



The Role of Vape Sensors in Prevention Efforts to Address the Epidemic of Student E-Cigarette Use

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The Epidemic of Student E-Cigarette Use

The U.S. Surgeon General declared youth e-cigarette use to be a public health epidemic in 2018.¹ As but one of many examples of how pervasive and damaging the youth e-cigarette epidemic has been to our nation's K12 schools, the 2019 National Youth Tobacco Survey (NYTS) found that 27.5% of high school students (4.11 million) and 10.5% of middle school students (1.24 million) self-reported being current e-cigarette users.² This means that over five million American secondary students were using e-cigarettes at the time the survey was conducted. With alarming numbers of students being rushed to hospitals via ambulance due to overdosing on nicotine, THC oil, opioids and other drugs through e-cigarette devices at school and on school buses, the vaping epidemic has had nothing less than a catastrophic impact on many U.S. K12 schools.

As an example of just how pervasive student e-cigarette use has become, data for the State of Florida showed tobacco/vaping as the most commonly reported incidents in Florida schools in the school year of 2020-2021.³ The data also shows that the number of reported tobacco/vaping incidents was over six times higher than the number of reported fighting incidents. Keeping in mind that while most fights in schools are detected by school officials, e-cigarette violations are more typically often not detected, making this data even more concerning. Of great concern, the data shows that the number of reported tobacco/vaping incidents almost doubled in school year 2021-2022, as shown in the chart below:

¹ https://www.cdc.gov/tobacco/basic_information/e-cigarettes/surgeon-general-advisory/index.html

² Teresa W. Wang et al., "Tobacco Product Use and Associated Factors Among Middle and High School Students — United States, 2019," *Morbidity and Mortality Weekly Report* 68(12), 2019: 1-22, <https://www.cdc.gov/mmwr/volumes/68/ss/pdfs/ss6812a1-H.pdf>

³ <https://www.safeschoolsforalex.org/fl-school-safety-dashboard/>

TOBACCO/VAPING INCIDENTS RISE DRAMATICALLY

Florida schools annual reported incidents | Data from SafeSchoolsforAlex.com via FL DOE



This data for the State of Florida shows that tobacco/vaping incidents have risen dramatically in recent years. Note also that the epidemic of e-cigarette use among youth has resulted in students being able to vape not only nicotine, but also THC oil, opioids, crystal methamphetamines and other drugs in mere seconds without being detected in restrooms, classrooms and other difficult to supervise areas at schools.

Fortunately, unlike entry point weapons screening, a school does not have to make it impossible for a student to use e-cigarettes for a high degree of impact. While a single individual needs to get only one firearm or other weapon into a school to cause mass casualty loss of life, a successful vaping prevention and intervention program only needs to create an environment where students cannot repeatedly and regularly use e-cigarettes to be effective.

The Extent and Impact of Student E-cigarette Use in U.S. K12 Schools

The co-authors were part of team of school safety experts that conducted an extensive assessment of the extent and impact of the problem of student e-cigarette use at secondary schools in five school districts in the U.S. and developed a customized comprehensive prevention and intervention approach for each district. The assessment included a four-hour site visit to each of the 141 secondary schools in the five districts in which the team members, using an assessment tool developed by the co-authors, observed various parts of the school buildings as well as interviewed representative school personnel. The co-authors also developed a district-level strategic assessment tool and conducted interviews with representative district-level personnel from each of the five school districts.

Among many important findings in various areas regarding the extent and impact of student e-cigarette use at secondary schools, the assessment showed that:

1. Student e-cigarette use has created a pervasive and highly negative impact on the safety, learning and social environment at secondary schools in all five school districts.
2. The pervasive and serious problem of student e-cigarette use at secondary schools has consumed a significant amount of the inherent limited resources at each of the five school districts.
3. In spite of significant efforts and resources the districts have expended on the prevention and mitigation of student e-cigarette use, due to the stealthy nature of e-cigarettes and the inability to effectively address the key driving factors of e-cigarette use among students, the current measures in use at all five school districts are inadequate to properly address the problem.
4. In order to properly and effectively prevent and address the problem of students using e-cigarettes on school property, each school district will need a customized comprehensive and multi-disciplinary strategy that includes the use of technology.

As with other pervasive problems with easily concealable contraband in schools such as weapons, there is no single approach that will dramatically reduce student e-cigarette use. However, there are technologies that when used as part of a comprehensive approach have proven to be particularly valuable. In other words, while no one technology can solve the problem of vaping in schools, there are a number of technologies that when used in combination and supported by policies and practices, have proven to be highly effective. Technologies such as electronic hall pass systems, “smart” cameras with analytic software, proximity card access control systems and vape sensors have all been used with success in helping to address student e-cigarette use. This white paper will focus on what we have found to be an important “hub” of these effective technologies – vape sensors.

Vape Sensors

Vape sensors, also referred to as “vape detectors,” are specialized and highly reliable sensor devices which can be used to detect the chemical constituents in e-cigarette aerosol. Vape sensors help address the difficulties school officials have encountered in trying to visually detect e-cigarette use through live, in-person student supervision. Vape sensors can be deployed for areas where it is difficult to supervise students via live personnel and/or in locations where cameras cannot be utilized (such as student restrooms, locker rooms, stage areas, alcoves, stairwells, etc.), and for areas where students can still quickly and surreptitiously use e-cigarettes without being caught even though an adult is present (such as classrooms).

Vape sensors currently available on the market can send a notification to school administrators or other school personnel designated to receive notifications when the sensors detect vaping in a covered area. This feature provides rapid notifications which, if supported by a robust e-hall-pass system and smart cameras with appropriate analytic software and other supportive measures will make it extremely difficult for a student to regularly use e-cigarettes without detection.

To confirm the functionality of vape sensors and to ensure that the devices can be effectively deployed in schools, we met with representatives from three leading vape sensor manufacturers. According to the representatives, as vape sensors are very sensitive to vapor aerosols, the manufacturers have developed features to determine causes of potential false alerts and to adjust individual sensors to maintain a high degree of detection reliability while making false alerts rare. Based on our interviews with school

officials across the nation, the false alerts reported with early models have been significantly reduced. The manufacturers have also added features to prevent device tampering. When combined with appropriate types of camera footage and an e-hall-pass system, rapid identification of students who attempt to damage vape sensors can be relatively easy and reliable. According to the manufacturers, vape sensors have been successfully deployed in thousands of schools in the U.S. and have been widely utilized in many other countries.

We found that to effectively prevent and address student e-cigarette use at schools, vape sensors should be deployed in the indoor areas that are prone to students vaping such as student restrooms, locker rooms, classrooms, stairwells, stage areas, etc. Since currently available vape sensors are less effective in large common areas with considerable air flow, we do not typically recommend installing the devices in areas such as hallways, large common areas (e.g., cafeterias, auditoriums, etc.) and outdoor areas (e.g., walkways, porches, etc.) unless the overall problem would make this appropriate. A practical alternative strategy for these areas is to use a combination of other technologies such as smart cameras with analytic software, periodic use of battery-operated and wireless vape sensors, and structured student supervision. A series of free staff development videos on student supervision techniques that can help school officials better address student e-cigarette use is available at [Student Supervision Videos - Safe Havens International](#).

The biggest drawback we found with vape sensors is cost. The cost for a proper number of vape sensors required to properly and effectively address student e-cigarette use as recommended above is still beyond the available fiscal resources for the majority of school districts we have worked with over the years. With this limitation in mind, we found that vape sensors are an important component of a comprehensive prevention and intervention approach for schools to help reduce the student use of e-cigarettes in K12 schools.

The co-authors work for Safe Havens International, the world's largest non-profit K12 school safety center. The co-authors, Safe Havens and its employees receive no compensation nor have any financial interest in any products mentioned in this paper.