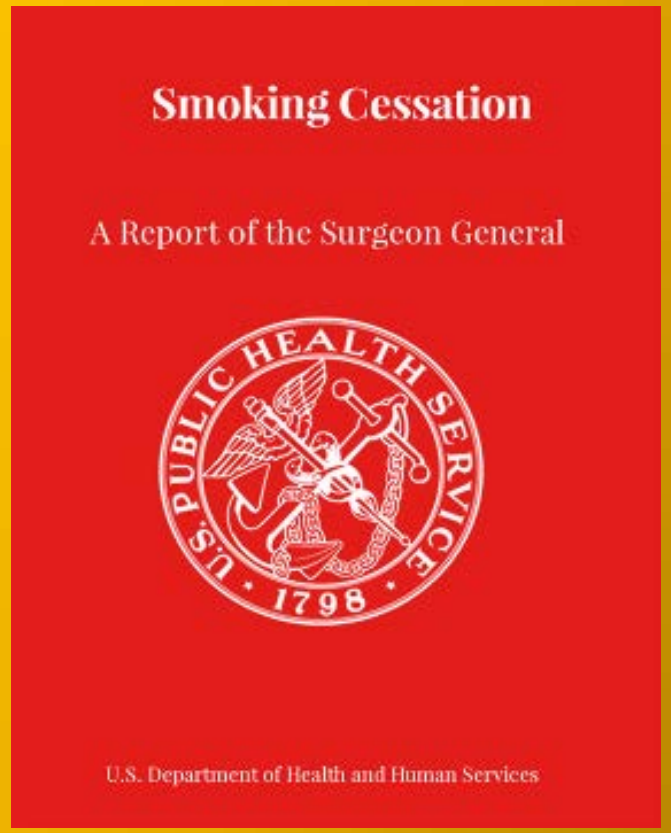
SMOKING CESSATION:
PAST, PRESENT, & FUTURE

Center For Disease Control And Prevention
National Center For Chronic Disease Prevention And Health Promotion
Office On Smoking And Health

CDC PUBLIC HEALTH GRAND ROUNDS • MAY 19, 2020



PAST: THE ROLE OF SURGEON GENERAL'S REPORTS AS A CATALYST FOR CHANGE

BRIAN KING, PHD, MPH | DEPUTY DIRECTOR FOR RESEARCH TRANSLATION
OFFICE ON SMOKING AND HEALTH

Centers for Disease Control and Prevention

National Center for Chronic Disease Prevention and Health Promotion

Office on Smoking and Health

OUTLINE

PAST

The Role of Surgeon General's Reports as a Catalyst for Change

PRESENT

Findings from the 2020 U.S. Surgeon General's Report on Cessation

FUTURE

The Increasing Importance of Strategies to Help Youth Quit Tobacco Product Use

OVER A HALF CENTURY OF DISEASE AND DEATH

34M

An estimated 34.2 million U.S. adults smoked in 2018.

1 vs. 30

For every one smoking-related death, at least 30 people live with a serious smoking-related illness.

480,000

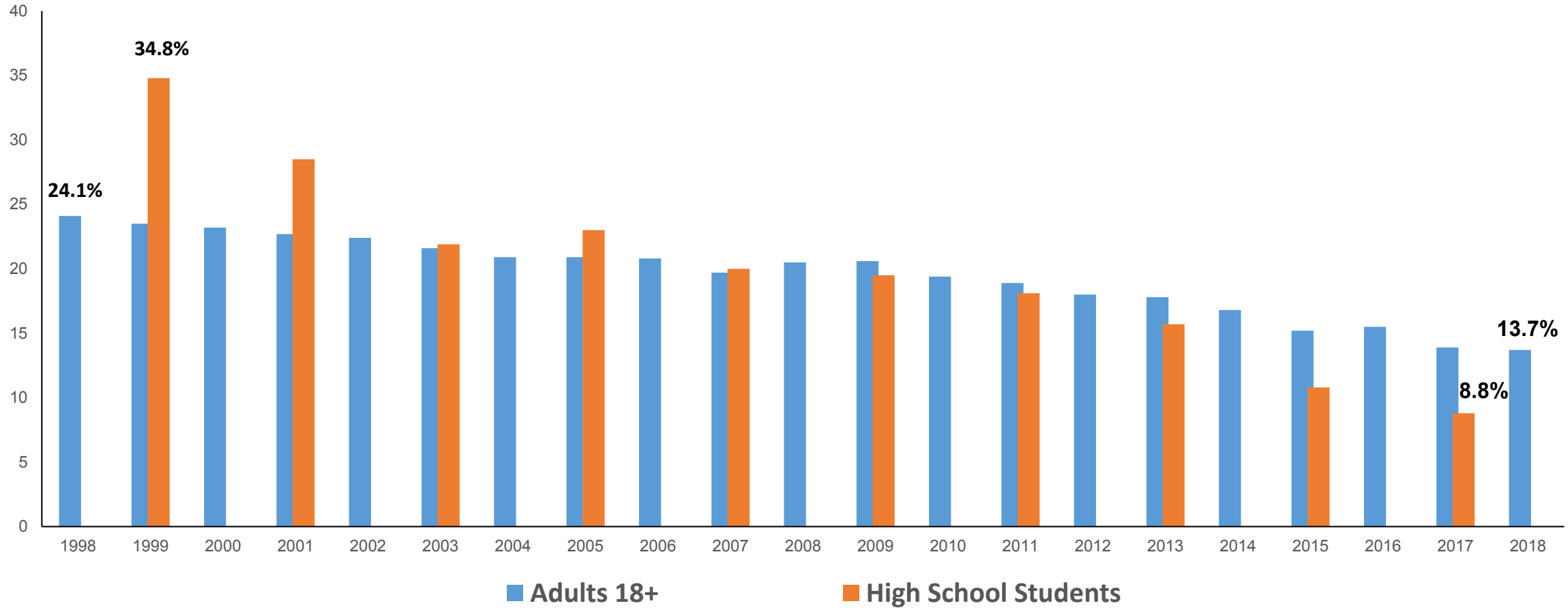
Cigarette smoking and secondhand smoke exposure kill about 480,000 Americans each year.

$300B

Each year, smoking costs more than $300 billion in medical costs and lost productivity.

Source: The health consequences of smoking – 50 years of progress: a report of the Surgeon General. – Atlanta, GA. : U.S. Department of Health and Human Services, CDC, Office on Smoking and Health, 2014.

GOOD NEWS: CIGARETTE SMOKING IS DOWN



Source: National Health Interview Survey; National Youth Risk Behavior Survey

BAD NEWS: DISPARITIES PERSIST
Current Cigarette Smoking Among U.S. Adults, 2018

Race/Ethnicity

22.6% American Indians
15% White

Education Level

36% GED
3.7% Graduate degree

Annual Household Income

21.3% <$35,000
7.3% ≥$100,000

Health Insurance Coverage

23.9% Uninsured
23.9% Medicaid
10.5% Private
9.4% Medicare

Disability/Limitation

19.2% Yes
13.1% No

Sexual Orientation

20.6% Lesbian/Gay/Bisexual
13.5% Heterosexual

Serious Psychological Distress

31.6% Yes
13.0% No

Source: Creamer MC et al. Tobacco Product Use and Cessation Indicators Among Adults – United States, 2018. MMWR 2019;68:1013-1019.

SURGEON GENERAL'S REPORTS ON TOBACCO RELEASED TO DATE

1964 — Smoking and Health

1979 — 15th Anniversary

1986 — Involuntary Smoking

1988 — Nicotine Addiction

1990 — Benefits of Cessation

1992 — Smoking in the Americas

1994 — Youth Prevention

1998 — Racial and Ethnic Minorities

2000 — Reducing Tobacco Use

2001 — Women and Smoking

2004 — Health Effects

2006 — Secondhand Smoke

2010 — Mechanisms of Disease

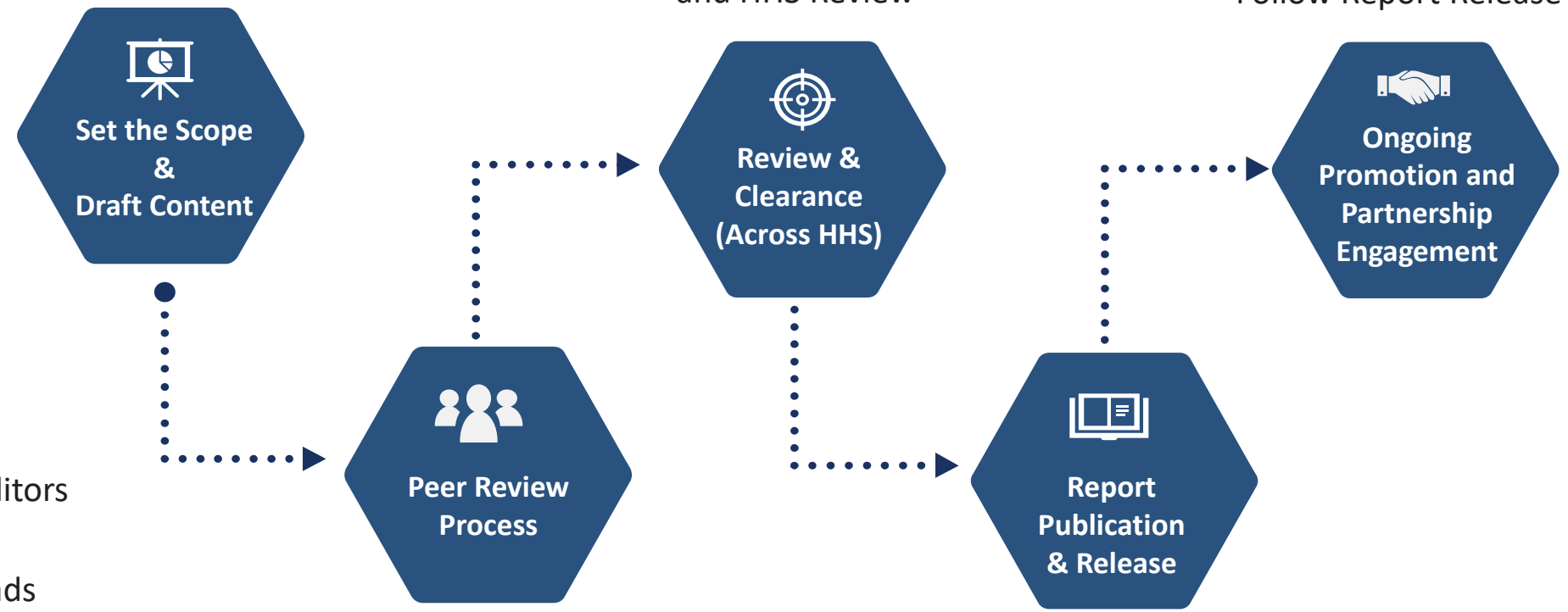
2012 — Youth Prevention (update)

2014 — 50th Anniversary

2016 — E-cigarette Use (Youth/Young Adults)

2020 — Smoking Cessation

PREPARING A SURGEON GENERAL'S REPORT



- Select Topic
- Select Scientific Editors
- Outline Content
- Select Chapter Leads
- Recruit Section Authors

- Peer Review
- Senior Scientific Review

- Initiation of CDC and HHS Review

- Surgeon General Releases the Report at a Press Event

- Implementation Activities Follow Report Release

2020 SURGEON GENERAL'S REPORT

More than 150 individuals involved, including 32 chapter authors, 46 peer reviewers, 20 senior scientists contributed to the compilation and review of the report

8 Comprehensive chapters consisting of more than 700 pages of the latest scientific evidence on smoking cessation

10 Major Conclusions

101 Chapter Conclusions

HOW SCIENTIFIC EVIDENCE IS REPORTED IN SURGEON GENERAL'S REPORTS ON SMOKING

- Sufficient
- Suggestive but not sufficient
- Inadequate
- Suggestive of no causal relationships

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PRESENT:FINDINGS FROM THE 2020 U.S. SURGEON GENERAL'S REPORT ON PATTERNS OF CESSATION, BIOLOGICAL INSIGHTS, AND HEALTH BENEFITS

RACHEL GRANA, PHD, MPH | PROGRAM DIRECTOR TOBACCO CONTROL RESEARCH BRANCH | NATIONAL CANCER INSTITUTE, NATIONAL INSTITUTES OF HEALTH

Centers for Disease Control and Prevention

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OVERVIEW OF SURGEON GENERAL'S REPORT CONTENT

Chapter 1
1 Introduction, Conclusions, and the Evolving Landscape of Smoking Cessation

Chapter 2
2 Patterns of Smoking Cessation Among U.S. Adults, Young Adults, and Youth

Chapter 3
3 New Biological Insights into Smoking Cessation

Chapter 4
4 The Health Benefits of Smoking Cessation

Chapter 5
5 The Benefits of Smoking Cessation on Overall Morbidity, Mortality, and Economic Costs

Chapter 6
6 Interventions for Smoking Cessation and Treatments for Nicotine Dependence

Chapter 7
7 Clinical-, System-, and Population-Level Strategies that Promote Smoking Cessation

Chapter 8
8 Vision for the Future

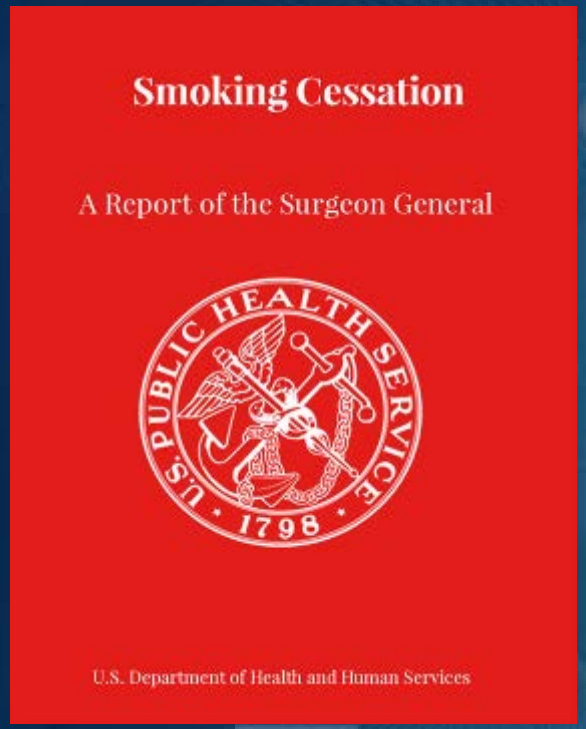
CHAPTER

1

INTRODUCTION, CONCLUSIONS, AND THE EVOLVING LANDSCAPE OF SMOKING CESSATION

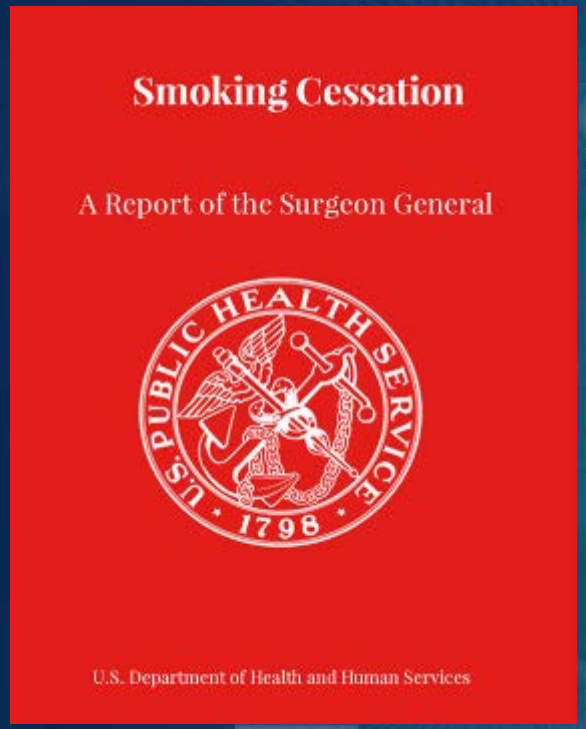
Chapter 1 provides a summary of the Surgeon General's report and its major conclusions, followed by the conclusions from each chapter. It also offers an overview of the evolving landscape of smoking cessation and key developments since the 1990 Surgeon General's report.

10 Major Conclusions



1. **Smoking cessation is beneficial at any age. Smoking cessation improves health status and enhances quality of life.**
2. **Smoking cessation reduces the risk of premature death and can add as much as a decade to life expectancy.**
3. Smoking places a substantial financial burden on smokers, healthcare systems, and society. Smoking cessation reduces this burden, including smoking-attributable healthcare expenditures.
4. **Smoking cessation reduces risk for many adverse health effects, including reproductive health outcomes, cardiovascular diseases, chronic obstructive pulmonary disease, and cancer. Quitting smoking is also beneficial to those who have been diagnosed with heart disease and chronic obstructive pulmonary disease.**
5. More than three out of five U.S. adults who have ever smoked cigarettes have quit. Although a majority of cigarette smokers make a quit attempt each year, less than one-third use cessation medications approved by the U.S. Food and Drug Administration (FDA) or behavioral counseling to support quit attempts.
6. Considerable disparities exist in the prevalence of smoking across the U.S. population, with higher prevalence in some subgroups. Similarly, the prevalence of key indicators of smoking cessation — quit attempts, receiving advice to quit from a health professional, and using cessation therapies — also varies across the population, with lower prevalence in some subgroups.
7. Smoking cessation medications approved by the U.S. Food and Drug Administration (FDA) and behavioral counseling are cost-effective cessation strategies. Cessation medications approved by the FDA and behavioral counseling increase the likelihood of successfully quitting smoking, particularly when used in combination. Using combinations of nicotine replacement therapies can further increase the likelihood of quitting.
8. Insurance coverage for smoking cessation treatment that is comprehensive, barrier-free, and widely promoted increases the use of these treatment services, leads to higher rates of successful quitting, and is cost-effective.
9. E-cigarettes, a continually changing and heterogeneous group of products, are used in a variety of ways. Consequently, it is difficult to make generalizations about efficacy for cessation based on clinical trials involving a particular e-cigarette, and there is presently inadequate evidence to conclude that e-cigarettes, in general, increase smoking cessation.
10. **Smoking cessation can be increased by raising the price of cigarettes, adopting comprehensive smokefree policies, implementing mass media campaigns, requiring pictorial health warnings, and maintaining comprehensive statewide tobacco control programs.**

10 Major Conclusions



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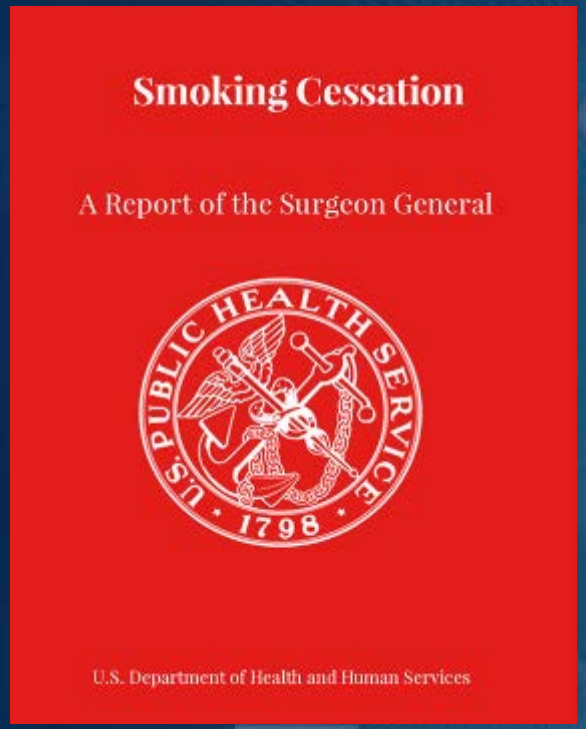

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CHAPTER

2

PATTERNS OF SMOKING CESSATION AMONG U.S. ADULTS, YOUNG ADULTS, AND YOUTH

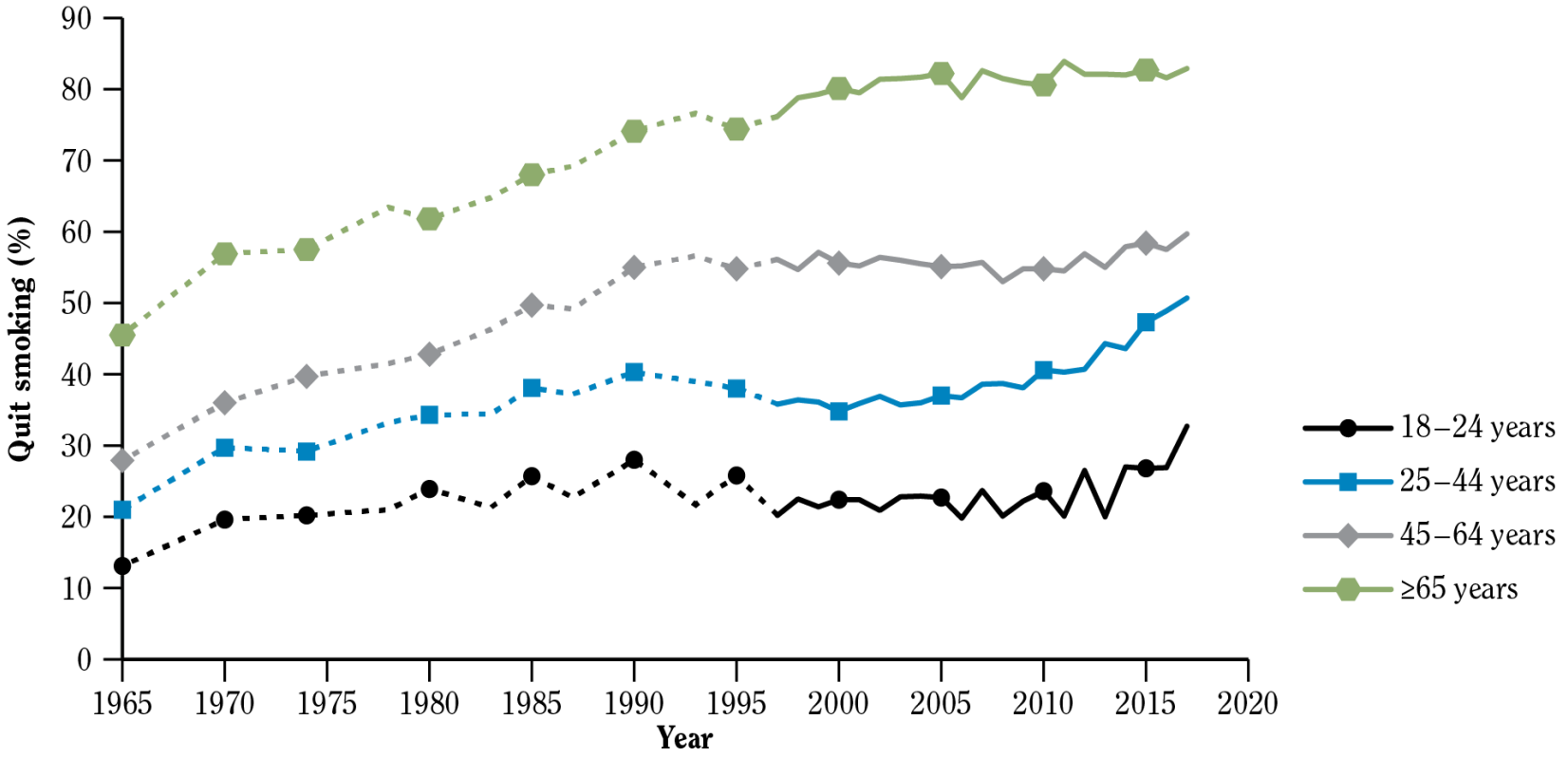
Chapter 2 documents key patterns and trends in cigarette smoking cessation in the United States. It also reviews the changing demographic and smoking-related characteristics of cigarette smokers, with a focus on how these changes may influence future trends in cessation.

- **18 YEARS OF AGE AND OLDER**
  Adults Overall
- **18–24 YEARS OF AGE**
  Young Adults
- **12–17 YEARS OF AGE**
  Youth

KEY EPIDEMIOLOGIC MEASURES

- In the U.S., more than three out of every five adults who were ever cigarette smokers have quit smoking.
- Past-year attempts and recent and longer-term cessation have increased over the past 2 decades among adult cigarette smokers.
- Use of evidence-based cessation counseling and/or medications has increased among adult cigarette smokers since 2000; however, more than two-thirds of adult cigarette smokers who tried to quit during the past year did not use evidence-based treatment.
- Advice from health professionals to quit smoking has increased since 2000; however, four out of every nine adult cigarette smokers who saw a health professional during the past year did not receive advice to quit.
- A large proportion of adult smokers report using non-evidence-based approaches when trying to quit smoking, such as switching to other tobacco products.
- Marked disparities in cessation behaviors, such as making a past-year quit attempt and achieving recent successful cessation, persist across certain population subgroups defined by educational attainment, poverty status, age, health insurance status, race/ethnicity, and geography.

Figure 2.8a: Percentage of Ever Smokers, 18 Years of Age And Older, Who Quit Smoking (Quit Ratio) By Age Group — National Health Interview Survey (NHIS), 1965–2017; United States



CHAPTER

3

NEW BIOLOGICAL INSIGHTS INTO SMOKING CESSATION

Chapter 3 focuses on how biology can influence smoking cessation and reviews four areas of intensive research: cell and molecular biology of nicotine addiction; vaccines and other immunotherapies as treatments for tobacco addiction; neurobiological insights into smoking cessation; and the role genes play in smoking, nicotine addition, and cessation.

BIOLOGICAL INSIGHTS

1

Cell and Molecular Biology of Nicotine Addiction

2

Vaccines and Other Immunotherapies as Treatments for Tobacco Addiction

3

Insights into Smoking Cessation from the Field of Neurobiology

4

Genetic Studies of Smoking Phenotypes

The evidence is suggestive but not sufficient to infer that :

- Increasing glutamate transport can alleviate nicotine withdrawal symptoms and prevent relapse.
- Modulating the function of certain neuropeptides can reduce smoking behavior in humans, as neuropeptide systems play a role in multiple stages of the nicotine addiction process adult cigarette smokers.
- Targeting the habenulo-interpeduncular pathway with agents that increase the aversive properties of nicotine are a useful therapeutic target for smoking cessation.
- Vaccines generating adequate levels of nicotine-specific antibodies can block the addictive effects of nicotine and aid smoking cessation.
- Dysregulated brain circuits, including prefrontal and cingulate cortical regions and their connections with various striatal and insula loci, can serve as novel therapeutic targets for smoking cessation.
- The effectiveness of nicotine replacement therapy may vary across specific genotype groups.

CHAPTER

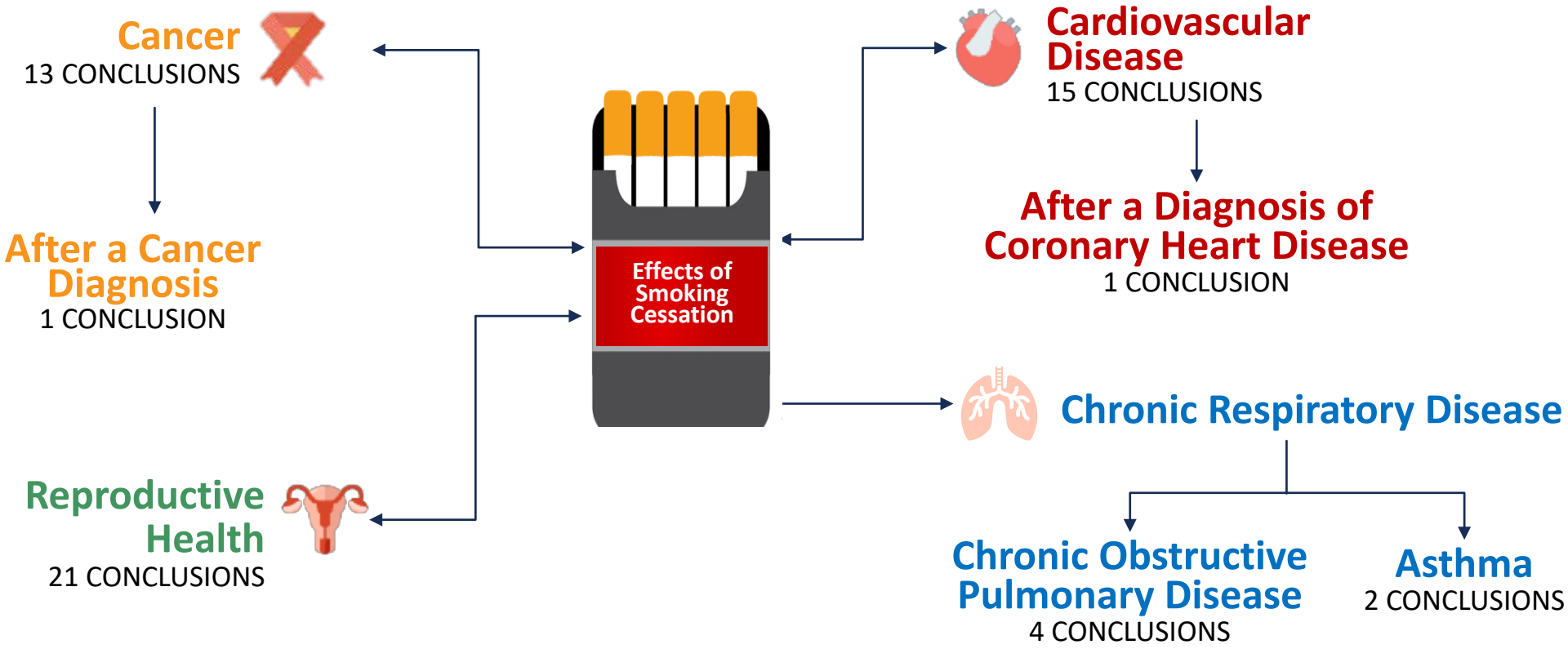
4

THE HEALTH BENEFITS OF SMOKING CESSATION

Chapter 4 reviews findings on disease risks from smoking and how these risks change after smoking cessation for major types of chronic diseases, including cancer, cardiovascular and respiratory systems, and a wide range of adverse reproductive outcomes.

SMOKING CESSATION REDUCES RISKS FROM SMOKING

The evidence is sufficient to infer that smoking cessation reduces the following:



HEALTH BENEFITS OF QUITTING SMOKING

IMPROVES
health and INCREASES life expectancy

LOWERS
risk of 12 types of cancer

LOWERS
risk of cardiovascular diseases

LOWERS
risk of Chronic Obstructive Pulmonary Disease (COPD)

LOWERS
risk of some poor reproductive health outcomes

BENEFITS
people who have already been diagnosed with coronary heart disease or COPD

BENEFITS
people at any age — even people who have smoked for years or have smoked heavily will benefit from quitting

Source: What You Need to Know About Quitting Smoking: Advice from the Surgeon General. Accessed from https://www.cdc.gov/tobacco/data_statistics/sgr/2020-smoking-cessation/index.html#consumer-guide.

PRESENT: FINDINGS ON ECONOMIC BENEFITS, INDIVIDUAL INTERVENTIONS, AND CLINICAL-, SYSTEM-, AND POPULATION-LEVEL STRATEGIES

GILLIAN SCHAUER, PHD, MPH, SENIOR CONSULTANT | CENTERS FOR DISEASE CONTROL AND PREVENTION

Centers for Disease Control and Prevention

National Center for Chronic Disease Prevention and Health Promotion

Office on Smoking and Health

CHAPTER

5

THE BENEFITS OF SMOKING CESSATION ON OVERALL MORBIDITY, MORTALITY, AND ECONOMIC COSTS

Chapter 5 highlights how quitting smoking can lead to changes in quality of life, health status, overall mortality, and lifespan. It also documents the cost-effectiveness of smoking cessation interventions.

HEALTH AND COST BENEFITS OF SMOKING CESSATION INTERVENTIONS

Smoking cessation improves well-being, including higher quality of life and improved health status.

Smoking cessation reduces mortality and increases the lifespan.

Smoking exacts a high cost for smokers, healthcare systems, and society.

Smoking cessation interventions are cost effective.

CHAPTER

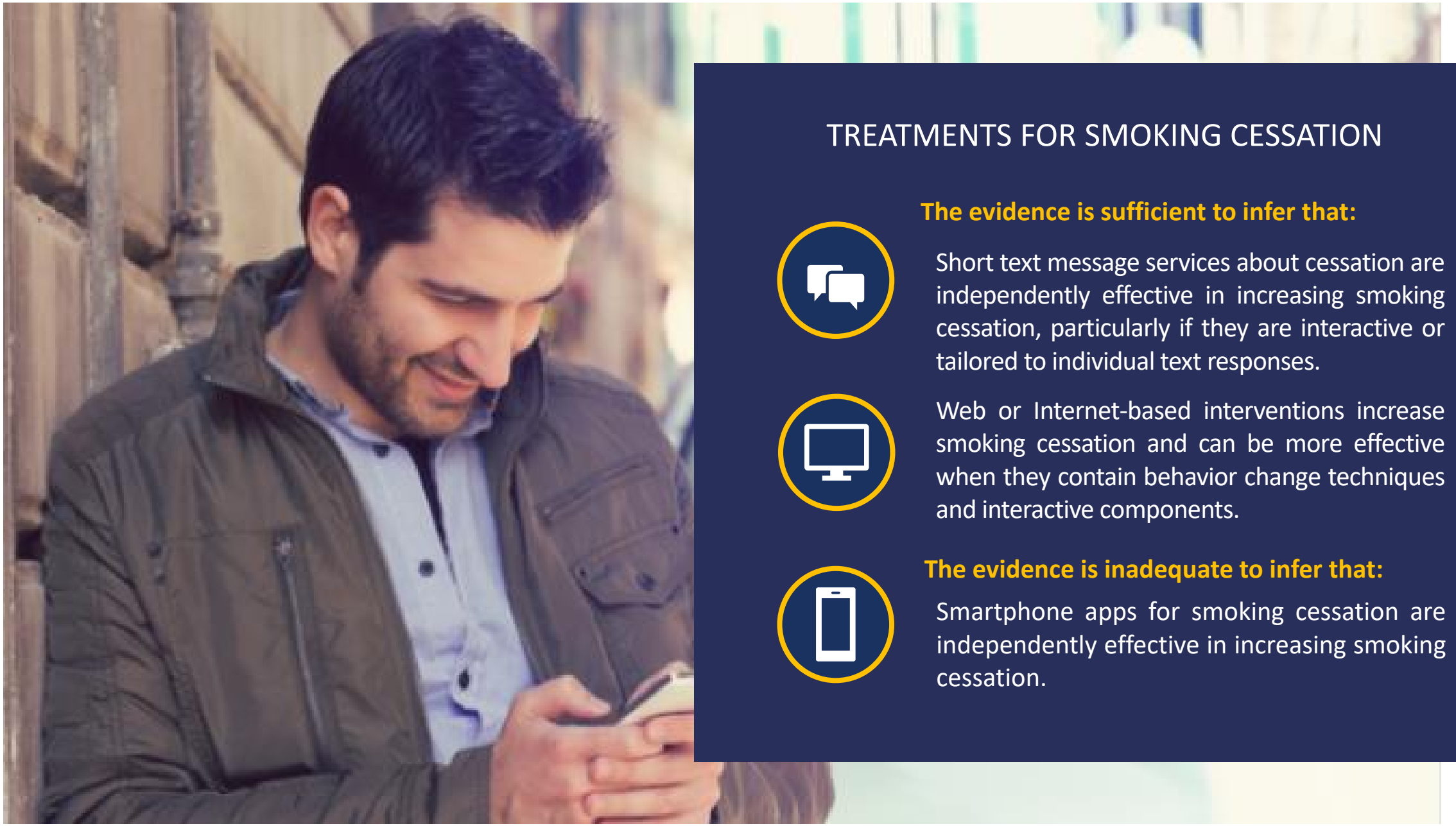
6

INTERVENTIONS FOR SMOKING CESSATION AND TREATMENTS FOR NICOTINE DEPENDENCE

Chapter 6 reviews the evidence on current and emerging treatments for smoking cessation, including research that has been conducted since the 2008 U.S. Public Health Service's Clinical Practice Guideline, *Treating Tobacco Use and Dependence: 2008 Update*.

TREATMENTS FOR SMOKING CESSATION

- Behavioral counseling and cessation medication interventions increase smoking cessation compared with self-help materials or no treatment.
- Behavioral counseling and cessation medications are independently effective in increasing smoking cessation, and even more effective when used in combination.
- Proactive quitline counseling, when provided alone or in combination with cessation medications, increases smoking cessation.



TREATMENTS FOR SMOKING CESSATION

The evidence is sufficient to infer that:

Short text message services about cessation are independently effective in increasing smoking cessation, particularly if they are interactive or tailored to individual text responses.

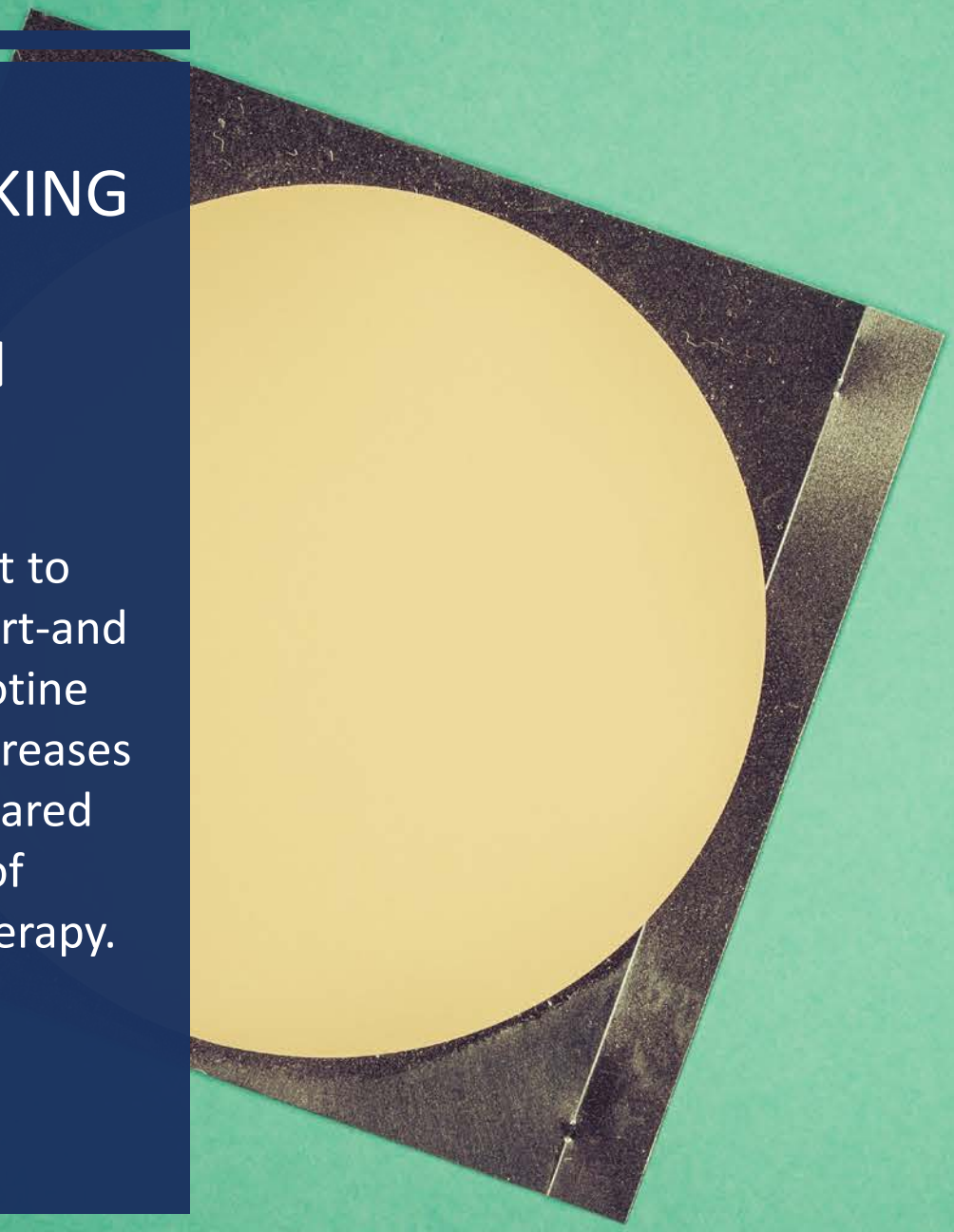
Web or Internet-based interventions increase smoking cessation and can be more effective when they contain behavior change techniques and interactive components.

The evidence is inadequate to infer that:

Smartphone apps for smoking cessation are independently effective in increasing smoking cessation.

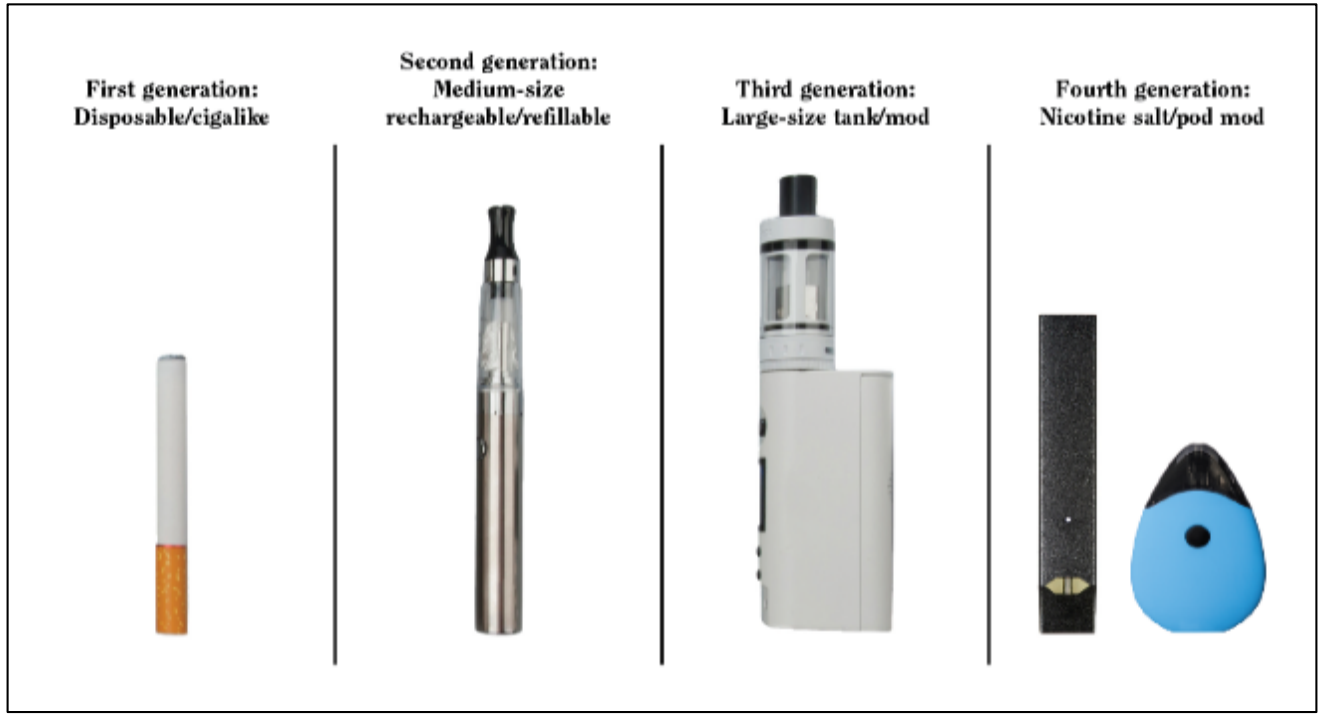
APPROVED SMOKING CESSATION MEDICATION

The evidence is sufficient to infer that combining short-and long-acting forms of nicotine replacement therapy increases smoking cessation compared with using single forms of nicotine replacement therapy.



MODIFIED AND ALTERNATIVE TOBACCO PRODUCTS: E-CIGARETTES

Figure 6.1 The Evolution of E-cigarettes, by Product Generation and Characteristics



- The evidence is inadequate to infer that e-cigarettes, in general, increase smoking cessation.
- The evidence is suggestive but not sufficient to infer that the use of e-cigarettes containing nicotine is associated with increased smoking cessation compared with the use of e-cigarettes not containing nicotine.
- The evidence is suggestive but not sufficient to infer that more frequent use of e-cigarettes is associated with increased smoking cessation compared with less frequent use of e-cigarettes.

CHAPTER

7

CLINICAL-, SYSTEM-, AND POPULATION-LEVEL STRATEGIES THAT PROMOTE SMOKING CESSATION

Chapter 7 focuses on strategies that encourage smoking cessation through actions taken within clinical settings, within health systems, and at the population level.

CLINICAL- AND HEALTH SYSTEM-BASED STRATEGIES

- The development and dissemination of evidence-based clinical practice guidelines increases the delivery of clinical interventions for smoking cessation.
- The adequate promotion of comprehensive, barrier-free, evidence-based cessation insurance coverage increases the availability and utilization of treatment services for smoking cessation.
- Strategies that link smoking cessation-related quality measures with payments to clinicians, clinics, or health systems increase the rate of delivery of clinical treatments for smoking cessation.
- Tobacco quitlines are an effective population-based approach to motivate quit attempts and increase smoking cessation.

POPULATION-BASED STRATEGIES

The evidence is sufficient to infer that:

Increasing the price of cigarettes reduces smoking prevalence, reduces cigarette consumption, and increases smoking cessation.

Smokefree policies reduce smoking prevalence, reduce cigarette consumption, and increase smoking cessation.

Mass media campaigns increase the number of calls to quitlines and increase smoking cessation.

Comprehensive state tobacco control programs reduce smoking prevalence, increase quit attempts, and increase smoking cessation.

Large, pictorial health warnings increase smokers' knowledge about the health harms of smoking, interest in quitting, and quit attempts and decrease smoking prevalence.

EMERGING POPULATION-BASED STRATEGIES

The evidence is suggestive but not sufficient to infer that:

Plain packaging increases smoking cessation.

Decreasing the retail availability of tobacco products and exposure to point-of-sale tobacco marketing and advertising increases smoking cessation.

Restricting the sale of certain types of tobacco products, such as menthol and other flavored products, increases smoking cessation, especially among certain populations.

CHAPTER

8

VISION FOR THE FUTURE

Chapter 8 discusses the past, present, and future of tobacco cessation in the United States. It provides a historical perspective, discusses the current tobacco control landscape, and provides a vision for enhancing tobacco cessation in the Unites States.

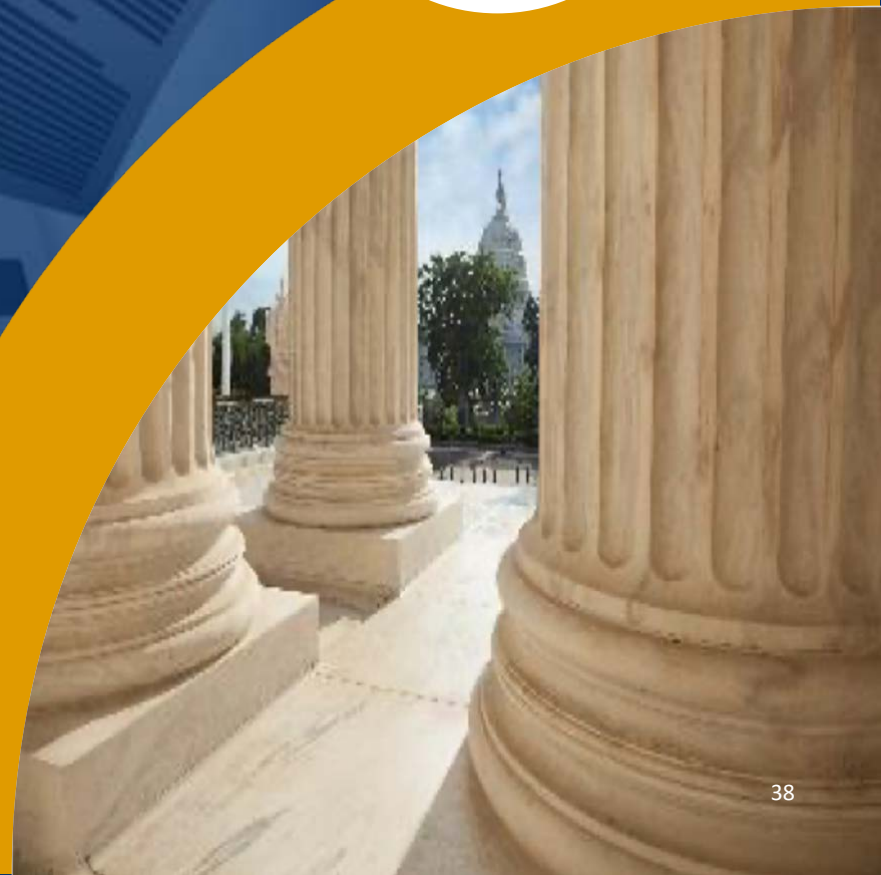
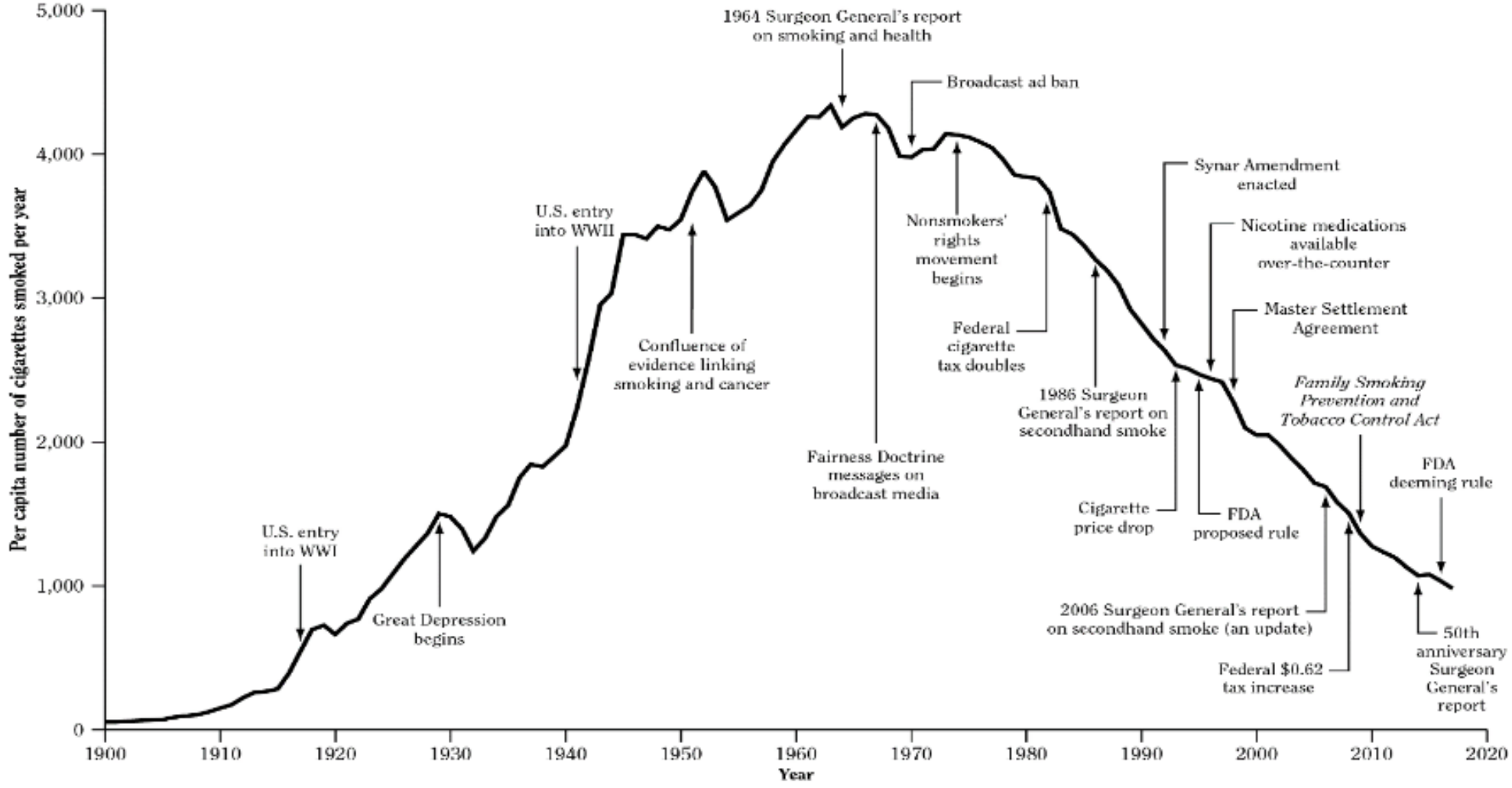


Figure 8.1.Per capita annual cigarette consumption among adults, 18 years of age and older, and major smoking and health events in the United States, 1900–2017



ENDING THE TOBACCO USE EPIDEMIC: POTENTIAL END-GAME STRATEGIES DISCUSSED IN THE 50TH ANNIVERSARY SURGEON GENERAL'S REPORT, 2014

POTENTIAL END-GAME STRATEGY	DESCRIPTION
Reduce nicotine yield in cigarettes and other tobacco products	Use government regulations to gradually reduce the level of nicotine in cigarettes, and possibly other tobacco products, to non-addictive levels
Reduce toxicity in tobacco products	Implement regulatory standards that require manufacturers to create tobacco products with very low toxicity
Gradually reduce the supply of tobacco products	Phase out over time the use of tobacco products via systematic reduction of supply to zero or to some other minimal level
Prohibit the sale of tobacco products to future generations	Prohibit the sale of tobacco products to persons born after a specific date, essentially creating tobacco-free cohorts that progressively increase in coverage and size over time
Prohibit cigarettes and/or cigarettes and other tobacco products	Prohibit the production and sale of cigarettes and possibly other types of tobacco products
Sell tobacco products through a not-for-profit agency	Transfer control of the supply and sales of tobacco products to a not-for-profit agency that has the goal of reducing consumption

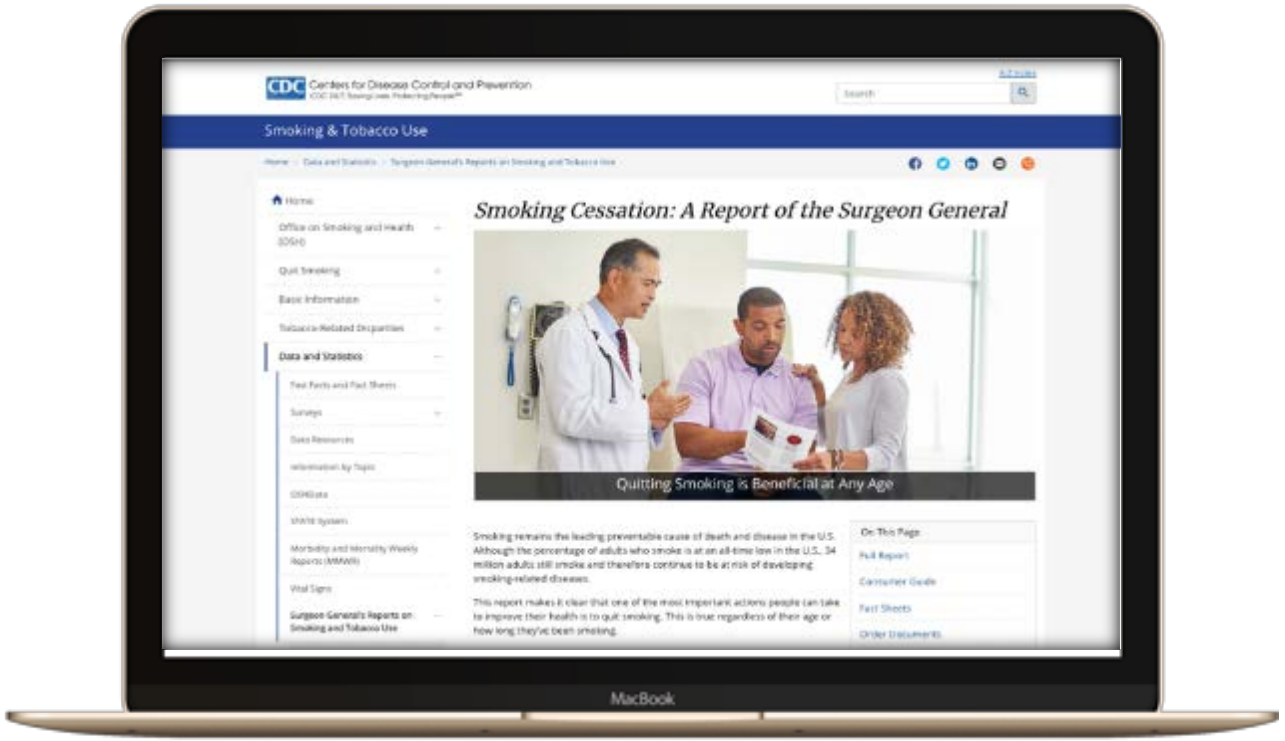
Source: Benowitz and Henningfield 1994, 2013; Borland 2003, 2013; Callard et al. 2005a,b; Daynard et al. 2010; Hatsukami et al. 2010, 2012, 2013; Khoo et al. 2010; Thomson et al. 2010; Proctor 2011, 2013; Berrick 2013; Callard and Collishaw 2013; Wilson et al. 2013; USDHHS 2014.

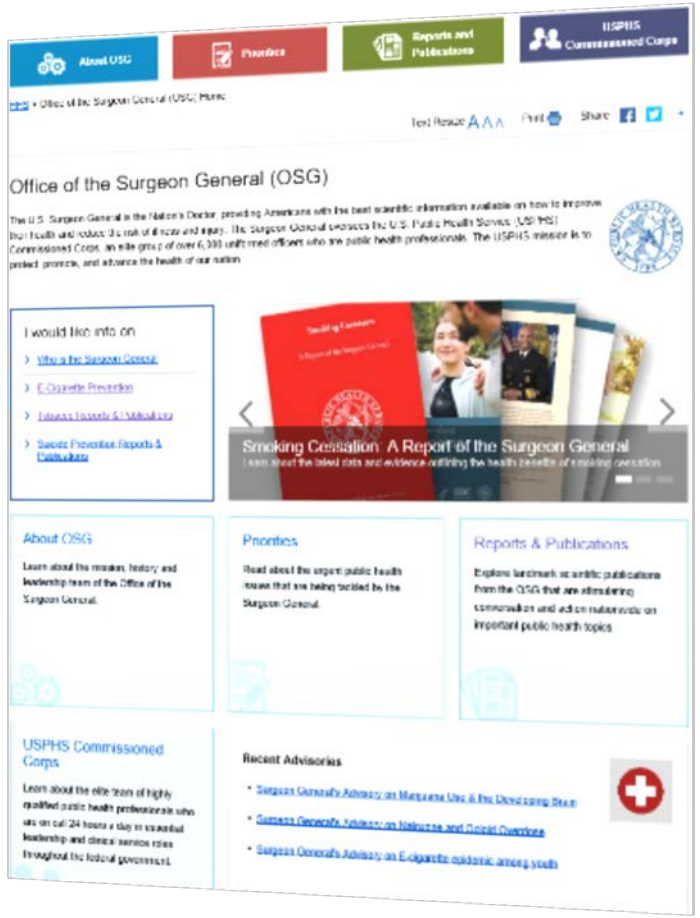
RESOURCES

To read the full report and access related materials, visit:

www.SurgeonGeneral.gov

www.CDC.gov/CessationSGR





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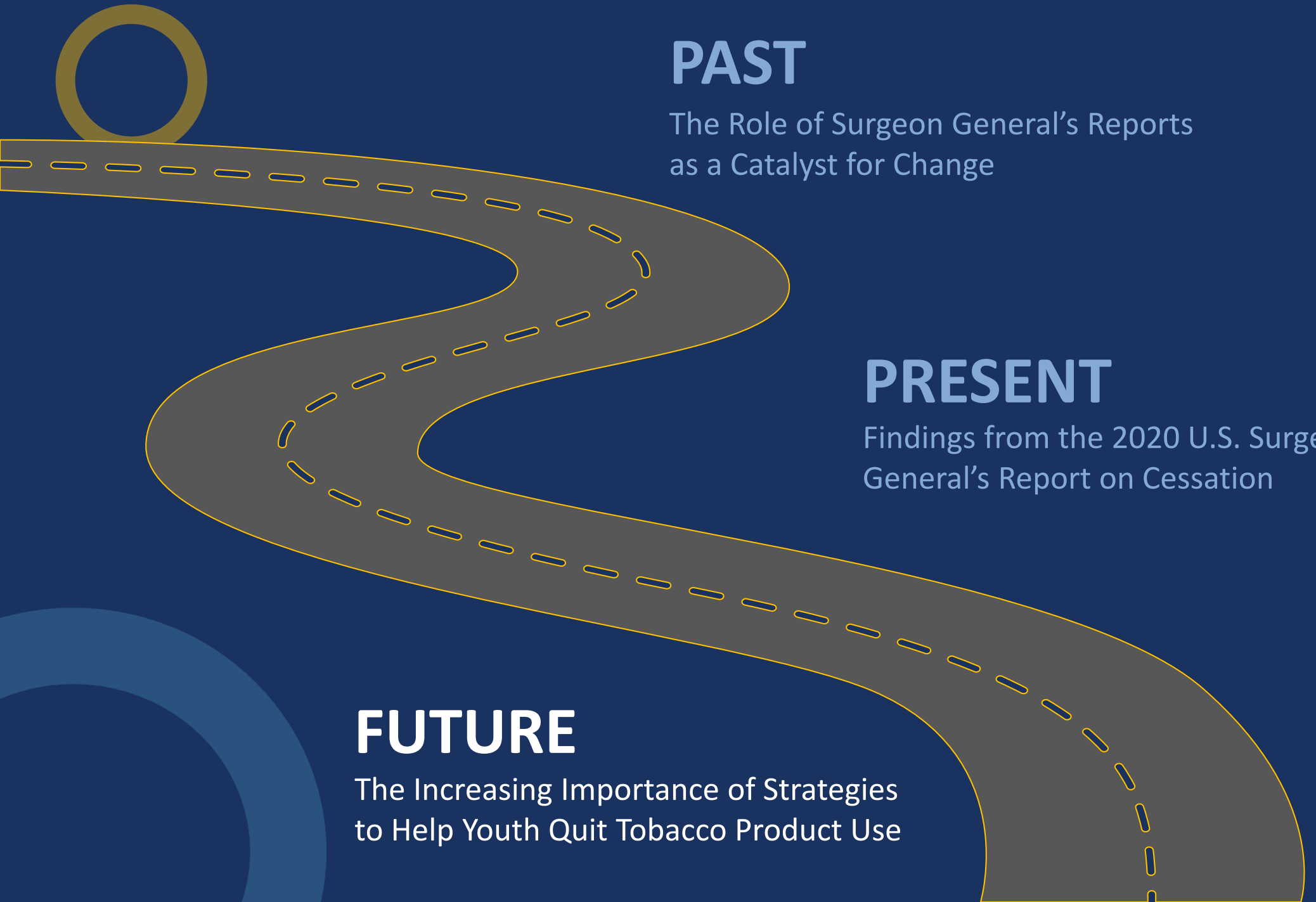

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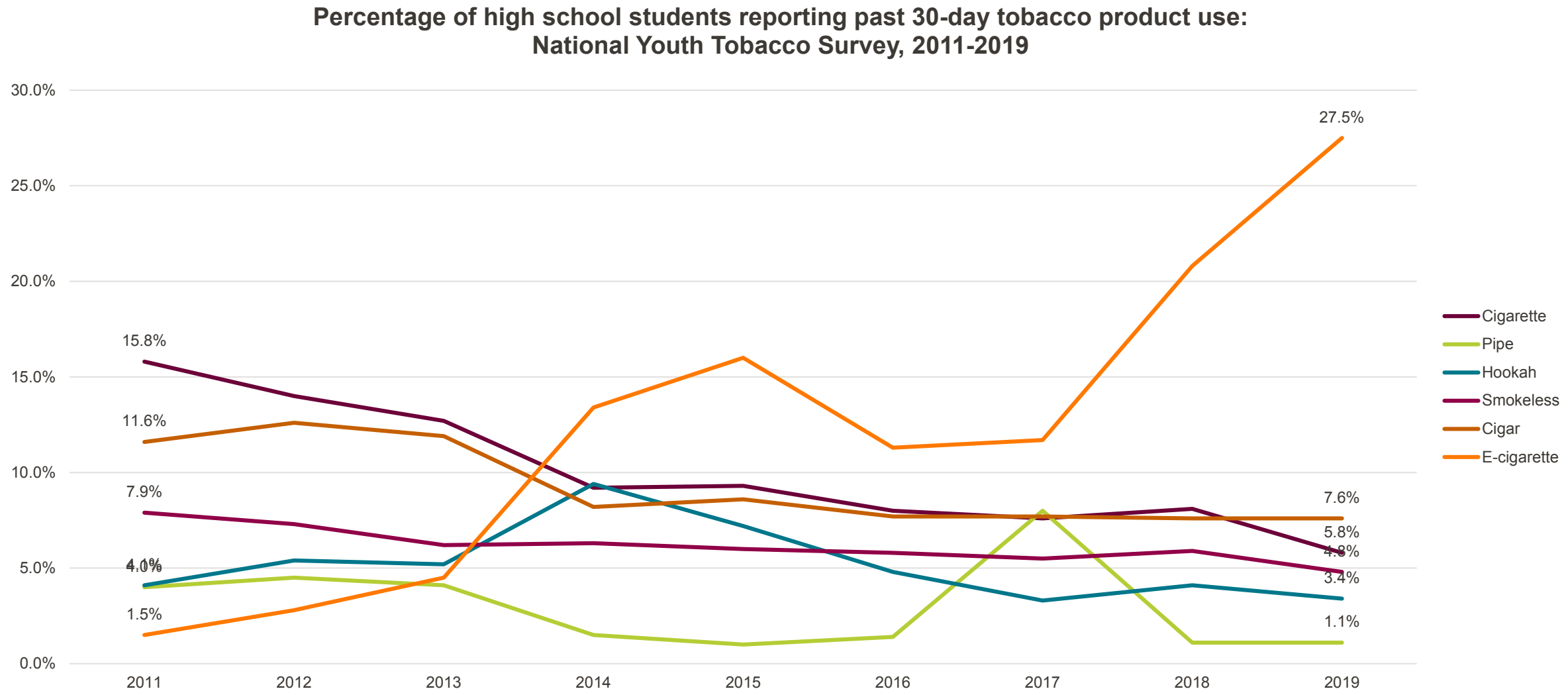
The Increasing Importance of Strategies to Help Youth Quit Tobacco Product Use

truth initiative®
INSPIRING TOBACCO-FREE LIVES

The Importance of Strategies to Help Youth Quit Tobacco Product Use

Amanda L. Graham, PhD
Chief of Innovations, Truth Initiative
Professor of Medicine (adjunct), Mayo Clinic College of Medicine and Science

Tobacco product landscape among youth



Gentzke et al. Vital Signs: Tobacco Product Use Among Middle and High School Students - United States, 2011-2018. *MMWR* 2019.
Wang et al. Tobacco Product Use and Associated Factors Among Middle and High School Students - United States, 2019. *MMWR* 2019.

Existing smoking cessation strategies for youth

Counseling Approaches

- Cognitive Behavioral Therapy
- Motivational enhancement
- Stages of Change
- Social Cognitive Theory
- 5 A's (Ask, Advise, Assess, Assist, Arrange)

Delivery Mode

- Group setting (e.g., school)
- Individual, face-to-face (e.g., clinic)
- Technology based (e.g., phone, computer)

Medication

- Nicotine Replacement Therapy
- Bupropion
- Varenicline
  - ➢ *Not approved for adolescents*

Evidence for smoking cessation strategies for youth

Intervention Type	Relative Effect (CI)	# Participants (studies)
Behavioral Interventions (vs. Control)		
Individual Counseling	1.07 (0.83 - 1.39)	2088 (7 RCTs)
Group counseling	***1.35 (1.03 - 1.77)***	1910 (9 RCTs)
Computer-based interventions	0.79 (0.50 - 1.24)	340 (3 RCTs)
Text messaging	1.18 (0.90 - 1.56)	2985 (3 RCTs)
Multiple delivery methods	1.26 (0.95 - 1.66)	2755 (8 RCTs)
Medication		
NRT vs. Placebo	1.11 (0.48 - 2.58)	385 (2 RCTs)
Bupropion vs. Placebo	1.49 (0.55 - 4.02)	207 (1 RCT)
Patch + Bupropion vs. Patch + Placebo	1.05 (0.41 - 2.69)	211 (1 RCT)

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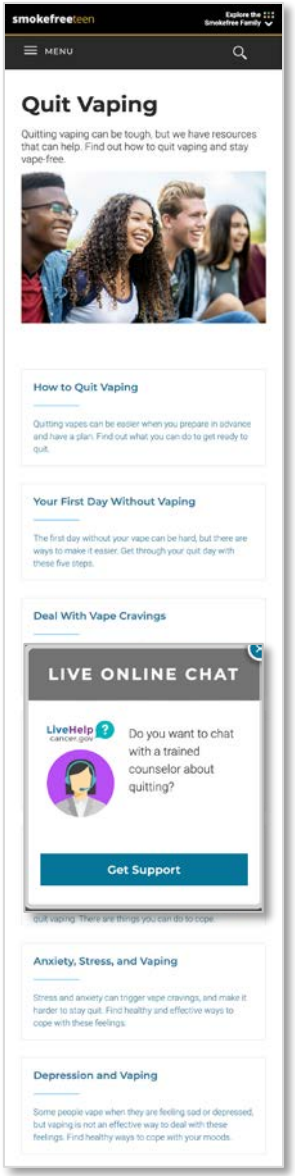
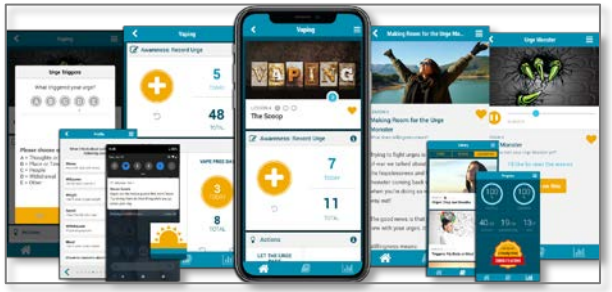
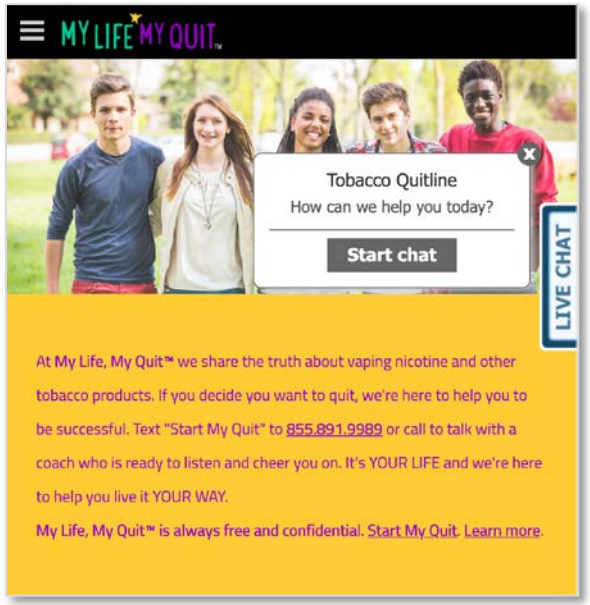
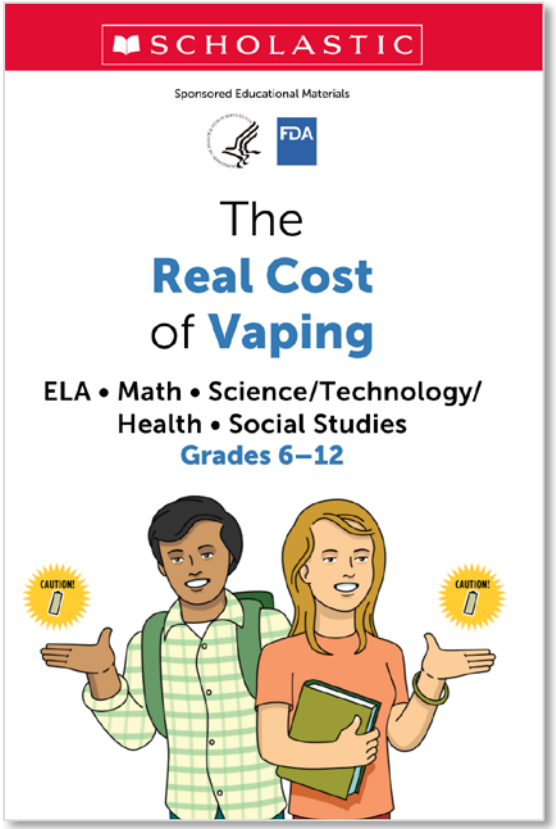
Fanshawe et al. Tobacco cessation interventions for young people. *Cochrane Database Syst Rev*. 2017.
Villanti et al. Smoking Cessation Interventions for U.S. Young Adults: New evidence from a systematic review. *Am J Prev Med.* In press.

Emerging vaping cessation strategies for youth

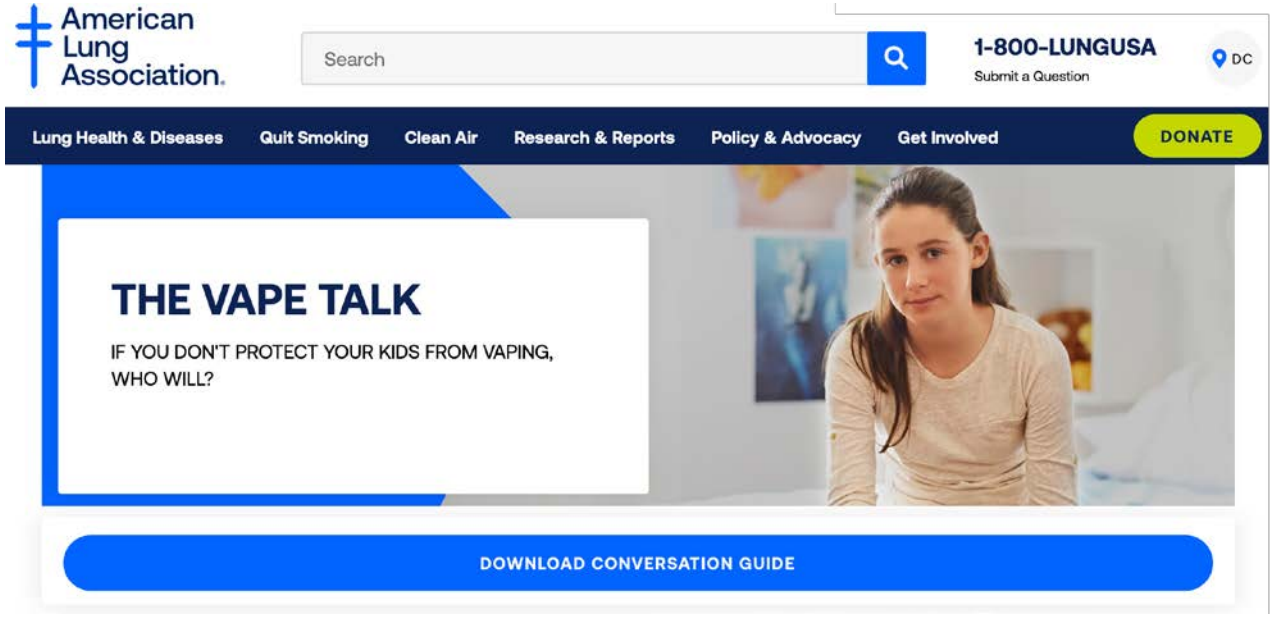








Emerging vaping cessation resources for parents



This is Quitting

Theory-Based & Grounded in Best Practices

- Build self-efficacy
- Establish/reinforce social norms & social support
- Support observational learning, grow behavioral capability

Individually Tailored

- Age (13-17 vs. 18-24)
- Product use (e.g., JUUL, Suorin)
- Quit date

Empathic and Supportive

- Fully automated, available 24/7
- Interactive (structured & open-ended)
- Messages from other users

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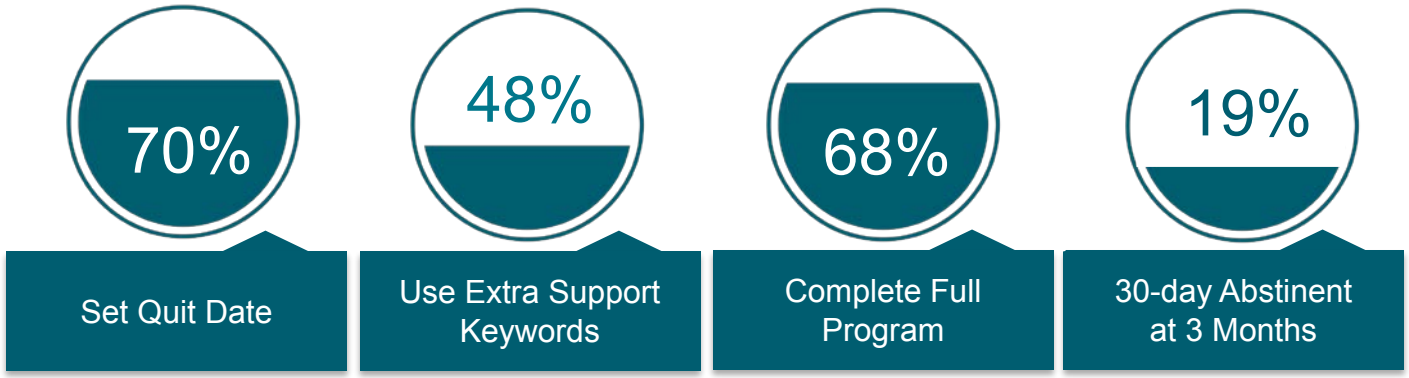
Graham et al. Engagement and 3-month outcomes from a digital e-cigarette cessation program in a cohort of 27,000 teens and young adults. *Nicotine Tob Res*. 2019 Jun.

Engagement and outcomes

Jan 18, 2019 – May 1, 2020

Age	Enrollment
Teen	66,289
Young adult	94,658
TOTAL	**160,947**



200-500 young people sign up each day

Graham et al. *JMIR Research Protocols*. 2020 May. ClinicalTrials.gov: NCT04251273.

Youth cessation research gaps and opportunities

Measurement of e-cigarette cessation

- What is “abstinent”?
- At what endpoint?
- Wording?

Treatment research

- Is Nicotine Replacement Therapy helpful for vaping cessation?
- Dosing?
- Does comorbid marijuana vaping reduce the odds of nicotine vaping cessation? Should we recommend quitting both? One before the other?

Opportunities

- E-cigarette Product Use-Associated Lung Injury (EVALI) and COVID-19 have heightened awareness of the risks of tobacco use
- May translate into interest in quitting and participation in research trials

Thank you

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