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香港牙醫學會促請立法會儘快通過 《2019 年吸煙(公眾衛生)(修訂)條例草案》

本會促請立法會儘快通過《2019 年吸煙(公眾衛生)(修訂)條例草案》(《條例草案》), 防止香港市民承受電子煙、加熱煙及所有另類煙的禍害!

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預防勝於治療 制訂健康政策更勝良醫

本會十分同意立法會摘要文件中列出眾多的健康風險。電子煙、加熱煙及所有另類煙(下文統稱電子煙)亦會對口腔及牙齒的健康造成損害, 例如, 電子煙的煙霧可能含有多種毒素, 能令人更容易患上牙周病, 而電子煙中的香料會刺激牙周組織, 並可能因此加重牙周病的病情 [1]。而電子煙和傳統煙一樣被驗出多種致癌物, 因此, 可以預見口腔癌將會是電子煙的可能風險之一。

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口腔內發生的癌症包括口腔黏膜癌、舌癌、唾液腺癌等等。口腔癌的主要風險因素包括煙草的使用, 不論是吸煙還是咀嚼煙草[1]。香港人患上口腔癌的發病率近 25 年來一直偏低 [2], 從 1983 年起每 100,000 人中有 7 人患上口腔癌, 到 2000 年降至 5 人, 並於其後的十多年一直維持在約 5 人的低水平。這趨勢和香港人吸煙率下降的趨勢不謀而合。香港牙醫學界普遍認為, 香港人口腔癌患病率偏低是因為吸煙比率一直下降[3], 而另一個重要因素, 是香港早於 80 年代已全面禁止出



售無煙煙草產品，亦即是今天香港法例第 138BW 章《無煙煙草產品(禁止)規例》，而持有這些煙草產品亦受《藥劑業及毒藥條例》所限制，因此香港市面幾乎不能找到無煙煙草產品。由此可見，三十年前的遠見，成就了香港今日極低的口腔癌發病率，實在得來不易！

電子煙不論是否含有尼古丁，均會釋出致癌物[4]，包括甲醛類，而這些致癌物並沒有安全水平可以參照，它們的致癌性亦不一定隨份量較少而下降。因此，我們可以預期，若然有更多人選擇使用電子煙，香港口腔癌發病率將會明顯上升。事實上，香港人吸煙已令香港醫療系統百上加斤。有研究指出，香港人吸煙令香港整體經濟每年損失高達 52 億港元，其中最少 35 億直接用在醫療系統上治療吸煙引起的各種疾病和護理的費用[5]。因此，任何能阻止電子煙在市面流通的措施，都對香港人的健康、香港的醫療系統，以至整個政府的財政，都有莫大的幫助。

若然未來的電子煙能夠被改良至對公眾有明顯戒煙效用，而又能證實這些新產品能安全地被公眾使用的話，該產品在條例草案通過後仍然可以如摘要文件中第 18 段所述，以藥物名義註冊並在港合法銷售。因此，本會認為通過條例草案並不會影響所謂的「潛在好處」。

電子煙門戶效應強大 煙民數量恐急速上升

本會察覺到社會上有聲音建議香港政府應該監管電子煙而非完全禁止，例如禁止出售電子煙予未成年兒童、管制電子煙製造成分、規格等等。本會認為此方案不能接受。

綜觀多個立法監管電子煙的國家，不少難題都會陸續出現。政府難以有效執行監管，尤其是限制不能出售予未成年兒童方面，令兒童吸煙率大為上升 [6]。傳統煙民比率沒有下降，電子煙煙民比率卻節節上升，等同為煙草商打開了新市場，主要原因都是因為電子煙強大的門戶效應。不論是否吸煙者，也有不少人認為電子煙的禍害較少，因而接觸電子煙[7]。傳統煙民接轉用電子煙後，卻會因此而更不願意戒煙[8]。

本會認為不應以從事電子煙行業人士的收入，或者吸食電子煙人士的選擇作考慮，應該以市民整體健康、社會整體醫療系統及生產力負擔為重，不要讓電子煙像歐美國家如疫症般蔓延[9]，禍延青年人。



香港牙醫學會(有限公司)

Hong Kong Dental Association (Ltd.)

因此，本會認為立法會應儘快通過條例草案，為香港樹立更健康的國際形象！

此致

立法會主席及全體議員

二零一九年四月廿四日

廖偉明醫生
香港牙醫學會 會長

附加：

I. FDI 世界牙科聯盟前主席信件

II. 參考資料

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III. 參考連結

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- iii. <https://medicalxpress.com/news/2019-02-e-cigarette-users-cancer-linked-genetic.html>
- iv. <https://askthedentist.com/e-cigarettes-oral-health/>
- v. <https://www.sciencedaily.com/releases/2018/08/180820085208.htm>
- vi. <https://medicalxpress.com/news/2018-08-e-cigarettes-dna.html>
- vii. <https://www.123dentist.com/smoking-vaping-and-dental-care-in-2018/>
- viii. <https://www.deltadentalwa.com/blog/entry/2018/06/ecigarettes-vaping-dental-health>
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- x. <https://www.medicalnewstoday.com/articles/314190.php>
- xi. <https://www.urmc.rochester.edu/news/story/4667/first-ever-study-shows-e-cigarettes-cause-damage-to-gum-tissue.aspx>
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(Appendixes)

908 Manning House
48 Queen's Road Central
Hong Kong
23 April 2019

Professor Sophia Chan Siu-chee
Secretary for Food and Health
The Government of Hong Kong

Dear Professor Chan,

I am writing to you in support of the appeal to the Legislative Council on the ban of electronic cigarettes in Hong Kong submitted by the Hong Kong Dental Association.

The Hong Kong Dental Association is a member of the FDI World Dental Federation who has been active globally for more than three decades working towards the elimination of all forms of tobacco and nicotine usage in the global populations.

The harm and danger electronic cigarettes pose to the population are well-known as cited by the WHO World Health Organization. There is no reason to delay the proposal to ban the use of electronic cigarettes any longer.

Any threat to the health of our population should be eliminated and no compromises should be entertained.

Yours sincerely,



Dr Tin Chun Wong
Past President
FDI World Dental Federation

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1. Eur J Dent Educ. 2018 Nov;22(4):e751-e758. doi: 10.1111/eje.12390. Epub 2018 Aug 19.

The need to educate future dental professionals on E-cigarette effects.

Martín Carreras-Presas C, Naeim M, Hsiou D, Somacarrera Pérez ML, Messadi DV.

OBJECTIVE: To compare knowledge and attitude of dental students in two countries towards E-cigarettes and their long-term effects.

MATERIAL AND METHODS: An anonymous cross-sectional survey, using self-administered questionnaires, was conducted amongst dental students from the University of California, Los Angeles School of Dentistry (UCLA) and Universidad Europea of Madrid (UE).

RESULTS: There were significant differences in knowledge and perception of E-cigarettes between dental students from both countries. Three (3%) of the participants from UE sample smoked E-cigarettes every day, compared to none of the students from UCLA. Almost 54 (80%) students from UCLA claimed that they had never experimented with an E-cigarette, whereas 61 (65%) of UE sample reported not having experimented with E-cigarettes in the past. More than 15% of students in both populations were unsure of the potentially harmful effects of E-cigarette usage. A significantly higher proportion of the Spanish sample used conventional cigarettes compared to the US sample 53 (56%) compared to 36 (24%), $P < 0.001$. In addition, when compared to the UE sample, UCLA students rated E-cigarettes as being less harmful overall than tobacco $P < 0.001$. Furthermore, more than 86% of both populations indicated interest in learning more about the potential risks associated with E-cigarettes.

CONCLUSIONS: This survey indicated that students from one dental school in the United States of America (USA) and one in Spain lacked the knowledge to address the rising E-cigarette population usage and provide information regarding them to patients. Specific educational programmes on E-cigarette hazards and long-term effects on oral and systemic health should be implemented in dental curricula in both of these schools in order to stay receptive to the changing field of tobacco education.

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2. BMC Oral Health. 2015 Jul 24;15:83. doi: 10.1186/s12903-015-0074-y.

Oral cavity cancer trends over the past 25 years in Hong Kong: a multidirectional statistical analysis.

Ushida K, McGrath CP, Lo EC, Zwahjen RA.

BACKGROUND: Even though oral cavity cancer (OCC; ICD 10 codes C01, C02, C03, C04, C05, and C06) ranks eleventh among the world's most common cancers, accounting for approximately 2 % of all cancers, a trend analysis of OCC in Hong Kong is lacking. Hong Kong has experienced rapid economic growth with socio-cultural and environmental change after the Second World War. This together with the collected data in the cancer registry provides interesting ground for an epidemiological study on the influence of socio-cultural and environmental factors on OCC etiology.

METHODS: A multidirectional statistical analysis of the OCC trends over the past 25 years was performed using the databases of the Hong Kong Cancer Registry. The age, period, and cohort (APC) modeling was applied to determine age, period, and cohort effects on OCC development. Joinpoint regression analysis was used to find secular trend changes of both age-standardized and age-specific incidence rates.

RESULTS: The APC model detected that OCC development in men was mainly dominated by the age effect, whereas in women an increasing linear period effect together with an age effect became evident. The joinpoint regression analysis showed a general downward trend of age-standardized incidence rates of OCC for men during the entire investigated period, whereas women demonstrated a significant upward trend from 2001 onwards.

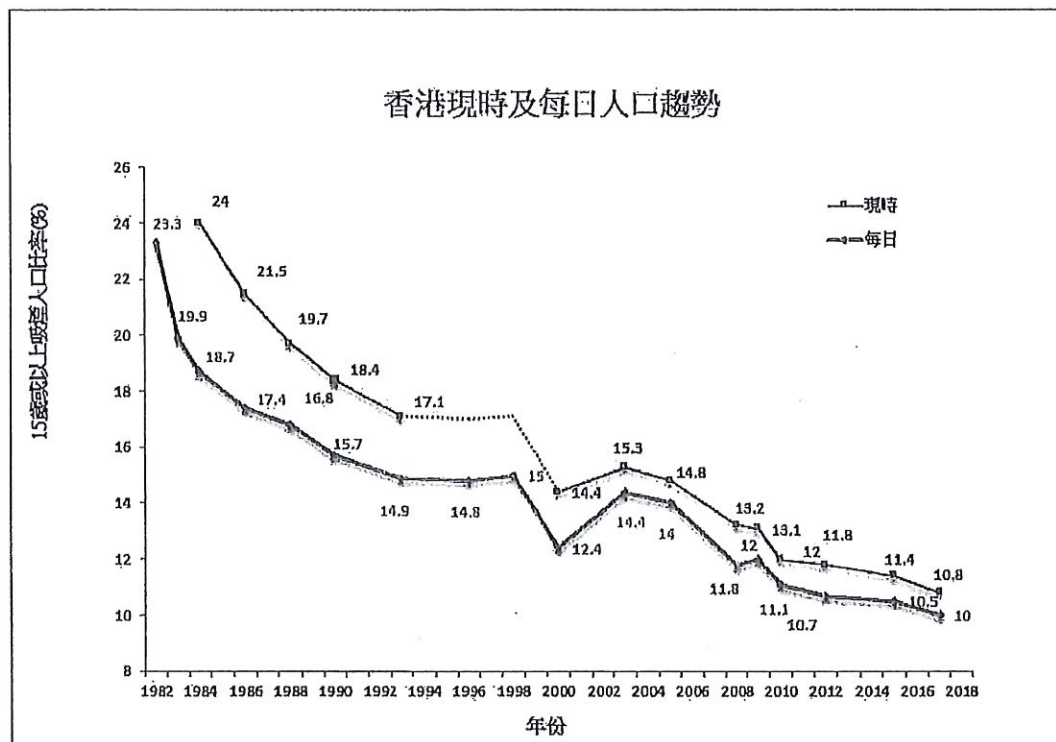
CONCLUSIONS: The results suggest that OCC incidence in Hong Kong appears to be associated with cumulative risk behaviors of the population, despite considerable socio-cultural and environmental changes after the Second World War.

DOI: 10.1186/s12903-015-0074-y

PMCID: PMC4513384

PMID: 26205649 [Indexed for MEDLINE]

3.



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Levels of selected carcinogens and toxicants in vapour from electronic cigarettes.

Goniewicz ML, Knysak J, Gawron M, Kosmider L, Sobczak A, Kurek J, Prokopowicz A, Jablonska-Czapla M, Rosik-Dulewska C, Havel C, Jacob P 3rd, Benowitz N.

SIGNIFICANCE: Electronic cigarettes, also known as e-cigarettes, are devices designed to imitate regular cigarettes and deliver nicotine via inhalation without combusting tobacco. They are purported to deliver nicotine without other toxicants and to be a safer alternative to regular cigarettes. However, little toxicity testing has been performed to evaluate the chemical nature of vapour generated from e-cigarettes. The aim of this study was to screen e-cigarette vapours for content of four groups of potentially toxic and carcinogenic compounds: carbonyls, volatile organic compounds, nitrosamines and heavy metals.

MATERIALS AND METHODS: Vapours were generated from 12 brands of e-cigarettes and the reference product, the medicinal nicotine inhaler, in controlled conditions using a modified smoking machine. The selected toxic compounds were extracted from vapours into a solid or liquid phase and analysed with chromatographic and spectroscopy methods.

RESULTS: We found that the e-cigarette vapours contained some toxic substances. The levels of the toxicants were 9-450 times lower than in cigarette smoke and were, in many cases, comparable with trace amounts found in the reference product.

CONCLUSIONS: Our findings are consistent with the idea that substituting tobacco cigarettes with e-cigarettes may substantially reduce exposure to selected tobacco-specific toxicants. E-cigarettes as a harm reduction strategy among smokers unwilling to quit, warrants further study. (To view this abstract in Polish and German, please see the supplementary files online.).

DOI: 10.1136/tobaccocontrol-2012-050859

PMCID: PMC4154473

PMID: 23467656 [Indexed for MEDLINE]

Economic costs attributable to smoking in Hong Kong in 2011: a possible increase from 1998.

Chen J, McGhee S, Lam TH.

Background: Reduction in smoking prevalence does not necessarily reduce the costs of smoking as evidence shows in developed countries. We provide up-to-date estimates for direct and indirect costs attributable to smoking in Hong Kong in 2011 and compare with our 1998 estimates.

Methods: We took a societal perspective to include lives and life years lost, health care costs and time lost from work in the costing. We followed guidelines on estimating costs of active smoking for those aged 35 years or above (35+) and costs due to SHS exposure for 35+, infants aged 12 months and under and children aged 15 and below. All costs are in US\$.

Results: We estimated that 6154 deaths among 35+ in Hong Kong in 2011 were attributable to active smoking, an increase of 10% from 1998. Besides, 672 deaths were attributable to SHS exposure, i.e. 10% of the total 6826 smoking-attributable deaths. The estimate of productive life lost due to deaths from active smoking by those aged under 65 years in 2011 was \$166 million, an increase of about 4% over the estimate in 1998. Our conservative estimate of the annual tobacco-related disease cost in 2011 was \$716 million which accounted for 0.3% of GDP. If we added the value of attributable lives lost, the annual cost would be \$4.7 billion.

Conclusion: Despite the reduction in smoking prevalence, smoking-attributable disease still imposes a substantial economic burden on Hong Kong society. These findings support more stringent and effective tobacco control legislation, policies and measures.

Implications: Current evidence shows reduction in smoking prevalence does not necessarily reduce the economic costs of smoking. Most studies in developed countries employed a societal perspective, including costs of productivity loss and indirect costs, but not all studies estimated costs associated with second-hand smoking (SHS). The present study estimated the total costs of smoking in Hong Kong including direct and indirect costs attributable to active smoking and to SHS exposure. Our study confirms the pattern of smoking epidemic in developed countries, forewarns the increasing economic burdens from tobacco, and provides East Asian countries with a prediction of their own future costs.

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DOI: [10.1093/ntr/ntx254](https://doi.org/10.1093/ntr/ntx254)

PMID: 29149286

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E-cigarettes, Cigarettes, and the Prevalence of Adolescent Tobacco Use.

Barrington-Trimis JL, Urman R, Leventhal AM, Gauderman WJ, Cruz TB, Gilreath TD, Howland S, Unger JB, Berhane K, Samet JM, McConnell R.

BACKGROUND: Adolescent e-cigarette use has increased rapidly in recent years, but it is unclear whether e-cigarettes are merely substituting for cigarettes or whether e-cigarettes are being used by those who would not otherwise have smoked. To understand the role of e-cigarettes in overall tobacco product use, we examine prevalence rates from Southern California adolescents over 2 decades.

METHODS: The Children's Health Study is a longitudinal study of cohorts reaching 12th grade in 1995, 1998, 2001, 2004, and 2014. Cohorts were enrolled from entire classrooms in schools in selected communities and followed prospectively through completion of secondary school. Analyses used data from grades 11 and 12 of each cohort (N = 5490).

RESULTS: Among 12th-grade students, the combined adjusted prevalence of current cigarette or e-cigarette use in 2014 was 13.7%. This was substantially greater than the 9.0% adjusted prevalence of current cigarette use in 2004, before e-cigarettes were available ($P = .003$) and only slightly less than the 14.7% adjusted prevalence of smoking in 2001 ($P = .54$). Similar patterns were observed for prevalence rates in 11th grade, for rates of ever use, and among both male and female adolescents and both Hispanic and Non-Hispanic White adolescents.

CONCLUSIONS: Smoking prevalence among Southern California adolescents has declined over 2 decades, but the high prevalence of combined e-cigarette or cigarette use in 2014, compared with historical Southern California smoking prevalence, suggests that e-cigarettes are not merely substituting for cigarettes and indicates that e-cigarette use is occurring in adolescents who would not otherwise have used tobacco products.

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DOI: 10.1542/peds.2015-3983

PMCID: PMC4960723

PMID: 27401102 [Indexed for MEDLINE]

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Electronic cigarette use by college students.

Sutfin EL, McCoy TP, Morrell HE, Hoeppe BB, Wolfson M.

BACKGROUND: Electronic cigarettes, or e-cigarettes, are battery operated devices that deliver nicotine via inhaled vapor. There is considerable controversy about the disease risk and toxicity of e-cigarettes and empirical evidence on short- and long-term health effects is minimal. Limited data on e-cigarette use and correlates exist, and to our knowledge, no prevalence rates among U.S. college students have been reported. This study aimed to estimate the prevalence of e-cigarette use and identify correlates of use among a large, multi-institution, random sample of college students.

METHODS: 4444 students from 8 colleges in North Carolina completed a Web-based survey in fall 2009.

RESULTS: Ever use of e-cigarettes was reported by 4.9% of students, with 1.5% reporting past month use. Correlates of ever use included male gender, Hispanic or "Other race" (compared to non-Hispanic Whites), Greek affiliation, conventional cigarette smoking and e-cigarette harm perceptions. Although e-cigarette use was more common among conventional cigarette smokers, 12% of ever e-cigarette users had never smoked a conventional cigarette. Among current cigarette smokers, e-cigarette use was negatively associated with lack of knowledge about e-cigarette harm, but was not associated with intentions to quit.

CONCLUSIONS: Although e-cigarette use was more common among conventional cigarette smokers, it was not exclusive to them. E-cigarette use was not associated with intentions to quit smoking among a sub-sample of conventional cigarette smokers. Unlike older, more established cigarette smokers, e-cigarette use by college students does not appear to be motivated by the desire to quit cigarette smoking.

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DOI: 10.1016/j.drugalcdep.2013.05.001

PMCID: PMC3760168

PMID: 23746429 [Indexed for MEDLINE]

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E-cigarettes and smoking cessation in real-world and clinical settings: a systematic review and meta-analysis.

Kalkhoran S, Glantz SA.

BACKGROUND: Smokers increasingly use e-cigarettes for many reasons, including attempts to quit combustible cigarettes and to use nicotine where smoking is prohibited. We aimed to assess the association between e-cigarette use and cigarette smoking cessation among adult cigarette smokers, irrespective of their motivation for using e-cigarettes.

METHODS: PubMed and Web of Science were searched between April 27, 2015, and June 17, 2015. Data extracted included study location, design, population, definition and prevalence of e-cigarette use, comparison group (if applicable), cigarette consumption, level of nicotine dependence, other confounders, definition of quitting smoking, and odds of quitting smoking. The primary endpoint was cigarette smoking cessation. Odds of smoking cessation among smokers using e-cigarettes compared with smokers not using e-cigarettes were assessed using a random effects meta-analysis. A modification of the ACROBAT-NRSI tool and the Cochrane Risk of Bias Tool were used to assess bias. This meta-analysis is registered with PROSPERO (number CRD42015020382).

FINDINGS: 38 studies (of 577 studies identified) were included in the systematic review; all 20 studies with control groups (15 cohort studies, three cross-sectional studies, and two clinical trials) were included in random effects meta-analysis and sensitivity analyses. Odds of quitting cigarettes were 28% lower in those who used e-cigarettes compared with those who did not use e-cigarettes (odds ratio [OR] 0.72, 95% CI 0.57-0.91). Association of e-cigarette use with quitting did not significantly differ among studies of all smokers using e-cigarettes (irrespective of interest in quitting cigarettes) compared with studies of only smokers interested in cigarette cessation (OR 0.63, 95% CI 0.45-0.86 vs 0.86, 0.60-1.23; $p=0.94$). Other study characteristics (design, population, comparison group, control variables, time of exposure assessment, biochemical verification of abstinence, and definition of e-cigarette use) were also not associated with the overall effect size ($p\geq 0.77$ in all cases).

INTERPRETATION: As currently being used, e-cigarettes are associated with significantly less quitting among smokers.

FUNDING: National Institutes of Health, National Cancer Institute, FDA Center for Tobacco Products.

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Evolving “The Real Cost” Campaign to Address the Rising Epidemic of Youth E-cigarette Use



Mitchell Zeller, JD

INTRODUCTION

As we approach the tenth anniversary of the Family Smoking Prevention and Tobacco Control Act, signed into law in June 2009, an animating principle underlying its foundation remains clear: One of the most important ways the U.S. Food and Drug Administration (FDA) and its Center for Tobacco Products can reduce the disease and death caused by tobacco use is by preventing current and future generations of children from starting down a path of lifelong addiction to nicotine—the highly addictive drug found in tobacco.¹ Age of initiation is a critical concern because nicotine's effect on the developing adolescent brain is profound.^{2–4} Nicotine can make structural changes to the brain to increase the number of nicotinic receptors, effectively “rewiring” the brain to crave more nicotine.⁵ Even occasional tobacco use in adolescence can lead to addiction, with some teens reporting nicotine cravings and other symptoms of addiction after experimenting with fewer than ten cigarettes.^{6,7} The insidious nature of nicotine, and its pivotal role in creating and sustaining addiction to deadly tobacco products, underscores the need for a multipronged regulatory approach that prioritizes youth prevention.

Since its inception, the FDA Center for Tobacco Products has taken clear and meaningful measures to help keep tobacco products out of the hands of youth by issuing and enforcing laws designed to reduce youth access to and use of tobacco products, and by educating the public—including tobacco retailers on the frontlines of youth tobacco use—about the harms of using these products. Public education campaigns, like “The Real Cost,” are an essential component of FDA's efforts and have already achieved significant results—including preventing nearly 350,000 youth aged 11–18 years from initiating smoking between 2014 and 2016.⁸ FDA also continues to consider and implement the most appropriate regulatory actions to make tobacco products less toxic, appealing, and addictive, including products deemed subject to the agency's tobacco authorities in 2016 (i.e., hookah, cigars, and e-cigarettes). Yet, although

the U.S. continues to see the impact of these and other comprehensive tobacco control efforts on driving down youth use of combustible tobacco products, our collective work is far from done, and the challenges before us are substantial.

ADDRESSING THE RISE OF YOUTH E-CIGARETTE USE

The advent of e-cigarettes presents a significant opportunity for addicted adult smokers to transition from conventional cigarettes to potentially less dangerous nicotine delivery products. However, the appeal to youth of these same products—and the rapid increase of “vaping” among teens nationwide—threatens to undermine decades of public health efforts to prevent and reduce youth tobacco use. E-cigarettes are the most commonly used tobacco product among youth in the U.S., with more than 3.6 million middle and high school students reporting current e-cigarette use in 2018.⁹ Also troubling is data indicating the overwhelming majority of youth do not perceive “great risk” of harm in using e-cigarettes regularly,¹⁰ as well as research suggesting youth who use e-cigarettes are more likely to try smoking conventional cigarettes.¹¹ Equally concerning is seeing social norms around tobacco use start to backslide as popular e-cigarette products become a social currency among teens with striking similarities to the “cool factor” associated with conventional cigarette smoking years ago. Certain products, like JUUL, with their sleek designs, appealing flavors, low aerosol emissions, and high nicotine content have the

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potential to change the trajectory of youth tobacco use for decades to come, making targeted action to address youth e-cigarette use imperative.

In April 2018, under a new Youth Tobacco Prevention Plan and as part of FDA's Comprehensive Plan for Tobacco and Nicotine Regulation, we announced our intentions to take new and significant actions to further address the growing epidemic of youth e-cigarette use. Such actions have included stepping up compliance and enforcement efforts targeting illegal sales and marketing of e-cigarettes to minors, asking manufacturers of top-selling brands to tell us their plans for addressing widespread youth access to and use of their products, and re-examining the compliance policies for e-cigarette companies to comply with deeming regulations. In addition, evidence-based and sufficiently funded mass media campaigns play a critical, strategic role in supporting and amplifying FDA's regulatory efforts and have demonstrated the power of public education to save thousands of lives and reduce the incredible burden of tobacco use in the U.S.

"THE REAL COST" YOUTH E-CIGARETTE PREVENTION CAMPAIGN

Building on the success of its youth smoking prevention effort, FDA expanded "The Real Cost" campaign in September 2018 with new, hard-hitting advertising designed to educate youth about the dangers of using e-cigarettes in adolescence. The campaign is designed to reach the more than 10.7 million youth aged 12–17 years who have used e-cigarettes or are open to trying them.¹² These youth are particularly challenging to reach and motivate with messages about the harms of using e-cigarettes considering e-cigarettes have some of the lowest risk perceptions among youth, in addition to alcohol.¹⁰ In fact, FDA's research with at-risk teens suggests that teens realize e-cigarettes can be addictive, but they are not concerned about becoming addicted to e-cigarettes because they do not see these products as harmful. Without a stronger health effects message, addiction risks are not sufficiently compelling to these teens. However, teens in the research we conducted expressed a desire to know if e-cigarettes were, in fact, harmful. With these and other insights, the campaign aims to challenge teens' cost-free mentality with messages about the risks of using e-cigarettes, including nicotine's impact on the developing brain and potential exposure to harmful chemicals known to cause serious health effects.^{13–17}

Considering the multifaceted goals of FDA's Comprehensive Plan for Tobacco and Nicotine regulation, the youth e-cigarette prevention campaign ads were also tested with adult smokers to assess whether they had any

unintended effects among adults who wanted to quit smoking. Although the ads did not discourage adults from attempting to quit cigarettes, the testing suggested that the ads may discourage some adults from switching to a potentially less harmful product, like e-cigarettes, because their perceptions of risk increased (FDA, unpublished data, 2018). As a result of these findings, the campaign is carefully targeted to reach youth online and in school, limiting exposure of the advertising to adults. The ads are delivered to teens on relevant digital and social media channels like YouTube, Spotify, Pandora, Facebook, and Instagram. Furthermore, as teens are increasingly faced with the opportunity to use e-cigarettes when they are in the school environment, the campaign also reaches teens with digital media and printed prevention messages in more than 10,000 high schools across the nation.

By using the power of advertising to persuade a new generation of young people to stay away from tobacco products, we are helping move our nation toward a future where tobacco use is no longer the leading cause of preventable death and disease. FDA regulatory strategies and tools will continue to evolve as necessary to ensure that youth are protected from tobacco products, including e-cigarettes.

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The author would like to thank and gratefully acknowledge the many professionals at FDA who have contributed to the success of "The Real Cost" campaign over the past 5 years and are continuing to build on that success in support of our mission to prevent youth tobacco use in the U.S.

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E-cigarettes 'could give you mouth cancer by damaging your DNA'

 oralcancernews.org/wp/e-cigarettes-could-give-you-mouth-cancer-by-damaging-your-dna/

Source: metro.co.uk

Author: Zoe Drewett

Researchers say vaping could lead to an increased risk of developing mouth cancer. A study carried out by the American Chemical Society found evidence to suggest using e-cigarettes raises the level of DNA-damaging compounds in the mouth. If cells in the body are unable to repair the DNA damage after vaping, the risk of cancer can increase, the study claims.



The long-term effects of e-cigarettes are not yet known but researchers say they should be investigated further (Picture: PA)

The researchers admit the long-term health effects of using electronic cigarettes are still unknown. Researcher Dr Romel Dator said: 'We want to characterize the chemicals that vapers are exposed to, as well as any DNA damage they may cause.'

Since they were introduced in 2004, e-cigarettes have been marketed as a safer alternative to smoking. But the team carrying out the study claim genetic material in the oral cells of people who vape could be altered by toxic chemicals. E-cigarettes work by heating a liquid – which usually contains nicotine – into an aerosol that the user inhales. It is often flavoured to taste like fruit, chocolate or bubblegum.

'It's clear that more carcinogens arise from the combustion of tobacco in regular cigarettes than from the vapor of e-cigarettes,' Silvia Balbo, the project's lead investigator said. 'However, we don't really know the impact of inhaling the combination of compounds produced by this device. 'Just because the threats are different doesn't mean that e-cigarettes are completely safe.' The

latest study, due to be presented at a meeting of the American Chemical Society this week, analysed the saliva and mouth cells of five e-cigarette users before and after a 15-minute vaping session.

Researchers found levels of the toxic chemicals formaldehyde, acrolein and methylglyoxal had increased after vaping. Now they plan to follow up on the preliminary study with a larger one involving more e-cigarette users. They also want to see how the level of toxic chemicals differs between e-cigarette users and regular cigarette smokers.

According to a 2016 report by the US Surgeon General, 13.5% of middle school students, 37.7% of high school students and 35.8% of 18 to 24-year-olds have used e-cigarettes, compared with 16.4% of adults aged 25 and over. Ms Balbo, a professor at the Masonic Cancer Center at the University of Minnesota, said:

'Comparing e-cigarettes and tobacco cigarettes is really like comparing apples and oranges. The exposures are completely different. 'We still don't know exactly what these e-cigarette devices are doing and what kinds of effects they may have on health, but our findings suggest that a closer look is warranted.'

Oral Carcinoma Associated with Chronic Use of Electronic Cigarettes

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Abstract

The electronic cigarette (E-cigarette) is a handheld electronic device that vaporizes a nicotine-containing fluid for inhalation. Invented in 2003 by Chinese pharmacist Hon Lik, the E-cigarette was developed as a substitute for tobacco cigarettes. The use of E-cigarettes continues to grow in popularity in most parts of the world, and many consider their use and the use of other electronic nicotine delivery systems (ENDS) to be healthier than smoking tobacco cigarettes. There is a paucity of medical research, however, to support that notion. In particular, the impact of chronic use of E-cigarettes and ENDS has not been studied adequately. Herein, we report two cases of oral carcinoma associated with chronic use of E-cigarettes. These highlight the need for increased awareness of this important, and potentially fatal, risk. Physicians, dentists and other health care providers must be made aware and should consider regularly-scheduled, comprehensive oral examinations of their patients that regularly use E-cigarettes or ENDS. In the United States, the Food and Drug Administration (FDA) collects adverse effect and safety data at their Safety Reporting Portal for Tobacco Products (<https://www.fda.gov/TobaccoProducts/PublicHealthScienceResearch>). Adverse effects suspected to be related to the use of E-cigarettes or ENDS should be reported to the FDA or to analogous regulatory governances in other countries.

Keywords: E-cigarette; Electronic cigarette; Electronic nicotine delivery systems; ENDS; Oral carcinoma; Oral cancer; Squamous cell carcinoma

and ENDS continues to increase across the world, health care providers need to be aware of the possible increased risk of oral carcinoma [6].

Introduction

Hookah pens, vaporizers, vape pens, E-cigarettes and E-pipes are some of the many type of Electronic Nicotine Delivery Systems (ENDS). In addition to liquid containing nicotine, propylene glycol, glycerin, flavorings and water are vaporized into an aerosol that the user inhales [1-4]. Many ENDS are commercial manufactured to look like conventional cigarettes or cigars, but some are manufactured to resemble everyday items (e.g. pens), and other types of ENDS (e.g. hookah devices) bear no resemblance to cigarettes or cigars. Claims that ENDS contain "only water vapour and nicotine" are false: the vapour has been found to contain varying amounts of heavy metals (Nickel, Tin, Silver, Aluminum, Mercury and Chromium) as well as carbonyls and other organic volatile compounds [4].

Herein we describe two cases of oral carcinoma associated with chronic E-cigarette use in otherwise healthy individuals. In both cases, their use of E-cigarettes began in 2003 and continued for more than 10 years. Neither patient had a family history of oral carcinoma nor did either have a history of known risk factors for oral carcinoma (e.g. hematopoietic stem-cell transplant, chronic heavy alcohol consumption, smoking or Human Papilloma Virus infection) [5,6]. Neither patient had diagnoses of acute or chronic oral infections caused by other microorganisms (e.g. fungi, bacteria, virus). Neither patient had a history of consumption/chewing of tobacco, paan (betel leaf mixed with areca nut) or other leaf types. Importantly, both presented with the same triad of symptoms - unintended weight loss, dry mouth, and difficulty swallowing. As the popularity of E-cigarettes

Case Reports

Case 1

A 66-year-old male presented to the out-patient office (otolaryngology) with chief complaints of unintended weight loss, dysphagia and xerostomia. His immunization records were up to date for Human Papilloma Virus, Varicella Zoster Virus and Hepatitis B Virus. His past medical history was unremarkable other than a social history positive for use of E-cigarettes (20 times per day for past 13 years). Examination of the oral cavity was consistent with xerostomia, and there were several areas of induration and paresthesia of the tongue. Several exophytic masses were present with surrounding hyperkeratotic areas with histological features of lichen planus. As infection or carcinoma were the chief suspects, the following clinical laboratory tests were ordered: complete blood count; complete blood chemistry panel; and blood calcium, liver enzymes, ferritin, urea, alpha-antitrypsin and alpha-anti-glycoprotein levels. Importantly, increased levels of serum ferritin, alpha-antitrypsin, and alpha-anti-glycoprotein are often associated with later stages of oral cancer. A tissue biopsy was performed and reported as follows: A small piece of tissue was cut from an abnormal paraesthesia, keratotic region at the anterior aspect of the tongue. This incisional biopsy was taken at the office, and neither general anesthesia nor localized anesthesia were needed. The removed tissue was cut into thin sections, placed on slides and stained before further processing to "frozen section" and "permanent section". Histopathology revealed a moderately

collagenous connective tissue stroma infiltrated with nests and islands of tumor epithelial cells. The tumor cells exhibited a basaloid appearance with hyperchromatic nuclei and scanty cytoplasm and were arranged in a lobular configuration. Occasional squamous differentiation was also noted and a large number of mitotic figures with nuclear atypia were observed. A diagnosis of basaloid squamous cell carcinoma was given. Oncologist was notified to follow-up.

Case 2

A 59-year-old male presented to an out-patient otolaryngology office with a chief complaint of a 9-month history of a non-healing ulceration of the lower lip. No pain or discomfort was reported by the patient, but the patient reported having some difficulty swallowing and severe dry mouth. No history of trauma to the area was reported and the patient denied a history of alcohol use. The patient reported consistent, routine dental care throughout his life but reported that he had smoked 30 E-cigarettes per day for the past 13 years. The patient's health history was otherwise unremarkable. Other than an ulcerative lesion (1-cm in diameter) on the vermillion of the lower lip, examination of the head and neck region was without abnormalities. Vitals signs were within normal limits, and no palpable lymph nodes were detected. No other abnormal extra oral findings were noted, and palpation of the lesion revealed induration at the periphery of the lesion. Basal squamous cell carcinoma was suspected, and the following clinical laboratory tests were ordered: complete blood count; complete blood chemistry panel; and blood calcium, liver enzymes, ferritin, urea, alpha-antitrypsin and alpha-anti-glycoprotein levels. Again, it is important to note that increased levels of serum ferritin, alpha-antitrypsin and alpha-anti-glycoprotein are often associated with later stages of oral cancer. An incisional tissue biopsy was examined for histologic analysis, and histopathological examination revealed a dysplastic stratified squamous epithelium infiltrating into underlying moderately collagenous connective tissue. The infiltrating tumor cells had a basaloid appearance. Nuclear atypia was observed and pleomorphisms with large numbers of mitotic figures were noted. A diagnosis of basaloid squamous cell carcinoma was made, and an Oncologist was scheduled for follow-up.

Summary

Clinical findings

Oral cancer may occur on the floor of the mouth, the lining of the cheek, the gingiva (gums), the lips or the palate (roof of the mouth) [7]. Early-stage symptoms can include persistent red or white patches, a non-healing ulcer, progressive swelling or enlargement, unusual surface changes, sudden tooth mobility without apparent cause, unusual oral bleeding or epistaxis and prolonged hoarseness. Late-stage symptoms can include induration of affected areas(s), paresthesia/dysesthesia of the tongue or lips, airway obstruction, chronic serous otitis media, dysphagia, cervical lymphadenopathy, and persistent pain. Oral cavity cancers can manifest as a red lesion (erythroplakia), a granular ulcer with fissuring or raised exophytic margins, a non-healing extraction socket or as a lesion fixed to deeper tissues [8].

Laboratory findings

A diagnosis of oral cancer is confirmed by tissue-biopsy microscopy. As more than 90% of oral cancers are squamous cell carcinoma, a FOXM1-based diagnostic test, quantitative malignancy diagnostic

system (qMIDS), is used to confirm diagnosis and quantify the aggressiveness of squamous cell carcinomas [9,10]. Bacterial identification testing also has some predictive value: *C. gingivalis*, *P. melaninogenica* and *S. mitis* have a predictive value of about 80% for oral squamous cell carcinoma. About 5% of oral cancer are verrucous carcinoma, a very slow-growing cancer also comprised of squamous cells and the remainder (<5%) of oral carcinomas are either minor salivary gland carcinoma or lymphoma [9,10].

Treatment

Surgical excision can be curative for oral cancers limited in size. Inoperable tumors are treated with radiation +/- chemotherapy, and more definitive treatment often combines these with surgery (e.g. maxillectomy, mandibulectomy, glossectomy and radical neck dissection) [8].

Pathophysiology

Tobacco is a known risk factor for oral cancer, and about 80% of patients with oral cancers have a history of smoking or chewing tobacco. An interaction between redox-active metals in saliva and the low reactive free radicals in tobacco smoke that results in saliva losing much of its antioxidant capacity [8]. Other known risk factors include gender (males are twice as likely as females to develop oral cancer), routine alcohol consumption (70% of patients with oral cancer regularly consume alcohol), chewing betel quid (a leaf from the betel plant wrapped around areca nut and lime) combined or without tobacco, human papilloma viruses (HPV) infection (about 25% of patients with oral cancer have HPV, particularly HPV-16), immune-system suppression, lichen planus infection (itchy rash +/- white lines or spots in oral cavity) and graft-versus-host disease (secondary to stem-cell transplant) [3,6,9].

Discussion

Nicotine solutions commercially available for use with ENDS and E-cigarettes can contain up to 100mg/mL of nicotine (as little as 1mg of nicotine can cause symptoms in a toddler and 6 to 13 mg/kg can be lethal in toddlers) [4]. In addition to nicotine, diethylene glycol, ethylene glycol, ethanol, formaldehyde, acrolein and various amounts of heavy metals (nickel, tin, silver, aluminum, mercury and chromium) comprise the inhaled vapour [4]. The effects of chronic exposure to these chemicals are unknown but should not be considered benign (several have known toxicity). Patients seeking smoking cessation should consider approved nicotine replacement delivers products (gums, patches, lozenges) instead of the use of E-cigarettes or ENDS.

Conclusion

Tobacco cigarette smoking is a known risk for cancers, including oral cancer. Patients and clinicians (physicians, dentist and nurses) need to be aware that the use of electronic-cigarettes (E-cigarettes) or other electronic nicotine delivery systems (ENDS) may also be associated with an increased risk of oral cancer. Here we describe two patients, with positive history for chronic E-cigarette use, that developed oral cancer without any identifiable risk factors other than E-cigarette use. Further investigation is warranted.

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Conflict of Interest

None

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E-cigarette users show cancer-linked genetic changes

15 February 2019, by Leigh Hopper



While studies have indicated that vaping can help smokers quit, USC researchers say the health consequences of using a e-cigarettes may be worse than widely believed. Credit: Photo/Pixabay

If you think vaping is benign, think again

A USC study in 93 people shows that e-cigarette users develop some of the same cancer-related molecular changes in oral tissue as cigarette smokers, adding to the growing concern that e-cigarettes aren't a harmless alternative to smoking.

The research, published this week in the *International Journal of Molecular Sciences*, comes amid a mushrooming e-cigarette market and mounting public health worries.

On a positive note, recent research found vaping is almost twice as effective as other nicotine replacement therapies in helping smokers quit.

But among adolescents, vaping now surpasses smoking, and there's evidence that e-cigarette use leads to nicotine addiction and future smoking in teens.

"The existing data show that e-cig vapor is not merely 'water vapor' as some people believe," said Ahmad Besaratinia, an associate professor at Keck School of Medicine of USC and the study's senior author. "Although the concentrations of most carcinogenic compounds in e-cig products are much lower than those in cigarette smoke, there is no safe level of exposure to carcinogens."

E-cigs and cancer: Early warning in oral cells

Besaratinia emphasized that the molecular changes seen in the study aren't cancer, or even pre-cancer, but rather an early warning of a process that could potentially lead to cancer if unchecked.

The researchers looked at gene expression in oral cells collected from 42 e-cigarette users, 24 cigarette smokers and 27 people who didn't smoke or vape. Gene expression is the process by which instructions in our DNA are converted into a functional product, such as a protein. Certain alterations in gene expression can lead to cancer.

They focused on oral epithelial cells, which line the mouth. More than 90 percent of smoking-related cancers originate in epithelial tissue, and oral cancer is associated with tobacco use.

Both smokers and vapers showed abnormal expression, or deregulation, in a large number of genes linked to cancer development. Twenty-six percent of the deregulated genes in e-cig users were identical to those found in smokers. Some deregulated genes found in e-cig users, but not in smokers, are nevertheless implicated in lung cancer, esophageal cancer, bladder cancer, ovarian cancer and leukemia.

E-cigs and cancer: What's next?

Besaratinia and his team plan to replicate his findings in a larger group of subjects and explore



the mechanisms that cause gene deregulation. He's also launching another experiment in which smokers switch to e-cigs; he wants to see whether any changes in gene regulation occur after the switch.

"For the most part, the participants are as curious as we are to know whether these products are safe," he said.

More information: Stella Tommasi et al.
Deregulation of Biologically Significant Genes and Associated Molecular Pathways in the Oral Epithelium of Electronic Cigarette Users, *International Journal of Molecular Sciences* (2019).
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Provided by Leigh Hopper

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ORAL & OVERALL HEALTH

no smoke, but plenty of fire: how do e-cigarettes affect oral health?

e-cigarettes are said to be safer than regular cigarettes since they produce an aerosol instead of smoke. since nicotine is delivered, there are large oral health implications for users of e-cigarettes.



E-Cigarettes Question: I was never really a smoker, but I've used an e-cigarette for about two years, although I hardly put any nicotine in it these days. (Dropping from 18 mg to probably 4-6 mg the past year). I've always had healthy teeth, but recently realized that my gums are receding, especially on the side where I "vape" from. Using an e-cigarette hasn't seemed to impact my teeth at all, but is it unhealthy for gums? Is there anything I should be doing aside from flossing and delicate brushing that could help keep my gums healthy or stop the recession?

Answer: It's easy to see why e-cigarettes seem like a fantastic alternative to regular cigarettes. E-cigarettes don't contain tobacco, although they do contain nicotine derived from the tobacco plant, and they don't produce smoke — instead they are battery-powered and work by producing an aerosol that you "vape" — so you can use them anywhere.

The problem is, e-cigarettes have not been fully studied.

In 2014, the US Food and Drug Administration (FDA) concluded that "e-cigarettes have not been fully studied, so consumers currently don't know the potential risks of e-cigarettes when used as intended, how much nicotine or other potentially harmful chemicals are being inhaled during use, or whether there are any benefits associated with using these products."

Clinical studies are in progress at the moment to understand e-cigarettes' impact on health — so until these are out, there's a lack of definitive research on the health effects and still much we can't know for sure.

I can say that e-cigarettes can still cause gum recession and other oral health problems because they still deliver nicotine, even if it's in smaller doses than traditional cigarettes.

what are the effects of nicotine on gum health?

Studies have shown that nicotine — whether delivered via traditional cigarette or other means — does harm to the mouth, gums and tongue.

A report published in the Journal of the Indian Society of Periodontology has stated that nicotine may contribute significantly to the development of gingivitis and periodontitis, which can cause bad breath and inflammation throughout the body.

Here's how nicotine can impact your oral health:

nicotine causes gum recession

Nicotine is a vasoconstrictor, meaning it reduces the amount of blood that can flow through your veins.

Without sufficient blood flow, the gums do not get the oxygen and nutrients they need to stay healthy. Nicotine chokes tissues in the mouth from the blood it needs to survive, causing death of the gum tissues.

nicotine masks symptoms of gum disease

"Almost two years vaping and my gum disease has dramatically improved."

"I just got back from the dentist and he said my gum health has actually improved since I started using e-cigarettes."

You might see reports like these in a lot of online forums.

That's because nicotine can hide the symptoms of gum disease from your dentist, making it harder to be diagnosed.

When you have gum disease, it's the increased blood flow to the gums that tips you off or tips off your dentist to the fact that you have gum disease. The gums are irritated and swell with blood, and when you floss or even brush, they bleed.

This fools everyone — both the dentist and yourself — into thinking that things are going well in your mouth.

If the progression of gum disease can't be observed or diagnosed, then things go south without treatment.

Even longterm chewing of nicotine gum can cause these problems.

nicotine causes bad breath

As a vasoconstrictor, nicotine also inhibits your body's ability to produce saliva. Not enough saliva can leave you susceptible to bacteria buildup, dry mouth, and tooth decay.

nicotine intensifies grinding

Nicotine is also a stimulant that fires up the muscles, making you grind your teeth more intensely if you're already a grinder — and might even prompt you to start grinding your teeth even if you weren't a grinder before.

my recommendation

If you're thinking about using e-cigarettes or you already use them, you've got to watch out for the signs of gum disease.

But how are you going to watch out for the tell-tale sign of gum disease — bleeding gums — if nicotine masks bleeding gums via vasoconstriction?

Since nicotine masks the symptoms of gum disease from both you and your dentist, you'll have to be extra vigilant about gum disease prevention.

To diagnose gum disease, as well as measure its progression, your dentist will take something called a pocket reading.

"Pockets" are like the "moat" around each of your teeth, which is naturally present. It's the space between the gum line (where you see your gums and teeth meet when you look in the mirror) and where the tooth and gum attach a little further down (see the illustration below). Deeper pockets indicate a breakdown of the attachment of the gums to the teeth.

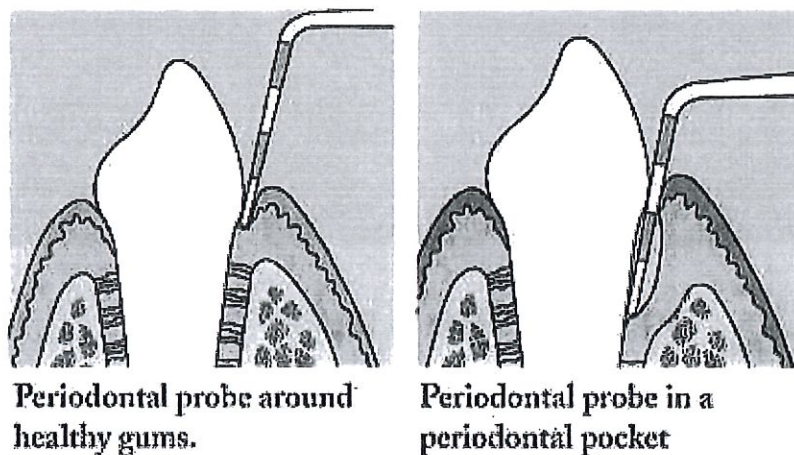


Image via healthsnap.ca

Visit your dentist every three months to monitor your pocket readings. Your likelihood of having gum disease is greater as long as you're using nicotine and because nicotine masks the tell-

tale signs, a frequency of every three months is necessary in order to prevent tooth loss, bone loss, and gum recession.

The best and most convenient option here, and I know it's hard to hear, is to eliminate the nicotine habit.

Mark Burhenne DDS

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MARK BURHENNE, DDS

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E-cigarettes can damage DNA

Date: August 20, 2018

Source: American Chemical Society

Summary: The popularity of electronic cigarettes continues to grow worldwide, as many people view them as a safer alternative to smoking. But the long-term effects of e-cigarette usage, commonly called 'vaping,' are unknown. Today, researchers report that vaping may modify the genetic material, or DNA, in the oral cells of users, which could increase their cancer risk.

FULL STORY

The popularity of electronic cigarettes continues to grow worldwide, as many people view them as a safer alternative to smoking. But the long-term effects of e-cigarette usage, commonly called "vaping," are unknown. Today, researchers report that vaping may modify the genetic material, or DNA, in the oral cells of users, which could increase their cancer risk.

The researchers will present their results today at the 256th National Meeting & Exposition of the American Chemical Society (ACS).

"E-cigarettes are a popular trend, but the long-term health effects are unknown," says Romel Dator, Ph.D., who is presenting the work at the meeting. "We want to characterize the chemicals that vapers are exposed to, as well as any DNA damage they may cause."

Introduced to the market in 2004, e-cigarettes are handheld electronic devices that heat a liquid, usually containing nicotine, into an aerosol that the user inhales. Different flavors of liquids are available, including many that appeal to youth, such as fruit, chocolate and candy. According to a 2016 report by the U.S. Surgeon General, 13.5 percent of middle school students, 37.7 percent of high school students and 35.8 percent of young adults (18 to 24 years of age) have used e-cigarettes, compared with 16.4 percent of older adults (25 years and up).

"It's clear that more carcinogens arise from the combustion of tobacco in regular cigarettes than from the vapor of e-cigarettes," says Silvia Balbo, Ph.D., the project's lead investigator, who is at the Masonic Cancer Center at the University of Minnesota. "However, we don't really know the impact of inhaling the combination of compounds produced by this device. Just because the threats are different doesn't mean that e-cigarettes are completely safe."

To characterize chemical exposures during vaping, the researchers recruited five e-cigarette users. They collected saliva samples before and after a 15-minute vaping session and analyzed the samples for chemicals that are known to damage DNA. To evaluate possible long-term effects of vaping, the team assessed DNA damage in the cells of the volunteers' mouths. The researchers used mass-spectrometry-based methods they had developed previously for a different study in which they evaluated oral DNA damage caused by alcohol consumption.

Dator and Balbo identified three DNA-damaging compounds, formaldehyde, acrolein and methylglyoxal, whose levels increased in the saliva after vaping. Compared with people who don't vape, four of the five e-cigarette users showed increased DNA damage related to acrolein exposure. The type of damage, called a DNA adduct, occurs when toxic chemicals, such as acrolein, react with DNA. If the cell does not repair the damage so that normal DNA replication can take place, cancer could result.

The researchers plan to follow up this preliminary study with a larger one involving more e-cigarette users and controls. They also want to see how the level of DNA adducts differs between e-cigarette users and regular cigarette smokers. "Comparing e-cigarettes and tobacco cigarettes is really like comparing apples and oranges. The exposures are completely different," Balbo says. "We still don't know exactly what these e-cigarette devices are doing and what kinds of effects they may have on health, but our findings suggest that a closer look is warranted."

Story Source:

Materials provided by **American Chemical Society**. *Note: Content may be edited for style and length.*

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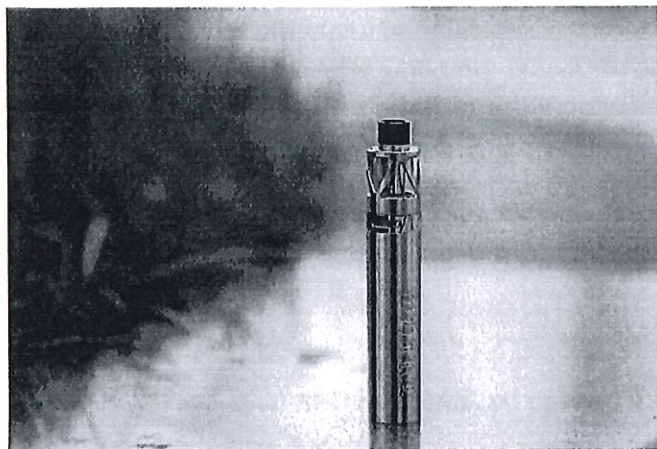
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E-cigarettes can damage DNA

20 August 2018



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The popularity of electronic cigarettes continues to grow worldwide, as many people view them as a safer alternative to smoking. But the long-term effects of e-cigarette usage, commonly called "vaping," are unknown. Today, researchers report that vaping may modify the genetic material, or DNA, in the oral cells of users, which could increase their cancer risk.

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More information: Integrating multi-"omics"-mass spectrometry-based methods to characterize electronic cigarette exposure in humans, the 256th National Meeting & Exposition of the American Chemical Society (ACS).

Abstract

Characterizing chemical exposures in humans remains a significant challenge. Our lab has been developing state-of-the-art high-resolution mass spectrometry-based methods to characterize the exposome and determine how it may influence overall health. Because it is challenging to capture the complexity of exposures, often at trace levels, improved tools are needed to move this field of research forward. We have recently developed a neutral loss (NL) screening and relative quantitation strategy for the targeted analysis of reactive carbonyls in biological fluids. In addition, a comprehensive DNA adductomics approach was developed to characterize covalent modifications in DNA generated from these exposures. Here, we have integrated these MS-based methods to characterize electronic cigarette exposure in humans, with the goal of identifying reactive carbonyls generated during vaping and the corresponding DNA adducts formed in the oral cavity. Human saliva and oral cell samples from e-cigarette users (n=10) and non-user controls (n=10) were obtained to screen reactive carbonyls and DNA adducts. Reactive carbonyls in saliva were derivatized with 2,4-dinitrophenylhydrazine to form hydrazones and analyzed by the NL screening method. Likewise, DNA from oral cells were isolated, hydrolyzed to nucleosides, and analyzed by both targeted and non-targeted DNA adductomics approaches. Using the NL loss screening strategy, increased levels of acrolein, methylglyoxal, and formaldehyde were observed after vaping, while the levels of acetaldehyde and glyoxal vary within subjects possibly due to

variations in composition of the e-liquid used. This information was then used to develop targeted and non-targeted DNA adductomics approaches to monitor the corresponding DNA adducts in oral cells of e-cigarette users. Our results showed increased levels of acrolein-derived DNA adducts, in particular, gamma-OH-Acro-dG in e-cigarette users compared to non-users. We are currently investigating other DNA adducts that might be relevant to e-cigarette exposure using non-targeted DNA adductomics approaches and expanding our analysis to a larger sample size.

Provided by American Chemical Society



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Smoking, Vaping, and Dental Care in 2018

July 13, 2018

By now, you're likely aware of the negative impact smoking has on your health. However, you might not realize the serious effects smoking has on your overall dental care. Since your mouth is the starting point for all cigarette damage, you'll deal with some significant oral health issues when you smoke. Even vaping, which is the latest trend pushed as a healthier alternative to smoking, has an impact on your health. Discover how smoking and vaping affect your dental care.

The Effects of Vaping on Oral Health

Vaping, which is when you inhale the vapours produced by e-cigarettes, has been pushed as a healthy alternative to traditional cigarette smoking. While research is still ongoing, what scientists have discovered so far isn't promising. While e-cigarettes don't result in bad breath, tooth discolouration, and plaque build up like traditional cigarettes, you still inhale nicotine if you choose a variety that has a nicotine cartridge. Nicotine reduces blood flow, which impacts your mouth's ability to fight off bacteria. In turn, this can lead to a serious gum infection called periodontal disease.

Additionally, e-cigarette vapours can release inflammatory proteins in the gum tissue that can lead to critical oral diseases. Some e-cigarettes use flavouring that can also lead to cellular damage in your mouth. Lastly, research done at the University of North Carolina School of Medicine shows that e-cigarettes lead to the same, and sometimes even broader, suppression of key immune genes in your respiratory system and nasal passages as traditional cigarette smoking. This means e-cigarettes could be just as harmful as regular cigarettes to your respiratory system.

Smoking's Impact on Your Oral Health

Since the nicotine, tar, and other harmful chemicals found in cigarettes immediately hit your teeth and mouth as soon as you start smoking, this is one part of your body that receives some of the worst side effects. These chemicals can lead to yellow stains on your teeth that are difficult to remove. They also weaken the protective enamel on your teeth, which can leave your teeth more susceptible to bacteria that eat away at your teeth and cause tooth rot. Weakened enamel also leads to sensitive teeth.

Additionally, this build up of bacteria can lead to gum disease, which causes your

gums to recede and compromises the stability of your teeth. Finally, perhaps the most major impact smoking has on your oral health is oral cancer. Tobacco smoke has over 7,000 chemicals, and over 70 of those chemicals are known to cause cancer.

Smoking and Surgeries

However, it's not just oral health concerns you have to consider when smoking. Smokers have an increase in severe cardiovascular complications compared to nonsmokers. In fact, one study showed that smokers were 57 per cent more likely to suffer from cardiac arrest, 73 per cent more likely to have a stroke, and 80 per cent more likely to have a heart attack. This is because smoking increases inflammation, which increases your chances of these complications.

Smoking's Impact on Wound Healing

In addition to a higher risk of complications during surgery, research also shows a direct connection between smoking and delayed wound healing after surgery. If you're a smoker and you need surgery on your mouth (or any part of your body), it's important to understand how smoking impacts your healing. Smoking reduces the amount of oxygen in your body. Without this necessary oxygen, surgical wounds take longer to close, which increases the risk of infection. It also increases your chances of scarring. Additionally, orthopaedic surgeries, which are those on your bones or joints, also take longer to heal.

While it's hard to do, if you can quit smoking before your surgery, your body can heal faster and better. Within just a few days after quitting, your blood flow improves and your body starts to get more oxygen. Within four weeks of quitting, inflammatory cell response is reduced.

Treatment Options for Smokers

You'll find a variety of mouthwashes and toothpastes marketed to smokers with claims that they can help repair damage caused by smoking. This includes toothpastes made to remove yellow nicotine stains and products used to mask cigarette odour in your mouth. However, no product on the market is as effective at treating oral problems brought on by smoking as actually quitting smoking. Additionally, many of these products use abrasive and harsh chemicals to attack bacteria that thrive in a smoker's mouth. Yet these products can do nothing to restore enamel, prevent gum and tooth rot, or stop any type of oral cancer.

If you're a smoker, it's important you regularly visit your dentist to monitor your oral

health, and you can use our Find Your Dentist tool to find one near you. If you're ready to quit smoking, talk to your healthcare professional about the variety of products available to help you meet your goal.

E-Cigarettes: Vaping and Dental Health

Bryana June 5, 2018

Smoking tobacco. We all know it's bad for our lungs and teeth. Smoking tobacco drastically increases a person's risk for lung and oral cancer. It also causes people to have more dental plaque which often leads to gum disease. If the smoker already has gum disease, their habit causes it to get worse more quickly than in non-smokers. This often leads to chronic bad breath (halitosis) and permanent tooth loss.

But, that's why they invented e-cigarettes. Right?

Its true sales of traditional cigarettes have fallen sharply over the last few years while sales of e-cigarettes has skyrocketed. They're viewed by many people as a healthier alternative to smoking tobacco cigarettes. Since there's no tobacco, they believe that cancer and other tobacco-related diseases are not a risk. And they're wrong.

E-cigarettes are not healthier. New research shows smoking e-cigarettes (vaping) isn't healthier than smoking tobacco.

What is Vaping?

Vaping simply means smoking an e-cigarette. E-cigarettes use an aerosol, or vapor, to deliver nicotine into the lungs. The term vaping, rather than smoking, is used because e-cigs don't produce tobacco smoke. They produce an aerosol, often mistaken for water vapor that actually consists of fine particles. Many of these particles contain toxic chemicals, which have been linked to cancer, respiratory disease, and heart disease.

Health Risks of Vaping

No tobacco does not mean no nicotine. Since nicotine is delivered via vaping, all of the health problems associated with nicotine are still there.

Nicotine is an addictive substance that's also a carcinogen. A carcinogen is simply a substance that's known to cause cancer.

Nicotine is known to promote tumor growth in the following:

Lung cancer

Gastrointestinal cancer

Pancreatic cancer

Breast cancer

While vaping hasn't been around long, early studies of its effects are concerning.

Short-term data shows vaping:

Impacts the health of your lungs and DNA

Damages your blood cells

Increases your risk of heart disease

Negatively impacts your immune system

Dental Health Risks of Vaping

That nicotine again. Not your friend. Here are some oral health specific issues associated with nicotine:

Nicotine reduces the amount of blood that can flow through your veins. Without sufficient blood flow, your gums don't get the oxygen and nutrients they need to stay healthy. In a way, nicotine chokes out tissues in the mouth from the blood it needs to survive, causing the death of gum tissues. And that's how it causes your gums to recede.

Nicotine prevents your body from producing saliva. Not enough saliva leads to bacteria buildup, dry mouth, and tooth decay.

Nicotine acts as a stimulant that fires up the muscles. If you already grind your teeth (bruxism), it can make it worse. If you aren't a teeth grinder, you may start. Bruxism is a condition in which you regularly grind, gnash, or clench your teeth. When left untreated, bruxism can lead to tooth damage and other oral health complications. Since vaping introduces nicotine into your body just like smoking tobacco, it does increase your risk for gum disease. Common symptoms of gum disease include:

Ongoing bad breath (halitosis)

Red, irritated, or bleeding gums

Tender or swollen gums

Wiggly or loss of teeth

Recession of gum tissue

The takeaway here is that vaping has health risks. It's a misperception to believe that e-cigarettes are healthier than tobacco cigarettes.

If you're a smoker or vaper, it's extremely important to stay on top of your regular dental check-ups.

Want to learn more?

Talk to your physician or dentist. They'll help you get on the path towards a healthier you.

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First Study Of E-Cigarettes Reveals Gum Tissue Damage

Many younger smokers have switched to e-cigarettes because they believe them to be a healthier alternative. However, an October article published in the journal *Oncotarget* showed that the vapors and flavoring present in e-cigarettes could damage the cells located in gums and the oral cavity.

Irfan Rahman, Ph.D., a professor of environmental medicine at the University of Rochester School of Medicine and Dentistry, led the research. Last year, Rahman published a study on the effects e-cigarettes have on lung cells. The National Institutes of Health funded this study.

Testing the effects of e-cigarettes required exposing a 3D model of human, non-smoker gum tissue to the different flavors available to smokers. The authors used a BLU rechargeable e-cigarette and two different flavors: classic tobacco and magnificent menthol. The research showed that both flavors inflame the gum cell and negatively effect cell regeneration. The menthol flavor was shown to do more damage than the classic tobacco flavor.

The authors seek to continue their work with long-term research to see if e-cigarettes can potentially lead to periodontitis (gum disease) through increased usage.

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This article is intended to promote understanding of and knowledge about general oral health topics. It is not intended to be a substitute for professional advice, diagnosis or treatment. Always seek the advice of your dentist or other qualified healthcare provider with any questions you may have regarding a medical condition or treatment.

E-cigarettes 'just as harmful as tobacco' for oral health

By Honor Whiteman | Published Thursday 17 November 2016

Electronic cigarettes are often marketed as a safer alternative to conventional cigarettes. When it comes to oral health, however, new research suggests vaping may be just as harmful as smoking.

In a study published in the journal *Oncotarget*, researchers found that the chemicals present in electronic cigarette (e-cigarette) vapor were equally as damaging - in some cases, more damaging - to mouth cells as tobacco smoke.

Such damage can lead to an array of oral health problems, including gum disease, tooth loss, and mouth cancer.

E-cigarettes are battery-operated devices containing a heating device and a cartridge that holds a liquid solution. The heating device vaporizes the liquid - usually when the user "puffs" on the device - and the resulting vapor is inhaled.

While e-cigarette liquids do not contain tobacco - a highly harmful component of conventional cigarettes - they do contain nicotine and other chemicals, including flavoring agents.



Researchers suggest vaping may be equally - if not more - harmful for oral health than smoking.

According to the Centers for Disease Control and Prevention (CDC), the use of e-cigarettes has increased in recent years, particularly among young people. In 2015, 16 percent of high-school students reported using the devices, compared with just 1.5 percent in 2011.

E-cigarettes are considered by many to be safer than conventional smoking, but because the devices are relatively new to the market, little is known about the long-term effects of vaping on health.

In particular, study leader Irfan Rahman, Ph.D., professor of environmental medicine at the University of Rochester School of Medicine and Dentistry in New York, and colleagues note that there has been limited data on how e-cigarette vapor affects oral health.

Flavored vapor worsens damage to gum tissue cells

To address this gap in research, the team exposed the gum tissue of nonsmokers to either tobacco- or menthol-flavored e-cigarette vapor.

The tobacco-flavored vapor contained 16 milligrams of nicotine, while the menthol flavor contained 13-16 milligrams of nicotine or no nicotine.

The researchers found that all e-cigarette vapor caused damage to gum tissue cells comparable to that caused by exposure to tobacco smoke.

"We showed that when the vapors from an e-cigarette are burned, it causes cells to release inflammatory proteins, which in turn aggravate stress within cells, resulting in damage that could lead to various oral diseases."

— Irfan Rahman, Ph.D.

The researchers note that nicotine is a known contributor to gum disease, but e-cigarette flavoring appeared to exacerbate the cell damage caused by e-cigarette vapor, with menthol-flavored vapor posing the most harm.

While further research is needed to investigate the long-term effects of e-cigarette use, Rahman and team believe their findings indicate that the devices may have negative implications for oral health.

"Overall, our data suggest the pathogenic role of [e-cigarette] aerosol to cells and tissues of the oral cavity, leading to compromised periodontal health," they conclude.

E-cigarette vapor damaged, killed 53 percent of mouth cells in 3 days

Another study recently published in the *Journal of Cellular Physiology* builds on the findings from Rahman and colleagues, after finding a high rate of mouth cell death with exposure to e-cigarette vapor over just a few days.

To reach their findings, Dr. Mahmoud Rouabhia, of the Faculty of Dental Medicine at Université Laval in Canada, and colleagues placed epithelial cells from the mouth in a chamber that contained a liquid similar to saliva.

To simulate vaping, the researchers pumped e-cigarette vapor into the chamber at a rate of two 5-second puffs every 60 seconds for 15 minutes a day. This was performed over 1, 2, or 3 days.

On analyzing the vapor-exposed epithelial cells under a microscope, the researchers identified a significant increase in the rate of cell damage and death.

The rate of damage or death in unexposed cells is around 2 percent, the researchers note. However, they found that with exposure to e-cigarette vapor, the number of dead or dying cells rose to 18 percent, 40 percent, and 53 percent over 1, 2, and 3 days, respectively.

While the cumulative effects of the cell damage caused by e-cigarette are unclear, the researchers believe their findings are a cause for concern.

"Damage to the defensive barrier in the mouth can increase the risk of infection, inflammation, and gum disease. Over the longer term, it may also increase the risk of cancer. This is what we will be investigating in the future."

– Dr. Mahmoud Rouabhia

Read how e-cigarettes may impair immune responses more than tobacco.

References

Additional information

Visit our Smoking / Quit Smoking category page for the latest news on this subject, or sign up to our newsletter to receive the latest updates on Smoking / Quit Smoking.

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URMC / News / First-ever Study Shows E-cigarettes Cause Damage to Gum Tissue
First-ever Study Shows E-cigarettes Cause Damage to Gum Tissue
Wednesday, November 16, 2016

A University of Rochester Medical Center study suggests that electronic cigarettes are as equally damaging to gums and teeth as conventional cigarettes.

The study, published in *Oncotarget*, was led by Irfan Rahman, Ph.D. professor of Environmental Medicine at the UR School of Medicine and Dentistry, and is the first scientific study to address e-cigarettes and their detrimental effect on oral health on cellular and molecular levels. Electronic cigarettes continue to grow in popularity among younger adults and current and former smokers because they are often perceived as a healthier alternative to conventional cigarettes. Previously, scientists thought that the chemicals found in cigarette smoke were the culprits behind adverse health effects, but a growing body of scientific data, including this study, suggests otherwise.

“We showed that when the vapors from an e-cigarette are burned, it causes cells to release inflammatory proteins, which in turn aggravate stress within cells, resulting in damage that could lead to various oral diseases,” explained Rahman, who last year published a study about the damaging effects of e-cigarette vapors and flavorings on lung cells and an earlier study on the pollution effects. “How much and how often someone is smoking e-cigarettes will determine the extent of damage to the gums and oral cavity.”

The study, which exposed 3-D human, non-smoker gum tissue to the vapors of e-cigarettes, also found that the flavoring chemicals play a role in damaging cells in the mouth.

“We learned that the flavorings—some more than others—made the damage to the cells even worse,” added Fawad Javed, a post-doctoral student at Eastman Institute for Oral Health, part of the UR Medical Center, who contributed to the study. “It’s important to remember that e-cigarettes contain nicotine, which is known to contribute to gum disease.”

Most e-cigarettes contain a battery, a heating device, and a cartridge to hold liquid, which typically contains nicotine, flavorings, and other chemicals. The battery-powered device heats the liquid in the cartridge into an aerosol that the user inhales.

<https://www.urmc.rochester.edu/news/story/4667/first-ever-study-shows-e-cigarettes-cause-damage-to-gum-tissue.aspx>

“More research, including long term and comparative studies, are needed to better understand the health effects of e-cigarettes,” added Rahman, who would like to see manufacturers disclose all the materials and chemicals used, so consumers can become more educated about potential dangers.

This study was funded by the National Institutes of Health. Study collaborators include first author Isaac K. Sundar, UR Department of Environmental Medicine, Fawad Javed, Department of General Dentistry, Eastman Institute for Oral Health at UR, Georgios E. Romanos, Department of Periodontology, School of Dental Medicine, Stony Brook University and Irfan Rahman, Department of Environmental Medicine at UR.

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The University of Rochester Medical Center is home to approximately 3,000 individuals who conduct research on everything from cancer and heart disease to Parkinson’s, pandemic influenza and autism. Spread across many centers, institutes and labs, our scientists have developed therapies that have improved human health locally, in the region and across the globe. To learn more, visit www.urmc.rochester.edu/research.

Media Contact Karen Black (585) 275-1131

E-cigarette vapour may prevent mouth ulcers from healing: Chemicals in the devices can impair the body's ability to repair itself

- Nicotine prevents certain cells getting enough energy to heal a wound properly
- Nearly 3 million adults in Britain have used e-cigarettes in the last ten years
- E-cigarettes could also be a 'gateway' for teenagers to turn to cigarettes

By RICHARD GRAY and BEN SPENCER FOR THE DAILY MAIL

PUBLISHED: 01:53 BST, 9 June 2017 | **UPDATED:** 03:35 BST, 9 June 2017

Electronic cigarettes can stop wounds from healing, experts have warned.

A study found that chemicals in the devices can impair the processes that allow the body to repair itself.

The findings may explain why some users can develop persistent painful mouth sores and ulcers. E-cigarettes are widely promoted as a safer replacement for tobacco.

But toxicology experts in the US say they can lead to a range of health issues. A study by the University of Rochester in New York, published in the journal Scientific Reports, exposed damaged lung tissue to e-cig vapours in the laboratory.



Chemicals and nicotine found in e-cigarette can prevent cells getting enough energy to heal a wound properly and can increase the risk of contracting gum disease (file photo)

They found the nicotine and flavour chemicals prevented certain cells getting enough energy to heal a wound properly. Study leader Dr Irfan Rahman said: 'While it is perceived that they may be less harmful than conventional smoking, our data shows e-cigarettes can lead to other health issues apart from lung damage.'

E-cigarettes contain a liquid form of nicotine that is heated into vapour to be inhaled, avoiding the harm caused by tobacco smoke.

Nearly 3 million adults in Britain have used e-cigarettes in the decade they have been on the market.

Health experts agree that the devices are much safer than smoking tobacco – and the gadgets are thought to have helped 22,000 people quit smoking each year.

But many are worried about unresolved safety concerns, particularly linked to the chemicals used to flavour the vapour.

<https://www.dailymail.co.uk/news/article-4586912/E-cigarette-vapour-prevent-mouth-ulcers-healing.html>

Others are also concerned that e-cigarettes provide a 'gateway' for teenagers to go on to smoke tobacco.

The scientists, whose work is published in the journal Scientific Reports, exposed human lung tissue to e-cigarettes vapours in the laboratory.

When they wounded the tissue by scratching it, some of the cells around the wound - known as fibroblasts - began to change to begin the process of repairing the damage.

Normally these cells produce matrix-like structures that new tissue can grow across while those cells around the edge of the wound shrink to help close it.

But Dr Rahman and his colleagues found after exposure to flavoured e-cigarette vapour, the wounds did not close up.

They also found the ability of the cells around the wound to convert to those needed for wound healing was also inhibited.



E-cigarette vapour could also trigger inflammation in the mouth, increasing the risk of gum disease. But experts say they are still less harmful than smoking cigarettes (file photo)

<https://www.dailymail.co.uk/news/article-4586912/E-cigarette-vapour-prevent-mouth-ulcers-healing.html>

Dr Rahman said it appears the nicotine and flavour chemicals in the e-cigarette vapour were preventing the fibroblast cells from getting the energy they needed to heal a wound properly.

He said further work was needed to examine what impact this would have in the lungs and mouth of real people.

But he added it may explain why vapers often report suffering persistent ulcers and sores on their gums.

It builds on previous work by Dr Rahman and his team that found e-cigarette vapour could also trigger inflammation in the mouth, increasing the risk of gum disease.

This gum damage could even lead to teeth falling out in the most serious cases, he warned.

He said: 'How much and how often someone is smoking or vaping flavoured e-cigarettes will determine the extent of damage to the gums and oral cavity.'

The research comes after scientists at the University of California, Berkeley, found traces of toxic metals in the e-liquids used by five major brands of e-cigarettes.

Others have found apparently harmless liquids can generate harmful compounds like formaldehyde when they are heated by the coil in an e-cigarette.

Martin Dockrell, head of tobacco control at Public Health England said that despite the results, e-cigarettes remain much less harmful than smoking.

He said: 'We know that smoking slows wound healing and increases the risk of infection, but when smokers switch to e-cigarettes the overall harm to their health is greatly reduced.'

Deborah Arnott, chief executive of health charity Action on Smoking and Health (ASH) added: 'Studies like this one are misleading because they don't compare the impact of vaping with smoking.'

'It's the smoke that does most if not all of the damage, not the nicotine.'

'Sadly that message isn't getting through - nearly a quarter of smokers who haven't tried vaping say they're unwilling to because of concerns e-cigarettes are not safe enough.

'We would always recommend smokers to quit completely but for those who can't then vaping is much lower risk than carrying on smoking.'

E-cigarettes 'just as harmful as tobacco' for oral health

Published Thursday 17 November 2016

By Honor Whiteman

Electronic cigarettes are often marketed as a safer alternative to conventional cigarettes. When it comes to oral health, however, new research suggests vaping may be just as harmful as smoking.



Researchers suggest vaping may be equally - if not more - harmful for oral health than smoking.

<https://www.medicalnewstoday.com/articles/314190.php>

In a study published in the journal *Oncotarget*, researchers found that the chemicals present in electronic cigarette (e-cigarette) vapor were equally as damaging - in some cases, more damaging - to mouth cells as tobacco smoke.

Such damage can lead to an array of oral health problems, including gum disease, tooth loss, and mouth cancer.

E-cigarettes are battery-operated devices containing a heating device and a cartridge that holds a liquid solution. The heating device vaporizes the liquid - usually when the user "puffs" on the device - and the resulting vapor is inhaled.

While e-cigarette liquids do not contain tobacco - a highly harmful component of conventional cigarettes - they do contain nicotine and other chemicals, including flavoring agents.

According to the Centers for Disease Control and Prevention (CDC), the use of e-cigarettes has increased in recent years, particularly among young people. In 2015, 16 percent of high-school students reported using the devices, compared with just 1.5 percent in 2011.

E-cigarettes are considered by many to be safer than conventional smoking, but because the devices are relatively new to the market, little is known about the long-term effects of vaping on health.

In particular, study leader Irfan Rahman, Ph.D., professor of environmental medicine at the University of Rochester School of Medicine and Dentistry in New York, and colleagues note that there has been limited data on how e-cigarette vapor affects oral health.

Flavored vapor worsens damage to gum tissue cells

To address this gap in research, the team exposed the gum tissue of nonsmokers to either tobacco- or menthol-flavored e-cigarette vapor.

The tobacco-flavored vapor contained 16 milligrams of nicotine, while the menthol flavor contained 13-16 milligrams of nicotine or no nicotine.

The researchers found that all e-cigarette vapor caused damage to gum tissue cells comparable to that caused by exposure to tobacco smoke.

"We showed that when the vapors from an e-cigarette are burned, it causes cells to release inflammatory proteins, which in turn aggravate stress within cells, resulting in damage that could lead to various oral diseases."

Irfan Rahman, Ph.D.

The researchers note that nicotine is a known contributor to gum disease, but e-cigarette flavoring appeared to exacerbate the cell damage caused by e-cigarette vapor, with menthol-flavored vapor posing the most harm.

While further research is needed to investigate the long-term effects of e-cigarette use, Rahman and team believe their findings indicate that the devices may have negative implications for oral health.

"Overall, our data suggest the pathogenic role of [e-cigarette] aerosol to cells and tissues of the oral cavity, leading to compromised periodontal health," they conclude.

E-cigarette vapor damaged, killed 53 percent of mouth cells in 3 days

Another study recently published in the *Journal of Cellular Physiology* builds on the findings from Rahman and colleagues, after finding a high rate of mouth cell death with exposure to e-cigarette vapor over just a few days.

To reach their findings, Dr. Mahmoud Rouabhia, of the Faculty of Dental Medicine at Université Laval in Canada, and colleagues placed epithelial cells from the mouth in a chamber that contained a liquid similar to saliva.

To simulate vaping, the researchers pumped e-cigarette vapor into the chamber at a rate of two 5-second puffs every 60 seconds for 15 minutes a day. This was performed over 1, 2, or 3 days.

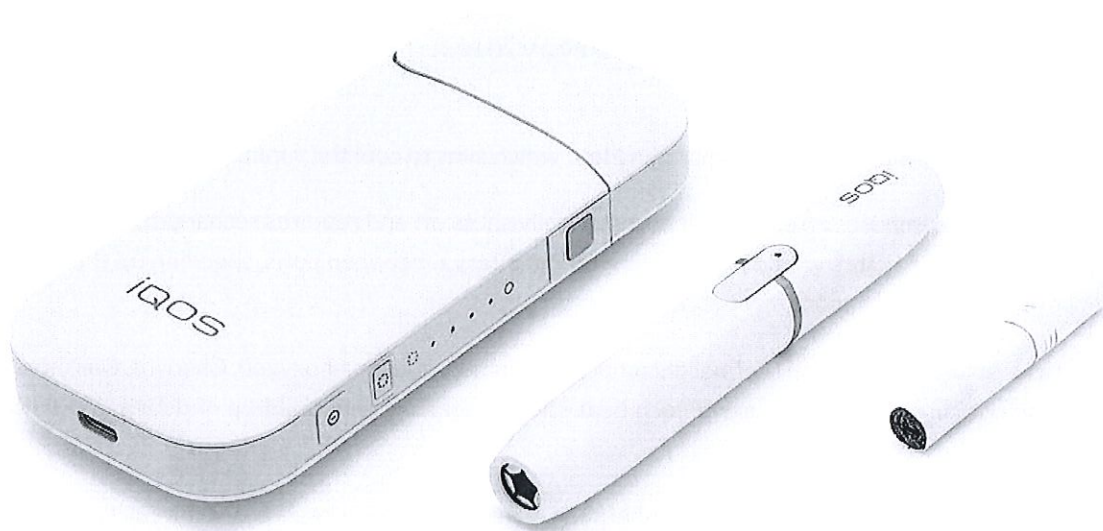
On analyzing the vapor-exposed epithelial cells under a microscope, the researchers identified a significant increase in the rate of cell damage and death.

The rate of damage or death in unexposed cells is around 2 percent, the researchers note. However, they found that with exposure to e-cigarette vapor, the number of dead or dying cells rose to 18 percent, 40 percent, and 53 percent over 1, 2, and 3 days, respectively.

While the cumulative effects of the cell damage caused by e-cigarette are unclear, the researchers believe their findings are a cause for concern.

"Damage to the defensive barrier in the mouth can increase the risk of infection, inflammation, and gum disease. Over the longer term, it may also increase the risk of cancer. This is what we will be investigating in the future."

Dr. Mahmoud Rouabhia



Heat not burn tobacco sticks under fire

Publicly released: Wed 14 Mar 2018 at 1030 AEDT | 1230 NZDT

Smokeless tobacco products that 'heat not burn' aren't quite as healthy as they're made out to be, as new research from the US finds that the device heats up much more than claimed, releasing toxic chemicals and increasing the amount of nicotine inhaled. The manufacturers of the iQOS heat stick (Philip Morris International) recommend cleaning the device after every 20 heat sticks but the researchers found that charred tobacco debris builds up after every stick, which shouldn't happen if the device only heated to the temperature claimed. The heat was also sufficient to melt the plastic film (designed to cool the tobacco vapour) even when it wasn't in contact with the heating element, releasing toxic chemicals like formaldehyde cyanohydrin.

Journal/conference: Tobacco Control

Organisation/s: University of California, Riverside, USA

Media Release

From: The BMJ

'Heat not burn' smokeless tobacco product may not be as harm free as claimed

iQOS use associated with tobacco plug charring and toxic chemical release

iQOS, one of the first 'heat not burn' smokeless tobacco products marketed as a safer alternative to conventional cigarettes, may not be as harm free as its manufacturer claims, suggests research published online in the journal ***Tobacco Control***.

iQOS is a battery-operated electronic device, which mimics the looks, taste, and sensory experience of a cigarette. It contains a specially designed heat stick, which uses a tobacco plug to deliver nicotine. This is heated to temperatures well below those at which conventional cigarettes burn, producing a tobacco-infused vapour for inhalation rather than smoke.

Tobacco smoke is what contains the cocktail of chemicals that is so harmful to health.

The manufacturer, Philip Morris International, has evaluated IQOS in several published studies, but there has been little independent research.

To try and plug this gap, the US researchers set out to assess the performance of IQOS under five different puff conditions, and the impact of two cleaning protocols: a thorough clean after use of each heat stick to remove fluid and debris from the heater; and the manufacturer's recommendations to clean the device after every 20 heat sticks before using the brush cleaners supplied with the product.

The researchers also wanted to gauge if the plastic polymer film filter, which aims to cool the vapour, might pose a risk to health.

Each IQOS heat stick only lasts for 6 minutes after which it automatically shuts off and requires recharging before use. So to get the most out of each heat stick, real life users would have to shorten the interval between puffs, speeding up their puff rate, and potentially breathing in larger amounts of vapour, say the researchers.

The tobacco plug charred as a result of pyrolysis--thermal decomposition in the absence of oxygen. Charring was more extensive when thorough cleaning was not carried out after use of each heat stick, suggesting that build-up of debris and fluid increases pyrolytic temperatures, say the researchers.

Analysis of the polymer film showed that irrespective of whether cleaning was done or not, the intensity of the heat was sufficient to melt the film even though it was not in direct contact with the heating element.

Following the manufacturer's recommended cleaning instructions increased both the extent of charring and polymer film melt.

Of further concern was the release of formaldehyde cyanohydrin by the melting filter at temperatures that all users will easily exceed, say the researchers. This chemical is highly toxic even at very low levels.

"iQOS is not strictly a 'heat not burn' tobacco product," write the researchers, who go on to say: "This study has shown that the iQOS system may not be as harm free as claimed, and also emphasises the urgent need for further safety testing as the popularity and user base of this product is growing rapidly."

Attachments:

Research (http://tobaccocontrol.bmj.com/lookup/doi/10.1136/tobaccocontrol-2017-054104) The BMJ Web page

The URL will go live after the embargo ends

Expert Reaction

These comments have been collated by the Science Media Centre to provide a variety of expert perspectives on this issue. Feel free to use these quotes in your stories. Views expressed are the personal opinions of the experts named. They do not represent the views of the SMC or any other organisation unless specifically stated.

Professor Marewa Glover, School of Health Sciences, College of Health, Massey University

""Davis et al (2018) argue that the IQOS 'is not strictly a heat-not-burn tobacco product'. However, they acknowledged that the IQOS did not 'ignite' the tobacco, which is a necessary condition for use of the term burn. To support their argument, the authors instead applied the word 'char' and 'charred' which implies that burning occurred.

"The distinction is important for the Ministry of Health's legal action against Philip Morris International (PMI). The Ministry of Health have argued that PMI breached Section 29 of the Smoke-Free Environments Act by importing the HEETS sticks used in IQOS devices into New Zealand for sale and distribution. Section 29 of the Act prohibits the import for sale of tobacco products that are not ignited for smoking and are not covered by the Medicines Act, such as nicotine replacement therapies.

"That is, the Ministry of Health are treating IQOS HEETS sticks as an 'oral' tobacco product. Davis et al cast doubt on this classification by saying both that the HEETS stick used in an IQOS *is not lit*, but *it is burned*, leaving science or judges to make the final call.

"It's a war of words that obfuscates the real question. Would switching from smoking tobacco to using an IQOS reduce a person's risk of developing diseases causing suffering and potentially a shorter life?

"Davis and colleagues do not consider this. Their study was solely concerned with identifying 'limitations' of the IQOS and toxic candidates that could be used to create alarm, fear and distrust of yet another potentially harm-reduced product appealing to smokers.

"This agenda is clear in their conclusion which incorrectly implies that people have been claiming that use of an IQOS is 'harm-free'. No one has claimed that heat-not-burn products providing an alternative to smoking tobacco are harm-free or harmless. The correct word they should have been focused on was 'harm-reduced'. On this point the paper has added nothing.""

Last updated: 13 Mar 2018 1:04pm

Associate Professor Natalie Walker from the University of Auckland, National Institute for Health Innovation Programme Leader – Tobacco and Addictions

"As outlined in this paper, 'heat-not-burn' devices are not without harm. However, they are less harmful than smoking cigarettes (which have over 4000 harmful chemicals in the smoke).

"Will this paper have an impact on the current PMI-Ministry of Health court case? Probably not – the court case is about whether PMI purposively broke the law by marketing their 'heat-not-burn' devices in New Zealand. Whether the wording of the specific law that they may/may not have broken is still valid is another issue, and it comes down to whether 'heat-not-burn' devices, and other reduced harm tobacco products, have a role in helping New Zealand reach our Smokefree 2025 goal.

"If you want to quit smoking tobacco and have tried all available quit smoking support and medication, e-cigarettes should be your next 'port-of-call', as they don't contain tobacco and so are safer than 'heat-not-burn' devices.

"However, what do we offer people who've tried everything (repeatedly) to quit smoking – even e-cigarettes? We have no other tools in our toolbox to offer. Do reduced harm products like 'heat-not-burn' devices, have a role then? I would argue yes – but in order for this to happen the New Zealand Government would need to consider proportional regulation around tobacco harm.

"With only seven years to reach our smokefree 2025 goal, and no plan to get there, the government urgently needs to do something big and bold with tobacco control. Perhaps this court case will be the trigger."

Last updated: 13 Mar 2018 1:00pm



(mailto:?Subject=scimex.org - Heat not burn tobacco sticks under

fire&body=https://www.scimex.org/newsfeed/heat-not-burn-tobacco-sticks-under-fire)

News for:

International

Media contact details for this story are only visible to registered journalists.

【政策論壇】牙醫學會會長廖偉明：電子煙等煙草產品威脅口腔健康



社會新聞

撰文：凌昕

2019-04-09 08:00

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電子煙、加熱煙、傳統煙仔都會釋出尼古丁及不同化學物品，現在已有充分證據 這些產品對心血管構成損害 。在這裡我想大家了解一下這些產品如何令口腔細胞組織受損。

尼古丁對口腔健康的禍害已經有很多研究證明。除了尼古丁外，電子煙更會加入一些香味吸引使用者。有研究指出這些香味經加熱後



此外，電子煙更會加入一些香味吸引使用者。有研究指出這些香味經加熱後釋出的化學物會令牙肉組織釋出發炎蛋白，這些發炎蛋白會減低組織自我修復功能。有研究指出，口腔上皮細胞如果暴露在這些電子煙霧中，會達到超過 50% 的死亡率。相對在同樣的模擬環境，口腔上皮細胞的死亡率只有 2%。資料來源: <https://www.medicalnewstoday.com/articles/314190.php>

吃糖太多不一定蛀牙？一文看清蛀牙關鍵因素 牙痛徵狀、預防方法

【電子煙】長期吸煙致牙周病 血管收縮 難察覺牙齦出血發炎

醫生分享運送危殆病人爭分奪秒 主動脈夾層撕裂或因高血壓

【郊遊遇蛇注意】醫生稱尖叫無用 宜向後退 被蛇咬傷謹記八貼士



傳統煙的禍害不少，包括引致心血管病及損害口腔健康。（資料圖片）

分子科學國際期刊 (International Journal of Molecular Sciences) 指出這些致癌物雖然比香煙低，但致癌物有異於其他有毒物質，導致癌變的風險從來不會因為這些是由物質的量較少而減低，原理是當細胞內的 DNA 受損，細胞自我修復時便不能回復原狀，造成一些異變細胞產生，大大增加患癌風險。

有口腔癌案例 患者是長期吸食電子煙

該研究更指出電子煙吸食者有 26% 基因變異，失序的情況和吸食傳統煙一樣，但其他則不同，這意味除了肺癌、口腔癌、咽喉癌這些在傳統吸煙者常見的癌症外，更可能會導致一些在吸煙者中不常見的癌症如膀胱癌、卵巢癌，甚至血癌。對一些傳統煙及加熱煙同時使用，希望達致戒煙效果的人是一個嚴重的警示！現在已經有口腔癌案例，患者是長期吸食電子煙。



香港牙醫學會會長廖偉明。(資料圖片)

香港牙醫學會支持政府立法全面禁止電子煙及其他另類煙草產品，並支持條例草案修訂《吸煙(公眾衛生)條例》(第 371 章)，以禁止進口、製造、售賣或在某些地方使用訂明的另類吸煙產品；限制給予、管有、宣傳或推廣該等產品；並對《吸煙(公眾衛生)條例》及相關法例，作出相關及雜項修訂。

(文章屬作者意見)

▼圖解禁電子煙條例▼(《香港 01》附加資料)