E-Cigarette Policy Review Taskforce
Findings and Recommendations
April 2016

Background and Issue

The University of Arizona became a smoke- and tobacco-free environment on August 25, 2014. University policy currently prohibits the use of products that contain tobacco or nicotine on University campuses and during its activities, but the policy excludes e-cigarettes from prohibited devices. The charge of the E-Cigarette Policy Review Taskforce is to determine if usage of e-cigarettes best protects the health and well-being of University faculty, staff, students, and visitors on its campuses and in its vehicles, or if e-cigarette usage should also be prohibited.

Members of the E-cigarette Policy Taskforce were recruited from the University community by Dr. Allison Vaillancourt, Vice President, Human Resources & Institutional Effectiveness, based on expertise and interest in the issue from investigative, public health and clinical/practice perspectives. The Taskforce convened on October 2015 and met four times until their findings and recommendation were finalized on April 24 2016. The Taskforce produced an executive summary of their recommendations and rationale, as well as a longer document that details the key findings and recommendation.

Key Findings

The Taskforce reviewed current research and related information on: 1. The components and dispersal mechanisms related to e-cigarettes and electronic nicotine delivery systems; 2. Related policies and practices of peer universities and other large employers; 3. Use of e-cigarettes among college students; and 4. Smoking cessation in young adult e-cigarette users. The Taskforce also reviewed recommendations of prominent health-related organizations. Key findings appear in the following synopsis.

<u>Components and Dispersal Mechanisms of E-Cigarettes and Electronic Nicotine Delivery Systems</u>

In addition to nicotine and basic humectants (moisture-retaining substances), e-cigarette liquids and vapors can contain a variety of chemicals used for flavoring; most of these chemicals have not been evaluated for lung toxicity. Nicotine can be transferred to bystanders by passive exposure to e-cigarette vapor; exhaled humectant- and flavor-related chemicals are also likely transferred to these by-standers. Such transfer could be especially problematic for children and adults with pre-existing lung conditions such as asthma. Additional points and specifics are that:

- E-cigarettes use a battery-powered atomizer to aerosolize various types of nicotine-containing liquids inside a cartridge. This generates a vapor that is delivered to the lungs during inhalation.

Exhalation results in a vapor that has a smoke-like appearance, largely due to the humectants/carrier components found in the e-liquid.

- There are numerous chemical components in the e-cigarette liquid ("juice"), and it is important not to be fooled by names of flavors, such as marshmallow crème. The carriers/humectants are typically propylene glycol and/or vegetable glycerin. Additional chemicals include carbonyl compounds, aldehydes (including formaldehyde), fine particulate matter, metals, and volatile organic compounds chemicals. E-cigarette liquid contains nicotine in various concentrations (typically 0 - 2.4%) and may contain toxic levels of nicotine that may lead to nicotine poisoning (Cameron et al., 2014; Chatham-Stephens et al., 2014).
- As of 2014, there were more than 450 distinct e-cigarette products with greater than 7500 flavors, mostly of unknown toxicity, available for sale. The flavors are commonly allowed due to their FDA approval for ingestion, and regulation is often limited due to lack of knowledge of direct toxicity.
- At least one of these flavoring chemicals, (diacetyl) is a causal agent for bronchiolitis obliterans or "popcorn lung". A recent manuscript (Allen et al., 2015) shows toxic components associated with lung disease in aerosols of many of 51 e-cigarette flavorings tested.
- While e-cigarette companies claim there is no "side stream" exposures (due to the method of operations of the e-cigarettes), a recent publication detected numerous "side stream" chemicals emitted during e-cigarette operation. (O'Connell et al., 2015). However, these have not been compared to conventional cigarettes.
- There is evidence that household mates can passively absorb nicotine by rooming with e-cigarette users (Ballbe et al., 2014); it is unknown if this is through aerosols or contact of settled nicotine in the environment.
- There are limited data on the composition of the exhaled vapor and the effects on bystanders from passive exposures.
- Nicotine can be transferred by passive exposure to e-cigarette smoke; exhaled humectant and flavor chemicals are also likely transferred to these bystanders (Flouris et al., 2103). A recent review of the literature indicated that in some e-cigarettes used under real world conditions, toxicants can be emitted in the exhaled breath (Fernandez et al., 2015).
- Such transfer by passive exposure could be especially problematic for bystanders with pre-existing lung conditions such as asthma (Lim, et al., 2014; Jaén and Dalton, 2014).

<u>Policies and Practices of Peer Universities</u>

The majority of the 15 peer institutions for The University of Arizona (established by the Arizona Board of Regents) currently prohibit e-cigarettes in their policies.

- Ten currently include a ban on e-cigarettes in their policy (UC-Davis; UCLA; University of Florida; University of Illinois at Urbana-Champaign; University of Iowa; University of Minnesota, Twin Cities; Ohio State University; Texas A&M; UT-Austin; University of Wisconsin-Madison).
- A tobacco-free ordinance, including e-cigarettes will go into effect on August 15, 2016 at Michigan State University. This will bring the number of peer institutions that include e-cigarettes in their tobacco policy to 11/15 (73%).
- Of the remaining four peer institutions, two do not specify e-cigarettes in their policy (University of Maryland-College Park; University of North Carolina-Chapel Hill). Penn State is not yet tobacco free. The University of Washington-Seattle maintains designated smoking areas on campus for smoking and vaping.

It is important also to note that American College Health Association recommends that e-cigarettes be included in tobacco-free policies. The rationale for this recommendation includes:

- Tobacco free environments have led to substantial reductions in smoking prevalence, the number of people exposed to secondhand smoke and the amount of tobacco products consumed.
- Tobacco free policies can and have transformed social norms around smoking and have made smoking a socially undesirable activity.
- Colleges and universities are key environments for implementing healthy behaviors for students.

E-Cigarette use among Adolescents and Young Adults

- The current literature with adolescents and young adults describes several concerns regarding the prevalence of e-cigarette use, targeted marketing/advertising, and impacts on health and health behaviors. The following are examples of key studies in the area.
- In a multi-college study, almost all participants (95.5%) were aware of e-cigarettes, 29.9% were ever users, and 14.9% were current users (Saddleson et al., 2015).
- Top reasons for experimentation with e-cigarette experimentation among adolescents and young adults included curiosity, appealing flavors, and peer influences (Kong et al., 2015).
- College students who had higher receptivity to e-cigarette marketing were more likely to perceive e-cigarettes as being less harmful than traditional cigarettes, which was associated with higher rates of recent e-cigarette use (Pokhrel et al., 2015).
- In a longitudinal study with college students, e-cigarette use predicted subsequent cigarette smoking (Sutfin et al., 2015).
- E-cigarette use was linked to other risky behaviors, including heavy drinking (Littlefield et al., 2015) and marijuana use (Saddelson et al., 2015), among college students.
- E-cigarettes were used to vaporize cannabis at high rates among high school students (Morean et al., 2015), increasing the challenges for regulating marijuana use.

Smoking Cessation in E-cigarette Users

The evidence for e-cigarette usage as an effective smoking cessation method is very weak. There are two small clinical trials (Caponnetto et al., 2013; Bullen et al, 2013) that show smoking cessation and reduction rates with e-cigarette use similar to FDA-approved safe methods, such as nicotine patches (Bullen et a., 2013). However, there are multiple reviews and meta-analyses showing that FDA-approved nicotine replacement therapies, including transdermal nicotine patches and nicotine gum, are effective and safe smoking cessation methods (e.g., Moore et al., 2009; Silagy et al., 2004). Such safety data are unavailable for e-cigarette usage. Additionally, studies on e-cigarettes as a smoking cessation method focus on middle-aged and older adults, and not teenagers and young adults, who represent the age of the typical college student. Additional points and specifics are:

- The studies on e-cigarettes and smoking cessation have significant concerns, such as design and methodology issues, selection of subjects with mental illness or no desire to quit smoking, and lack of determination of nicotine dependency.
- The mean subject age in the above trials is in the 40s with SDs between 8-12 years, thus specific data on smoking cessation in adolescents and young adults are not available.
- Relevant to adolescents (mean age 14 years), a more recent report (Leventhal et al., 2015) reveals associations between E-cigarette usage and subsequent cigarette smoking.

Health Organizations that Include E-Cigarettes in Smoke and Tobacco-Free Policies

Numerous health organizations recommend including e-cigarettes in smoke and tobacco-free policies. Examples are the American College Health Association, American Lung Association, American Academy of Pediatrics, and American Heart Association.

Recommendation

The Taskforce recommends that e-cigarettes be added to the list of tobacco- and nicotine-containing products that are prohibited from campus and from University activities and its vehicles.

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