

Improving the quality of research on e-cigarettes

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Disclosures

- I undertake, or have undertaken, research and consultancy for Pfizer, J&J and GSK, who develop and manufacture smoking cessation medicines
- I provide advice to the UK's National Centre for Smoking Cessation and Training, Public Health England, and ASH
- I am an unpaid member of the scientific steering group of the SmokeFree mobile application
- My research is funded by Cancer Research UK
- I am Editor-in-Chief of the journal, Addiction

Key topics in e-cigarette research

What are the effects of e-cigarette use on ...?

1. Health
2. Smoking cessation
3. Smoking reduction
4. Smoking initiation

Problems with the reporting of research

Over-interpreting:	Attributing causal connections when there are plausible alternative explanations
Overstating:	Creating a misleading impression about the nature, size or importance of effects
Overgeneralising:	Unwarranted generalisation beyond the study population, conditions or measures
Cherry picking:	Selecting findings to report or highlight according to a specific viewpoint
Double standards:	Applying different critical standards to research that supports or conflicts with a given view

'Bad Science Bingo'* in E-cigarette research!

	Health	Smoking cessation	Smoking reduction	Smoking initiation
Over-interpreting	1	2	3	4
Overstating	5	6	7	8
Overgeneralising	9	10	11	12
Cherry picking	13	14	15	16
Double standards	17	18	19	20

* A term which I think was first used by Ben Goldacre <http://www.badscience.net/>

Disclaimer

- We all fall short to some degree on occasions
- The aim is not to ascribe blame but to provide a framework for improving the quality of reporting of research

Where the problems arise

- The body of primary study reports
- Primary study abstracts
- Primary study titles
- Reviews
- Review abstracts
- Review titles
- Expert commentaries
- Press releases
- Media reports

‘More evidence that e-cigarettes harm smokers more than just smoking cigarettes’ (Glantz, listserve)

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‘This paper shows that smokers who use e-cigarettes report having more chest pain, are more likely to notice blood when brushing their teeth, to have sores or ulcers in their mouth, and to have more than one cold than smokers who did not use e-cigarettes in the last 30 days.

Even after controlling for cigarettes smoked per day, e-cigarette expenditure or use was associated with greater odds of wheezing and shortness of breath.

This paper adds to the evidence that dual use of e-cigarettes with cigarettes is more dangerous than smoking cigarettes.’

‘As currently being used, e-cigarettes are associated with significantly less quitting among smokers’ (Kalkhoran, journal abstract)

‘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; $p=0.94$).

‘Ever use of e-cigarettes was robustly associated with initiation but more modestly related to escalation of cigarette use’ (Conner, journal abstract)

Baseline ever use of e-cigarettes was strongly associated with subsequent initiation (n=1726; OR 5.38, 95% CI 4.02 to 7.22; controlling for covariates, OR 4.06, 95% CI 2.94 to 5.60) and escalation (n=318; OR 1.91, 95% CI 1.14 to 3.21)

Controlling for covariates, this effect became non-significant, OR 1.39, 95% CI 0.97 to 1.82) for cigarette use.

MRC Good Research Practice guidelines

- Research excellence and integrity
- Respect, ethics and professional standards
- Honesty and transparency
- Openness and accountability

MRC ethics series

Good research practice:
Principles and guidelines



Research excellence and integrity

1. Clarity of models and constructs and their link to measures
2. Appropriateness of research designs, samples and measures
3. Comprehensive and balanced review and analysis of existing research using consistent criteria
4. Comprehensive and balanced analysis of plausible explanations for study findings using consistent criteria

Respect, ethics and professional standards

1. Respectful and collegiate attitude to other researchers
2. Adherence to professional standards and discipline in interpreting and communicating findings

Honesty and transparency

1. Full documentation of all aspects of the study process, including all data transformations and analyses undertaken
2. Willingness to make these available as required



Open Science Framework

Openness and accountability

1. Pre-registration of all study protocols and hypotheses and documentation of changes to these
2. Full disclosure of potential competing interests, including any that influence career prospects and other valued outcomes



Open Science Framework

Example of good practice?

How do we determine the impact of e-cigarettes on cigarette smoking cessation or reduction? (Villanti, journal abstract)

‘Only a small proportion of studies seeking to address the effect of e-cigarettes on smoking cessation or reduction meet a set of proposed quality standards. Those that do are consistent with randomized controlled trial evidence in suggesting that e-cigarettes can help with smoking cessation or reduction

How to achieve improvements

- Journals and grant awarding bodies should develop and adopt specific guidance based on the principles
- This should be accompanied by promotion campaigns and systems for monitoring and promoting adherence

Public health science has a long way to go but we urgently need to make a start for the credibility of the field as well as providing sound guidance to policy makers