



# Puff, Not the Magic Dragon... The Cost of America's Tobacco and Marijuana Abuse (2nd edition)

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## EDUCATIONAL OBJECTIVES

At the conclusion of this course, the dental health-care professional will be able to:

1. Correlate patients' nicotine and marijuana use with the adverse effects to their general health and well-being and be familiar with risk factors.
2. Understand the different forms of tobacco products currently on the market in the United States and their components.
3. Pharmacologically understand why patients have difficulties sustaining a quit plan and be knowledgeable of FDA-approved tobacco cessation programs and products.

## ABSTRACT

Tobacco use in America remains the single largest preventable cause of death in the United States, accounting for more than 480,000 (1:5) deaths annually.<sup>1,2,3</sup> Even with the increased cost for tobacco products, increased anti-tobacco media campaigns, and smoke-free laws for workplaces and public places, 15% of Americans still continue to smoke cigarettes.<sup>3</sup> The newer nicotine products on the US market, such as electronic cigarettes and snus, along with the legalization of marijuana, are systematically changing the dynamics of American culture. Dental professionals are in an ideal position to directly influence nicotine and marijuana use among their patients. This course will present current statistics of nicotine and marijuana use, and also the pharmacokinetics as it relates to addiction, dependence, and cessation.



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## INTRODUCTION

Americans' dependency on tobacco comes with a high price tag, with an estimated annual cost of more than \$170 billion in direct medical expenses and \$156 billion in lost productivity.<sup>4,5</sup> More than 10 times as many US citizens have died prematurely from cigarette smoking than have died in all wars fought by the United States during its history.<sup>6</sup> Smoking causes more deaths annually than HIV, illegal drug use, alcohol use, motor vehicle injuries, and firearm-related incidents combined.<sup>7</sup> A pack of cigarettes averaged \$7.89 in 2016, and electronic cigarette starter-kits ranged from \$59.95 to \$129.95 with refills \$0.50 to \$3.00.<sup>5,8,9</sup> A can of smokeless tobacco's average cost is \$3.00, and a can of snus averages \$1.99 to \$4.50.<sup>10,11</sup> Therefore, the average American tobacco user spends anywhere from \$900 to \$2,500 annually to support their habit.

It is an indelible requirement of all dental health professionals to assist and advise their patients on the health risks associated with tobacco and marijuana abuse. The dental Hippocratic Oath holds practitioners to a standard above that of the public, and as a result, makes it imperative that clinicians stay up-to-date with new products on the market and understand the risks they pose to patients. The CDC and FDA allude to a new fear with the introduction of electronic cigarettes (e-cigarettes) and dissolvable products (snus) to the American market with their youthful appearance and appeal.<sup>12,13</sup> Health-care professionals should be aware of the possible resurgence of adolescent tobacco users in their risk profile.

## STATISTICS

### Nicotine products

Most statistics reported by varying agencies are centered on traditional cigarettes and smokeless tobacco, as these two have been the American staple tobacco products for decades. It is impossible to know the long-term consequences of e-cigarettes and snus as neither had been fully regulated by the FDA until 2016. In 2016, for the first time, the FDA finalized a rule extending their authority to regulate the manufacture, import, packaging, labeling, sale, and distribution of e-cigarettes and dissolvable products (snus).<sup>14,15</sup> Prior to this time, e-cigarettes had been a safety hazard for the public with reports of battery explosions causing second and third degree burns on skin and in the mouth.

Forty million American adults smoke cigarettes and 4.7 million middle and high school students use at least one tobacco product, including e-cigarettes.<sup>4</sup> In 2016, 11 out of

100 high school students reported using e-cigarettes.<sup>4,14</sup> Cigarette advertising and promotional expenses totaled \$8.2 million in 2015 and the sale of e-cigarettes grew 320% during 2012 to 2013.<sup>4,16</sup>

The CDC reports the highest tobacco use rates in the US are for people ages 18-64 with the overall percentage of nonsmokers not significantly declining until after age 65.<sup>3</sup> Men of all races smoke more than women of comparable ethnicity.<sup>2,7</sup> Hispanics and Asian-Americans have the lowest percentage of tobacco use, while Caucasian, African-American, and mixed races have the highest.<sup>2,7</sup> Tobacco use rates are higher among non-high school graduates and those with a GED, and lowest among those with associate, bachelor, or graduate degrees.<sup>2,7</sup> Throughout the regions of the United States, tobacco use rates vary dramatically; the highest rates are found in the Midwest and South, with lower rates in the Northeast and West.<sup>2,7</sup>

### Marijuana statistics

Marijuana is the most commonly used illegal drug in the United States (22.2 million users).<sup>17</sup> Currently marijuana is a Schedule I drug (no medically acceptable use and high abuse potential) federally, which makes performing medical research very challenging.<sup>18,19</sup> Marijuana is considered a gateway drug, as it has been shown that its use earlier in childhood increases a person's risk for future drug abuse.<sup>19,20</sup> In 1975, the FDA established the Compassionate Use Program, which allowed the medicinal use of marijuana for a range of disorders.<sup>18,19</sup>

The most common medicinal marijuana products sold in the US are dronabinol (Marinol), which is synthetic delta-9THC, nabilone (Cesamet), a synthetic cannabinoid, and nabiximols (Sativex), a liquid spray mixture of 50% THC and 50% CBD.<sup>19,20,21</sup>

Colorado was the first state to legalize the recreational use and sale of marijuana in 2012, and has now established the Medical Marijuana Scientific Advisory Council given the societal effects that have occurred.<sup>18</sup> Traffic fatalities involving drivers testing positive for marijuana increased 100% in five years.<sup>18</sup> Marijuana-related emergency department visits increased by 57%, and hospitalizations increased 82% between 2009 to 2013.<sup>18</sup> Marijuana-related exposure of children (ages 0-5) increased 268%, and pet poisoning from ingested marijuana increased fourfold in four years.<sup>18</sup>

As of 2018, there are eight states that have legalized the recreational use of marijuana.<sup>22</sup> California was the first

## Colorado was the first state to legalize the recreational use and sale of marijuana in 2012

state to legalize the medical use of marijuana in 1996, and in 2016 legalized recreational use.<sup>22</sup> Other states that have legalized the recreational use of marijuana are Alaska, Maine, Massachusetts, Nevada, Oregon, Washington, and Washington DC.<sup>22</sup> Interestingly, there is no evidence that the legalization of recreational marijuana has decreased the black market sale as anticipated by lawmakers.<sup>18,23</sup>

**TOBACCO COMPONENTS**

Long gone are the days when a tobacco user had only two choices in products: cigarettes or smokeless tobacco. Newer products have broken into the US market in the past decade such as e-cigarettes, snus, and legalized marijuana. All products contain carcinogenic ingredients and increase a patient’s risk for abuse due to their dependence, tolerance, and addictive components.

The presence of physical dependence is established by the withdrawal or abstinence syndrome that occurs when a person ceases the use of a substance.<sup>24,25</sup> Tolerance refers to the dose of a drug that must be increased over time to produce the same effects.<sup>24,25</sup> Addiction is defined as the pattern of abuse that includes compulsive use of a substance despite any physical, financial, or social complications.<sup>1</sup>

**Cigarettes**

Cigarettes remain the predominant form of tobacco use in the United States.<sup>27</sup> Cigarettes contain hundreds of different chemicals and gases in varying concentrations, depending

on the specific brand. There are at least 45 ingredients classified as carcinogens or tumor causing agents.<sup>26</sup>

Table 1 lists the active chemicals commonly found in cigarettes:

It is well established in the literature that smoking reduces a person’s life span and can affect every organ in the body. Smoking has been linked to COPD, acute myeloid leukemia, coronary artery disease, GERD, stroke, and cancer of the bladder, cervix, colon, rectum, oropharynx, trachea, lung, esophagus, larynx, kidney, ureter, liver, pancreas, and stomach.<sup>26</sup> Thirty percent of cancer deaths are attributed to smoking; in women, 90% of lung cancer deaths are attributable to smoking, and lung cancer is now the leading cause of preventable death in women, surpassing breast cancer.<sup>1,2,8</sup>

**E-cigarettes**

E-cigarettes were patented in 2003 by a Chinese pharmacist, Hon Lik.<sup>8,29</sup> They are battery-operated devices that simulate cigarette smoking by producing a vapor from liquid without the combustion products found in cigarettes.<sup>30</sup> (Figure 1) They consist of three parts: a battery (Figures 2, 3), atomizer (Figure 4), and a liquid.<sup>31</sup> The user pushes a button (Figure 5) and inhales to activate the device. The atomizer (heating element) turns the liquid (Figure 6) into an aerosol or vapor that is inhaled.

Table 2 lists the active chemicals commonly found in e-cigarette fluids:

Table 1

Chemical	Definition/Effect on human body
<b>Ammonia</b>	Volatile gas used to make explosives.
<b>Acetylene</b>	Industrial colorless gas used in welding torches.
<b>Benzene</b>	Industrial solvent, refined from crude oil. Risk factor for leukemia. <sup>27</sup>
<b>Cadmium</b>	Not essential for human life although humans obtain it through their diet. Smokers will have double the exposure to daily cadmium than nonsmokers. Implicated in many cancers. <sup>26</sup>
<b>Carbon monoxide</b>	Decreases hemoglobin’s ability to bind with oxygen; it instead binds with carbon monoxide. Causes a decrease in oxygen consumption in the body. <sup>26</sup>
<b>Cyanide</b>	Smoking cigarettes is one of the major sources of cyanide exposure for people who do not work in cyanide-related industries. <sup>27</sup> Prevents the body’s cells from using oxygen, which leads to lysis, and is most harmful to the heart and brain.
<b>Formaldehyde</b>	Organic compound used as a disinfectant and in paint and automobile manufacturing.
<b>Nicotine</b>	Addictive component.
<b>Polonium-201</b>	Highly radioactive element implicated in many different cancers. <sup>26</sup>
<b>Tar</b>	Describes a collection of solid particles that are inhaled while smoking. When tar settles, it forms a sticky brown residue that is responsible for the staining of teeth, fingers, and lungs in smokers. <sup>28</sup>

Figure 1: E-Cigarette



Figure 2: Battery component of e-cigarette



Figure 3: Battery inside e-cigarette container



Figure 4: Atomizer



Figure 5: Button on e-cigarette



Figure 6: Tank that holds the wick and liquid components of e-cigarette



Table 2

Chemical	Description
Nicotine	Liquid compositions can contain nicotine or be nicotine free. Consumers are free to choose.
Humectant	Usually propylene glycol or glycerol for vapor production. <sup>8</sup> Propylene glycol is a nearly odorless, clear, viscous liquid. The chemical is metabolized into pyruvic acid, acetic acid, lactic acid, and the potentially hazardous substance propionaldehyde in the body. <sup>32</sup>
Flavoring	Almost any flavoring is offered, such as menthol, coffee, chocolate, bubble gum, vanilla, and many more. <sup>8,33</sup> Concerns have been raised by lawmakers that these flavoring agents are marketing toward a younger generation and may lead to a resurgence of nicotine use in America's youth. <sup>33</sup>
Additives	Some brands have potentially harmful additives such as animal carcinogens, genotoxins, and other irritants.

**Smokeless**

People who use smokeless (dip, chew, snuff) tobacco have a fiftyfold increased risk of cancer in the mouth (cheek, tongue, gingiva) than nonsmokers.<sup>26</sup> Snuff is a finely ground or shredded tobacco that is either sniffed through the nose or placed between the cheek and gum. Chewing tobacco is used by placing a preferred amount inside the cheek and either spitting or swallowing juices. Regardless of the delivery, all forms put a patient at an increased risk for caries (due to sugar additives), periodontal disease, coronary artery disease, heart attack, stroke, and cancer of the esophagus, oral cavity, pancreas, and kidney.<sup>1,8,34,35</sup>

Chemicals found in cigarettes are similar for smokeless. Common and possibly carcinogenic chemicals are nicotine, nitrosamines, nitrosamines 28+, benzoapyrene and other polycyclic aromatic carcinogens, cadmium, formaldehyde, lead, polonium 210, acetaldehyde, hydrazine, uranium 235 (used in nuclear weapons), polycyclic aromatic hydrocarbons, sodium, sugar, fiberglass, and sand.<sup>36,37,38</sup> A panel of experts convened by the National Institutes of Health in 2006 stated that the "range of risks, including nicotine addiction, from smokeless tobacco products may vary extensively because of differing levels of nicotine, carcinogens, and other toxins in different products."<sup>39</sup>

**Snusn**

Snus is a Swedish term for "tobacco," where it was discovered in the 18<sup>th</sup> century. It is a small, tea baglike pouch that is placed under the upper lip for extended periods of time, and there is no need to spit (classified as dissolvable by the FDA).<sup>15</sup> Snus has similar flavors to e-cigarette liquids and comes in decorative tins. The National Cancer Institute states their public health concern with this product and its apparent marketing appeal to younger consumers.<sup>40</sup>

There are varying amounts of nicotine and carcinogens that are present in the brands of snus produced in the United States. The sale of snus is illegal in the European Union and Russia and is consumed primarily in Norway, Denmark, Sweden, and the US.<sup>41</sup>

### Marijuana

There are over 100 naturally occurring cannabinoids worldwide, and the most commonly used in medicinal and recreational marijuana in the US is delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD).<sup>42</sup> The word “cannabis” references the plant, and the term “cannabinoids” refers to the chemical components of cannabis. The effects seen in the body are dependent on the plant, such as the specific species used, soil, moisture, light, and temperature in which the plant is grown, and the plant part harvested.<sup>42</sup> THC concentrations in products vary in the US from 1.5% to 9.4%.<sup>42</sup> Systemic adverse effects associated with marijuana use are pulmonary problems, increased risk for myocardial infarction, impairment of sperm motility, THC crossing the placental barrier, neurotoxicity, exacerbation of mental disorders, depression, and long-term cognitive impairment.<sup>18,20</sup> For those using cannabis, 40% have a risk of developing psychosis.<sup>18</sup> Acute effects are characterized by euphoria, short-term memory loss, increased heart rate, reddened conjunctivae, and impaired thinking.<sup>43</sup>

### PHARMACOLOGY

Understanding the pharmacology of nicotine and marijuana will enhance the practitioner’s understanding of the physiological effects of their use and will aid in cessation interventions.

### Nicotine

Nicotine is a natural ingredient in tobacco leaves and is a human central nervous system stimulant that is toxic.<sup>44</sup> As a stimulant, it increases a person’s heart rate and blood pressure.<sup>1</sup> Nicotine produces a diminishing effect with time, which means the same dose of nicotine produces less effect with consecutive dosing.<sup>24</sup>

Due to pH, nicotine is well absorbed through the mouth and has rapid pulmonary absorption.<sup>45</sup> Nicotine enters the lungs and passes into arterial circulation via blood vessels lining the sacs of the bronchi. It is delivered to the brain in less than 20 seconds, reaching peak plasma levels in four to five minutes.<sup>1,46</sup> The plasma half-life is two hours, at which point cravings begin to set in.<sup>46</sup> Nicotine is distributed throughout all body tissues.<sup>46</sup> Nicotine is metabolized in the

liver, and its most common metabolite is cotinine, which is a highly specific and sensitive marker for tobacco use and allows for measurements of ongoing exposure to nicotine from both first- and secondhand smoke.<sup>46</sup> Nicotine is excreted via acidic urine.<sup>46</sup> To determine long-term exposure to nicotine, scientists can use nail, hair, and urine samples.<sup>46,47</sup>

### Marijuana

Cannabinoids have two main receptors in the body: CB-1, which is found in the brain, and CB-2, which is found in the gut and involved in the immune system.<sup>19</sup> Through interaction with these receptors, cannabinoids are able to produce psychoactive properties and affect the immune system and inflammatory regulation.<sup>19</sup> THC serves as the main source for the pharmacological effects seen.<sup>48</sup> The plant, *Cannabis sativa*, chemically has higher THC and CBD ratios, which lifts a patient’s mood and relieves stress.<sup>19,20,21</sup> *Cannabis indica* chemically has lower THC and higher CBD ratios, which relaxes muscles and provides analgesia.<sup>19,20,21</sup>

Absorption is dependent on the route of administration, which can be oral, inhalation, transdermal, rectal, sublingual, or through eye drops.<sup>48</sup> Inhaled marijuana reaches maximum plasma concentration within 15 to 30 minutes with a plasma half-life of two to three hours.<sup>48</sup> Oral administration will delay effects to 30 to 90 minutes and last four to 12 hours depending on dose.<sup>48</sup> The major acid metabolite of THC is THC-COOH, which is excreted via acidic urine.<sup>48</sup>

### CESSATION

Dental professionals are in a prime position within the community to assist patients with a quit plan. Advice from health-care professionals has been shown to be a powerful influence on a patient’s decision to stop or not begin using tobacco products.<sup>1</sup> There are multiple agencies (hospitals, health departments, community centers) and online programs to assist patients who wish to stop using tobacco.

Marijuana has shown to be less addictive than other substances, including nicotine.<sup>18</sup> Research has shown about 9% of regular marijuana users will become addicted, compared to nicotine users at 32%.<sup>18</sup> In 2015, more than five in 10 adult smokers made a quit attempt and seven in 10 wanted to stop smoking.<sup>16</sup> E-cigarettes, snus, and marijuana are not approved by the FDA as part of a smoking cessation program.<sup>1,33</sup>

The US government has implemented many laws and regulations aimed at reducing tobacco use among US citizens. They have increased the price of tobacco products, implemented smoke-free laws in workplaces and public areas,

**Nicotine is distributed throughout all body tissues.<sup>46</sup>**

required warnings about the dangers of tobacco use with anti-tobacco media campaigns, and enforced restrictions on tobacco advertising, promotion, and sponsorship.

Tobacco cessation causes many psychological as well as physiological challenges for patients. This can include falling heart rate and blood pressure, nausea, headache, increased hunger, constipation, mood alterations (anxiety, irritability, depression), and problems concentrating.<sup>49</sup> Peak withdrawal symptoms appear within two to three days after cessation.<sup>49</sup> Relapse rates are highest within the first week after cessation due to these factors. Objectives of assisted cessation strategies are to reduce withdrawal symptoms and make it easier for patients to abstain from tobacco by partial replacement of nicotine or by counteracting nicotine's physiological actions.<sup>24,25</sup>

Nicotine replacement therapies (NRTs) provide plasma levels of nicotine in the range of low-level cigarette smokers.<sup>46</sup> NRTs result in one third to two thirds the concentration of nicotine achieved from smoking.<sup>46,50</sup> Normal nicotine levels in the blood plasma of smokers are 1-1.5 mg and for oral snuff users are 3.6 mg.<sup>46</sup> NRT's nicotine levels in the blood plasma are as follows:

Table 3

Form of NRT Delivery	Nicotine Levels in Plasma	Delivery System 1
Patch	5 mg	Transdermal
Gum	2 mg	Transmucosal: chew until "peppery" taste appears
Nasal spray	0.7 mg	Nasal mucous membranes
Inhaler	2 mg	Transmucosal: hold vapor in mouth, not inhale
Lozenge	1 mg	Transmucosal

Nicotine-free therapies are available and sold in the US and are pregnancy category D.<sup>24</sup> The first-line pharmacological agents are bupropion hydrochloride (*Wellbutrin SR, Zyban*) and varenicline tartrate (*Chantix, Champix*), both of which are approved by the FDA as part of a tobacco cessation program. Bupropion is classified as an atypical SSRI antidepressant drug that is used to reduce nicotine cravings.<sup>1,24</sup> Varenicline is a selective partial agonist of nicotinic acetylcholine receptor.<sup>51</sup> It stimulates nicotine receptors more weakly than nicotine itself and helps prevent nicotine from exerting its full effects.<sup>24</sup>

Lastly, practitioners should not ignore the cognitive changes that a patient will endure when they withdraw from an addictive substance. Dental providers can be in-

involved in this process by following up with patients, encouraging focus on long-term health benefits of cessation, and using positive reinforcement.<sup>1,44</sup>

## CONCLUSION

The products in this course contain dangerous substances that can lead to adverse health risks. Newer products, such as e-cigarettes, snus, and legalized marijuana are beginning to pose serious societal and health risks to Americans. They are being advertised as a "safer" alternative to smoking, when in fact, there is no sound research to support this claim. Dental professionals should be leading the way in the health-care community of promoting cessation and total body health and wellness.

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#### AUTHOR DISCLOSURE

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## QUESTIONS

1. **What is the single largest preventable cause of death in the United States?**
  - a. Tobacco
  - b. Alcohol
  - c. HIV
  - d. Motor vehicle accidents
2. **What percentage of Americans currently smoke?**
  - a. 10%
  - b. 15%
  - c. 50%
  - d. 70%
3. **What is the estimated annual costs to US citizens in direct medical expenses associated with tobacco use?**
  - a. \$1 million
  - b. \$10 million
  - c. \$1 billion
  - d. \$170 billion
4. **In 2015, what were the expenses for cigarette advertising and promotion in the United States?**
  - a. \$1 million
  - b. \$5 million
  - c. \$8.2 million
  - d. \$9.5 million
5. **What age range has the highest tobacco use rates?**
  - a. 18-64
  - b. 65-74
  - c. 75-85
  - d. 85+
6. **What is the most commonly used illegal drug in the United States?**
  - a. Marijuana
  - b. Cocaine
  - c. Heroin
  - d. Crack
7. **What schedule class of drug is marijuana?**
  - a. Schedule V
  - b. Schedule IV
  - c. Schedule III
  - d. Schedule I
8. **What was the first state to legalize the recreational use of marijuana?**
  - a. Texas
  - b. Colorado
  - c. Wyoming
  - d. Washington
9. **What was the first state to legalize the medical use of marijuana?**
  - a. Colorado
  - b. Washington, DC
  - c. California
  - d. Texas
10. **Which term refers to the dose of a drug that must be increased over time to produce the same effects?**
  - a. Dependence
  - b. Tolerance
  - c. Addiction
  - d. Withdrawal
11. **Which chemical in cigarettes is the addictive component?**
  - a. Nicotine
  - b. Tar
  - c. Cadmium
  - d. Formaldehyde
12. **Which chemical in cigarettes is an industrial solvent that is refined from crude oil and has been shown to be a risk for leukemia?**
  - a. Benzene
  - b. Nicotine
  - c. Formaldehyde
  - d. Tar
13. **Which chemical found in cigarettes is responsible for the sticky brown residue staining on teeth?**
  - a. Nicotine
  - b. Tar
  - c. Cadmium
  - d. Formaldehyde
14. **What product is described as a dissolvable small tea baglike pouch that is placed under the upper lip for extended periods of time and swallowed?**
  - a. Dip
  - b. Snuff
  - c. Snus
  - d. E-cigarettes
15. **What is the concentration of THC that is sold in marijuana in the United States?**
  - a. 1.0-1.5%
  - b. 1.5%-9.4%
  - c. 2.5-10.5%
  - d. 10.5-15.5%
16. **Which of the following is an adverse effect of marijuana use?**
  - a. Pulmonary problems
  - b. Impaired sperm motility
  - c. Neurotoxicity
  - d. All of the above
17. **Where was snus originally developed?**
  - a. Denmark
  - b. Sweden
  - c. United States
  - d. Russia
18. **When will peak plasma levels occur after nicotine absorption?**
  - a. 1-2 minutes
  - b. 2-3 minutes
  - c. 3-4 minutes
  - d. 4-5 minutes
19. **What is the half-life of nicotine?**
  - a. 2 hours
  - b. 5 hours
  - c. 10 hours
  - d. 24 hours
20. **Which of the following is a receptor for cannabinoids?**
  - a. S5
  - b. D2
  - c. CB-1
  - d. H1
21. **When does the maximum plasma concentration of marijuana occur?**
  - a. 15-30 minutes
  - b. 4-5 minutes
  - c. 20 minutes
  - d. 1 hour
22. **What percentage of regular marijuana users will become addicted to the substance?**
  - a. 9%
  - b. 20%
  - c. 25%
  - d. 35%
23. **What percentage of regular nicotine users will become addicted to the substance?**
  - a. 15%
  - b. 25%
  - c. 32%
  - d. 50%

## QUESTIONS (CONTINUED)

**24. Which of the following is an FDA-approved therapy as part of a quit plan?**

- a. E-cigarettes
- b. Snus
- c. Chantix
- d. None of the above

**25. At what range do nicotine replacement therapies (NRTs) generally provide plasma levels of nicotine?**

- a. High-level cigarette smoker
- b. Low-level cigarette smoker
- c. High-level smokeless user
- d. There is no set range

**26. When will peak withdrawal symptoms occur after nicotine cessation?**

- a. 24 hours
- b. 36 hours
- c. 2-3 days
- d. 3-4 days

**27. All of the following are approved tobacco cessation products by the FDA except which one?**

- a. Bupropion hydrochloride (Wellbutrin SR, Zyban)
- b. Varenicline tartrate (Chantix)
- c. Electronic-cigarettes
- d. Nicotine patches

**28. Which of the following nicotine replacement therapies (NRTs) delivers nicotine via a transdermal system?**

- a. Inhaler
- b. Gum
- c. Lozenge
- d. Patch

**29. What pregnancy category are nicotine-free therapies?**

- a. A
- b. B
- c. D
- d. X

**30. Bupropion hydrochloride (Wellbutrin SR, Zyban) is what class of drug?**

- a. SSRI antidepressant
- b. Nicotine agonist
- c. Nicotine antagonist
- d. Antipsychotic

## NOTES

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ANSWER SHEET

# Puff, Not the Magic Dragon... The Cost of America's Tobacco and Marijuana Abuse (2nd edition)

Name: \_\_\_\_\_ Title: \_\_\_\_\_ Specialty: \_\_\_\_\_

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### EDUCATIONAL OBJECTIVES

1. Correlate patients' nicotine and marijuana use with the adverse effects to their general health and well-being and be familiar with risk factors.
2. Understand the different forms of tobacco products currently on the market in the United States and their components.
3. Pharmacologically understand why patients have difficulties sustaining a quit plan and be knowledgeable of FDA-approved tobacco cessation programs and products.

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\_\_\_\_\_

13. Was there any subject matter you found confusing? Please describe.

\_\_\_\_\_

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| 12. (A) (B) (C) (D) | 27. (A) (B) (C) (D) |
| 13. (A) (B) (C) (D) | 28. (A) (B) (C) (D) |
| 14. (A) (B) (C) (D) | 29. (A) (B) (C) (D) |
| 15. (A) (B) (C) (D) | 30. (A) (B) (C) (D) |

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