

## The High Cost of Vaping in Schools: Destruction on a Generational Scale

### Executive Summary

Few issues have impacted American schools like vaping. Called both a discipline and health crisis, it may be the greatest preventable health crisis we have faced. The real cost of student vaping has yet to be measured. Aside from the headline-grabbing deaths over the last year, and the news that vaping may leave students more susceptible to severe illness from COVID 19 and other viral infections, the cost of creating a generation of nicotine addicts may take a lifetime to properly assess. But the real costs run even deeper.

There is the drain on faculty resources, the drain on teacher resources, the cost of student suspensions and its impact on achievement and graduation rates, the subsequent decline in school ratings and the inevitable decline in property values and tax revenue. Community confidence also takes a hit when anchor institutions like schools continually receive bad press. Lawsuits, which are happening in districts across America, can have a cash cost of a million dollars or more. And corrective staffing for counselors and nurses can be a seven-figure cost on top of all other expenses. Many superintendents privately confess they are at their wit's end.

### Just how deep the problem extends

According to a report released by the Centers for Disease Control and Prevention (CDC) in December 2019, among U.S. Students attending public and private schools, over half of all high school students and a quarter of all middle school students have tried tobacco products including vaping. Approximately one third of high school students and one in eight middle school students are

*"The bottom line is that in the data sets we use, we've never seen use of any substance, and by America's young people, rise this rapidly. This is an unprecedented challenge."*

— Alex Azar  
Health and Human Services Secretary

### *In this Brief*

E-cigarette use among youth, also known as vaping, has reached epidemic proportions. A third of high school students and one in eight middle school students are regular users, often choosing to vape at school. Until now, efforts to eliminate this problem have been costly and ineffectual. However, schools now have a powerful new deterrent to help combat the vaping epidemic.



current or regular users, spending \$1,000 or more per year. And despite on-going efforts from the school community, CDC research indicates the continued positive messaging about e-cigarettes continues to flood the youth market. According to the results from the 2019 National Youth Tobacco Survey (NYTS), "Established factors of use and initiation, including the availability of flavors, exposure to tobacco product marketing, curiosity and susceptibility and misperceptions about harm from tobacco product use remained prevalent in 2019 and continue to promote tobacco product use among youths."

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—Dr. Russell W. Rumberger,  
Professor of Education  
University of California,  
Santa Barbara

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## Suspensions: Making a bad situation worse

What’s perceived by many districts as a behavioral issue has fast become an education interruption issue. Districts are doling out suspensions as punishment and hoping this might be a deterrent for future vapers. States from coast to coast are seeing record numbers of out of school suspensions. Unless a better solution that includes real deterrence can be found, this policy adds another layer to the cost of vaping. According to the US Commission on Civil Rights, “When schools use exclusionary discipline as a way to punish a student, students not only miss valuable instruction time, but they also lose a sense of belonging and engagement in school. Students can begin to feel like they are not valued and lose interest in their education.”

Further data from the Education Commission of the States indicate “Exclusionary discipline — suspensions or expulsions that remove students from the learning environment — can have long-lasting, negative impacts on a student’s trajectory. Research suggests that students who are suspended or expelled suffer academically and are more likely to drop out and be involved in the criminal justice system later in life.”

“Wide-Ranging, Long-Term Negative Impacts Research suggests that students who experience exclusionary discipline — such as suspension or expulsion — are more likely to experience a variety of negative outcomes, including decreased academic performance, increased rates of grade retention and drop out, increased likelihood of future involvement with the criminal justice system and decreased likelihood of economic success as adults. While exclusionary discipline has a direct, negative impact on the student, effects are felt beyond the individual and community levels. Research suggests that high suspension and expulsion rates also have significant long-term impacts on state economies. State-specific studies document net economic losses because of delayed workforce entry caused in part by school suspensions and expulsions.”

In a report entitled “The High Cost of Harsh Discipline and Its Disparate Impact,” released by the UCLA Center for Civil Rights Remedies, it is estimated the total cost of 10th grade suspensions exceed \$35 Billion. “Being suspended increases risk for dropping out of high school. That is a well-established fact,” said Dr. Russell W. Rumberger, co-author of the study and professor of education in the Gevirtz Graduate School of Education at the University of California, Santa Barbara. “People without a high school diploma earn

less, have more health problems, and are more likely to get into trouble with the law. That means less tax revenue and higher health care and criminal justice costs for all of us.”

Using national longitudinal data that tracked a cohort of 10th graders, the researchers estimated that 10th grade school suspensions result in more than 67,000 additional high school dropouts nationally.

Using different data sources, the study also estimated the costs and



effects of school suspensions in California and Florida, reaching remarkably consistent conclusions. According to the study, California 10th grade suspensions resulted in more than 10,000 additional high school dropouts. In Florida 9th grade suspensions increased the number of dropouts by nearly 3,500.

Cumulatively, the total cost of the 67,000 additional dropouts caused by school suspensions nationally exceeds \$35 billion.

### And then there's the health costs

Smoking-related illness in the United States cost more than \$300 billion each year, including almost \$170 billion for direct medical care for adults and more than \$156 billion in lost productivity.

According to the CDC, most e-cigarettes contain nicotine—the addictive drug in regular cigarettes, cigars, and other tobacco products. Despite some labels not disclosing they contain nicotine and others falsely marketed as nicotine-free, a recent CDC study found that 99 percent of the e-cigarettes sold in assessed venues in the United States contained nicotine.

Research indicates that nicotine can harm the developing adolescent brain. The brain keeps developing until about age 25. Further, using nicotine in adolescence can harm the parts of the brain that control attention, learning, mood, and impulse control. Each time a new memory is created, or a new skill is learned, stronger connections – or synapses – are built between brain cells. Young people's brains build synapses faster than adult brains. Nicotine changes the way these synapses are formed.



In addition to the hazards of nicotine to young people, there are many health concerns related to the ancillary ingredients found in e-cigarettes. Some of the ingredients in the aerosol could also be harmful to the lungs in the long-term. For example, some flavorings may be safe to eat but not to inhale because the gut can process more substances than the lungs. Children and adults have been poisoned by swallowing, breathing, or absorbing e-cigarette liquid through their skin or eyes. Nationally, approximately 50 percent of calls to poison control centers for e-cigarettes are for kids 5 years of age or younger.

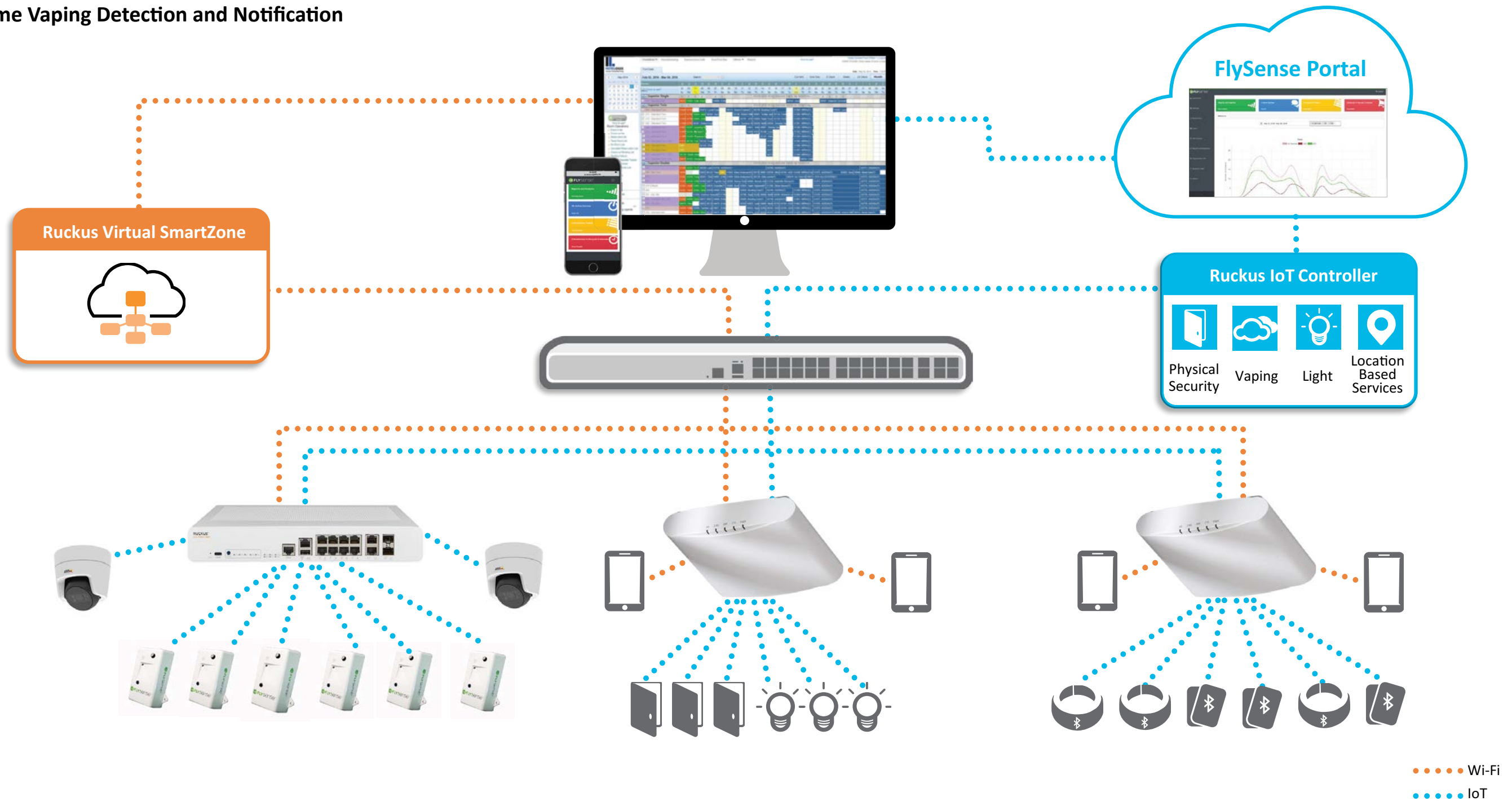
E-cigarette aerosol is NOT harmless water vapor. The aerosol that users breathe from the device and exhale can contain harmful and potentially harmful substances, including: nicotine, ultrafine particles that can be inhaled deep into the lungs, flavorings such as diacetyl, a chemical linked to a serious lung disease, volatile organic compounds, cancer-causing chemicals and heavy metals such as nickel, tin, and lead. The aerosol can be harmful to bystanders as well.

### How schools are combatting the problem

Because of the difficulty detecting vaping activity without the proper detection devices, many schools have taken some very drastic measures. Some schools have removed the doors to bathroom stalls. Other schools are requiring teachers to walk to the bathroom and be present while students are there. The loss in dignity by removing stall doors is



## Real-time Vaping Detection and Notification



creating psychological damage to many students. The loss in teaching time by requiring teacher escorts is enormous and is adding to the already tenuous desirability of the teaching profession. Students are also asked to inform on fellow students, which creates a tense scenario where students fear going to the bathroom because they may be bullied into silence by vapers. Schools want to see what's happening, but CCTV cameras are not allowed in bathrooms or locker rooms. A new answer is called for.

### A better solution: Real-time vaping detection and notification

Schools can now install multi-sensor devices capable of detecting vaping, smoke, and noise disturbances that may suggest violence such as bullying. When these sensors detect vaping signatures or decibel level anomalies caused by bullying, a zero-delay, location-specific alert notification is sent by SMS and or email to designated school officials.

These multi-sensor devices are proving to be a powerful deterrent to on-campus vaping, eliminating vaping activity and sharply reducing the number of suspensions and disciplinary actions. At the same time, these sensors can act as the 'snitch' on vapers rather than students, while deterring bullying behavior, which reduces stress on campus as well. Soter Technologies is the company that created the first and most widely adopted vape and bullying detection and alert system for schools.

The result is a sensor solution routed through an incident management platform that coordinates alerts, messages and notifications through communication and Internet of Things (IoT) devices across and within first responders, school safety and security teams, teachers and staff and the entire education community. With this technology, all incidents of student vaping and bullying detected by the Soter FlySense™ sensor system are immediately reported to school administrators or personnel.



Given the busy nature of a school campus and continually growing number of priorities, it may not always be possible to respond to an alert quickly. Many campuses have numerous bathrooms and locker rooms across multiple buildings, often with more than one floor. Imagine a vaping alert is received by the Principal who is engaged on a call from a parent and the nearest teacher is in the middle of teaching a class, while the school security officer is currently out in the parking lot monitoring visiting guests. Who responds? Thankfully, IoT solutions add efficiency through automation. The RUCKUS IoT Suite, for example, enables inte-

gration of school security camera video with alerts so that schools can remain focused on the critical work of communicating with parents, teaching students, and protecting against security threats without losing the opportunity to return to review the vaping alert at the appropriate time. These video events are also helpful in follow up conversations with students and their parents who may question their involvement.

### **How it works**

When a sensor device detects a trigger event such as vaping or bullying in a school bathroom, the sensor sends a packet over the network, first to the Ruckus IoT Suite - which records a timestamp of the event for the video associated with the camera feed that correlates to the activated sensor – and ultimately to the Soter FlySense portal. This time stamp can be adjusted to automatically start video playback for a brief time before the trigger event, to see who may have entered this area and continue to play back to see who leaves the area after the triggered event. Accessing this specific event video is made simply by clicking the event message. All the work of correlating which camera, at which time, for a specific event is performed automatically by the Ruckus IoT Suite. Now, schools can review these events at any time to see who entered and exited an area before and after any alert. This greatly simplifies what is typically a lengthy process of finding the proverbial needle in a haystack.

Soter FlySense™ version 2.75 supports 5 GHz Wi-Fi and includes an advanced algorithm to identify and detect the dangerous Volatile Organic Compounds (VOCs) that are present when vape devices are used. These advanced algorithms can detect flavored vape, THC Vape and Nicotine Vape. As mentioned, schools may now connect sensors directly into video management systems (VMS). When vaping, fighting or bullying is detected, cameras located near bathrooms can be turn on, aiding in the identification of students involved.

### **Information at your fingertips**

Teachers and administrators have access to device set-up, device adjustments and monitoring, scheduling, and customization of alert notifications through their computer or phone with the mobile app. Real-time sensor data and analytical reports determine

which locations and time of day experience the most activity to help schools align operations and react accordingly. Administrators can use their smartphone to check or adjust their FlySensors™ at any time – from school or home, work or away. They can schedule and receive real-time text and email alerts when the system detects an environmental disturbance.

### Clear choices for your students' future

Given the enormous costs in teacher time, the cost in administrator resources, the academic cost of student suspensions and the health concerns to a significant portion of America's youth, a deterrent ecosystem utilizing the RUCKUS IoT Suite offers a realistic measure to soften the harsh realities of vaping. The RUCKUS IoT Suite simplifies the creation of IoT access networks through the reuse of LAN and WLAN infrastructure, thus shortening deployment duration and reducing the cost to support multiple IoT solutions. Additional Soter FlySense™ sensor costs are modest and create a firewall to the high costs of vaping in schools. With the facts in hand, the choice becomes very clear.

*“Our partnership gives school administrators what they have been asking for – a robust application which offers emergency notification capabilities along with student health and safety alerts combined with complete incident management functionality.”*

**-Derek Peterson,**  
Founder and CEO,  
Soter Technologies.

**Funding Sources**

[Soter Technologies #NoVaping Grant Application](#)  
[CDC-RFA-DP20-2001: National and State Tobacco Control Program](#)  
[Soter Technologies #NoVaping Grant Application](#)  
[CDC-RFA-DP20-2001: National and State Tobacco Control Program](#)  
[CDC-RFA-DP19-1904: Technical Assistance to Increase Tobacco Cessation](#)  
[Public Health Approaches for Ensuring Quitline Capacity](#)  
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