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E-cigarettes are a gateway to marijuana, too

It's bad enough that e-cigarettes are a strong gateway to cigarette smoking, including stimulating kids who are experimenting with cigarettes to become established smokers, but now there is evidence that, like cigarettes, they are a gateway for marijuana.

Hongying Dai and colleagues used the FDA PATH study to examine the association between e-cigarette (and cigarette) use at baseline with marijuana use one year later among kids who had never used marijuana at baseline. In their paper "Electronic cigarettes and future marijuana use: A longitudinal study" published in *Pediatrics* they find that any e-cigarette use at baseline about doubles the odds of using marijuana a year later.

The effects of smoking cigarettes at baseline is an independent effect with about the same magnitude.

The impact on younger kids was bigger.

We found a similar independent of marijuana use on cigarette smoking initiation in our study of the effects of youth initiating with any non-cigarette product (including e-cigarettes).

Dai and collagues have an interesting comment on what may be causing this effect:

> There are several possible reasons why e-cigarette use might be associated with subsequent marijuana initiation. On the one hand, e-cigarettes may simply be a marker of risk-taking behavior; e-cigarette users are more likely to smoke cigarettes and drink alcohol, which are also associated with marijuana use. Alternatively, because the brain is still developing during the teenage years, nicotine exposure might lead to changes in the central nervous system that predispose teenagers to dependence on other drugs of abuse. Experimenting with e-cigarettes might also increase a youth's curiosity about marijuana, reduce perceived harm of marijuana use, and increase the social access to marijuana from peers and friends. As a result of marketing and social media promotion, vaping cannabis is gaining popularity. Youth who experiment with e-cigarettes may use the same device or switch to newer generation devices for vaping marijuana, which could lead to use of substance with stronger addictive effects.
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> In research on the developmental trajectory of substance use and addiction, the critical role of nicotine initiation at an early age has been highlighted. For instance, smoking at a young age increases the likelihood of becoming an addicted daily smoker. Our study revealed heterogeneity in the associations of e-cigarette use on subsequent marijuana use by age group. The temporal association between baseline e-cigarette use and initiation of marijuana use

was larger among younger adolescents aged 12 to 14 years than among older adolescents aged 15 to 17 years. This finding is consistent with previous cross-sectional studies in which it was indicated that younger high school students were more likely to use e-cigarettes to vape cannabis, and that e-cigarettes may have made inroads among younger users who have low risks of using traditional substances. As youth start to initiate e-cigarettes as early as 7 years old, the interaction between age and subsequent marijuana use underscores the importance of starting prevention efforts on e-cigarette and other substance use at an earlier age because these youth have the most to gain. In addition, we found that youth who reported a larger number of e-cigarettes and/or cartridges used in a lifetime at baseline were more likely to be subsequent marijuana heavy users. Because the regular use of marijuana during adolescence is of particular concern for adverse health effects, we add to the existing literature by identifying the quantity of e-cigarette use as a risk factor for marijuana heavy use. [citations deleted]

When doing population health impact studies of e-cigarettes and e-cigarette regulation it will be important to consider these effects. This study is one more piece of evidence on how tobacco and marijuana policy are intertwined. You can't deal with one without dealing with the other.

Here is the abstract:

BACKGROUND: Cigarettes have been strongly associated with subsequent marijuana use among adolescents, but electronic cigarettes (e-cigarettes) are now rapidly replacing traditional cigarettes among youth. This study examines associations between youth e-cigarette use and subsequent marijuana use in a national sample.

METHODS: Youth (aged 12–17 years) never marijuana users at wave 1 (n = 10364; 2013–2014) from the Population Assessment of Tobacco and Health study were followed-up in 1 year (wave 2, 2014–2015). Multivariable logistic regressions were performed to evaluate associations between e-cigarette use at wave 1 and ever/heavy marijuana use in the past 12 months (P12M) and at wave 2.

RESULTS: Among never marijuana users, e-cigarette ever use (versus never use) at wave 1 was associated with increased likelihood of marijuana P12M use (adjusted odds ratio [aOR] = 1.9; 95% confidence interval [CI]: 1.4–2.5) at wave 2. There was a significant interaction between e-cigarette use and age ($P < .05$) with aOR = 2.7 (95% CI: 1.7–4.3) for adolescents aged 12 to 14 and aOR = 1.6 (95% CI: 1.2–2.3) for adolescents aged 15 to 17. The association with heavy marijuana use was significant among younger adolescents (aOR = 2.5; 95% CI: 1.2–5.3) but was not among older adolescents. Heavier e-cigarette use at wave 1 yielded higher odds of P12M and heavy marijuana use at wave 2 for younger adolescents.

CONCLUSIONS: E-cigarette use predicts subsequent marijuana use among youth, with a stronger associations among young adolescents. Reducing youth access to e-cigarettes may decrease downstream marijuana use.

The full citation is Dai H, Catley D, Richter KP, Goggin K, Ellerbeck EF. Electronic Cigarettes and Future Marijuana Use: A Longitudinal Study. Pediatrics. 2018 Apr 23. pii: e20173787. doi: 10.1542/peds.2017-3787. [Epub ahead of print]. It is available here.

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