

INVESTMENT IN RESEARCH SAVES LIVES AND MONEY

# Tobacco Use and Addiction

Tobacco use – primarily cigarette smoking – is the leading preventable cause of disease and death in the United States.<sup>1</sup> Tobacco contains nicotine, which is a chemical compound that leads to tobacco addiction.<sup>2</sup> Nicotine produces pleasing physical and mood-altering effects in the brain.<sup>3,4</sup> It is not the nicotine itself that causes disease and death; it is the many other chemicals, some carcinogens, that are used in cigarettes and other forms of tobacco.<sup>4</sup> Tobacco use can affect the heart, secretion and effect of hormones, and the gastrointestinal system.<sup>2,3</sup> It increases the risk of cancer (including mouth, lung, liver, and stomach cancer), and lung diseases such as chronic obstructive pulmonary disease (COPD), chronic bronchitis, and emphysema.<sup>5</sup> In 2018, more than 34 million adults in the U.S. smoked cigarettes and every day, almost 2,500 young people under the age of 18 try their first cigarette.<sup>6,7</sup>

## TODAY

**480,000** people in the U.S. die each year as a result of effects from cigarette smoking.<sup>1</sup>

**42,000** people in the U.S. die each year from secondhand smoke.<sup>8</sup>

**58 million** nonsmokers are exposed to secondhand smoke.<sup>1</sup>

### Research Delivers Solutions

There are many tools that can help people quit smoking, including counseling and the use of products, such as the nicotine patch, nicotine gum, bupropion, and varenicline, that lessen tobacco cravings.<sup>10</sup>

Bupropion is a drug prescribed for smoking cessation and predates varenicline. Bupropion has been approved as an antidepressant by the FDA since 1985.<sup>11</sup> Smokers are more likely to have a history of major depression than non-smokers.<sup>12</sup> This led researchers in 1997, to conduct a clinical trial which showed that bupropion was also an effective drug for smoking cessation.<sup>13</sup>

Varenicline is a key drug which lessens tobacco cravings and was discovered in 2005 by Pfizer Pharmaceuticals.<sup>14</sup> Researchers discovered varenicline by making modifications to the chemical structure of a known natural inhibitor of the nicotine receptor.<sup>15</sup> Varenicline works by limiting tobacco cravings and withdrawal symptoms and is now commonly used to help smokers quit smoking.<sup>14,15</sup>

Another possible product is the exploratory compound cytisine. A study in the *New England Journal of Medicine* in 2014 concluded that cytisine in combination with brief behavioral support was superior to currently available nicotine-replacement therapy for quitting smoking, but users reported higher frequency of nausea, vomiting, and sleep disorders.<sup>16</sup> Cytisine is currently in phase III clinical trials in the United States.<sup>17</sup>

## COST

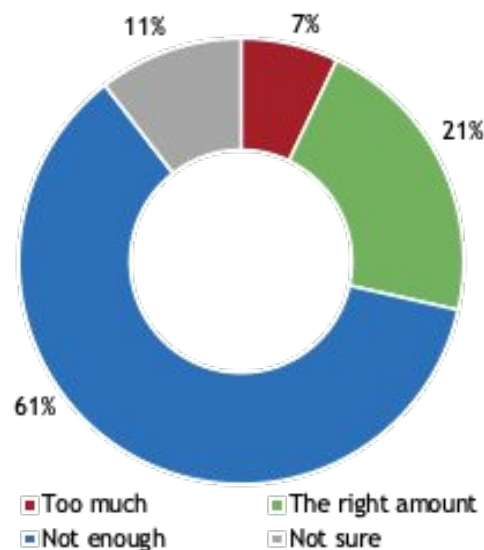
**\$300 Billion:**

\$300 billion: the annual total cost of smoking-related illnesses in the U.S.<sup>1</sup>

**\$170 Billion:**

\$170 billion of the overall \$300 billion is spent on direct treatment of smoking-related disease in the U.S.<sup>1</sup>

The U.S. spends about 5 cents of each health dollar on research to prevent, cure and treat disease and disability. Do you think that this is too much, the right amount or not enough?



Source: A Research!America poll of U.S. adults conducted in partnership with Zogby Analytics in January 2020

# Tobacco Use and Addiction

## Then. Now. Imagine.

### THEN

In 1964, the Surgeon General of the United States issued the first report on smoking and health which concluded that cigarette smoking causes lung and laryngeal cancer.<sup>18</sup>

### NOW

Thanks to research, we know that nicotine is the addictive agent in tobacco.<sup>19</sup> This knowledge led to the development of nicotine replacement therapies to help people quit smoking.

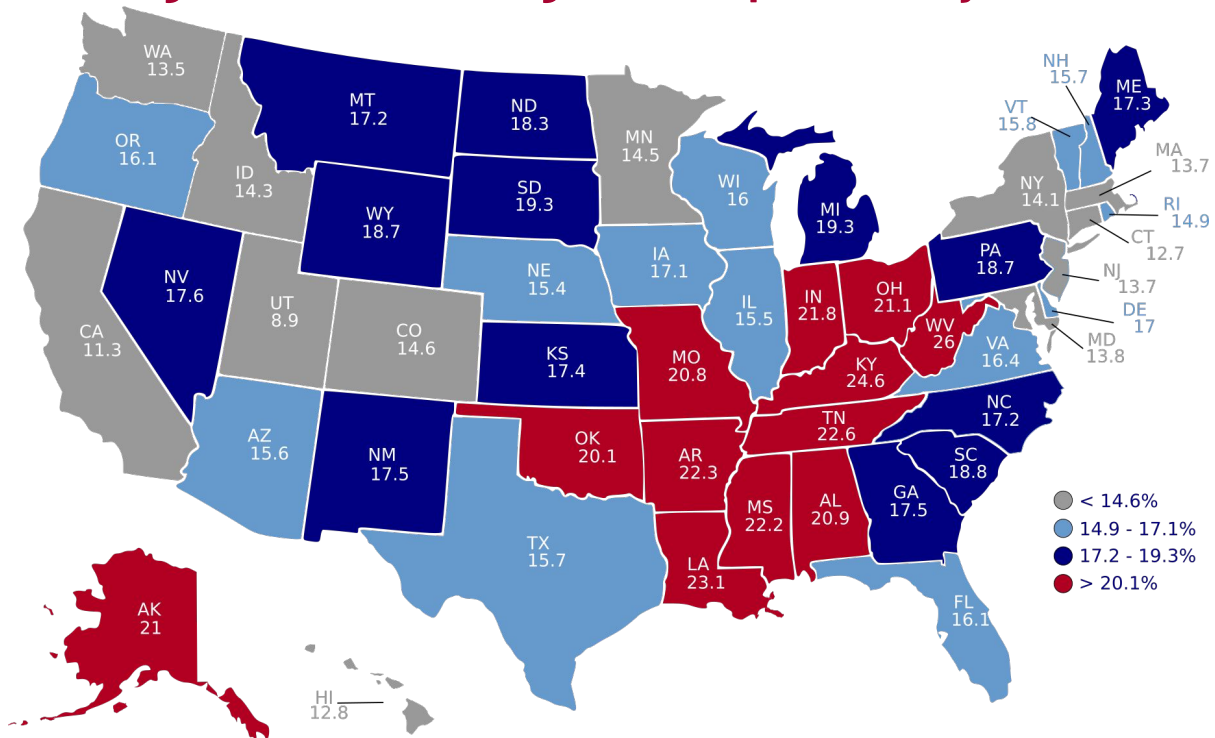
### IMAGINE

A world without tobacco addiction.

## Spotlight: How do e-cigarettes work?

E-cigarettes, also known as “vapes,” are battery powered devices which aerosolize a liquid containing nicotine and other chemicals.<sup>20</sup> The user then inhales the aerosol. In 2018, more than three million American high school students reported using e-cigarettes and evidence suggests that young adults who use e-cigarettes may move to using of regular cigarettes.<sup>21,22</sup> The CDC and FDA are investigating a national outbreak of e-cigarette, or vaping, product use-associated lung injury (EVALI).<sup>20</sup> Recent data shows that vitamin E acetate, an additive in many e-cigarettes, is associated with the EVALI outbreak.<sup>23</sup> Fortunately, there has been a continued decline in new EVALI hospitalizations since September 2019. Scientists are continuing to investigate the risks of using e-cigarettes including risk of cancer and cardiovascular disease.<sup>25</sup>

## Percent Cigarette Use Among Adult Population By State (2017)<sup>25</sup>



1. "Tobacco Use" CDC. 2019.  
 2. "Nicotine: Facts, effects, and addiction" Medical News Today. 2018.  
 3. "Nicotine dependence - Symptoms and causes" Mayo Clinic. 2020.  
 4. "Nicotine: The Addictive Chemical in Tobacco Products" FDA. 2019.  
 5. "Health Risks of Smoking Tobacco" American Cancer Society. 2018.  
 6. "Current Cigarette Smoking Among Adults in the United States" CDC. 2019.  
 7. "Tobacco Use among Children and Teens" American Lung Association. 2020.  
 8. Hall et al. "How Much Can the USA Reduce Health Care Costs by Reducing Smoking?" PLoS Med 2016;13.  
 9. "Tobacco Free. Economic Trends in Tobacco" CDC. 2019.  
 10. "Nicotine Replacement Therapy for Quitting Tobacco" American Cancer Society. 2017.  
 11. Huecker et al. "Bupropion" StatPearls. 2020.  
 12. Glassman et al. "Smoking, smoking cessation, and major depression" JAMA. 1990;264.  
 13. Hurt et al. "A comparison of sustained-release bupropion and placebo for smoking cessation" NEJM. 1997;337.  
 14. "How CHANTIX works" CHANTIX®. 2018.  
 15. Coe et al. "Varenicline: an alpha4beta2 nicotinic receptor partial agonist for smoking cessation" J. Med. Chem. 2005;48.  
 16. Walker et al. "Cytisine versus Nicotine for Smoking Cessation" NEJM 2014;371.  
 17. "Achieve Announces FDA Acceptance of the Investigation New Drug Application (IND) for Cytisine as a Smoking Cessation Treatment" Achieve Life Sciences. 2017.  
 18. Brawley et al. "The first surgeon general's report on smoking and health: The 50th anniversary" A Cancer Journal for Clinicians. 2014;64.

19. Jarvik et al. "Inhibition of cigarette smoking by orally administered nicotine" Clinical Pharmacology & Therapeutics. 1970;11.  
 20. "Smoking and Tobacco Use; Electronic Cigarettes" CDC. 2020.  
 21. "2018 NYTS Data: A Startling Rise in Youth E-cigarette Use" FDA. 2018.  
 22. Barrington-Trimis et al. "E-Cigarettes and Future Cigarette Use" Pediatrics. 2016;138.  
 23. Blount et al. "Vitamin E Acetate in Bronchoalveolar-Lavage Fluid Associated with EVALI" New England Journal of Medicine. 2020;382.  
 24. "How safe is vaping? New human studies assess chronic harm to heart and lungs" Science. 2019.  
 25. "Map of Cigarette Use Among Adults | STATE System" CRC. 2019

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