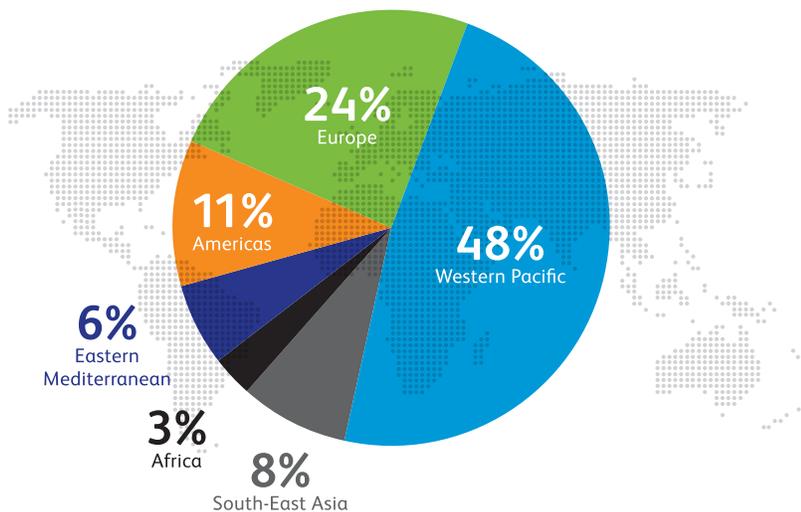


Value of Medicines: Smoking Cessation

Tobacco dependence is a chronic and relapsing disease, and cigarette smoking has significant negative health, economic, and social consequences. There are more than one billion smokers globally.¹ Based on 2010 figures, more than 300 million people smoke in China (nearly equivalent to the total U.S. population),² and it is estimated that one in six adults in the United States (U.S.) and one in five in the United Kingdom (U.K.) currently smoke.^{3,4} By 2030 the total number of smokers globally could reach 2 billion based on current population and smoking trends.⁵ More than 43 trillion cigarettes were smoked globally in one decade (between 2002 and 2012).⁶ Tobacco use is also a shared risk factor for the four leading noncommunicable diseases in the world: heart disease/stroke, cancer, diabetes, and chronic respiratory diseases, causing over 6 million deaths annually.^{7,17}

World Cigarette Consumption

By region, 2009



Adapted from: American Cancer Society. The Tobacco Atlas Fourth Edition. 2012 American Cancer Society, Atlanta GA.

Nicotine Addiction

Regardless of age, people continue to use tobacco because many are addicted to nicotine.

Nicotine is one of the primary chemical components of tobacco, and not receiving this chemical leads to unpleasant nicotine withdrawal symptoms.⁸ Tobacco dependence has been recognized as a disorder by the World Health Organization (WHO).⁹

Combustion is the most efficient method for nicotine delivery to the brain.⁷ Smoking addiction results from the pharmacological effects of nicotine.¹⁰ When inhaling cigarette smoke, it takes nicotine approximately 10 seconds to reach the brain via the circulatory system. Once in the brain, nicotine disperses and binds to nicotinic acetylcholine receptors (nAChRs). Stimulation of these nAChRs by nicotine releases various neurotransmitters, including dopamine. The release of dopamine produces a pleasurable experience that, along with the desire to avoid the unpleasant experience of withdrawal, helps drive the motivation to smoke and the addiction to nicotine. The prevention of withdrawal symptoms is one of the biggest barriers smokers must overcome to realize abstinence.^{11,12,13}

KEY TAKEAWAYS

Tobacco is possibly the largest public health threat the world has ever seen.¹⁷

Cigarette smoking is the No. 1 preventable cause of death.¹⁸

Each year 6 million people die from cigarette smoking.¹⁷

Access to effective and comprehensive treatment for tobacco dependence is a proven policy strategy to reverse the tobacco epidemic.⁴²

The reasons people start smoking vary and data suggest virtually all people who smoke start young, by the age of 26.¹⁴ Adolescents demonstrate greater sensitivity to the effects of nicotine and require fewer cigarettes to develop nicotine dependence than adults.¹⁵ More people in the United States are addicted to nicotine than to any other drug.¹⁶

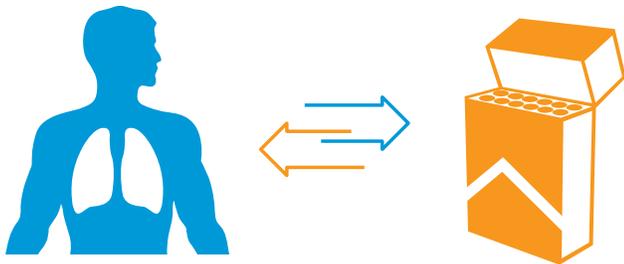
Tobacco is possibly the largest public health threat the world has ever seen, according to the WHO.¹⁷

Comorbidities and Economic Burdens of Cigarette Smoking

While the percentage of the population that smokes every day has decreased in recent years, the number of cigarette smokers worldwide has increased due to population growth. Cigarette smoking remains the number one preventable cause of death worldwide, and plays a major role in the development of cardiovascular disease (CVD), chronic obstructive pulmonary disease (COPD), cancer, and pregnancy complications.^{18,19,20,21}

Key facts and figures: Health

- Six million people die from cigarette smoking each year, and it caused the death of 100 million people in the 20th century alone, according to 2015 data available from the WHO.¹⁷
- Cigarette-related deaths account for more deaths than car accidents, alcohol use, illegal drug use, suicide, homicide, and AIDS combined in the U.S.²²

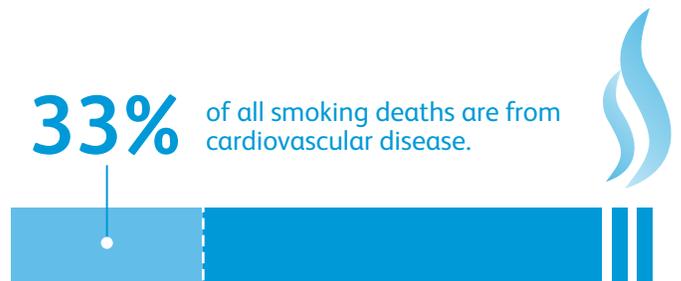


It's estimated that **85–90 percent** of COPD cases can be linked to cigarette smoking and between **15–20 percent** of smokers are likely to develop COPD

Source: Jiménez-Ruiz, C. A., Miranda, J. A. R., Gómez, N. A., Blasco, J. J. L., Miñana, J. S., ... Ferrero, M. B. (2013). Treatment of smoking in smokers with chronic obstructive pulmonary disease. *Arch Bronconeumol*, 49, 8, 354-63. Accessed on December 8, 2014 at <http://www.archbronconeumol.org/en/treatment-smoking-in-smokers-with/articulo/S1579212913001043/>

- Secondhand smoke, or environmental tobacco smoke (ETS), contributes to more than 600,000 deaths per year globally, according to 2015 data available from the WHO.¹⁷ Unless effective campaigns can be instituted to promote smoking cessation, the combination of smoking and aging will vastly increase the rates of cancer and other chronic diseases.⁵

- Half of all tobacco users will die prematurely as a result of their tobacco use.¹⁷
- Smoking is responsible for 90 percent of lung cancer-related deaths.²³
- Studies have shown that involuntary exposure to secondhand smoke increases the risk of developing coronary heart disease (CHD) by 25 to 30 percent and stroke by 20 to 30 percent.²⁴



Source: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention. Smoking-attributable mortality, years of potential life lost, and productivity losses—United States, 200–2004. *Morbidity and Mortality Weekly Report*. 2008;57(45):1226-8.

Key Facts and Figures: Economic

- The direct costs attributable to smoking totaled \$34.8 billion across the U.K., Germany, France, and Spain and \$104 billion in the Americas, according to a study published in 2012.⁶
- Smokers had significantly higher healthcare, absenteeism, and lost productivity costs than non-smokers, according to a 2013 U.S.-based study.²⁵

Tobacco Control Measures

In 2008, a WHO report found that in developing countries, for every \$5,000 in cigarette revenues, only \$1 was spent on tobacco control.²⁶

Many countries realize the detrimental effects that smoking has on their population. As a result, governments have instituted tobacco-control strategies to curb its use. For example, the **Framework Convention on Tobacco Control (FCTC)** was the first global health treaty negotiated under the auspices of the WHO. The FCTC gave a new legal dimension to international health cooperation and became one of the most widely embraced treaties in United Nations history. It aims to save lives through preventing and controlling the use of tobacco products. However, evidence suggests that strategies focusing on prevention alone would provide only minimal reductions in tobacco-related morbidity over the next 20 years.²⁷

Tobacco control has been identified as one of the most rational, evidence-based policies in medicine.²⁸ Tobacco control is defined by WHO as strategies that aim to improve the health of a population by eliminating or reducing their consumption of tobacco products and exposure to tobacco smoke.

These strategies include elements such as:²⁹

- Pricing and tax measures,
- Smoking bans (to deter environmental tobacco smoke),
- Education and awareness campaigns,
- Access to smoking cessation support and medication,
- Regulations on advertising and package labeling.

These efforts have helped raise awareness of the benefits of quitting smoking. In early 2015 for example, the Korean government raised the price of tobacco and reinforced its overall smoking cessation policy, including the reimbursement for smoking cessation counseling and treatments.³⁰

Analysis of tobacco control strategies across 18 European countries found that these strategies, despite variations in the level of implementation, resulted in **quit ratios between 22.4 and 62.2 percent among men and between 25.0 and 26.9 percent among women who were either former or current smokers aged 25–59 years-old**.³¹ Quit ratios are defined as the number of ex-smokers divided by the number of ever smokers (current plus former smokers). A recent study in 41 countries that adopted at least one high-impact reduction measure estimated that the number of smokers dropped by 14.8 million, **averting approximately 7.4 million would-be deaths that would have been attributed to smoking**.³²

While over 90 percent of the 180 parties of the FCTC report that they have implemented at least one priority of the WHO FCTC, over half of them refer to gaps between the financial and human resources available and the needs assessed for implementation. As of 2014, more than half (77) of the parties stated that they seek to ensure the accessibility and affordability of treatment for tobacco dependence, including relevant pharmaceutical products.³³

Full implementation of the Framework Convention would deal the greatest single prevention blow to the four biggest noncommunicable diseases, namely heart disease/stroke, cancer, diabetes, and chronic respiratory diseases.³²

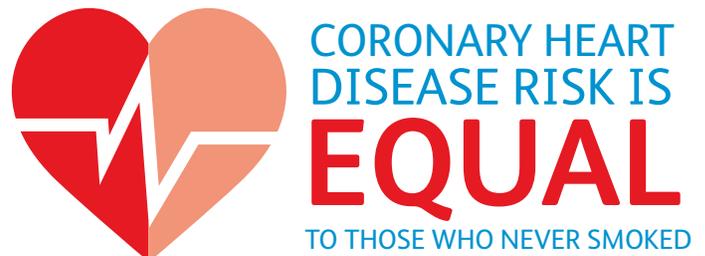
Effects of Tobacco Control Policies

- Based on 2012 data, WHO estimates that by increasing tobacco taxes by 50 percent, all countries would reduce the number of smokers by 49 million within the next three years and ultimately save 11 million lives.³⁴
- Heart attack admissions rate dropped by 42 percent in the U.K. since a smoking ban was instituted in 2007.^{35,36}
- Reviews of 33 out of 44 studies found a significant reduction in heart disease following the introduction of a smoking ban.^{35,36}
- One year after cessation, a former smoker's risk of coronary heart disease drops to about half that of a current smoker's, and after 15 years of abstinence, coronary heart disease risk is equal to those who never smoked.³⁷

ONE YEAR AFTER CESSATION, A SMOKER'S RISK OF CORONARY HEART DISEASE DROPS TO ABOUT **HALF** THAT OF A CURRENT SMOKER'S



AFTER 15 YEARS OF SMOKING ABSTINENCE,



Source: World Health Organization (WHO). (2016). Tobacco Free initiative (TFI). Who.int. Retrieved from <http://www.who.int/tobacco/quitting/benefits/en/>

More People Want to Quit

While more people want to quit, it just isn't that easy. A study conducted by the Centers for Disease Control and Prevention evaluating adults quitting smoking in the U.S. between 2001 and 2010 found that 68.8 percent of all smokers in the U.S. would like to quit. However, a separate study found that 44 percent try to quit each year, mostly without assistance, and that only 4 to 7 percent of smokers who attempted to quit unaided were likely to have succeeded in quitting.^{38,39} National tobacco control strategies should, therefore, offer access to approved therapies for those desiring to quit,⁴⁰ as increasing smokers' access to effective and comprehensive treatment for tobacco dependence can be an effective policy strategy to combat the tobacco epidemic.²⁷

Strategies to Help People Quit

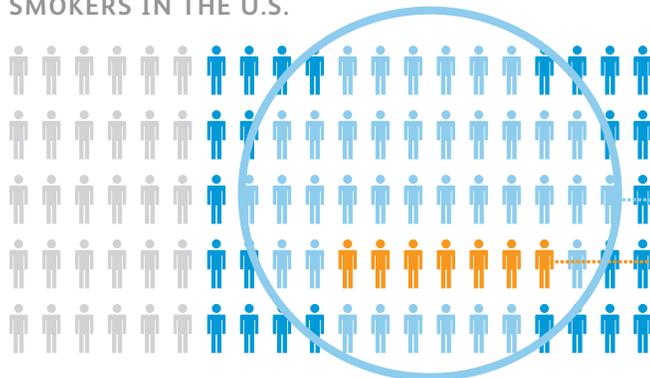
There are currently seven Food and Drug Administration (FDA) approved treatments to help people quit. These include nicotine replacement therapy (NRT), which is available over the counter and by prescription, and non-nicotine prescription medication.

An emerging trend in smoking is the use of electronic cigarettes (also known as e-cigarettes) or electronic nicotine delivery systems (ENDS). These battery-operated devices, which usually resemble a cigarette or pen, transform nicotine and other substances into an inhaled vapor. E-cigarettes' effectiveness as a smoking cessation product and their long-term effects on public health are not yet known. Organizations like the American Lung Association have expressed concern about their potential health risks.⁴¹

Research to better understand the pathophysiology of nicotine addiction is ongoing, as are efforts to reduce the harmful effects of smoking. Innovations in smoking cessation therapy include research into anti-nicotine vaccines and novel delivery mechanisms.

Cigarette smoking is deadly, and for those desiring to quit, research suggests that the best way for people to quit smoking is through evidence-based smoking cessation technologies and programs.⁴² Advances in smoking cessation and tobacco control policies, combined with smoking cessation therapies, are necessary to reverse a global health epidemic. The potential value to improved human health and disease prevention is massive and warrants furthering these advancements in smoking cessation.

SMOKERS IN THE U.S.



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and that only **4% to 7%** of smokers who attempted to quit unaided were likely to have succeeded in quitting.

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