care, a financial externality occurs as public finances are applied to treat illnesses resulting from the use of tobacco or consumption of alcohol or SSBs.

The most common and powerful economic policy intervention used to correct negative externalities is taxes. Taxes increase prices so that the price paid by consumers internalizes these costs, thereby ensuring the price paid by consumers fully accounts for externalities. Such a tax is referred to as a Pigouvian tax. Furthermore, increased prices reduce consumption and also raise revenue for the government. Historically, the role of taxes on these commodities has been to generate revenues because they are relatively price inelastic (see the “Price elasticity of demand” section below), have a small number of substitutes, and are produced by a small number of firms.

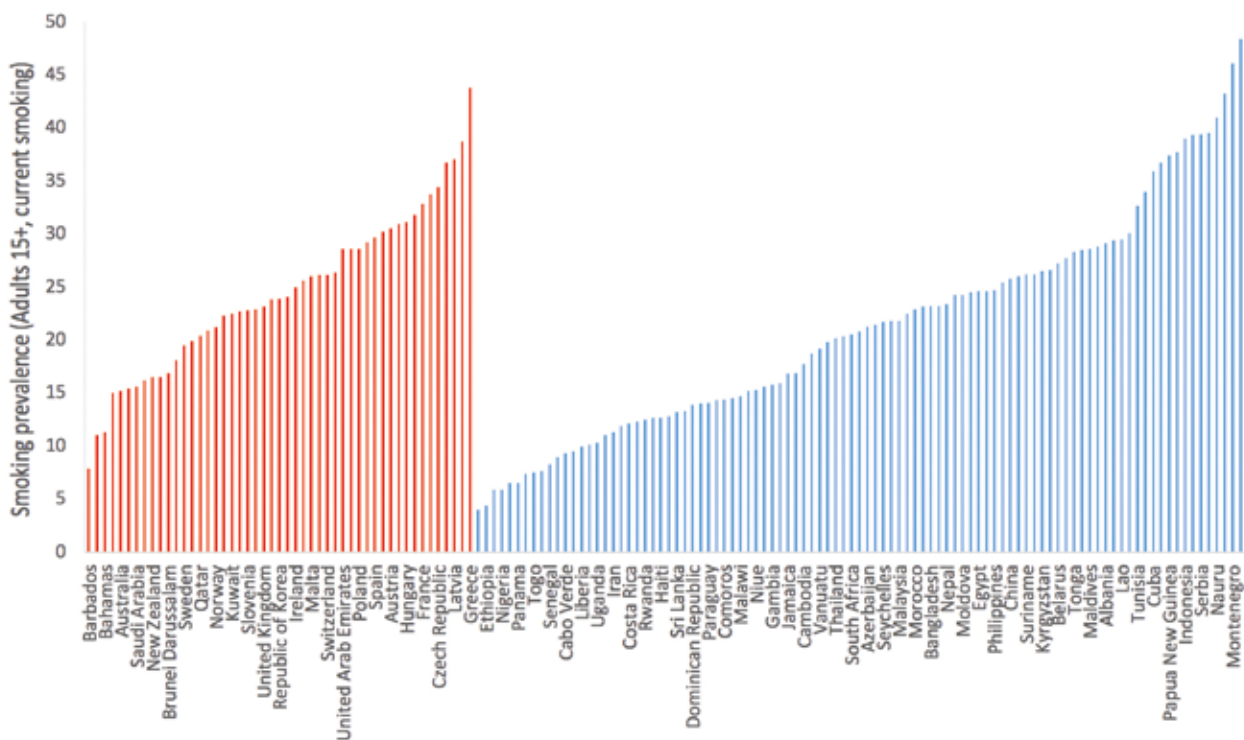
Economists consider the demand for a product to be a function of price (of the product itself as well as of substitutes and complements

in consumption), income, tastes, and preferences. Demand is modifiable through policies that influence these variables. For example, increases in taxes that increase the price of the product reduce demand, as does banning advertising. Increasing knowledge of the health effects through warning labels adjusts preferences and therefore reduces demand.

Between- and within-country variations in use

Various definitions of smoking prevalence exist, including current or daily tobacco smoking or cigarette-only smoking. Adult prevalence generally relates to those 15 years and older. Fig. 11.1 shows the current prevalence of smoking of all tobacco products, that is, the broadest definition,

Fig. 11.1. Adult smoking prevalence by World Bank income group. Red, high-income countries; blue, low- and middle-income countries. Source: compiled from WHO (2014b).



for the most recent year. Large between-country variations in smoking prevalence exist, but without a clear gradient between countries at different levels of socioeconomic development; being a high-income country (HIC) or LMIC is a poor predictor of whether a country has a low or high prevalence of smoking. However, significant variation in tobacco use and a strong socioeconomic gradient exist within countries. For example, Hosseinpoor et al. (2012) found that the poorest men were more than 2.5 times as likely to smoke as the richest men, and, in 42 of 48 countries, the poorest men had a higher smoking prevalence than the richest men. Results among women were more mixed; the poorest women had a higher smoking prevalence than the richest women in only 31 of 48

countries. Using similar data but a different methodology, Harper and McKinnon (2012) found that wealthier men were less likely to be current smokers in 47 of 50 countries (see also Example 1). Results for women also showed greater variation.

This link to income extends to poverty. John et al. (2012a) reported that tobacco use was significantly higher among those living in regions of higher poverty and lower education in Ghana, and higher tobacco use was associated with a lower probability of purchasing health insurance. In Cambodia, expenditure on tobacco was found to crowd-out expenditure on education. Because a higher education level was associated with a reduced frequency of daily smoking, a vicious circle was created: a lower education level led to increased

smoking, which, in turn, led to lower spending on education (John et al., 2012b).

Wide variation in alcohol intake is also seen across countries, with the highest consumption levels seen in the World Health Organization (WHO) European Region (average, 10.9 L per person per year) and the lowest in the Eastern Mediterranean Region (average, 0.7 L per person per year) (WHO, 2014a). Across all settings, men are more likely to consume alcohol than women are, and the amount of alcohol consumed by those who drink is higher for men than for women.

Alcohol intake is generally associated with increased national wealth; the population in more developed economies is more likely to consume alcohol, is at risk of a higher prevalence

Fig. 11.2. Proportion of population who have abstained from the consumption of alcohol within the past 12 months, by World Bank income group. Red, high-income countries; blue, low- and middle-income countries. Source: compiled from WHO (2014b).

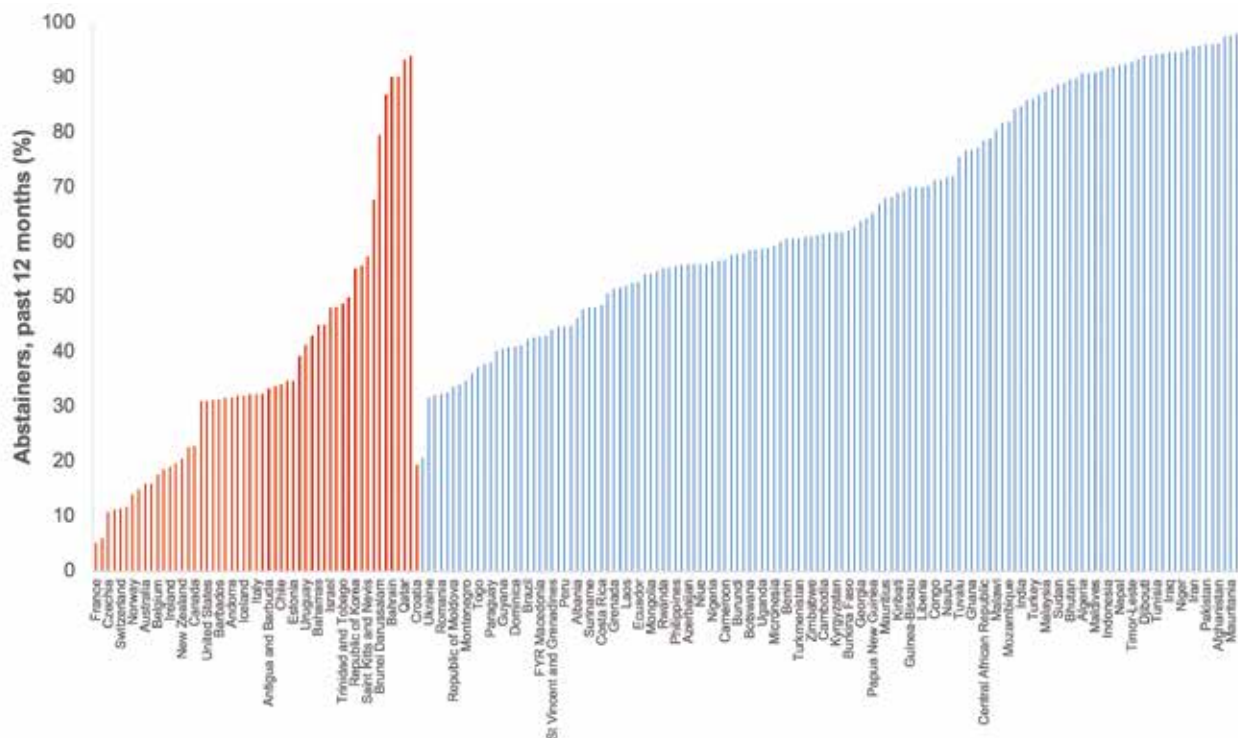
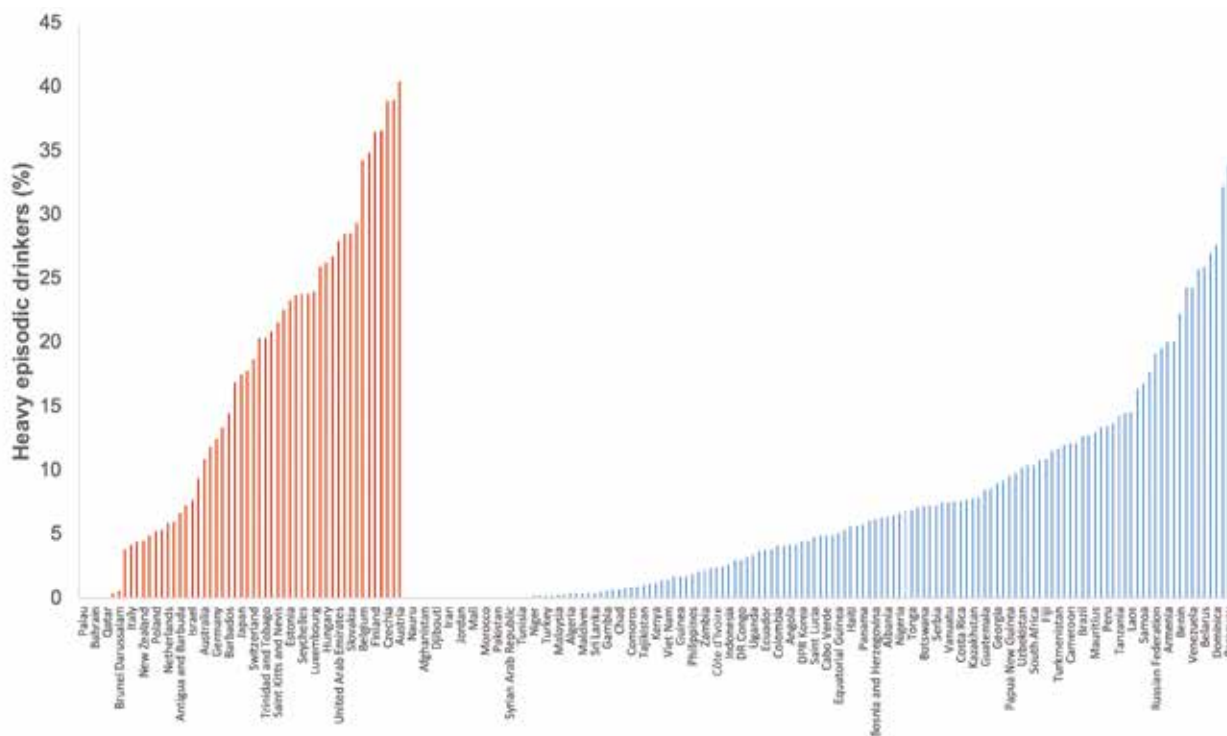


Fig. 11.3. Proportion of population who have undergone periods of heavy episodic drinking within the past 12 months, by World Bank income group. Red, high-income countries; blue, low- and middle-income countries. Source: compiled from WHO (2014b).



of heavy episodic drinking, and has the lowest numbers of abstainers. Fig. 11.2 displays the proportions of populations who abstain from alcohol consumption, and Fig. 11.3 depicts the proportions who partake in heavy episodic drinking (WHO, 2014b). Although significant within-group variation exists, abstinence is higher in LMICs and declines as gross domestic product (GDP) increases.

Within countries, differences in drinking patterns by socioeconomic status (SES) are complex. People with higher SES are more likely to participate in heavy episodic drinking (the intensity of drinking is important because there is a dose–response association between alcohol consumption and health consequences, including cancer; Stewart and Wild, 2014). However, those with lower SES who engage in heavy episod-

ic drinking do so more frequently than those with higher SES (Collins, 2016), meaning that those with lower SES are more vulnerable to the health consequences of alcohol consumption (Grittner et al., 2012). In addition, adult unemployment has been associated with increased alcohol use, with higher levels of alcohol misuse diagnosed in people who have experienced unemployment within the previous year (Bryden et al., 2013; Popovici and French, 2013).

Having low SES is a risk factor for alcohol-related mortality; lower SES leads to a 1.5–2-fold increase in mortality for alcohol-attributable causes compared with all causes (Probst et al., 2014; see also Chapter 7).

For the purposes of this chapter, SSBs are defined as all types of beverages that contain free sugars (monosaccharides and disaccharides

added to foods and beverages by the manufacturer, cook, or consumer, and sugars naturally present in honey, syrups, fruit juices, and fruit juice concentrates) (WHO, 2015). SSBs include carbonated or non-carbonated soft drinks, fruit or vegetable juices and drinks, liquid and powder concentrates, flavoured water, energy and sports drinks, ready-to-drink tea and coffee, and flavoured milk drinks. Unlike for tobacco use and alcohol consumption, no global database exists on SSB consumption. Individual countries are able to estimate SSB consumption from food intake surveys, but at the global level sales data or modelled estimates, such as those from the Global Burden of Disease Study, are the best sources available (GBD 2016 DALYs and HALE Collaborators, 2018). There is some indication that SSB consumption increases

with the wealth of a country; however, consumption can be very high even at very low per capita GDP values (Euromonitor International, 2018). Limited information exists with which to accurately assess within-country variations in SSB consumption.

Affordability

Tax policy has long been considered the most effective tool to reduce the demand for a product through increases in prices. However, as attention has shifted to rapidly growing LMICs, increasing prices may not be sufficient to reduce demand; incomes are growing more rapidly than prices are increasing. As a result, attention has been shifting to the affordability of products. Affordability is most commonly defined as the ratio of price to income, and several different measures of affordability – based on the narrowest to the broadest measures of income – are described in the following.

Blecher and van Walbeek (2009) have published the longest (1990–2006) analysis of between-country affordability of cigarettes. They used the relative income price, defined as the percentage of GDP required to purchase 100 packs of the cheapest brand of cigarettes. Although this method used a broad measure of income, it was nevertheless able to measure affordability annually in the largest number of countries, particularly LMICs, over the longest period of time. However, relative income price is unable to take into account within-country inequalities in income and price variation. They found that although cigarettes are more affordable in HICs, they have become less affordable since 1990, and at an ever increasing rate since 2000. In nearly all countries where cigarettes have become less affordable, this has

occurred because increases in prices have been greater than increases in incomes.

Recent data on the affordability of beer and SSBs have shown different results. Blecher et al. (2018) reported that beer has similar levels of prices in HICs and LMICs but is significantly more affordable in HICs. They found that beer became more affordable in 81% of HICs and in 95% of LMICs between 1990 and 2016. In another study, Blecher et al. (2017) found that SSBs, proxied by a best-selling cola-flavoured soft drink, became more affordable in 79 of 82 countries between 1990 and 2016.

Price elasticity of demand

The relationship between price and consumption is defined by the price elasticity of demand (PED), or the percentage change in consumption as a result of the percentage change in price. For example, a PED of -0.6 means that a 6% decline in consumption has resulted from a 10% increase in real prices, all else being held constant. If the percentage change in consumption is less than

the percentage change in price, the product is considered price inelastic; if the percentage change in consumption is greater than the percentage change in price, it is considered price elastic.

The price elasticity of tobacco, particularly of cigarettes, has been widely estimated. Although tobacco is universally found to be price inelastic, meaning that the percentage decline in consumption is less than the percentage increase in price, consumption nevertheless has declined. PED has been estimated to be about -0.4 for HICs and between -0.6 and -0.2 for LMICs (IARC, 2011). Younger and poorer smokers are more responsive (i.e. less inelastic) than older and richer smokers. Alcohol is also price inelastic; however, results vary substantially because of the greater product heterogeneity. An important consideration in addition to the price elasticity of an individual product is the cross-price elasticities between different alcohol products. Furthermore, price elasticity also varies substantially by intensity of use; heavier drinkers are

Fig. 11.4. Real taxes levied on, and prices and consumption of, cigarettes in South Africa, 1961–2016 (constant 2016 prices). GST, goods and services tax; VAT, value-added tax. Source: UCT (2018), courtesy of Corné van Walbeek.

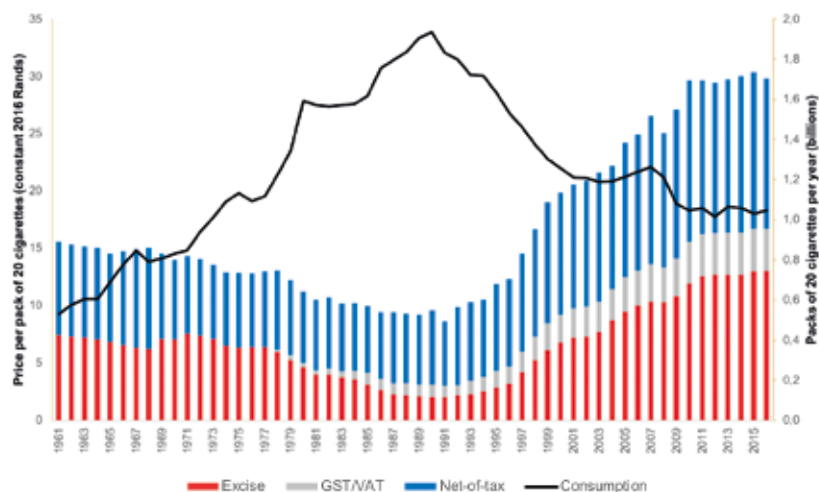
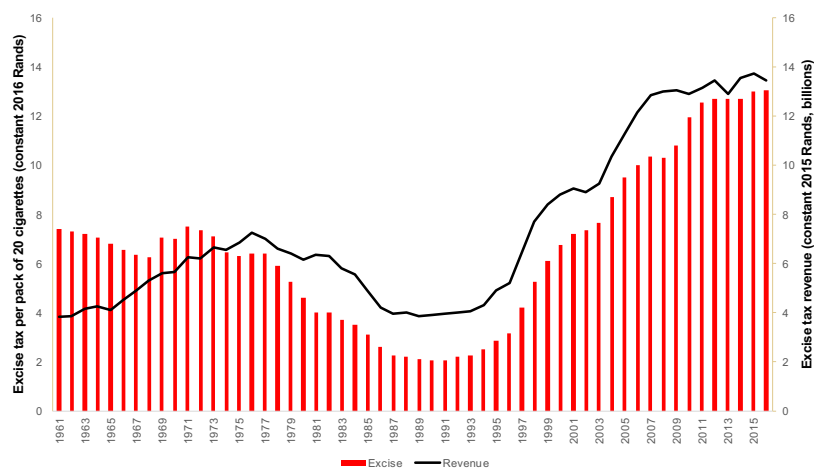


Fig. 11.5. Real excise taxes and revenues in South Africa, 1961–2016 (constant 2016 prices). Source: UCT (2018), courtesy of Corné van Walbeek.



more inelastic. The prices of non-alcoholic beverages are found to be less inelastic than those of alcohol and tobacco; the subset of SSBs is sometimes even elastic because of the large number of substitutes available, particularly those with less or no calories.

Price elasticity has two important implications. The less inelastic, or the more elastic, a product is, the more effective is a tax-induced price increase in reducing consumption. However, the more inelastic a product is, the more efficient a revenue generator it becomes because the percentage decline in consumption is less than the percentage increase in price.

One of the best examples of price elasticity occurred in sales of cigarettes in South Africa. Between 1961 and 1991, cigarette excise taxes declined in real terms by 72%, which led to a 45% decline in real prices (see Fig. 11.4). As a result, consumption increased by 245%. However, since 1991, taxes have increased by 535% and prices by 245%, causing a 43% decline in consumption. Furthermore, because of the price inelastic nature of the product, the de-

cline in consumption coincided with an increase in tax revenues. The increase in tax revenues from 1991 to 2016 was 238% in real terms (see Fig. 11.5).

Tax structure

The policy tool used to increase the price is to increase the excise tax. An excise tax is a consumption tax levied early in the supply chain. It is discriminatory, in that it is applied to a very narrow range of goods. It is applied equally to domestically produced and imported products. Excise taxes are preferred to sales taxes (e.g. goods and services tax, or value-added tax) because sales taxes are non-discriminatory and increasing the rate of tax would not change relative prices. Excise taxes are also preferred to import tariffs or duties, because increasing the tariff or duty would only change relative prices between domestically produced and imported products.

Excise taxes can be levied as specific taxes (per unit of volume) or ad valorem taxes (percentage of value), or a combination of these (mixed system). Taxes can be applied uni-

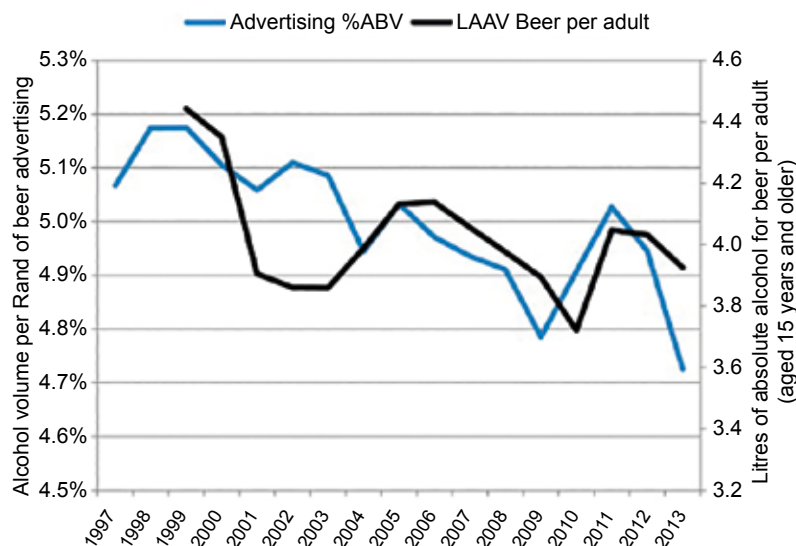
formly or in tiers based on product characteristics or value.

There is a consensus that uniform specific taxes represent the optimal tax structure for cigarettes. They result in the least variation in prices, thereby reducing the possibility of smokers trading down to cheaper brands to avoid tax increases, and result in higher prices. Furthermore, they are significantly easier to administer and result in more predictable and stable revenue streams for government.

Uniform specific taxes are not necessarily optimal for alcohol, where significantly greater price variation may warrant the use of ad valorem systems. However, large specific components will result in higher prices and ensure the effectiveness of tax increases. A particularly innovative option, which is equally applicable to SSBs, is targeting the dose of alcohol or sugar when setting the tax. Given that the magnitude of negative externalities is directly related to the dose of alcohol or sugar, taxing the volume of alcohol or sugar rather than the volume of the beverage can generate incentives for producers to reformulate their products to reduce the alcohol or sugar content to reduce their tax burden or, alternatively, to shift spending on advertising to lower-alcohol or lower-sugar beverages.

South Africa began to implement a dose-based tax system on beer in the late 1990s. The rate of tax was also increased each year, thereby increasing the incentives for producers to avoid the tax by shifting the market to lower-alcohol beers. This shift occurred not by the producers lowering alcohol levels in existing beer, but by shifting spending on advertising from higher-alcohol to lower-alcohol beers. Blecher (2015) showed

Fig. 11.6. Advertising expenditure on major South African beer brands and volume of alcohol in beer. ABV, alcohol by volume; LAAV, litres of absolute alcohol by volume. Source: reprinted from Blecher (2015), copyright 2015, with permission from Elsevier.



how the average alcohol content by volume of advertised beer fell from 5.2% in 1999 to 4.7% in 2013, which coincided with a 12% reduction in the number of litres of alcohol consumed per adult (from beer) during the same period (see Fig. 11.6).

The most prominent SSB tax was levied in Mexico in 2014, on both carbonated and non-carbonated beverages with sugar. Mexico implemented a uniform specific tax of 1 peso per litre, which equated to approximately 10% of the retail price. Evaluations conducted so far have shown declines in consumption of SSBs (Colchero et al., 2016), with larger declines among the households with low SES.

South Africa and the United Kingdom are the first countries to propose more innovative tax structures to target the dose of sugar. South Africa will impose a tax per gram of sugar from 2018, with an exemption for the first 4 g of sugar. The United Kingdom will impose the tax through tiers rather than a linear model.

Distributional consequences and use of revenues

As indicated earlier, in many countries smoking is more prevalent among the poor than the rich. As a result, the poor are likely to spend a greater proportion of their income on tobacco than the rich. Tax increases are therefore argued to be regressive, because the poor will pay a greater proportion of their income on the tax increase. Taking a more comprehensive approach to considering regressivity, recent studies have indicated that although price policies do create a higher financial burden in lower-income populations, they will have a greater health impact because disease burdens are concentrated in these groups. By preventing diseases, including cancer, price policies therefore have the potential to prevent catastrophic out-of-pocket expenditure incurred because of poor health (Sassi et al., 2018).

The first point to note from the above is that it considers only the

distributional impact of taxes and not that of government expenditure, which is likely to be progressive. For example, South Africa has increased taxes on tobacco and alcohol significantly since the early 1990s; Inchauste et al. (2015) have shown that although excise taxes in South Africa are, on average, regressive, the expenditure that they have enabled was overwhelmingly progressive and the net effects were progressive.

The second point is that one should consider not only the average impact but also the marginal impact. Research shows that the poor are more responsive to tax or price increases than are the rich. This is supported by economic theory, because the poor spend a larger proportion of their income on these commodities. One should expect the poor to reduce their consumption in response to tax or price increases more than the rich. Again, data from South Africa support this. van Walbeek (2002) showed that between 1990 and 1995 cigarette excise taxes became less regressive as the tax increased, as poor households reduced expenditure on tobacco at a faster rate than rich households did.

Third, tobacco tax receipts can be directed to specifically reduce the regressivity of taxes through earmarking. This may include earmarking revenues to assist low-income smokers to quit smoking (Warner, 2000).

Different tobacco and non-tobacco products

In most countries, cigarettes overwhelmingly remain the most-used tobacco product. Some countries have a greater diversity of tobacco products, for example, bidis and chewing tobaccos in South Asia, waterpipe smoking in the Middle East, and snus in Scandinavia. The recent

growth in the popularity of electronic nicotine delivery systems, including electronic cigarettes, which contain nicotine but not tobacco, has added to product variation. Combustible tobacco products are considered to be of highest risk; non-combustible products such as snus have been shown to reduce tobacco-attributable mortality (Ramström and Wikmans, 2014). Electronic nicotine delivery systems show promise in being substantially less harmful than combustible tobacco, although the long-term risk has not yet been established (McNeill et al., 2018; National Academies of Sciences, Engineering, and Medicine, 2018).

The guidelines for implementation of Article 6 of the WHO Framework Convention on Tobacco Control provide countries with a set of best practices for tobacco taxation (WHO, 2018). One of the key recommendations is that countries should tax tobacco products in a comparable way to ensure that increases in taxes and prices do not result in the substitution of cheaper categories of products. In the case where products have similar levels of harm, this is an appropriate strategy. However, as less harmful products have become more prevalent, and a continuum of risk or harm is present, it is appropriate to differentiate taxes according to relative risks (Chaloupka et al., 2015). The overriding focus remains the reduction of demand for the most harmful products.

Cost-effectiveness of different interventions

Appendix 3 of the WHO Global Action Plan for the Prevention and Control of NCDs 2013–2020 provides guidance for countries on the cost-effectiveness and feasibility of implementing health interventions to prevent and control NCDs (WHO, 2017a). Approved by the World Health Assembly in 2017, this guidance provides the most up-to-date economic rationale for implementing interventions. A total of 16 interventions, 11 of which correspond to cancer prevention and treatment (Box 11.1), are considered “best buys”, meaning that the cost-effectiveness ratio is less than US\$ 100 (adjusted for purchasing power) per disability-adjusted life year gained, the financial impact is low, and there are no major feasibility issues.

Several fiscal and regulatory policies are available to reduce the use of tobacco and the consumption of alcohol and food products that contribute to obesity. Taxation of both tobacco and alcohol products are two of the WHO “best buys”, meaning that they are highly cost-effective and feasible to implement in all settings. Taxation of SSBs is also a recommended intervention, although it has been conservatively modelled and is not yet considered as cost-effective as other health taxes.

Other regulatory actions to reduce tobacco use, alcohol consump-

tion, and obesity are also included in WHO “best buys”. Regulatory actions tend to be low in cost when only public sector contributions are considered, but with high potential to improve health and reduce social inequalities in health (Nugent et al., 2018).

Conclusions

Use of tobacco and consumption of alcohol and SSBs are significant contributors to disease, disability, and death globally, and significant contributors to the cancer burden. Furthermore, the burden is increasingly shifting to LMICs as well as low-income populations within HICs. These risk factors are modifiable, however, and population-level policy interventions are available to successfully reduce the burden associated with them. Such policy interventions are aimed at reducing the demand for tobacco, alcohol, and SSBs through price and non-price interventions. These interventions, referred to as “best buys” because of their cost-effectiveness, are significantly underutilized, particularly by LMICs. Taxes and other fiscal measures are particularly cost-effective and are able to reduce the negative externalities associated with their use.

Box 11.1. “Best buys” related to cancer prevention and treatment, from the World Health Organization Global Action Plan for the Prevention and Control of NCDs 2013–2020 (WHO, 2017a).

- Increase excise taxes and prices on tobacco products
- Implement plain/standardized packaging and/or large graphic health warnings on all tobacco packages
- Enact and enforce comprehensive bans on tobacco advertising, promotion and sponsorship
- Eliminate exposure to second-hand tobacco smoke in all indoor workplaces, public places, public transport
- Implement effective mass media campaigns that educate the public about the harms of smoking/tobacco use and second hand smoke
- Increase excise taxes on alcoholic beverages
- Enact and enforce bans or comprehensive restrictions on exposure to alcohol advertising (across multiple types of media)
- Enact and enforce restrictions on the physical availability of retailed alcohol (via reduced hours of sale)
- Implement community wide public education and awareness campaign for physical activity which includes a mass media campaign combined with other community based education, motivational and environmental programmes aimed at supporting behavioural change of physical activity levels
- Vaccination against human papillomavirus (two doses) of girls aged 9–13 years
- Prevention of cervical cancer by screening women aged 30–49 years, either through: visual inspection with acetic acid linked with timely treatment of precancerous lesions; pap smear (cervical cytology) every 3–5 years linked with timely treatment of precancerous lesions; human papillomavirus test every 5 years linked with timely treatment of precancerous lesions

Key points

- There is significant between- and within-country variation in tobacco use and alcohol consumption by income and socioeconomic status; within a particular country, low-income populations are more likely to smoke than high-income populations are.
- Smoking and alcohol consumption are the most significant contributors to noncommunicable diseases, but measures to prevent and counter their impact are significantly underfunded within health systems.
- Several tools are available to reduce the demand for tobacco, alcohol, and sugar-sweetened beverages, including taxation.
- Taxation tools are particularly powerful in reducing the use of tobacco and the consumption of alcohol and sugar-sweetened beverages; however, the optimal tax design differs with product type, and careful attention should be paid to the tax structure to ensure maximum impact.
- Attention should also be paid to the distributional impact of taxes to ensure that progressive outcomes are achieved, including the earmarking of revenues to health-related expenditures.

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