Brief Report

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Case Study: Accuracy of Press Release Generation and News Reporting on a Cross-Sectional Study of E-Cigarette and Combusted Cigarette Dual-Use

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Abstract

Media reporting on scientific studies influences how adults who smoke perceive the risks of combusted cigarettes vs. non-combusting nicotine products. The U.S. FDA has indicated that adults who switch away from smoking cigarettes to FDA-authorized alternative nicotine products can reduce their health risks. Despite this guidance, a growing proportion of adults who smoke in both the US and England believe the opposite, that combusted cigarettes are safer. Cross-sectional studies represent an important source of information on the health impact of nicotine products but can require evaluation of the precision of the study design and results to avoid inaccurate conclusions. An analysis of news coverage surrounding a recent cross-sectional observational study on dual-use highlights how misinterpretations of underlying data can originate and then spread. This case study identified key issues, including significant omissions and unsupported claims during press release development and subsequent media reporting. Understanding these problems can guide more precise designs of cross-sectional studies and highlights the imperative for precise and accurate press release generation and media reporting.

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Introduction: A Case Study Illustrates Inaccuracy in News Reporting on Cross-Sectional Studies of Nicotine Products

Smoking of combusted cigarettes (CC) remains a leading cause of premature death in the US and globally. The U.S. FDA has scientifically reviewed and authorized for sale several types of non-combusting nicotine products, such as such as electronic cigarettes (EC), oral nicotine pouches (ONP), and heated tobacco products (HTP), which the FDA has indicated can reduce health risks when used by adults as a substitute for combustible cigarettes. (1–3) At the same time, these products may induce health risks compared to not using any nicotine products, especially by adolescents.(2–4) The accuracy of scientific analyses regarding the relative and absolute health risks associated with nicotine products, and the way these findings are reported in scientific publications and associated press releases, and then re-communicated through the media, can significantly influence perceptions of adults who smoke, particularly those considering switching to alternative nicotine products. (5,6)

Scientific understanding of the relative and absolute health effects of nicotine products come from different categories of studies, including compositional analysis of products and their aerosols, cellular assays, animal models, and studies of the impact of human exposure. Within human studies, randomized controlled studies allow for clear measurement of the causal impact of product use. Even so, randomized trials may not reflect real-world use conditions, and are often limited in size, duration, and scope. Consequently, non-randomized cross-sectional observational studies represent a primary source of information on the real-world health effects of product use.(7)

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However, the accuracy of these cross-sectional studies is dependent on and limited by the study design decisions of the authors. Imprecise quantification of timing and duration of tobacco and nicotine product use can impact dose-response accuracy. Insufficient or imprecise segmentation can further exacerbate confounding between products whose use patterns are not independent of one another. (8) Therefore, accurate press release generation and news reporting requires a precise verification of these nuanced issues, and how they read on the risk associated with use of these products.

Here, a case study involving a cross-sectional analysis of the impact of dual-use shows how media coverage that fails to critically engage with study nuances can fuel misinformation, often misrepresenting health risks and downplaying potential harm reduction for adult smokers of combustible cigarettes.(9) The case study involves the toxicant exposure associated with dual use of EC and CC in comparison to exclusive use of either product. It highlights a press release which obscured or contradicted material facts from the underlying studies, with news reports then amplifying these inaccuracies.

Methods

The study of Xue et al. reported statistics of BOE (biomarker of exposure) levels in dual-users of EC and CC products, broken into 4 segments in Table S2. To accurately add cohorts for the current analysis, to determine the differential impact of EC frequency (<20 days/month vs. 20+days/month), it was relevant to consider that they were reported using geometric means.

The weighted average of geometric means (GM) was calculated as follows:

$$\text{GM-combined} = ((GM1)^{n1} \times (GM2)^{n2})^{(1/(n1+n2))}$$

In Excel, to prevent data overflow issues, this can be equivalently coded as:

$$\text{GM-combined} = \text{EXP}((n1*\ln(GM1)+n2*\ln(GM2))/(n1+n2))$$

Case Study: Association of EC and CC Use with Toxicant Exposure (Xue et al., 2025)

This case study involves a recent analysis of PATH (Population Assessment of Tobacco and Health Study, NIH) data, which evaluated the impact of dual-use (DU) of EC and CC (Xue et al., 2025).(9) This study segmented the DU population into 4 samples, representing (higher or lower frequency EC use) x (higher or lower frequency CC use). This segmentation is illuminating because it highlights that dual-use is not a unitary behaviour; it spans a range of multi-product use patterns, as discussed in a recent editorial (Jackson, 2025). (10)

Centrally to interpreting this study, the dual-use population was highly bi-modal: 45.5% of dual-users used EC every day, and another 10% used them ~5.7 days per week, representing the high frequency of use mode. The remaining 45% of dual-users used EC only ~1 day per week (data from Xue et al., Table S1). Therefore, it would be misrepresentative to use mean statistics to homogeneously describe the dual-users in this study, as mean descriptors most accurately characterize populations which are normally distributed, while for bi-modal populations it is more appropriate to characterize each mode separately. (11)

As shown in Figure 1, for dual-users of EC and CC products, higher frequency of EC use (20+ days per month) was associated with reduction in exposure to measured non-nicotine toxicants vs. exclusive CC use (data from Xue et al., 2025, Table S2). This result is not unexpected, as multiple studies have shown that for both EC and NRT (nicotine replacement therapy), there is a dose-response relationship between frequency of use and reduction of CC smoking. (12)

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Despite these results suggesting a harm-reducing effect among the dual users who used EC at a sufficient frequency to displace CC use, the American Cancer Society (ACS) issued a press release, and made television appearances, incorrectly asserting that "no influence of intensity of e-cigarette use was observed on BOE for those reporting dual use."(13–16) While the ACS press release did include one sentence indicating that "cigarette use… was generally associated with higher BOE than exclusive e-cigarette use," the headline did not reflect this important finding. (13) Consequently, some news reports suggested that EC and CC products were found to be equally harmful, without considering the more nuanced actual findings of the study. (16,17) This study has been widely reported, by 54 news outlets in the first 3 months since its publication. (18)

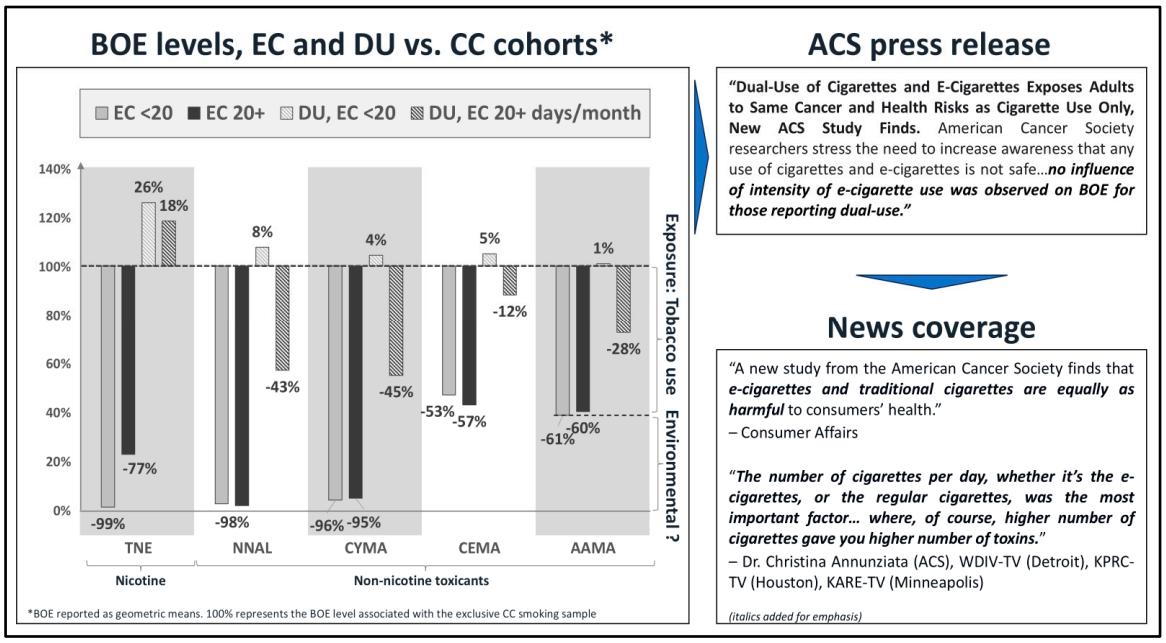

Figure 1. Inaccuracies in the communication of results of Xue et al., 2025. BOE (biomarkers of exposure), ACS (American Cancer Society), TNE (total nicotine equivalents), NNAL (a tobacco-specific nitrosamine), CYMA (biomarker of acrylonitrile), CEMA (biomarker of acrolein), AAMA (biomarker of acrylamide). DU (dual-use), EC (electronic cigarette). Note: Actual environmental exposure was not directly measured, as there was no non-tobacco-use control group. However, the lack of dose-response between intensity of exclusive EC use and non-nicotine BOE suggests that the environmental exposure is approximately equal to the levels measured during exclusive EC use for these BOE. Therefore, a 28% reduction in AAMA under dual use with frequent EC use may represent a ~46% reduction in exposure due to tobacco use (in comparison to exclusive CC use). Left panel adapted from (Xue et al, 2025, Table S2).

The Xue study design had two additional limitations which impacted the interpretability and generalizability of the results and the accuracy of the press release and news reporting. Firstly, the dual-use group was not assessed for its baseline smoking history. The higher level of nicotine equivalents measured in the dual-use group vs. exclusive CC group raises the possibility that the toxicant reduction vs. baseline condition was under-reported, as these may have been heavier smokers to begin with. The finding that nicotine exposure (TNE) was anti-correlated with frequency of EC use (TNE increased as EC use frequency decreased) is corroborative of this likelihood. Furthermore, mean cigarettes per day (CPD) were numerically higher in the dual-use group (13.1 CPD) vs. the CC exclusive-use group (11.8 CPD), even before accounting for the baseline level. The authors reported that there was no statistical difference between these groups, but this may have been in large part due to the large confidence intervals in the dual-use group consistent with the mean being used to represent a bi-modal population. For completeness, an alternate possibility is that dual-use increased nicotine exposure vs. baseline exclusive smoking, and this topic is deserving of further verification in future studies.

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In spite of baseline CPD not being assessed in the study, the title of the ACS press release was "Dual-Use of Cigarettes and E-Cigarettes Exposes Adults to Same Cancer and Health Risks as Cigarette Use Only" which implied that the study compared the before vs. after effects of dual-use (rather than studying possibly different populations). This conclusion was interpreted as such in the subsequent news reporting, in spite of a caveat in much smaller print in the press release indicating that the conclusion applied *"in particular"* to cases where CC use frequency didn't change, which again was not representative of the primary mode of dual-use in this population.(9,18) For example, *The Washington Post* mirrored the press release's primary message, and used it to support an argument that for people who smoke CC, using non-combusting nicotine products may increase disease risk. (19)

This lack of quantitative assessment of and adjustment for prior smoking history is unfortunately common in the literature when comparing dual-use vs. exclusive use cohorts. For example, it was a critical issue limiting the interpretability of a recent meta-analysis of 107 cross-sectional studies spanning disease areas, (which was also cited in the Washington Post article). (7,8,19)

The second issue impacting the interpretability of the Xue study was that it did not measure toxicant exposure in a non-tobacco/nicotine-using control group. In other words, exposure due to background environmental exposure was not quantified, leading to a further understatement of the toxicant exposure reduction associated with EC use vs. continued CC smoking. Highlighting this issue, for exclusive EC users, frequency of EC use did not significantly change exposure levels, suggesting that other environmental sources may have contributed to residual BOE levels (for instance, exposure to AAMA, a metabolite of acrylamide, can occur from other sources beyond tobacco use). (20) Overlooking subtraction of non-tobacco-use background risk was also limiting to the interpretability of the 107-study meta-analysis. (7,8)

In conclusion, while the results of Xue et al., should be interpreted with these caveats in mind, they do provide meaningful data about the dose-response relationship between intensity of use of EC and CC and their impact on BOE toxicant exposure. (10)

Discussion: Inaccurate Reporting Harms Public Health

Accurate reporting on scientific studies of tobacco products is critical for informing the public, particularly adults who smoke, as well as for informing clinical practice. Propagation of scientific inaccuracy is consequential: an analysis of PATH study data concluded that the belief that CC were safer or not more harmful than EC prevented 1.1 million US adults from stopping smoking over a 2-year period (Wave 4 to Wave 5). (21) Furthermore, the misperception by adults who smoke that combusted cigarettes are a safer product has more than doubled in the past decade in the UK, with a dramatic acceleration from 2021-2023; in the US this misperception, among all adults, increased five-fold from 2015-2020. (22,23)

This case study highlighted challenges in accurately interpreting and reporting on cross-sectional studies and did not appear to be isolated incidents. (5) For example, a 2021 cross-sectional study that found EC use was associated with a doubling of self-diagnosed erectile dysfunction risk resulted in at least 83 news reports. (24,25) Troublingly, this study did not account for duration of prior CC use in the EC cohort and did not have an exclusive CC use comparator segment. Furthermore, they chose to segment into harm- and no-harm cohorts, which exposed the study to confounding between CC and EC, whose use patterns are not independent. Consequently, they concluded that CC use was harmless or protective. (8) Furthermore, the study did not quantify nor exclude self-diagnoses which preceded start of EC use, violating basic principles of causal association.

This commentary warns how heavily the media may rely on press releases to shape reporting, underscoring the need for study authors and entities issuing press releases to summarize findings accurately, specifically noting limitations to prevent exaggerated and sensationalist communication of study results. Similarly, reporters can maximize reporting accuracy by performing sufficient diligence on study methods, results, and conclusions. It is beyond the scope of this commentary to

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speculate on the motivations or incentives underlying the inaccuracies and sensationalism found in these specific case studies. However, recent research has shown that negative framing increases engagement and click-through rates in news stories. (26)

Regarding reporting on nicotine products, while the prevailing precautionary narrative rightly emphasizes the critical goal of preventing youth from initiating use of products that can induce harm compared to non-use, communication of these themes should not be done at the expense of misrepresenting evidence for harm-reducing effects of nicotine-containing products for adults who smoke. (1,27) There is no consensus solution for reconciling this tension, but the importance of precision and accuracy of press releases and of subsequent reporting should be a source of agreement for all points of view.

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References

1. Warner KE, Benowitz NL, McNeill A, Rigotti NA. Nicotine e-cigarettes as a tool for smoking cessation. Nat Med. 2023 Mar;29(3):520–4.
2. Food and Drug Administration. FDA Issues Marketing Decisions on NJOY Daily E-Cigarette Products [Internet]. 2022 [cited 2024 May 17]. Available from: https://www.fda.gov/tobacco-products/ctp-newsroom/fda-issues-marketing-decisions-njoy-daily-e-cigarette-products
3. FDA Center for Tobacco Products. FDA. FDA; 2025 [cited 2025 Jul 4]. FDA Authorizes Marketing of 20 ZYN Nicotine Pouch Products after Extensive Scientific Review. Available from: https://www.fda.gov/news-events/press-announcements/fda-authorizes-marketing-20-zyn-nicotine-pouch-products-after-extensive-scientific-review
4. Cummings et al. NTSC Conference. [cited 2025 Jun 16]. 2024 Conference Archive | Nicotine and Tobacco Science Conference. Available from: https://www.tobaccoscience.com/2024-2/
5. Jeong M, Singh B, Wackowski OA, Mukherjee R, Steinberg MB, Delnevo CD. Content Analysis of E-cigarette News Articles Amidst the 2019 Vaping-Associated Lung Injury (EVALI) Outbreak in the United States. Nicotine & Tobacco Research. 2022 Mar 26;24(5):799–803.
6. Wackowski OA, Gratale SK, Jeong M, Delnevo CD, Steinberg MB, O'Connor RJ. Over 1 year later: smokers' EVALI awareness, knowledge and perceived impact on e-cigarette interest. Tob Control. 2023 Aug;32(e2):e255–9.
7. Glantz SA, Nguyen N, Oliveira Da Silva AL. Population-Based Disease Odds for E-Cigarettes and Dual Use versus Cigarettes. NEJM Evidence [Internet]. 2024 Feb 27 [cited 2024 Jul 21];3(3). Available from: https://evidence.nejm.org/doi/10.1056/EVIDoa2300229
8. Cohen G, Cook S. Observational studies of exposure to tobacco and nicotine products: Best practices for maximizing statistical precision and accuracy. iScience. 2025 Mar;28(3):111985.

 doi:10.20944/preprints202508.0147.v2

9. Xue Z, Orr-Souza E, Nargis N, Patel M, Nighbor T. Nicotine and Toxicant Exposure among Individuals using both Combustible Cigarettes and E-cigarettes Based on Level of Product Use. Nicotine and Tobacco Research. 2025 Apr 15;ntaf053.
10. Jackson SE. "Dual Use" of e-cigarettes alongside cigarettes encompasses varied behavior patterns and motives that have different implications for health and smoking cessation. Nicotine and Tobacco Research. 2025 Jun 6;ntaf124.
11. Everitt BS, Hand DJ. Finite Mixture Distributions. London: Chapman and Hall; 1981.
12. Cohen G, Bellanca CM, Bernardini R, Rose JE, Polosa R. Personalized and adaptive interventions for smoking cessation: Emerging trends and determinants of efficacy. iScience. 2024 Oct;111090.
13. American Cancer Society. American Cancer Society MediaRoom. 2025 [cited 2025 Jun 4]. Dual-Use of Cigarettes and E-Cigarettes Exposes Adults to Same Cancer and Health Risks as Cigarette Use Only, New ACS Study Finds. Available from: https://pressroom.cancer.org/dual-use-cancer-risk
14. KARE11 (NBC). kare11.com. 2025 [cited 2025 Jun 8]. Study: Dual use of vape, cigarettes, pose same health risk. Available from: https://www.kare11.com/video/news/health/study-dual-use-of-vape-cigarettes-pose-same-health-risk/89-855d9e5c-2c6a-4b40-8f44-78bec3ff4e9e
15. KPRC-TV (NBC). KPRC. 2025 [cited 2025 Jun 8]. Vaping And Smoking Together Pose Same Risk As Just Smoking, Study Finds. Available from: https://www.click2houston.com/video/news/local/2025/04/16/vaping-and-smoking-together-pose-same-risk-as-just-smoking-study-finds/
16. WDIV-TV. WDIV. 2025 [cited 2025 Jun 8]. Combining smoking and vaping poses serious health risks, researchers say. Available from: https://www.clickondetroit.com/video/health/2025/04/16/combining-smoking-and-vaping-poses-serious-health-risks-researchers-say/
17. Dalli K. Consumer Affairs. 2025 [cited 2025 Jun 4]. Smoking and vaping together just as dangerous as smoking alone, study finds. Available from: https://www.consumeraffairs.com/news/smoking-and-vaping-together-just-as-dangerous-as-smoking-alone-study-finds-041525.html
18. Oxford University Press. Oxfordjournals.altmetric.com. 2025 [cited 2025 Jul 17]. Nicotine and Toxicant Exposure among Individuals using both Combustible Cigarettes and E-cigarettes Based on Level of Product Use Overview of attention for article published in Nicotine & Tobacco Research, April 2025. Available from: https://oxfordjournals.altmetric.com/details/176214803/news
19. Wen LS. Opinion | Do nicotine pouches have a public health benefit? It's complicated. The Washington Post [Internet]. 2025 Jul 24 [cited 2025 Jul 31]; Available from: https://www.washingtonpost.com/opinions/2025/07/24/nicotine-pouches-harm-reduction-addiction/
20. F. Fernández S, Poteser M, Govarts E, Pardo O, Coscollà C, Schettgen T, et al. Determinants of exposure to acrylamide in European children and adults based on urinary biomarkers: results from the "European Human Biomonitoring Initiative" HBM4EU participating studies. Sci Rep. 2023 Dec 2;13(1):21291.
21. Kim S, Shiffman S, Sembower MA. US adult smokers' perceived relative risk on ENDS and its effects on their transitions between cigarettes and ENDS. BMC Public Health. 2022 Sep 19;22(1):1771.
22. Jackson SE, Tattan-Birch H, East K, Cox S, Shahab L, Brown J. Trends in Harm Perceptions of E-Cigarettes vs Cigarettes Among Adults Who Smoke in England, 2014-2023. JAMA Netw Open. 2024 Feb 28;7(2):e240582.
23. National Cancer Institute. HINTS 5 Cycle 4 (2020) [Internet]. 2023 [cited 2024 Jul 21]. Available from: https://hints.cancer.gov/view-questions/question-detail.aspx?PK_Cycle=13&qid=1282
24. PlumX. PlumX - Association of E-Cigarettes With Erectile Dysfunction: The Population Assessment of Tobacco and Health Study [Internet]. 2025 [cited 2025 Jun 16]. Available from: https://plu.mx/plum/a/news?doi=10.1016%2Fj.amepre.2021.08.004
25. El-Shahawy O, Shah T, Obisesan OH, Durr M, Stokes AC, Uddin I, et al. Association of E-Cigarettes With Erectile Dysfunction: The Population Assessment of Tobacco and Health Study. American Journal of Preventive Medicine. 2022 Jan;62(1):26–38.
26. Robertson CE, Pröllochs N, Schwarzenegger K, Pärnamets P, Van Bavel JJ, Feuerriegel S. Negativity drives online news consumption. Nat Hum Behav. 2023 Mar 16;7(5):812–22.

 doi:10.20944/preprints202508.0147.v2

27. Mendelsohn CP, Hall W, Borland R, Wodak A, Beaglehole R, Benowitz NL, et al. A critique of the Australian National Health and Medical Research Council CEO statement on electronic cigarettes. Addiction. 2023 Jun;118(6):1184–92.