of Investigation director a few days before the election) the results of the election would have been predictably different. Hence the belief that history is about explaining what determined events in the past. Colleagues have often told me that history is a wonderful hobby and that, if they had more time, they would read more and get more into it. They think of history as a set of relatively inconsequential stories and interpretations of the past. In what appear to be good times in politics and the economy, we tend to forget that, because history is always being made, no outcomes are certain before they happen, and that social and human affairs are modifiable when people "do" things. As Arendt would put it, we are responsible for the history we are making.

When the contemporary history challenges our expectations—especially our expectations of progress—we have evidence that the course of events in public health is not determined by what happened before. *Roe v. Wade* can be abrogated, hate crimes can resurface, lesbians and gays can be subject to discrimination, immigrants who arrived here as children can be deported, and access to health care can be limited. An assumption about the "inevitability" of progress can also make us miss phenomena that contradict our expectations. Few realized that optimistic beliefs about life expectancy had begun to be inverted for particular sectors of the White working class, probably since the 1970s.[3–7] This also was a worrisome consequence of our obliviousness to history and overconfidence in the inevitability of progress.

Snyder does not limit himself to drawing lessons from the past. He interprets his obligations as a historian to offering advice for the present. His pamphlet stresses that the history we are making depends on our actions, collectively and as individuals. Here is another one of his 20 lessons: "Contribute to good causes": do not be passive; do something socially useful about your ideas (even if only becoming an American Public Health Association member). It is not the scope of the involvement that matters but the involvement itself—and its intensity. When millions get strategically involved in political and social causes, there is less chance that a majority of citizens will be disenfranchised from their rights.

CONCEIVE ALTERNATE FUTURES

There is note of solemnity in Snyder's call for a new generation to "become a historical generation." But he is not a fatalist. Our history is what we make of our daily lives. *On Tyranny* is a call for new generations to learn from the mistakes made almost exactly 100 years ago. There is still time to "conceive alternate futures" (p. 119) and "find solutions" (p. 121). Nothing less. This is how important history is. AJPH

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Facing Addiction: A Laudable, but Incomplete Effort

According to a recently published Centers for Disease Control and Prevention report, the opioid overdose death rate for adolescents aged 15 to 19 years increased in 2015 after seven years of relative stability and decline, sparking new concern about the evolving epidemic of opioid addiction in the United States.[1] Understanding the drivers of opioid use and progression to addiction in this age group is critical to reversing course. *Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health* provides an in-depth analysis of opioid initiation, addiction, and treatment and is an important first step. However, in the face of escalating opioid overdose among young cohorts, further analysis of the precursors is critical for universal prevention.

DATA-DRIVEN DIRECTIONS

Surgeons general's reports have long considered public health concerns, beginning with the 1964 release of *Smoking and Health*. This report drew attention to tobacco use as a critical public health issue, leading to monumental and ultimately life-saving policy and prevention initiatives. In light of this history and the current opioid use public health crisis, we commend the 2016 publication of *Facing Addiction*. The report clearly states that addiction is a medical problem associated with significant morbidity and mortality—not bad behavior or moral failings—and it calls for responses from health care systems and society that reflect this medical frame.

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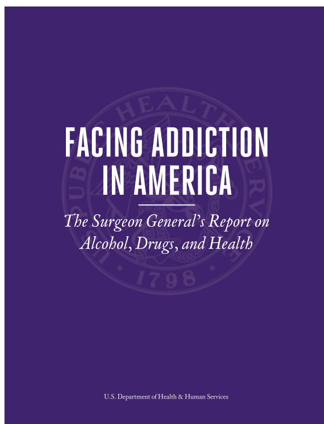

Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health
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413 pp

Reconceptualization of the problem coupled with thoughtful policy, prevention, and clinical practice efforts may improve the health of millions of Americans, including children affected by a family member's substance use disorder and adolescents at risk from their own. This paradigm shift voiced by the nation's top physician should be immune to changes in political culture or presidential administrations. Surgeons general are uniquely positioned to bring attention to public health issues and catalyze forward-looking responses. As a new surgeon general assumes this responsibility, attention to the wisdom and data-driven directives of *Facing Addiction* is merited for numerous reasons, including to address one of our country's most pressing public health concerns: adolescent use of opioids and other substances.

ADOLESCENCE, A CRITICAL AT-RISK PERIOD

Facing Addiction highlights that adolescence is a critical at-risk period for substance use. Brain maturation during adolescence makes it a key period for the manifestation of current substance use disorders and for laying down neurological pathways that predispose young people to future substance use disorders. Whereas the nucleus accumbens—the seat of the brain's reward center—matures during the adolescent years, the prefrontal cortex—responsible for executive functions that underpin decision-making—fully develops in the early to midtwenties. Although normal, the phased development of these two systems creates an imbalance for adolescents, making them neurologically wired to seek rewards at a time when they are relatively undeterred by risk and consequence. For adolescents in particular, drug use hijacks the natural neurological reward system, delivering large unnatural (and unhealthy) rewards.

Furthermore, the immaturity of the prefrontal cortex during this developmental period leaves the brain more vulnerable to developing the neurological disorder of addiction. Physiological vulnerability is aggravated by environmental factors, including the availability, promotion, and modeling of substance use behaviors; taken together, these factors may in large part explain why alcohol and marijuana use are so common during adolescence. This neurological and environmental landscape of risk provides a context for understanding the especially serious threat that the opioid epidemic poses to this nation's youths.

ALCOHOL AND MARIJUANA USE

Facing Addiction explains that the increase in prescribing opioid pain relievers has driven the opioid crisis. Solutions to the crisis include changing prescribing practices, delivering evidence-based treatment, and using harm reduction strategies. However, the report misses a key piece of the puzzle: the role that early initiation of substance use, particularly alcohol and marijuana use, plays in priming adolescents and adolescent brains to addiction, including to opiates.

As physicians and scientists who, respectively, treat adolescents with opioid use disorders and study substance use in this age group, we recognize that opioid addiction does not appear out of nowhere. Nearly all adolescents with an opioid use disorder—whether they use prescription pain medications, heroin, or both—have transitioned to opioid use from substantial use of marijuana and alcohol. Although research on this subject is limited, studies conducted to date build on the widely accepted gateway hypothesis and show that alcohol and marijuana play an important, if incompletely understood, role in the development of opioid addiction.

For instance, research has found that youths who use alcohol are more likely to misuse opioids.[2] Adolescents and young adults who use marijuana are approximately two and a half times more likely to subsequently use opioids[3] or misuse prescription opioids[2] and five times more likely to develop an opioid use disorder.[3] Alcohol and marijuana use affect brain morphology and function in a manner that fuels future drug use, as revealed by magnetic resonance imaging. For example, adolescents with alcohol use disorders have abnormal prefrontal cortex volumes,[4] which predisposes them to opioid and other substance use disorders.[5] Nearly two thirds of adolescents have used alcohol and almost half have used marijuana by the end of high school.[6] Because of these high rates, preventing adolescent alcohol and marijuana use could be one of the most efficacious strategies for combating the opioid epidemic.

Research in adult populations also highlights the role other substances, including alcohol and marijuana, play in opioid misuse, addiction, and overdose. For example, among patients being treated for chronic pain with opioids, those who had a history of alcohol use disorder were 2.6 times more likely to misuse their opioid pain killers.[7] Overprescribing opioid pain killers is one of the culprits behind the opioid epidemic, but research is increasingly demonstrating that it is not the only factor: use of alcohol and other drugs seems to prime the brain for these problems. As opioid use disorders are chronic, are challenging to treat, and cause great mortality, a thorough examination of these issues is necessary, and prevention must be a central component of a long-term solution.

EARLY SUBSTANCE USE INITIATION

The ambitious intention of *Facing Addiction* to foster better understanding of substance use disorders by presenting them through a comprehensive, public health lens is laudable. However, in its discussion of the opioid crisis, the report begins in the middle of the story. Opioid addiction does not spring forth de novo. An examination of its antecedents (including alcohol and marijuana use) and a focus on modifiable risk factors

(including easy access to and promotion of substances that can lead to early substance use initiation and, for some, addiction) are crucial to a holistic understanding of and response to the opioid crisis, especially considering the recent increase in the opioid overdose death rate for adolescents.

We hope that the report marks the first step of a national effort to overcome addiction and that the new surgeon general prioritizes this effort. We wish to see a future report build on this work to describe factors that affect the progression of psychoactive substance use from initiation to disorder. A more thorough understanding of the interplay between neurobiology and environmental factors is a necessary foundation for defining effective prevention and intervention strategies. We hope that, as with *Smoking and Health*, the work in *Facing Addiction* will culminate in recommendations for action that tackle some contentious issues—including marijuana and alcohol policy—to guide the nation toward rational and health-protecting policy. AJPH

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