

United States public health officials need to correct e-cigarette health misinformation

Health misinformation is harmful as it can cause confusion and sow mistrust regarding the adoption of public health recommendations and policies. We provide examples of e-cigarette misinformation promoted by the United States public health officials, which have persisted despite new data challenging the validity of the original assertions.

The Surgeon General of the United States (SG) recently launched an initiative to reduce health misinformation. In an advisory [1], he wrote: 'Health misinformation is a serious threat to public health. It can cause confusion, sow mistrust, harm people's health, and undermine public health efforts. Limiting the spread of health misinformation is a moral and civic imperative.'

We agree and applaud the SG for addressing this important issue, which has garnered media attention primarily due to COVID. Questions related to risks of e-cigarettes constitute another area where there is widespread misinformation. We focus upon two specific examples that continue to be propagated by the US public health officials, despite evolving scientific data contradicting these assertions. As the recent SG advisory on misinformation observed, 'updating assessments and recommendations based on new evidence is an essential part of the scientific process' [1].

E-CIGARETTE, OR VAPING, PRODUCT USE-ASSOCIATED LUNG INJURY (EVALI)

EVALI was a lung disease resulting in serious illness and premature deaths in North America between mid-2019 and early 2020. It was originally labeled 'vaping associated pulmonary illness' (VAPI) [2], but 'e-cigarette' was later added to the title by the Centers for Disease Control and Prevention (CDC). Canadian health authorities, by contrast, chose the label 'vaping associated lung illness' (VALI) [3]. While the CDC's name includes 'e-cigarette', all evidence points towards Vitamin E acetate-contaminated illegal tetrahydrocannabinol (THC) vapes as the cause, and no research has identified any chemicals found in nicotine e-cigarettes as the cause [4, 5]. Vitamin E acetate is not soluble in nicotine e-liquids and has never been detected in nicotine e-liquids [6].

Despite the evidence, the CDC continues including 'e-cigarettes' in the name EVALI. This naming has affected news coverage and contributed to distorted consumer beliefs about the risks of nicotine

vaping. Smokers are twice as likely to incorrectly identify nicotine e-cigarettes as the cause of EVALI than to correctly identify illicit, adulterated THC products [7]. EVALI contributed to an immediate increase in the perceived risks of e-cigarettes relative to more dangerous combustible cigarettes, and these increased misperceived risks have not fully abated [8]. This increased perceived risk is associated with a 30% reduction in both e-cigarette demand and reduced use of e-cigarettes for smoking cessation [9]. In August 2021, 75 experts asked the CDC to remove the reference to 'e-cigarettes' from the term 'EVALI' [10] but the CDC refused, in part because '14% of EVALI patients report exclusive use of nicotine-containing products' [11]. However, this ignores the reality that THC is illegal in many jurisdictions and so self-report on its use is unreliable, as shown by THC or its metabolites frequently being found in samples collected from EVALI patients claiming to only use nicotine-containing products [5].

Another issue is that the CDC lacks a clear definition of an e-cigarette [12]. Under the CDC's unclear guidance, e-cigarettes can include non-nicotine-containing THC-only vaping products. The CDC can end this confusion by issuing an e-cigarette definition that separates nicotine-only forms of vaping from those containing THC, only the latter of which caused EVALI. We suggest the following simple definition that accomplishes this goal: 'E-cigarettes are electronic devices that transform a liquid containing nicotine into an aerosol that is inhaled via a mouthpiece'.

New research papers continued to be published throughout 2022 with no mention of THC vapes as the source of Vitamin E acetate [13] or falsely claiming that specific brands of e-cigarettes cause EVALI [14]. This demonstrates that, in addition to the public, clinicians and researchers continue to be confused by the name EVALI.

The CDC's EVALI response also differed from other types of outbreak; for example, when there is a listeria outbreak connected with lettuce consumption, the CDC very quickly identifies the brand, source location and dates of the offending lettuce to be recalled, clears the lettuce that is probably safe to eat and announces when the outbreak is over [15].

E-CIGARETTE USE AS A 'GATEWAY' TO CIGARETTE SMOKING

The SG-sponsored public information website about e-cigarettes, entitled 'Know the Risks: E-cigarettes and Young People [16]', states

that ‘e-cigarette use is associated with the use of other tobacco products’. While technically accurate, many have misinterpreted this statement to mean that nicotine vaping causes young people to smoke cigarettes. The origins of this misunderstanding stem in part from concerns first raised in the 2016 SG report and later reinforced in the 2018 National Academies of Sciences, Engineering and Medicine report on e-cigarettes, both of which asserted that nicotine vaping was a ‘gateway’ to smoking for young people [17, 18]. However, significant evidence now exists that this association between vaping and smoking is not causal, which is a source of confusion for the lay public [19] and health-care professionals [20]. Survey data show youth cigarette use declining steadily despite vaping increasing [21]. When past-30-day youth e-cigarette use rates were as high as 32.9% in 2019 [22], youth smoking rates should have been rising if the SG’s statement that ‘e-cigarette use is associated with the use of other tobacco products’ represents a causal relationship. Instead, by 2021 the youth cigarette use rate fell to a record low 1.9% [23].

Additional evidence inconsistent with the causal connection between youth nicotine vaping and smoking uptake comes from natural experiments evaluating how e-cigarette restrictions adopted by some localities but not others at a given point in time have impacted youth cigarette smoking. These natural experiments attempt to address confounding from common liabilities, and can provide causal inference if outcome trends in the pre-period can be shown to be parallel between adopters and non-adopters [24, 25]. There are seven natural experiment difference-in-difference-style studies of e-cigarette minimum legal purchase age laws and e-cigarette tax rates on youth, six of which find that these policies increase cigarette use [26–32]. Collectively, these natural experiment studies suggest that e-cigarettes reduce youth cigarette use in the aggregate, which aligns with observed trends. This is inconsistent with the SG’s assessment of the vaping–smoking relationship.

Despite this evidence, the website currently says: ‘there is no evidence to support the claim [...] that use of e-cigarettes by young people might “protect” them from using cigarettes’ [16]. The 2016 SG report also omitted two peer-reviewed natural experiment studies, then available, that found that e-cigarettes reduced cigarette use among young people [27, 29].

MOVING FORWARD

Association does not mean causation. Public health officials, in particular the SG and the CDC, must do a better job of explaining this difference to the public, as public health recommendations should be based on solid causal data and communicated clearly and appropriately to the lay public [1]. The two examples of e-cigarette-related misinformation addressed here continue to be widely disseminated even today, with recent examples in the lay press [33–35], from public health organizations [36–38], and from physician organizations [39]. This misinformation often supports advocacy for aggressive e-cigarette regulation that many studies have shown leads to increases in combustible tobacco product use [26–31, 40], which is more

dangerous [18]. This makes correcting this misinformation a public health priority.

We urge these public health officials to change the name EVALI to remove any reference to e-cigarettes, to issue an e-cigarette definition that separates nicotine-only forms of vaping from those containing THC and to update the evidence on the relationship between e-cigarette use and subsequent smoking by youth. These updates should explain to the public the reasons for these changes.

In the future, public health officials can reduce the risk of misinforming or confusing the public by acknowledging when evidence is incomplete or based on statistical association rather than clear evidence of causality and by updating any statements or recommendations quickly when plausibly causal or otherwise significant new evidence becomes available [24, 25]. Doing this could help to reverse the trend of declining trust in public health institutions [41] and will benefit long-term public health.

KEYWORDS

Centers for Disease Control and Prevention, EVALI, E-cigarette, health misinformation, public health communication, Surgeon General

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