

**Oral Comments of Dan Costa, Sc.D.,
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Before the Clean Air Science Advisory Committee on Particulate Matter Panel**

November 17, 2021

My name is Dan Costa. Although I have been working with the Environmental Protection Network and the American Thoracic Society, in this statement I'm speaking for myself. I have been directly involved in air pollution health research for 47 years, 34 of which were at EPA in both research and management capacities. As was the case for the 2019 ISA, my review of the Supplement is positive. The science review is largely well-structured to support consideration of stricter annual PM_{2.5} NAAQS. However, my primary message today is to emphasize the need for a more careful review of the evidence for the 24 hour PM_{2.5} NAAQS and to affirm the need to tighten that daily standard considerably; I would suggest a maximum level of 25 ug/m³.

It is clear that great progress has been made in reducing air pollution, notably with the evolution of the PM NAAQS begun in 1970, and especially since the promulgation of the PM_{2.5} standards in 1997. At present, the national annual average for PM_{2.5} is less than 8 ug/m³¹ with only 3 states having multiple counties in nonattainment.² This improvement in air quality and health-welfare gains is widely acknowledged to have been accelerated by the establishment and subsequent tightening of the annual PM_{2.5} NAAQS. However, I would posit that the daily standard has largely been a stepchild to the annual NAAQS, drawing much less attention either in research, or in risk assessment and policy development. The undercurrent thought has been that the daily levels will mirror, perhaps with a lag, the reductions in the annual average, and undoubtedly, pushing down peak values contributes to the overall reduction in the annual average. The monitoring network used to ensure compliance is a network which, by design, avoids major sources of PM. This contributes to a “hazy” (pun intended) protection of public health to the millions of people who experience daily, and in some cases hourly, PM_{2.5} exposure excursions. The science cited in the ISA and Supplement clearly show significant, yet oddly underemphasized risk with such exposures, which, in my opinion, is further undervalued in the PA.

¹ <https://www.statista.com/statistics/1137388/united-states-pm25-air-pollution-exposure/>

² <https://www3.epa.gov/airquality/greenbook/knmapa.html>

The ISA cites several studies focusing on higher risk with environmental justice (EJ), socioeconomic status (SES), pre-existing health conditions etc., with several post-ISA studies noted in Section 3.3 of the Supplement reinforcing this concern. The data for higher exposures in people of color and social disadvantage are clearly noted with evidence (e.g., Tessum et al., 2021) showing the importance of point sources. Yet, the argument developed in the PA is that these short, high exposures are covered by a “margin of safety”, which is in keeping with the traditional development of NAAQS.

At this point in the evolution of annual PM_{2.5} NAAQS, most Americans, although not all, are on average at lower (not zero) risk. Tightening the annual standard certainly will protect many more people in the U.S. However, I would argue that at this point, the focus should be on those at high risk due to daily, shorter peak exposures and with health or social disadvantage. We do our analysis the same old way when perhaps it is time it should be reversed. The SES/EJ data base is clearly not nearly as rich as the full epi database, but the evidence demonstrates risk to many communities is so much higher. Growing satellite data show many are exposed at higher levels than the monitors reveal even with sophisticated exposure models. Reliance on large epi studies for statistical strength, even with the newer “causal-inference” approaches, generally do not focus on local societal health burdens. The link lies in the empirical health data in controlled human studies as well as panel studies, supported by animal toxicology. The 2019 ISA has the panel studies in humans (e.g., Zhang et al, 2021 and select others cited below) largely lumped in with the epi data where it is undervalued. Taken only as affirmation of plausible causality, the impact these studies reveal on daily and hourly exposure via effects on inflammatory and cardiopulmonary variables in elderly and at-risk people at or below the daily NAAQS is missed. Further, these panel study findings are strengthened by controlled human exposures to varied ambient PM again showing coherent cardiac and inflammatory markers in healthy young people exposed only 3-4 hours (Wyatt et al., 2020; others cited). That epi studies show mortality and morbidity via downstream cardiac and inflammatory events provide an overall coherence and confirmation that short term effects are real and demand action.

This brings us back to the EJ issue. The EPA Administrator, indeed the national Administration, has declared that EJ is to be a focus in policy and funding. So often, EJ concerns and issues, seem an assumed coverage or after-thought, perhaps even a bit as “a square peg in a round hole”. This review is an opportunity to address EJ priorities with the data it has in hand from panel and

empirical studies in the ISA and Supplement to take a significant step in public health protection by tightening the daily PM_{2.5} NAAQS.

Select References (new and old)

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