EPA dings epidemiology for “uncertainty,” won’t use it for pollution standards

Enlarge / WASHINGTON, DC – FEBRUARY 27: EPA Administrator Andrew Wheeler testifies before the US House Subcommittee on Environment and Climate Change.

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The US Environmental Protection Agency periodically reviews certain pollution standards, considering new science and analysis to see if the previously chosen limit should be updated. The latest of these reviews looked at the standards for particulate-matter pollution—dust and soot categorized by size as $PM_{2.5}$ (2.5 micrometers across or less) and PM_{10} (up to 10 micrometers).

On Tuesday, the EPA released its decision to not tighten the standards set in 2012. That’s not really a surprise given current leadership under the Trump administration, but the argument employed to defend the decision is remarkable. At a time when a pandemic has shut down most of the United States, the EPA is essentially arguing that epidemiology isn’t up to the task of guiding policy.

A change in process

The EPA’s process for these multi-year reviews, like the

process for setting new standards, is ostensibly designed to minimize the influence of politics. EPA analysts do the work of combing through and synthesizing existing scientific research, quantifying best estimates of the health impacts of pollutants at various levels, as well as the economic costs of restricting pollutants to those levels. Those estimates then go through advisory panels of outside scientists and are subject to public comment before the agency decides which standard fulfills its obligations under the law.

But under the Trump administration, EPA Administrator Andrew Wheeler and his predecessor Scott Pruitt have either dissolved advisory panels or replaced many of the scientists on them with industry representatives. The EPA's science review for the $PM_{2.5}$ and PM_{10} standards started before these changes took place, so it reads noticeably different from Wheeler's final decision. So while the science review found evidence that favored tightening limits, Wheeler had to explain why he didn't find that science persuasive enough to lower any of the standards.

Fine particulate matter can cause damage in the lungs and exacerbate other respiratory or cardiovascular conditions. Like many health risks, it is a challenge to quantify that damage when so many other variables affect peoples' health. But that's what epidemiological studies are for. A massive study published in 2017, for example, estimated the impacts of particulates on Americans based on health data from almost 61 million Medicare beneficiaries. That study found "significant evidence of adverse effects related to exposure to $PM_{2.5}$ and ozone at concentrations below current national standards."

Awkwardly, a study released last week (not yet peer-reviewed) that examined the distribution of deaths from COVID-19 found that a "small increase in long-term exposure to $PM_{2.5}$ leads to a large increase in COVID-19 death rate."

Who needs epidemiology?

The EPA's analysis concluded that, totaled over 47 urban areas it studied, around 52,000 people die prematurely each year in the United States because of particulate matter in the air. And it found that lowering the current annual-average $PM_{2.5}$ standard from 12 micrograms per cubic meter to nine could reduce the number of deaths by about a quarter.

A scientific advisory committee that was dissolved in 2018 actually decided to continue on its own, meeting and evaluating these reports, as one member detailed in an article at The Conversation. The committee recommended lowering that standard to 8-10 micrograms per cubic meter, in line with the scientific analysis.

But the EPA's new, smaller Clean Air Scientific Advisory Committee voted 4-2 that the standard should remain unchanged. The EPA's final decision explains that Administrator Andrew Wheeler—a former coal lobbyist with previous experience at the EPA and working for Sen. Jim Inhofe (R-Okla.)—doesn't find epidemiological studies to be strong enough evidence.

As reported by The New York Times, Wheeler stated in a press call, "Through the 5-year review process we've identified a lot of uncertainties. Through those uncertainties we've identified that the current standard does not need to be changed."

In the decision, Wheeler bemoans a lack of laboratory studies quantifying health impacts.

We're all lab rats

Wheeler's decision goes on:

> *[T]he Administrator is cautious about placing too much weight on reported $PM_{2.5}$ health effect associations for air quality*

> *meeting those standards. He concludes that such associations alone, without supporting experimental evidence at similar $PM_{2.5}$ concentrations, leave important questions unanswered regarding the degree to which the typical $PM_{2.5}$ exposures likely to occur in areas meeting the current standards can cause the mortality or morbidity outcomes reported in epidemiologic studies. Given this concern, the Administrator does not think that recent epidemiologic studies reporting health effect associations at $PM_{2.5}$ air quality concentrations likely to have met the current primary standards support revising those standards.*

On Twitter, NC State Prof. Chris Frey—the former member of the science advisory committee who authored the article at The Conversation—noted that ethical considerations are obviously among the reasons experimental studies are limited on these questions. "The Administrator does not understand the concept that the standards should protect sensitive subgroups, not merely healthy adults," Frey wrote. "Does he presume that any [Institutional Review Board] is going to approve a controlled study of severely asthmatic children exposed to $PM_{2.5}$, for example?"

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