



The Overall Scientific Evidence Does Not Support the EPA Administrator's Proposed Conclusion That the Primary Ozone NAAQS Standard Should Be Between 65 and 70 ppb

US Environmental Protection Agency Public Hearing on the Proposed Updates to the National Air Quality Standards for Ground-level Ozone
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Thank you for the opportunity to speak today. I am Stewart Holm, Chief Scientist, at the American Forest & Paper Association.

The American Forest & Paper Association (AF&PA) serves to advance a sustainable U.S. pulp, paper, packaging, and wood products manufacturing industry through fact-based public policy and marketplace advocacy. AF&PA member companies make products essential for everyday life from renewable and recyclable resources and are committed to continuous improvement through the industry's sustainability initiative - [*Better Practices, Better Planet 2020*](#). The forest products industry accounts for nearly 4 percent of the total U.S. manufacturing GDP, manufactures approximately \$210 billion in products annually, and employs nearly 900,000 men and women. The industry meets a payroll of approximately \$50 billion annually and is among the top 10 manufacturing sector employers in 47 states.

AF&PA's sustainability initiative - *Better Practices, Better Planet 2020* - is the latest example of our members' proactive commitment to the long-term success of our industry, our communities and our environment. We have long been responsible stewards of our planet's resources. Our member companies have collectively made significant progress in each of the following goals, which comprise one of the most extensive quantifiable sets of sustainability goals for a U.S. manufacturing industry: increasing paper recovery for recycling; improving energy efficiency; reducing greenhouse gas emissions; promoting sustainable forestry practices; improving workplace safety; and reducing water use.

In 2006, EPA concluded that evidence for respiratory mortality from long-term ozone exposure was "suggestive" of causation, but in the proposed rule, the EPA Administrator concluded that the association with respiratory mortality was likely to be causal, whereas the evidence for all-cause and cardiovascular mortality were deemed to be suggestive of causation (US EPA, 2006, 2013). However, the evidence for respiratory mortality is limited, not consistent across studies, and not consistent with the evidence for total mortality. Consequently, these data do not support lowering the primary NAAQS below the current standard of 75 ppb.

Studies of long-term exposures and respiratory mortality are far too limited to make a causal determination for respiratory mortality. Compared to studies of short-term ozone exposures and mortality, there are few studies that have evaluated mortality associated with long-term ozone exposures. Most studies that assessed cause-specific mortality have focused on cardiopulmonary mortality; I am only aware of three that have evaluated respiratory mortality on its own: Abbey *et al.* (1999), Jerrett *et al.*, and Lipsett *et al.* Only the studies by Abbey *et al.* and Jerrett *et al.* were referenced in the ISA, and EPA appeared to base its likely causal conclusion for respiratory mortality only on the inconsistent results in Jerrett *et al.*

Jerrett *et al.* evaluated total, respiratory, and cardiovascular mortality risks associated with long-term ozone exposure in single- and two-pollutant models (with PM_{2.5}) in the American Cancer Society cohort. Jerrett *et al.* reported small increases in mortality, particularly respiratory mortality, but the results were inconsistent across the mortality endpoints evaluated. For example, Jerrett *et al.* did not observe an association between ozone exposure and all-cause mortality or other cause-specific mortality outcomes. Notably, in their two-pollutant models that controlled for PM_{2.5}, Jerrett *et al.* found statistically significant *decreased* risks between long-term ozone exposure and all-cause and cardiovascular-related mortality. These findings raise questions regarding the respiratory mortality findings on which EPA relied in the proposed rule to calculate long-term risks.

In addition, this study has several shortcomings in its design and implementation. For example, it did not fully consider meteorological factors, such as temperature, or lifestyle factors, such as smoking, that may be independently linked to mortality risk. There are also significant uncertainties associated with the use of a single ozone value, averaged over both space and time, to represent ozone exposures for the entire population within each metropolitan area.

EPA acknowledged that environmental temperature and region of the country were significant modifiers of the reported ozone associations with respiratory mortality. Jerrett *et al.* reported a lack of statistically significant associations between ozone and mortality in the Northeast and Industrial Midwest, which had the most respiratory deaths, and in Southern California, which had the highest ozone concentrations. This lack of correlation suggests that something other than ozone is affecting mortality risks and further highlights a lack of clear support for ozone-induced respiratory mortality.

The findings by Jerrett *et al.* were not supported by the other two epidemiology studies that specifically evaluated respiratory mortality and long-term ozone exposures. Abbey *et al.* conducted a study of mortality in the Seventh-day Adventists cohort in California. The authors reported results for non-malignant respiratory, cardiopulmonary, and all-cause mortality that were not statistically significantly increased with long-term ozone exposures. Lipsett *et al.* investigated the association between ozone and mortality, including respiratory mortality, in a cohort of female teachers in California. For respiratory mortality, the authors also reported results that were not statistically significant.

Overall, EPA's conclusions in the proposed rule regarding long-term ozone exposure and respiratory mortality are not supported by the limited available evidence or the lack of association with total mortality. Thus, respiratory mortality risks from long-term ozone exposure do not support lowering the standard below 75 ppb.

References

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