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Editorial
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Understanding the Role of Additives in Tobacco Products

Tobacco products are highly engineered, from the tobacco itself through to the paper and filter (in the case of manufactured cigarettes). While nicotine is the primary addictive constituent of tobacco, the dose and speed of nicotine delivery can be influenced, directly and indirectly, in a variety of ways. This can include the use of additives; for example, additives that increase the availability of free nicotine may increase the dose of nicotine delivered, while those that facilitate deeper inhalation in smoked tobacco products may enhance addictiveness indirectly. Understanding the contribution of additives (as well as other naturally occurring constituents of tobacco) to the initiation and maintenance of tobacco use is vital to informing tobacco regulatory efforts.

To this end, van de Nobelen and colleagues[1] describe guidelines and recommendations for developing a regulatory strategy for assessing the role and impact of tobacco additives. They acknowledge many of the challenges inherent in this task and, in particular, in dissecting the role of individual additives when these are delivered in the complex matrix of constituents that make up both unburned tobacco and tobacco smoke. The 2010 report by the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR),[2] which provides scientific advice to the European Commission, emphasized the need to distinguish between additives that may be addictive themselves, those that may enhance the addictiveness of nicotine and those that may increase the attractiveness of tobacco products. Understanding the role of additives requires experimental studies in both animals and humans, and these can include a range of outcome measures, ranging from self-reported psychological measures (in particular when assessing attractiveness or appeal) to biomarkers such as metabolites and patterns of brain activation.

The 2010 SCENIHR report describes criteria for assessing addictiveness in both human and animal studies. In human studies, clinical criteria for dependence, as well as laboratory measures of self-administration and choice preference, exist. These confirm the addictiveness of tobacco, but have only limited ability to assess the addictiveness of individual additives, in part because of the considerable variability in experimental paradigms used, in the absence of a widely agreed universal standard. In animal studies the reinforcing potential of a drug (eg, nicotine) can be used as a criterion, but these studies are limited by the general reliance on self-administration of nicotine as a model, which is some way removed from the delivery of nicotine in the vehicle of tobacco smoke. It is also possible to assess the effects of additives on the speed and dose of nicotine delivered, for example, by the levels of nicotine (or cotinine, the primary metabolite of nicotine) in blood and on the activation of relevant neural pathways, such as the mesolimbic dopamine system[1].

Therefore, while there are clearly challenges to assessing the impact of additives on the addictiveness and attractiveness of tobacco products, these are not entirely insurmountable. Important gaps in our knowledge remain, such as the impact of sugar levels in tobacco, and the role of noncombustible tobacco products, as well as in e-cigarettes.[3] Even the impact of widely studied additives, such as menthol[4] and ammonia,[5] remains poorly understood. Developing this understand will be critical if research is to guide the development of evidence-based policy to regulate and restrict additives in these products and reduce their addictiveness and attractiveness.

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