NEJM Letter to the Editor

Critique of Air Pollution and Mortality in Medicare Population

June 29, 2017 *NEJM* article "Air Pollution and Mortality in the Medicare Population"
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The Di et al. article contains weak non-causal evidence that PM2.5 is related to total mortality in the Medicare population. It omits evidence published by Dominici of large unexplained geographic variation in PM2.5 mortality risk (1). The reported PM2.5 mortality risk might be insignificant if it could be properly adjusted at the individual level for confounding from cigarette smoking and socioeconomic status (2). It omits reference to the null PM2.5 mortality risk in two large national cohorts (3,4). Table 1 shows key null results for the US and California from Dominici's 2008 analysis of the Medicare population (1), Thurston's 2016 analysis of the NIH-AARP cohort (3), and my 2017 independent reanalysis of the ACS CPS II cohort (4). My 2017 reanalysis, as well as my 2015 Sounding Board manuscript "Particulate Matter Does Not *Cause* Premature Deaths," were both rejected by the NEJM (4), indicating publication bias against null findings. Before the Federally funded Di et al. findings are accepted as valid the underlying Medicare data must be independently analyzed as per the HONEST Act (5).

References

1. Zeger SL, Dominici F, McDermott A, Samet JM. Mortality in the Medicare Population and Chronic Exposure to Fine Particulate Air Pollution in Urban Centers (2000-2005). *Environ Health Perspect* 2008;116(12):1614-1619. DOI: 10.1289/ehp.11449

2. Greven S, Dominici F, Zeger SL. An Approach to the Estimation of Chronic Air Pollution Effects Using Spatio-Temporal Information. *Journal of the American Statistical Association* 2011;106(494):396–406. DOI: 10.1198/jasa.2011.ap09392

3. Thurston GD, Ahn J, Cromar KR, et al. Ambient Particulate Matter Air Pollution Exposure and Mortality in the NIH-AARP Diet and Health Cohort. *Environ Health Perspect* 2016;124(4):484-490. DOI: 10.1289/ehp.1509676

4. Enstrom JE. Fine Particulate Matter and Total Mortality in Cancer Prevention Study Cohort Reanalysis. *Dose-Response* 2017;15(1):1-12. DOI: 10.1177/1559325817693345

5. H.R. 1430, Honest and Open New EPA Science Treatment (HONEST) Act of 2017 (http://thehill.com/blogs/congress-blog/politics/339048-honest-act-needs-honest-engagement-of-scientific-community)

Table showing the relative risk of death from all causes and 95% confidence interval, RR (95% CI), associated with an increase of 10 µg/m3 in PM2.5 in three large US cohorts

Publication	Cohort	Follow-up	Population	Participants	RR (95% CI)
United States					
Zeger (1)	Medicare	2000-2005	Entire US	13,200,000	1.044 (1.032-1.057)
Thurston (3)	NIH-AARP	2000-2009	8 states-cities	517,041	~1.025 (1.000-1.049)
Enstrom (4)	ACS CPS II	1982-1988	85 counties	269,766	1.023 (0.997-1.049)
Enstrom (4)	ACS CPS II	1982-1988	50 counties	195,215	1.025 (0.990-1.061)
California					
Zeger (1)	Medicare	2000-2005	CA+OR+WA	3,100,000	0.989 (0.970-1.008)
Thurston (3)	NIH-AARP	2000-2009	58 counties	160,209	~1.017 (0.990-1.040)
Enstrom (4)	ACS CPS II	1982-1988	11 counties	60,521	0.992 (0.954-1.032)
Enstrom (4)	ACS CPS II	1982-1988	4 counties	36,201	0.879 (0.805-0.960)