

With the growing use of e-cigarettes, physicians need to be alert for nicotine poisoning. They also need to educate patients and parents about this danger and advocate for measures that will help prevent potentially fatal liquid nicotine poisoning of infants and young children.

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Candy Flavorings in Tobacco

TO THE EDITOR: Flavored tobacco products are marketed worldwide (see the Supplementary Appendix, available with the full text of this letter at NEJM.org). A 2007 World Health Organization (WHO) report¹ states, "In view of the little research that has been conducted on flavoured tobacco, the WHO Study Group on Tobacco Product Regulation . . . urges health authorities to consider public health initiatives to reduce the marketing and use of flavoured tobacco products."

In the United States, the Food and Drug Administration reports, "Almost 90 percent of adult smokers start smoking as teenagers. . . . flavored cigarettes are a gateway for many children and young adults to become regular smokers."²

The Family Smoking Prevention and Tobacco Control Act of 2009 banned U.S. sales of cigarettes with "characterizing flavors" other than menthol. However, that ban does not extend to the many products that are not categorized as cigarettes under U.S. tax law. These products include cigarette-like small and large cigars, cigarillos, blunts (large cigars composed of a tobacco-based paper overwrap holding shredded tobacco [such as a "Phillies Blunt cigar"]), conventional rolled-leaf cigars, "roll-your-own" tobacco, "blunt wraps" (i.e., tobacco-based wraps — often flavored — that are related to the wraps used on a blunt cigar and are often used to roll

cannabis), hookah tobacco, moist snuff for "dipping," "dissolvables" such as Camel Orbs, and electronic cigarettes. Some cannabis smokers use the shell of a blunt cigar to "roll a blunt"; this creates a nexus of tobacco use with cannabis use.³ Blunt wraps provide just a tobacco wrap in a ready-to-roll form. Because some cigars are now structurally very similar to cigarettes (see

Figure 1 (facing page). Levels and Patterns of Chemicals in Various Brands of Cherry-, Grape-, and Apple-Flavored Candies, Kool-Aid Drink Mix, and Tobacco Products.

Panel A shows that the cherry-flavored products contain the chemicals benzaldehyde, benzyl alcohol, and other "cherry" chemicals. The cherry-vanilla pairing (with vanillin, ethyl vanillin, or both) was detected in all the cherry-flavored tobacco products examined. As shown in Panel B, all "grape" products tested were found to contain methyl anthranilate; several of the tobacco products were found to include raspberry ketone (a "berry" flavor chemical), vanillin, or both. The cherry-flavor chemical benzyl alcohol was detected in the grape-flavored Phillies Blunt cigar, Kayak snuff, and Zig-Zag wraps. As shown in Panel C, all "apple" products were found to contain 1-hexanol. Other six-carbon flavor compounds (e.g., [Z]-3-hexen-1-ol) were detected in multiple products. Pairing with "vanilla" was detected in every "apple" tobacco product examined. Pairing with the cherry-flavor chemical benzyl alcohol was detected in the apple-flavored Kayak snuff, Skoal snuff, and Zig-Zag wraps.

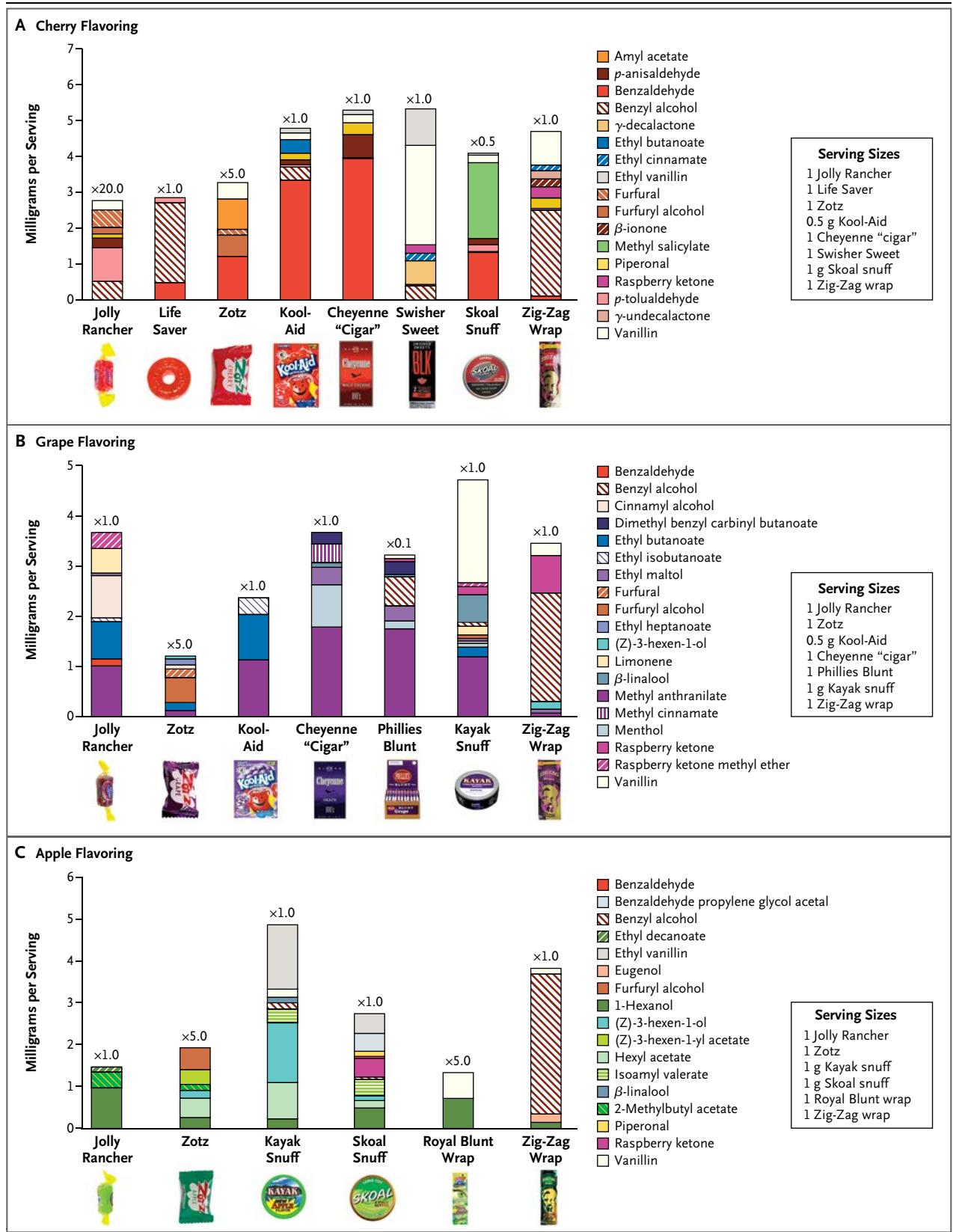


Fig. S1 in the Supplementary Appendix), the ability to flavor cigars translates into the continued availability of flavored cigarette-like products. A recent article in which results from the Centers for Disease Control and Prevention were reported⁴ showed that flavored smoking products are used by 42% of middle-school and high-school students who smoke. Such products have been called “candy-flavored tobacco,” and some jurisdictions (e.g., New York City and Providence, RI) have enacted restrictions.^{5,6}

We identified the flavor chemicals and their levels in several brands of candy, Kool-Aid drink mix, and similarly labeled “cherry,” “grape,” “apple,” “peach,” and “berry” tobacco products. Within each flavor type, we found great overlap in the flavor chemicals used. Benzaldehyde, benzyl alcohol, or both were detected in “cherry” Jolly Rancher candies, Life Savers, Zotz candy, Kool-Aid drink mix, and all cherry-flavored tobacco products examined (Fig. 1A). Methyl anthranilate was detected in all the “grape” candies, Kool-Aid, and tobacco products (Fig. 1B). The organic alcohol 1-hexanol was detected in all “apple” candy and tobacco products (Fig. 1C). We also found analogous patterns for “peach” and “berry” products (see the Supplementary Appendix). Some tobacco products contained flavor chemicals at much higher levels per serving than the non-tobacco products.

The same, familiar, chemical-specific flavor sensory cues that are associated with fruit flavors in popular candy and drink products are being exploited in the engineered designs of flavored tobacco products. What we are seeing is truly candy-flavored tobacco.

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