

# The public health risks of e-cigarettes: A systematic review

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**Abstract.** With the relevant anti-smoking policy introduced by the state, people realized the significance of smoking cessation. Therefore, E-cigarettes were regarded as a replacement of cigarettes. The analysis, which is about prevalence trends, the reason about taking systematical review, and the value of systematical review, explains this review's stand. In this paper, the 9 articles from PubMed was collected and organized for classification. The dangers of human health is caused by the special component of e-cigarettes. Generally speaking, some countries' legislate measures related to tobacco control have not fully met the requirements of the WHO Framework Convention on Tobacco Control and played a role in protecting people from tobacco hazards, displaying in the lack of smoke-free legislation in public places at the national level, relatively low tobacco consumption taxes, no comprehensive ban on tobacco sponsorship. The control of e-cigarettes as tobacco products in many countries may not achieve the purpose of strict regulation. The authority believed to add punishment to people who sell novel flavor e-cigarettes should let them take legal responsibility. Furthermore, schools should increase publicity and education about public and individual health, to promote people's health awareness and stop them from using e-cigarettes at a relatively young age. The objective of this review is to spot literature and describe the effects of e-cigarettes on public human health. Through researching and comparing articles, this article discusses the reason of smoking, the lack in policies in public health, and the solutions what people should take.

**Keywords:** e-cigarettes, nicotine addiction, cigarettes cessation, lung diseases, respiratory system.

## 1. Introduction

With the relevant anti-smoking policy introduced by the state, more and more smokers realized the dangers of their smoking behavior, so they began to find ways to quit smoking. However, due to the long-term mental erosion of nicotine, it is difficult for many smokers to quit smoking, so e-cigarettes came into people's sight. In recent years, an e-cigarette trend has gradually emerged. More than ten entrepreneurial projects have been involved, and the number of physical stores and online stores has increased exponentially.

Users and non-users are exposed to aerosol and product constituents from ENDS like e-cigarettes.[1]. Nowadays, people, especially teenagers, have more access to e-cigarettes and get addicted to them. Teenagers' addiction becomes a notable problem at present. According to the China Survey Report of the International Tobacco Control Policy Assessment Project (ITC Project), from 2009 to 2014, Smokers

who actively understand e-cigarettes and switch to them have become more prevalent, with the percentage of smokers who have heard of them rising from 29% to 60%.

As research progresses, more and lengthier articles are written in all fields. Despite the growing number of relevant studies, several questions may remain unanswered. In searching for proof, we may encounter conflicting studies. We must evaluate research critically.

As the best evidence, only a high-quality systematic review can provide a scientific basis for clinicians, patients, and other decision-makers. A high-quality systematic review needs to have the following characteristics: ① a clear title and a clear purpose; ② a comprehensive and holistic search strategy to search the literature; ③ clear criteria for study inclusion and exclusion; ④ a list of all included studies; ⑤ a clear expression of the characteristics of each included study and an evaluation of the quality of the study methodology; ⑥ a clarification of the reasons for all excluded studies; ⑦ for quantitative analysis, Meta-analysis is used to combining the results of eligible studies; ⑧ performing sensitivity analysis and subgroup analysis of synthetic results, if possible; ⑨ reporting study results using a uniform format; and ⑩ assessing the potential for publication bias. AMSTAR, developed by Dutch and Canadian experts in 2007, is the more recognized tool for evaluating the quality of systematic reviews.

## 2. Methods

The conduct of this systematic review was based on the framework reported by Callahan-Lyon [1] which is related to e-cigarettes and health effects and the ideas provided by Maxwell L Smith, Michael B Gotway, et al [2]. Additional knowledge is offered by Thomas Münzel, Omar Hahad, et al [3]. In the full passage, 9 text seems relevant to this review, and their articles were published between 2014 and 2022. The review included the following steps: identifying the research questions, searching for relevant studies, and analyzing study limitations. Analysis of risk, comparison of the difference between the studies, and evaluating prevalence trends (population, prevalence) are noted in the whole review.

## 3. Results

### 3.1. *The dangers of human health related to the special component of e-cigarettes*

ENDS, sometimes referred to as E-cigarettes and vaping devices, were first created as a substitute for traditional tobacco cigarette smokers' cigarettes [4]. It has many novel flavors such as peaches, strawberries, peppermints, and so on, making young people want to try e-cigarettes. Without the need for fire, the e-cigarette is easier to use. One cigarette bag can be used for a long time and is cheaper than traditional cigarettes. Nicotine is the primary ingredient in e-cigarettes, but tar also contains several hazardous chemicals, particularly carcinogens. E-cigarettes are in fact significantly less dangerous than tobacco from this vantage point. E-cigarettes' composition does, however, also have certain unique qualities. In contrast to e-cigarettes, tobacco has a constant nicotine concentration. The amount of nicotine can be altered whenever you want. The main selling point of e-cigarettes is addiction, which frequently has a higher nicotine level. For instance, a well-known e-cigarette brand says that its nicotine level is as high as 59 milligrams per milliliter, despite the fact that one e-cigarette only has a volume of 0.7 milliliters and has the same amount of nicotine as 20 packs of cigarettes. In addition to being addicting, nicotine is also bad for the health. The harm increases with content level. Resembling traditional cigarettes, the e-cigarette is a kind of electronic nicotine delivery system, and people also rely on it deeply once they try it. It has many novel flavors such as peaches, strawberries, peppermints, and so on, making young people want to try e-cigarettes. Without the need for fire, the e-cigarette is easier to use. One cigarette bag can be used for a long time and is cheaper than traditional cigarettes. Though e-cigarettes have less tar than traditional cigarettes, they have more nicotine, which makes people get addicted more easily. Nicotine heating in the e-cigarette leads to quickly contracting blood vessels and increasing blood pressure. It aggravates the prevalence of cardiovascular diseases. E-cigarettes contain substances such as antifreeze and propylene glycol, which may cause allergies.

Mid to late 2019, vaping sparked an epidemic of EVALI in the US. Thousands of E-cigarette users, mostly males 13–34, had respiratory, GI, and systemic problems [5].

Interstitial lung disease from smoking appears as airway, pleura, and lung parenchyma problems with different radiological patterns. Clinical history, radiologic, and pathologic findings can differentiate rare diseases. Multidisciplinary diagnosis and treatment is recommended. [6] Example: interstitial. Interstitial pneumonia (ILD) is an inflammation of the lung's interstitial tissue, infecting the bronchial wall, alveolar wall, peribronchial arteries, and connective tissue between lobules and alveolar septa as necrotic lesions. Early symptoms of interstitial pneumonia are not obvious, but progressive dyspnea is present in severe cases of interstitial pneumonia. Later, the symptoms of interstitial pneumonia may change as the disease worsens.

Cough and dyspnea may be present in interstitial pneumonia. Thereafter, respiratory infections are often precipitated and exacerbated with progressive exacerbations. The common symptoms of interstitial pneumonia are irritant or coughing cough or sputum, rarely fever, hemoptysis or chest pain, and increased breathing but no asthma.

Unknown-cause ILD can't be prevented. The risk of idiopathic interstitial pulmonary fibrosis increases with the number of smokers. Prevention of ILD of known etiology should focus on monitoring long-term exposure to irritating gases such as chlorine, ammonia, carbon dioxide, formaldehyde, acid mists, and radiation damage, and regular pulmonary function measurements, blood gas analysis, and routine X-rays for early disease detection and timely diagnosis and treatment.

### *3.2. The lack of policies about e-cigarettes*

The inhalation of e-cigarette aerosol and nicotine levels result in unfavorable health effects for primary smokers and secondhand smokers [7-8]. ENDS regulation is difficult. Preventing kids and nonsmokers from becoming nicotine addicts using e-cigarettes is a difficulty. Tobacco corporations' plans to promote e-cigarettes as a "far safer alternative" while promoting flavors appealing to minors should be banned. Endorsing ENDS as social interaction devices opens the door for peer-pressured kids to make bad choices. Several studies have found that e-cigarettes lessen a smoker's exposure to hazardous tobacco smoke elements. Thus, e-cigarettes can help smokers quit. Balance between these two extremes requires multidimensional policy [9].

In China, the State Tobacco Monopoly Administration and the State Administration of Market Supervision and Administration recently released "Circular No. 1," which reaffirmed the 2018 ban on the sale of e-cigarettes to minors and made clear that since the date of issuance of the n, in order to further increase the protection of minors' physical and mental health and prevent minors from purchasing and smoking through the Internet Increased market oversight of e-cigarette products is necessary, as are tighter controls, efforts to restrict the promotion and sale of e-cigarettes online, as well as an investigation and possible punishment of any infractions that are discovered. The legal repercussions of breaking this provision are not stated in "Notice No. 1," hence the effectiveness of the notice's implementation depends on how the relevant departments police and penalize infractions.

### *3.3. Potentials for the reduction of e-cigarettes*

Few people know that e-cigarettes originated in China. Sixteen years ago, e-cigarettes were born in Shenyang, China, and Chinese pharmacist Han Li was recognized as the inventor of e-cigarettes. In 2004, the world's first e-cigarette was tested on the market. E-cigarettes have always been claimed to be "healthy and harmless" and "help quit smoking". Many people believe that e-cigarettes are harmless to health. This is just self-deception.

Strictly speaking, the authority is supposed to add punishment to people who sell novel flavor e-cigarettes and sell them to teenagers. Those people need to take legal responsibility. However, schools should add publicity and education about public health and individual health, to promote students' health awareness. This way might prevent teens from e-cigarettes or cigarettes at the source. At present, Chinese legislative measures related to tobacco control have not fully met the requirements of the WHO Framework Convention on Tobacco Control and play a role in protecting people from tobacco hazards

(lack of comprehensive smoke-free legislation in public places at the national level, relatively low tobacco consumption taxes and prices, no comprehensive ban on tobacco promotion and sponsorship, and the use of large-scale graphic health warnings on cigarette box packaging). Therefore, the control of e-cigarettes as tobacco products in China may not achieve the purpose of effective and strict regulation.

#### **4. Discussion**

The objective of this review is to spot literature and describe the effects of e-cigarettes on public health and human health. On one hand, e-cigarettes are recognized as the replacement for cigarettes, which is misleading for people who want to quit smoking. Human health can be damaged by its harmful contents. Inhaling e-cigarettes is a pathogenic factor of respiratory system disease, oral disease, and makes mental illness. Maslow's Hierarchy of Requirements is a motivational needs hypothesis. Human motivation is determined by human needs, and different requirements dominate at different times. People's needs range from physiological to transcendent: safety, belonging, esteem, cognitive, aesthetic, self-actualization, and transcendence. In my opinion, smoking is included in physiological needs. According to the theory, physiological need stands at the bottom of Maslow's pyramid model. So it is a basic need for people. It can explain why people love smoking very much. And because the e-cigarette is a kind of replacement for cigarettes, thus, some people are also addicted to e-cigarettes.

On the other hand, there is a lack of relevant policies. On February 13, according to foreign news reports, the U.S. federal government officially expressed its opposition to the e-cigarette epidemic sweeping the city and other parts of the country. However, New York City officials pointed out the limitations of the ban and said that New York has its laws applicable to law. On Thursday, the Federal Food and Drug Administration banned the censorship of incense e-cigarettes and their products. The statement said: according to this policy, companies that do not stop producing, distributing, and selling unauthorized incense boxed e-cigarettes (except tobacco or menthol) within 30 days may face enforcement action by the FDA. However, according to the New York Post, the federal ban does not include disposable products, including Puff Bar, which are also sold in convenience stores and gas stations across the country. Fortunately, New York City can rely on its law, which will prohibit the sale of seasoned e-cigarette products, including disposable products, and the city law that will come into effect in July prohibits the use of any refill or any other component of e-cigarettes. Besides, there are still shops that sell e-cigarettes around some schools. Although the law bans the sale of some flavors except original cigarette flavor, many online shops are still selling novel flavor e-cigarettes. By the way, there are many sales today. For example, in shopping malls, online shops, entertainment places, and so on. And the shop boss sometimes makes a discount for customers to drive customers to buy more e-cigarettes.

In a word, inhaling e-cigarettes and cigarettes is an important problem in public health. People should pay more attention to it.

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