


Partnerships to Ensure Safe Handling and Disposal of Electronic Smoking Devices

The use of electronic smoking devices, such as e-cigarettes, has increased dramatically in recent years. To keep pace with this demand, many communities are seeing a proliferation of retail outlets where customers can purchase, sample, and use electronic smoking devices. This fact sheet offers suggestions for public health professionals to partner with agencies devoted to occupational and environmental health and safety to ensure safe handling and disposal of electronic smoking devices.[1]

Q: What are electronic smoking devices?

A: Electronic smoking devices or e-cigarettes are products that are designed to deliver nicotine or other substances to users in the form of an aerosol (also known as vapor). E-cigarettes typically consist of a battery-powered heating element, a cartridge that contains liquid nicotine or other chemicals, and an atomizer that, when heated, converts the contents of the cartridge into an aerosol that the user inhales.

While originally developed to resemble conventional cigarettes, electronic smoking devices now come in a wide variety of styles and are sold under such product names as e-cigarettes, e-cigars, e-hookah pens, and vaporizers. While some electronic smoking devices contain disposable, prefilled cartridges, increasingly more are open systems, which allow the user to add a liquid solution ("e-liquid" or "e-juice") to a refillable tank. Depending on the brand, this solution typically contains tobacco-derived nicotine, humectants to produce the aerosol (for example, propylene glycol or glycerol), and flavorings.[2]

The e-liquid and other component parts of electronic smoking devices may be manufactured in the U.S. or abroad. Although many electronic smoking devices are sold over the internet, sales in brick-and-mortar establishments are increasing, including in stand-alone e-cigarette shops, also known as vape shops. Some vape shops purchase and sell pre-packaged e-liquid from a manufacturer, while some mix their own e-liquid onsite to accommodate customers' preferences.

Q: Why are electronic smoking devices dangerous?

A: In addition to the potential negative health effects caused by the use of electronic smoking devices,[3] the nicotine itself is a highly toxic chemical. Nicotine is classified as a hazardous substance under federal law as well as most state laws or regulations.[4] Poisoning from liquid nicotine can occur by ingestion, inhalation, or absorption of the product through the skin or

eyes.[5] The most common symptoms of liquid nicotine poisoning reported to poison centers are vomiting, nausea, and eye irritation. Calls to poison control centers as a result of exposure to e-liquids have increased dramatically. Nationally, the number of calls rose from one per month in September 2010 to 215 per month in February 2014.[6] E-cigarette cartridges also may contain other potentially harmful constituents, such as formaldehyde, acetaldehyde, benzene, and toluene.[7]

Employees who handle e-cigarette products or waste, either at the manufacturing or retail level, should be protected from potentially dangerous exposure to nicotine or other toxic substances. Additionally, electronic smoking device manufacturers and retailers should properly handle and dispose of hazardous waste, such as nicotine, in order to protect the environment.

Q: How can public health professionals partner with other agencies to ensure safe handling and disposal of electronic smoking devices?

A: There are two main avenues to ensure that electronic smoking devices and related products are handled and disposed of in a safe manner: (1) worker protection laws or regulations to safeguard workers who may be exposed to nicotine; and (2) environmental laws or regulations to ensure safe handling and disposal of hazardous chemicals such as nicotine.

Worker Protection

The U.S. Occupational Safety and Health Administration (OSHA) sets and enforces standards for safe working conditions. The agency also provides training to employers and workers. Many states also have their own occupational safety and health agency.

OSHA has a specific health standard on nicotine exposure, which sets a maximum permissible exposure level (PEL) and requires additional protections for employees exposed to nicotine, including personal protective equipment such as gloves and eye wash stations in the event of contamination.[8]

OSHA agencies at the state and federal levels may not have the capacity to proactively provide training for employees or inspect e-cigarette manufacturing or retail production sites. However, state or local health department staff can contact their state or regional OSHA office in order to make them aware of the potential risk faced by employees at workplaces that work with nicotine, such as in manufacturing e-liquids.

An employee experiencing unsafe working conditions can file a complaint with the nearest federal or state OSHA office. In addition, anyone who knows about a workplace safety or health hazard may report unsafe conditions to OSHA, and OSHA will investigate the concerns reported. To find the contact information for the nearest OSHA office, go to https://www.osha.gov/html/RAmap.html.

OSHA has taken action against at least two e-cigarette manufacturers. In 2013, OSHA fined an e-cigarette manufacturer in Lakewood, NJ, $185,000 for safety violations that included failing to provide gloves and eye protection to workers exposed to nicotine.[9] Similarly, in 2011, OSHA cited an e-liquid manufacturer in California for multiple safety violations.[10]

Environmental Protection

Another possible mechanism for ensuring that chemicals such as nicotine are being handled and disposed of properly is adopting an environmental health law or regulation. In contrast to worker protection policies, environmental health policies are designed to reduce exposure to health risks to protect the larger population and the environment.

Public health staff can establish relationships with their peers in environmental health in order to ensure that businesses handling liquid nicotine or other electronic smoking device chemicals are complying with existing environmental laws and regulations. To do so, consider the following steps:

1. **Identify the state and/or local agency charged with protecting environmental health and safety.** This agency may be housed within the health department or it may be a separate agency with a name such as environmental health, environmental protection, environmental quality, ecology, or natural resources.

2. **Educate environmental health staff about electronic smoking devices**. Although environmental health staff may be familiar with the phenomenon of electronic smoking devices, they may not be aware of how liquid nicotine and other chemicals are used in production and at the retail level. For example, different requirements may apply to businesses that:

    - Manufacture e-liquids for wholesale or retail sale (these businesses are likely to handle liquid nicotine and other chemicals)
    - Mix e-liquid flavors containing nicotine on-site for retail sale
    - Purchase large volumes of e-liquid with nicotine from a vendor and repackage it in smaller quantities for retail sale
    - Interact directly with customers using open containers of e-liquid, which is common in vape shops that allow for customer sampling of products.

3. **Learn what requirements apply for businesses that handle nicotine or other chemicals.** For example, businesses may need a plan for handling or disposing of nicotine and other hazardous materials, such as:

    - Providing personal protective equipment (such as gloves, face shield)
    - Providing training for employees who handle or manage hazardous materials/waste
    - Posting a Material Safety Data Sheet (MSDS)
    - Creating and disseminating a hazard communication plan or an accident prevention plan
    - Properly disposing of hazardous waste

    Note that such requirements may apply only if a business is handling nicotine in amounts that exceed a certain threshold. If so, depending on where this level is set, manufacturers

of electronic smoking devices may be subject to these requirements, but retail sites that mix their own e-liquids may not.

4. **Ensure that existing laws and regulations are enforced.** For example, if your state or local government requires a license to sell tobacco products, license compliance checks could extend to environmental health and safety requirements. Additionally, environmental health inspectors can incorporate information on safe handling and disposal of nicotine in their permitting and inspection requirements.

Q: What else can be done?

A: In addition to ensuring that existing laws and regulations are enforced against electronic smoking device manufacturers and retailers, state and local governments may seek to adopt new requirements to address nicotine handling or disposal. For example, state or local governments may wish to consider adopting policies that require environmentally responsible disposal of e-cigarette waste or require protective equipment such as gloves when handling any amount of nicotine.

State and local governments are exploring other means of regulating electronic smoking devices, such as prohibiting the use of such products in places where smoking is prohibited, requiring childproof packaging, restricting the sale of flavored e-liquid, increasing the tax rate, and restricting retail or youth access. To learn more about these additional policy options, please see the following Consortium resources:

- US E-Cigarette Regulation: 50 State Review
- Regulating Electronic Cigarettes and Similar Devices
- Policy Approaches to Prevent Liquid Nicotine Poisonings
- E-Cigarette Taxation: Frequently Asked Questions
- World Health Organization's Recommended Options for Regulating E-Cigarettes

Please feel free to contact the Tobacco Control Legal Consortium with any questions about the information included in this fact sheet.

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Notes

[1] The information contained in this document is not intended to constitute or replace legal advice.

[2] Brian A. King et al., *Awareness and Ever Use of Electronic Cigarettes Among U.S. Adults, 2010-2011*, 15 NICOTINE & TOBACCO RESEARCH 1623-7 (2013). While some e-liquids are labeled as containing no nicotine, studies have found low levels of nicotine in such products. *See, e.g.*, U.S. FOOD & DRUG ADMIN., *Summary of Results: Laboratory Analysis of Electronic Cigarettes Conducted By FDA*, April 24, 2014, *available at* http://www.fda.gov/NewsEvents/PublicHealthFocus/ucm173146.htm.

[3] For example, e-cigarette use by teens now surpasses the use of conventional cigarettes. Lloyd D. Johnston, et al., *Monitoring the Future: Key Findings on Adolescent Drug Use*, Feb. 2015, http://www.monitoringthefuture.org/pubs/monographs/mtf-overview2014.pdf.

[4] 40 C.F.R. § 355, App. A (2008) and 40 C.F.R. § 355, App. B (2008) (Nicotine is an "Extremely Hazardous Substance."); 40 C.F.R. § 261.33. 22 (2011) (Nicotine could be considered as hazardous waste which must be properly disposed of). *See, e.g.*, Alabama: Ala. Admin. Code r. 335-14-2, App. VIII ("Hazardous Constituents"); Colorado: 6 CCR 1007-3:261.33 ("Hazardous Wastes"); Kentucky: 106 Ky. Admin. Regs. 1:081 ("Extremely Hazardous Substances"); and New York - 6 NYCRR 597.2 ("Hazardous Substance").

[5] CTRS. FOR DISEASE CONTROL AND PREVENTION, NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH, *Nicotine: Systemic Agent*, http://www.cdc.gov/niosh/ershdb/emergencyresponsecard_29750028.html.

[6] Kevin Chatham-Stephens., et al., *Notes From the Field: Calls to Poison Centers for Exposures to Electronic Cigarettes - United States, September 2010-February 2014*, 63 MORBIDITY AND MORTALITY WKLY. REP. 292-3 (2014), http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6313a4.htm. The American Association of Poison Control Centers reports 1,499 e-cigarette device and liquid nicotine exposures between 1/1/15 and 5/31/15, approximately 300 per month. Am. Ass'n of Poison Control Centers, *E-Cigarette Devices and Liquid Nicotine*, http://www.aapcc.org/alerts/e-cigarettes.

[7] Maciej Lukasz Goniewicz et al., *Levels of Selected Carcinogens and Toxicants in Vapour from Electronic Cigarettes*, 23 TOBACCO CONTROL 133-9 (2014).

[8] The federal guidelines for nicotine exposure are: 0.5 milligrams of nicotine per cubic meter of air (mg/m3) averaged over an eight-hour work shift. U.S. DEP'T OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMIN., *Occupational Health Guideline for Nicotine*, Sept. 1978, www.cdc.gov/niosh/docs/81-123/pdfs/0446.pdf.

[9] U.S. DEP'T OF LABOR, *U.S. Labor Department's OSHA Fines Lakewood, NJ, Manufacturer Nearly $185,000 for Exposing Workers to Chemical, Other Hazards*, Mar. 27, 2013, https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=23844; U.S. DEP'T OF LABOR, *Citation and Notification of Penalty*, Mar. 21, 2013, www.osha.gov/ooc/citations/ESmoke-655718.pdf.

[10] U.S. DEP'T OF LABOR, OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION, *Inspection: 315313940 - Braithwaites Consumer Goods, Llc Dba Tasty Vapor*, www.osha.gov/pls/imis/establishment.inspection_detail?id=315313940. For an explanation of the violations, see California Code of Regulations, Title 8, Subchapter 7, www.dir.ca.gov/Title8/sub7.html.