



## What's the Vibe on Vaping? A Novel Gateway to Addiction and Abuse

IntNSA 2017 Annual Educational Conference

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10/20/2017

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### Presentation Learning Objectives

By the end of this presentation:

- 1.The participant will be able to define electronic cigarette technology (ENDS and NCO) as it relates to vaping.
- 2.The participant will be able to identify the growing public health concerns aligned with vaping and population at risk.
- 3.The participant will be able to understand the health risks and dangers associated with vaping.
- 4.The participant will be able to recognize the risk association between vaping and addiction and dependence.

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### Introduction

- The vaping culture of using Non-Cigarette Tobacco and Electronic Nicotine Delivery Systems (ENDS) are the latest risky trend of youth and young adults.
- Vaping is the use of high-tech, advanced electronic devices such as electronic cigarettes, refillable atomizers, and other tobacco products as an alternative or in addition to regular cigarettes.<sup>1</sup>
- A concerning 10-11 fold rapid rise noted in middle and high school students poses dangers of nicotine exposure to the pediatric population.<sup>2</sup>

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### The Background of Nicotine Delivery Methods

- The first electronic cigarette was conceptualized and patented in 1965 by Herbert Gilbert aimed at a safe and harmless modality to smoking cigarettes.<sup>3,4</sup>
- In 2003, an electronic atomizer version was patented by Ruyan Technology in China, marketed to the United States (U.S.) in 2007, and touted as a healthier alternative to smoking conventional cigarettes.<sup>3</sup>
- Modern generation devices have included mid-size e-cigarettes known as Personal Vaporizers (PVs), which are similar to a pen or laser pointer.<sup>4</sup> The Advanced Personal Vaporizers (APVs) contain a mechanical firing device called a “MOD” may be used in conjunction with different atomizers (e.g. tank systems), and vary in size, shape, and delivery methods.<sup>4</sup> The most innovative and advanced devices though are regulated “Vape MODs,” which contain an internal circuitry.<sup>4</sup>

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### The Vaping Culture

- From 2011 to 2014, the use of e-cigarettes (≥1 past 30 day use) grew rapidly to 13.4% of high school students and 3.9% of middle school students.<sup>4</sup>
- By 2014, e-cigarettes had become the most frequently tobacco product utilized among youth, exceeding conventional cigarette use.<sup>4</sup>
- In 2015, 1:6 middle and high school students and over 25% reportedly tried e-cigarettes.<sup>4</sup>

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### Vaping: What is it?

- Vaping refers to the vaporization of substances (nicotine, flavorings, cannabis, or other substances in popularity) where oil, liquid, or plant material is heated to a temperature resulting in the release of aerosolized water vapor and active ingredients (e.g. nicotine, cannabis) delivered via inhaled aerosol.<sup>3,4,6</sup>
- Tremendous controversy has been propelled surrounding potential harm reduction or risks associated with e-cigarettes/vaping on youth.<sup>3</sup>
- Regardless of the novel delivery devices, use of nicotine containing products in any form present dangers and are unsafe.<sup>4</sup>

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### Nicotine Use and Health Concerns

- Health effects of nicotine include hemodynamic effects secondary to catecholamines (e.g. increase in heart rate and blood pressure, vasoconstriction of arteries and vessels, endothelial dysfunction, atherosclerosis acceleration).<sup>3</sup>
- During adolescence while the brain is developing, nicotine can result in addiction and harmful consequences (e.g. behavioral and cognitive impairments, memory issues, attention, and executive function impairments).<sup>4,7</sup>
- Besides the potential for nicotine addiction, addiction risk exists for cannabis and other illicit drug use.<sup>4</sup>

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### Nicotine Use and Other Harmful Effects

- Brief exposures to e-cigarette aerosol and additives, such as propylene glycol, have been reported to be a respiratory and eye irritant in patients without asthma.<sup>7</sup>
- High-powered e-cigarettes comprising tank systems have the capacity to heat nicotine liquids to high temperatures producing cancer-causing carcinogens in the vapor such as formaldehyde and acetaldehyde.<sup>4,7</sup>

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### Marketing Nicotine to Youth

- Robust marketing and colorful advertising campaigns directed towards the youth population proliferated between 2011-2013.<sup>3,7</sup> One study found television advertisements soared 256% reaching over 24 million youth.<sup>3</sup>
- Appealing child-friendly flavorings/taste were among the 3 most commonly reported reasons for e-cigarette use among youth along with perceived low-harm as compared to conventional tobacco products and curiosity.<sup>3</sup>
- Evidence emerging suggest flavorings when vaporized at high temperatures result in chemical reactions of toxic levels of carbonyl compounds (e.g. formaldehyde) although the health effects are not completely appreciated.<sup>4,9</sup>

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## “Dripping”

- “Dripping” is one of the newest trends where e-liquid at high temperatures is manually applied directly on the atomizer coil and the vapor produced is inhaled.<sup>9</sup>
- Reasons for “dripping” included: thicker vapor clouds (63%), better tasting flavors (38.7%), and a stronger hit was produced in the throat (27.7%) by “dripping”.<sup>9</sup>
- Safety studies are not available on the practice of “dripping” although some research suggests e-liquid exposure may have a considerable increases in toxic vapors (e.g. acetaldehyde, formaldehyde, acetone) and may increase exposure to high levels of nicotine.<sup>9</sup>

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## Promoting Awareness of this Public Health Problem

- In one study where teenagers were asked why they used e-cigarettes, more than half of the students stated the main reason was simple curiosity.<sup>11</sup>
- Of concern was that when asked what they were inhaling when vaping, more than 60% reported that they were vaporizing “just flavoring,” not realizing e-cigarettes contain nicotine.<sup>11</sup>
- Only 10% of the adolescent research participants stated they were using e-cigarettes in an attempt to quit smoking regular cigarettes.<sup>11</sup>
- Another alarming problem is the (161%–333%) increase in calls to poison control centers involving children under the age of five suffering potential fatal poisonings through the ingestion, inhalation, or absorption through the skin or eyes due to access to the liquid nicotine cartridges, which are not required to be childproof.<sup>3</sup>

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## Parental Support & Guidance

- A national endeavor issued by the Surgeon General, The Call to Action on E-Cigarette Use Among Youth and Young Adults, outlines six goals and strategies to reduce e-cigarette use among the youth and young adults.<sup>4</sup>
- Strategies to accomplish the goals encompass areas where stakeholders (e.g. individual, parent/caregiver, families, teachers, coaches, youth influencers) can become involved.<sup>4</sup>
- One way parents can engage is to become educated on the risk of e-cigarette use enabling the parent/caregiver to educate their own youth about the harmful effects of e-cigarettes, other nicotine products, and vaping of illicit substances.<sup>4</sup>
- Being tobacco-free role models, open discussions about the harms of tobacco and nicotine products, protecting youth from indirect exposure (tobacco smoke or aerosol from e-cigarettes) are illustrations.<sup>4</sup>

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### The Role of Health Care Providers

- Lack of knowledge can be a result of healthcare providers receiving little or no formal training in either their academic or practice setting on screening, treating, or providing referrals to youth and their families in regards to vaping. Health care providers can play a key role in clinical practice and as faculty in higher education.<sup>14</sup>
- The provision of skills necessary to address the health and safety implications of pediatric nicotine use and exposure needs to be incorporated in clinical practicum course objectives.<sup>14</sup>
- Education initiatives in medical and nursing practice can enhance the ability to assess and synthesize data, make clinical judgments, and enhance diagnostics decisions. The development of appropriate plans of care and anticipatory guidance may be a sustainable long-term solution related to this evolving public health epidemic.<sup>14</sup>

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### Recommendations for Policy and Practice

- In 2014 the U.S. Food and Drug Administration (FDA) expanded regulatory authority under the *Family Smoking Prevention and Tobacco Control Act* of 2009 to include all tobacco products (e.g. e-cigarettes, hookahs).<sup>4,5</sup>
- Concerns by public health advocates exist as the proposed regulations do not include regulations of marketing practices or flavored nicotine products targeting the youth.<sup>13</sup>
- Added hazards include a rise in vaping other substances such as the concoction of chemicals, cannabis, or synthetic drugs. Legalization of medical and recreational marijuana use in some states are reasons rooted in escalating use of vaporized cannabis use among youth.<sup>10</sup>
- Globally, taxation has been used as an effective means to reduce cigarette consumption with approximately a 10% increase in price resulting in a 1% decrease in smoking prevalence.<sup>12</sup>

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### Any Questions?



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