

Abstract:

The World Health Organization reports that \$13 billion was spent on e-cigarettes in 2013, with sales expected to increase 17-fold in 15 years. A staggering number of children have begun to experiment with this product; CDC estimates that 1.75 million children tried e-cigarettes as of 2012, with 160,000 of them reporting that they had not used tobacco cigarettes. There are also over 7,000 flavored e-cigarettes that are currently being marketed, many with flavors that appeal to young consumers (e.g., Cupcake, "Alien Blood", Cotton Candy, Oatmeal Cookie). Similar to the rise in use e-cigarettes and availability of flavored e- cigarettes, the national prevalence of flavored cigar use is 2.8%, with almost half of cigar users reporting the use of flavored cigars (43%). For youth, 4.2% of youth currently use flavored cigarettes and 3.3% currently use flavored little cigars. Similar to adults and cigar use, a large percentage of youth cigarette users use flavored cigarettes (35.4%). Although the popularity and use of flavored cigarettes, e-cigarettes and cigars continues to increase, there is a lack of data on the exposures and potential human health effects of the use of e-cigarettes. Chemicals used in flavorings gained notoriety in the early 2000's after workers at microwave popcorn were diagnosed with bronchiolitis obliterans, which was attributed to diacetyl exposure from inhalation of vapors off heated mixing vats. Diacetyl, a flavoring compound, and its replacements, 2, 3- pentanedione and acetoin, are used in the manufacture of many foods for a wide range of flavors beyond butter (e.g., caramel, cream, pina colada, strawberry). Many of these flavors are common in e-cigarette flavor cartridges, and, similar to popcorn workers, users of e-cigarettes are directly inhaling heated flavoring compounds. We propose to quantify the concentrations of these flavoring compounds in e-cigarettes, estimate exposures for users of e-cigarettes, and compare these to health-based guidelines.