ONLINE EXCLUSIVE

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Q/ Does using e-cigarettes increase cigarette smoking in adolescents?

EVIDENCE-BASED ANSWER

A/ **PROBABLY.** Electronic cigarette (e-cigarette) use by adolescents is associated with a 2- to 4-fold increase in cigarette smoking over the next year (strength of recommendation: **A**, meta-analysis and subsequent prospective cohort studies).

Evidence summary

A meta-analysis of 9 prospective cohort studies (total 17,389 patients) at least 6 months in duration evaluated the association between e-cigarette exposure and subsequent cigarette smoking in adolescents and young adults.[1] It found that smoking was more prevalent in ever-users of e-cigarettes than nonusers at 1 year (23.3% vs 7.2%; odds ratio [OR] = 3.5; 95% confidence interval [CI], 2.38-5.16). The association was even stronger among recent users (within 30 days) of e-cigarettes compared with nonusers (21.5% vs 4.6%; OR = 4.28; 95% CI, 2.52-7.27). The mean age of approximately 80% of participants was 20 years or younger.

Further studies also support a link between e-cigarette and cigarette use

Four subsequent cohort studies also found links between e-cigarette exposure and any level of cigarette smoking (**TABLE**).[2-5] A Canadian study of high school students reported a positive association between recent e-cigarette use (within the previous 30 days) and subsequent daily cigarette usage (OR = 1.79; 95% CI, 1.41-2.28).[2] A British study that documented the largest association uniquely validated smoking status with carbon monoxide testing.[3] A study of Mexican adolescents found that adolescents who tried e-cigarettes were more likely to smoke cigarettes and also reported an association between e-cigarette use and marijuana use (relative risk [RR] = 1.93; 95% CI, 1.14–3.28).[4] A California study that evaluated e-cigarette nicotine level and subsequent cigarette smoking found a dose-dependent response, suggesting an association between nicotine concentration and subsequent uptake of cigarettes.[5]

Recommendations

A policy statement from The American Academy of Pediatrics Section on Tobacco Control states that youth who use e-cigarettes are more likely to use cigarettes and other tobacco products.[6] It recommends that physicians screen patients for use of electronic nicotine delivery systems (ENDS), counsel about immediate and long-term harms and the importance of not using ENDS, and offer current users tobacco cessation counseling (with Food and Drug Administration-approved tobacco dependence treatment).

Editor's takeaway

While these cohort studies don't definitively prove causation, they provide the best quality evidence that we are likely to see in support of counseling adolescents against using e-cigarettes, educating them about harms, and offering tobacco cessation measures when appropriate. JFP

TABLE

E-cigarette use and subsequent cigarette smoking: What the studies show

Location	Demographic (N)	Duration (mo)	E-cigarette exposure	Any cigarette smoking* (95% CI)
Canada[2]	Grades 9-12 (19,130)	12	Within past 30 days	OR = 2.12 (1.68-2.66) NNH = 5
England[3]	Ages 13-14 (2836)	12	Ever used	OR = 5.38 (4.02-7.22)
Mexico[4]	Ages 12-13 (4695)	20	Ever used	RR = 1.4 (1.22-1.6) NNH = 5
United States[5] (California)	Grade 10 (181)	6	Ever used (at different concentrations)	OR = 2.26 (1.28-3.98) for each tertile increase

CI, confidence interval; e-cigarette, electronic cigarette; NNH, number needed to harm; OR, odds ratio; RR, relative risk.

*All outcomes are compared with no e-cigarette exposure.

References

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