

**RESULTS:** The survey included 10 097 high school students (mean [SD] age, 16.1 [3.0] years; 47.5% female) and 8837 middle school students (mean [SD] age, 12.7 [2.8] years; 48.7% female). The response rate was 66.3%. An estimated 27.5% (95% CI, 25.3% to 29.7%) of high school students and 10.5% (95% CI, 9.4% to 11.8%) of middle school students reported current e-cigarette use. Among current e-cigarette users, an estimated 34.2% (95% CI, 31.2% to 37.3%) of high school students and 18.0% (95% CI, 15.2% to 21.2%) of middle school students reported frequent use, and an estimated 63.6% (95% CI, 59.3% to 67.8%) of high school students and 65.4% (95% CI, 60.6% to 69.9%) of middle school students reported exclusive use of e-cigarettes. Among current e-cigarette users, an estimated 59.1% (95% CI, 54.8% to 63.2%) of high school students and 54.1% (95% CI, 49.1% to 59.0%) of middle school students reported JUUL as their usual e-cigarette brand in the past 30 days. Among current e-cigarette users, 13.8% (95% CI, 12.0% to 15.9%) of high school students and 16.8% (95% CI, 13.6% to 20.7%) of middle school students reported not having a usual e-cigarette brand. Among current exclusive e-cigarette users, an estimated 72.2% (95% CI, 69.1% to 75.1%) of high school students and 59.2% (95% CI, 54.8% to 63.4%) of middle school students used flavored e-cigarettes, with fruit, menthol or mint, and candy, desserts, or other sweets being the most commonly reported flavors.

**CONCLUSIONS:** In 2019, the prevalence of self-reported e-cigarette use was high among high school and middle school students, with many current e-cigarette users reporting frequent use and most of the exclusive e-cigarette users reporting use of flavored e-cigarettes.

**REVIEWER COMMENTS:** Trends of declining youth smoking—achieved after decades of public health policy, educational programs, and activism—have begun to reverse with the growing popularity of e-cigarettes. This study estimates that roughly 60% of current e-cigarette users in high school and middle school use e-cigarettes and no other type of tobacco product. This suggests many young e-cigarette users might never have been drawn to traditional smoking or other tobacco use. Known risks of adolescent nicotine-use, as well as the rising popularity of e-cigarettes, and the largely unknown health consequences of long-term e-cigarette use, suggest a need for educational programs specifically designed to inform students about the manipulative history of tobacco sales and present dangers of e-cigarette use. Previous research has shown adolescents with asthma use e-cigarettes at higher rates than adolescents without asthma, have positive beliefs about e-cigarette products, and experience worsened asthmatic symptoms after exposure to e-cigarette flavoring agents and traditional tobacco products. Thus, the rising

prevalence of adolescent e-cigarette use is especially worrisome in asthmatic populations.

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Alexandra A. Halberstam, BA  
Harvey L. Leo, MD  
Ann Arbor, Michigan

## **Electronic Vapor Products, Marijuana Use, Smoking, and Asthma in US Adolescents**

Han YY, Rosser F, Forno E, Celedón JC. *J Allergy Clin Immunol.* 2020;145(3):1025–1028.e6

**PURPOSE OF THE STUDY:** Consumption of e-cigarettes can lead to cigarette smoking and use of other combustible products, but little is known about concurrent use of e-cigarettes, marijuana, and cigarettes in adolescents. Use of e-cigarettes has been associated with symptoms and exacerbations of asthma and the authors hypothesized that e-cigarette use would be associated with asthma in adolescents, and that such association would be stronger when e-cigarette use is combined with marijuana and/or cigarette smoking.

**STUDY POPULATION:** Data from the Youth Risk Behavior Surveillance (YRBS) system from 2015 and 2017, including 21 532 study participants with valid data.

**METHODS:** The US Centers for Disease Control and Prevention established the YRBS system to monitor health risk behaviors in US youth. The YRBS is conducted every 2 years and uses a 3-stage cluster sampling design to produce a representative sample of ninth-grade through 12th-grade students. The YRBS contained questions on use of an electronic vapor product (including e-cigarettes, e-cigs, e-pipes, vape pipes, vaping pens, e-hookahs, and hookah pens), cigarette smoking, and marijuana use. Data from the 2015 and 2017 surveys were used for this analysis.

**RESULTS:** The overall prevalence of asthma was 24.3%. Compared with control subjects, subjects with asthma were more likely to report current cigarette smoking, marijuana use, and use of an electronic vapor product. Of the 4073 participants reporting use of an electronic vapor product, 2587 (63.5%) also reported marijuana use and/or cigarette smoking. Use of any of these products was higher in subjects with asthma than in controls across all racial/ethnic groups. Frequent cigarette smoking, frequent marijuana use, and frequent use of an electronic vapor product were each significantly associated with 55% to 65% increased odds of asthma. Compared with participants who reported no current use of an electronic vapor product or marijuana or cigarette smoking, those currently using an electronic vapor product and marijuana had significantly increased (1.45 times greater) odds of asthma, and

those currently using an electronic vapor product, marijuana, and cigarette smoking had significantly increased (1.74 times greater) odds of asthma.

**CONCLUSIONS:** Together with recent reports of serious and sometimes fatal e-cigarette/vaping-related acute lung injury, the authors conclude that these results strongly support both vigorous policies to stop use of e-cigarettes in children and adolescents and continued research on the detrimental effects of these products on respiratory health.

**REVIEWER COMMENTS:** While we all recognize that these activities are common in adolescents and that they must have negative health consequences, to me, these results are absolutely striking in both their prevalence and their effects on asthma.

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**Robert A. Wood, MD**  
Baltimore, Maryland

## DRUG ALLERGY

### Oral Amoxicillin Challenges in Low-Risk Children During a Pediatric Emergency Department Visit

Vyles D, Chiu A, Routes J, et al. *J Allergic Clin Immunol Pract.* 2020;8(3):1126-1128.e1

**PURPOSE OF THE STUDY:** To evaluate feasibility of completing penicillin (PCN) allergy risk categorization followed by direct amoxicillin challenge in low-risk children during a pediatric emergency department (PED) visit and the effect on length of stay (LOS).

**STUDY POPULATION:** This study included a convenience sample of children (age 2-16 years) with parent-reported penicillin allergy presenting to the PED between December 1, 2017, and December 1, 2018.

**METHODS:** Families of eligible patients completed a PCN allergy risk stratifying questionnaire. Those interested in pursuing amoxicillin oral challenge who had low-risk symptoms of allergy and lack of exclusionary conditions were randomized via permuted block randomization to "Oral Challenge" or "No Oral Challenge." Children randomized to the "Oral Challenge" group received an invariant dose of 500 mg amoxicillin tablet (or 520 mg amoxicillin liquid) followed by a 1-hour observation period and next-day phone follow-up.

**RESULTS:** Of 376 questionnaires completed, 228 (60.6%) had low-risk symptoms, with 114 (50%) families interested in oral challenge and 82 patients (81.2% of those eligible) ultimately consented for the study. Forty patients were randomized to receive "Oral Challenge" and 42 patients were randomized to the "No Oral Challenge" group. Thirty-seven patients (92.5% of those randomized to

challenge) received the challenge and 36 (97.3% of those challenged) tolerated the dose without reaction. One child developed mild urticaria treated with an antihistamine. Twenty-nine children (78.4% of those challenged) completed next-day follow-up and none reported delayed reactions. Compared with controls, the group randomized to oral challenge had increased LOS (216 vs 151 minutes,  $P < .1$ ).

**CONCLUSIONS:** Addressing PCN allergy in the PED setting is feasible when using direct oral amoxicillin challenge. The health and economic benefits of delabeling PCN allergy offsets the cons associated with increased LOS in the PED.

**REVIEWER COMMENTS:** Given the low prevalence of confirmed PCN allergy in the pediatric population, multiple studies have shown that direct PCN challenge without initial skin testing in low-risk children is safe and effective when performed in a clinical setting prepared to manage adverse events. Previously, the authors found that 100% of children with low-risk symptoms of PCN allergy identified via questionnaire were subsequently able to tolerate amoxicillin oral challenge. In this study, during a PED visit, the authors successfully identified low-risk patients and implemented direct oral amoxicillin challenge. Since ~30 million children are seen in the PED annually, this strategy would facilitate widespread PCN challenges and delabeling of low-risk patients. Direct oral challenge to penicillin is an effective delabeling strategy for low-risk patients reporting a history of benign rashes who do not have a history of penicillin severe cutaneous adverse reaction, anaphylaxis, or other high-risk features.

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**Di Sun, MD, MPH**  
Philadelphia, Pennsylvania  
**Marcus Shaker, MD, MS**  
Lebanon, New Hampshire

### Non-β-Lactam Antibiotic Hypersensitivity Reactions

Grinlington L, Choo S, Cranswick N, Gwee A. *Pediatrics.* 2020;145(1):e20192256

**PURPOSE OF THE STUDY:** To analyze non-β-lactam antibiotic (NBLA) hypersensitivity reactions in children.

**STUDY POPULATION:** Children 0-18 years who had a suspected NBLA allergy and had a skin test, intravenous test, or oral challenge test at a tertiary pediatric hospital in Melbourne, Australia.

**METHODS:** 141 children who underwent a skin test, intravenous test, or oral challenge test from May 2011 to June 2018 were retrospectively identified through chart review. Detailed allergy histories were obtained at an outpatient clinic before admission for allergy testing.

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Adolescents**

Robert A. Wood

*Pediatrics* 2020;146;S334

DOI: 10.1542/peds.2020-023861W

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