

Cigarette Filter Ventilation and its Relationship to Increasing Rates of Lung Adenocarcinoma

Min-Ae Song Neal L. Benowitz Micah Berman Theodore M. BraskyK. Michael Cummings
Dorothy K. Hatsukami Catalin MarianRichard O'Connor Vaughan W. Rees Casper Woroszylo ... [Show more](#)

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The 2014 Surgeon General's Report on smoking and health concluded that changing cigarette designs have caused an increase in lung adenocarcinomas, implicating cigarette filter ventilation that lowers smoking machine tar yields. The Food and Drug Administration (FDA) now has the authority to regulate cigarette design if doing so would improve public health. To support a potential regulatory action, two weight-of-evidence reviews were applied for causally relating filter ventilation to lung adenocarcinoma. Published scientific literature (3284 citations) and internal tobacco company documents contributed to causation analysis evidence blocks and the identification of research gaps. Filter ventilation was adopted in the mid-1960s and was initially equated with making a cigarette safer. Since then, lung adenocarcinoma rates paradoxically increased relative to other lung cancer subtypes. Filter ventilation 1) alters tobacco combustion, increasing smoke toxicants; 2) allows for elasticity of fuse so that smokers inhale more smoke to maintain their nicotine intake; and 3) causes a false perception of lower health risk from "lighter" smoke. Seemingly not supportive of a causal relationship is that human exposure biomarker studies indicate no reduction in exposure, but these do not measure exposure in the lung or utilize known biomarkers of harm. Altered puffing and inhalation may make smoke available to lung cells prone to adenocarcinomas. The analysis strongly suggests that filter ventilation has contributed to the rise in lung adenocarcinomas among smokers. Thus, the FDA should consider regulating its use, up to and including a ban. Herein, we propose a research agenda to support such an effort.