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# Society for Research on Nicotine and Tobacco as an Outgrowth of the 1988 Surgeon General's Report on Nicotine Addiction: Reflections of the Early Presidents

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## Abstract

**Introduction:** The Society for Research on Nicotine and Tobacco began in the United States as a scientific organization “to stimulate the generation and dissemination of new knowledge concerning nicotine and tobacco in all its manifestations.” Now in its 30<sup>th</sup> year, the Society is taking on new challenges in tobacco control, nicotine vaping, product regulation, and public policy.

**Aims and Methods:** This Review describes the formative years of the Society from the perspective of researchers who were in leadership positions during that time, documenting how biobehavioral and clinical research in the first 10 years was a continuation of the scientific mission of the 1988 United States Surgeon General's Report on Nicotine Addiction and summarizing organizational innovations during each president's term of office.

**Conclusions:** The Society's promotion of scientific research served as a catalyst for funding, policy, and regulation, setting the stage for its influence and credibility.

**Implications:** This Commentary provides context and an overview of the scientific research and the organizational innovations that occurred during the early years of the Society for Research on Nicotine and Tobacco using publications and available documentation. The Society was able to thrive because biobehavioral research on nicotine addiction provided the scientific underpinnings for the tobacco control enterprise as a whole. The objective of this Commentary is to describe formative events in the Society's history based on the accomplishments of its early leaders.

## Introduction

The Society for Research on Nicotine and Tobacco (SRNT) began in the United States as a scientific society “to stimulate the generation and dissemination of new knowledge concerning nicotine and tobacco in all its manifestations.”<sup>1</sup> Starting with 100 charter members in 1994, the Society has grown into a global organization with 1077 members from 37 countries, with active regional affiliates in both Europe and Oceania; nearly 1200 people registered to attend its recent annual meeting in 2023. As the Society enters its 30th year and takes on new challenges in tobacco control, nicotine vaping, product regulation, and public policy, it seems timely to look back at the events that were set into motion by the 1988 Surgeon General's Report on Nicotine Addiction.<sup>2</sup>

This Review will describe how biobehavioral research on nicotine addiction by the early presidents of SRNT furthered the scientific mission of the 1988 Surgeon General's Report by conducting investigations with funding that was independent of the tobacco industry. Inspiration and the scientific zeitgeist were derived from the Surgeon General's Report. The research interests of the people who joined the Society early on were reflected in the interests of the officers they selected for leadership positions in the Society and the relationship was mutually reinforcing. With respect to the developmental innovations, the first presidents set the themes for plenary sessions at the Society's annual meetings and they encouraged individual members to take on projects to further the aims of the society; they also identified resources and designated specific committees to take on major initiatives. Under the

leadership of the first presidents, the collaborative research and organizational activities of the Society defined it and gave it momentum, providing the context for its success and pre-eminence as an organization.

The question might be raised as to how the Society transitioned from its initial biobehavioral focus to the incorporation of macro-level public health influences. The straightforward answer is that the Society, as a membership-driven organization, evolved in ways that reflected the collective interests of the individuals who joined. To the extent that the mission of the 1988 Surgeon General's Report to document the implications of nicotine as an addictive substance was realized, a broader purview of tobacco control was feasible. Additional research funding became available and governmental and regulatory agencies became more responsive to the need for tobacco control, leading to Food and Drug Administration (FDA) regulation for example. The greater inclusion of public health issues came about because biobehavioral and clinical research on nicotine addiction provided the scientific foundation for the field of tobacco control as a whole.

### Impact of the 1988 U.S. Surgeon General's Report on Nicotine Addiction Research

The 1988 Report was directed by Surgeon General C. Everett Koop under the aegis of Ron M. Davis at the Office on Smoking and Health. Dr. Koop proposed the topic in 1987 following the release of the 1986 National Cancer Institute (NCI)'s Report on Smokeless Tobacco which included a chapter on addiction by the National Institute on Drug Abuse (NIDA) concluding that "nicotine exposure from smoking cigarettes can cause addiction [and] that smokeless tobacco use can also be addictive."<sup>3</sup>

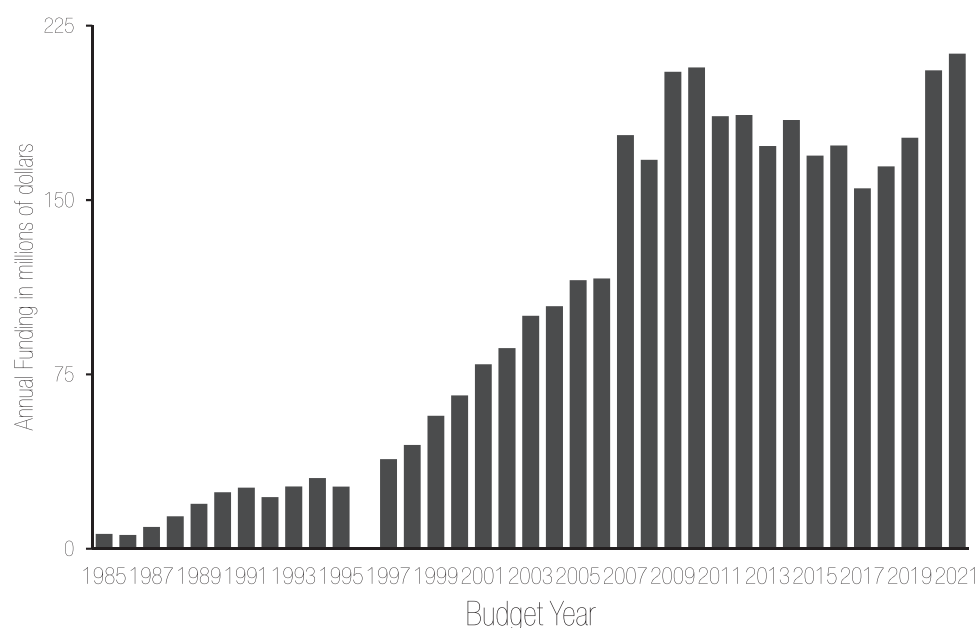
Dr. Koop and the director of the NIDA, William Pollin, determined that a full Surgeon General's Report was needed to address the relevant science to challenge the commonplace belief that smoking was not an addiction. Taking into account

the objective of guiding future research and public health policy, they received extensive input from NIDA staff to ensure scientific rigor and credibility—along the lines of prior reports on health consequences of smoking like cancer and heart disease that had been based on the expertise of the NCI and the National Heart, Lung, and Blood Institute (NHLBI). In addition to Ronald M. Davis as Senior Editor with Thomas E. Novotny and William R. Lynn as Managing Editors, four Scientific Editors—Neal L. Benowitz, Neil E. Grunberg, Jack E. Henningfield, and Harry A. Lando—were recruited to ensure coverage of pharmacological, psychosocial, and cognitive factors along with the treatment and prevention implications of conceptualizing tobacco use as a substance disorder.

Based on the credibility of this new information on the role of nicotine in smoking and tobacco use, NIDA substantially expanded its purview to include behavioral and neuroscience research on tobacco addiction. As shown in Figure 1, NIDA grant support for nicotine research increased dramatically afterward—approximately 3-fold by 1989, 4-fold by 1990, and 5-fold by 1994.

The rise in research funding stimulated scientific activity and related discourse on smoking and tobacco to such an extent by 1993 that these activities exceeded the scope of broadly focused organizations like the College on Problems of Drug Dependence, the American Psychological Association Psychopharmacology and Substance Use Division, or the Society of Behavioral Medicine—previous venues for nicotine addiction studies. Moreover, by providing a scientific basis for enhanced regulatory activity, the Surgeon General's Report prompted the FDA to conduct formal reviews of tobacco products to guide regulation of cigarettes and smokeless tobacco.<sup>4-6</sup>

In this rapidly evolving environment, Ovide F. Pomerleau, John R. Hughes, and John Rosecrans—building on enthusiasm for Nicotine Roundtable breakout sessions at the American Society for Addiction Medicine—initiated discussions with colleagues in 1993 about the feasibility of forming a new scientific society. As detailed in an earlier publication,<sup>1</sup> the



**Figure 1.** Estimates of annual nicotine and tobacco research funding—primarily extramural research grants—were provided by National Institute on Drug Abuse upon request by the authors and are based on title, terms, and abstract searches of projects listed within the NIH RePORTER system.

founders were “frustrated by general scientific meetings in which nicotine and tobacco research was a bit player as well as by meetings focusing on nicotine and tobacco in which the scientific method was a negligible concern.” The solution that emerged was to start a new, multidisciplinary society to “foster the exchange of scientific information on the biological, behavioral, social, and economic effects of nicotine and tobacco.”

What follows is a summary of research by the presidents around their time of office based on their peer-review publications and a brief description of organizational innovations during the time of each president using available documentation.<sup>1</sup>

## Research Themes and Organizational Developments in the First 10 Years of SRNT

### Ovide F. Pomerleau 1994–1995

#### Research Themes

As defined in the 1988 Surgeon General’s Report, the central element in drug addiction is that the user’s behavior is controlled by a psychoactive substance producing transient alterations in mood that are primarily mediated by effects in the brain.<sup>2</sup> Research conducted on the Nicotine Research Laboratory at the University of Michigan pursued this theme. Our earlier observations on nicotine stimulation of neuroregulators such as beta-endorphin<sup>7</sup> were extended to explorations of nicotine neuromodulation of pain and anxiety<sup>8</sup> and of pleasure.<sup>9</sup> Studies in smokers were also conducted on individual differences in nicotine sensitivity and metabolism,<sup>10,11</sup> on eating disorders,<sup>12</sup> on adult attention deficit disorder,<sup>13</sup> and on gender differences in difficulty quitting.<sup>14</sup> The research findings clearly supported the idea that cigarette smoking was based on nicotine addiction and that smoking was not just a habit or a “pleasant social custom.”

#### Organizational Development

The Bylaws for the Society were drafted and, in October 1994, the Society was officially incorporated. The first SRNT Newsletter was issued around this time and quickly became a vital resource. The first annual meeting of SRNT was convened in March, 1995, and Former US Surgeon General, Jesse Steinfeld, served as keynote speaker; an unexpectedly large number of researchers—222—attended the meeting in San Diego. SRNT held plenary meetings in the beginning in order to encourage attendees from a wide range of disciplines to be exposed to the methods and concepts underlying research on nicotine dependence.

### John R. Hughes 1995–1996

#### Research Themes

Research on nicotine dependence and withdrawal at the University of Vermont Center on Health and Behavior provided empirical tests for key hypotheses in the 1988 Report. An extensive review of the relationship between nicotine dependence and smoking prevalence around the world revealed that, in countries where smoking was broadly distributed in the population, nicotine dependence was low; in countries where smoking-cessation efforts eliminated mildly dependent smokers, the smokers who remained were more highly addicted.<sup>15</sup> Classic addiction research methods were utilized to characterize nicotine withdrawal and the efficacy of nicotine replacement (eg, nicotine polacrilex) in alleviating withdrawal

symptomology in several clinical trials.<sup>16,17</sup> Related themes included identifying predictors of relapse in smoking-cessation treatment<sup>18</sup> and recommendations for improving cessation outcomes in special populations such as smokers with comorbid psychiatric disorders like schizophrenia.<sup>19</sup> The public health benefits of reducing nicotine content in cigarettes were also broached.<sup>20</sup> Six trends influencing future smoking-cessation intervention were identified<sup>21</sup>: (1) the changing characteristics of smokers (2) demands for cost-effectiveness in health care, (3) the development of new treatment guidelines, (4) conceptualizing smoking as drug dependence, (5) the relevance of harm-reduction strategies for smokers unable or unwilling to quit, and (6) the feasibility of reimbursing smoking-cessation treatment. These research activities validated and extended the 1988 Report’s recommendations for reducing the health impact of tobacco smoking.

#### Organizational Development

The SRNT webpage and ListServe were designed and became operational at this time. NIDA issued a directive that, henceforth, it would support research on all drugs of abuse—legal and illegal, and these efforts came to fruition in March, 1995, when NIDA announced a request-for-applications for nicotine research for the first time in 10 years. The Association for the Treatment of Tobacco Use and Dependence (ATTUD), an organization of nicotine and tobacco treatment specialists and researchers was chartered to promote evidence-based tobacco treatment for the tobacco user and facilitate access to resources, organizations, and credentialed counselors. SRNT co-sponsored the conference, Smoking Cessation: Alternative Strategies at Johns Hopkins University, signaling the start of harm-reduction studies for tobacco control and the Society convened a conference to review the safety of nicotine as a medication for smoking cessation.

### Neal L. Benowitz 1996–1997

#### Research Themes

Clinical pharmacology studies conducted at the University of California San Francisco enhanced the understanding of the human pharmacology of nicotine in relation to addiction and its treatment, as well as the translation of pharmacology to public policy. Delivery, absorption, disposition kinetics, and metabolic effects of nicotine from different nicotine delivery devices, including nicotine gum, nasal spray, patches, and smokeless tobacco, were characterized.<sup>22–25</sup> Studies of the chronopharmacokinetics of nicotine showed that meals accelerated while sleep slowed nicotine metabolism.<sup>26</sup> Pharmacodynamic studies included determining the development of acute tolerance to various actions of nicotine and examining cardiovascular and hormonal effects of nicotine that were useful in assessing benefits versus harms of nicotine replacement therapy in patients with cardiovascular disease.<sup>22,27,28</sup> In 1994, Benowitz and Henningfield used human nicotine pharmacology data to propose a regulatory intervention to mandate a reduction of the nicotine content of cigarettes to reduce addictiveness, thereby reducing the likelihood of children becoming addicted smokers and to make it easier for established adult smokers to quit.<sup>29</sup>

#### Organizational Development

In 1996, the Society encouraged the Council of Scientific Affairs of the American Medical Association to advocate and support nicotine reduction as a regulatory intervention.<sup>30</sup>

SRNT sponsored a systematic review of Agency for Health Care and Policy Research guidelines for smoking-cessation therapy in 1997 and, in the same year, explored the possibility of publishing a scientific journal, leading to the establishment of *Nicotine & Tobacco Research* as the official publication of the Society.

### Maxine L. Stitzer, 1997–1998

#### Research Themes

The late 1990s were an exciting time in nicotine and tobacco research. There was already scientific recognition that smoking was a prototypic addictive behavior with nicotine as the underlying addictive substance. Research from the Hopkins laboratory provided groundwork for FDA regulation of nicotine in cigarettes by examining changes in smoking behavior as a function of nicotine levels in cigarettes.<sup>31,32</sup> Other research showed that smoking behavior could be modified using contingency management procedures to obtain reduction or cessation.<sup>33,34</sup> Tobacco control efforts grew apace and research was conducted on the impact of hospital smoking bans on the smoking habits of employees.<sup>35</sup> Other lines of research attempted to refine the delivery of nicotine replacement products<sup>36,37</sup> and to document the prevalence and the characteristics of smoking behavior in vulnerable populations such as drug users.<sup>38</sup> Finally, there was now sufficient understanding of effective intervention approaches to publish definitive clinical practice guidelines for smoking cessation, such as that sponsored by the Agency for Health Care Policy and Research.<sup>39</sup>

#### Organizational Development

The Society's first international meeting was convened in Copenhagen, Denmark in 1997 with a remarkable turnout of 500 attendees. SRNT became active in advocating the use of tobacco settlement monies to support research on nicotine addiction, tobacco control, and the health consequences of smoking and it provided input to the Clinton Administration's plans for legislation concerning the tobacco-industry settlement.

### Jack E. Henningfield, 1998–1999

#### Research Themes

The multidisciplinary approaches of the University of Minnesota Psychopharmacology Training Program, Johns Hopkins University, and NIDA provided the foundation for my contributions to the 1986 and 1988 Surgeon General's Reports and to the establishment of SRNT. Previous research findings had shown that tobacco addiction was more than nicotine tolerance or dependence and involved diverse "effects that may promote tobacco use," as described in the 1986 and 1988 Surgeon General Reports; this comprehensive view was factored into a subsequent regulatory proposal by the FDA.<sup>4</sup> SRNT's diversity-welcoming and inclusive approach to scientific participation catalyzed collaborations that rapidly advanced the Society's impact. These trends were flourishing around the time of my presidency<sup>40</sup> and provided momentum to my collaborative research and policy efforts.<sup>41–44</sup>

#### Organizational Development

The Society sponsored a highly successful conference, "Addicted to Nicotine," in conjunction with the NIDA, and the keynote address was delivered by U.S. Vice President Al Gore. SRNT also provided assistance to the NCI on their

Tobacco Research Implementation Plan, helping define the rationale for the forthcoming Transdisciplinary Tobacco Research Centers Program. Responding to coordination difficulties and longstanding professional management issues, the Board selected a new company, Thomas Miller Associates (now TRG), to replace Phoenix Professional Partnerships. A mark of later recognition is that by 2009—along with the Institute of Medicine—the Society was listed as one of the most influential organizations for regulating, promoting, and encouraging the development of innovative procedures and treatments for smoking.<sup>45</sup>

### Dorothy K. Hatsukami, 1999–2000

#### Research Themes

Building on previous research on nicotine dependence,<sup>46</sup> our University of Minnesota research team focused on tailoring pharmacological and behavioral treatments to subpopulations of tobacco users.<sup>47</sup> At the same time, our interest in tobacco harm-reduction approaches increased in recognition (1) that overcoming nicotine addiction was difficult for a significant number of people who smoke and (2) that there was uncertainty in the scientific literature on whether harm-reduction would lead to individual or public health benefit.<sup>48</sup> Stephen Hecht—an expert on tobacco-product toxicity and exposure biomarkers<sup>49</sup>—and I began a 'decades-long exploration of approaches for decreasing toxicant and carcinogen exposure in people who smoke cigarettes and smokeless tobacco users<sup>50</sup>; investigations were also conducted on the effects of reducing the nicotine content of cigarettes<sup>51</sup> and the impact of switching from cigarettes to noncombustible tobacco products.<sup>52</sup> As a whole, the research during this time contributed to the concept of a continuum of risk for tobacco products<sup>53</sup> and to the importance of imposing regulatory product standards.<sup>54</sup>

#### Organizational Development

SRNT was able to secure a recurring grant from NIDA in 1999 to defray some of the costs for annual meetings. This grant signaled the Society's shift from pharmaceutical industry support to greater reliance on funding from government and voluntary agencies. The Society also sponsored a Treatment Outcome Methodology report, an effort that eventuated in a compendium of articles on recommended methods. In June, 1999, the first issue of *Nicotine & Tobacco Research* was distributed to the membership and to libraries around the world. Also during this time, SRNT collaborated with the World Health Organization, the World Bank Organization, the Cochrane Tobacco Addiction Group, and the Centers for Disease Control to develop a new resource for the treatment of tobacco dependence using the internet, [www.treattobacco.net](http://www.treattobacco.net). This new portal provided access to a comprehensive database focusing on five critical aspects of tobacco-dependence management: efficacy, safety, economics, policy, and demographics/health effects. The Society's international expansion objectives were formalized with the creation of a Global Network Committee.

### William A. Corrigall, 2000–2001

#### Research Themes

Studies of the basic neuroscience of reinforcement at the Addiction Research Foundation in Toronto shifted to nicotine in the mid-1980s, leading to publication of a model of nicotine self-administration in laboratory rats.<sup>55</sup> This added to the evidence that nicotine per se was a typical addictive



substance—and equally relevant—the model provided a tool by which to discover the CNS mechanisms underpinning that addiction, exemplified by early studies of midbrain dopaminergic neurons.<sup>56,57</sup> The 1988 Surgeon General's report provided both license and impetus for a broader pursuit of basic science approaches. The laboratory in Toronto made some early progress to this end with studies of other CNS loci, neurochemical mechanisms, and nicotine receptor subtypes in reinforcement.<sup>58–60</sup> Real progress has since been made by numerous researchers to delineate the rewarding and aversive nicotine addiction-related processes.<sup>61–63</sup> SRNT provided access to an eclectic research community comprised of nicotine and tobacco scientists from a wide range of disciplines. First, this afforded the opportunity to integrate basic brain science into a broader framework; second, it facilitated learning from and participating in an exchange of information with other disciplines. Both contributed to my subsequent decision to accept a position at NIDA to facilitate its research agenda for nicotine and tobacco research.

### Organizational Development

A renewed emphasis was placed on enhancing the role and increasing the participation of basic science researchers in the Society. A byproduct of this effort was the development of preconference sessions at the annual meeting and the deployment of additional tracks to meet increased demand for specialized scientific presentations. The Society's Bylaws were modified extensively at this time to accommodate the inclusion of international affiliates; the changes included provisions for adding more Board members outside of North America and organizing new regional affiliates. The first affiliate, SRNT-Europe, was admitted later in the year.

### Kenneth A. Perkins, 2001–2002

#### Research Themes

The multidisciplinary nature of SRNT made it a primary outlet to disseminate results from the nicotine and smoking research programs at the Department of Psychiatry, University of Pittsburgh. First was the effort to translate preclinical (non-human) models to human behavioral testing of the ability to perceive the acute psychoactive effects of nicotine.<sup>64</sup> Key findings documented: (1) the threshold for doses required to detect nicotine effects<sup>65</sup> thus identifying lower doses that could not be perceived—a finding of potential relevance to nicotine product regulation,<sup>66</sup> and (2) CNS mediation of nicotine discrimination,<sup>67</sup> confirming that perception of the stimulus effects of nicotine in the brain was critical to the reinforcement of its use. A second program explored consequences of chronic nicotine tolerance on dependence<sup>68</sup> and found that nicotine dosage-choice prior to quitting predicted smoking persistence during initial quit attempts.<sup>69</sup> Another research theme identified sex differences in the relative influence of acute nicotine versus non-nicotine (eg, sight, smell) effects of tobacco smoking, findings with potential implications for aiding cessation in women versus men.<sup>70</sup> Overall, our research confirmed the idea that perception of the stimulus effects of nicotine per se is critical to its reinforcement value.<sup>71</sup>

### Organizational Development

At this point in time, SRNT had largely fulfilled its goal to serve as the meeting place of choice and the principal center of communication for nicotine/tobacco scientists around the

world. Electronic distribution of the Newsletter began during the year and the SRNT Website was further improved. The Board made the decision to hold an annual meeting outside of the US, and Prague in the Czech Republic was chosen as the venue for the 2005 meeting. In response to concerns from the membership, the Society's journal, *Nicotine & Tobacco Research*, released an official position statement requiring full disclosure of conflicts of interest from authors as a way of addressing the problem of potential bias from tobacco-industry funding for research.

### Harry A. Lando, 2002–2003

#### Research Themes

A major implication of the 1988 Surgeon General's Report was that, despite its addictive nature, tobacco dependence can be treated successfully. Tobacco-dependence treatment was a major emphasis of my research group in the School of Public Health at the University of Minnesota. The Surgeon General had noted that much of the prior work on tobacco dependence was limited in clinical application and that only a few studies had addressed the pharmacological determinants of tobacco use.<sup>72</sup> An increased understanding of the addictive properties of nicotine was expected to lead to improved treatment approaches and members of SRNT were instrumental in taking up this challenge. Clinical practice guidelines were commissioned by the Department of Health and Human Services, and SRNT members were well represented in the guideline panels.<sup>73</sup> Nicotine replacement therapy became part of treatment practice, followed later by the use of bupropion and varenicline. Our investigations, informed by increased recognition of environmental influences and interventions, were directed not only at helping individuals<sup>74,75</sup> but also populations.<sup>76–81</sup> Public health and policy professionals joined SRNT in increasing numbers. Taking into account the global nature of the tobacco epidemic, SRNT undertook initiatives to expand its membership in low- and middle-income countries.

### Organizational Development

While plenary meetings were a feature of the early years of the Society to expose attendees from different disciplines to basic concepts underlying nicotine addiction mechanisms, by 2003, multi-track presentations were now required to accommodate all the different specialties and interests, and new formats such as Rapid Communications, Theme and Award Lectures, New Investigator Papers, Current Issue Debates, and Workshops for young investigators were added to the annual meetings. Of paramount importance, the first 10 years provided a tradition by which respect for the scientific method was fostered and procedures by which threats to the integrity of the organization were addressed and resolved in a regular and open manner.

### Conclusion

The Society for Research on Nicotine and Tobacco came into being as a scientific organization stimulated by enhanced support for biobehavioral research on nicotine addiction, primarily from the NIDA and to a lesser extent from the NCI. Early presidents of the Society explored areas identified in the 1988 Surgeon General's Report in parallel with other members of the Society, helping consolidate the Report's scientific mission. The presidents promoted organizational innovation and

provided leadership for critical decisions during their terms in office. From its first meeting, SRNT served as a catalyst for research policy and fostered extensive involvement with NIDA, NCI, the FDA, and the Centers for Disease Control. In conjunction with the Society's promotion of scientific research, collaborative activities provided the basis for its influence and credibility.

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John R. Hughes was unable to participate as an author on this Review. A sample of some of his research publications during the time he was in office has been included to commemorate his contributions and leadership as the second president of SRNT.

## Declaration of Interests

Ovide F. Pomerleau. No conflicts of interest. Neal L. Benowitz. Dr. Benowitz has been a consultant to pharmaceutical companies that market or are developing smoking-cessation medications, and has been an expert witness in litigation against tobacco companies. Maxine L. Stitzer. Dr. Stitzer has served as a consultant to PEAR Therapeutics and DynamiCare Health, two companies that have developed and marketed phone apps for delivery of substance abuse treatment. Jack E. Henningfield. Jack Henningfield is an employee of PinneyAssociates, Inc. which provides scientific and regulatory consulting support for new drug applications for CNS-active drug products including psychedelic substances, new chemical entities, alternative formulations, as well as dietary ingredient notifications, and cannabinoid assessment. In addition, PinneyAssociates provides consulting services to advance tobacco harm reduction on an exclusive basis for JUUL Labs, Inc. Dr. Henningfield also provides expert witness testimony on behalf of JUUL. Dr. Henningfield received no financial support for writing this article and no external commercial interests had any input. Dorothy K. Hatsukami. No conflicts of interest. William A. Corrigall. No conflicts of interest. Kenneth A. Perkins. No conflicts of interests. Harry A. Lando. No conflicts of interests.

## Author Contributions

Ovide Pomerleau (Conceptualization [Equal], Writing—original draft [Equal], Writing—review & editing [Equal]), Neal Benowitz (Writing—original draft), Maxine Stitzer (Writing—original draft [Supporting]), Jack Henningfield (Conceptualization [Equal], Writing—original draft [Equal]), Dorothy Hatsukami (Writing—original draft [Equal]), William Corrigall (Writing—original draft [Equal]), Kenneth Perkins (Writing—original draft [Equal]), and Harry Lando (Writing—original draft [Equal])

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