Call of Abstracts - “International conference on the E-Cigarette: patterns of use and health impacts”

Call of abstracts
“International conference on the E-Cigarette: patterns of use and health impacts” - Paris, on 5-6th December 2022

Submission form

Symposium proposal

Contact details of the corresponding organiser

Title

Ms

First name

Leonie

Last name

Brose

E-mail

leonie.brose@kcl.ac.uk

Institution / company

King's College London

Unit / department

Addictions

Address

4 Windsor Walk
London, SE5 8BB
United Kingdom

Background information

Type of submission

Symposium

Theme of conference

Health impact

Keywords

E-Cigarette and use related diseases | Harm reduction | Health impact

Symposium title

Health effects of vaping - a comprehensive systematic review

Organiser's contact details :

Title

Ms

First name

Leonie

Last name

Brose

E-mail

leonie.brose@kcl.ac.uk

Institution / company

King's College London

Chairpersons's contact details :

Number of chairpersons

1

Chairperson 1

Ann McNeill UK ann.mcneill@kcl.ac.uk

Symposium proposal

Abstract of the symposium

Authors: McNeill A, Simonavičius E, Brose L, Taylor E, East K, Zuikova E, Calder R & Robson D

This symposium presents some findings from the eighth in a series of independent reports on vaping originally commissioned by Public Health England and now the Office for Health Improvement and Disparities in the Department of Health and Social Care in England. The series aims to summarise the evidence on vaping products and inform policies and regulations. The present report, led by academics at King's College London with international collaborators and reviewers, is the most comprehensive to date.

The symposium focuses on evidence on the health risks of vaping. Our systematic review (https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020215915) addressed two questions: 1) What effect does vaping and second-hand exposure to vaping have on biomarkers of exposure and biomarkers of potential harm associated with the risk of cancer, respiratory or cardiovascular health conditions? 2) What are the effects of vaping among people with existing health conditions (as above) on disease outcomes? We searched four scientific databases in July 2021 and included randomised controlled trials, non-randomised studies, cross-over studies, single group

studies, longitudinal and cross-sectional studies in humans, animals and cells. This report substantially extends previous reviews, including the 2018 National Academies of Sciences Engineering and Medicine (NASEM) review.

The four presentations will summarise different aspects of the findings, starting with the overall methods and health risks of vaping nicotine and flavourings (Robson); biomarkers of exposure (Taylor), evidence on disease outcomes (Brose), and finishing with research limitations and recommendations (Simonavičius).

The report will be published in August 2022 and our results are embargoed until then but will be presented at the conference if the symposium is selected.

Main messages

We assessed both absolute risks of vaping (compared to people who do not smoke) and relative risks (compared to smoking).
Studies of longer-term exposure, greater standardisation and improved methodology are needed to strengthen the evidence base.

Number of presentations

4

Presentation 1

Methods and health risks of nicotine and flavourings
Presenting: Dr Debbie Robson
Background: Most adults who vape use nicotine and added flavourings and both are central to the experience of vaping and quitting smoking. However, there are concerns about dependence, toxicity and the impact on health from both nicotine and flavours alone and in combination.
Methods: These are the same for the 4 presentations. In summary, databases were searched between 08/2017 and 07/2021, using vaping related terms. Data were extracted and narratively reviewed and/or meta-analysed based on pre-specified criteria and an algorithm.
Results: Out of 10,305 identified records, 413 studies were included [humans n=275; animals or cells n=138]. Twenty human studies assessed pharmacokinetics of nicotine through vaping: 15 cross-over and 5 acute studies. These were supplemented by 60 studies examining nicotine and nicotine metabolites, and 5 meta-analyses of studies of participants who vaped or smoked at least weekly were possible. Nicotine and metabolite levels varied by length of exposure to vaping, experience with vaping, and characteristics of vaping products. Due to different study methods, it was difficult to separate health effects of nicotine from other aerosol constituents. Twenty-one studies assessed potential health effects of flavourings. We identified 6 human studies: 2 cross-over studies which assessed the role of flavourings on nicotine delivery, 3 on biomarkers of exposure (randomised parallel cohort design, cross-over and representative cross-sectional study) and 1 longitudinal design assessing self-reported adverse effects. Thirteen animal and cell studies found that some flavourings have the potential to alter cellular responses, but less so than tobacco smoke. Most evidence on potential risk come from animal studies.
Conclusions: Overall health risks literature has greatly increased over the last 4 years. Nicotine underpins vaping in adults, but exposure varies by product and user characteristics. With experience, people who vape can achieve similar levels of nicotine exposure to smoking cigarettes. In the presentation, we will highlight the flavours we identified as of concern and implications for regulation.

Presentation 2

Biomarkers of exposure
Presenting: Ms Eve Taylor
Background: Smokers are exposed to hundreds of tobacco-related toxicants. Vaping products can help smokers quit smoking and expose users to lower toxicant levels hence reducing risks to health. We compared the differences in levels of toxicants between people who vape, smoke or do neither,

including: nicotine and its metabolites, four tobacco-specific nitrosamines (TSNAs), metabolites of nine volatile organic compounds (VOCs: acrylamide, acrolein, acrylonitrile, benzene, 1.3-Butadiene, crotonaldehyde, formaldehyde, isoprene and toluene) and carboxyhaemoglobin and expired air carbon monoxide levels.
Methods: Peer-reviewed articles that reported levels of toxicants in bio-samples (e.g., urine or blood) among adults who exclusively vaped, smoked or used neither were included. Using an algorithm, we selected studies with similar methodology which were pooled for meta-analyses.
Results: We identified 28 studies assessing TSNAs, 24 VOCs, 33 carbon monoxide exposure, 9 other potential toxicants and 10 metals. Six studies assessed second-hand exposure. We were able to carry out several meta-analyses: 5 of TSNAS assessing relative risks (i.e vapers vs smokers), 3 absolute risks (i.e. vapers vs non-users); 15 VOCs for relative risks 10 absolute risks; 2 for carbon monoxide for relative risks, Levels of tobacco-specific nitrosamines were significantly lower among vapers compared to smokers. Levels were significantly higher among vapers compared to non-users.
Levels of carboxyhaemoglobin and expired carbon monoxide were significantly lower among vapers compared to smokers.
Comparison of levels of exposure to volatile organic compounds and other potential toxicants between smokers and vapers, and vapers and non-users will be presented in the symposium.
Conclusions: Exposure to tobacco-specific nitrosamines, and carbon monoxide was significantly lower among vapers compared to smokers,. Differences in volatile organic compounds and other potential toxicants will also be discussed. Quality of evidence varied with a lack of studies comparing biomarker of exposure levels between longer-term smokers, vapers and non-users.

Presentation 3

Cancer, respiratory and cardiovascular diseases (CVD)
Presenting: Dr Leonie Brose
Background
The main causes of smoking-related illness and death are cancer, respiratory and cardiovascular diseases (CVD), so we reviewed the evidence on effect of vaping on outcomes relevant to these diseases.
Method
We compared the differences in levels of biomarkers of toxicant exposure, biomarkers of potential harm cutting across several diseases (oxidative stress, inflammation, endothelial function and platelet activation) as well as biomarkers of harm specific to cancer, respiratory diseases, CVD and other diseases, between people who vape, smoke or do neither. We conducted meta-analyses where availability and definition of comparator data allowed and summarised the evidence in weight of evidence statements.
Results
Evidence on biomarkers of potential harm associated with the development of multiple diseases was drawn from 41 unique studies in 43 publications. For cancer-specific outcomes, two RCTs, one longitudinal study and five cross-sectional studies of gene expression and DNA methylation in humans were included alongside twelve cell and seven animal studies. For respiratory disease, 25 studies assessed relevant outcomes in humans, mostly spirometry, also fractional exhaled nitric oxide, impulse oscillometry, imaging and bronchoscopy. Further information on respiratory conditions came from 47 cell and 25 animal studies. For CVD, 41 human studies assessed relevant outcomes, mostly heart rate and blood pressure, also arterial stiffness and oxygen saturation. Two cell and 16 animal studies provided further evidence. No studies assessed how vaping affects the health of people who have had cancer or cardiovascular conditions, four studies were in adults with asthma and one study followed a small cohort with COPD for up to five years. Evidence on second-hand exposure was mostly lacking.
Conclusions
Due to embargo, we are unable to share full results or conclusions at the time of abstract submission but results from the studies will be discussed in relation to the three main diseases.

Presentation 4

Overview of methodological limitations when assessing vaping effects on health biomarkers Presenting: Dr Erikas Simonavičius

Background: It took years to show that smoking causes diseases therefore to evaluate health risks of vaping—which is deemed less harmful than smoking—researchers need to focus on early warning signs of risk or progression towards ill health. Biomarkers of exposure to toxicants that are related to specific diseases and biomarkers of potential harm to health that provide surrogate end points for diseases may help estimate vaping harm potential before it translates into chronic health outcomes. This presentation summarises common research limitations in studies on vaping health biomarkers and provides recommendations for research on vaping health risks.

Method: Over 100 human studies (published between August 2017 and July 2021) on biomarkers of exposure and potential harm between vapers, smokers and non-users were reviewed. Findings were summarised by study design (cross-sectional or longitudinal), groups of biomarkers of exposure (e.g., tobacco-specific nitrosamines, volatile organic compounds, etc.), groups of biomarkers of potential harm (specific to diseases or cutting across multiple diseases) and exposure length (up to 7 days, 8 days to 12 months, over 12 months). Common methodological differences and research limitations were identified.

Results: Very few studies were included in meta-analyses due to methodological heterogeneity. The identified research limitations were associated with study design, study populations and user groups, characteristics of exposure to vaping and smoking, and ways in which biomarkers were assessed. Limitations of existing research precluded conclusions about longer-term vaping harms to health. Few studies included people with existing health outcomes.

Conclusions: Research on vaping associations with various biomarkers is promising but at the early stage. Our evidence review identified multiple methodological challenges that need to be addressed so that studies can deliver findings that are easy to interpret and synthesise. Implementing our recommendations will help ensure key questions about relative and absolute vaping harms to health can be answered.

Funding of symposium

Federal source

Yes

State source

Yes

Nonprofit Grant Funding Entity Source

No

Nonprofit Grant Funding Entity Source

No

Academic Institution Source

No

Pharmaceutical Industry Source

No

Tobacco/E-Cigarette Industry Source

No

Declaration of interest

The submitter declares that during the past 5 years have a direct nor indirect link (professional*, personal or financial) with the tobacco and e-cigarette companies**

No