

To: Ministry of Health, Welfare, and Sport
Government of the Netherlands

From: Donald S. Kenkel, PhD & Alan D. Mathios, PhD
Cornell Brooks School of Public Policy
Department of Economics
Cornell University
Ithaca New York 14852 USA

Date: September 28, 2022

Subject: Consultation on regulation regulating e-cigarette flavors

Smoking combustible tobacco products is an important cause of death and disease in the Netherlands and worldwide. Evidence-based regulation of vaping, or electronic cigarette, products has the potential to reduce the harm that combustible tobacco causes to public health. In a review article on e-cigarettes, 15 past Presidents of the Society of Nicotine and Tobacco Research state that: “Many, including this article’s authors, believe that vaping can benefit public health, given substantial evidence supporting the potential of vaping to reduce smoking’s toll.”¹ The U.S. Food and Drug Administration recognizes the lower health risks of non-combustible tobacco products and has authorized the marketing of a brand of smokeless tobacco, a heated tobacco product, and some tobacco-flavored e-cigarettes as appropriate for public health due to the potential health benefits to smokers who uses non-combustible tobacco products to cut down or quit smoking.

We are submitting evidence on the potential impact of the Ministry of Health, Welfare, and Sport’s proposed regulation of e-cigarette flavors. We are academic economists with expertise in health policy and regulatory analysis related to smoking and other health-related behaviors. We are not policy advocates and we do not take a position in favor or against the proposed regulation. We are presenting preliminary findings from ongoing research that has not yet undergone peer review.

The goal of banning e-cigarette flavors other than tobacco is to make e-cigarettes less attractive to children and young people. However, e-cigarette regulation faces a possible policy tradeoff if the removal of flavors other than tobacco also reduces the appeal of e-cigarettes to adult smokers. The proposed regulation might have the unintended consequence to increase smoking or to decrease smoking cessation.

We are conducting cross-country research on how adult smokers make choices between smoking combustible cigarettes, vaping e-cigarettes, or quitting both. Although our study does not include

¹ Balfour, David J. K., Neal L. Benowitz, Suzanne M. Colby, Dorothy K. Hatsukami, Harry A. Lando, Scott J. Leischow, Caryn Lerman, Robin J. Mermelstein, Raymond Niaura, Kenneth A. Perkins, Ovide F. Pomerleau, Nancy A. Rigotti, Gary E. Swan, Kenneth E. Warner, and Robert West. 2021. “Balancing Consideration of the Risks and Benefits of E-Cigarettes.” *American Journal of Public Health*.

subjects from the Netherlands, we have from data from two European countries (Sweden and the U.K.), as well as the U.S. and four other countries. Our ongoing research on adult smokers in Sweden and the U.S., but not the U.K., provides evidence that the removal of flavored e-cigarettes will decrease e-cigarette use and tend to increase smoking combustible cigarettes. We conducted Discrete Choice Experiments (DCEs) across seven countries. In the DCEs, subjects were asked to make hypothetical choices between continuing to purchase their usual brand of cigarettes, an e-cigarette, or to quit smoking and vaping entirely. Our specific research findings include:

- In the DCE conducted with subjects from Sweden, we find that evidence that limiting the available flavors in e-cigarettes reduces the use of e-cigarette use and might increase the use of combustible cigarettes. Compared to scenarios where available e-cigarette flavors are tobacco, menthol, and fruit/sweet/candy, when only tobacco-flavored e-cigarettes are available subjects were 2.7 percentage points less likely to choose e-cigarettes and 1.7 percentage points more likely to choose combustible cigarettes. The estimated reduction in e-cigarette use is statistically significantly different from zero at conventional statistical confidence levels and corresponds to an 11 percent reduction in the sample proportion of subjects who chose e-cigarettes. The estimated increase in the use of combustible cigarettes is not statistically significantly different from zero.
- In the DCE conducted with subjects from the U.S., we find that evidence that limiting the available flavors in e-cigarettes reduces the use of e-cigarette use and increases the use of combustible cigarettes. Compared to scenarios where available e-cigarette flavors are tobacco, menthol, and fruit/sweet/candy, when only tobacco-flavored e-cigarettes are available subjects were 2.6 percentage points less likely to choose e-cigarettes and 2.1 percentage points more likely to choose combustible cigarettes. The estimated reduction in e-cigarette use is statistically significantly different from zero at conventional statistical confidence levels and corresponds to a 11 percent reduction in the sample proportion of subjects who chose e-cigarettes. The estimated increase in the use of combustible cigarettes is statistically significantly different from zero and corresponds to a 4 percent increase in the sample proportion of subjects who chose cigarettes.
- In the DCE conducted with subjects the U.K., we do not find strong evidence that limiting the available flavors in e-cigarettes reduces the use of e-cigarette use or increases the use of combustible cigarettes. Compared to scenarios where available e-cigarette flavors are tobacco, menthol, and fruit/sweet/candy, when only tobacco-flavored e-cigarettes are available subjects were 1.2 percentage points less likely to choose e-cigarettes and 0.4 percentage points more likely to choose combustible cigarettes. The estimates are not statistically significantly different from zero. For evidence-based regulatory policymaking, it is important to consider both statistical and practical significance. We interpret the results from our U.K. DCE as not providing strong evidence about the impacts of the availability of flavored e-cigarettes because at standard confidence levels our statistical estimates cannot rule out the possibility that the impacts are zero. At the same time, it should be noted that the 95 percent confidence intervals around our estimates also include larger impacts. For example, the 95 percent confidence interval around the estimate from our U.K. DCE includes the possibility that when only tobacco-flavored e-cigarettes are available, the probability of choosing e-cigarettes decreases by 4.0 percentage points.

- In the DCEs with subjects from Sweden, the U.S., and the U.K we find that higher cigarette prices reduce the use of combustible cigarettes and increase the probability that subjects choose e-cigarettes. We also find a general pattern that higher e-cigarette prices reduce the probability that subjects choose e-cigarettes and increase the probability that subjects choose cigarettes. The estimates that cigarette and e-cigarette demand is price-responsive are consistent with prior econometric research and tends to support the external validity of our DCE results. Our results suggest that higher cigarette taxes have the potential to discourage smoking and to encourage smokers to switch to less harmful e-cigarettes. Our results also suggest that higher e-cigarette taxes might have the unintended consequence of encouraging smoking.
- Our results contribute to a growing body of research that provides evidence that combustible cigarettes and e-cigarettes are economic substitutes.² Policies including flavor bans and e-cigarette taxes that make e-cigarettes less attractive tend to have the unintended consequence of increasing the use of combustible cigarettes. Our U.S. DCE results are consistent with other evidence from US studies that many adult smokers prefer flavored e-cigarettes and use them to quit smoking.³ Zare et al. (2018) undertake a systematic review of studies focused on consumer preferences for flavors and levels of nicotine content in e-cigarettes.⁴ They find, that for adults, flavors were an important consideration in e-cigarette use and that in the U.S. the most popular e-cigarette flavors, in descending order were fruit, menthol/mint and candy/chocolate/other sweet flavors. The systematic review identifies four studies focused on flavors and quitting. Two studies found menthol being perceived as having greater quit efficacy, while one study found that a combination of two or more flavors, mixed together, was more likely to support cessation. One study indicated flavors were associated with lower quit intentions.
- Because our data only include adult smokers, we are unable to estimate whether eliminating e-cigarette flavors other than tobacco would reduce youth use of e-cigarettes or might have the unintended consequence of causing more youth to use combustible cigarettes.

Additional Background on our Research

Our research has been produced with the help of a grant to Cornell University from the Foundation for a Smoke-Free World, Inc. (FSFW), a U.S. nonprofit 501(c) (3) private foundation. This study is, under the terms of the grant agreement with FSFW, editorially independent of FSFW. The FSFW had no role in the design and conduct of the study; collection, management, analysis, or interpretation of the data; preparation, review, or approval of the

² Cotti C, Courtemanche C, Maclean J C, et al. The effects of e-cigarette taxes on e-cigarette prices and tobacco product sales: Evidence from retail panel data. *Journal of Health Economics* 86 (2022).

³ Russell C, McKeganey N, Dickson T, Nides M. Changing patterns of first e-cigarette flavor used and current flavors used by 20,836 adult frequent e-cigarette users in the USA. *Harm Reduct J.* 2018;15(1):33. Friedman AS, Xu S. Associations of flavored e-cigarette uptake with subsequent smoking initiation and cessation. *JAMA Netw Open.* 2020; 3(6): e203826. Li L, Borland R, Cummings KM, et al. How does the use of flavored nicotine vaping products relate to progression towards quitting smoking? Findings from the 2016 and 2018 ITC 4CV Surveys. *Nicotine Tob Res.* 2021; ntab033; e-pub ahead of print February 25, 2021.

⁴ Zare S, Nemati M, Zheng Y (2018) A systematic review of consumer preference for e-cigarette attributes: Flavor, nicotine strength, and type. *PLoS ONE* 13(3): e0194145.

manuscript; decisions to submit results for publication; or the decision to submit this consultation. The contents, selection, and presentation of facts, as well as any opinions expressed herein are the sole responsibility of the authors and under no circumstances shall be regarded as reflecting the positions of FSFW. FSFW accepts charitable gifts from PMI Global Services Inc. (PMI), which manufactures cigarettes and other tobacco products. Under FSFW's Bylaws and Pledge Agreement with PMI, FSFW is independent from PMI and the tobacco industry.

The questionnaire was developed by Cornell University in consultation with the SSRS project team and included a Discrete Choice Experiment (DCE) across 7 different countries. The questionnaire was largely the same across countries. Differences by country mostly accounted for brands prevalent in each country, currency differences, price points, and terminology regarding e-cigarettes. Extensive checking of the program was conducted to ensure that skip patterns and sample splits followed the design of the questionnaire. The final sample sizes were 618 subjects for Sweden, 616 subjects for the U.K., and 1202 subjects for the U.S. The Swedish data were collected during the period November 29, 2021 to December 14, 2021; the U.K. data were collected during the period November 16, 2021 to December 4, 2021; and the U.S. data were collected during the period October 28, 2021 to November 15, 2021. All respondents were adult smokers.

The final DCE design consisted of 12 versions, all of which had specific combinations of product attributes/prices to be presented to each respondent. The program controlled which version the respondent would evaluate so that each version had a similar number of exposures across respondents. In the DCE experiment, respondents were presented with 12 tasks, each consisting of two steps. In each task, respondents viewed 2 nicotine products with descriptions of the products (one traditional cigarette and one e-cigarette). In the first step, respondents were asked which of these products they would choose. They also had the option to indicate that they would quit and choose neither of the products. In the second step, respondents were presented the same scenarios and asked which they would choose six months from now. Then they were presented with the remaining tasks and asked after seeing each task which choice they would make. The 24 choices (now and 6 months from now) collected from these 12 tasks across respondents enable us to analyze the trade-offs that respondents make and model the relative importance of each product feature to respondents' ultimate decision to select that option.

Choice attributes included the cigarette and e-cigarette product price, the nicotine content of the e-cigarette, the availability of e-cigarette flavors, and the warning message that was associated with the e-cigarettes. Each scenario included one of 3 possible attributes for cigarettes (1 of 3 cigarette prices, a nicotine content description, and a flavor description) and one of the 108 possible combinations for e-cigarettes (one of 3 e-cigarette prices, one of 3 nicotine content descriptions, one of 3 flavor availability descriptions, and one of 4 possible warning messages). For flavors, which is the focus of our comment, the 3 flavor availability descriptions were

E-cigarette flavor 1	Available flavors: tobacco, menthol, fruit/sweet/candy
E-cigarette flavor 2	Available flavors: tobacco and menthol
E-cigarette flavor 3	Available flavor: tobacco only

Our Expertise

We offer these comments based on our long-standing experience in health policy and regulatory analysis related to smoking and other health-related behaviors.

Expertise of Professor Kenkel

Professor Kenkel, Andrew Dickson White Professor at Cornell University, is an expert on the economics of tobacco. From 1997 on, he has received steady funding from the National Institutes of Health as a Principal Investigator (PI), (co-PI) or Investigator (I) on a series of ten tobacco research projects: An Economic Analysis of Student and Dropout Smoking (PI); An Economic Study of Three Decades of Smoking Cessation (PI); Smoking Cessation Among Older Americans (co-PI); Smoking Cessation and Advertising: An Econometric Study (co-PI); Econometric Study of Schooling, Information, and Smoking (PI); An Econometric Analysis of Cigarette Price Search and Tax Incidence (PI); Econometric Study of the Impact of Restaurant Smoking Bans on Consumer Behavior (PI); Econometric Analysis of Cigarette Purchases on Native American Reservations (PI); The Economics of Electronic Nicotine Delivery Systems: Advertising and Outcomes (Co-Investigator); and Econometric Research on Regulating Menthol Cigarettes and Smoking (PI); He has also received support from the Foundation for a Smoke Free World (FSFW) on three research projects: Economic Analysis of Hyperbolic Discounting and the EU Menthol Ban on Consumer Demand for Harm Reduction Products (PI); An Economic Study of Risk Perceptions and Consumer Demand for Harm Reduction Products (PI); and The Economics of Tobacco Harm Reduction: A Cross-Country Analysis (PI). In the past the research team received additional funding for their tobacco research through grants from the Robert Wood Johnson Foundation's Substance Abuse Policy Research Program. Since 2000, Professors Kenkel and his co-authors have published their research on the economics of tobacco in top peer-reviewed general-interest and field journals in economics as well as in interdisciplinary journals.⁵

⁵ See, DeCicca, Philip, Donald Kenkel, and Michael Lovenheim. (Forthcoming) "The Economics of Tobacco Control Regulations." *Journal of Economic Literature*; Kenkel, Donald, Sida Peng, Michael Pesko, and Hua Wang (2020). "Mostly Harmless Regulation? Electronic Cigarettes, Public Policy, and Consumer Welfare." *Health Economics* 9:1364–1377; Dave, Dhaval, Daniel Dench, Donald Kenkel, Alan Mathios, and Hua Wang (2020). "News that takes Your Breath Away: Risk Perceptions During an Outbreak of Vaping-related Lung Injuries." *Journal of Risk & Uncertainty* 60 (3) 281-307; Dave, Dhaval, Daniel Dench, Michael Grossman, Donald Kenkel, and Henry Saffer (2019). "Does E-Cigarette Advertising Encourage Adult Smokers to Quit?" *Journal of Health Economics* 68 (December); Kenkel, Don, Alan Mathios, and Hua Wang (2018). "Advertising and Health: A Case Study of Menthol Cigarette Advertising and Cigarette Demand." *American Journal of Health Economics* 4 (3): 263–286; Richards, Michael, Joachim Marti, Catherine Maclean, Jason Fletcher, and Donald Kenkel (2017). "Tobacco Control Policies, Medicaid Coverage, and the Demand for Smoking Cessation Drugs." *American Journal of Health Economics* 3(4): 528-549; Kenkel, Donald S (2016). "Healthy Innovation: Vaping, Smoking, and Public Policy"/ "Healthy Regulation." Point/ Counterpoint. *Journal of Policy Analysis and Management* 35 (2): 473-479/490 – 492; Pesko, Michael F, Donald S Kenkel, Hua Wang, and Jenna M Hughes (2016). "The Effect of Potential Electronic Nicotine Delivery System Regulations on Nicotine Product Selection." *Addiction* 111 (4): 734-744; Cutler, David M, Amber Jessup, Donald Kenkel, and Martha A Starr (2016). "Economic Approaches to Estimating Benefits of Regulations Affecting Addictive Goods." *American Journal of Preventive Medicine* 50 (5S1): S20 – S26; Maclean, J. Catherine, Asia Sikora and Donald Kenkel (2016). "Cigarette Taxes and Older Adult Smoking: Evidence from the Health and Retirement Study." *Health Economics* 25 (4): 424-438; Cutler, David M, Amber Jessup,

In addition to external funding and peer reviewed publications, Professor Kenkel's expertise on the economics of tobacco is recognized nationally and internationally. For an OECD publication he compared obesity control and tobacco control in a section titled "Are Health Behaviors

Donald Kenkel, and Martha A Starr (2015). "Valuing Regulations Affecting Addictive or Habitual Goods." *Journal of Benefit-Cost Analysis* 6 (2); DeCicca, Philip and Donald Kenkel (2015). "Synthesizing Econometric Evidence: The Case of Demand Elasticity Estimates." *Risk Analysis* 35 (6): 1073-1085; DeCicca, Philip, Donald Kenkel, and Feng Liu (2015). "Reservation Prices: An Economic Analysis of Cigarette Purchases on Indian Reservations." *National Tax Journal* 68 (1): 93-118. Jin, Lawrence, Don Kenkel, Feng Liu, and Hua Wang (2015). "Retrospective and Prospective Benefit-Cost Analyses of U.S. Anti-Smoking Policies." *Journal of Benefit-Cost Analysis* 6 (1):154 – 186; Kenkel, Donald, Maximillian Schmeiser, and Carly Urban (2014). "Is Smoking Inferior? Evidence from Variation in the Earned Income Tax Credit." *Journal of Human Resources* 49 (4): 1094-1120; DeCicca, Philip, Donald Kenkel, and Feng Liu (2013). "Excise Tax Avoidance: The Case of State Cigarette Taxes." *Journal of Health Economics* 32: 1130 – 1141; Kenkel, Don and Hua Wang (2013). "The Economics of Personalization in Prevention and Public Health." *Forum for Health Economics & Policy* 16 (2): 87 – 105; DeCicca, Philip, Donald Kenkel, and Feng Liu (2013). "Who Pays Cigarette Taxes? The Impact of Consumer Price Search." *Review of Economics and Statistics* 95 (2): 516-529. Cheng, Kai-Wen and Donald Kenkel (2010). "U.S. Cigarette Demand: 1944-2004," The B.E. *Journal of Economic Analysis & Policy* 10 (1) (Contributions), Article 78; Kenkel, Donald, Dean Lillard, and Feng Liu (2009). "An Analysis of Life Course Smoking Behavior in China." *Health Economics* 18: S147-S156; DeCicca, Philip, Donald Kenkel, and Alan Mathios (2008). "Cigarette Taxes and the Transition from Youth to Adult Smoking: Smoking Initiation, Cessation, and Participation." *Journal of Health Economics* 27 (4): 904-917; DeCicca, Phillip, Donald Kenkel, Alan Mathios, Yoon-Jeong Shin, and Jae-Young Lim (2008). "Youth Smoking, Cigarette Prices, and Anti-Smoking Sentiment." *Health Economics* 17 (6): 733-749; Avery, Rosemary, Donald Kenkel, Dean Lillard, and Alan Mathios (2007). "Private Profits and Public Health: Does Advertising Smoking Cessation Products Encourage Smokers to Quit?" *Journal of Political Economy* 115 (3): 447-481; Lillard, Dean, Vandana Plassman, Donald Kenkel, and Alan Mathios (2007). "Who Kicks the Habit and How They Do It: Socioeconomic Differences across Methods of Quitting Smoking in the USA." *Social Science & Medicine* 64; Avery, Rosemary, Donald Kenkel, Dean Lillard, and Alan Mathios (2007). "Regulating Advertisements: The Case of Smoking Cessation Products." *Journal of Regulatory Economics* 31 (2):185-208; Kenkel, Donald, Dean Lillard and Alan Mathios (2006). "The Roles of High School Completion and GED Receipt in Smoking and Obesity." *Journal of Labor Economics*: Special Issue in Honor of Mark Berger 24 (3): 635-660; Kenkel, Donald, Dean Lillard and Alan Mathios (2004). "A Cross-Country Analysis of Tobacco Control Policies and Smoking Over the Life-course." *Journal d'Economie Medicale* 22 (3): 131-143; Kenkel, Donald, Dean Lillard and Alan Mathios (2004). "Accounting for Misclassification Error in Retrospective Smoking Data." *Health Economics* 13: 1031-1044; Kenkel, Donald, Dean Lillard and Alan Mathios (2003). "Smoke or Fog? The Usefulness of Retrospectively Reported Information about Smoking." *Addiction* 98: 1307-1313; Kenkel, Donald, Dean Lillard and Alan Mathios (2003). "Tobacco Control Policies and Smoking Cessation: A Cross Country Analysis." Proceedings of the 2002 Fifth International Conference of German Socio-Economic Panel Study Users (GSOEP 2002) E. Holst, J. Hunt, and J. Schupp editors. Schmollers Jahrbuch (*Journal of Applied Social Science Studies*) 123 (1); Kenkel, Donald and Alan Mathios (2002). "Gateway Effects': Insights from Economics are Needed." Commentary on Andrew R. Morral, Daniel F. McCaffrey, and Susan M. Paddock, "Reassessing the Marijuana Gateway Effect." *Addiction* 97: 1505; DeCicca, Philip, Donald Kenkel, and Alan Mathios (2002). "Putting Out the Fires: Will Higher Taxes Reduce the Onset of Youth Smoking?" *Journal of Political Economy* 110 (1): 144-169; Kenkel, Donald, Alan Mathios, and Rosalie Pacula (2001). "Economics of Youth Drug Use, Addiction and Gateway Effects." *Addiction* 96 (1), Special Issue: 151-164; DeCicca, Philip, Donald Kenkel, and Alan Mathios (2000). "Racial Differences in the Determinants of Smoking Onset." *Journal of Risk and Uncertainty* 21 (2/3): 311-340.

Driven by Information?"⁶ In 2008 he provided testimony describing his NIH-funded research at a hearing on "The Role of Social Sciences in Public Health," Subcommittee on Research and Science Education, House Committee on Science and Technology, U.S. Congress. He reviewed research and co-authored a chapter on "Consumer Information and Tobacco Use" for a World Bank project.⁷ He served as a reviewer for two tobacco-related Institute of Medicine reports⁸ and a tobacco-related National Cancer Institute monograph.⁹ In October 2011 Professor Kenkel made an invited presentation to the FDA Roundtable on "Understanding the Economics of Tobacco Regulation." Most recently he served in the Federal government as a Senior Economist and then Chief Economist at the Council of Economic Advisors in the Executive Office of the President (2018-2020).

Professor Kenkel also has expertise in cost-benefit analysis of policies, especially policies that affect health. Much of the interest in these methods has been for regulatory impact analyses of federal regulations. Professor Kenkel's co-edited book became a standard reference for regulatory impact analyses conducted by the Office of Information and Regulatory Affairs, Office of Management and Budget.¹⁰ Professor Kenkel has made invited presentations about cost-benefit analysis at: a Workshop on Strengthening Benefit-Cost Methodology for the Evaluation of Early Childhood Interventions, National Academy of Sciences (2009), EPA Conference on Valuing Environmental Health Risks to Children (2003), Conference on Valuing Health Outcomes, sponsored by Resources for the Future and various federal agencies (2003), EPA Conference on Valuing Environmental Health Risks to Children (2003), EPA-sponsored workshop on Economic Valuation of Health for Environmental Policy: Assessing Alternative Approaches (2002), and on Valuing the Health Benefits of Food Safety, sponsored by the FDA, USDA, CDC, EPA, and others (2000). Professor Kenkel also served on the Executive Board and as President of the Society for Benefit-Cost Analysis. Finally, a common measure of research innovation is the H-index and number of citations. Professor Kenkel's H index is 39 with 7422 citations.

Expertise of Professor Mathios

Professor Mathios has a long and distinguished record analyzing the impact of health-related advertising and promotion on consumer health choices. His work on the impact of health-related advertising on consumer choice has been widely cited and published in a number of academic publications, Federal Trade Commission reports and has been cited by thousands in research and policy relevant publications.¹¹ Professor Mathios' expertise in the economics of tobacco

⁶ *Obesity and the Economics of Prevention* (2010, Sassi, editor)

⁷ *Tobacco Control in Developing Countries* (Oxford University Press 2000, Chaloupka and Jha, editors)

⁸ *Scientific Standards for Studies on Modified Risk Tobacco Products* (2012); Chapter 6 on "Tobacco" in the Institute of Medicine Report *Cancer Control Opportunities in Low- and Middle-Income Countries* (2007, Sloan and Gelband, editors)

⁹ Reviewer of the chapter on "The Impact of Information on Tobacco Demand" of the NCI monograph, *Economics of Tobacco Control* (2011 draft);

¹⁰ Tolley, George S, Donald S Kenkel, and Robert Fabian (1994). *Valuing Health for Policy* (University of Chicago Press, Chicago)

¹¹ Federal Trade Commission Staff Report by P. Ippolito and A. Mathios (1990). *Health Claims in Advertising and Labeling: A Study of the Cereal Market*, Bureau of Economics Staff Report to the Federal Trade

regulation is also reflected by the fact that he is a co-author on approximately half of the publications listed Footnote 7 and has been PI or co-PI on 5 of the NIH-supported projects described above. He is also Co-PI on the current FSFW project focused on the economics of harm reduction. Professor Mathios has expertise on the interface of industry and consumer choice. He was the Principal Investigator on the Merck Foundation grant entitled “Consumers, Pharmaceutical Policy, and Health” which was active between 2003-2010. A subset of that project was focused on the economics of smoking cessation.

Professor Mathios is also an expert on health communication and warning labels. He has been co-investigator on two large NIH/FDA projects related to tobacco and e-cigarette warning labels. These include: Constitutional Compliance, Credibility and FDA Regulated Tobacco Warning Labels; and The E-Cigarette Population Paradox: Testing Effects of Youth Targeted Population Warnings for E-Cigarettes Among Two Key Populations. Research from these projects has led to a large number of co-authored peer reviewed articles.¹² Professor Mathios’ H-index is 30 with 4,046 citations.

Commission and the follow-up report P. Ippolito and A. Mathos (1996) “Information and Advertising Policy, A Study of Fat and Cholesterol Consumption in the United States, 1977 - 1990,” Bureau of Economics Staff Report to the Federal Trade Commission. In addition to these staff reports there are a number of relevant journal publications including Mathios, A. (2000). “The Impact of Mandatory Disclosure Laws on Product Choices: An Analysis of the Salad Dressing Market, *Journal of Law and Economics*, 43 (2), 651-677; Ippolito, P., and Mathios, A. (1993). “New Food Labeling Regulations and the Flow of Nutrition Information to Consumers,” *Journal of Public Policy and Marketing*, 12 (2), 188-205; Ippolito, P., and Mathios, A. (1990). “Information, Advertising and Health Choices,” *RAND Journal of Economics*, 21 (3), 459-480.

¹² Jovanova, M., Skurka, C., Byrne, S., Kalaji, M., Greiner Safi, A., Porticella, N., Mathios, D. A., Avery, J. R., Dorf, C. M., Niederdeppe, J. (2021). “Should graphic warning labels proposed for cigarette packages sold in the United States mention the Food and Drug Administration?” *Nicotine & Tobacco Research*, 23 (2), 402-406; Katz, S.J., Byrne, S., Mathios, A.D., Avery, R.J., Dorf, M.C., Safi, A.G., & Niederdeppe, J. (2020). “Testing the Effects of Certain Versus Hypothetical Language in Health Risk Messages,” *Communication Monographs*, 87 (1), 47-69; Byrne, S., Greiner Safi, A., Kemp, D., Skurka, C., Davydova, J., Scolere, L., Mathios, A., Avery, R., Dorf, M., Steinhardt, J., Niederdeppe, J. (2019). “Effects of Varying Color, Imagery, and Text of Cigarette Package Warning Labels among Socioeconomically Disadvantaged Middle School Youth and Adult Smokers,” *Health Communication*, 34(3), 306-316; Skurka, C., Kalaji, M., Dorf, M., Kemp, D., Greiner Safi, A., Byrne, S., Mathios, A., Avery, R., Niederdeppe, J. (2019). “Independent or Synergistic? Effects of varying size and using pictorial images in tobacco health warning labels,” *Drug and Alcohol Dependence*, 198 (1), 87-94; Niederdeppe, J. Kemp, D., Jesch, E., Scolere, L., Greiner Safi, A., Porticella, N. A., Avery, R., Dorf, M., Mathios, A., & Byrne, S. (2018) “Using warning labels to counter effects of social cues and brand imagery in cigarette advertising,” *Health Education Research*, 34(1), 38-49; Skurka, C., Byrne, S., Davydova, J., Kemp, D., Greiner Safi, A., Avery, R., Dorf, M., Mathios, A., & Niederdeppe, J. (2018) “Testing competing explanations for graphic warning label effects among adult smokers and non-smoking youth,” *Social Science & Medicine*, 211, 294-303; Skurka, C., Kemp, D., Thrasher, JF. Byrne, S., Safi, A., Avery, R., Dorf, M., Mathios, A., Scolere, L., Niederdeppe J. (2017) “Effects of 30% and 50% Cigarette Pack Graphic Warning Labels on Visual Attention, Negative Affect, Quit Intentions, and Smoking Susceptibility among Disadvantaged Populations in the United States,” *Nicotine and Tobacco Research* 20 (7), 859-866; Byrne, S., Mathios, A., Avery, R. & Hart, P. S. (2012). “The Unintended Consequences of Disclosure: The Impact of Manipulating Sponsor Identification on the Perceived Credibility and Effectiveness of Smoking Cessation Advertisements,” *Journal of Health Communication*, 17 (10), 1119-1137; Byrne, S., Mathios, A., Niederdeppe J. & Katz, S (2012) “Do the Ends Justify the Means? A Test of Alternatives to the FDA Proposed Cigarette Warning Labels,” *Health Communications* 30 (7), 680-69.