From cool to non-cool: California's 'non-menthol' cigarettes in 2025

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ABSTRACT

Since late 2022, the sale of most flavored tobacco products has been prohibited in California, including menthol cigarettes. Tobacco companies responded by introducing 'non-menthol' cigarettes in which menthol was replaced with WS-3, an odorless synthetic cooling agent to elicit cooling sensations similar to menthol. Legislation enacted in 2024 banned the addition of cooling characterizing flavors in tobacco products in California. However, the industry continues to market 'non-menthol' cigarettes in the state, with very similar package designs. The aim of this study was to verify whether cooling agents were removed from these cigarettes. Available Newport-branded 'non-menthol' cigarettes were purchased in California in 2025, extracted and tested for sensory cooling activity by Ca^{2+} microfluorimetry of HEK293T cells expressing the human TRPM8 cold/menthol receptor. Chemical analysis was performed by gas chromatography - mass spectrometry (GCMS). 'Non-menthol' and menthol cigarettes marketed in 2023–2024 served as controls. While extracts from Newport 'non-menthol' and menthol cigarettes marketed in California in 2023 produced a TRPM8-mediated Ca^{2+} increase of 60 ± 8% and 39 ± 3%, ($p<0.0001$, n=3) respectively, responses elicited by extracts of Newport 'non-menthol' cigarettes marketed in 2025 were indistinguishable from baseline ($p=0.48$, n=3). Chemical analysis confirmed no menthol or WS-3 above the level of detection (10 µg/cigarette), and no other major commercial synthetic cooling agents. The tobacco industry removed sensory cooling agents from 'non-menthol' cigarettes marketed in California. However, this did not result in the market withdrawal of 'non-menthol' cigarettes in the state. 'Non-menthol' cigarettes in California continue to be marketed with package designs resembling those of former menthol cigarettes, signaling the potential presence of a characterizing flavor.

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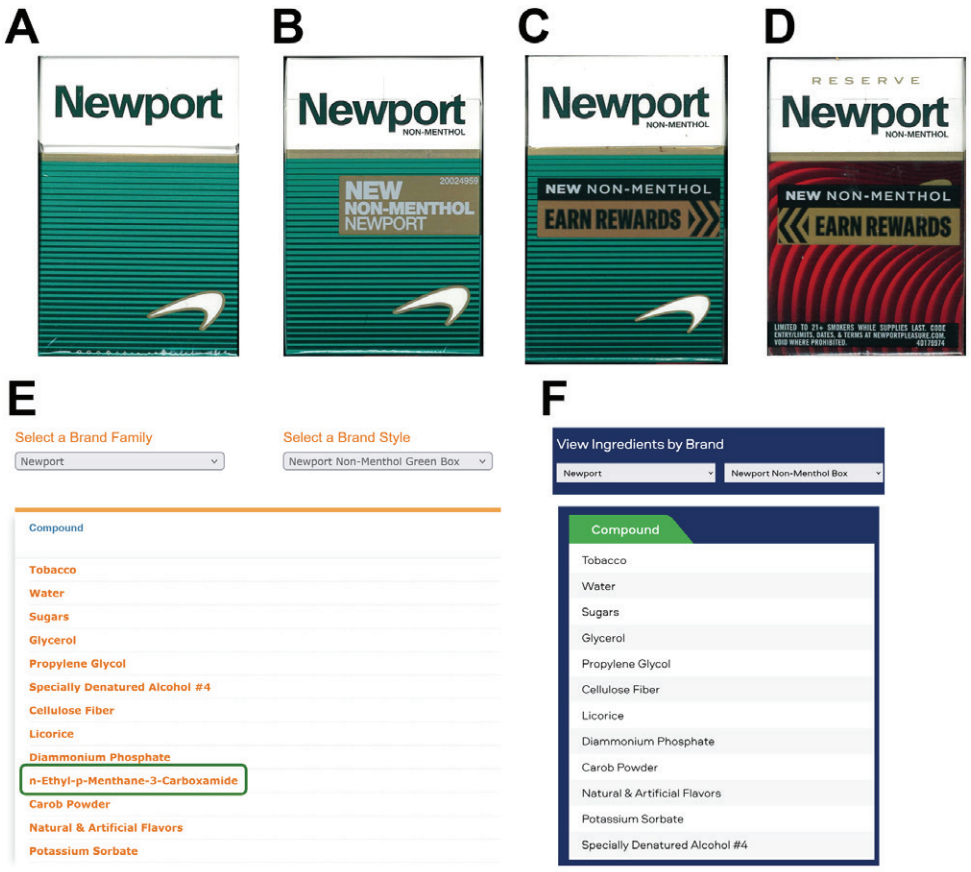
INTRODUCTION

Since 21 December 2022, the sale of most flavored tobacco products has been prohibited in California[1]. This ban includes menthol cigarettes that were previously favored by youth and young adults, women and non-Hispanic Black Americans[2]. In the same month, tobacco companies introduced 'non-menthol' cigarettes in California, advertising them with designs highly similar to former menthol cigarette brands, including R.J. Reynolds Tobacco's Newport (Figures 1A and 1B) and Camel and Imperial Tobacco Group (ITG) Brands' Kool cigarettes[3-5]. Total cigarette sales in California declined by 21.1% in the 18 months after the flavor ban, mostly

due to the abrupt decline in menthol cigarette sales[6]. However, this was partially offset by sales of 'non-menthol' cigarettes[6]. Some brands of 'non-menthol' cigarettes, Newport Green and Camel Crisp, were found to contain WS-3, a synthetic sensory cooling agent[3,4]. California regulators determined that these cigarettes violated the State's flavor ban; however, R.J. Reynolds filed a judicial complaint stating that WS-3-containing 'non-menthol' cigarettes have no characterizing flavors[7]. California lawmakers responded by revising tobacco legislation to include cooling sensations in the definition of characterizing flavors, thereby effectively banning WS-3-containing cigarettes[7,8].

In March 2025, after California's new legislation took effect, two new 'non-menthol' cigarette varieties were introduced by R.J. Reynolds, including: 1) a Newport variety with altered 'new non-menthol' advertising on the wrapper, but otherwise in an unaltered green box; and 2) a Newport Reserve 'new non-menthol' variety in a box with red/black wave patterns (Figures 1C and 1D). The company had also changed its 'Commercial Integrity' website in which WS-3 was listed as an ingredient in its California-marketed Newport varieties introduced in 2022 (Figure 1E)[9]. On the revised website, WS-3 is not listed as an ingredient of the new varieties introduced in 2025 (Newport non-menthol Box, Newport Reserve non-menthol Box) (Figure 1F). However, the ingredient list includes 'Natural & Artificial Flavors' which could include WS-3 or other synthetic cooling agents[10]. The aim of this study was to verify whether sensory cooling agents are indeed absent in these newly introduced 'non-menthol'

Figure 1. New 'non-menthol' cigarettes introduced in California in 2025



A: Newport menthol cigarettes box purchased in North Carolina in 2023. B: Newport 'Non-Menthol' green box purchased in California in 2023, in cellophane wrapper with white letters on gold background. C: Newport 'Non-Menthol' Box (green) purchased in California in March 2025, in cellophane wrapper with 'New Non-Menthol' printed in white letters on black background, and 'Earn Rewards' printed in black letters on gold background and with arrow pattern. D: Newport 'Non-Menthol' Reserve Box (red/black) purchased in California in March 2025. E: Ingredient list of Newport Non-Menthol Green Box (shown in B), copied from the 2023 R.J. Reynolds commercial integrity website, with WS-3 (n-Ethyl-p-Menthane-3-Carboxamide) highlighted. F: Ingredient list of 2025 Newport Non-Menthol Box (shown in C), copied from the 2025 R.J. Reynolds commercial integrity website.

cigarettes.

Newport 'non-menthol' cigarettes were purchased in March and May 2025 at convenience stores in the Alameda and San Francisco areas for *in vitro* pharmacological and chemical analysis. Extracts from tobacco rods were serially diluted and superfused over HEK293T cells expressing the human TRPM8 cold/menthol receptor activated by menthol, WS-3 and other synthetic cooling agents, measuring activity by Calcium-microfluorimetry as published (Supplementary file)[3].

Whole cigarettes (3 cigarettes from 3 different packages of the same variety) were extracted and analyzed in triplicate for the major commercial sensory cooling agents (menthol, WS-3, WS-23, WS-12, Frescolat MGA, Frescolat ML, Frescolat X-cool) by gas chromatography - mass spectrometry following published protocols (Supplementary file)[3].

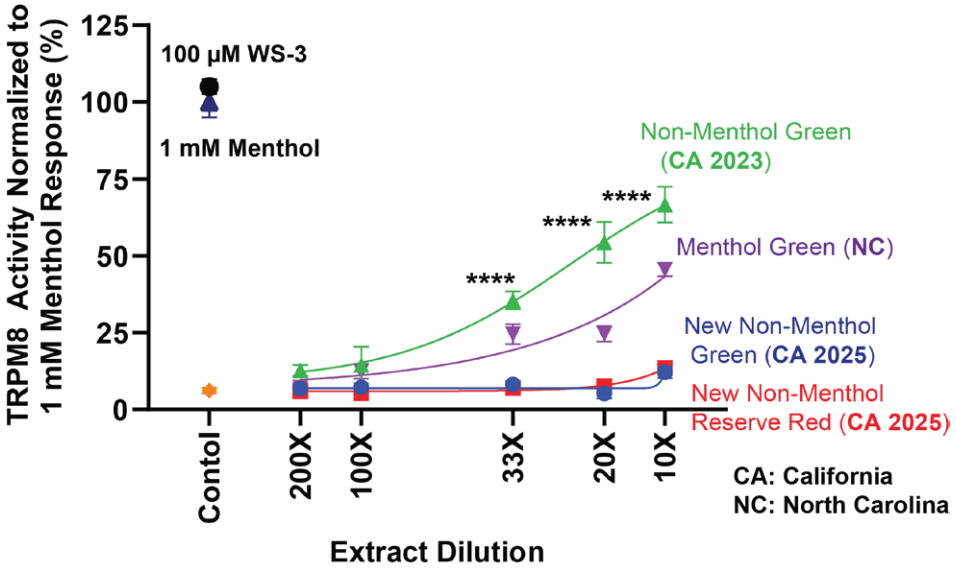
COMMENTARY

Extracts from Newport new 'non-menthol' (green) cigarettes did not increase intracellular Ca^{2+} levels, even at the lowest dilution tested (10×, p=0.48, n=3), similar to Newport 'non-menthol' Reserve (red) unflavored control cigarettes (Figure 2). In contrast, control extracts of 2023 North Carolina-marketed Newport menthol cigarettes and 2023 California-marketed 'non-menthol' green cigarettes increased intracellular Ca^{2+} levels in a dose-dependent manner, by 39 ± 3%, (p<0.0001, n=3) and 60 ± 8% (p<0.0001, n=3) due to the previously verified presence of menthol or WS-3 (Figure 2)[3].

Chemical analysis revealed that none of the Newport 'non-menthol' varieties introduced in 2025 contained any of the major commercial cooling agents over the limits of detection, while the WS-3 content of Newport 'non-menthol' green cigarettes marketed in 2023 was 1.26 ± 0.05 mg/cig, similar to our previously reported findings[3].

Taken together, these data demonstrate that R.J. Reynolds removed sensory cooling agents from their California-marketed Newport 'non-menthol' varieties. However, this does not mean that 'non-menthol' cigarettes have disappeared from California's market. It is important to note that in the case of the Newport non-menthol green variety (Figure 2C), the box design and color are identical to the previous WS-3-containing version, and very similar to Newport menthol cigarettes (except the

Figure 2. Sensory cooling activity of Newport 'non-menthol' cigarettes introduced in California in 2023 and 2025, compared to Newport menthol cigarettes



Dose-response analysis of human TRPM8 cold/menthol receptor-mediated Ca^{2+}-influx, upon superfusion of cells with dilution series of extracts from Newport brand cigarettes (n=3 each). Green: Non-menthol green box, purchased in California in 2023 (CA 2023; Purple: Menthol green box, purchased in North Carolina in 2023 (NC); Red: New non-menthol green box, purchased in California in 2025 (CA 2025); Black: New non-menthol reserve, purchased in California in 2025 (CA 2025). The increase in intracellular Ca^{2+}, measured as fluorescence units (Fmax-F0), was normalized to the Ca^{2+}-response elicited by a saturating concentration of agonist L-menthol (1 mM; solid black triangle). Response to a saturating concentration of WS-3 (100 µM; solid black circle) and vehicle control (orange diamond) shown for comparison. 1X dilution is defined as the extract of one tobacco rod contents in 50 mL assay buffer, and 10X is 10-fold dilution thereof. Error bars indicate SEM.

'non-menthol' label), which could continue to signal the presence of a minty and cooling characterizing flavor to people who previously smoked menthol cigarettes. R.J. Reynolds' strategy is similar to ITG Brands' for their Kool 'non-menthol' cigarettes introduced in California in December 2022 that have blue/black or green/black box coloring similar to the brand's menthol cigarettes, but do not contain any cooling agent[3,4]. A distinctive choice of package coloring and design by the industry is a common strategy to manipulate consumer expectations about the flavor and strength of tobacco products[11]. In June 2023, California regulators raised concerns about the misleading package design and coloring of these Kool 'non-menthol' cigarettes[12]. Similar concerns should be raised about the new Newport non-menthol green variety introduced in 2025 that continues to signal that a characterizing flavor could be present. Implementation of plain packaging requirements would likely prevent consumers from assuming the presence of a characterizing flavor based on package design and color[13].

Limitations

While highly sensitive, it is possible that the cigarettes tested may contain trace amounts of menthol or cooling agents below the detection limits of our pharmacological and chemical analytical methods. However, such small amounts would not be detected by consumers as characterizing flavors[14]. Sensory evaluations in consumer panels, with and without knowledge of the 'non-menthol' descriptor and package color and design, may reveal whether marketing affects consumer perceptions, even in the absence of cooling agents in the products.

CONCLUSION

The tobacco industry removed sensory cooling agents from 'non-menthol' cigarettes marketed in California. However, this did not result in the market withdrawal of 'non-menthol' cigarettes in the state. 'Non-menthol' cigarettes in California continue to be marketed with package designs resembling those of former menthol cigarettes, signaling the potential presence of a characterizing flavor.

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CONFLICTS OF INTEREST

The authors have each completed and submitted an ICMJE form for disclosure of potential conflicts of interest. The authors declare that they have no competing interests, financial or otherwise, related to the current work. S.E. Jordt reports that since the initial planning of the work received support from the United States National Institutes of Health (U54DA036151, R01DA060884) and that in the past 36 months, received consulting fees on matters of tobacco product regulation from the State of California, Department of Justice (payments made to him), participated on a Data Safety Monitoring Board or Advisory Board [United States Food and Drug Administration (USFDA), Tobacco Products Scientific Advisory Committee (TPSAC)] and had a leadership or fiduciary role in the American Thoracic Society (ATS) (Vice-Chair, Tobacco Action Committee). S.S. O'Malley reports that since the initial planning of the work received Grant U54DA036151 (Yale Tobacco Center of Regulatory Science) from the National Institute on Drug Abuse (NIDA) of the National Institutes of Health (NIH); consulting fees from the American Society of Clinical Psychopharmacology's Alcohol Clinical Trials Initiative supported by Alkermes, Dicerna, Eli Lilly and Company, Indivior, Imbrium Therapeutics, Pear Therapeutics and Kinnov Therapeutics; consulting fees from Dicerna; patents pending with Novartis, mavoglurant for gambling disorder; received support as an advisory board member from Emmes Corporation, NIDA Clinical Trials Network, Newleos Therapeutics, Eli Lilly and Company; stock options, Newleos Therapeutics; study medication supplies from Novartis, Stalicla and Amygdala; and Clinical Trial contracts from Altimmune (to the Institution), and Tempero Bio (to the Institution).

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ETHICAL APPROVAL AND INFORMED CONSENT

Ethical approval and informed consent were not required for this study.

DATA AVAILABILITY

The data supporting this research are available from the authors on reasonable request.

PROVENANCE AND PEER REVIEW

Not commissioned; externally peer reviewed.

DISCLAIMER

The views and opinions expressed in this article are those of the authors.