Contrasting Adverse Effects of Electronic Cigarettes (ECs) with Traditional Nicotine Replacement Therapies (NRTs)
A Systematic Review Meta-analysis

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INTRODUCTION
Tobacco is a leading cause of preventable death in Australia, with high relapse for established nicotine replacement therapies (NRTs).

Adverse effects (AEs) associated with cessation therapies are commonly cited as reasons for discontinuation.

With the development of electronic cigarettes (EC), their role as a smoking cessation aid has been theorised.

This systematic review compares the side effect profiles of traditional NRTs (i.e. patches, gums, lozenges, sprays) with EC nicotine delivery.

RESULTS

Figure 1: Five most common adverse effects associated with electronic cigarette (EC): Oral Irritation (36.49%), Dry Mouth (24.42%), Flatulence/Hiccup (18.24%), Nasopharyngitis (17.69%), Cough (14.27%)

Figure 2: Five most common adverse effects associated with traditional nicotine replacement therapies (NRTs) as reported by Mills et al. (2010): Skin irritation (15.19%), Cough (12.51%), Dizziness (5.85%), Insomnia (3.54%), Nausea/Vomiting (3.24%)

Figure 3: Comparison of the joint adverse effects between electronic cigarettes (EC) and traditional nicotine replacement therapies (NRTs)

DISCUSSION
Overall, results indicate that ECs were associated with a greater incidence of:
- Oral Irritation (OR = 32.15)
- Cough (OR = 1.16)
- Headache (OR = 5.01)
- Insomnia (OR = 2.30)

Contrarily, NRTs induced a greater incidence of:
- Vertigo (OR = 0.97)

Understanding the negative health implications of commonly prescribed cessation therapies is essential in determining whether a sphere exists for the role of ECs. The most common AEs associated with EC use were consistent with those linked with tobacco use such as oral irritation, dry mouth, nasopharyngitis and cough. This suggests that tolerability of these AEs would be greater in tobacco users attempting ECs as a cessation tool. Contrarily, the most common NRT AEs are not considered common side effects of tobacco consumption such as skin irritation, insomnia and nausea/vomiting. The unfamiliarity of NRT’s AEs in smokers attempting cessation may result in reduced abstinence rates.

Three key limitations of the study were noted:
1. Studies reporting quantitative data on common AEs were included in final data extraction
2. Database search for EC adverse effects was executed on PubMed, Web of Science & PsycINFO
3. Database search resulted in 2850 unique entries (post-duplicate removal) with 39 papers (28,424 participants) being used in final synthesis

Odds Ratio (OR)

Electronic Cigarettes (EC)
Nicotine Replacement Therapies (NRT)

Oral Irritation
32.15

Cough
1.16

Headache
5.01

Insomnia
2.30

Vertigo


Table 1: Tabulation of the common adverse effects reported between electronic cigarettes (ECs) and nicotine replacement therapies (NRTs). All numbers expressed are the reported odds ratios (ORs) associated with each adverse effect

Conclusion
This review effectively quantifies the frequency of common clinical presentations associated with mainstream cessation aids. Future work could seek to understand the experiential nature of traditional NRTs and ECs by quantifying not only the adverse events but also the favourable experiences of users, providing an avenue to enhance adherence.