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Conference on Abuse Liability and Appeal of Tobacco Products: Conclusions and Recommendations*

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Abstract

The rate of initiation and progression to dependence and premature mortality are higher for tobacco products than for any other dependence producing substance. This is not explained simply by the addictiveness (“abuse liability”) or by enticing product designs (“product appeal”) alone, but rather by both of these factors in combination with marketing and social influences that also influence “product appeal”. A working meeting of leading experts in abuse liability (AL) and product appeal was convened to examine how these disciplines could be more effectively applied to the evaluation of tobacco products for the purposes of regulation that would include setting standards for designs and contents intended to reduce the risk of initiation and dependence. It was concluded that abuse liability assessment (ALA) is a validated approach to testing pharmaceutical products but has not been extensively applied to tobacco products: such application has demonstrated feasibility, but special challenges include the diverse range of products, product complexity, and the absence of satisfactory placebo products. Consumer testing for product appeal is widely used by consumer products marketers as well as by researchers in their efforts to understand consumer product preferences and use but has not been extensively applied to tobacco products except by the tobacco industry. Recommendations for testing, methods development, and research were developed. A major recommendation was that tobacco products should be tested for AL and product appeal, and the results integrated and evaluated so as to more accurately predict risk of initiation, dependence, and persistence of use.

*A list of the conference participants can be found as supplementary material by accessing the online version of this paper at <http://dx.doi.org> and entering doi:...

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Keywords

Tobacco; Nicotine; Abuse Liability; Abuse Potential; Addiction; Dependence; Formulation; Ingredients; Dose; Consumer; Product; Appeal; Marketing; Policy; Nicotine Delivery

1. Introduction

Use of tobacco products is driven by their appeal or attractiveness to potential consumers and sustained by their pharmacological addiction or dependence potential (Food and Drug Administration, 1995, 1996; World Health Organization, 2007). Addiction potential and product appeal vary widely among tobacco products and can be manipulated by their design, manufacture, and marketing (Food and Drug Administration, 1995, 1996; Hilts, 1996; Hurt and Robertson, 1998; Kessler, 2001; Slade et al., 1995; World Health Organization, 2001, 2007). Pharmacologically-based addictiveness is typically referred to as abuse liability (AL) or abuse potential, and testing procedures for quantifying these properties are referred to as ALA or abuse potential assessment* (Expert Panel, 2003; Schuster and Henningfield, 2003; Schuster et al., 2009; Food and Drug Administration, 2010a). ALA methods have evolved over approximately one half a century in efforts to understand and control drug addiction and to provide the science foundation for the regulation of addictive drugs including how drugs should be formulated, labeled, and marketed (Balster and Bigelow, 2003; Expert Panel, 2003; Food and Drug Administration, 2010a; Grudzinskas et al., 2006; Schuster and Henningfield, 2003).

The appeal or attractiveness of products to potential and current consumers is often referred to as “consumer appeal,” “product appeal,” or “product attractiveness,” and is related to a broad range of factors. These include the following: the sensory characteristics of products including taste, smell, or other sensory effects; advertising and promotion efforts; image; cost; the targeted population; positioning among other products; and statements in the form of claims and warnings related to benefits and risks which can increase or decrease product appeal respectively (National Cancer Institute, 2008; Rees et al., 2009; Slovic, 2001; Food and Drug Administration, 2010b).

Tobacco companies integrate both the pharmacologically addicting potential of their products and factors modulating consumer appeal into the design, manufacture, and marketing of their products to increase the population prevalence, volume of use, and market share (Food and Drug Administration, 1995, 1996; World Health Organization, 2001, 2007). Outside of tobacco companies, however, experts in addiction and experts in product appeal do not commonly collaborate and they tend to utilize differing theoretical models and methods. Yet it is becoming increasingly evident that progress in understanding the determinants of tobacco product use and in developing more effective interventions to control tobacco product use will require concerted collaboration among experts in abuse liability and experts in product appeal.

These issues are of global relevance in efforts to control tobacco use and reduce tobacco-attributable morbidity and mortality as discussed in the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) (World Health Organization, 2005). The WHO Tobacco Product Regulation Study Group has acknowledged the

*The terms “abuse liability” and “abuse potential” are often used interchangeably, with some organizations and individuals seeming to prefer one term over the other. However in some publications, abuse potential refers to a focus on the pharmacologically based potential for abuse, whereas abuse liability includes some non pharmacological determinants of abuse and/or the risks or liability of abuse. In the present conference and report, the broader term “abuse liability assessment” is used to describe the pharmacologically determined risk of abuse as well as the risk of harm resulting from abuse.

importance of the assessment abuse liability (“dependence potential”) and consumer product appeal in developing policies and regulations to reduce tobacco use and associated disease (World Health Organization, 2007). In 2010, The Fourth Conference of the Parties to the WHO FCTC discussed the urgency of developing guidelines for tobacco product regulation for “reducing tobacco-attributable disease and premature death by reducing the attractiveness of tobacco products, reducing their addictiveness (or dependence liability) or reducing their overall toxicity.” (Conference of the Parties, 2010, p. 5). The European Union has also recognized the urgency of progress in this area and, in 2010, finalized a report concluding that there is a need to develop specific criteria and methods for assessing “addictiveness” and “attractiveness” of tobacco products (Scientific Committee on Emerging and Newly Identified Health Risks, 2010).

In the United States, the enactment of the Family Smoking Prevention and Tobacco Control Act (hereafter referred to as the “Tobacco Control Act” or the “Act”) has increased the urgency for advances in the ability to identify and quantify factors that increase product use and addictiveness, regardless of whether those factors are pharmacological, or based on product marketing, product flavoring or other factors (United States Congress, 2009). The Act requires the FDA to consider “initiation,” “dependence,” “cessation,” and “effects on the population” in the development of regulations and standards to control the contents and emissions from tobacco products, as well as in the evaluation of new products and in the evaluation of potential claims for putative modified risk tobacco products. The FDA cannot simply evaluate products by their impact on individuals who continue to use the product but must also evaluate the potential impact at the population level on factors such as the risk of dependence development (United States Congress, 2009).

A major challenge to reducing tobacco-attributable disease and death, therefore, is to identify and apply the relevant science from the realm of ALA to the new world of science-based tobacco product regulation. This report is intended to serve WHO in its efforts to guide implementation of the FCTC, and the United States FDA, the European Union and other governmental organizations in their efforts to regulate tobacco products. The report is also intended to serve scientists and research funding organizations by identifying areas in which research is needed to more effectively regulate tobacco products.

The Conference on the Abuse Liability and Appeal of Tobacco Products brought together leading experts from addiction science and drug and tobacco product regulation with experts in the psychology of product perception, product appeal, and marketing. Members of the program planning committee, which included the funders, sponsors, and organizers of the conference, identified presenters who were primarily non-industry scientists and participants who represented a breadth of disciplines. The program planning committee members were asked to provide advice as to the structure of the program, topics to be covered, and to recommend experts to provide the most authoritative, insightful, and balanced perspectives. The program is shown in Table 1; the program planning committee is listed in the Acknowledgements; the complete listing of participants is provided in the Supplemental Materials. The goal of the conference was to address challenges in the development of recommendations to more effectively control and regulate tobacco products based on a better understanding and application of the science of ALA and the science of product appeal assessment. The financial and institutional sponsors and program committee for the conference are listed in the Acknowledgements. The state of the science, the applicability and limitations of extant methods of product assessment, and research needs were presented through background papers, presentations, and panels of experts as summarized in Table 1.

2. Background

Abuse liability assessment of new medications and potentially addicting substances is a well developed area of science and is relied upon for providing the science foundation for drug regulation, including regulation of nicotine and non-nicotine containing medications for treating tobacco dependence (Expert Panel, 2003; Grudzinskas et al., 2006; Houtsmuller et al., 2002; Houtsmuller et al., 2003; Johanson et al., 2009; Pickworth et al., 1996; Schuh et al., 1997; Schuster and Henningfield, 2003; Sellers and Johanson, 2006), as well as to evaluate the addictiveness of tobacco itself (Food and Drug Administration, 1996; United States Department of Health and Human Services, 1988). In fact, the tobacco industry has used many of the same methods to assess potential determinants of use and addiction to its products in its product development efforts (DeNoble and Mele, 2006; Farone, 2004; Food and Drug Administration, 1995, 1996; Henningfield, 2004; Kessler, 2001; United States District Court for the District of Columbia, 2006). Nonetheless, as compared to medications, considerably less experience exists in the application of ALA to tobacco products (Carter et al., 2009).

In brief, ALA is accomplished through a combination of laboratory based procedures to determine the pharmacological activity of a substance in assays for various correlates and contributors to abuse and/or dependence. These include studies that can determine the physiological site and molecular mechanism of action including which neurotransmitters might be modulated (e.g., dopaminergic or serotonergic), animal and human studies of the ability to produce CNS-mediated discriminative (“psychoactive”) effects, and to characterize the qualitative nature of the effects (e.g., stimulant like, sedative like or opioid like), animal and human studies of the reinforcing (“rewarding”) effects of the substance, and the ability of the substance to produce tolerance and physical dependence such that withdrawal symptoms are evident upon abrupt discontinuation of intake of the substance (Carter and Griffiths, 2009, Drug Enforcement Administration, 2010; Expert Panel, 2003; Food and Drug Administration, 2010a). Such research and testing is required by the Food and Drug Administration and the Drug Enforcement Administration (DEA), and the World Health Organization Expert Committee on Drug Dependence for evaluating the addictiveness of substances in order to make recommendations for controlled substance scheduling (Drug Enforcement Administration, 2010; Food and Drug Administration, 2010a; Spillane and McAllister, 2003).

Several types of tobacco products, and many nicotine delivering medicines, have been studied using such methods; however, tobacco products pose special challenges compared to most medications (Carter et al., 2009). These challenges include the rapidly changing nature of tobacco products, the interactions of the complex mixture of constituents in the tobacco product and in smoke emissions, the importance of ingredients (e.g., menthol) to modify the taste and sensory feel in product use, and the influence of product design on the delivery of nicotine, other reinforcing constituents, and sensory experiences (Wayne and Carpenter, 2010; Okuyemi et al., 2010).

Furthermore, although non pharmacological factors are important determinants of use, abuse, and addiction to drugs, such factors take on even greater importance as determinants of use and addiction to tobacco products, and many of these factors have been intentionally employed by the tobacco industry to spread use and increase addiction to their products (Food and Drug Administration, 1995, 1996; United States District Court for the District of Columbia, 2006). Such factors are not included in traditional ALA; they involve product packaging, labeling, advertising and other promotional efforts, product claims, consumer perceptions, product acceptability, ease of use, and the cost and accessibility of the product. These are often referred to as factors affecting consumer product appeal and/or

attractiveness (World Health Organization, 2007), and they can have important effects on the population impact of tobacco use. Pierce et al. (2010), for example, concluded that RJ Reynolds' bright pink advertising and promotion for its brand, Camel No. 9, may have effectively targeted adolescent girls and increased smoking uptake in this under-aged group.

Based on a review of the literature of ALA as applied to tobacco products under a National Cancer Institute contract, including Potential Reduced Exposure Products (Carter et al., 2009), it became evident that there are many methodological issues that need to be addressed in the evaluation of tobacco products for AL. These issues are receiving increased attention in the evaluation of pharmaceuticals. The concept of addressing nonpharmacological determinants of the potential use and abuse of products that contain an abusable substance was also addressed in an earlier CPDD conference (Grudzinskas et al., 2006). Several laboratories engaged in ALA have begun to develop scientific methods for evaluating opioid analgesics for both pharmacologically conferred AL and product perception related influences on appeal and attractiveness, demonstrating the potential value of combining these approaches (McColl and Sellers, 2006). Bringing together these two worlds of science and methodology as they relate to tobacco was a major goal of the conference.

In the course of the conference, many fundamental conclusions emerged concerning the state of the science, the challenges, gaps in knowledge, and the applicability and limitations of extant methods for assessing tobacco product AL and appeal. The participants were also asked to develop recommendations to support progress in the further refinement and conduct of AL research and testing. Recommendations which are related primarily to application of methods, research, and regulatory issues also emerged. This report represents a good faith effort by the authors of this paper to reflect what emerged at the conference based on the presentations and discussions that took place. Papers for each presentation and PowerPoint presentations are available on the CPDD and Society for Research on Nicotine and Tobacco (SRNT) websites (www.cpdd.org; www.srnt.org).

3. Conclusions

3.1

Laboratory based ALA using human and non-clinical testing protocols has been shown to have good predictive ability for real world abuse of drugs acting on the central nervous system as evidenced by the utility of such methods in guiding the regulatory control of various opioids, sedatives, and stimulants, in accordance with their potential for abuse and dependence (cf. Expert Panel, 2003; Food and Drug Administration, 2010a; Johanson et al., 2009).

3.2

Product appeal can be scientifically evaluated according to standardized protocols in laboratory and non-laboratory settings through sensory and subjective assessments of consumer risk perceptions, responses to products, and product acceptability, and such methods are routinely used in product development for new foods, beverages, detergents, and other consumer goods, as well as for new tobacco products (Rees et al., 2009; Slovic, 2001).

3.3

Abuse liability of a product is most accurately achieved by using multiple tests for its evaluation. Tests may include analysis of constituents and product design factors associated

with potential for addiction, animal studies, human laboratory and clinical trials, and surveillance (Carter et al., 2009).

3.3.1—Tobacco products are complex formulations that make ALA a multifaceted undertaking that may involve assessment of several pharmacologically active constituents (e.g., nicotine, acetaldehyde, anabasine, and nornicotine) in some products as well as contents that could influence nicotine delivery speed and efficiency (e.g., buffering agents) and design features that influence nicotine release and the formation of unprotonated nicotine (e.g., tobacco cutting size and ventilated filters) (Carter et al., 2009).

3.3.2—Nicotine is considered to be the primary addictive agent in tobacco and can exist in different forms that may vary in pharmacological activity. Specifically, unprotonated nicotine (also known as “free nicotine”), unlike the protonated form, is more likely to migrate into the gas phase and is highly lipophilic; it also more readily moves across the mucosal membranes and reaches nicotinic receptors faster than protonated nicotine (Hoffman and Hoffman, 2010; Wayne et al., 2006). Unprotonated nicotine levels may be altered by pH and by design features such as filter ventilation (Ashley et al., 2009; Watson et al., 2004).

3.3.3—It was suggested that non-nicotine constituents including, but not limited to acetaldehyde, MAO inhibitors, minor alkaloids (e.g., nornicotine, anabasine, anatabine) (Benowitz et al., 2006; Hoffman and Hoffman, 2010), and menthol might also contribute to AL through various actions such as stimulation of trigeminal neurons in addition to or instead of central nervous system effects (Megerdichian et al., 2007; Wayne and Carpenter, 2010; Wayne et al., 2004).

3.3.4—Abuse liability might also be influenced by ingredients and design features that facilitate the inhalation and absorption of nicotine into the lung by reducing harshness of the smoke, such as by filter ventilation and smoke “smoothing” and throat “soothing” smoke constituents such as menthol (Ashley et al., 2009; Okuyemi et al., 2010; Wayne and Carpenter, 2010). Nicotine dosing flexibility or elasticity may also contribute to AL by enabling easy or even inadvertent absorption of substantially higher nicotine dosages than labeled or intended by the product user.

3.4

Post marketing surveillance will be critical to measure the population impact of marketing new or modified risk products on initiation, maintenance, and cessation of use of existing tobacco products, as well as on the use patterns of the new products (Stratton et al., 2001).

3.4.1—Current national surveys do not provide timely information to rapidly detect problems and guide interventions, and they do not provide sufficient detail to assess specific tobacco products. Factors that should be considered for tobacco product surveillance include timeliness, geographic specificity, product and brand specificity and population specific issues such as youth initiation, adult cessation versus substitution and dual use of products, targeting of minority and vulnerable populations, undermining of tobacco control policies, product tampering, and accidental poisoning.

3.4.2—Experience with tobacco and prescription drugs shows that surveillance may need to incorporate multiple and diverse approaches for assessing product effects on the population in order to provide both quantitative and qualitative data in a timely manner. These can include commercial marketing data, mall intercept and other opportunistic sampling studies,

internet surveys, health provider surveys, school and college surveys, and surveillance data from poison control centers (Dart, 2009; Dasgupta and Schnoll, 2009).

3.5

Product appeal is increasingly recognized as vital to understanding and predicting real world substance abuse in general. It is also vital to assess and integrate product appeal with traditional ALA for tobacco products.

3.5.1—A consumer's decision to use a product is based on both the perception of and response to the product (Rees et al., 2009). Product perception encompasses knowledge, attitudes, beliefs, risk perceptions, benefit perceptions, and affective associations with the product. Product response includes sensory and subjective effects from the product. Each construct interacts and influences the other.

3.5.2—Decisions (e.g., to use a product or to discontinue use) are processed using two different modes of thinking: an affective and experiential mode, and a deliberative and analytic one (Slovic et al., 2004). Affect towards a tobacco product may be manipulated by brand images, packaging, marketing, and advertising messages such as tobacco advertising associating tobacco brands with health and sex as compared to disease and premature death. Deliberative thinking can include assessment of product contents, specific health risks, and other factual information. Marketing, which emphasizes affective processing, is an important factor that can influence product appeal, and plays a key role in producing the exposure to pharmacological effects that can lead to addiction. Strategies have been developed by tobacco companies to appeal to new users and to discourage health-concerned smokers from quitting, and the effects of these strategies can be scientifically evaluated.

3.5.3—Market segmentation, the targeting of specific products to the most vulnerable or receptive subpopulations, increases the risk of developing addiction by appealing to an individual's desire for acceptance. Market segmentation is a basic tool used by the tobacco companies to define a target market by dividing a mass audience into specific targets based on demographics, geography, product use patterns, or psychographics (Ling and Glantz, 2002; Smith, 1956). "Psychographics" involve targeted marketing tailored to attitudes, wants, needs, and lifestyle of different segments of the population. Market segmentation may increase the risk of developing addiction in the population by targeting specific products to the most vulnerable or receptive populations.

3.5.4—Exposure to cigarette advertising and portrayals of tobacco use in the popular media such as movies encourages smoking initiation escalation and continuation (National Cancer Institute, 2008). The encouragement of adolescents to experiment with tobacco products leads in turn to the development of dependence in about 30-50% of those who begin to smoke (Food and Drug Administration, 1995, 1996; National Cancer Institute, 2009; United States Department of Health and Human Services, 1994). Promotional strategies used by the tobacco industry to appeal to youth are diverse and have included aspirational brand imagery, placement (e.g., sport sponsorship, magazines with youth readership, placement in movies and television, music, point of sale advertising, direct mail, and internet), packaging design, sampling, and relationship marketing (methods to build long term relationships with customers) (National Cancer Institute, 2008).

3.5.5—Tobacco product marketers use strategies to discourage cessation such as psychographic targeting, psychological appeals, advertising or packaging that communicates that a product is safer, and marketing that includes viral and relationship-based strategies

(e.g., Anderson and Ling, 2008). These strategies appear to work synergistically with the pharmacologically determined AL to confer high levels of addiction and persistent use.

4. Recommendations

4.1 Regulatory

4.1.1—To address population impact, both AL and product appeal should be evaluated on a case by case basis by the Food and Drug Administration (FDA) and both types of testing should be considered for inclusion in the development of performance standards, and the testing of modified risk products and of new tobacco products.

4.1.2—Product development and evaluation would be facilitated by the delineation of standardized approaches that will be accepted by regulatory agencies for the purposes of their regulation. An example of such a standardized approach is various guidance for abuse liability assessment developed in CPDD conferences (e.g., Expert Panel, 2003), and FDA (e.g., Balster and Bigelow, 2003; Food and Drug Administration, 2010a).

4.2. Research

4.2.1—Research should pursue a better understanding of the interaction of product design and contents with emissions, product use, and delivery of addictive substances (particularly unprotonated nicotine) over a full range of use.

4.2.2—Research should further assess the threshold dose(s), accounting for variability of this dose across individuals, of nicotine for producing reinforcing effects, discriminative stimulus effects, and physical dependence (“withdrawal”), and should examine factors that might moderate this threshold dose such as characteristics of the individual, environmental stimuli, and environmental context.

4.2.3—Research needs to continue to develop and refine animal and human ALA models that can assess a diversity of tobacco products. Relevant study design features and measures need to be identified and their predictive validity determined. Methods to quantify relative risks across products must also be identified.

4.2.4—Uniform terminology must be developed for ALA and product appeal and this should be consistent with terminology used by experts and in guidance documents in the fields of ALA and product appeal assessment.

4.2.5—Continuing research is needed to evaluate non pharmacological factors that contribute to the risk of developing addiction including packaging, marketing, sensory perception, and environmental stimuli.

4.2.6—Expanded research is needed to understand better the mechanisms by which AL and product use are influenced by factors beyond those resulting from delivery of nicotine and other substances to the central nervous system. For example, these factors include oral effects that may immediately trigger conditioned positive and negative feelings and stimulation of the peripheral nervous system components such as the trigeminal nerves that can activate reinforcing brain responses before the drug even reaches the brain.

4.2.7—Further research is needed on how tobacco product ingredients such as traditionally-considered non-pharmacologic flavor enhancers might contribute to AL. These include menthol at discriminable levels and at the low levels present in some “non menthol”

cigarette brands as well as chocolate and other substances that are apparently used to enhance product use without providing obvious characterizing flavors.

4.2.8—Further research is needed on factors that might moderate the AL of products or product appeal, such as the state of the individual (e.g., abstinent or non-abstinent) and other characteristics of the individual (e.g., sex, age, education, degree of dependence, stage of change, health literacy and numeracy, executive functioning), as well as the environmental context and brand awareness.

4.2.9—Abuse liability and product appeal assessments should be conducted in diverse populations of subjects (e.g., smokers, novice smokers, occasional smokers, smokers at different stages of change or trajectory of dependence, smokers with substance abuse problems or psychiatric disorders, adolescents), as is ethically and technologically feasible.

4.2.10—Research is needed to further the understanding of how consumer perception of a tobacco product influences AL and how both of these factors predict product uptake, continued use, and cessation, and how inaccurate consumer perceptions of tobacco product risk can be corrected and further misperceptions can be avoided.

4.2.11—Research needs to explore how advertising, messaging, and promotion influence and interact with experience with the product and how repeated exposures and experiences affect product uptake, use, and cessation.

4.2.12—Research should investigate determinants of pleasurable and unpleasurable physiological and subjective responses to tobacco products taking into account product constituents, individual differences, and environmental factors.

4.2.13—Further tobacco document research should include gaining knowledge of industry studies on AL of tobacco products, product appeal, market segmentation strategies, and consumer response to new products and marketing.

4.3. Infrastructure

4.3.1—A rapid response network needs to be created to keep up with industry modification of existing products and introduction of new products. This network could assess how consumers are reacting to new products/advertising using innovative surveillance that is substantially more rapid, sensitive, geographically specific, and brand-specific than those currently available.

4.3.2—A data-base should be established in which tobacco product surveillance systems can be linked to other resources such as AC Nielson sales data, national and state surveys on tobacco use, opportunistic surveys of vulnerable populations, and data from poison control centers.

4.3.3—A working group should be established to propose a practical approach to incorporate some state of the art consumer appeal metrics in human ALA methodology that are applicable to tobacco products.

4.3.4—National Institutes of Health (NIH) should collaborate with FDA to extend efforts to develop and validate the integration of AL and product appeal assessment.

4.3.5—The NIH and FDA should develop supplies of adequate placebo products, including cigarettes and smokeless tobacco with graded nicotine dosing capacity including products

with zero or at least non-pharmacologically active levels to be used for research and tobacco product assessment for regulatory purposes.

4.3.6—Products that vary in constituents and emissions of substances other than nicotine are also important to make available to researchers. These include products that vary in their content and/or emissions of acetaldehyde, non-nicotine alkaloids, monoamine oxidase inhibitors, and menthol.

4.3.7—The NIH and FDA should develop guidance for researchers, sponsors, and institutional review boards for the conduct of ethical research with existing and new tobacco products in humans.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1**Program for the Conference on Abuse Liability and Appeal of Tobacco Products**

Thursday, April 8, 2010		
Time	Topic	Presenter
8:30 am	Introductions	Dorothy Hatsukami, PhD, Mitch Zeller, JD, Cathy Backinger, PhD, MPH Wilson M. Compton, MD, MPE
8:45 am	FDA Bill: Why is assessing abuse liability important	Corinne G. Husten, MD, MPH
9:15 am	Science of abuse liability	Jack E. Henningfield, PhD
10:00 am	Chemistry, design, flavorants	David L. Ashley, PhD
10:40 am	Break	
11:00 am	Preclinical animal studies	Mark LeSage, PhD
11:40 am	Human laboratory studies	Thomas Eissenberg, PhD
12:20 pm	Working Lunch	
1:30 pm	Clinical Trials	Dorothy Hatsukami, PhD
2:10 pm	Post-marketing surveillance	Charles R. Schuster, PhD
2:50 pm	Break	
3:10 pm	Discussants/panel	William A. Farone, PhD Eric C. Donny, PhD Scott Lukas, PhD Kenneth A. Perkins, PhD Maxine Stitzer, PhD Edward M. Sellers, MD, PhD
3:40 - 4:30pm	General Discussion	
Friday, April 9, 2010		
8:30 am	Conceptual framework for assessing consumer appeal	Richard O'Connor, PhD
9:00 am	Psychology of risk	Ellen Peters, PhD
9:40 am	Marketing and promotion	Pamela Ling, MD, MPH
10:20 am	Product design, marketing and promotion: Evidence of impact	Lois Biener, PhD
11:00 am	Break	
11:15 am	Discussants/panel	Valerie Reyna, PhD Gregory N. Connolly, DMD, MPH Daniel Romer, PhD Paula Bone, PhD
11:40 am	General discussion	
12:30 pm	Working Lunch and Summary of Key Points for Discussion and Comment at Conference	Jack E. Henningfield, PhD Dorothy Hatsukami, PhD
2:00 pm	Meeting adjourned	