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Commentary

The Role of Public Health in Combatting Synthetic Cannabinoid Use in Adolescents

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A B S T R A C T

As the country struggles to address an epidemic of alcohol and drug overdose, a wide-ranging category of chemical substances known as synthetic drugs have provoked a new sense of public urgency over the past decade. Synthetic cannabinoids, a heterogeneous and evolving set of synthetic compounds that act on endogenous cannabinoid receptors, have become particularly popular among adolescents due to their relative ease of access and reputation as a "legal high." The Baltimore City Health Department has worked to combat the recent surge in synthetic drug use through a major public awareness campaign, legislative reform, and retailer engagement and compliance initiative. In doing so, the city has built a coalition of clinicians, advocates, retailers, educators, legislators, and community members to fight synthetic cannabinoid use in Baltimore City. In this commentary piece, we offer strategies from our work and from that of our colleagues across the country for clinicians and communities fighting to stem the tide of recreational synthetic cannabinoid use.

A wide-ranging category of chemical substances known as synthetic or designer drugs have provoked a new sense of public urgency over the past decade [1]. Unlike better-known drugs such as nicotine, alcohol, marijuana, heroin, or cocaine, there is a dearth of literature and much misinformation on their psychoactive effects and potential toxicity [2–11]. Emerging evidence indicates that synthetic cannabinoids have become increasingly popular among adolescents and young adults [12–21]. Evidence continues to mount demonstrating the relationship between adolescent substance use and adult substance use disorders [22–24] and between adolescent cannabis use and adult mental health disorders [25–27]. As the United States struggles to address epidemic substance use disorders, the growth of synthetic cannabinoid use among adolescents is a worrisome trend that requires a full public health coalition to address.

Synthetic Cannabinoids in the United States

Since synthetic cannabinoid products first became available in the early 2000s, they have grown in popularity and developed a reputation among young people seeking a "legal," "safe," and "natural" high [28]. In 2015, 5.2% of U.S. 12th graders reported using synthetic marijuana products over the past year [29]. These products can be purchased at gas stations, corner stores, and on the Internet [8]. Known by brand names such as Spice, K2, Black Diamond, and Mojo [30], these structurally heterogeneous compounds act on the same cannabinoid receptors as Δ^9-tetrahydrocannabinol with two to 100 times the potency and longer duration [8,9,31,32]. Although more reliable toxicological detection methods are in development [11], the diversity and rapid evolution of active ingredients has made consistent toxicological screening difficult and posed new challenges for regulation, law enforcement, medicine, and public health [33]. This trend is far from limited to the United States; recreational use of synthetic cannabinoids has been reported in Germany [33], the United Kingdom [34], Australia [35], New Zealand [36], and Japan [37].

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Recent data from the National Poison Data System indicate that the majority of reported synthetic cannabinoid cases involved young men with the most common reported clinical presentations of tachycardia (37.7%). In these select clinical cases in which a report was made to a participating poison data system, the most common therapeutic intervention was the provision of intravenous fluids (25.3%); a minority of cases resulted in more severe medical and psychiatric emergencies including seizures (3.8%) and even death (.1%) [8]. In a study of adolescent synthetic cannabinoid exposures, the medical outcome was considered serious in 61% of cases [13]. Adverse effects in adolescents included tachycardia (41.6%), drowsiness and lethargy (24.3%), agitation and irritability (16.4%), vomiting (13.1%), hallucinations and delusions (11.5%), nausea (8.5%), confusion (8.2%), hypertension (7.5%), chest pain (6.9%), and dizziness or vertigo (5.2%) [13]. Case reports of acute kidney injury [38,39] and psychosis [18,28,40] have also been recorded. Most of the existing evidence based on synthetic cannabinoids consists of case series [9,14,18,40,41] given inconsistencies in drug testing and reporting nationwide [11]. This commentary aims to examine the role of public health in combatting synthetic drug use among youth through case studies from local jurisdictions.

Federal Regulation and Legislation

The Drug Enforcement Agency has encountered approximately 95 different synthetic cannabinoids marketed as "legal" alternatives to marijuana since 2009 [42]. Although these products often contain the synthetic cannabinoid JWH-018 as an active ingredient [8], a number of other cannabimimetic agents have been identified [37] and classified as Schedule I substances under the Controlled Substances Act by the Drug Enforcement Agency since 2011 [42]. In total, 22 synthetic cannabinoids have been controlled through either legislative or regulatory action, although more than 75 additional compounds exist in the U.S. marketplace [42].

To stem the flood of synthetic drugs in the market, the U.S. Congress passed the Synthetic Drug Abuse Prevention Act in 2012. Signed into law by President Obama, the Act placed 26 types of synthetic cannabinoids and cathinones into Schedule I of the Controlled Substance Act [43]. Federal legislators introduced the Protecting Our Youth from Dangerous Synthetic Drugs Act in 2013 and 2015, which proposed expanding the classification of synthetic drugs in Schedule I and increasing the regulatory and enforcement speed to counter a highly adaptive synthetic drug market [44]. The Synthetic Abuse and Labeling of Toxic Substances Act of 2015 was introduced to target deceptive marketing of synthetic drugs [45]. These bills remained in committee amid concerns about the implications of further scheduling certain synthetic substances on the federal criminal justice system and on medical research.

Local Level Public Health and Regulatory Efforts

Given the challenges of federal regulation and legislation, local public health initiatives have emerged to engage local adolescents and their communities in outreach around synthetic cannabinoids. Drawing from our own efforts in Baltimore City as well as best practices identified by other local public health jurisdictions, this commentary identifies a number of important steps that coalitions of clinicians, local legislators, public health providers, and community members can take to decrease access and educate adolescents on the dangers of synthetic cannabinoids.

Dispel common myths and misconceptions

Adolescents hold a number of misconceptions about synthetic cannabinoids, often called "synthetic marijuana." Many believe it to be a legal, safe, and natural alternative to marijuana given its marketing as "herbal incense" or "potpourri" [42].

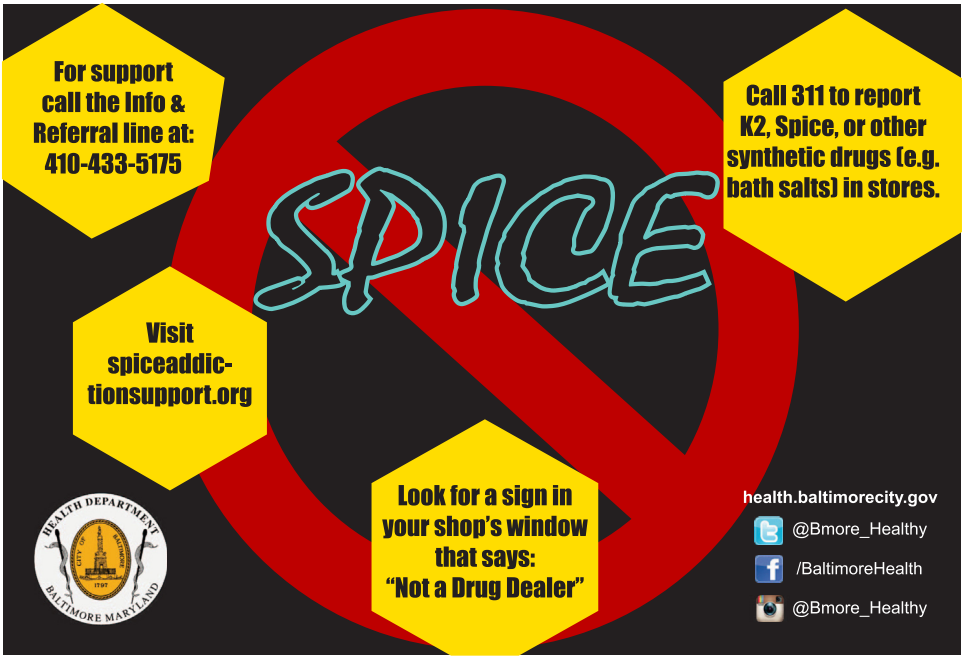

Figure 1. Baltimore City Health Department campaign to combat synthetic cannabinoid use in adolescents.