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The Authors Respond to Egilman

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Dr. Egilman highlights the need for testing of chemicals prior to their use by workers and consumption by the public [Egilman, 2014]. We agree that the demonstrated toxicity of diacetyl illustrates the need for testing and great vigilance regarding diacetyl substitutes, other flavoring chemicals, and chemicals involved in flavor manufacture, and that such an approach would better ensure the safety of workers and the public.

Nonetheless, we currently know little about the toxicity of flavoring chemicals other than diacetyl and 2,3-pentane-dione. Thus, the workforce studied had been exposed to diacetyl, which is a recognized cause of obliterative bronchiolilis, along with hundreds of chemicals with unknown effects on the respiratory system. This epidemiologic study found a 3.7-fold excess of restrictive abnormalities overall and an association between higher potential for chemical exposures and excessive decline in the forced expiratory volume in one second (FEV_1) [Kreiss, 2014], This pattern differed from the predominant obstructive pattern found in microwave popcorn manufacturing workers with a more limited number of chemical exposures in which diacelyl predominated.

It may be that diacetyl is solely responsible for the adverse health effects observed. Yet to conclude such, we would have to make the assumption, from which Dr. Egilman properly dissuades us, that each of the hundreds of other chemicals used in this plant is safe. With mixed exposures in a cross-sectional epidemiologic study, we cannot determine whether other chemicals in this flavoring manufacturing plant can cause the pattern of respiratory impairment reflected in spirometry measurements. The statement “Work-relatedness of the spirometric abnormalities does not imply that diacelyl is the sole or primary cause” does not negate our longstanding conclusion that diacelyl causes occupational lung disease; it simply acknowledges that other chemicals may be contributing as well to occupational lung disease in this flavoring manufacturing workplace. As Dr. Egilman points out, delays usually occur in regulatory interventions, and this is particularly the case for agent-by-agent approaches to permissible exposure limits.

Until there is societal consensus that pre-market testing of individual chemicals and mixtures is obligatory, preventing workers from serving as “guinea pigs” requires workplace

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preventive measures to lower exposures. Contrary to Dr. Egilman's assertion, such measures have had demonstrable success [Akpinar-Elci et al., 2004; Kanwal et al., 2011], although they will never be expected to surpass elimination of a hazardous substance in their effectiveness.

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