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**Comments of the American Thoracic Society
To the US EPA Clean Air Scientific Advisory Committee
(CASAC) Teleconference on Particulate Matter
March 3, 2022**

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Dear CASAC Committee:

Thank you for the opportunity to submit written comments to the CASAC PM Advisory panel. These comments are being submitted on behalf of the American Thoracic Society. The American Thoracic Society (ATS) is a medical professional society whose 16,000 members include physicians who treat patients with lung disease and scientists who study the effects of air pollution on lung health. Members of the ATS Environmental Health Policy Committee have reviewed the draft Policy Assessment for particulate matter (PM) and we appreciate the detailed policy analyses reported in this document.

The ATS wish to emphasize the following points:

1. There is clear evidence of serious health effects, including death, at PM_{2.5} exposures below the current annual standard for PM. The ATS recommends lowering the annual standard to 8ug/m³.
2. There is clear evidence of serious health effects, including death, at PM_{2.5} exposures below the current 24-hour PM_{2.5} standard. The ATS recommends lowering the 24-hour standard to 25ug/m³.

The Annual Standard is Not Protective

There is clear evidence as shown in **Figure 3-20** of premature mortality in association with PM_{2.5} exposure below the annual standard of 12 µg/m³. Recent studies (in particular Wang 2020, Wu 2020, Dominici 2019, Wang 2017, Di 2017, Shi 2016, Pinault 2016) have been conducted using follow-up years with lower annual exposure levels (e.g., below 11 µg/m³). Since these studies reflect current exposure levels and include large study populations, they should be weighted heavily in determining the PM levels that protect the health of the US population.

The ATS emphasize the analysis by Di (2017), of Medicare recipients with exposure levels below 12 µg/m³, which found linear associations with mortality as mean PM_{2.5} levels increased above 6 µg/m³. The 2016 Shi study also performed a restricted analysis of those with long-term exposures below 10 µg/m³, among whom average annual exposure was lower than 8.0 µg/m³. Studies in Canada with even lower PM_{2.5} exposures than the US provide relevant evidence that should not be ignored. For example, the 2016 study by Pinault found an increase in mortality in association with PM_{2.5} with a mean PM_{2.5} level of 6.3 µg/m³. Given the compelling evidence that annual PM_{2.5} exposures at 8 µg/m³ and above are associated with higher mortality, **the ATS recommends revising the annual PM_{2.5} standard to 8 µg/m³.**

Factoring into this recommendation is our concern for susceptible subgroups, and the mandate that the EPA protect public health with an adequate margin of safety. In particular, effects of long-term PM exposure on infants and children, such as lower birthweight (Fong 2019) and impaired lung function growth (Gauderman 2004), and asthma (Garcia 2019) are of particular concern because these effects are likely irreversible and impair health into adulthood.

The 24-Hour Standard is Not Protective

The ATS agrees with the conclusion of the Policy Document on page 3-7 that “there continues to be sufficient evidence to conclude that a causal relationship exists between short-term PM_{2.5} and cardiovascular effects.” And the conclusion on 3-54 that “evidence is sufficient to conclude that a causal relationship exists between short-term PM_{2.5} exposure and total mortality.” We also agree with the comment on 3-54 that studies “consistently demonstrated a linear relationship with no evidence of a threshold. Additionally, recent analyses conducted at lower PM_{2.5} concentrations (i.e., 24-hour avg PM_{2.5} concentrations <30ug/m3) provided initial evidence indicating that PM_{2.5}-mortality associations persist and may be stronger (i.e., a steeper slope) at lower concentrations.”

There is clear evidence that even brief (24 hour) exposures to PM_{2.5} at levels in the range of 25 to 35 µg/m³ triggers acute respiratory and cardiovascular events, including mortality (Di, Dai 2017), stroke (Wellenius 2012), hospital admission risk (Wei 2021). Older persons, persons of color, and Medicaid eligible persons are particularly susceptible to these harmful effects (Di, Dai 2017). Based on this, as we did in 2012 (Thurston and Balmes. 2012), **the ATS recommends lowering the 24-hour PM_{2.5} standard to 25 µg/m³**. Critically, structural systems produce and perpetuate inequities in exposure to air pollution and subsequent health effects. While on average PM_{2.5} exposures across the United States have declined, communities of color and environmental justice communities remain disproportionately exposed (Tessum 2021, Nardone 2020). The ATS emphasizes that lowering the 24-hour standard will be particularly beneficial for the health of these communities. Further, a more protective 24-hour standard will help develop a policy response to exposure hotspots.

We urge CASAC, in advising EPA about the PM standard, to consider the recommendations of the ATS, and establish a more protective PM NAAQS.

Sincerely,

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References:

Di Q, Dai L, Wang Y, Zanobetti A, Choirat C, Schwartz JD, Dominici F (2017). Association of Short-term Exposure to Air Pollution With Mortality in Older Adults. JAMA. Dec 26;318(24):2446-2456.



Di, Q, Wang, Y, Zanobetti, A, Wang, Y, Koutrakis, P, Choirat, C, Dominici, F and Schwartz, JD (2017b). "Air pollution and mortality in the Medicare population." *New England Journal of Medicine* 376(26): 2513-2522.

Dominici, F, Schwartz, J, Di, Q, Braun, D, Choirat, C and Zanobetti, A (2019). *Assessing adverse health effects of long-term exposure to low levels of ambient air pollution: Phase 1*. Health Effects Institute. Boston, MA.

Fong KC, Di Q, Kloog I, Laden F, Coull BA, Koutrakis P, Schwartz J (2019). Relative toxicities of major particulate matter constituents on birthweight in Massachusetts. *Environ Epidemiol. Jun*; 3(3): e047.

Garcia E, Berhane KT, Islam T, McConnell R, Urman R, Chen Z, Gilliland FD (2019). "Association of changes in air quality with incident asthma in children in California, 1993-2014." *JAMA* 321(19): 1906-1915

Gauderman, WJ, Avol, E, Gilliland, F, Vora, H, Thomas, D, Berhane, K, McConnell, R, Kuenzli, N, Lurmann, F, Rappaport, E, Margolis, H, Bates, D and Peters, J (2004). "The effect of air pollution on lung development from 10 to 18 years of age." *New England Journal of Medicine* 351(11): 1057-1067.

Nardone A, Casey JA, Morello-Frosch R, Mujahid M, Balmes JR, Thakur N (2020). "Associations between historical residential redlining and current age-adjusted rates of emergency department visits due to asthma across eight cities in California: an ecological study." *Lancet Planet Health* Jan; 4(1): e24-e31

Pinault, L, Tjepkema, M, Crouse, DL, Weichenthal, S, van Donkelaar, A, Martin, RV, Brauer, M, Chen, H and Burnett, RT (2016). "Risk estimates of mortality attributed to low concentrations of ambient fine particulate matter in the Canadian community health survey cohort." *Environmental Health: A Global Access Science Source* 15(1): 18.

Shi, L, Zanobetti, A, Kloog, I, Coull, BA, Koutrakis, P, Melly, SJ and Schwartz, JD (2016). "Low-concentration PM2.5 and mortality: estimating acute and chronic effects in a population-based study." *Environmental Health Perspectives* 124(1): 46-52.

Tessum CW, Paoletta DA, Chambliss SE, Apte JS, Hill JD, Marshall JD (2021). "PM2.5 pollutants disproportionately and systemically affect people of color in the United States." *Sci Adv* 7: eabf4491

Thurston GD, Balmes JR; Environmental Health Policy Committee of the American Thoracic Society (2012). "Particulate matter and the environmental protection agency: setting the right standard." *Am J Respir Cell Mol Biol. Dec*;47(6):727-8. doi: 10.1165/rcmb.2012-0414ED.

Wellenius GA, Burger MR, Coull BA, Schwartz J, Suh HH, Koutrakis P, Schlaug G, Gold DR, Mittleman MA (2012). "Ambient air pollution and the risk of acute ischemic stroke." *Arch Intern Med. Feb* 13;172(3):229-34.

Wang, B, Eum, KD, Kazemiparkouhi, F, Li, C, Manjourides, J, Pavlu, V and Suh, H (2020). The impact of long-term PM2.5 exposure on specific causes of death: exposure-response curves and effect modification among 53 million U.S. Medicare beneficiaries. *Environmental Health: A Global Access Science Source* 19(1): 20.



Wang, Y, Shi, L, Lee, M, Liu, P, Di, Q, Zanobetti, A and Schwartz, JD (2017). "Long-term exposure to PM2.5 and mortality among older adults in the Southeastern US." *Epidemiology* 28(2): 207-214.

Wei Y, Wang Y, Di Q, Choirat C, Wang Y, Koutrakis P, Zanobetti A, Dominici F, Schwartz JD (2019). "Short term exposure to fine particulate matter and hospital admission risks and costs in the Medicare population: time stratified, case crossover study." *BMJ* 367; 16258

Wu, X, Braun, D, Schwartz, J, Kioumourtzoglou, MA and Dominici, F (2020). "Evaluating the impact of long-term exposure to fine particulate matter on mortality among the elderly." *Science Advances* 6(29): eaba5692.