

Virtual reality game is an effective tool for vaping prevention among teens

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Students wear their virtual reality headsets. Credit: play4REAL XR Lab

Yale researchers have developed an immersive, virtual reality video game that helps teens learn about the dangers of e-cigarettes and practice strategies for refusing them.

E-cigarette use among youth is on the rise—they are the most popular smoking product used by middle and [high school students](#) in the U.S. Approximately half of teenagers between 14-18 years old have tried an e-cigarette at least once, while about 10% of teens vape regularly. However, many teens are unaware of the long-lasting effects nicotine can have on a developing brain. Furthermore, 90% of adults who smoke combustible cigarettes started before turning 18, an ominous sign that teenagers now vaping might also vape or smoke well into adulthood.

"When teenagers think of vaping, they think of JUUL," says Veronica Weser, Ph.D., associate research scientist in the play4REAL XR Lab in the Department of Pediatrics and lead researcher. "They don't make the connection to nicotine and the harmful, addictive nature that e-cigarettes actually present."

Armed with five large suitcases filled with 30 [virtual reality headsets](#), the researchers teamed up with three middle schools in Milford, Connecticut. All 285 students enrolled in the study took a pre-test designed to better understand the participants' knowledge and perceptions of various indicators of e-cigarette prevention, including knowledge and harm perceptions of e-cigarettes and nicotine addiction, as well as social perceptions of vaping. In the control group, the students continued with their regular health courses. Meanwhile, students in the experimental group spent up to two hours over two to three sessions playing the researchers' game. The researchers followed the students for six months, conducting assessments of the students' e-cigarette knowledge after three and six months.

The virtual reality game, called Invite Only VR: A Vaping Prevention Game, transports students into a simulated high school world where they are in the ninth grade. Surrounded by a small group of "nerdy" friends, players have a goal of befriending the popular senior in their health class and getting invited to his exclusive party. Along the way, gamers

experience peer pressure from classmates about trying e-cigarettes and learn alongside their virtual friends about the dangers of their use. Through voice recognition technology, the game also prompts students to practice navigating peer pressure situations involving vaping. By encouraging teens to use their own voices in simulated situations, the researchers hoped they would become better prepared to face real world scenarios.

"As the game progresses, you learn more and more strategies to refuse e-cigarettes while still preserving your 'coolness' and dignity as a high school [student](#) so that you can secure this invitation to the party," says Weser. "It's really all about social interactions regarding e-cigarettes."

To assess whether participants retained information from the game, researchers administered another survey immediately after the teens finished playing. They would then repeat the assessment both three and six months later. The researchers found that the teens that played the game increased their knowledge regarding e-cigarettes compared with the [control group](#). They were more likely to have a greater understanding of e-cigarettes, nicotine addiction and the harmfulness of vaping.

There was also a significant change in the experimental group's social perceptions of [e-cigarette](#) use—students in this group were more likely to perceive vaping as less cool. All of these factors are important indicators of prevention of future [e-cigarette use](#). These improvements in knowledge and perception persisted even six months after the teens experienced the virtual reality simulation.



The game's opening screen. Credit: play4REAL XR Lab

Furthermore, participants reported a satisfactory gameplay experience and nearly 80% finished the game. The high satisfaction ratings and low dropout rate indicate that overall students enjoyed the game, which may have contributed to its success.

The researchers published their findings in *Addictive Behaviors*.

"We think these findings are really exciting because two hours playing a video game can affect you six months down the road," says Weser.

Weser says the Milford school district was extremely pleased with the

program, and after the study ended, the researchers gifted 30 virtual reality headsets to each of the participating [middle schools](#). As an incentive for good behavior, students can now earn a VR pass to play the game during their free period.

"We felt it was really important as researchers that we didn't just come in, collect data, and leave," says principal investigator and senior author Kimberly Hieftje, Ph.D., MS, assistant professor of pediatrics and director of the play4REAL XR Lab.

The long-term goal of the game is to keep kids from trying vaping and change the perception that all of their peers are doing it. Middle school is an especially important time to implement this program. Because the percentage of kids who have tried vaping jumps from 5.7% in middle school to 50.1% in high [school](#), the program can provide essential tools to teens before they transition between schools.

"Our goal is to focus on prevention—to get to teens before they become addicted to nicotine," says Hieftje.

The game is now played on the Oculus Go virtual reality headset. Looking forward, the team hopes to adapt the [game](#) to the newer Oculus Quest headset, which offers a greater freedom of movement and could provide a more engaging and immersive experience. The researchers also plan to expand the program to cover marijuana [vaping](#) prevention, another rising concern among teens.

[More information about the play4REAL XR Lab can be found here.](#)

Invite Only VR was made possible through collaboration with PreviewLabs.

Provided by Yale University

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