

Tobacco in Australia

Facts & Issues

Relevant news and research

12C Reducing the nicotine content of cigarettes

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Research:

12C Reducing the nicotine content of cigarettes

Le Foll, B, Piper, ME, Fowler, CD, Tonstad, S, Bierut, L, Lu, L et al. (2022). Tobacco and nicotine use. *Nat Rev Dis Primers*, 8(1), 19. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35332148>

Wilson N, Hoek J, Nghiem N, Summers J, Grout L, et al. Modelling the impacts of tobacco denicotinisation on achieving the smokefree 2025 goal in aotearoa new zealand. *New Zealand Medical Journal*, 2022; 135(1548). Available from: <https://journal.nzma.org.nz/journal->

[articles/modelling-the-impacts-of-tobacco-denicotinisation-on-achieving-the-smokefree-2025-goal-in-aotearoa-new-zealand](#)

Oliver AC, DeSarno M, Irvin CG, Kaminsky D, Tidey JW, et al. Effects of reduced nicotine content cigarettes on fractional exhaled nitric oxide and self-reported respiratory health outcomes among smokers with psychiatric conditions or socioeconomic disadvantage. *Nicotine & Tobacco Research*, 2022; 24(1):135–40. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34255068>

Donny EC and White CM. A review of the evidence on cigarettes with reduced addictiveness potential. *Int J Drug Policy*, 2022; 99:103436. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34535366>

Differding MK, Katz SJ, Strayer LG, White C, Strasser AA, et al. Educating the public on the health risks of very low nicotine content cigarettes: Results from a u.S.-based convenience sample. *Nicotine & Tobacco Research*, 2022. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/35023564>

Sweitzer MM, Pacek LR, Kozink RV, Locey E, Kollins SH, et al. Reactions to reduced nicotine content cigarettes in a sample of young adult, low-frequency smokers. *Psychopharmacology (Berl)*, 2021; 238(9):2429–38. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33982143>

Schlagintweit HE, Tyndale RF, and Hendershot CS. Acute effects of a very low nicotine content cigarette on laboratory smoking lapse: Impacts of nicotine metabolism and nicotine dependence. *Addict Biol*, 2021; 26(3):e12930. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32573054>

Reed GL, Colby SM, Sokolovsky AW, Snell LM, DeAtley T, et al. Predicting non-adherence with very low nicotine content cigarettes among adults with serious mental illness who smoke. *Nicotine & Tobacco Research*, 2021. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34958368>

Qin Q, Humphry M, Gilles T, Fisher A, Patra B, et al. Nic1 cloning and gene editing generates low-nicotine tobacco plants. *Plant Biotechnol J*, 2021. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34468078>

Nighbor TD, Klemperer EM, Hughes JR, Reed EN, Simone SJ, et al. Both reducing cigarettes per day and transitioning to very low-nicotine-content cigarettes decreases demand for usual-brand cigarettes. *Experimental and Clinical Psychopharmacology*, 2021; 29(6):587–92. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32658536>

Mercincavage M, Pacek LR, Thrasher J, Cappella JN, Delnevo C, et al. Effects of advertising features on smokers' and non-smokers' perceptions of a reduced nicotine cigarette modified risk tobacco product. *Tobacco Control*, 2021. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33858965>

MacLean RR, DeVito EE, Eid T, Parida S, Gueorguieva R, et al. Threshold dose for intravenous nicotine self-administration in young adult non-dependent smokers. *Psychopharmacology (Berl)*, 2021. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33796907>

Lin B, Yao Y, Wang Y, Chen L, Peng X, et al. Facile fabrication of a functional filter tip for highly efficient reduction of nicotine content in mainstream smoke. *ACS Appl Mater Interfaces*, 2021; 13(31):37638–44. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34324292>

Levy DT, Cummings KM, Heckman BW, Li Y, Yuan Z, et al. The public health gains had cigarette companies chosen to sell very low nicotine cigarettes. *Nicotine & Tobacco Research*, 2021; 23(3):438–46. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32710538>

Krebs NM, Zhu J, Wasserman E, Kuprewicz R, Martinez DJ, et al. Switching to progressively reduced nicotine content cigarettes in smokers with low socioeconomic status: A double-blind randomized clinical trial. *Nicotine & Tobacco Research*, 2021; 23(6):992–1001. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33249498>

Kaplan BA, Koffarnus MN, Franck CT, and Bickel WK. Effects of reduced-nicotine cigarettes across regulatory environments in the experimental tobacco marketplace: A randomized trial. *Nicotine & Tobacco Research*, 2021; 23(7):1123–32. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33165612>

Kaplan BA, Crill EM, Franck CT, Bickel WK, and Koffarnus MN. Blood nicotine predicts the behavioral economic abuse liability of reduced-nicotine cigarettes. *Nicotine & Tobacco Research*, 2021. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34865118>

Johnson AC, Mercincavage M, Souprontchouk V, Rogelberg S, Sidhu AK, et al. Responses to reduced nicotine cigarette marketing features: A systematic review. *Tobacco Control*, 2021. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34620718>

Higgins ST, DeSarno M, Bunn JY, Gaalema DE, Leventhal AM, et al. Cumulative vulnerabilities as a potential moderator of response to reduced nicotine content cigarettes. *Preventive Medicine*, 2021; 152(Pt 2):106714. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34242666>

Hatsukami DK, Xu D, and Ferris Wayne G. Regulatory approaches and implementation of minimally addictive combusted products. *Nicotine & Tobacco Research*, 2021. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34192324>

Food and Drug Administration. FDA authorizes marketing of tobacco products that help reduce exposure to and consumption of nicotine for smokers who use them. 2021. Available from: <https://www.fda.gov/news-events/press-announcements/fda-authorizes-marketing-tobacco-products-help-reduce-exposure-and-consumption-nicotine-smokers-who>.

Duong HT, Loud EE, Thrasher JF, Henderson KC, Ashley DL, et al. 'It brings light to what you really put into your body': A focus group study of reactions to messages about nicotine reduction in cigarettes. *Tobacco Control*, 2021. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33863835>

Dermody SS, Tessier KM, Meier E, al'Absi M, Denlinger-Apte RL, et al. An evaluation of potential unintended consequences of a nicotine product standard: A focus on drinking history and outcomes. *Nicotine & Tobacco Research*, 2021; 23(7):1168–75. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33220047>

Denlinger-Apte RL, White CM, Donny EC, Hatsukami DK, Benowitz NL, et al. "I actually finally feel like the cigarettes aren't controlling me." - interviews with participants smoking very low nicotine content cigarettes during a residential study. *Drug and Alcohol Dependence*, 2021; 219:108465. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33383351>

Denlinger-Apte RL, Pacek LR, Ross JC, Bansal-Travers M, Donny EC, et al. Risk perceptions of low nicotine cigarettes and alternative nicotine products across priority smoking populations. *International Journal of Environmental Research and Public Health*, 2021; 18(10). Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34067652>

Denlinger-Apte RL, Koopmeiners JS, Tidey JW, Luo X, Smith TT, et al. Support for a nicotine reduction policy among participants enrolled in a 20-week trial of very low nicotine content cigarettes. *Addictive Behaviors*, 2021; 114:106727. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33261915>

Cassidy RN, Tidey JW, Cao Q, Colby SM, McClernon FJ, et al. Responses to gradual and immediate reduction of nicotine in cigarettes in young versus older adult smokers. *Nicotine & Tobacco Research*, 2021; 23(9):1559–66. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33754156>

Carroll DM, Lindgren BR, Dermody SS, Denlinger-Apte R, Egbert A, et al. Impact of nicotine reduction in cigarettes on smoking behavior and exposure: Are there differences by race/ethnicity, educational attainment, or gender? *Drug and Alcohol Dependence*, 2021; 225:108756. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34051544>

Bialous S and Freeman B. Communication challenges of a tobacco addictiveness reduction policy. *Tobacco Induced Diseases*, 2021; 19:38. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/34017232>

White CM, Hatsukami DK, and Donny EC. Reducing the relative value of cigarettes: Considerations for nicotine and non-nicotine factors. *Neuropharmacology*, 2020; 175:108200. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32535010>

Streck JM, Davis DR, Pang RD, Sigmon SC, Bunn JY, et al. Potential moderating effects of sex/gender on the acute relative reinforcing and subjective effects of reduced nicotine content cigarettes in vulnerable populations. *Nicotine & Tobacco Research*, 2020; 22(6):878–84. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31225625>

Smith TT, Koopmeiners JS, White CM, Denlinger-Apte RL, Pacek LR, et al. The impact of exclusive use of very low nicotine cigarettes on compensatory smoking: An inpatient crossover clinical trial. *Cancer Epidemiology, Biomarkers & Prevention*, 2020; 29(4):880–6. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32102910>

Smith TT, Koopmeiners JS, Hatsukami DK, Tessier KM, Benowitz NL, et al. Mouth-level nicotine intake estimates from discarded filter butts to examine compensatory smoking in low nicotine cigarettes. *Cancer Epidemiology, Biomarkers & Prevention*, 2020; 29(3):643–9. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32102909>

Robinson JD, Kyriotakis G, Al'absi M, Denlinger-Apte RL, Drobles DJ, et al. Very low nicotine content cigarettes disrupt the feedback loop of affective states and smoking behavior. *Nicotine & Tobacco Research*, 2020; 22(8):1294–300. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31701153>

Perkins KA and Karelitz JL. Differences in acute reinforcement across reduced nicotine content cigarettes. *Psychopharmacology (Berl)*, 2020; 237(6):1885–91. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32221696>

Perkins KA and Karelitz JL. A forced-choice procedure to assess the acute relative reinforcing effects of nicotine dose per se in humans. *Nicotine & Tobacco Research*, 2020; 22(10):1685–93. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31800053>

Pauwels CG, Hintzen K, Talhout R, Cremers H, Pennings JLA, et al. Smoking regular and low-nicotine cigarettes results in comparable levels of volatile organic compounds in blood and exhaled breath. *J Breath Res*, 2020. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33027777>

Park EY, Park E, Jeong BY, Park J, Lee DH, et al. Comparison of smoking cessation rates of quitline users in Korea between smokers of ultra-low nicotine yield cigarettes and other types of cigarette: A prospective study. *Addiction*, 2020; 115(9):1745–53. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32083364>

Lin W, Krebs NM, Zhu J, Foulds J, Horn K, et al. Comparison between gradual reduced nicotine content and usual nicotine content groups on subjective cigarette ratings in a randomized double-blind trial. *International Journal of Environmental Research and Public Health*, 2020; 17(19). Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32993116>

Kamens HM, Silva CP, Nye RT, Miller CN, Singh N, et al. Pharmacokinetic profile of spectrum reduced nicotine cigarettes. *Nicotine & Tobacco Research*, 2020; 22(2):273–9. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30892637>

Higgins ST, Tidey JW, Sigmon SC, Heil SH, Gaalema DE, et al. Changes in cigarette consumption with reduced nicotine content cigarettes among smokers with psychiatric conditions or socioeconomic disadvantage: 3 randomized clinical trials. *JAMA Netw Open*, 2020; 3(10):e2019311. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33079196>

Heil SH, Bergeria CL, Lee DC, Bunn JY, Harfmann RF, et al. Abuse liability of cigarettes with very low nicotine content in pregnant cigarette smokers. *Preventive Medicine*, 2020; 140:106227. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32768512>

Havermans A, Pieper E, Henkler-Stephani F, and Talhout R. Feasibility of manufacturing tobacco with very low nicotine levels. *Tobacco Regulatory Science*, 2020; 6(6):405–15. Available from: <https://www.ingentaconnect.com/content/trsg/trs/2020/00000006/00000006/art00004>

Denlinger-Apte RL, Donny EC, Lindgren BR, Rubin N, Goodwin C, et al. Smoking topography characteristics during a 6-week trial of very low nicotine content cigarettes in smokers with serious mental illness. *Nicotine & Tobacco Research*, 2020; 22(8):1414–8. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31628475>

Buckell J, Hensher DA, and Hess S. Kicking the habit is hard: A hybrid choice model investigation into the role of addiction in smoking behavior. *Health Econ*, 2020. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33128328>

Abrams DB and Notley C. Is nicotine reduction in cigarettes enough? JAMA Netw Open, 2020; 3(10):e2019367. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/33079192>

White CM, Pickworth WB, Sved AF, and Donny EC. Using product standards to render the most harmful tobacco products minimally addictive: Maximum nicotine level, non-nicotine constituents, and scope. Nicotine & Tobacco Research, 2019; 21(Suppl 1):S13–S5. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867639>

Villanti AC, Byron MJ, Mercincavage M, and Pacek LR. Misperceptions of nicotine and nicotine reduction: The importance of public education to maximize the benefits of a nicotine reduction standard. Nicotine & Tobacco Research, 2019; 21(Suppl 1):S88–S90. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867645>

Tidey JW, Muscat JE, Foulds J, Evins AE, Gaalema DE, et al. Reducing the nicotine content of cigarettes: Effects in smokers with mental health conditions and socioeconomic disadvantages. Nicotine & Tobacco Research, 2019; 21(Supplement_1):S26–S8. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867647>

Tidey JW, Colby SM, Denlinger-Apte RL, Goodwin C, Cioe PA, et al. Effects of 6-week use of very low nicotine content cigarettes in smokers with serious mental illness. Nicotine & Tobacco Research, 2019; 21(Suppl 1):S38–S45. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867650>

Stanton CA and Hatsukami DK. Nicotine standards in the united states. Nicotine & Tobacco Research, 2019; 21(Supplement_1):S1–S4. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867658>

Smith TT, Koopmeiners JS, Tessier KM, Davis EM, Conklin CA, et al. Randomized trial of low-nicotine cigarettes and transdermal nicotine. American Journal of Preventive Medicine, 2019; 57(4):515–24. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31542129>

Smith TT, Heckman BW, Tidey JW, Colby SM, and Cummings KM. Behavioral outcomes of nicotine reduction in current adult smokers. Nicotine & Tobacco Research, 2019; 21(Suppl 1):S125–S7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867649>

Smith TT, Donny EC, Luo X, Allen AM, Carroll DM, et al. The impact of gradual and immediate nicotine reduction on subjective cigarette ratings. Nicotine & Tobacco Research, 2019; 21(Suppl 1):S73–S80. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867651>

Shiffman S, Scholl SM, and Mao JM. Very-low-nicotine-content cigarettes and dependence among non-daily smokers. Drug and Alcohol Dependence, 2019; 197:1–7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30743194>

Shiffman S and Scholl SM. How intensely nondaily smokers smoke in laboratory topography sessions correlates with cigarette smoking intensity in the field. Experimental and Clinical Psychopharmacology, 2019. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31393144>

Schachtsiek J and Stehle F. Nicotine-free, nontransgenic tobacco (nicotiana tabacum l.) edited by crispr-cas9. Plant Biotechnol J, 2019; 17(12):2228–30. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31206994>

Ribisl KM, Hatsukami DK, Huang J, Williams RS, and Donny EC. Strategies to reduce illicit trade of regular nicotine tobacco products after introduction of a low-nicotine tobacco product standard. *American Journal of Public Health*, 2019; 109(7):1007–14. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31166743>

Popova L, Owusu D, Nyman AL, Weaver SR, Yang B, et al. Effects of framing nicotine reduction in cigarettes on anticipated tobacco product use intentions and risk perceptions among us adult smokers. *Nicotine & Tobacco Research*, 2019; 21(Suppl 1):S108–S16. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867652>

Piper ME, Drobes DJ, and Walker N. Behavioral and subjective effects of reducing nicotine in cigarettes: A cessation commentary. *Nicotine & Tobacco Research*, 2019; 21(Supplement_1):S19-S21. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867644>

Perkins KA. Research on behavioral discrimination of nicotine may inform FDA policy on setting a maximum nicotine content in cigarettes. *Nicotine & Tobacco Research*, 2019; 21(Suppl 1):S5–S12. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867642>

Patel M, Cuccia AF, Czaplicki L, Donovan EM, Simard B, et al. Smokers' behavioral intentions in response to a low-nicotine cigarette policy. *Drug and Alcohol Dependence*, 2019; 205:107645. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31704376>

Lindblom EN. Illicit trade poses no threat to an FDA rule to minimize nicotine in smoked tobacco products. *American Journal of Public Health*, 2019; 109(7):960–1. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31166729>

Kuehn B. Less addictive cigarettes. *Journal of the American Medical Association*, 2019; 322(8):718. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31454020>

Koopmeiners JS, Vock DM, Boatman JA, Carroll D, Colby SM, et al. The importance of estimating causal effects for evaluating a nicotine standard for cigarettes. *Nicotine & Tobacco Research*, 2019; 21(Supplement_1):S22-S5. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867648>

Klemperer EM, Hughes JR, Callas PW, Benner JA, and Morley NE. Effectiveness of switching to very low nicotine content cigarettes plus nicotine patch versus reducing daily cigarette consumption plus nicotine patch to decrease dependence: An exploratory randomized trial. *Addiction*, 2019; 114(9):1639–50. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31106492>

Johnson AC, Mays D, Villanti AC, Niaura RS, Rehberg K, et al. Marketing influences on perceptions of reduced nicotine content cigarettes. *Nicotine & Tobacco Research*, 2019; 21(Suppl 1):S117–S24. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867656>

Hrabovsky SM, Midya V, Lester C, Veldheer S, Yingst JM, et al. Effect of cigarette rod length on smokers switching to spectrum cigarettes. *American Journal of Health Behavior*, 2019; 43(2):380-92. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30808477>

Hatsukami DK, Luo X, Heskin AK, Tang MK, Carmella SG, et al. Effects of immediate versus gradual nicotine reduction in cigarettes on biomarkers of biological effects. *Addiction*, 2019; 114(10):1824–33. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31140663>

Hall MG, Byron JM, Brewer NT, Noar SM, and Ribisl KM. Interest in illicit purchase of cigarettes under a very low nicotine content product standard. *Nicotine & Tobacco Research*, 2019; 21(Suppl 1):S128–S32. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867641>

Gaalema DE, Tidey JW, Davis DR, Sigmon SC, Heil SH, et al. Potential moderating effects of psychiatric diagnosis and symptom severity on subjective and behavioral responses to reduced nicotine content cigarettes. *Nicotine & Tobacco Research*, 2019; 21(Suppl 1):S29–S37. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867653>

Food and Drug Administration. FDA permits sale of two new reduced nicotine cigarettes through premarket tobacco product application pathway. 2019. Available from: <https://www.fda.gov/news-events/press-announcements/fda-permits-sale-two-new-reduced-nicotine-cigarettes-through-premarket-tobacco-product-application>.

Denlinger-Apte RL, Tidey JW, Koopmeiners JS, Hatsukami DK, Smith TT, et al. Correlates of support for a nicotine-reduction policy in smokers with 6-week exposure to very low nicotine cigarettes. *Tobacco Control*, 2019; 28(3):352–5. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30385649>

Denlinger-Apte RL, Kotlyar M, Koopmeiners JS, Tidey JW, Luo X, et al. Effects of very low nicotine content cigarettes on smoking behavior and biomarkers of exposure in menthol and non-menthol smokers. *Nicotine & Tobacco Research*, 2019; 21(Supplement_1):S63–S72. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867637>

Denlinger-Apte RL, Cassidy RN, Colby SM, Sokolovsky AW, and Tidey JW. Effects of cigarette nicotine content and menthol preference on perceived health risks, subjective ratings, and carbon monoxide exposure among adolescent smokers. *Nicotine & Tobacco Research*, 2019; 21(Suppl 1):S56–S62. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867646>

Davis DR, Parker MA, Villanti AC, Streck JM, Priest JS, et al. Examining age as a potential moderator of response to reduced nicotine content cigarettes in vulnerable populations. *Nicotine & Tobacco Research*, 2019; 21(Suppl 1):S49–S55. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867655>

Davis DR, DeSarno MJ, Bergeria CL, Streck JM, Tidey JW, et al. Examining effects of unit price on preference for reduced nicotine content cigarettes and smoking rate. *Preventive Medicine*, 2019; 128:105823. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31470023>

Colby SM, Cassidy RN, Denlinger-Apte R, Smith TT, Pacek LR, et al. Anticipated effects of nicotine reduction on youth smoking initiation and maintenance. *Nicotine & Tobacco Research*, 2019; 21(Suppl 1):S46–S8. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867638>

Cassidy RN, Tidey JW, Cao Q, Colby SM, McClernon FJ, et al. Age moderates smokers' subjective response to very-low nicotine content cigarettes: Evidence from a randomized controlled trial. *Nicotine & Tobacco Research*, 2019; 21(7):962–9. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29718460>

Byron MJ, Strasser AA, and Delnevo CD. Little and filtered cigars meet the legal definition of cigarettes and should be included in nicotine reduction regulation. *Tobacco Control*, 2019; 28(3):350–1. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30021871>

Byron MJ, Hall MG, King JL, Ribisl KM, and Brewer NT. Reducing nicotine without misleading the public: Descriptions of cigarette nicotine level and accuracy of perceptions about nicotine content, addictiveness, and risk. *Nicotine & Tobacco Research*, 2019; 21(Suppl 1):S101–S7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867657>

Branstetter SA, Nye R, Sipko JJ, and Muscat JE. The effect of price on the consumption of reduced nicotine cigarettes. *Nicotine & Tobacco Research*, 2019; 21(7):955–61. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30137465>

Berman ML and Glasser AM. Nicotine reduction in cigarettes: Literature review and gap analysis. *Nicotine & Tobacco Research*, 2019; 21(Supplement_1):S133-S44. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867659>

Bergeria CL, Heil SH, Davis DR, Streck JM, Sigmon SC, et al. Evaluating the utility of the modified cigarette evaluation questionnaire and cigarette purchase task for predicting acute relative reinforcing efficacy of cigarettes varying in nicotine content. *Drug and Alcohol Dependence*, 2019; 197:56-64. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30776572>

Benowitz NL, Donny EC, Edwards KC, Hatsukami D, and Smith TT. The role of compensation in nicotine reduction. *Nicotine & Tobacco Research*, 2019; 21(Suppl 1):S16–S8. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31867654>

Ali FRM, Al-Shawaf M, Wang TW, and King BA. U.S. Adults' attitudes toward lowering nicotine levels in cigarettes. *American Journal of Preventive Medicine*, 2019; 57(3):403–7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31303387>

Streck JM, Bergeria CL, Parker MA, Davis DR, DeSarno M, et al. Response to reduced nicotine content cigarettes among smokers with chronic health conditions. *Preventive Medicine Reports*, 2018; 12:321–9. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30416951>

Smith TT, Hatsukami DK, Benowitz NL, Colby SM, McClernon FJ, et al. Whether to push or pull? Nicotine reduction and non-combusted alternatives - two strategies for reducing smoking and improving public health. *Preventive Medicine*, 2018; 117:8–14. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29604326>

Shiffman S, Mao JM, Kurland BF, and Scholl SM. Do non-daily smokers compensate for reduced cigarette consumption when smoking very-low-nicotine-content cigarettes? *Psychopharmacology (Berl)*, 2018; 235(12):3435–41. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30291402>

Shiffman S, Kurland BF, Scholl SM, and Mao JM. Nondaily smokers' changes in cigarette consumption with very low-nicotine-content cigarettes: A randomized double-blind clinical trial. *JAMA Psychiatry*, 2018; 75(10):995–1002. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29902305>

Peters EN, Herrmann ES, Cohn AM, Coleman-Cowger VH, Smith C, et al. How will alcohol research be impacted by future reduction in nicotine content in cigarettes? *Alcohol Clin Exp Res*, 2018. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30103287>

Perkins KA. FDA policy on setting maximum nicotine content in cigarettes. *Nicotine & Tobacco Research*, 2018. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29660048>

Parker MA, Streck JM, Bergeria CL, Bunn JY, Gaalema DE, et al. Reduced nicotine content cigarettes and cannabis use in vulnerable populations. *Tobacco Regulatory Science*, 2018; 4(5):84-91. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30417034>

Pacek LR, Oliver JA, Sweitzer MM, and McClernon FJ. Young adult dual combusted cigarette and e-cigarette users' anticipated responses to a nicotine reduction policy and menthol ban in combusted cigarettes. *Drug and Alcohol Dependence*, 2018; 194:40-4. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30399498>

Pacek LR, Joseph McClernon F, Denlinger-Apte RL, Mercincavage M, Strasser AA, et al. Perceived nicotine content of reduced nicotine content cigarettes is a correlate of perceived health risks. *Tobacco Control*, 2018; 27(4):420-6. Available from: <http://tobaccocontrol.bmj.com/content/tobaccocontrol/27/4/420.full.pdf>

Mercincavage M, Lochbuehler K, Villanti AC, Wileyto EP, Audrain-McGovern J, et al. Examining risk perceptions among daily smokers naive to reduced nicotine content cigarettes. *Nicotine & Tobacco Research*, 2018. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29718357>

Lewis RS. Potential mandated lowering of nicotine levels in cigarettes: A plant perspective. *Nicotine & Tobacco Research*, 2018. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29401309>

Kasza KA, Coleman B, Sharma E, Conway KP, Cummings KM, et al. Correlates of transitions in tobacco product use by u.S. Adult tobacco users between 2013(-)2014 and 2014(-)2015: Findings from the path study wave 1 and wave 2. *International Journal of Environmental Research and Public Health*, 2018; 15(11). Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30441875>

Higgins ST, Bergeria CL, Davis DR, Streck JM, Villanti AC, et al. Response to reduced nicotine content cigarettes among smokers differing in tobacco dependence severity. *Preventive Medicine*, 2018. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29626557>

Hatsukami DK, Luo X, Jensen JA, al'Absi M, Allen SS, et al. Effect of immediate vs gradual reduction in nicotine content of cigarettes on biomarkers of smoke exposure: A randomized clinical trial. *Journal of the American Medical Association*, 2018; 320(9):880–91. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30193275>

Hatsukami DK. Reducing nicotine in cigarettes to minimally addictive levels: A new frontier for tobacco control. *JAMA Psychiatry*, 2018; 75(10):987-8. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30285225>

<https://jamanetwork.com/journals/jamapsychiatry/article-abstract/2704143>

Government of Canada. Request for information regarding availability, costing, and storage of canadian very low nicotine content virginia flue-cured cigarettes (1000198655). 2018. Available from: <https://buyandsell.gc.ca/procurement-data/tender-notice/PW-18-00814424>

Foulds J, Hobkirk A, Wasserman E, Richie J, Veldheer S, et al. Estimation of compliance with exclusive smoking of very low nicotine content cigarettes using plasma cotinine. *Preventive Medicine*, 2018. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29626556>

Federal Register. Tobacco product standard for nicotine level of combusted cigarettes. Proposed Rule, U.S. Department of Health and Human Services, 2018. Available from: <https://www.federalregister.gov/documents/2018/03/16/2018-05345/tobacco-product-standard-for-nicotine-level-of-combusted-cigarettes>.

Dermody SS, McClernon FJ, Benowitz N, Luo X, Tidey JW, et al. Effects of reduced nicotine content cigarettes on individual withdrawal symptoms over time and during abstinence. *Experimental and Clinical Psychopharmacology*, 2018; 26(3):223–32. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29504780>

Cassidy RN, Colby SM, Tidey JW, Jackson KM, Cioe PA, et al. Adolescent smokers' response to reducing the nicotine content of cigarettes: Acute effects on withdrawal symptoms and subjective evaluations. *Drug and Alcohol Dependence*, 2018; 188:153–60. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29775959>

Byron MJ, Jeong M, Abrams DB, and Brewer NT. Public misperception that very low nicotine cigarettes are less carcinogenic. *Tobacco Control*, 2018. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29363610>

Britton J. Denicotinised cigarettes. *Lancet*, 2018; 392(10142):104-5. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30017116>

Bevins RA, Barrett ST, Huynh YW, Thompson BM, Kwan DA, et al. Experimental analysis of behavior and tobacco regulatory research on nicotine reduction. *J Exp Anal Behav*, 2018. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29869329>

Berman ML, Zettler PJ, and Ashley DL. Anticipating industry arguments: The us food and drug administration's authority to reduce nicotine levels in cigarettes. *Public Health Rep*, 2018; 133(4):502–6. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29879366>

Benowitz NL and Henningfield JE. Nicotine reduction strategy: State of the science and challenges to tobacco control policy and FDA tobacco product regulation. *Preventive Medicine*, 2018. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29944901>

Apelberg BJ, Feirman SP, Salazar E, Corey CG, Ambrose BK, et al. Potential public health effects of reducing nicotine levels in cigarettes in the united states. *New England Journal of Medicine*, 2018; 378(18):1725–33. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29543114>

Tucker MR, Laugesen M, and Grace RC. Estimating demand and cross-price elasticity for very low nicotine content (vlnC) cigarettes using a simulated demand task. *Nicotine & Tobacco Research*, 2017. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28340034>

Robinson JD, Kypriotakis G, Karam-Hage M, Green CE, Hatsukami DK, et al. Cigarette nicotine content as a moderator of the relationship between negative affect and smoking. *Nicotine & Tobacco Research*, 2017. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28371900>

Restrepo BJ. Nicotine intake per cigarette smoked among smokers nationally and in new york city. *American Journal of Preventive Medicine*, 2017. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28161036>

Proctor RN. Fda's new plan to reduce the nicotine in cigarettes to sub-addictive levels could be a game-changer. *Tobacco Control*, 2017; 26(5):487-8. Available from: <http://tobaccocontrol.bmj.com/content/tobaccocontrol/26/5/487.full.pdf>

Perkins KA, Karelitz JL, and Kunkle N. Sex differences in subjective responses to moderate versus very low nicotine content cigarettes. *Nicotine & Tobacco Research*, 2017. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29059330>

No authors listed. Impact of exclusive use of low nicotine cigarettes on compensatory smoking. *Clinical Trials.gov (NIH and FDA)*, US 2017. Available from: https://clinicaltrials.gov/ct2/show/NCT03311646?sfpd_d=60&lupd_s=09%2F17%2F2017&lupd_d=30

No authors listed. The regulation of nicotine. *John Hopkins Bloomberg School of Public Health*, US 2017. Available from: <https://www.jhsph.edu/offices-and-services/practice-and-training/news-and-events/the-regulation-of-nicotine.html>.

No authors listed. FDA announces comprehensive regulatory plan to shift trajectory of tobacco-related disease, death. *US* 2017. Available from: <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm568923.htm>.

No authors listed. Fda's new plan for tobacco and nicotine regulation. *US* 2017. Available from: <https://www.fda.gov/TobaccoProducts/NewsEvents/ucm568425.htm>.

Mercincavage M, Wileyto EP, Saddleson ML, Lochbuehler K, Donny EC, et al. Attrition during a randomized controlled trial of reduced nicotine content cigarettes as a proxy for understanding acceptability of nicotine product standards. *Addiction*, 2017. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28107596>

Mercincavage M, Saddleson ML, Gup E, Halstead A, Mays D, et al. Reduced nicotine content cigarette advertising: How false beliefs and subjective ratings affect smoking behavior. *Drug and Alcohol Dependence*, 2017; 173:99-106. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28214392>

Krebs NM, Allen SI, Veldheer S, Martinez DJ, Horn K, et al. Correction to reduced nicotine content cigarettes in smokers of low socioeconomic status: Study protocol for a randomized control trial. *Trials*, 2017; 18(1):598. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29246173>

Krebs NM, Allen SI, Veldheer S, Martinez DJ, Horn K, et al. Reduced nicotine content cigarettes in smokers of low socioeconomic status: Study protocol for a randomized control trial. *Trials*, 2017; 18(1):300. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/28673312>

Kozlowski LT. Cigarette prohibition and the need for more prior testing of the WHO tobreg's global nicotine-reduction strategy. *Tobacco Control*, 2017; 26(e1):e31-e4. Available from: <http://tobaccocontrol.bmj.com/content/tobaccocontrol/26/e1/e31.full.pdf>

Keith DR, Kurti AN, Davis DR, Zvorsky IA, and Higgins ST. A review of the effects of very low nicotine content cigarettes on behavioral and cognitive performance. *Preventive Medicine*, 2017. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28647546>

Jing Y, Yu B, Li P, Xiong B, Cheng Y, et al. Synthesis of graphene/dpa composite for determination of nicotine in tobacco products. *Scientific Reports*, 2017; 7(1):14332. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29084991>

Hatsukami DK, Zaatar G, and Donny E. The case for the WHO advisory note, global nicotine reduction strategy. *Tobacco Control*, 2017; 26(e1):e29-e30. Available from: <http://tobaccocontrol.bmj.com/content/tobaccocontrol/26/e1/e29.full.pdf>

Gottlieb S. Protecting american families: Comprehensive approach to nicotine and tobacco. US 2017. Available from: <https://www.fda.gov/NewsEvents/Speeches/ucm569024.htm>.

Fraser T and Kira A. Perspectives of key stakeholders and smokers on a very low nicotine content cigarette-only policy: Qualitative study. *New Zealand Medical Journal*, 2017; 130(1456):36-45. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28571047>

Faulkner P, Petersen N, Ghahremani DG, Cox CM, Tyndale RF, et al. Sex differences in tobacco withdrawal and responses to smoking reduced-nicotine cigarettes in young smokers. *Psychopharmacology (Berl)*, 2017. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29022071>

Faulkner P, Ghahremani DG, Tyndale RF, Cox CM, Kazanjian AS, et al. Reduced-nicotine cigarettes in young smokers: Impact of nicotine metabolism on nicotine dose effects. *Neuropsychopharmacology*, 2017. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28117337>

Donny EC, Walker N, Hatsukami D, and Bullen C. Reducing the nicotine content of combusted tobacco products sold in new zealand. *Tobacco Control*, 2017; 26(e1):e37-e42. Available from: <http://tobaccocontrol.bmj.com/content/tobaccocontrol/26/e1/e37.full.pdf>

Borland R. Paying more attention to the 'elephant in the room'. *Tobacco Control*, 2017; 26(e1):e35-e6. Available from: <http://tobaccocontrol.bmj.com/content/tobaccocontrol/26/e1/e35.full.pdf>

Benowitz NL, Donny EC, and Hatsukami DK. Reduced nicotine content cigarettes, e-cigarettes and the cigarette end game. *Addiction*, 2017; 112(1):6-7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/27555354>

Arger CA, Heil SH, Sigmon SC, Tidey JW, Stitzer ML, et al. Preliminary validity of the modified cigarette evaluation questionnaire in predicting the reinforcing effects of cigarettes that vary in nicotine content. *Experimental and Clinical Psychopharmacology*, 2017; 25(6):473-8. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29251976>

Allen SI, Foulds J, Pachas GN, Veldheer S, Cather C, et al. A two-site, two-arm, 34-week, double-blind, parallel-group, randomized controlled trial of reduced nicotine cigarettes in smokers with mood

and/or anxiety disorders: Trial design and protocol. BMC Public Health, 2017; 17(1):100. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28103841>

Tidey JW, Pacek LR, Koopmeiners JS, Vandrey R, Nardone N, et al. Effects of 6-week use of reduced-nicotine content cigarettes in smokers with and without elevated depressive symptoms. Nicotine & Tobacco Research, 2016. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27613885>

Smith TT, Cassidy RN, Tidey JW, Luo X, Le CT, et al. Impact of smoking reduced nicotine content cigarettes on sensitivity to cigarette price: Further results from a multi-site clinical trial. Addiction, 2016. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27741367>

Rupprecht LE, Koopmeiners JS, Dermody SS, Oliver JA, al'Absi M, et al. Reducing nicotine exposure results in weight gain in smokers randomised to very low nicotine content cigarettes. Tobacco Control, 2016. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/27856940>

Perkins KA, Kunkle N, Karelitz JL, Michael VC, and Donny EC. Threshold dose for discrimination of nicotine via cigarette smoking. Psychopharmacology (Berl), 2016. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27037937>

Nardone N, Donny EC, Hatsukami DK, Koopmeiners JS, Murphy SE, et al. Estimations and predictors of non-compliance in switchers to reduced nicotine content cigarettes. Addiction, 2016. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27367436>

Mercincavage M, Souprontchouk V, Tang KZ, Dumont RL, Wileyto EP, et al. A randomized controlled trial of progressively reduced nicotine content cigarettes on smoking behaviors, biomarkers of exposure, and subjective ratings. Cancer Epidemiology, Biomarkers & Prevention, 2016. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27197288>

Mercincavage M, Smyth JM, Strasser AA, and Branstetter SA. Reduced nicotine content expectancies affect initial responses to smoking. Tobacco Regulatory Science, 2016; 2(4):309-16. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27917397>

Kozlowski LT. Let actual markets help assess the worth of optional very-low-nicotine cigarettes before deciding on mandatory regulations. Addiction, 2016. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27554993>

Jensen KP, DeVito EE, and Sofuoglu M. How intravenous nicotine administration in smokers can inform tobacco regulatory science. Tobacco Regulatory Science, 2016; 2(4):452-63. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29082299>

Higgins ST, Heil SH, Sigmon SC, Tidey JW, Gaalema DE, et al. Response to varying the nicotine content of cigarettes in vulnerable populations: An initial experimental examination of acute effects. Psychopharmacology (Berl), 2016. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27714427>

Hatsukami DK, Luo X, Dick L, Kangkum M, Allen SS, et al. Reduced nicotine content cigarettes and use of alternative nicotine products: Exploratory trial. Addiction, 2016. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/27614097>

Gray RJ, Hoek J, and Edwards R. A qualitative analysis of 'informed choice' among young adult smokers. *Tobacco Control*, 2016; 25(1):46–51. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/25192770>

Government of Canada. Health benefits modeling, expert elicitation and analysis relating to a product standard (1000174109). 2016. Available from: <https://buyandsell.gc.ca/procurement-data/tender-notice/PW-16-00718749>

Goldstein JA and Goldstein LK. Randomized trial of reduced-nicotine standards for cigarettes. *New England Journal of Medicine*, 2016; 374(4):395–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26816025>

Donny EC and Hatsukami DK. Randomized trial of reduced-nicotine standards for cigarettes. *New England Journal of Medicine*, 2016; 374(4):396–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26816022>

Dermody SS, Tidey JW, Denlinger RL, Pacek LR, al'Absi M, et al. The impact of smoking very low nicotine content cigarettes on alcohol use. *Alcohol Clin Exp Res*, 2016. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26916879>

Coffa BG, Coggins CR, Werley MS, Oldham MJ, and Fariss MW. Chemical, physical, and in vitro characterization of research cigarettes containing denicotinized tobacco. *Regulatory Toxicology and Pharmacology*, 2016; 79:64–73. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27181452>

Cao C, Li W, and Shen H. Randomized trial of reduced-nicotine standards for cigarettes. *New England Journal of Medicine*, 2016; 374(4):394–5. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26816023>

Anselm E. Randomized trial of reduced-nicotine standards for cigarettes. *New England Journal of Medicine*, 2016; 374(4):395. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26816024>

World Health Organization. Advisory note: Global nicotine reduction strategy: WHO study group on tobacco product regulation. 2015. Available from: <https://www.who.int/publications/i/item/advisory-note-global-nicotine-reduction-strategy-who-study-group-on-tobacco-product-regulation>

Walker N, Fraser T, Howe C, Laugesen M, Truman P, et al. Abrupt nicotine reduction as an endgame policy: A randomised trial. *Tobacco Control*, 2015; 24(e4):e251–e7. Available from: <http://tobaccocontrol.bmj.com/content/24/e4/e251.abstract>

Kozlowski LT. Prospects for a nicotine-reduction strategy in the cigarette endgame: Alternative tobacco harm reduction scenarios. *Int J Drug Policy*, 2015; 26(6):543–7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/25795345>

Hatsukami DK, Donny EC, Koopmeiners JS, and Benowitz NL. Compensatory smoking from gradual and immediate reduction in cigarette nicotine content. *Cancer Epidemiology, Biomarkers & Prevention*, 2015; 24(2):472–6. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/25515551>

Fiore M and Baker T. Reduced-nicotine cigarettes--a promising regulatory pathway. *New England Journal of Medicine*, 2015; 373(14):1289–91. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26422720>

Donny EC, Denlinger RL, Tidey JW, Koopmeiners JS, Benowitz NL, et al. Randomized trial of reduced-nicotine standards for cigarettes. *New England Journal of Medicine*, 2015; 373(14):1340–9. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/26422724>

Dermody SS, Donny EC, Hertsgaard LA, and Hatsukami DK. Greater reductions in nicotine exposure while smoking very low nicotine content cigarettes predict smoking cessation. *Tobacco Control*, 2015; 24(6):536–9. Available from: <http://tobaccocontrol.bmj.com/content/24/6/536.abstractN2> -

Benowitz NL, Nardone N, Dains KM, Hall SM, Stewart S, et al. Effect of reducing the nicotine content of cigarettes on cigarette smoking behavior and tobacco smoke toxicant exposure: 2-year follow up. *Addiction*, 2015; 110(10):1667–75. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/26198394>

Bandiera FC, Ross KC, Taghavi S, Delucchi K, Tyndale RF, et al. Nicotine dependence, nicotine metabolism, and the extent of compensation in response to reduced nicotine content cigarettes. *Nicotine & Tobacco Research*, 2015. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25555385>

Vogel RI, Hertsgaard LA, Dermody SS, Luo X, Moua L, et al. Sex differences in response to reduced nicotine content cigarettes. *Addictive Behaviors*, 2014; 39(7):1197–204. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24746485>

Smith TT, Sved AF, Hatsukami DK, and Donny EC. Nicotine reduction as an increase in the unit price of cigarettes: A behavioral economics approach. *Preventive Medicine*, 2014. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25025523>

McKinney DL, Frost-Pineda K, Oldham MJ, Fisher MT, Wang J, et al. Cigarettes with different nicotine levels affect sensory perception and levels of biomarkers of exposure in adult smokers. *Nicotine & Tobacco Research*, 2014; 16(7):948–60. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24638852>

Hammond D and O'Connor RJ. Reduced nicotine cigarettes: Smoking behavior and biomarkers of exposure among smokers not intending to quit. *Cancer Epidemiology, Biomarkers & Prevention*, 2014; 23(10):2032–40. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25150282>

Donny EC, Hatsukami DK, Benowitz NL, Sved AF, Tidey JW, et al. Reduced nicotine product standards for combustible tobacco: Building an empirical basis for effective regulation. *Preventive Medicine*, 2014. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24967958>

Dermody SS and Donny EC. The predicted impact of reducing the nicotine content in cigarettes on alcohol use. *Nicotine & Tobacco Research*, 2014; 16(8):1033–44. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24647051>

Brailon A. Reducing nicotine content of cigarettes: In search of a regulator. *Preventive Medicine*, 2014. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25150383>

Benowitz NL, Nardone N, Hatsukami DK, and Donny EC. Biochemical estimation of non-compliance with smoking of very low nicotine content cigarettes. *Cancer Epidemiology, Biomarkers & Prevention*, 2014. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25416718>

AhnAllen CG, Bidwell LC, and Tidey JW. Cognitive effects of very low nicotine content cigarettes, with and without nicotine replacement, in smokers with schizophrenia and controls. *Nicotine & Tobacco Research*, 2014. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25143294>

Hatsukami DK, Heishman SJ, Vogel RI, Denlinger RL, Roper-Batker AN, et al. Dose-response effects of spectrum research cigarettes. *Nicotine & Tobacco Research*, 2013; 15(6):1113–21. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/23178320>

Benowitz NL and Henningfield JE. Reducing the nicotine content to make cigarettes less addictive. *Tobacco Control*, 2013; 22 Suppl 1(suppl 1):i14–7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/23591498>

Benowitz NL, Dains KM, Hall SM, Stewart S, Wilson M, et al. Smoking behavior and exposure to tobacco toxicants during 6 months of smoking progressively reduced nicotine content cigarettes. *Cancer Epidemiology, Biomarkers & Prevention*, 2012; 21(5):761–9. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/22354905>

Hatsukami DK, Perkins KA, LeSage MG, Ashley DL, Henningfield JE, et al. Nicotine reduction revisited: Science and future directions. *Tobacco Control*, 2010; 19(5):e1–e10. Available from: <http://tobaccocontrol.bmj.com/content/19/5/e1.abstract>

Hatsukami DK, Kotlyar M, Hertsgaard LA, Zhang Y, Carmella SG, et al. Reduced nicotine content cigarettes: Effects on toxicant exposure, dependence and cessation. *Addiction*, 2010; 105(2):343–55. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/20078491>

Zhou X, Nonnemaker J, Sherrill B, Gilseman AW, Coste F, et al. Attempts to quit smoking and relapse: Factors associated with success or failure from the attempt cohort study. *Addictive Behaviors*, 2009; 34(4):365–73. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/19097706>

United States Code. Family smoking prevention and tobacco control act. In *stat 1776 united states*. 2009. Available from: <https://www.govtrack.us/congress/bills/111/hr1256/text>

Hall W and Gartner C. Supping with the devil? The role of law in promoting tobacco harm reduction using low nitrosamine smokeless tobacco products. *Public Health*, 2009; 123(3):287–91. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/19223052>

Donny E and Jones M. Prolonged exposure to denicotinized cigarettes with or without transdermal nicotine. *Drug and Alcohol Dependence*, 2009; 104((1–2)):23–33. Available from: <http://www.sciencedirect.com/science/article/pii/S0376871609001124>

Benowitz NL, Hall SM, Stewart S, Wilson M, Dempsey D, et al. Nicotine and carcinogen exposure with smoking of progressively reduced nicotine content cigarette. *Cancer Epidemiology, Biomarkers & Prevention*, 2007; 16(11):2479–85. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/18006940>

Tengs TO, Ahmad S, Savage JM, Moore R, and Gage E. The ama proposal to mandate nicotine reduction in cigarettes: A simulation of the population health impacts. *Preventive Medicine*, 2005; 40(2):170–80. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/15533526>

Benowitz NL and Henningfield JE. Establishing a nicotine threshold for addiction. The implications for tobacco regulation. *New England Journal of Medicine*, 1994; 331(2):123–5. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/7818638>

Benowitz N. Pharmacologic aspects of cigarette smoking and nicotine addition. *New England Journal of Medicine*, 1988; 319(20):1318–30. Available from: <http://www.nejm.org/doi/full/10.1056/NEJM198811173192005>

12C.1 Rationale for reducing the level of nicotine in cigarettes

Cassidy, RN, Tidey, JW, Bello, MS, Denlinger-Apte, R, Goodwin, C, Godin, J et al. (2024). Effects of Very Low Nicotine Content Cigarettes and Nicotine Vaping Device Characteristics on Choices to Smoke, Vape, or Abstain in Early Young Adults. *Nicotine Tob Res*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/39109883>

Dwivedi, S, Singh, D, Singh, N, & Trivedi, PK. (2024). Advances in regulatory mechanism(s) and biotechnological approaches to modulate nicotine content in tobacco. *Plant Physiol Biochem*, 207, 108397. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38316099>

Braillon, A. (2022). Tobacco control without a maximum nicotine level in products is a smokescreen. *BMJ*, 378, o1942. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35940613>

12C.2 Development of low nicotine cigarettes

Kernodle, SP, Webb, S, Steede, TM, & Lewis, RS. (2022). Combined reduced expression of two gene families lowers nicotine content to ultra-low levels in cultivated tobacco. *Plant Cell Rep*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35779084>

Shoji, T, Moriyama, K, Siirro, N, Ouadi, S, Ivanov, NV, Hashimoto, T, & Saito, K. (2022). Natural and induced variations in transcriptional regulator genes result in low-nicotine phenotypes in tobacco. *Plant J*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35883194>

Carter, RR, Kovach, AL, & Thomas, BF. (2022). A comparison of nicotine content methods to produce a UPC(2)-MS(2) method for the analysis of nicotine and minor alkaloids in SPECTRUM nicotine research cigarettes. *Anal Bioanal Chem*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35676561>

Zhang, J, Zhou, Q, Zhang, D, Yang, G, Zhang, C, Wu, Y et al. (2022). The Agronomic Traits, Alkaloids Analysis, FT-IR and 2DCOS-IR Spectroscopy Identification of the Low-Nicotine-Content Nontransgenic Tobacco Edited by CRISPR-Cas9. *Molecules*, 27(12). Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35744944>

Ma H, Wang F, Wang W, Yin G, Zhang D, et al. Alternative splicing of basic chitinase gene pr3b in the low-nicotine mutants of nicotiana tabacum l. Cv. Burley 21. *J Exp Bot*, 2016; 67(19):5799–809. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/27664270>

Li C, Teng W, Shi Q, and Zhang F. Multiple signals regulate nicotine synthesis in tobacco plant. *Plant Signal Behav*, 2007; 2(4):280–1. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/19704681>

Hibi N, Higashiguchi S, Hashimoto T, and Yamada Y. Gene expression in tobacco low-nicotine mutants. *Plant Cell*, 1994; 6(5):723–35. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/8038607>

Valleau WD. Breeding low-nicotine tobacco. *Journal of Agricultural Research*, 1949; 78:171–81. Available from: https://books.google.com.au/books?hl=en&lr=&id=3-nUAAAAMAAJ&oi=fnd&pg=PA171&ots=ooV2OC6ZHP&sig=WbwCQa2mx69WUJ0RfpvDTfKv72c&redir_esc=y#v=onepage&q&f=false

12C.3 Effects of reduced nicotine content cigarettes on smoking and health

Giummo, R, Oliver, JA, McClernon, FJ, & Sweitzer, MM. (2024). Associations between compliance with very low nicotine content (VLNC) cigarettes, abstinence self-efficacy, and quit outcomes in a pilot smoking cessation trial. *Drug Alcohol Depend*, 262, 111393. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/39024797>

Hatsukami, DK, Jensen, JA, Carroll, DM, Luo, X, Strayer, LG, Cao, Q et al. (2024). Reduced nicotine in cigarettes in a marketplace with alternative nicotine systems: randomized clinical trial. *Lancet Reg Health Am*, 35, 100796. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38911348>

Katz, BR, Gaalema, DE, Dumas, JA, Heil, SH, Sigmon, SC, Tidey, JW et al. (2024). Cigarette smoking and cognitive task performance: Experimental effects of very-low nicotine-content cigarettes. *Exp Clin Psychopharmacol*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38722587>

Harfmann, RF, Heil, SH, Bunn, JY, Snell, LM, Tidey, JW, Sigmon, SC et al. (2024). Changes in weight among individuals with psychiatric conditions or socioeconomic disadvantage assigned to smoke very low nicotine content cigarettes. *Exp Clin Psychopharmacol*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38236223>

Strickland, JC, Gelino, BW, Naude, GP, Harbaugh, JC, Schlitzer, RD, Mercincavage, M et al. (2023). Effect of nicotine expectancy and nicotine dose reduction on cigarette demand, withdrawal alleviation, and puff topography. *Drug Alcohol Depend*, 254, 111042. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38086213>

Pesola, F, Phillips-Waller, A, Beard, E, Shahab, L, Sweanor, D, Jarvis, M, & Hajek, P. (2023). Effects of reduced-risk nicotine-delivery products on smoking prevalence and cigarette sales: an observational study. *Public Health Res (Southampton)*, 11(7), 1-39. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/37795840>

Johnson, AC, Mercincavage, M, Tan, ASL, Villanti, AC, Delnevo, CD, & Strasser, AA. (2023). Effects of reduced nicotine content cigarette advertising with warning labels and social media features on

product perceptions among young adults. *J Behav Med*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/37605036>

DeAtley, T, Johnson, AC, Stone, MD, Audrain-McGovern, J, Mercincavage, M, & Strasser, AA. (2023). Effects of Modified Tobacco Risk Products with Claims and Nicotine Features on Perceptions among Racial and Ethnic Groups. *Int J Environ Res Public Health*, 20(15). Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/37568996>

Dolan, SB, Bradley, MK, & Johnson, MW. (2023). E-Cigarette price impacts legal and black-market cigarette purchasing under a hypothetical reduced-nicotine cigarette standard. *Nicotine Tob Res*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/37195268>

Henriksen, L, Johnson, TO, Mahoney, M, Schleicher, NC, Ali, A, & Prochaska, JJ. (2023). Rapid-response surveillance of the first US test market for VLN cigarettes. *Tob Control*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/36927515>

Snell, LM, DeAtley, T, Tidey, JW, Colby, SM, & Cassidy, RN. (2023). Impact of reduced nicotine content on behavioral economic measures of cigarette reinforcement in adolescents who smoke cigarettes. *Drug Alcohol Depend*, 246, 109786. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/36933541>

Cassidy, RN, Tidey, JW, Jackson, KM, Cioe, PA, Murphy, SE, Krishnan-Sarin, S et al. (2022). The Impact of Reducing Nicotine Content on Adolescent Cigarette Smoking and Nicotine Exposure: Results from a Randomized Controlled Trial. *Nicotine Tob Res*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/36482794>

Cohn, AM, Cassidy, R, Denlinger-Apte, R, Donny, E, Villanti, AC, Hatsukami, D et al. (2022). Impact of a reduced nicotine standard on young adult appeal for menthol and non-menthol cigarettes. *BMJ Open*, 12(11), e067694. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/36410805>

Foulds, J, Veldheer, S, Pachas, G, Hrabovsky, S, Hameed, A, Allen, SI et al. (2022). The effects of reduced nicotine content cigarettes on biomarkers of nicotine and toxicant exposure, smoking behavior and psychiatric symptoms in smokers with mood or anxiety disorders: A double-blind randomized trial. *PLoS One*, 17(11), e0275522. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/36322562>

Gaalema, DE, Snell, LM, Tidey, JW, Sigmon, SC, Heil, SH, Lee, DC et al. (2022). Potential effects of nicotine content in cigarettes on use of other substances. *Prev Med*, 107290. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/36208817>

Meier, E, Rubin, N, Dermody, SS, Tessier, KM, Hecht, SS, Murphy, S et al. (2022). Immediate Switching to Reduced Nicotine Cigarettes in a U.S.-Based Sample: The Impact on Cannabis Use and Related Variables at 20 Weeks. *Nicotine Tob Res*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/36198098>

Peters, EN, Pickworth, WB, Monahan, E, Smith, CE, Triplett, CA, & Coleman-Cowger, VH. (2022). Effect of very low nicotine content cigarettes on alcohol drinking and smoking among adult smokers who are at-risk alcohol drinkers. *Exp Clin Psychopharmacol*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/36174143>

Higgins, ST, Erath, TG, DeSarno, M, Reed, DD, Gaalema, DE, Sigmon, SC et al. (2022). Leveraging the cigarette purchase task to understand relationships between cumulative vulnerabilities, the relative reinforcing effects of smoking, and response to reduced nicotine content cigarettes. *Prev Med*, 107206. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35995102>

Lin, W, Hobkirk, AL, Zhu, J, Krebs, NM, Hayes, JE, Richie, JP, Jr et al. (2022). Effect of Menthol on Nicotine Reduction: Pooled results from two Double-Blind Randomized Controlled Trials. *Brain Res Bull*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/36038015>

Ranney, LM, Jarman, KL, Clark, S, Baler, G, Gourlay, M, Brewer, NT et al. (2022). Reducing misperceptions about very low nicotine content cigarettes: insights from adults who smoke. *Nicotine Tob Res*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35797207>

Klemperer, EM, Luo, X, Jensen, J, al'Absi, M, Cinciripini, PM, Robinson, JD et al. (2022). Smoking abstinence and cessation-related outcomes one month after an immediate versus gradual reduction in nicotine content of cigarettes. *Prev Med*, 107175. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35870575>

DeAtley, T E, Cassidy, R, Snell, ML, Colby, SM, & Tidey, JW. (2022). Effects of Very Low Nicotine Content Cigarette use on Cigarette Reinforcement among Smokers with Serious Mental Illness. *Addict Behav*, 133, 107376. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35671553>

Li, C, Yao, N, Miller, S L, Macpherson, C, Hassinger, T, Love, K, & Malin, SK. (2022). Exercise and Reduced Nicotine Content Cigarettes in Adult Female Smokers: A Pilot Trial. *Int J Environ Res Public Health*, 19(11). Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35682232>

Li, Q, Chen, X, Li, X, Gorowska, M, Li, Z, & Li, Y. (2022). The Effects of Immediate vs Gradual Reduction in Nicotine Content of Cigarettes on Smoking Behavior: An Ecological Momentary Assessment Study. *Front Psychiatry*, 13, 884605. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35633808>

Snell, LM, Reed, GL, Tidey, J, Bunn, J Y, Harfmann, RF, Heil, SH et al. (2022). Predictors of Adherence Among Vulnerable Populations of Adults Assigned to Smoke Very Low Nicotine Content Cigarettes. *Nicotine Tob Res*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35704338>

Tidey, JW, Snell, LM, Colby, SM, Cassidy, RN, & Denlinger-Apte, RL. (2022). Effects of very low nicotine content cigarettes on smoking across vulnerable populations. *Prev Med*, 107099. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35704338>

Wilson, N, Hoek, J, Nghiem, N, Summers, J, Grout, L, & Edwards, R. (2022). Modelling the impacts of tobacco denicotinisation on achieving the Smokefree 2025 goal in Aotearoa New Zealand. *N Z Med J*, 135(1548), 65-76. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35728131>

12C.4 Public health considerations in implementing a nicotine reduction policy

Chido-Amajuoyi, OG, Mantey, DS, Igbinomwanhia, E, Omega-Njemnobi, O, Onyeaka, H, Yu, RK et al. (2024). Perceptions of the Addictiveness of Low-Nicotine Cigarettes Versus Typical Cigarettes and Exposure to Tobacco Industry-Sponsored Corrective Campaign. *Subst Use Misuse*, 59(10), 1511-1518. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38831538>

Reed, GL, Colby, SM, DiLorenzo, J, Totten, J, Tidey, JW, & Cassidy, RN. (2024). Reactions to a Nicotine Reduction Policy Among Adolescents Who Smoke: A Qualitative Study. *Nicotine Tob Res.* Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38908011>

Mercincavage, M, Wackowski, OA, Johnson, AC, Young, WJ, Tan, ASL, Delnevo, CD et al. (2024). Associations of educational and marketing messages with beliefs about nicotine and reduced nicotine cigarettes. *Prev Med*, 185, 108056. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38944058>

Tan, ASL, Mercincavage, M, Young, WJ, Hrywna, M, Delnevo, CD, & Strasser, AA. (2024). Perceived relative harm and addictiveness compared with cigarettes and intentions to use modified risk tobacco products utilizing FDA-authorized marketing claims among adults in the United States. *Drug Alcohol Depend*, 261, 111291. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38851035>

Reynolds, RM, Trasher, JF, Yang, B, Henderson, KC, Ashley, DL, Hackworth, EE et al. (2024). Perceptions of a reduced nicotine policy and predictors of policy support: A nationally representative U.S. survey. *Prev Med*, 107952. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38657684>

Pei, D, Reynolds, RM, Ntansah, CA, Hackworth, EE, Henderson, KC, Yang, B et al. (2024). Independent and combined effects of very low nicotine cigarette messages and e-cigarette messages: a randomised clinical trial. *Tob Control*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38664002>

Gendall, P, Popova, L, Thrasher, J, & Hoek, J. (2024). Nicotine beliefs and perceptions of low nicotine labels and mitigating statements among people who do and do not smoke: a cross-sectional study from Aotearoa New Zealand. *Tob Control*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38195244>

Trigg, J, Rich, J, Williams, E, Gartner, CE, Guillaumier, A, & Bonevski, B. (2023). Perspectives on limiting tobacco access and supporting access to nicotine vaping products among clients of residential drug and alcohol treatment services in Australia. *Tob Control*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/37821220>

Reynolds, RM, Popova, L, Ashley, DL, Henderson, KC, Ntansah, CA, Yang, B et al. (2022). Messaging about very low nicotine cigarettes (VLNCs) to influence policy attitudes, harm perceptions and smoking motivations: a discrete choice experiment. *Tob Control*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/36171147>

White, CM, Tessier, KM, Koopmeiners, JS, Denlinger-Apte, RL, Cobb, CO, Lane, T et al. (2022). Preliminary evidence on cigarette nicotine reduction with concurrent access to an e-cigarette: Manipulating cigarette nicotine content, e-liquid nicotine content, and e-liquid flavor availability. *Prev Med*, 107213. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35995103>

Mowls Carroll, D, Hatsukami, D, & Denlinger-Apte, R. (2022). Prioritize Health Equity When Implementing a Nicotine Product Standard. *Nicotine Tob Res.* Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35867992>

Henderson, KC, Loud, EE, Duong, HT, Reynolds, RM, Yang, B, Ntansah, C et al. (2022). Perceptions of nicotine reduction policy in the US: A qualitative study. *Nicotine Tob Res*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/35312014>

12C.5 International approaches to reducing nicotine in cigarettes

Reed, GL, Colby, SM, DiLorenzo, J, Totten, J, Tidey, JW, & Cassidy, RN. (2024). Reactions to a Nicotine Reduction Policy Among Adolescents Who Smoke: A Qualitative Study. *Nicotine Tob Res*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38908011>

El-Hellani, A, Wagener, TL, & Brinkman, MC. (2024). Reengineering Addiction - The Tobacco Industry's Potential Response to a Nicotine Standard for Cigarettes. *N Engl J Med*, 390(18), 1639-1641. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/38708820>

News reports:

12C Reducing the nicotine content of cigarettes

No authors listed. FDA authorizes marketing of tobacco products that help reduce exposure to and consumption of nicotine for smokers who use them. FDA, 2022. Available from: <https://www.fda.gov/news-events/press-announcements/fda-authorizes-marketing-tobacco-products-help-reduce-exposure-and-consumption-nicotine-smokers-who>

Craver R. 22nd century begins retail production of very-low-nicotine cigarettes. *Winston-Salem Journal*, 2022. Available from: https://journalnow.com/business/local/22nd-century-begins-retail-production-of-very-low-nicotine-cigarettes/article_7eabc862-7ec5-11ec-8bb9-2bad57bce5a9.html

Ralph A. Plan to limit nicotine level cuts £6bn off tobacco firms. *The Times*, 2021. Available from: <https://www.thetimes.co.uk/article/plan-to-limit-nicotine-level-cuts-6bn-off-tobacco-firms-chfgvplnf>

Owermohle S. House tobacco bill revives talk of nicotine limits. *Politico*, 2020. Available from: <https://www.politico.com/news/2020/02/27/house-tobacco-bill-revives-talk-of-nicotine-limits-117908>

US Food and Drug Administration. 22nd century group inc. Modified risk tobacco product (mrtp) applications. FDA, 2019. Available from: <https://www.fda.gov/tobacco-products/advertising-and-promotion/22nd-century-group-inc-modified-risk-tobacco-product-mrtp-applications>

Rees T. Nicotine cap threat hits big tobacco. *Telegraph*, 2019. Available from: <https://www.telegraph.co.uk/business/2019/06/18/nicotine-cap-threat-hits-big-tobacco/>

Perrone M. Us permits sale of cigarettes with 95% less nicotine. *AP News*, 2019. Available from: <https://apnews.com/d34f391754690977cbe80c9b370d29d9>

Le Page M. Non-addictive crispr-edited tobacco could help eliminate smoking. New Scientist, 2019. Available from: <https://www.newscientist.com/article/2207636-non-addictive-crispr-edited-tobacco-could-help-eliminate-smoking/>

Kekatos M. Us regulators drop plans to cap nicotine levels in cigarettes to non-addictive levels just hours after trump's FDA nominee says he will not ban flavored e-cigs. Daily Mail Australia, 2019. Available from: <https://www.dailymail.co.uk/health/article-7707305/U-S-health-regulators-drop-plan-sharply-cut-nicotine-cigarettes-Bloomberg.html>

Blankenhorn D. Promise of low nicotine fires up 22nd century stock as trading scrutinized. Investor Place, 2019. Available from: <https://investorplace.com/2019/02/22nd-century-stock-is-a-bet-on-smokes-without-the-high-fimg/>

Stanton A. Glantz, Neal Benowitz, Benjamin Chaffee, Jeffrey Gotts, Bonnie Halpern-Felsher, et al. Tobacco product standard for nicotine level: The FDA should set a nicotine level to be achieved in a single step for all combusted tobacco products

Public Comment to the FDA, 2018. Available from: <https://tobacco.ucsf.edu/fda-should-set-nicotine-product-standard-level-be-achieved-single-step-all-combusted-tobacco-products>

Perrone M. FDA begins anti-smoking push to cut nicotine in cigarettes. Business Insider (UK), 2018. Available from: <http://uk.businessinsider.com/ap-fda-begins-anti-smoking-push-to-cut-nicotine-in-cigarettes-2018-3/?r=AU&IR=T>

Pavlova U. Altria thinks low-nicotine cigarettes could lead to about a million lost jobs Bloomberg, 2018. Available from: <https://www.bloombergquint.com/onweb/2018/07/17/altria-sees-low-nicotine-smokes-eating-about-a-million-u-s-jobs#gs.2L8AXYE>

Paige Winfield C. The health 202: Who knew? A top Trump conservative is aggressively taking on tobacco. The Washington Post, 2018. Available from: https://www.washingtonpost.com/news/powerpost/paloma/the-health-202/2018/03/16/the-health-202-who-knew-a-top-trump-conservative-is-aggressively-taking-on-tobacco/5aaa9cac30fb047655a06cbe/?utm_term=.ace3fc5c09d9

No authors listed. 22nd century group comments on grossly misleading “short and distort” article Business Wire, 2018. Available from: <https://www.businesswire.com/news/home/20181026005127/en/22nd-Century-Group-Comments-Grossly-Misleading-%E2%80%9CShort>

No authors listed. Jama publishes greatly anticipated phase iii study using 22nd century’s spectrum® very low nicotine content cigarettes Business Wire, 2018. Available from: <https://www.businesswire.com/news/home/20180905005335/en/JAMA-Publishes-Greatly-Anticipated-Phase-III-Study>

No authors listed. FDA seeks public comment on a potential product standard to lower nicotine in cigarettes to a minimally or non-addictive level. U.S. Food & Drug Administration (FDA), 2018. Available from: <https://www.fda.gov/TobaccoProducts/NewsEvents/ucm600955.htm>

Myers ML. FDA plan to reduce nicotine levels in cigarettes would save millions of lives – agency must quickly implement it. Tobacco Free Kids, 2018. Available from: https://www.tobaccofreekids.org/press-releases/2018_03_15_fda

Lunn S. What would a million cigarettes cost? Health Canada wants to know. CBC News, 2018. Available from: <http://www.cbc.ca/news/politics/what-would-a-million-cigarettes-cost-health-canada-wants-to-know-1.4517203>

Koval R. Less is more when it comes to the FDA's game-changing nicotine reduction plan. Truth Initiative, 2018. Available from: <https://truthinitiative.org/news/less-more-when-it-comes-fdas-game-changing-nicotine-reduction-plan>

Gottlieb S. Statement from FDA commissioner Scott Gottlieb, M.D., on pivotal public health step to dramatically reduce smoking rates by lowering nicotine in combustible cigarettes to minimally or non-addictive levels. U.S. Food & Drug Administration (FDA), 2018. Available from: <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm601039.htm>

Duprey R. Will the FDA burn tobacco giants with low-nicotine rules? The Motley Fool, 2018. Available from: <https://www.fool.com/investing/2018/10/28/will-fda-burn-tobacco-giants-with-low-nicotine-rul.aspx>

Bender K. Immediate reduction of nicotine in cigarettes provides greatest decrease in biomarkers of smoke exposure. MD Magazine, 2018. Available from: <https://www.mdmag.com/medical-news/immediate-reduction-of-nicotine-in-cigarettes-provides-greatest-decrease-in-biomarkers-of-smoke-exposure>

Arnstein SE and LLP L. FDA to evaluate minimally or non-addictive cigarette product standard, also plans to look at flavors and premium cigars. JD Supra, 2018. Available from: <https://www.jdsupra.com/legalnews/fda-to-evaluate-minimally-or-non-81382/>

Young S. Reducing nicotine in cigarettes could curb smoking addiction, finds study MSN, 2017. Available from: <http://www.msn.com/en-gb/lifestyle/lifestylegeneral/reducing-nicotine-in-cigarettes-could-curb-smoking-addiction-finds-study/ar-AAqFYne>

Wilts A. US proposes cutting nicotine in cigarettes to 'non-addictive' levels. Independent, 2017. Available from: <http://www.independent.co.uk/news/world/americas/us-politics/us-cigarettes-nicotine-levels-non-addictive-e-cigarettes-vaping-fda-food-drug-administration-deaths-a7869626.html>

Vashi N. Tobacco addiction influenced by cigarette nicotine content. Medical News Bulletin, 2017. Available from: <https://www.medicalnewsbulletin.com/tobacco-addiction-influenced-cigarette-nicotine-content/>

Vail J. Phase III study using 22nd century's spectrum® research cigarettes demonstrates immediate reduction to very low nicotine is most likely to lead to less harm. Business Wire, 2017. Available from: <http://www.businesswire.com/news/home/20171006005223/en/Phase-III-Study-22nd-Century%E2%80%99s-SPECTRUM%C2%AE-Research>

Proctor RN. Taking the addiction out of smoking. The New York Times, 2017. Available from: <https://www.nytimes.com/2017/08/02/opinion/fda-smoking-nicotine.html?mcubz=1>

No authors listed. 22nd century ships 2.4 million spectrum® cigarettes for the national institute on drug abuse Business Wire, 2017. Available from: <https://www.businesswire.com/news/home/20171130005870/en/22nd-Century-Ships-2.4-Million-SPECTRUM%C2%ae-Cigarettes>

No authors listed. 22nd century hires former Reynolds american vice president. Business Wire, 2017. Available from: <http://www.businesswire.com/news/home/20171102005363/en/22nd-Century-Hires-Reynolds-American-Vice-President>

No authors listed. Smoking cessation and nicotine de-addiction products market | analysis & key trends 2023. OpenPR 2017. Available from: <http://www.openpr.com/news/717383/Smoking-Cessation-and-Nicotine-De-addiction-Products-Market-Analysis-Key-Trends-2023.html>

No authors listed. 22nd century technology is a “game changer”. Business Wire, 2017. Available from: <http://www.businesswire.com/news/home/20170823005257/en/22nd-Century-Technology-%E2%80%9CGame-Changer%E2%80%9D>

No authors listed. Tobacco industry faces bifurcation following FDA proposed regulation. The Hedge Connection, 2017. Available from: <http://hedgeconnection.com/blog/?p=8309>

No authors listed. Altria group’s statement on fda’s tobacco regulatory plan. Altria Group, Inc., 2017. Available from: <http://www.altria.com/Media/Press-Releases/Pages/PressReleaseDetails.aspx?reqID=2289943>

No authors listed. Big tobacco smoked after FDA takes aim on cigarette nicotine levels. Reuters, 2017. Available from: <http://www.reuters.com/article/big-tobacco-smoked-after-fda-takes-aim-o-idUSL5N1KJ62J>

No authors listed. “Learn how this plant biotechnology company is reducing the harm caused by cigarette smoking”. Stock News Watch, 2017. Available from: <http://www.stocknewswatch.com/xxii-profile/?gclid=CIONgLSx1tMCFQx7fgod3QsFFA>

No authors listed. New zealand study recommends 22nd century’s vln cigarettes as an effective tobacco control strategy. Business Wire, 2017. Available from: <http://www.businesswire.com/news/home/20170404005332/en/Zealand-Study-Recommends-22nd-Century%E2%80%99s-VLN-Cigarettes>

No authors listed. 22nd century accepted to present proprietary smoking cessation product at biochina partnering forum in zhuhai, China. Business Wire, 2017. Available from: <http://www.businesswire.com/news/home/20170425005978/en/22nd-Century-Accepted-Present-Proprietary-Smoking-Cessation>

No authors listed. Turning point brands to host fy2016 earnings conference call. Business Wire, 2017. Available from: <http://www.businesswire.com/news/home/20170301005401/en/Turning-Point-Brands-Host-FY2016-Earnings-Conference>

No authors listed. 22nd century granted FDA guidance meeting for x-22 smoking cessation aid. Business Wire, 2017. Available from: <http://www.businesswire.com/news/home/20170302005015/en/22nd-Century-Granted-FDA-Guidance-Meeting-X-22>

No authors listed. 22nd century's "non- or minimally-addictive" cigarettes gaining support of leading tobacco scientists around the world. Business Wire, 2017. Available from: <http://www.businesswire.com/news/home/20170330005421/en/22nd-Century%E2%80%99s-%E2%80%9CNon--Minimally-Addictive%E2%80%9D-Cigarettes-Gaining-Support>

Maloney J. Altria, anticipating FDA rule, is developing reduced-nicotine cigarettes. Fox Business, 2017. Available from: <http://www.foxbusiness.com/features/2017/11/02/altria-anticipating-fda-rule-is-developing-reduced-nicotine-cigarettes.html>

Lachapelle T. Tobacco's teflon gets tested. Bloomberg News, 2017. Available from: <https://www.bloomberg.com/gadfly/articles/2017-07-28/fda-cigarette-proposal-tests-teflon-tobacco-stocks>

Krauskopf L. S&p 500 dented by earnings; dow hits record high. Reuters, 2017. Available from: <http://www.reuters.com/article/us-usa-stocks-idUSKBN1AD1EI>

Koval R. FDA nicotine reduction plan announced today has promise, but timeline puts young lives at risk. Truth Initiative (American Legacy Foundation), 2017. Available from: <https://truthinitiative.org/news/fda-nicotine-reduction-plan-announced-today-has-promise-timeline-puts-young-lives-risk>

Haag A and Redington T. FDA provides positive and encouraging feedback for 22nd century's very low nicotine mrtpa filings. Business Wire, 2017. Available from: <http://www.businesswire.com/news/home/20170105005614/en/FDA-Positive-Encouraging-Feedback-22nd-Century%E2%80%99s-Nicotine>

Glantz S. Fda's "new" nicotine policy: A mixed picture that highlights the importance of local and state action to maintain progress. UCSF Center for Tobacco Control Research and Education, 2017. Available from: <https://tobacco.ucsf.edu/fda%E2%80%99s-%E2%80%9Cnew%E2%80%9D-nicotine-policy-mixed-picture-highlights-importance-local-and-state-action-maintain-progress>

Eriksen MP. Why lowering nicotine in cigarettes could change the course of health The Conversation 2017. Available from: <https://theconversation.com/why-lowering-nicotine-in-cigarettes-could-change-the-course-of-health-82241>

Edney A and Kaplan J. 8 million tobacco deaths could be avoided by slashing nicotine. Bloomberg, 2017. Available from: <https://www.bloomberg.com/news/articles/2017-10-19/8-million-tobacco-deaths-could-be-avoided-by-slashing-nicotine>

Edney A and Kaplan J. FDA targets cigarettes in broadening of fight against addiction. Bloomberg News, 2017. Available from: <https://www.bloomberg.com/news/articles/2017-07-28/fda-looks-to-cut-nicotine-in-cigarettes-to-non-addictive-level>

Edney A and Bjerga A. Tiny biotech's tobacco tinkering makes it a rare winner. Bloomberg, 2017. Available from: <https://www.bloomberg.com/news/articles/2017-08-04/tiny-biotech-s-tobacco-tinkering-makes-it-smoking-s-rare-winner>

Doss C. Uva researching reduced-nicotine cigarettes, looking for study participants. 2017. Available from: <http://wset.com/news/local/uva-researching-reduced-nicotine-cigarettes-looking-for-study-participants>

Craver R. 22nd century gets FDA authorization for low tar-to-nicotine cigarette clinical trial Winston-Salem Journal 2017. Available from: http://www.journalnow.com/business/business_news/local/nd-century-gets-fda-authorization-for-low-nicotine-cigarette-clinical/article_cdbbbf4c-0272-589d-8c40-ebf3edb7f04b.html

Beranac N. 7 facts about nicotine free herbal cigarettes. Insider Monkey, 2017. Available from: <http://www.insidermonkey.com/blog/7-facts-about-nicotine-free-herbal-cigarettes-590781/?singlepage=1>

Abcede A. Trump base may nix low nicotine. Convenience Store/Petroleum (CSPNet), 2017. Available from: <http://www.cspdailynews.com/category-news/tobacco/articles/trump-base-may-nix-low-nicotine#page=0>

Redington T and Haag A. 22nd century's very low nicotine cigarettes reduce smoking and are now associated with reduced alcohol use. Business Wire, 2016. Available from: <http://www.businesswire.com/news/home/20160628005078/en/22nd-Century%E2%80%99s-Nicotine-Cigarettes-Reduce-Smoking-Reduced>

No authors listed. 22nd century's very low nicotine cigarettes identified as an important public health tool to reduce smoking rates in new zealand New Zealand Doctor 2016. Available from: <http://www.nzdoctor.co.nz/un-doctored/2016/february-2016/10/22nd-Century%E2%80%99s-very-low-nicotine-cigarettes-identified-as-an-important-public-health-tool-to-reduce-smoking-rates-in-New-Zealand.aspx>

Haag A and Redington T. 22nd century's very low nicotine cigarettes significantly reduce withdrawal and craving symptoms in vulnerable population groups. Business Wire, 2016. Available from: <http://www.businesswire.com/news/home/20161020005415/en/22nd-Century%E2%80%99s-Nicotine-Cigarettes-Significantly-Reduce-Withdrawal>

Haag A and Redington T. 22nd century announces launch of very low nicotine magic cigarettes and extreme nicotine red sun cigarettes in Australia. Business Wire, 2016. Available from: <http://www.businesswire.com/news/home/20160406005813/en/22nd-Century-Announces-Launch-Nicotine-MAGIC-Cigarettes>

Haag A and Redington T. Fifteen scientific studies with 22nd century's reduced nicotine spectrum® cigarettes presented at the society for research on nicotine & tobacco 2016 annual meeting. Business Wire, 2016. Available from: <http://www.businesswire.com/news/home/20160310006023/en/Fifteen-Scientific-Studies-22nd-Century%E2%80%99s-Reduced-Nicotine>

Greber D. New 'low-nicotine' cigarette could help smokers kick habit. WKRN, 2016. Available from: <http://wkrn.com/2016/01/06/new-low-nicotine-cigarette-could-help-smokers-kick-habit/>

Blackwell T. Health Canada looks at forcing tobacco companies to make cigarettes less addictive. National Post 2016. Available from: <http://news.nationalpost.com/news/canada/health-canada-looks-at-forcing-tobacco-companies-to-make-cigarettes-less-addictive>

No authors listed. Very low nicotine cigarettes: A game-changer for the tobacco industry Business Wire, 2015. Available from: <http://www.businesswire.com/news/home/20150903005807/en/Nicotine-Cigarettes-Game-Changer-Tobacco-Industry#.VhxnTyuFmu9>

No authors listed. Low-nicotine cigarettes fail to sway smokers Bright Surf 2015. Available from: <http://www.brightsurf.com/news/headlines/112187/Low-nicotine-cigarettes-fail-to-sway-smokers.html>

Marchione M. Low-nicotine cigarettes cut use, dependence, study finds. NBC News, 2015. Available from: <http://www.nbcnews.com/health/health-news/low-nicotine-cigarettes-cut-use-dependence-study-finds-n436506>

Haag A and Redington T. 22nd century presents potential reduced exposure tobacco cigarettes at national tobacco science research conference. Business Wire 2015. Available from: <http://www.businesswire.com/news/home/20150924005743/en/22nd-Century-Presents-Potential-Reduced-Exposure-Tobacco#.Vhxm3yuFmu->

Haag A and Redington T. 22nd century group announces closing of \$6 million registered direct offering. Business Wire, 2015. Available from: <http://www.businesswire.com/news/home/20150602006992/en/22nd-Century-Group-Announces-Closing-6-Million#.Va4PzfmFmu->

12C.1 Rationale for reducing the level of nicotine in cigarettes

12C.2 Development of low nicotine cigarettes

Thompson, D. As low-nicotine cigarettes hit the market, anti-smoking groups press for wider standard. *Medical Xpress*, 2023. July 6, 2023. Retrieved from

<https://medicalxpress.com/news/2023-07-low-nicotine-cigarettes-anti-smoking-groups-wider.html>

12C.3 Effects of reduced nicotine content cigarettes on smoking and health

12C.4 Public health considerations in implementing a nicotine reduction policy