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# Reducing Noncommunicable Disease Risk Factors in Adolescents: An Investment Case for Kenya

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Noncommunicable diseases (NCDs) are diseases that are not caused by an infection and not spread through contact with another person.

NCDs such as cardiovascular disease, diabetes, cancer, respiratory disorders, and mental and neurological disorders are the cause of 27% of deaths in Kenya.<sup>1</sup>

Adolescents—young people between the ages of 11 and 19—make up 24% of Kenya's population.<sup>2</sup> Their ongoing neural, psychosocial, and physical development makes them especially vulnerable to the four main risk factors for NCDs<sup>1,3</sup>:

*Unhealthy diet, lack of physical activity, alcohol use, and tobacco use*

In this brief, we examine the benefits and costs of a set of effective interventions for reducing NCD risk factors among adolescents in Kenya. When people initiate these (and other) unhealthy behaviors in adolescence, they often adopt these behaviors for life, which increases their risk for NCDs as they age. The three dominant NCD risk factors affecting adolescents are alcohol, tobacco use, and physical inactivity.

## What You Need to Know

- Adolescents make up 24% of Kenya's population.
- They are constantly exposed to risk factors for NCDs, putting them at high risk of lifetime diseases and early death.
- Implementing evidence-based interventions that target adolescents could avert between 8,700 and 130,000 premature NCD deaths from 2020 to 2070.
- Avoiding these deaths would provide economic benefits ranging from USD 45 million to USD 710 million over the next 50 years.
- One way to reduce key NCD risk factors for adolescents in Kenya—such as the use of tobacco, the consumption of sugar-sweetened beverages (SSBs), and the harmful use of alcohol—is the use of well-designed excise taxes.



Among Kenyan adolescents, **13%** of boys and **7%** of girls use tobacco products.<sup>4</sup>

In Kenya, 10% of adolescents—young people between the ages of 11 and 19—consume alcohol and are exposed to minimally regulated, potent, illicit alcoholic brews. Among Kenyan adolescents, 13% of boys and 7% of girls use tobacco products, and 45% of them are exposed to secondhand smoke.<sup>4</sup> Kenya is also facing the double burden of malnutrition, with 13% of adolescent girls being overweight or obese and most of the 17% of girls classified as thin being undernourished.<sup>4</sup> Physical inactivity is increasing as the population becomes more urban. These risk factors are modifiable, and the adolescent life stage offers opportunities to embed healthy behaviors that will endure as they age.<sup>3</sup>

Kenya is aware of these health risks and has taken some initial steps to improve the health environment for adolescents. In 2010, the Government of Kenya implemented the Alcoholic Drinks and Control Act to regulate the production, sale, and consumption of alcohol—with the aims to educate the public on alcohol use and reduce youth alcohol consumption.<sup>5</sup> The National School Health Policy and Guidelines offer suggestions to enhance school feeding programs by providing balanced meals in schools, encouraging children and adolescents to carry nutritious snacks and lunches, and educating them about the risk factors for NCDs.<sup>5</sup> Also, the Kenya Tobacco Control Act prohibits the sale of cigarettes to individuals younger than the age of 18 years.

Donor programs aimed at adolescent health have made major investments in tobacco control among youth but have not targeted other NCD risks influencing youth health behavior. The emphasis in donor programs has been on sexual and reproductive health and HIV/AIDs prevention, whereas the budget for donor programs targeted to adolescents remains small—only 2.2% of total developmental assistance for health in 2015.<sup>6</sup> If the current trend of adolescent NCD risk exposure continues, by 2060, there will be 20 million premature deaths globally at an economic cost of USD 300 billion.<sup>7</sup>

## Making the Investment Case for Kenya

This NCD risk factor investment case shows the benefits of investing in cost-effective, policy-level interventions for adolescents in Kenya to reduce the risk of acquiring NCDs later in life.

### Approach

We estimated the health and economic gains that could be realized through maximum implementation of select evidence-based interventions targeted at tobacco use, harmful use of alcohol, and obesity among adolescents in Kenya. We looked at the current implementation level for these interventions in the country and assessed how closing the gap between current and maximum implementation could reduce premature death among adolescents. Additionally, we estimated the economic consequences of not fully implementing these interventions throughout adulthood to age 70; ultimately, the cost of inaction.

### Interventions

We conducted structured literature reviews from 2000 to 2018 using multiple databases to identify tobacco and obesity interventions in Kenya designed specifically for adolescents. We also searched World Health Organization (WHO) materials and Kenya Ministry of Health policy documents, and then reviewed their relevant citations and recommendations. Additionally, we conducted stakeholder interviews with country experts in each domain to substantiate and finalize our selection of interventions.

Although we were not able to identify interventions implemented among Kenyan adolescents for each of our risk factors, we applied the best available evidence from Kenya and other contexts. Our review suggests that intersectoral and fiscal policies are ways to reduce NCD risk in Kenya. The most promising interventions and the estimates of their effectiveness used in our analysis are summarized in Table 1.

**Table 1. Adolescent Noncommunicable Disease Risk Factor Interventions Selected for Kenya<sup>a</sup>**

| RISK FACTOR                          | OUTCOME  | INTERVENTION  | ESTIMATE OF EFFECTIVENESS  | SOURCE  |
|--------------------------------------|--|---|--|---|
| Tobacco use                          | Reduce monthly smoking prevalence among adolescents  | Increase in excise tax to 75% of final retail price of tobacco products               | For every 10% increase in price, smoking prevalence declines by 3.5%                                     | Okello, 2001 <sup>8</sup>   |
|                                      |  | Point-of-sale advertising bans  | Full implementation leads to a 27% reduction in the chance of smoking                                    | Shang, Huang, Cheng, Li, & Chaloupka, 2016 <sup>9</sup>           |
| Harmful use of alcohol               | Reduce heavy episodic drinking (having 5 or more than 5 drinks in a row during the past 30 days) among adolescents | Increase in 50% excise tax as compared with current levels                            | For every 10% increase in price, binge drinking declines by 6.03%  | Sornpaisarn, Shield, Cohen, Schwartz, & Rehm, 2013 <sup>10</sup>  |
|                                      |  | Complete ban on alcohol advertising (television, radio, outdoors, and print)          | Full implementation leads to a 42% reduction in binge drinking   | Saffer & Dave, 2003 <sup>11</sup>                                 |
| Obesity (High body mass index [BMI]) | Reduce the population mean BMI among adolescents   | Addition of 20% excise taxes on sugar-sweetened beverages                             | A 10% increase in price will lead to a 11.8% decrease in consumption, considering an elasticity of -1.18 | Stacey, Tugendhaft, & Hofman, 2017 <sup>12</sup>                  |
|                                      |  | School-based nutrition and physical activity programs to reduce obesity or overweight | Program implementation leads to a long-term -0.29 kg/m <sup>2</sup> reduction in BMI                     | Meng, Xu, Liu, Van Raaij, Bemelmans, Hu, & Ma, 2013 <sup>13</sup> |

<sup>a</sup>The highlighted effectiveness estimates are from studies done in Kenya.

## Tobacco Use

The most likely factors to have an impact on tobacco use among adolescents are an increase in the excise tax on tobacco products and point-of-sale (POS) advertising bans.

*Tobacco taxes* are often seen as a “win-win” because they lead to improved health outcomes and contribute to government revenue, which can be used to further tobacco control or other public health programs. Currently, Kenya taxes cigarettes at about 52.3% using a range of taxes, including specific excise tax, value-added tax, and sales tax.<sup>14</sup> However, this level is still below the WHO recommendation to tax tobacco at 75% of the price. Further, the WHO recommends excise taxes as the preferred design.

For this study, we defined maximum implementation of the tobacco policy as following the WHO-recommended level. We estimated the percentage price increase needed to reach the WHO recommendation by using the state average price of cigarettes<sup>14</sup> to calculate the amount untaxed and the absolute price needed that would reflect a 75% tax. We then used published data<sup>8</sup> to calculate the reduction in adolescent smoking prevalence that would result from the tax increase.

*Point-of-sale (POS) advertising bans* reduce youth exposure to tobacco industry messages and consequently reduce smoking initiation and prevalence among youth.





POS advertising bans are often missing from country tobacco control efforts.<sup>15</sup> Although Kenya has a ban on direct tobacco advertising at the POS, there is no evidence for implementation of the ban or for compliance.<sup>14</sup> For our analysis, we defined maximum implementation as full implementation and enforcement of a POS advertising ban in the country. According to the WHO mPOWER country profiles,<sup>14</sup> Kenya stated that a POS advertising display ban was in place but provided no further details about the extent of the ban. Consequently, for our estimations, we used a score of 5 in the base case, 0 for the best case, and 10 for the worst case and used estimates of effectiveness from the literature<sup>9</sup> to calculate the reduction in smoking prevalence among adolescents resulting from full compliance.

### Harmful Use of Alcohol

We identified excise tax increases and an advertising ban on alcohol as being most likely to reduce the harmful use of alcohol among adolescents in Kenya.

Although a definitive target for an alcohol tax does not exist to the same extent as it does for tobacco, the WHO suggests a 50% increase over current tax rates for harmful use of alcohol.<sup>16,17</sup> We calculated the reduction in heavy episodic drinking prevalence based on a 50% tax increase and estimates of effectiveness from the literature.<sup>10,18</sup>

For *advertising ban*, we used WHO's NCD Progress monitor 2017 report<sup>19</sup> to assess Kenya's current level of ban and estimates of effectiveness from literature to calculate reduction in heavy episodic drinking.<sup>12</sup>

### Obesity

We identified an excise tax on SSBs and school-based physical and nutrition education programs as being most likely to reduce obesity among adolescents. In most countries, schools are logical sites for programs that encourage healthy diet and lifestyle habits.<sup>19</sup> We modeled the effects of maximum implementation of the two interventions, defined as uniform execution of an SSB tax and scale-up of the nutrition and physical activity programs to every adolescent currently attending school in Kenya.

For *SSB taxes*, we collected SSB consumption data for Kenya,<sup>20</sup> estimates of tax effectiveness,<sup>12</sup> and information on the relationship between SSB consumption and

body mass index (BMI)<sup>21</sup> to calculate the reduction in mean BMI among adolescents in Kenya. The range of SSB taxes currently imposed by countries with taxes is from 20% to 50%. We conservatively modeled the effects of a 20% SSB tax in Kenya.

For the *school-based education intervention*, no examples from Kenya were available. Consequently, we drew evidence from a multicomponent model of a nutrition and lifestyle intervention for adolescents conducted in Chinese schools.<sup>13</sup> We adjusted our calculations based on secondary school completion rates in Kenya.<sup>22</sup>

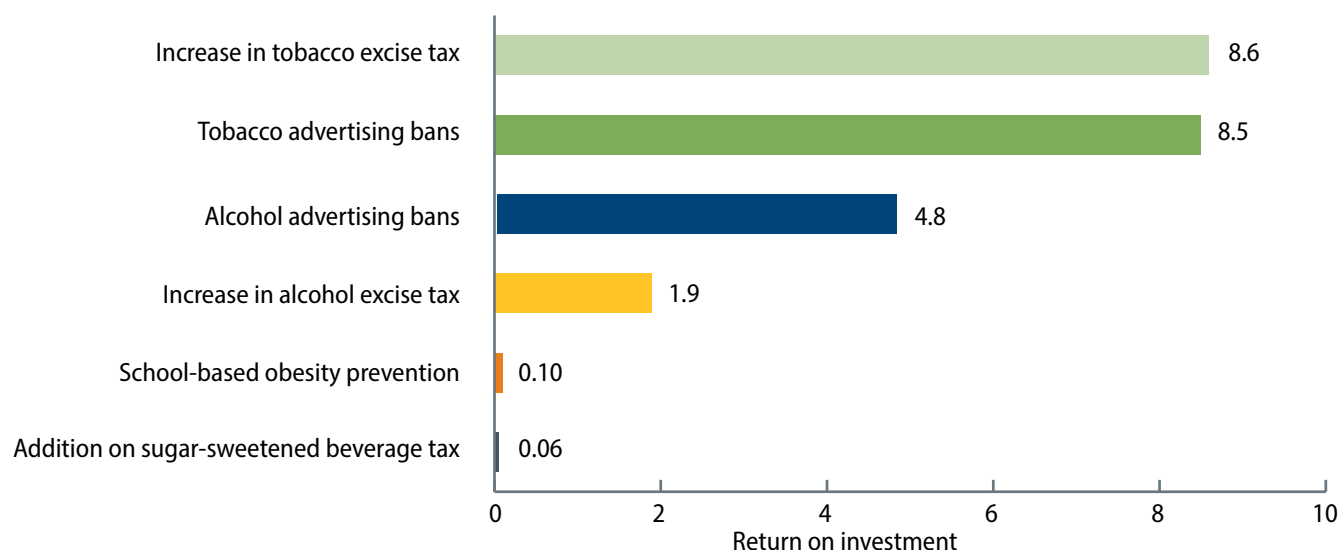
## What We Found

Implementation of adolescent-specific interventions for the three main NCD risk factors—tobacco use, harmful use of alcohol, and obesity—would result in the following significant health and economic benefits for Kenya over the long term:

- By increasing tobacco taxes and implementing a POS advertising ban, an estimated 42,100 premature deaths from tobacco use could be avoided over the next 50 years.
- Full implementation of legislated SSB taxes plus the implementation of school-based obesity programs, and an increase in alcohol taxes along with an alcohol advertising ban will avert 7,200 and 42,100 premature deaths, respectively.
- Together, these interventions would provide an economic benefit of USD 340 million from 2020 to 2070 (KES 35 billion),<sup>b</sup> or USD 6.7 million annually (KES 680 million). The tobacco interventions would provide annual economic benefits of 4.5 million (KES 450 million), the alcohol control interventions would provide USD 1.6 million (KES 160 million), and the obesity interventions would provide USD 0.67 million (KES 68 million) annually.<sup>c</sup>

The return on investment (ROI) for each intervention is shown in Figure 1. In Kenya, increasing tobacco taxes has the highest ROI (8.6), followed by tobacco advertising bans (8.5), alcohol advertising bans (4.8), and increasing alcohol taxes (1.9). The two interventions that target obesity are not cost-beneficial.

**Figure 1.** Return on investment for tobacco, alcohol, and obesity interventions for Kenya (2015–2070)



<sup>b</sup>Based on the average 2016 exchange rate of 101.54 KES per USD.

<sup>c</sup>Numbers may not add up due to rounding. All figures are rounded to the second significant digit.

To the extent possible, our intervention scenarios are based on experience in Kenya to demonstrate what is possible to achieve with maximum effort. Reducing tobacco use, harmful use of alcohol, and obesity beyond the levels assumed here may be possible by implementing a broader set of interventions. However, the evidence for additional Kenya-specific interventions is lacking, and additional research is needed to support this assertion.

## Discussion

Policy and programmatic actions to support adolescents to live long and healthy lives have not been fully explored by donors and governments. In Kenya, where approximately 25% of the population is between the ages of 11 and 19, it is imperative that national and county governments prioritize NCD prevention during adolescence by implementing cost-effective interventions to reduce NCD risk factors, curb the NCD epidemic, avoid premature deaths, increase productivity, and improve the well-being of the future generation.

The low ROI on obesity reduction among school children does not imply that this is a poor solution. The costs of implementing the intervention in schools is high, but the intervention example has shown cost-effectiveness in China. With additional trials to adapt the school-based intervention in other contexts, we anticipate that the implementation costs would decline and the benefits would grow, especially in countries with high and rising youth obesity.

## Recommendations

Because the increasing NCD risk in Kenya threatens to reduce the life expectancy of today's adolescents, the following set of recommended interventions will provide multiple options for the country's NCD action plans:

- **Taxation** for tobacco and alcohol should be a top priority at the country level.
- **Advocacy** for these policies, at the country and global levels, should emphasize the benefits to adolescents.
- **School-based programs** are effective, but they can be resource intensive. However, the school-based intervention needs to be tried in multiple counties across the country, and that would be expected to reduce costs over time, making the intervention a better investment.



## Study Limitations

Our assessment of lives saved relies on existing projections<sup>23</sup> of population size and structure during the next several decades and the presumption that current death rates will continue in the future, absent changes such as those identified. To the best extent possible, we used Kenyan adolescent-specific data, although we had to rely on a small number of rigorous intervention studies for reducing NCD risk factors.

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