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Summary of Results: Laboratory Analysis of Electronic Cigarettes Conducted By FDA

- FDA conducted a preliminary analysis on some samples of electronic cigarettes and components from two leading brands. Due to the variability among products, this analysis should not be used to draw conclusions about what substances are or are not present in particular electronic cigarettes or brands of electronic cigarettes.
- FDA's Center for Drug Evaluation, Office of Compliance purchased two samples of electronic cigarettes and components from two leading brands. These samples included 18 of the various flavored, nicotine, and no-nicotine cartridges offered for use with these products. These cartridges were obtained in order to test some of the ingredients contained in them and inhaled by users of electronic cigarettes.
- FDA's Center for Drug Evaluation, Division of Pharmaceutical Analysis (DPA) analyzed the cartridges from these electronic cigarettes for nicotine content and for the presence of other tobacco constituents, some of which are known to be harmful to humans, including those that are potentially carcinogenic or mutagenic.
- DPA's analysis of the electronic cigarette samples showed that the product contained detectable levels of known carcinogens and toxic chemicals to which users could potentially be exposed.
- DPA's testing also suggested that quality control processes used to manufacture these products are inconsistent or non-existent.
- Specifically, DPA's analysis of the electronic cigarette cartridges from the two leading brands revealed the following:
 - Diethylene glycol was detected in one cartridge at approximately 1%. Diethylene glycol, an ingredient used in antifreeze, is toxic to humans.
 - Certain tobacco-specific nitrosamines which are human carcinogens were detected in half of the samples tested.
 - Tobacco-specific impurities suspected of being harmful to humans—anabasine, myosmine, and β -nicotyrine—were detected in a majority of the samples tested.
 - The electronic cigarette cartridges that were labeled as containing no nicotine had low levels of nicotine present in all cartridges tested, except one.
 - Three different electronic cigarette cartridges with the same label were tested and each cartridge emitted a markedly different amount of nicotine with each puff. The nicotine levels per puff ranged from 26.8 to 43.2 mcg nicotine/100 mL puff.
 - One high-nicotine cartridge delivered twice as much nicotine to users when the vapor from that electronic cigarette brand was inhaled than was delivered by a sample of the nicotine inhalation product (used as a control) approved by FDA for use as a smoking cessation aid.

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