ry. There is still room for improvement in the speed and completeness of reporting of results, but the legislation and subsequent rulemaking have made ClinicalTrials.gov an increasingly useful resource[5] and have limited the ability of sponsors to suppress negative studies or data on adverse effects of approved drugs.

Finally, the FDA has made use of its authority to require REMS to try to mitigate the risks associated with the use of several drugs. Whereas some of these programs have helped promote safer prescribing, others have been less beneficial. For example, REMS programs covering the use of extended-release and long-acting opioids often focus on how to use these products more than on how to avoid prescribing them, and company-run REMS for other opioids appear to have expanded rather than contained their use. REMS programs themselves have also been patented by brand-name drug makers in order to limit the entry of generic products into the marketplace — an outcome that could hardly have been predicted when the FDAAA was drafted.

An audio interview with Dr. Avorn is available at NEJM.org

With more than a decade of experience accumulated, it is clear that the FDAAA introduced important improvements in the FDA's capacity to track medication effects and mitigate risk. These features will also provide a means of assessing the effects of more recent efforts to accelerate drug approval and employ a wider range of evidence to demonstrate efficacy — part of the routine ebb of regulation once a crisis has faded. The FDAAA will continue to serve as an important reminder of the lasting power that health-related legislation can have when enacted and enforced intelligently.

Disclosure forms provided by the authors are available at NEJM.org.

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Adolescents' Use of "Pod Mod" E-Cigarettes — Urgent Concerns

Jessica L. Barrington-Trimis, Ph.D., and Adam M. Leventhal, Ph.D.

Adolescents' use of electronic cigarettes initially took the public health community by surprise. In 2011, less than 2% of U.S. high school students reported having used e-cigarettes in the previous month. But by 2015, the percentage had jumped to 16%. The following year, the U.S. Surgeon General issued a report concluding that e-cigarette use among young people was "a public health concern." Ensuing public education campaigns and policies helped bring the prevalence of past-month e-cigarette use among U.S. high school students down to 11% in 2016.[1]

A recent evolution in technology and marketing may threaten this progress. A new product class called "pod mods" — small, rechargeable devices that aerosolize liquid solutions containing nicotine, flavoring, and other contents encapsulated in cartridges (see graphic) — appears to be gaining traction. Media stories about Juul, a popular pod mod brand, highlight anecdotal reports from students, parents, teachers, and school superintendents indicating that use of these products is rampant among young people. According to Nielsen data, as of January 27, 2018, Juul had captured 49.6% of the e-cigarette market.[2] There is reason to be concerned that adolescents' use of pod mods is not a passing trend and could bring a host of adverse health consequences to the current generation of adolescents and young adults.

Pod mods may deliver high levels of nicotine with few of the deterrents that are inherent in other tobacco products. Traditional e-cigarette products use solutions with free-base nicotine formulations in which stronger nicotine concentrations can cause aversive user experiences. Juul and other pod mods use protonated

Juul Pod Mod.
A Juul's pod cartridge resembles a USB drive.

nicotine formulations derived from the nicotine salts in loose-leaf tobacco. According to their advertisements, nicotine salt solutions contain nicotine concentrations 2 to 10 times those found in most free-base-nicotine e-cigarette products. Juul's website indicates that there is 0.7 ml of nicotine per pod (concentration, 59 mg per milliliter [5%]) — equivalent to approximately 20 combustible cigarettes. According to a patent application, the combination of salt-based nicotine and other additives results in a satisfying experience even at high nicotine concentrations.[3]

This innovation in nicotine chemistry may be critical with regard to the addictiveness of pod mods. Combustible cigarettes deliver high doses of nicotine as well, but the noxious taste and sensations of the initial smoking experience discourage some young people from continuing to smoke. Pod mods may deliver an addictive dose of nicotine without an aversive user experience or other tobacco-related deterrents — which may be one reason why 80% of 15-to-24-year-olds who try Juul continue using the product[4] and why social media posts saying "addicted to my Juul" are common.[2]

Pod mods are easy to conceal from authority figures. As compared with many e-cigarette devices, they generally need less electrical power to deliver high doses of nicotine and so are compact. Juul vaporizers measure 9.4 cm by 1.5 cm by 0.8 cm and weigh only 0.01 kg. They are inconspicuous, closely resembling computer USB drives. Young people can therefore readily conceal them, and teen use of pod mods on school grounds, including use during class time, is reportedly widespread (see image).[2]

Furthermore, pod mods may appeal to a wide audience. They have a sleek, modern design, and their packaging resembles that of a smartphone. Customizable adhesive covers for Juul (like mobile-phone cases) are marketed as "skins" — the same term used for the visual personae that video-game players can select to represent their gaming characters. Juuls are available in attractive-sounding flavors, including "creme," "fruit medley," "mango," and "cool mint," and are easy to use. Many e-cigarette devices require purchase of solutions from independent manufacturers, manual refilling, and user calibration. With most pod mods, consumers merely open their starter kit package, slide a flavor pod into the device, and start vaping.

Although there may be far less diversity and quantity of toxins in e-cigarette aerosol than in combustible cigarette smoke, e-cigarettes are not without risks. Their aerosol can include metals, volatile organic compounds, and flavoring additives, which may be harmful when inhaled, particularly to adolescent users, who in fact are more likely than nonusers to report having respiratory symptoms.[1]

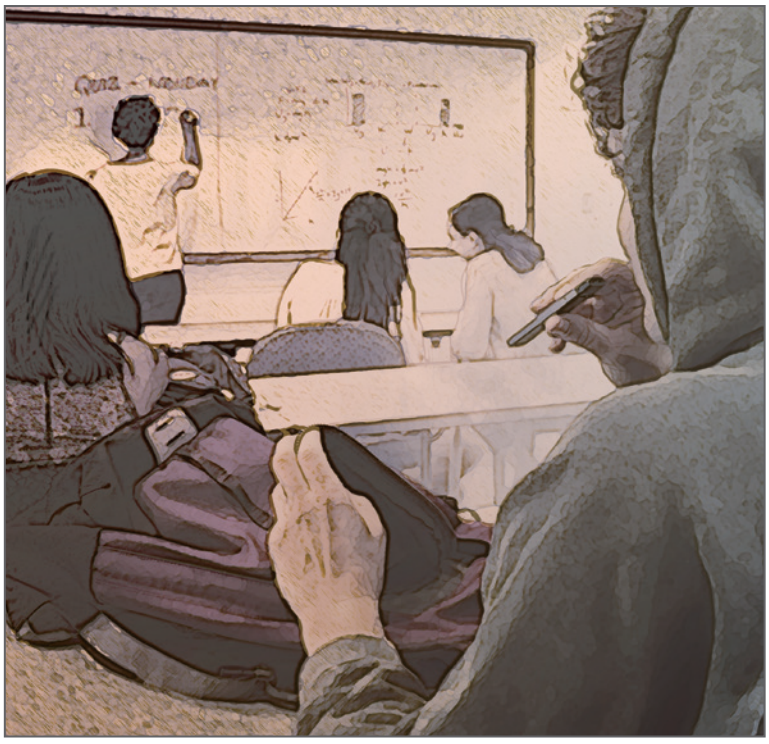
Moreover, nicotine adversely affects the developing brain and causes addiction. Adolescent exposure to nicotine is associated with an increased risk of mood and attention problems.[1] Nicotine is the principal constituent responsible for the substantial addictiveness of tobacco products. Symptoms of nicotine addiction, such as drug withdrawal and forfeiture of social, occupational, or recreational activities in favor of nicotine use, cause substantial distress and impairment. Given the high nicotine concentrations in pod mods, the nicotine-related health consequences of use by young people could be worse than those from most e-cigarette products. Yet 63% of 15-to-24-year-olds surveyed did not know that

nicotine is present in all Juul products.[4]

E-cigarette use may increase the risk for combustible-cigarette smoking. A consensus report of the National Academies of Sciences, Engineering, and Medicine concluded that adolescents and young adults who use e-cigarettes are more likely than nonusers to start smoking combustible cigarettes, and it cited evidence that higher nicotine concentrations may heighten the risk of such a transition.[1] It's important to study how and to what extent the increased popularity of pod mods among adolescents affects the prevalence of combustible-tobacco use among young people.

Since many pod mods are virtually indistinguishable from USB drives, some schools have banned all USB drives from their grounds. School districts have launched parent- and teacher-education programs to inform adults about pod mods and how to determine whether their children or students are using them. We believe that schools should emphasize zero-tolerance policies for the possession of any tobacco products on school grounds. There are several school-based educational programs focused on prevention and cessation of tobacco use that are considered promising by the Substance Abuse and Mental Health Services Administration's National Registry of Evidence-Based Programs and Practices and by other agencies. Such programs may provide a useful launching point for the development of evidence-based interventions addressing pod mod use by adolescents.

On April 18, 2018, six public health organizations urged the Food and Drug Administration (FDA) — the federal agency charged with regulating e-cigarettes — to take action to prevent "Juul-ing" by young people.[5] The group urged the FDA to act to suspend Internet sales of Juul until stronger regulations can be implemented to prevent online purchases by young people and to increase enforcement of restrictions against e-cigarette sales to minors in brick-and-mortar stores. It also encouraged the FDA to advance the deadline (currently set for 2022) for determinations of whether existing e-cigarette products may remain on the market. A coalition of 11 U.S. senators also recently wrote to the FDA with similar concerns and called for the prohibition of sales of e-cigarettes in "kid-friendly" flavors.



Pod Mod Use in a Classroom.

The FDA has begun to take action. On April 24, 2018, the agency announced recently initiated, nationwide, undercover operations to identify and intervene with retailers that sell e-cigarettes to minors, restrictions against third-party resale of Juuls on the popular shopping website eBay, and detailed requests for information from the manufacturer of Juul to aid FDA efforts to prevent Juul-ing by young people. Comprehensive actions are urgently needed to counteract adolescents' use of pod mods and other e-cigarettes. In the meantime, we advise physicians and parents to remain on alert regarding this emerging public health concern.

Disclosure forms provided by the authors are available at NEJM.org.

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The CMS Proposal to Reform Office-Visit Payments

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The Medicare payment policy for evaluation and management services — the most commonly billed type of physician services in the United States — has long attracted scrutiny. Tasked with rewarding cognitive work by physicians that is commensurate with patients' needs while minimizing the potential for fraud, Medicare pays for office visits using five levels of codes based on clinical complexity, medical decision-making complexity, and time. For visits with established patients, physicians are currently paid $22, $45, $74, $109, and $148 for levels 1, 2, 3, 4, and 5 visits, respectively; for new patients, they receive $45, $76, $110, $167, and $172. This pricing structure in the Medicare Physician Fee Schedule, established by Congress in 1989, is the basis for physician payment by both public and private payers.

In July 2018, the Centers for Medicare and Medicaid Services (CMS) proposed revamping Medicare payments for office visits. CMS plans to collapse Medicare fees for levels 2 through 5 office visits into a single price beginning in 2019.[1] For visits with established patients, physicians would be paid $93; for new patients, $135. There would be an add-on payment of about $5 for visits with primary care providers, and a $9 add-on payment for visits with certain specialists. A separate add-on fee of about $67 would be available for a 30-minute prolonged visit. Simultaneously, CMS would reduce the documentation requirements for this uniform fee to those of a current level 2 visit — brief history, single-system physical examination, minimal decision making, or 10 minutes of physician time. In addition, physicians would be allowed to update only what has changed, carrying over remaining documentation from prior notes. A visit code between levels 2 and 5 would still have to be chosen, but it would not affect payment.

This policy embodies the CMS commitment to reducing administrative burden — a key goal of its "Patients Over Paperwork" initiative. It attempts to address widespread concerns that documentation requirements contribute to physician burnout and distract from patient care.[2] In addition, CMS would create payments for telehealth services, non–face-to-face check-ins, and assessments of patient-submitted photos and videos.

Despite the admirable intention of reducing burden, the policy poses risks for Medicare beneficiaries with the most complex needs and may exacerbate workforce deficiencies. Collapsing fees for levels 2 to 5 office visits, which account for essentially all physician visits billed to Medicare, effectively removes physicians' incentive to spend time with patients who have complex needs. The physician effort required for a level 2 visit is minimal. In contrast, working with patients who have multiple coexisting conditions, psychosocial challenges, and language or other barriers requires additional effort that would no longer result in a larger payment. The incentive to conduct shorter, repeated visits would be heightened.

Physicians who disproportionately care for patients with complex needs would face a fee cut for levels 4 and 5 visits, despite the add-on payment. Physicians in nonprocedural specialties whose revenue derives largely from these visits (see graph) could find this cut untenable. To maintain their income, they would need to reduce visit time and bring patients back more often for shorter visits, potentially compounding patients' burden and increasing care fragmentation. Concretely, the $67 that would be added to a physician's reimbursement for a 30-minute prolonged visit pales in comparison to the $279 ($93 per visit) he or she could earn by using that time to conduct three level 2 visits. Such pressure to churn patients could prove antithetical to the goal of burden reduction for some specialties and consequently exacerbate physician burnout. Conversely, specialties whose visits are disproportionately level 2 or 3 would receive relative payment increases. But insofar as CMS aims to reduce