Thomas Jefferson Institute for Public Policy
Center for Environmental Stewardship
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Small Particulate Matter from Motor Vehicles
is Not A Threat to Public Health or the Environment.

In a recent webinar hosted by the League of Conservation Voters, a physician claimed that very small particles, those below 2.5 microns in size (PM2.5), float around in the air and threaten the public's health and the environment. This argument has become the basis for promoting elimination of motor vehicles that are powered by gasoline or diesel fuel. Fact checking shows this statement is not supported by the most recent data or the views of Federal experts. PM2.5 does not threaten the health of Virginia citizens.

PM2.5 does not threaten the health of Virginia citizens. It does not cause excess death, it does not cause asthma, it does not cause more death from COVID. PM2.5 levels in Virginia are very low and are well below national standards.

According to the U.S. Environmental Protection Agency's Clean Air Scientific Advisory Committee's 2019 report on PM 2.5, the science EPA assembled regarding the health risks from PM2.5

> does not provide a sufficiently comprehensive, systematic assessment of the available science relevant to understanding the health impacts of exposure to PM, due largely to a lack of a comprehensive, systematic review of relevant scientific literature; inadequate evidence and rationale for altered causal determinations; and a need for clearer discussion of causality and causal biological mechanisms and pathways.[1]

In simpler words, the science does not support a flat statement that PM2.5 causes heart attacks, asthma or increased of death from COVID-19. Let's look at the science.

COVID-19

In breathing an hour of average US air, you will shallowly inhale less than 9 micrograms of PM2.5. Compare that with smoking a single cigarette during which you will deeply inhale anywhere from 10,000 to 40,000 micrograms of PM2.5. If exposure to 9 micrograms of small particles cause an increase in COVID-19 death rates, then those who smoke should be dying of COVID more often than non-smokers. But the opposite is true. Norden, et al, looked carefully at smokers and non-smokers and found that increased smoking is associated with lower COVID death rates, a statistically significant scientific result.[2]

PM2.5 does not cause higher rates of COVID-19 death.

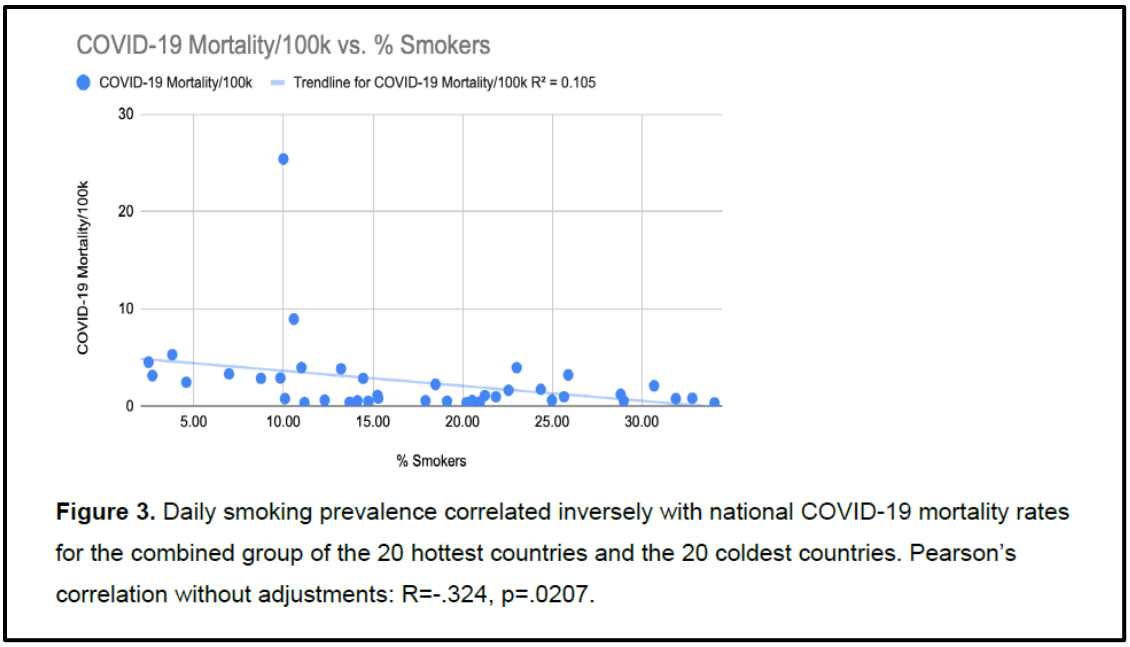
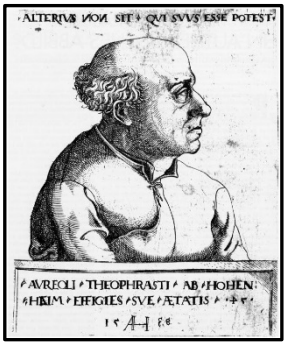


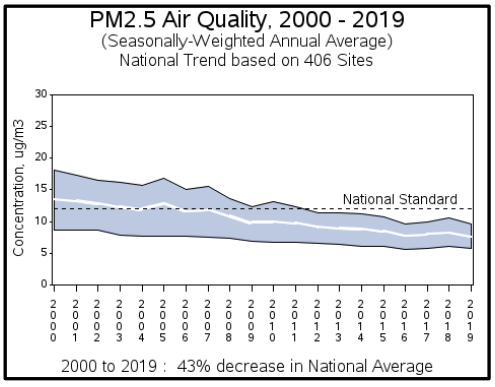
Figure 3. Daily smoking prevalence correlated inversely with national COVID-19 mortality rates for the combined group of the 20 hottest countries and the 20 coldest countries. Pearson's correlation without adjustments: R=-.324, p=.0207.

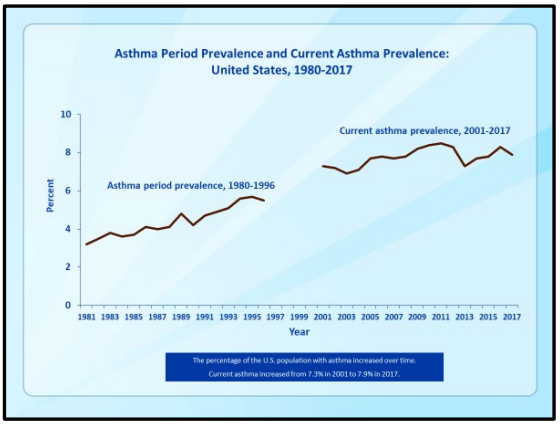
Asthma



The core scientific principle applied by health scientists is that there must be a positive relationship between the levels of a possible pollutant and the health effect it is supposed to cause. This is called a positive dose-response relationship. This principle is ancient, first propounded by Paracelsus in circa 1530. Further, Paracelsus demanded that statements about poisons be founded on scientific observations, not opinions or "models", a view unhappily not shared by too many in the health science community and the media today.[3]

So, let's look at PM2.5 levels over time and asthma levels over time. Over the past 20 years, and according to U.S. federal agencies, PM2.5 levels have decreased[4] while asthma prevalence[5] has increased. PM2.5 levels have a NEGATIVE dose-response relationship, meaning PM2.5 is not the cause of asthma.





PM2.5 levels below 12 ug/M^3 do not increase cases of asthma.

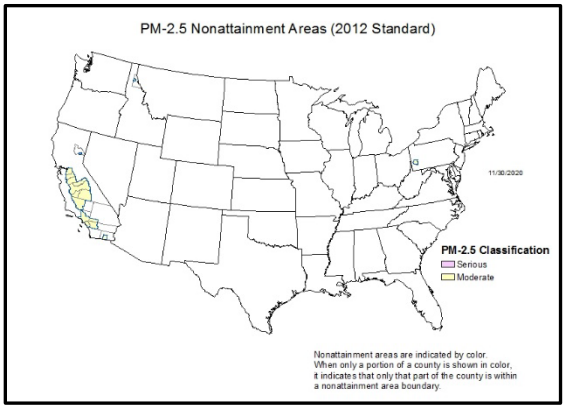
Death

If there is a definitive study on PM2.5 and death, it is the 2018 peer-reviewed paper by You, Lin and Young.[6] Dr. Young is the Chairman of EPA's Clean Air Scientific Advisory Committee. The conclusion of their study: "There is no statistically significant association between either ozone or $PM_{2.5}$ and acute human mortality. In the absence of an association, causality is in question." As Dr. Young reminds us, a single well done experiment can overturn the findings (and opinions) of previous work. There isn't, however, just one such study. Dr. Young cites to numerous other studies reaching the same conclusion. Dr. Young explains, "the game is over. Enstrom drives an important stake into the heart of EPA asserted causality,"[7] referring to the 2017 landmark study of James Enstrom (Paper no. 25 cited below).

PM2.5 at levels below 12 ug/m^3 do not cause death.

The Virginia Experience

EPA has established a national air quality standard of 12 ug/M^3 for PM2.5. Here is a chart identifying every county in the U.S. that violates that standard.[8]



Note: Virginia is in full compliance with the standard. What does this mean? Because EPA's National Ambient Air Quality Standard for PM2.5 is set at a level that will protect human health, with an adequate margin of safety, Virginia citizens are now protected from PM2.5, even if PM2.5 increased some (because of the safety factor). In other words, there is no need to reduce motor vehicles PM2.5 emissions in Virginia. Here is a snapshot of PM2.5 levels in Virginia (December 9, 2020).[9]

Location	PM2.5 level
Franconia	3.25 ug/M^3
Albemarie HS	4.8 ug/M^3
Richmond	6.4 ug/M^3
Hampton	4.7 ug/M^3
Roanoke	5.0 ug/M^3

Even if EPA reduced its PM2.5 standard to 10 ug/M^3, Virginia would still no need to reduce PM2.5 levels within the Commonwealth.

More Science

There is a reason the EPA Clean Air Scientific Advisory Committee could not agree that PM2.5 levels below 12 ug/M^3 was a threat. They recognized that there are many studies showing no harm from these levels. Here is a list of some of them.

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