

**Bills Committee on
Smoking (Public Health) (Amendment) Bill 2019**

**List of follow-up actions arising from the discussion
at the meeting on 18 March 2019**

The Government's response on the items raised by Members is set out as follows.

Justifications for proposing a ban on alternative smoking products ("ASPs")

2. The Food and Health Bureau ("FHB") first raised the idea of a full ban on e-cigarettes at a Legislative Council Panel on Health Services ("HS Panel") meeting in May 2015. Nevertheless, due to a lack of substantive scientific evidence on the harmful health effects and gateway effects of ASPs at that time, and absence of World Health Organization ("WHO") recommendation to impose a ban on the emerging heat-not-burn ("HNB") products, and mindful of a protracted legislative process for a full ban, FHB submitted a regulatory proposal for ASPs, similar to that for conventional tobacco products, to the HS Panel meeting on 19 June 2018, with a view to putting in place a regulatory regime as quickly as possible, to minimise the harm brought about by these new products. We have nonetheless emphasised the possibility of imposing a more stringent control subject to stakeholders' views and availability of new scientific evidence. While we acknowledge that this approach was not optimal, it could serve as a first step in the regulation of these harmful products.

3. The regulatory proposal put forth to the HS Panel was heavily criticised by the medical professions, education sector, parents and many members of the public. They were worried that allowing the sale of ASPs, even though with restrictions, would not be adequate to protect public health, and would bring about very negative impact and pose health risks on children and adolescents in particular. A non-binding motion was passed at the HS Panel meeting, urging the Government to impose a full ban.

4. Meanwhile, there is increasing evidence that ASPs are definitely harmful to health and would bring about gateway effects. Members may wish to refer to Annex B of the Legislative Council brief for the detailed information on the health risks, gateway and renormalisation effects, prevalence, WHO recommendation, etc., in relation to ASPs. A list of the scientific studies that we studied while formulating the control over ASPs is at **Annex A**. The results of the tests conducted by the Government Laboratory on e-cigarettes and HNB products are at **Annex B**.

5. Indeed, overseas experience suggests that prevalence of ASPs may change very quickly and form an irreversible trend. In particular, the prevalence and growth of underage use of ASPs in places, where age restriction for selling smoking products has

been imposed, are alarming. In 2018, more than 3.6 million United States middle and high school students were current e-cigarette users, a dramatic increase of more than 1.5 million students over a one year period.¹ A longitudinal study in Japan showed a more than 3 times increase in current use of a specific named brand of HNB product among those aged 15 to 19, from 0.6% in 2015 to 2.0% in 2017.²

6. A full ban will be the most effective form of control when a new product has not yet established itself in a market. This is particularly true for products that are expected to be aggressively marketed in whatever way possible. With the increasing evidence on the adverse effects of ASPs, WHO recommendations and overseas experience, we consider that any control short of a full ban undermines our ongoing efforts on tobacco control, and requires a complex enforcement regime with a whole new set-up involving extra resources, the use of which we do not consider well-justified. A fundamental question would be why should we put in significant public resources to “facilitate” the introduction of new products that are known to be harmful.

7. We must also stress that although these new products have been put on the market just for a short period of time, we must avoid what had happened regarding the regulation of conventional tobacco products. On the one hand, a mere regulatory approach may be construed as the Government formally endorsing these ASPs. On the other, HNB products in particular contain real tobacco and thus retain the addictive effect of nicotine. With the intended attraction of these new products to the younger generation, we could be faced with a new generation with nicotine dependence. Not only has smoking prevalence in Hong Kong reached a historic low of 10% in 2017, we also have a low smoking prevalence among young people, 1% among those aged 15-19 and 6.7% among those aged 20-29. The formal introduction of these products into the local market could reverse this trend. We must therefore take action before these products become popular. We must ensure our achievement in tobacco control over the years will not be undermined, and prevent the harm of these new products from taking root.

8. Overall, protecting public health should be the Government’s prime consideration. With this in mind, the Chief Executive announced in the Policy Address 2018 the legislative amendment proposal to ban the import, manufacture, sale, distribution and advertisement of ASPs.

Tar and nicotine yields of tobacco products

9. Article 11³ of the WHO Framework Convention on Tobacco Control requires Parties to adopt effective measures to ensure that tobacco product packaging and

¹ <https://www.fda.gov/TobaccoProducts/PublicHealthEducation/ProtectingKidsfromTobacco/ucm625887.htm>

² Tabuchi T, et al. Heat-not-burn tobacco product use in Japan: its prevalence, predictors and perceived symptoms from exposure to secondhand heat-not-burn tobacco aerosol. Tobacco Control. 2017;10.1136/tobaccocontrol-2017-053947

³ https://www.who.int/tobacco/industry/product_regulation/art_11_fctc/en/

labelling do not promote a tobacco product by any means that are false, misleading, deceptive or likely to create an erroneous impression about its characteristics, health effects, hazards or emissions, including any term, descriptor, trademark, figurative or any other sign that directly or indirectly creates the false impression that a particular tobacco product is less harmful than other tobacco products. These may include terms such as “low tar”, “light”, “ultra-light”, or “mild”.

10. According to the Guidelines for implementation of Article 11 of the WHO Framework Convention on Tobacco Control (Packaging and labelling of tobacco products), “parties **should not require quantitative or qualitative statements** on tobacco product packaging and labelling about tobacco constituents and emissions that might imply that one brand is less harmful than another, such as the tar, nicotine and carbon monoxide figures or statements such as “these cigarettes contain reduced levels of nitrosamines”” (emphasis added).⁴

11. In fact, products with lower tar and/or nicotine yields should not be considered less harmful. The WHO International Agency for Research on Cancer stated that analysis of the ways in which people smoke cigarettes shows that actual doses of nicotine, carcinogens and toxins consumed depend on the intensity and method of smoking and have little relation to the stated tar yields. The tar and nicotine yields as currently measured by ISO/FTC methods are misleading and have little value in the assessment of human exposure to carcinogens.⁵ Smokers who crave nicotine may inhale these products more deeply; take larger, more rapid, or more frequent puffs; or smoke extra cigarettes each day to get enough nicotine to satisfy their craving. Therefore, people who switch to low-tar cigarettes from regular cigarettes are likely to have inhaled the same amount of toxic chemicals, and cigarettes of lower tar and nicotine yields do not result in lower risk in smokers.⁶ A large prospective study showed that there was no difference in lung cancer risk among men who smoked brands rated as very low tar or low tar compared with those who smoked regular tar brands.⁷ Instead, the misconception that lower-yield cigarettes are safer undermines cessation efforts. Studies showed smokers who switch to cigarettes that are claimed to be “lighter” cigarettes are associated with lower likelihood of quitting.⁸ The industry-promoted misconception that “lighter” cigarettes are safer has proved to be difficult to

⁴ https://www.who.int/fctc/guidelines/article_11.pdf

⁵ <https://monographs.iarc.fr/wp-content/uploads/2018/06/mono83.pdf>

⁶ National Cancer Institute. Risks Associated with Smoking Cigarettes with Low Machine-Measured Yields of Tar and Nicotine. Smoking and Tobacco Control Monograph 13 External. Bethesda: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute, 2001

⁷ Harris Jeffrey E, Thun Michael J, Mondul Alison M, Calle Eugenia E. Cigarette tar yields in relation to mortality from lung cancer in the cancer prevention study II prospective cohort, 1982-8 BMJ 2004; 328 :72

⁸ Tindle, H. A., Shiffman, S., Hartman, A. M., & Bost, J. E. (2009). Switching to "lighter" cigarettes and quitting smoking. Tobacco control, 18(6), 485–490. doi:10.1136/tc.2008.029314

dispel once created.^{9,10,11}

12. There is no safe level of exposure to tobacco smoke, and there is no safe tobacco product. Even if ASPs emit less toxic substances than conventional tobacco products, they cannot be regarded as less harmful until it is so proven. There is currently no evidence to suggest that reduced exposure to the toxic chemicals in tobacco smoke translates to reduced risk of disease or death in human. Our advice is that members of the public, rather than using these products that are claimed to be less harmful, should quit smoking by using methods that have been proven effective and safe, such as nicotine replacement therapy. The Department of Health operates an integrated smoking cessation hotline (Quitline: 1833 183) to provide general professional counselling and information on smoking cessation, and arrange referrals to various smoking cessation services in Hong Kong. Besides, local non-governmental organisations provide free smoking cessation services, including community-based smoking cessation services offering counselling and pharmacotherapy, acupuncture, outreach service to workplaces and services for youth.

13. Afterall, the claim that HNB products contain a lower level of harmful constituents in their aerosol is still debatable (see study/report numbers 13-27 of **Annex A**). In view of the above, the Government does not agree with Members' suggestion to permit the sale of HNB products with statutory nicotine and tar limits.

Proposed amendment to the long title of the Smoking (Public Health) (Amendment) Bill 2019 ("Bill")

14. Members have raised the question as to whether proposed Committee stage amendment ("CSA") involving deletion of "alternative" from "alternative smoking products" in the long title of the Bill would be admissible under the Rules of Procedure ("RoP") of the Legislative Council. RoP 58(9) provides that "[i]f any amendment to the title of the bill is made necessary by an amendment to the bill, it shall be made at the conclusion of the proceedings detailed above, but no question shall be put that the title (as amended) stand part of the bill; nor shall any question be put upon the enacting formula." The application of RoP 58(9) is that **"the long title of a bill is not subject to amendment"** at the Committee stage unless an amendment made to the provisions in the bill makes it necessary to do so or there are some other technical reasons such as

⁹ Borland R, Fong GT, Yong HH, et al. What happened to smokers' beliefs about light cigarettes when "light/mild" brand descriptors were banned in the UK? Findings from the International Tobacco Control (ITC) Four Country Survey Tob Control. 2008;17:256–62. [PMC free article] [PubMed] [Google Scholar]

¹⁰ Haddock CK, Lando H, Klesges RC, et al. Modified tobacco use and lifestyle change in risk-reducing beliefs about smoking. Am J Prevent Med. 2004;27:35–41. [PubMed] [Google Scholar]

¹¹ Smith SY, Curbow B, Stillman FA. Harm perception of nicotine products in college freshmen. Nicotine Tob Res. 2007;9:977–82. [PubMed] [Google Scholar]

to improve the language or to clarify a certain point which is within the scope of the bill” (emphasis added).¹²

15. We are of the view that there is currently no information to demonstrate that the proposed deletion of “alternative” from “alternative smoking products” in the long title –

- (a) is necessitated as a result of one or more CSAs to the operative provisions of the Bill; or
- (b) would improve or clarify the language used in the long title.

As such, we consider that the proposed CSA to the long title infringes RoP 58(9) and should not be allowed to be moved.

**Food and Health Bureau
Department of Health
Department of Justice
April 2019**

¹² President’s ruling on Committee stage amendments to the Communications Authority Bill proposed by Dr Hon Margaret NG dated 27 June 2011, paragraph 9.

Scientific Evidence on ASPs

There is increasing evidence that ASPs are definitely harmful to health and would bring about gateway effect. Based on the current scientific evidence, the following conclusions can be drawn –

- (a) **E-cigarettes:** Aerosol of e-cigarettes contains harmful substances and carcinogens. Although the emission profile of e-cigarettes is different from conventional cigarettes, there is substantial evidence that the use of e-cigarettes is harmful to health. There is only limited evidence showing that e-cigarettes may be effective smoking cessation aid. Instead, studies show dual use with conventional cigarettes is common. There is also substantial evidence showing the gateway effect that e-cigarette use predicts ever use and initiation of smoking conventional cigarettes among youth and young adults.
- (b) **HNB products:** Similar to conventional cigarettes, HNB products release substantial levels of harmful substances and carcinogens, including nicotine and tar at a level comparable to those in conventional cigarettes. There is no safe level of exposure to the harmful substances and carcinogen released from tobacco products. Moreover, independent study found that there was actually no statistically detectable difference between HNB product and conventional cigarettes for most of the biomarkers of potential harm tested by HNB manufacturer. A change in emission profile of HNB products may not translate into reduction in toxicity as well as disease risk. There is currently no evidence to support the claim that the use of HNB products is less harmful than conventional cigarettes. Also, studies have shown that dual use of HNB products and conventional cigarettes is common. HNB products also expose bystanders to side-stream emissions and passive smoking. Misleading claims made by the tobacco trade may mislead the public to underestimate the risk of HNB products. Moreover, the stylish design and marketing of HNB products are particularly attractive to youth and young people.
- (c) **Herbal cigarettes:** Although herbal cigarettes that do not contain tobacco or nicotine, they may still produce toxic substances including carcinogens. Smoking herbal cigarettes is at least as hazardous as smoking cigarettes.

2. The table below includes the relevant international and local studies and reports list out according to the following categories of findings –

- A. Level of harmful substances in emissions (pg. 3-5);
- B. Risk for clinical symptoms or diseases (pg. 6-9);

- C. Secondhand smoke (pg. 10-11);
- D. Potential gateway effect (pg. 12-14);
- E. Dual use (pg. 15);
- F. Cessation (pg.16-17);
- G. Potentially misleading claims (pg. 18); and
- H. Injury and poisoning (pg. 19).

A. Level of harmful substances in emissions

	Study / Report
E-cigarettes	
1.	National Academies of Sciences Engineering, and Medicine. Public health consequences of e-cigarettes. Washington, DC: The National Academies Press; 2018 .
2.	Chivers E, Janka M, Franklin P, Mullins B, Larcombe A. Nicotine and other potentially harmful compounds in “nicotine-free” e-cigarette liquids in Australia. The Medical Journal of Australia. 2019 ;210(3):1.
3.	Goniewicz ML, Smith DM, Edwards KC, Blount BC, Caldwell KL, Feng J, et al. Comparison of Nicotine and Toxicant Exposure in Users of Electronic Cigarettes and Combustible Cigarettes. JAMA Network Open. 2018 ;1(8):e185937-e.
4.	Rubinstein ML, Delucchi K, Benowitz NL, Ramo DE. Adolescent Exposure to Toxic Volatile Organic Chemicals From E-Cigarettes. Pediatrics. 2018 ;141(4).
5.	Fuller TW, Acharya AP, Meyyappan T, Yu M, Bhaskar G, Little SR, et al. Comparison of Bladder Carcinogens in the Urine of E-cigarette Users Versus Non E-cigarette Using Controls. Scientific Reports. 2018 ;8(1):DOI:10.1038/s41598-017-19030-1.
6.	Hackshaw A, Morris JK, Boniface S, Tang J-L, Milenković D. Low cigarette consumption and risk of coronary heart disease and stroke: meta-analysis of 141 cohort studies in 55 study reports. BMJ. 2018 ;360:j5855 doi: 10.1136/bmj.j5855.
7.	Chung S-S, Zheng J-S, Kwong ACS, Lai VWY. Harmful flame retardant found in electronic cigarette aerosol. Journal of Cleaner Production. 2018 ;171:10-6.
8.	Wei B, Goniewicz M, O'Connor R, Travers M, Hyland A. Urinary Metabolite Levels of Flame Retardants in Electronic Cigarette Users: A Study Using the Data from NHANES 2013–2014. International Journal of Environmental Research and Public Health. 2018 ;15(2):201.
9.	Salamanca JC, Meehan-Atrash J, Vreeke S, Escobedo JO, Peyton DH, Strongin RM. E-cigarettes can emit formaldehyde at high levels under conditions that have been reported to be non-averse to users. Scientific reports. 2018 ;8(1):7559.
10.	Breland A, et al. Electronic cigarettes: what are they and what do they do? Annuals of the New York Academy of Sciences. 2016 :1-26.
11.	American Academy of Pediatrics. Electronic Nicotine Delivery Systems. Pediatrics. 2015 ;136(5):1018-1026.
12.	Pisinger C, Døssing M. A systematic review of health effects of electronic cigarettes. Prev Med. 2014 ;69:248-260.

	Study / Report
HNB products	
13.	Jeong WT, Cho HK, Lee HR, Song KH, Lim HB. Comparison of the content of tobacco alkaloids and tobacco-specific nitrosamines in 'heat-not-burn' tobacco products before and after aerosol generation. <i>Inhalation toxicology</i> . 2019 :1-7.
14.	Salman R, Talih S, El-Hage R, Haddad C, Karaoghlanian N, El-Hellani A, et al. Free-Base and Total Nicotine, Reactive Oxygen Species, and Carbonyl Emissions From IQOS, a Heated Tobacco Product. <i>Nicotine & Tobacco Research</i> . 2018 :nty235-nty.
15.	Leigh NJ, Palumbo MN, Marino AM, O'Connor RJ, Goniewicz ML. Tobacco-specific nitrosamines (TSNA) in heated tobacco product IQOS. <i>Tobacco Control</i> . 2018 ;Published Online First: 21 September 2018:doi: 10.1136/tobaccocontrol-2018-054318.
16.	Glantz SA. PMI's own in vivo clinical data on biomarkers of potential harm in Americans show that IQOS is not detectably different from conventional cigarettes. <i>Tobacco Control</i> . 2018 ;27(Suppl 1):s9-s12.
17.	St.Helen G, Jacob III P, Nardone N, Benowitz NL. IQOS: examination of Philip Morris International's claim of reduced exposure. <i>Tobacco Control</i> . 2018 ;Published Online First: 29 August 2018:doi: 10.1136/tobaccocontrol-2018-054321.
18.	Farsalinos KE, Yannovits N, Sarri T, Voudris V, Poulas K, Leischow SJ. Carbonyl emissions from a novel heated tobacco product (IQOS): comparison with an e-cigarette and a tobacco cigarette. <i>Addiction</i> . 2018 ;113(11):2099-106.
19.	Nabavizadeh P, Liu J, Havel CM, Ibrahim S, Derakhshandeh R, Jacob III P, et al. Vascular endothelial function is impaired by aerosol from a single IQOS HeatStick to the same extent as by cigarette smoke. <i>Tobacco Control</i> . 2018 ; Published Online First: 11 September 2018:doi: 10.1136/tobaccocontrol-2018-054325.
20.	Davis B, Williams M, Talbot P. iQOS: evidence of pyrolysis and release of a toxicant from plastic. <i>Tobacco Control</i> . 2018 ; published Online First: 13 March 2018:doi: 10.1136/tobaccocontrol-2017-054104.
21.	Mallock, N., Böss, L., Burk, R. et al. Levels of selected analytes in the emissions of "heat not burn" tobacco products that are relevant to assess human health risks. <i>Arch Toxicol</i> . 2018 . 92: 2145. https://doi.org/10.1007/s00204-018-2215-y
22.	Li X, et al. Chemical Analysis and Simulated Pyrolysis of Tobacco Heating System 2.2 Compared to Conventional Cigarettes. <i>Nicotine & Tobacco Research</i> . 2018 ;nty005-nty.
23.	HNB no less harmful than e-cigarettes. <i>The Korea Times</i> . 2018 http://www.koreatimes.co.kr/www/nation/2018/09/119_250291.html
24.	Kawamura K, Yamada K, Morioka I. [Health Effects Accompanying the Transition from Cigarettes to Heat-not-burn Tobacco: Nicotine Dependence, Nicotine Withdrawal Symptoms, and Changes in Smoking Behaviors]. <i>Nihon Eiseigaku</i>

	Study / Report
	Zasshi. 2018 ;73(3):379-87.
25.	Bekki K, et al. Comparison of chemicals in mainstream smoke in heat-not-burn tobacco and combustion cigarettes. Journal of UOEH. 2017 ;39(3):201-7.
26.	Auer R, et al. Heat-not-burn tobacco cigarettes: Smoke by any other name. JAMA Internal Medicine. 2017 ;177(7):1050-2.
27.	Forster M, et al. An experimental method to study emissions from heated tobacco between 100-200 C. Chemistry Central Journal. 2015 ;9(1):20.
Herbal cigarettes	
28.	Jorgensen ED, Zhao H, Traganos F, Albino AP and Darzynkiewicz Z. DNA damage response induced by exposure of human lung adenocarcinoma cells to smoke from tobacco- and nicotine-free cigarettes. Cell Cycle 2010 ;9(11):2170-6.
29.	Gan Q, Yang J, Yang G, Goniewicz M, Benowitz N and Glantz S. Chinese 'herbal' cigarettes are as carcinogenic and addictive as regular cigarettes. Cancer Epidemiology, Biomarkers & Prevention 2009 ;18(12):3497–501.
30.	Calafat AM, Polzin GM, Saylor J, Richter P, Ashley DL and Watson CH. Determination of tar, nicotine, and carbon monoxide yields in the mainstream smoke of selected international cigarettes. Tobacco Control 2004 ;13:45-51.
31.	Groman E, Bernhard G, Blauensteiner D and Kunze U. A harmful aid to stopping smoking. The Lancet 1999 ;353:466-7.

B. Risk for clinical symptoms or diseases

	Study / Report
E-cigarettes	
32.	Skotsimara G, Antonopoulos AS, Oikonomou E, Siasos G, Ioakeimidis N, Tsalamandris S, et al. Cardiovascular effects of electronic cigarettes: A systematic review and meta-analysis. <i>European Journal of Preventive Cardiology</i> . 2019 ;https://doi.org/10.1177/2047487319832975.
33.	Vindhyal M. Impact on Cardiovascular Outcomes among E-Cigarette Users: A review from National Health Interview Surveys. The American College of Cardiology 68th Annual Scientific Session; March 16-18, 2019; New Orleans, US: The American College of Cardiology 2019 .
34.	Osei AD, Mirbolouk M, Orimoloye OA, Dzaye O, Uddin SMI, Benjamin EJ, et al. The association between e-cigarette use and cardiovascular disease among never and current combustible cigarette smokers: BRFSS 2016 & 2017. <i>The American Journal of Medicine</i> . 2019 ;https://doi.org/10.1016/j.amjmed.2019.02.016.
35.	Li D, Sundar IK, McIntosh S, Ossip DJ, Goniewicz ML, O'Connor RJ, et al. Association of smoking and electronic cigarette use with wheezing and related respiratory symptoms in adults: cross-sectional results from the Population Assessment of Tobacco and Health (PATH) study, wave 2. <i>Tobacco Control</i> . 2019 ;tobaccocontrol-2018-054694.
36.	Chaumont M, Borne Pvd, Bernard A, Muylem AV, Deprez G, Ullmo J, et al. Fourth generation e-cigarette vaping induces transient lung inflammation and gas exchanges disturbances: results from two randomized clinical trials. <i>American Journal of Physiology-Lung Cellular and Molecular Physiology</i> . Published online 6 February 2019 ;doi.org/10.1152/ajplung.00492.2018.
37.	Ndunda PM, Muutu TM. Abstract 9: Electronic Cigarette Use is Associated With a Higher Risk of Stroke. <i>Stroke</i> . 2019 ;50(Suppl_1):A9-A.
38.	Grant JE, Lust K, Fridberg DJ, King AC, Chamberlain SR. E-cigarette use (vaping) is associated with illicit drug use, mental health problems, and impulsivity in university students. <i>Annals of Clinical Psychiatry</i> . 2019 ;31(1):27-35.
39.	Lee Y, Lee K-S. Association of Depression and Suicidality with Electronic and Conventional Cigarette Use in South Korean Adolescents. <i>Substance Use & Misuse</i> . 2019 ;1-10. doi.org/.1080/10826084.2018.1552301.
40.	King JL, Reboussin BA, Wiseman KD, Ribisl KM, Seidenberg AB, Wagoner KG, et al. Adverse symptoms users attribute to e-cigarettes: Results from a national survey of US adults. <i>Drug and Alcohol Dependence</i> . 2019 ;196:9-13.
41.	Kerr DMI, Brooksbank KJM, Taylor RG, Pinel K, Rios FJ, Touyz RM, et al. Acute effects of electronic and tobacco cigarettes on vascular and respiratory function in healthy volunteers: a cross-over study. <i>Journal of Hypertension</i> . 2019 ;37(1):154-66.

	Study / Report
42.	Wills TA, Pagano I, Williams RJ, Tam EK. E-cigarette use and respiratory disorder in an adult sample. Drug and Alcohol Dependence. 2019 ;194:363-70.
43.	Chang Y-C, Lee Y-H, Liu C-T, Shelley M. Patterns of e-cigarette use and self-reported health outcomes among smokers and non-smokers in the United States: A preliminary assessment. Journal of Substance Use. 2019 ;24(1):79-87.
44.	Glantz SA, Bareham DW. E-Cigarettes: Use, Effects on Smoking, Risks, and Policy Implications. Annual Review of Public Health. 2018 ;39(1):215-35.
45.	Huang SJ, Xu YM, Lau ATY. Electronic cigarette: A recent update of its toxic effects on humans. Journal of Cellular Physiology. 2018 ;233(6):4466-78.
46.	Dimitriadis K, Tsioufis K, Konstantinidis D, Kalos T, Fragoulis C, Konstantinou K, et al. ACUTE DETRIMENTAL EFFECTS OF E-CIGARETTE AND TOBACCO CIGARETTE SMOKING ON BLOOD PRESSURE AND SYMPATHETIC NERVE ACTIVITY IN HEALTHY SUBJECTS. Journal of Hypertension. 2018 ;36:e245.
47.	Wang JB, Olgin JE, Nah G, Vittinghoff E, Cataldo JK, Pletcher MJ, et al. Cigarette and e-cigarette dual use and risk of cardiopulmonary symptoms in the Health eHeart Study. PLOS ONE. 2018 ;13(7):e0198681.
48.	Alzahrani T, Pena I, Temesgen N, Glantz SA. Association Between Electronic Cigarette Use and Myocardial Infarction. American Journal of Preventive Medicine. 2018 ;55(4):455-61.
49.	Nocella C, Biondi-Zoccai G, Sciarretta S, Peruzzi M, Pagano F, Loffredo L, et al. Impact of Tobacco Versus Electronic Cigarette Smoking on Platelet Function. The American Journal of Cardiology. 2018 ;122(9):1477-81.
50.	Perez M, Atuegwu N, Mead E, Oncken C, Mortensen E. E-Cigarette Use Is Associated with Emphysema, Chronic Bronchitis and COPD. D22 CUTTING EDGE RESEARCH IN SMOKING CESSATION AND E-CIGARETTES: American Thoracic Society; 2018 . p. A6245-A.
51.	Reinikovaite V, Rodriguez IE, Karoor V, Rau A, Trinh BB, Deleyiannis FW-B, et al. The effects of electronic cigarette vapour on the lung: direct comparison to tobacco smoke. European Respiratory Journal. 2018 ;51(4).
52.	Staudt MR, Salit J, Kaner RJ, Hollmann C, Crystal RG. Altered lung biology of healthy never smokers following acute inhalation of E-cigarettes. Respiratory Research. 2018 ;19(1):78.
53.	Scott A, Lugg ST, Aldridge K, Lewis KE, Bowden A, Mahida RY, et al. Pro-inflammatory effects of e-cigarette vapour condensate on human alveolar macrophages. Thorax. 2018 ;73(12):1161-9.
54.	Alexander LEC, Drummond CA, Hepokoski M, Mathew D, Moshensky A, Willeford A, et al. Chronic inhalation of e-

	Study / Report
	cigarette vapor containing nicotine disrupts airway barrier function and induces systemic inflammation and multiorgan fibrosis in mice. American Journal of Physiology-Regulatory, Integrative and Comparative Physiology. 2018 ;314(6):R834-R47.
55.	Terentes-Printzios D, Ioakeimidis N, Vlachopoulos C, Abdelrassoul M, Georgakopoulos C, Gourgouli I, et al. ELECTRONIC CIGARETTE SMOKING EXERTS AN UNFAVOURABLE EFFECT ON AORTIC HEMODYNAMICS AND WAVE REFLECTIONS. Journal of Hypertension. 2018 ;36:e2-e3.
56.	Hedman L, Backman H, Stridsman C, et al. Association of electronic cigarette use with smoking habits, demographic factors, and respiratory symptoms. JAMA Network Open. 2018 ;1(3):e180789.
57.	Sommerfeld CG, Weiner DJ, Nowalk A, Larkin A. Hypersensitivity Pneumonitis and Acute Respiratory Distress Syndrome From E-Cigarette Use. Pediatrics. 2018 ;141(6).
58.	Huilgol P, Bhatt SP, Biligowda N, Wright NC, Wells JM. Association of e-cigarette use with oral health: a population-based cross-sectional questionnaire study. Journal of Public Health. 2018 :fdy082-fdy.
59.	Li G, Saad S, Oliver B, Chen H. Heat or Burn? Impacts of Intrauterine Tobacco Smoke and E-Cigarette Vapor Exposure on the Offspring's Health Outcome. Toxics. 2018 ;6(3):43.
60.	Nguyen T, Li GE, Chen H, Cranfield CG, McGrath KC, Gorrie CA. Maternal E-Cigarette Exposure Results in Cognitive and Epigenetic Alterations in Offspring in a Mouse Model. Chemical Research in Toxicology. 2018 ;DOI: 10.1021/acs.chemrestox.8b00084.
61.	Lee H-W, Park S-H, Weng M-w, Wang H-T, Huang WC, Lepor H, et al. E-cigarette smoke damages DNA and reduces repair activity in mouse lung, heart, and bladder as well as in human lung and bladder cells. Proceedings of the National Academy of Sciences. 2018 ;115(7):E1560-E9.
HNB products	
62.	Sohal SS, Eapen MS, Naidu VGM, Sharma P. IQOS exposure impairs human airway cell homeostasis: direct comparison with traditional cigarette and e-cigarette. ERJ Open Research. 2019 ;5(1):00159-2018.
63.	Aokage T, Tsukahara K, Fukuda Y, Tokioka F, Taniguchi A, Naito H, et al. Heat-not-burn cigarettes induce fulminant acute eosinophilic pneumonia requiring extracorporeal membrane oxygenation. Respiratory Medicine Case Reports. 2019 ;26:87-90.
64.	Moazed F, Chun L, Matthay MA, Calfee CS, Gotts J. Assessment of industry data on pulmonary and immunosuppressive effects of IQOS. Tobacco Control. 2018 ; doi:10.1136/tobaccocontrol-2018-054296.

	Study / Report
65.	Leigh N, Tran P, O'Connor R, Goniewicz M. Cytotoxic effects of heated tobacco products (HTP) on human bronchial epithelial cells. Tob Control. 2018 ; doi:10.1136/tobaccocontrol-2018-054317.

C. Secondhand smoke

	Study / Report
E-cigarettes	
66.	Glantz SA, Bareham DW. E-Cigarettes: Use, Effects on Smoking, Risks, and Policy Implications. Annual Review of Public Health. 2018 ;39(1):215-35.
67.	Marcham CL, Floyd EL, Wood BL, Arnold S, Johnson DL. E-cigarette nicotine deposition and persistence on glass and cotton surfaces. Journal of Occupational and Environmental Hygiene. 2019 :1-6.
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E. Dual use

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G. Potentially misleading claims

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H. Injury and poisoning

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Test Results of E-cigarettes and HNB Products

E-cigarettes

The Government Laboratory tested e-cigarettes purchased from the market for the presence of selected harmful chemicals. The samples were purchased from consignment stores, e-cigarette specialty shops as well as the Internet. Five rounds of tests have been conducted and the following chemicals have been tested:

- (a) formaldehyde¹;
- (b) tobacco-specific nitrosamines² (TSNAs) including N-nitrosornicotine (NNN) and 4-(N-nitrosomethylamino)-1- (3-pyridyl)-1-butanone (NNK);
- (c) flavourings³ including diacetyl, acetyl propionyl, and acetoin; and
- (d) heavy metals⁴ including lead, arsenic, cadmium, antimony, chromium, and nickel.

2. The table below summarises the test results :

Date	Source	Chemical tested	No. of samples tested (No. of positive samples)	Presence of tested chemical(s)
Sep 2015	E-liquid	Formaldehyde	37 (26)	5.6mg/kg to 9600mg/kg
Feb 2016	Aerosol	Formaldehyde	20 (10)	0.07 to 8.1µg/100ml puff.
Jul/Aug 2016	Aerosol	TSNAs	20 (0)	Not detected
Feb 2017	Aerosol	<ul style="list-style-type: none"> • Diacetyl • Acetyl propionyl • Acetoin 	<ul style="list-style-type: none"> • Diacetyl: 20 (0) • Acetyl propionyl: 20 (0) • Acetoin: 20 (2) 	0.7µg/100ml puff for both samples
Apr 2017	Aerosol	<ul style="list-style-type: none"> • Lead • Arsenic • Cadmium • Antimony • Chromium • Nickel 	20 (0)	Not detected

¹ Formaldehyde is an irritant and can produce irritation of the nose and pharynx. It is also classified by WHO as Group 1 carcinogen i.e. there is sufficient evidence in humans for the carcinogenicity of formaldehyde.

² TSNAs occur widely in tobacco and tobacco smoke and are formed from the chemical reactions of nicotine and other tobacco alkaloids. They are known carcinogens, and both NNN and NNK are Group 1 carcinogens as classified by WHO.

³ Flavourings are often complex mixtures of natural and manmade substances. Although they are safe to eat, these chemicals might be harmful to breathe in the forms and amounts to which food may be exposed.

⁴ Many heavy metals are carcinogenic e.g. cadmium and nickel are Group 1 carcinogens as classified by WHO or harmful to body organs e.g. lead can damage renal and nervous systems.

HNB products

3. In 2017, seven samples of an HNB product were sent to the Government Laboratory for testing of nicotine and tar yields by the Department of Health. The aerosol emitted from all samples was found to contain nicotine and tar. Nicotine can cause addiction and narrowing of blood vessels. Tar is carcinogenic and can irritate airways. The test results are set out in the table below.

Sample	Nicotine (mg/stick)	Tar (mg/stick)
1	0.2	5
2	0.2	4
3	0.2	4
4	0.2	5
5	0.2	4
6	0.2	4
7	0.1	4

4. According to test results of the Government Laboratory, the nicotine and tar yields of conventional cigarettes sold in local market in 2017 ranged from 0.1-1.3 mg/stick and 1-14 mg/stick respectively. The test confirmed that the tar and nicotine yields in HNB products are comparable to conventional cigarettes.