

AMERICAN CHRONICLES

# THE PROMISE OF VAPING AND THE RISE OF JUUL

*Teens have taken a technology that was supposed to help grownups stop smoking and invented a new kind of bad habit, molded in their own image.*

**By Jia Tolentino**

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If I get addicted to vaping, I thought, in March, I will always remember this Texas strip mall. I was walking out of a store called Smoke-N-Chill Novelties, in Southwest Austin, holding a receipt for \$62.95 and two crisp, white shrink-wrapped boxes. I got into the driver's seat of a rental car and began to open them. From one I extracted a Juul: a slim black vaporizer about half the width and weight of a Bic lighter, with rounded edges and a gently burnished finish. (It looks like a flash drive, everyone always points out. You can recharge it by plugging it into your computer.) From the other I extracted a thumbnail-size cartridge called a pod, filled with juice containing a cigarette pack's worth of nicotine. The juice in my pod was cucumber-flavored. This was an odd choice, I was later told; of Juul's eight flavors, people tend to prefer mango, or mint. I inserted the pod into the Juul, and a little light on the device glowed green. I took a sharp experimental inhalation and nearly jumped. It felt as if a tiny ghost had rushed out of the vaporizer and slapped me on the back of my throat.

I took another hit, and another. Each one was a white spike of nothing: a pop, a flavored coolness, as if the idea of a cucumber had just vanished inside my mouth. As I pulled out of the parking lot, my scalp tingled. To Juul (the brand has become a verb) is to inhale nicotine free from the seductively disgusting accoutrements of a cigarette: the tar, the carbon monoxide, the garbage mouth, the smell. It's an uncanny simulacrum of smoking. An analyst at Wells Fargo projects that this year the American vaporizer market will grow to five and a half billion dollars, an

increase of more than twenty-five per cent from 2017. In the latest data, sixty per cent of that market belongs to Juul.

That's just a fraction of what old-fashioned smoking brings in—the U.S. cigarette market is worth a hundred and twenty billion dollars. But it's a fast rise after a long wait: inventors have been attempting to develop a successful electronic cigarette since the nineteen-sixties. Traditional cigarettes pair nicotine—which, contrary to common belief, does not cause cancer—with an arsenal of carcinogenic substances. As the harm-reduction pioneer Michael Russell said, in 1976, “People smoke for the nicotine, but they die from the tar.” And so people keep looking for healthier ways to deliver a fix. Philip Morris and R. J. Reynolds have reportedly invested billions in creating so-called heat-not-burn products, which generate smoke from tobacco at lower temperatures than cigarettes do—but early versions of these, released in the eighties, flopped. More recent efforts are still awaiting F.D.A. review.

In 2003, a Chinese pharmacist named Hon Lik patented the first version of today's standard e-cigarette: a device that vaporizes liquid nicotine through a heating element. (Imagine a handheld humidifier that's hot and full of nicotine.) The following year, two product-design grad students at Stanford, Adam Bowen and James Monsees, decided that they could disrupt Big Tobacco: they created a startup called Ploom, which launched formally, in San Francisco, three years later. In 2012, they came out with the Pax, a vaporizer that resembled, as *Inc.* put it, “a stubby iPhone.” You could load it with weed as well as with loose-leaf tobacco. (They later sold the Ploom brand and one of their vaporizer lines to a Japanese outfit and became Pax Labs.)

Soon afterward, they began work on the Juul, choosing a name that evoked both a precious stone and the amount of energy required to produce one watt of power for one second. The Juul, they decided, would be a nicotine-only device, squarely targeted at the roughly one billion cigarette smokers in the world. (Both Bowen and Monsees are former smokers who switched to vaping with their own early

prototypes.) The e-cigarette market was growing, and becoming less independent: a brand called blu, founded in 2009, was acquired by the Lorillard Tobacco Company, in 2012; R. J. Reynolds launched Vuse in 2013. (Reynolds subsequently bought Lorillard and sold blu to the British multinational Imperial Brands.) But the more advanced vapes were either unattractively large or required users to monitor finicky temperature settings, coils, and wicks. Bowen and Monsees gave each Juul its own circuit board and firmware, removing the need for technical know-how and insuring better control, and managed to fit it all into a small device. After a series of focus groups with longtime smokers, they developed a flavor strategy: a tobacco profile, a mint profile, a fruit profile, a dessert profile. For the design, they avoided the roundness of a cigarette, and the glowing tip, because they wanted people who used the Juul to feel as if they were doing something new.

Their biggest breakthrough was chemical. Since the sixties, cigarette companies, starting with Philip Morris, have freebased nicotine using ammonia, which liberates the nicotine so that it can be speedily absorbed into the lungs and the brain. As one addiction expert has said, “The modern cigarette does to nicotine what crack does to cocaine.” Pax Labs discovered that by adding benzoic acid to nicotine salts, which occur naturally in tobacco, they could mimic a cigarette’s rapid nicotine delivery.

Nicotine is both a stimulant and a relaxant: it peps you up when you’re tired, and if you’re anxious it calms you down. Historically, people have smoked tobacco as soon as they come into contact with it—Native Americans took it up thousands of years ago, the English got started in the sixteenth century—with anti-tobacco campaigns often following closely behind. King James I’s 1604 treatise “A Counterblaste to Tobacco” called tobacco a “filthie noveltie” that was “hatefull to the Nose” and “harmefull to the braine.”

He wasn’t wrong: the nicotine in tobacco binds to receptors in multiple regions of the brain, raising dopamine levels and mimicking a key neurotransmitter that affects focus and arousal. This is so pleasing—and life so arduous—that nearly

forty million Americans currently smoke, despite knowing that it may give them lung cancer. (Before the cigarette-rolling machine was invented, in the late nineteenth century, lung cancer was a rare disease.) The younger the brain, the more easily its reward circuits can be manipulated: the vast majority of adult smokers began before age eighteen.

This is at least partly why parents are freaking out about the Juul, which has become a ubiquitous presence at high schools in America's more affluent Zip Codes—precisely those places where, in recent decades, smoking has declined the most. (The vaporizers retail for \$34.99, and a four-pack of pods costs \$15.99. In February, at a press conference after the Parkland shooting, a student said that he no longer thought of Marjory Stoneman Douglas as “just a school of entitled children and those who Juul.”) Each week brings dozens of local news stories sounding the same alarm: innocent, vulnerable, sneaky American teen-agers are getting hooked. High schools are holding informational sessions about vaping, sending letters home to parents, investing in vape detectors. One school district in Pennsylvania banned flash drives. “We are seeing the vaping and the ‘Juuling’ across the board,” a substance-abuse counsellor in Arlington, Virginia, told a local radio station, surmising that vapes might contain “cocaine liquid.” (It is possible, though difficult, to crack open a Juul pod and fill it with your own liquid. This would be a complicated and perhaps unprecedented way to do cocaine.) An assistant principal in North Dakota warned the *Grand Forks Herald* about the dangers of e-cigarette liquid, which he had inadvertently touched after confiscating a bottle that he found in a student's backpack. Soon afterward, he began to feel nauseated and “real emotional,” he said.

As fears about youth Juuling have intensified, calls for a government crackdown have increased. The F.D.A. did not regulate e-cigarettes as tobacco products until 2016. (Previously, it attempted to regulate them as “drug-delivery devices,” but that approach was struck down in court.) Now e-cigarette companies must submit a premarket tobacco application, or P.M.T.A., in order to keep their products on

the market. (The process is complex and expensive, and will probably put smaller independent vape companies out of business.) The deadline for this application was planned for this year, then pushed back to 2022. In March, the American Heart Association, the American Lung Association, and several other groups sued the F.D.A., arguing that the delay needlessly exposes consumers to “lethal and addictive” substances. In April, eleven senators, including Chuck Schumer and Elizabeth Warren, sent an open letter to Juul Labs—which was spun off from Pax last June—asserting that Juul’s products are “putting an entire new generation of children at risk of nicotine addiction and other health consequences.”

Cigarette smoking is still the No. 1 cause of preventable death in this country, killing nearly five hundred thousand people each year. (According to some studies, more than half of longtime smokers will die from smoking-related complications.) It’s incredibly hard to stop smoking; people spend lifetimes trying. Around seventy per cent of American smokers say that they want to quit, and for many of them e-cigarettes have been a godsend. But, according to a 2017 study by the C.D.C., about fifty per cent more high schoolers and middle schoolers vape than smoke. Young people have taken a technology that was supposed to help grownups stop smoking and invented a new kind of bad habit, one that they have molded in their own image. The potential public-health benefit of the e-cigarette is being eclipsed by the unsettling prospect of a generation of children who may really love to vape.

If you’re over forty, your idea of smoking was likely shaped by Madison Avenue and Hollywood: the strong-jawed cowboy lighting a Marlboro, Lauren Bacall asking for a match. Juul has been defined by Instagram and Snapchat. The company’s official Instagram account, @juulvapor, is age-appropriate and fairly boring—it has an aesthetic reminiscent of *Real Simple*, and forty-four thousand followers. But viral, teen-centric Juul fan accounts like @doit4juul (a hundred and ten thousand followers) are populated with a different sort of imagery: a bodybuilder Juuling in a tank top that says “Real Men Eat Ass”; a baby (labelled

“me”) being shoved into a birthday cake (“the Juul”) by her mom (“my nicotine addiction”); a topless college student who has a Juul in her mouth and is wearing a pink hat that says “Daddy.” Teen Juul iconography radiates a dirtbag silliness. Vapes are meme-ready, funny in a way that cigarettes never were: the black-and-white photograph of James Dean smoking in shirtsleeves has been replaced with paparazzi snaps of Ben Affleck ripping an e-cig in his car. In one popular video, a girl tries to Juul with four corn dogs in her mouth. In another, teens at a party suck on a flash drive that they’ve mistaken for a Juul. “I know one of the girls in that video!” a high-school senior from Maryland told me. “It was a *huge* deal at my school.”

Juuling and scrolling through Instagram offer strikingly similar forms of contemporary pleasure. Both provide stimulus when you’re tired and fidgety, and both tend to become mindless tics that fit neatly into rapidly diminishing amounts of free time. (You can take two Juul hits and double-tap a bunch of pics in about ten seconds. You need an inefficient five minutes to burn a paper tube of tar and leaves into ash.) The omnipresence of Juul on social media has undoubtedly made kids overestimate the extent of teen Juuling—young people tend to think that their peers drink, smoke, and hook up more than they actually do. And it’s all beyond regulation: the F.D.A. can control the behavior of companies advertising nicotine for profit, but it can do nothing about teens advertising nicotine to one another for free.

A high-school sophomore named Kate, from Houston, told me that the Juulers she knows have their own cars to vape in and cash to spare. You have to be twenty-one to shop at Juul’s online store, and the company requires a match between public records, credit-card information, and government I.D. (The site turns more than a quarter of would-be purchasers away, inadvertently filtering out many adults who have recently moved.) But kids can buy Juuls in bulk on eBay and Alibaba with prepaid debit cards and a little creativity. Juul has a team devoted to taking down such listings, but the company says that it’s like “playing Whac-a-

Mole.” “And if you deal Juul you can make a *lot* of money,” Kate said. She described multiple levels and types of Juul dealers at her school: some sold pods, some sold devices, some would do bootleg refills if you wanted a different flavor or THC oil instead. (The resale markup is partly what makes Juuling an expensive habit for teens. Juul is not subject to cigarette taxes, though, so in places where they’re high—New York, New England, Chicago—Juuling can otherwise be cheaper than smoking.)

I talked to a sixteen-year-old girl in Westchester County, whom I’ll call Leslie, to keep her from narking on her classmates. Juuls caught on at her school last summer, she said. Upperclassmen bought them, underclassmen tried them at parties, and suddenly people were Juuling in the cafeteria, charging Juuls on their laptops, and filling their Instagram and Snapchat feeds with Juuling videos and GIFs. “Dealers will announce on Snapchat that they’ve bought a hundred of them, and they’ll write the price, the date, and the meeting place for kids to show up with cash,” Leslie said. She described her classmates Juuling in locker rooms, and on the trail behind the school—where people also drink and smoke weed—and in the quad, if they’re ballsy. “But the biggest spots are the bathrooms,” she said. “There are so many people Juuling sometimes that all the varieties of flavors just get morphed into one big vape. Some days I’m just, like, why do you need to do this at 11 A.M.?”

The high-school students I talked to took a level of ambient stress for granted, as if it were like the iPhone—a non-negotiable condition of everyday life. Did people Juul because they were anxious? Of course, they said, as though I’d asked whether they ate when they were hungry. Leslie had also noticed “a weird paradox,” she



said. “You’re expected to Juul, but you’re expected to not depend on it. If you’re cool, then you Juul with other people, and you post about it, so everyone will see that you’re social and ironic and funny. But, if you’re addicted, you go off by yourself and Juul because you need it, and everyone knows.” Like all the teen-agers I talked to, she thought of the Juul as something made for people like her. “I’m always surprised when I see an adult with a Juul,” she said. “It’s sort of like seeing my grandma with an Alexa.”

“Let’s be clear,” Jonathan Winickoff, the former chair of the American Academy of Pediatrics Tobacco Consortium, which is trying to end youth smoking, told me in March. “Juul is already a massive public-health disaster—and without dramatic action it’s going to get much, much, much worse.”

Winickoff is a pediatrician at Massachusetts General Hospital and a professor at Harvard Medical School. A few weeks after we spoke, the American Academy of Pediatrics joined the American Lung Association and others in their lawsuit against the F.D.A. “If you were to design your ideal nicotine-delivery device to addict large numbers of United States kids, you’d invent Juul,” Winickoff said. “It’s absolutely unconscionable. The earlier these companies introduce the product to the developing brain, the better the chance they have a lifelong user.”

Winickoff believes that the vape industry is co-opting the national wellness trend —“when, in fact, vaping can cause something called bronchiolitis obliterans, or popcorn lung,” he said. Popcorn lung has been linked to diacetyl, an organic compound that some companies use in their e-liquid, and that has been detected as a by-product of e-cigarette vapor. But diacetyl has also been detected in cigarette smoke, at a level hundreds of times greater, and no feasible amount of smoking has been found to cause popcorn lung. (Juul does not use diacetyl in its liquid, and, in tests, the company has found no measurable amounts of diacetyl in the vapor emitted by its devices.)

Winickoff is passionate on the subject, and he grew more fervent as we spoke. At one point, he likened e-cigarettes to “bioterrorism.” He predicted that, eventually, a state’s attorney general would sue Juul “for willfully designing and pushing a product that will cause harm to the children of the United States.” He added, “It’s extremely hard, once someone is addicted to nicotine, to get them off it. As a clinician, you know that their brain has changed, that it will always be nicotine-hungry. You feel that you have lost that child.”

But e-cigarettes are definitively safer than cigarettes, aren’t they? There are typically around six hundred ingredients in cigarettes. Juul’s e-cigarette liquid contains only five: glycerol, propylene glycol, nicotine, benzoic acid, and food-grade flavoring. Glycerol is a sweet liquid that has been used in antifreeze, giving rise to the urban legend that e-cigarettes contain antifreeze. But it is also used in toothpaste. Propylene glycol is used in asthma nebulizers. Benzoic acid is a common food preservative.

“If you compare the Juul to a thing that kills one out of every two users, of course it’s safer,” Winickoff said. “And it’s not just Juul,” he went on. He noted some of the by-products of other e-cigarette vapor, including formaldehyde and trace metals. “There are hundreds of different companies. There’s a significant and growing market for bogus, pirated versions of each product.” Some companies sell cheaper, Juul-compatible pods in flavors like blueberry, watermelon, and “strawberry milk.” Vaping, Winickoff said, was like smoking marijuana: “You don’t know what the drug might be laced with.”

I had been thinking about the weed comparison. Nicotine is far more addictive than THC, and its use pattern is more intrusive: stoners don’t get overpowering physical cravings to hide in airplane bathrooms and hit a bong. But smoking marijuana produces carcinogens—tar, carbon monoxide, ammonia—that vaping nicotine does not, and, as a drug, marijuana has a much more intense psychoactive effect than nicotine. Even so, weed is now legal for recreational use in ten states and in Washington, D.C. In April, Chuck Schumer introduced legislation to

decriminalize marijuana at the federal level. It's possible to imagine a future in which nicotine would be viewed as something akin to marijuana—not necessarily great for you, but not catastrophic, either.

I admitted to Winickoff that I was probably endangering my lungs as a weed smoker. He gamely pointed out that I could look into ingested forms of marijuana, and noted that my brain was in a much more stable place than it had been when I was twenty-one.

“Well, maybe,” I said. “I’ve been Juuling a little for this piece.”

Winickoff gasped. “Jia, you *can’t!*”

Over Easter weekend, I visited my alma mater, the University of Virginia, established by the Founding Father and tobacco farmer Thomas Jefferson. Smoking was still permitted in restaurants when I was an undergrad in Charlottesville, and that was the main reason I started smoking: I waited tables, and it felt good to have a couple of cigarettes when my shift was over, while I was sitting at the bar and having my free beer. (I quit smoking five years after I graduated.) Walking across campus, I noticed that the spots where smokers used to congregate—the sidewalk on the main drag, the benches outside the library—were vacant. I had come to the school to speak on a panel about careers in journalism. When the panel discussion ended, a visiting high-school student introduced herself, and I told her about the story I was working on. “Smoking is gross,” she said. “Juuling is really what’s up.”

Saying the word “Juul” in front of a group of young people with spending money is like dropping an everything bagel into a flock of pigeons in a public park. A sophomore, overhearing our conversation, showed me his Juul: it had “Fuck Off” scratched into one side and “Work Harder” on the other. He was from Colorado, where in the summer, he said, you can drive around Juuling with your windows

down and girls in passing cars will go, “Wooo!! Juul!!” The Juul is the “devil’s stick,” he said. “I hit it from the moment I wake up to the moment I can’t go to sleep, and keep Juuling.” But at least he was better off than his friend, he said, who had spent \$999.46 on pods this year.

While high-school Juuling has prompted local-news horror stories, college Juuling has inspired work in a different genre: the satirical essay. In January, a junior at Cornell named Jason Jeong published a newspaper column called “The Juul Manifesto.” (“A spectre is haunting Cornell—the spectre of the Juul.”) He argued that the Juul represents his generation’s “tech-savvy ingenuity when it comes to making bad decisions.” Over the phone, Jason, who grew up in California, told me that he first tried Juul in 2016. “Someone pulls one out at a party, and naturally the question is ‘Can I try it?’, and then after ‘Can I try it?’ five or six times you end up buying your own, and, soon enough, you’re breathing in more Juul than air.”

At Cornell, Jason told me, people Juuled in bathrooms and classrooms, in “every nook and cranny of this campus.” In the fall, he’d started a group text, with a few friends, to coordinate pod runs. He called the group Juuluminati, and it has since grown to three hundred and twenty-four members. Jason was Juuling while he talked to me, on the third floor of an academic building. “I know for a fact that there are two or three of my good friends sitting on the first floor of this building eating ham sandwiches and just Juuling away,” he said.

Jason believes that the Juul craze is fundamentally ironic. “It’s young people doing something terrible for them that’s supposed to be healthy,” he said. He compared the infatuation with Juul to the millennial love of the restaurateur and TV host Guy Fieri—“this completely bizarre food personality that people call Daddy now”—and observed that his generation was most flippant when it came to serious things, “like health, or mortality.” Jason was mildly wary of his new nicotine habit, as most young Juulers are. There’s a whole genre of throwing-away-my-Juul videos on social media, with people tossing their vape into a river or a snowbank as dramatic music plays.

In Charlottesville, I went to the main library on campus to meet a freshman from Virginia Beach named Katie McCracken, whose contribution to the canon of college Juul-writing was titled “Who Needs a Boyfriend When You Have a Juul?” In high school, she told me, she didn’t smoke or know anyone who did. But at U.V.A. people were Juuling in the dorm lounges, trading Juul hits at parties, repping Juul in their Tinder profiles, Juuling inside bars. “There are bouncers who will sell you a cheap Juul because they just find a ton of them on the ground,” she said. For college kids, drinking and Juuling go together: people who like buzzes tend to mix them.

Katie’s younger brother was a Juuler, she told me—“He does a thing where he Juuls through his nose”—as was her twenty-three-year-old sister, who had switched from cigarettes. (“She sort of looks weird with the Juul, though, because she’s older.”) “I thought Juuls were so dumb when I first saw them,” Katie said. “And then I wrote an article about how Juul is my boyfriend.”

She took out her phone, opened Snapchat, and scrolled through her saved pics and videos: people hitting multiple Juuls simultaneously, her friends in dramatic poses with deadpan expressions and Juuls in their mouths. I burst out laughing at one captioned “100% Headass.” Remembering how I’d sat in that library a decade earlier, sending a text message every few hours, I briefly felt old and sad. It was hard to imagine being in college and swiping through Tinder, watching Instagram Stories, sucking on electronics, getting push alerts about the warming Arctic and the latest Cabinet secretary to be fired. I asked Katie if she thought that Juul relieved her generation’s anxiety or exacerbated it. “I don’t know,” she said. “People definitely stress-Juul. But everything we do is like Tide Pods. Everyone in this generation is semi-ironically, like, We’re ready to die.”

She pulled out her Juul, which was covered in iridescent stickers. Personalization is big among young Juulers; some take a blowtorch to the Juul to turn the finish metallic, or buy “Juul skins” from third-party venders. Juul Wraps, a Florida-based company that sells vinyl vape covers—patterns include the American flag and the

slogan “I Love Boobies”—has been so successful that one of its three young co-founders recently bought himself a McLaren. (“To say we’re surprising our friends and family would be an understatement,” one of the other founders told me.)

“Can I . . . maybe hit it?” I asked Katie.

“Here?” she said.

We looked around conspiratorially. The big library lobby was full of people. We were within view of a café, a computer lab, a reference desk. She handed me the Juul, giggling quietly. I stuck it in the wrist of my sweater, inhaled, and blew out a little cloud of vapor. No one noticed. My mouth felt perky.

“Mint!” Katie said.

Three days later, I flew to California to visit Juul’s headquarters, in San Francisco. The company had recently moved from a cramped space in the Mission to a renovated warehouse in the Dogpatch, a gentrifying industrial neighborhood that was full of construction equipment beeping gently in the rain. Inside, the office was open-plan and airy, with forest-green trim on the windows and cream-colored walls. A glossy chocolate Labrador sat in the lunchroom, accepting ear scratches in front of an impressive array of snacks—RxBars, Boomchickapop, M&M’s, waffle cookies—and four fridges filled with LaCroix seltzer and craft beer. Another dog lounged under the table in one of the conference rooms, which are named for San Francisco landmarks: Ocean Beach, Painted Ladies, Candlestick Park. Everyone looked indeterminately hip and focussed, like figures in an architectural rendering, if such figures occasionally Juuled.

There are now around four hundred Juul employees. The company is hiring so rapidly that about twenty new people show up every week at the all-hands meeting. Many of the new hires come from other tech companies: Tesla, Fitbit,

Facebook. Some are former smokers who have switched to Juuling—one of the office's few pieces of visible Juul paraphernalia is a large locked cabinet with a stack of pods that employees can purchase at a discount. But many of the people who work there have never smoked or Juuled, and were averse to even meeting with the company until they were convinced that Juul presented an opportunity to work on a problem of unrivalled magnitude. Ashley Gould, the company's chief administrative officer, has worked at the genetic-testing company 23andMe and for companies that develop treatments for rare diseases. "I came to feel that I could have greater impact on public health here than at any place I had ever worked before," she told me.

At the moment, company executives are putting in long hours on the P.M.T.A. process, gunning to secure F.D.A. approval. Juul vaporizers and pods are built in clean rooms in Chinese factories, the all-white kind that require you to scrub in, as if for surgery; to eliminate human error, the company designed an enormous machine, the size of three bedrooms, for filling the pods. Each device undergoes multiple rounds of inspection. (The tests include hooking the vaporizer up to a hose that simulates a person inhaling for three full minutes.) The liquid for the pods is shipped in five-gallon batches, each of which, the company told me, is subjected to a blind human taste test for consistency. (The liquid is manufactured in the United States, though no one would tell me where; a spokesperson for the company called this "competitive information.")

Juul's C.E.O., Kevin Burns, who is fifty-four, has a friendly dad-who-loves-his-vacation-house demeanor. He came to Juul from Chobani last October. Burns described Juul to me as a "cigarette-killing company." Before he accepted the job, he said, he convened an informal focus group in his kitchen with his son, who's in high school, and a few of his son's friends. When he asked them about vaping, three kids pulled out their Juuls. He asked them why they had these things, when they got them, how prevalent they were. He realized, he said, that he was looking

at a challenge. “We have frustrations about how the product is glorified on social media,” he told me.

Juul is caught in a very particular dilemma: the more appealing the product is for smokers, the more appealing it’s likely to be for everyone else, including teenagers. At a Manhattan location of Beyond Vape, in March, a sweet-natured clerk named Christ told me that he had smoked two packs a day since he was a teenager and that vapes had saved his life. He showed me a vast array of liquids, and explained the appeal of various flavors for people trying to quit cigarettes. (His favorite: Phillip Rocke Honey Cream.) But Juul is frequently condemned for targeting young people with its sweeter flavors, which are limited to mango, crème brûlée, mixed fruit, and cucumber. The company has refrained from introducing new flavors—though it has prototyped “tons” of them, Adam Bowen said.

Many Juulers I talked to found themselves taking in more nicotine with Juul than they had with cigarettes—going through a pod a day, say, when they were never pack-a-day smokers. A low-nicotine option would help ease their dependency, and the company briefly experimented with lighter formulations. Currently, the pods are five per cent nicotine by weight. “You think, Let’s introduce these three-per-cent pods on our most popular flavor—let’s do it on mango,” Burns said. “But the first thing I’ll get after that is a news story about how I’m lowering the bar for young people to initiate.” Juul eventually decided to release low-nicotine pods in mint and tobacco, which will be out later this year. Internationally, Juul plans to introduce an Android app that allows users to track their nicotine intake. (A Juul team is now exploring the market in Central and Western Europe, and an Asia team is in the works.)



Last year, Juul added a small gray bar to its packaging that reads “The alternative for adult smokers.” The company had considered a bigger, more aggressive statement, but executives were afraid that it would make the product seem edgy, like a parental-advisory warning on a CD cover. (They are also considering dropping the word “cool” from the “cool cucumber” flavor.) In March, Juul filed paperwork to create a political-action committee. In April, the company said that it would spend thirty million dollars to combat underage Juuling, and announced its support for state and federal legislation that would raise the minimum age for tobacco purchases to twenty-one. The company is also developing a “mindfulness curriculum” for high-school students. This will almost certainly be useless, as life in America today is unstable for reasons that go beyond nicotine products. Gould mentioned that the company had thought about producing a P.S.A. “Oh, no,” I said. “Definitely don’t do that. It’ll become a meme.”

On April 24th, the F.D.A. announced that it was conducting a “large-scale, undercover nationwide blitz to crack down on the sale of e-cigarettes—specifically JUUL products—to minors.” Warning letters had been issued to forty retailers: 7-Elevens, vape shops, Circle Ks. A public letter had also been sent to Juul, requesting every internal document pertaining to the company’s marketing strategy, product design, and “health, toxicological, behavioral, and physiologic effects, including appeal or addictive potential for youth.” The agency’s statement mentioned other brands, too, such as KandyPens, whose Instagram account is full of vaguely pornographic soft-focus images of hot girls hitting the vape. On May 1st, the F.D.A. issued thirteen warning letters to companies that sell e-cigarette liquid in packaging that resembles juice boxes or candy.

The F.D.A.’s current director, Scott Gottlieb, is relatively vape-friendly. “We believe that nicotine delivery exists on a continuum of risk,” he told me. The F.D.A. is pushing to lower nicotine levels in cigarettes, which, Gottlieb said, “will prompt smokers to migrate off combustible products, ideally off nicotine

altogether, or onto medicinal products—but, if not that, onto e-cigarettes.” He thinks that it’s possible to market a vape that appeals to adults while vigorously enforcing age restrictions. The vaping blitz is just the “opening salvo” in an ongoing, escalating fight, he said. “We don’t fully understand why Juul has become so popular among youth,” he added. Gottlieb described the document request as “quite extensive,” and told me that if Juul didn’t comply “there are a range of things we can do.”

Last year, Juul approached David Abrams, a professor at N.Y.U.’s College of Global Public Health, for advice on keeping kids away from the company’s products. Abrams is a former director of the Office of Behavioral and Social Sciences Research, at the National Institutes of Health. He advised Juul to work closely with the F.D.A. and to consider supporting Tobacco 21, the campaign to raise the legal smoking age. (Abrams was not compensated by Juul, and he has not received financial support for his research from Juul or from any other vape company, he said.) Abrams believes that Juul is an important public-health innovation, and that the benefits for adult smokers will far outweigh the harm from youth vaping. “Thirteen hundred people die from smoking every day,” he told me. “Imagine three jumbo jets crashing every single day with no survivors. But because this happens slowly and quietly, thirty or forty years after people start smoking, we no longer notice and we no longer care.”

Abrams directed me to a recent study by a Georgetown oncology professor, which concluded that 6.6 million lives would be saved if we switched ten per cent of American smokers to e-cigarettes every year in the next ten years. “Cigarettes were a wolf in sheep’s clothing,” he said. “Now, with vaping, we have a sheep in wolf’s clothing, and we cannot get the wolf out of our minds.”

In 2015, *The New England Journal of Medicine* published a widely cited study in which formaldehyde, a carcinogen, was detected when propylene glycol and glycerol were heated by e-cigarettes operating at high voltage. But that study,

Abrams said, was tantamount to putting a piece of bread in your toaster oven, toasting the bread until it turned black and the smoke detectors went off in your apartment, and saying that toaster ovens produce carcinogens. I asked him whether he thought that a lifetime vaping habit posed any danger. He characterized the habit as a dependency, not as an addiction, because it may not have serious adverse consequences for most people. It would be unwise, he said, for pregnant women and people with heart problems or diabetes. “It changes your heart rate a little bit,” he said. “There’s some vasoconstriction, some possible effects on blood pressure. E-cigarettes are not harmless. But I think long-term use of nicotine, if decoupled from the toxins in cigarette smoke, would probably be much safer than heavy long-term use of alcohol and marijuana.”

Abrams is skeptical of the models that suggest that vaping is a gateway to smoking for young people—he believes that’s a matter of correlation rather than causation. (The young vapers I talked to all found cigarettes disgusting.) When I described the concerns that Winickoff had raised, Abrams said, “The American Academy of Pediatrics is doing its job. They are protecting kids. And we should be protective of kids. But there are adult lives at stake, too.”

Michael Siegel, a preventive-medicine physician, worked in epidemiology at the C.D.C. before joining Boston University’s School of Public Health. He was skeptical of vapes a decade ago, but he has come to believe that they are the singular technology that could put an end to smoking. Cigarette alternatives have to be appealing to catch on, and current F.D.A.-approved replacements—nicotine patches, inhalers, gum—are designed to achieve a bare minimum of satisfaction. E-cigarettes offer something more like the real thing—including, Siegel noted, “the psychological components of smoking: the associations, the ritual behavior, the oral fixation, the tactile aspects.”

Siegel is concerned that the use of nicotine salts could make the Juul more addictive. “With Juul, the pattern of use isn’t kids having a cherry vape every now

and then,” he said. “It’s kids sneaking off to the bathroom, kids vaping consistently throughout the day.” Siegel said that he was keeping an eye on this behavior.

He added, “I’m afraid that we will look back at this moment and see that we had this unbelievable discovery, this technology that had the potential to put the final nail in the coffin in cigarette smoking in this country—and because of this ideology that nicotine itself should be prohibited, that anything that looks like smoking is bad, we will squander this opportunity, and we’ll have gone back to where we were.”

**O**n the first warm Friday in New York this year, I went to an outdoor bar in Brooklyn and found two of my friends balancing their drinks on a planter. One of them, Erin, had always vowed that she’d stop smoking before she was “thirty, dead, or pregnant, whichever comes first.” She had beaten her deadline with the Juul, which may as well be surgically attached to her body.

“I have a present for you,” I said.

We sat down at a picnic table as the blue sky deepened and the lights on the patio started to glow. I took out my Juul and stared at Erin’s hand—she was holding hers like a joystick. “Is that your Juul grip?” I asked.

“It’s my subway Juul grip,” she said, miming how she Juuls on the train: bringing a fist to her mouth, as if to stifle a cough. “Tell me a situation and I’ll show you how I Juul.” She ran through vaping at the movie theatre (blowing vapor down her shirt), vaping in the waiting room at the doctor’s office (tiny sips, tiny exhalations), getting a last vape in before Pilates (one big pull), sneaking a vape at a restaurant if she’s had too much to drink (nodding and talking while trying to swallow the vapor), and vaping on a plane (exhaling into her shoulder). “Only when the plane lands, though,” she said. “My Juul-free time is plane rides and sleeping. And, actually, even with sleeping, since I’m always watching TV in bed—”

“You fall asleep with your Juul under your pillow,” my other friend said.

The patio was crowded and lively, with people cramming in at the ends of long tables. I looked for little white plumes and counted three Juuls. Two people were smoking cigarettes in the corner, and I felt a twinge of longing. I liked cigarettes because they were gross and terrible for me—a way of confronting everyday stresses in a manner that seemed suitably destructive and illogical. The Juul, despite all the teenage Instagram feeds I’ve seen, feels clinical, sensible, virtuous. I didn’t like it—or, at least, I didn’t need it. I took an ostentatious farewell pull, coughed like a twelve-year-old, and, wreathed with cucumber-scented vapor, gave it away. ♦

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*Jia Tolentino is a staff writer at The New Yorker. In 2023, she won a National Magazine Award for Columns and Essays. Her first book, the essay collection “Trick Mirror,” was published in 2019.*

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