



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C. 20460

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December 6, 2004

EPA-COUNCIL-LTR-05-001

The Honorable Michael O. Leavitt
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

SUBJECT: Advisory Council on Clean Air Compliance Analysis Response to Agency
Request on Cessation Lag

Dear Administrator Leavitt:

In a letter of August 11, 2004, the Office of Air and Radiation and Office of Policy, Economics and Innovation jointly asked the Health Effects Subcommittee (HES) of the Advisory Council on Clean Air Compliance Analysis to comment on an EPA proposal. This proposal, developed in collaboration with OMB, concerns the cessation lag of $PM_{2.5}$. The cessation lag is defined as the time pattern of reductions in risks of mortality that would be expected after a decrease in ambient particulate matter smaller than $2.5 \mu m$ in aerodynamic diameter, *i.e.* $PM_{2.5}$. The letter requested the Council's Subcommittee to consider whether a proposed lag structure is generally consistent with our recommendations regarding a previous charge question on this issue.

Our previous comments on this issue noted that because some fraction of the mortality risk associated with $PM_{2.5}$ is the result of long-term exposures and disease processes such as chronic respiratory disease and cancer, the reduction in mortality risk that occurs when exposures are reduced may take several years to be fully realized. The EPA described a proposed lag structure that would allocate 20% of the benefits in the first year, a further 50% equally divided in the years 2 through 5, and the final 30% equally divided in the years 6 through 20. While we believe this proposal is broadly consistent with our recommendations, and preferable to the 5-year distributed lag used earlier, we would suggest a slight modification to this proposal. We have reviewed newly available evidence on this issue and considered several intervention studies examining reductions in exposure to either air pollution or from direct smoking. (*See attachment.*)

While there is still considerable uncertainty about the cessation lag, the air pollution evidence is generally suggestive of greater impacts in the first year relative to the proposed lag

structure in question. In fact, some recent abstracts suggest that substantial benefits might occur in the first year. Therefore, the Advisory Council on Clean Air Compliance Analysis recommends that EPA use a primary case where 30% of the mortality reductions occur in the first year, 50% occur equally in years 2 through 5, and the remaining 20% occur equally over years 6 through 20.

These proposed changes to the cessation lag (both the EPA proposal and the HES recommended modification) do not change the estimates of total mortality reductions expected as a result of reductions in $PM_{2.5}$, but they both represent changes in the estimated timing of the expected mortality reductions. The HES recognizes that measures of health benefits in physical terms are not the final step in benefit-cost analysis, where all benefits need to be valued. The time profile assumed for health benefits may have implications for “net present value” calculations. However, this final step of economic valuation does not lie within the scope of expertise of the HES. The charge to the HES on this matter specifically concerns the pattern of health benefits in physical terms, so we limit our comments to this question.

We also urge EPA to: (1) review and keep abreast of the emerging literature in this area; (2) provide the best available justification for the lag structure they use; and (3) strongly consider conducting sensitivity analyses of other possible lag structures. EPA should also consider using smoothed distributions.

With regard to the suggestion to review emerging literature, it should be noted that, in addition to the literature from PM intervention studies, information from the smoking cessation literature is considered very relevant to the PM/mortality cessation lag question. Therefore, we recommend that EPA conduct a systematic review of the literature on the time course of health benefits following cessation of active and passive smoking to better account for this potentially useful information.

Sincerely,

/s/

Trudy Cameron, Ph.D.
Chair
Advisory Council on Clean Air Compliance Analysis

/s/

Bart Ostro, Ph.D.
Chair
Health Effects Subcommittee

Attachment:

Studies Considered by HES on PM-Mortality Cessation Lag

**Studies Considered by the Health Effects Subcommittee
on the
PM-Mortality Cessation Lag**

Clancy, L., Goodman, P., Sinclair, H., and Dockery, D.W. (2002). Effect of Air-Pollution Control on Death Rates in Dublin, Ireland: An Intervention Study. *The Lancet* **360**: 1210-1214.

Fry, C., Hoelscher, B., Cyrus, J., Wjst, M., Wichmann, H. and Heinrich, J. (2003). Association of Lung Function with Declining Ambient Air Pollution. *Environmental Health Perspectives* **111**: 383-387.

Heinrich, J. Hoelscher, B., Frye, C., Meyer, I. Pitz, M. Cyrus, J., Wjst, M. Neas, L., Wichmann, H.E. (July 2002). Improved Air Quality in Reunified Germany and Decreases in Respiratory Symptoms. *Epidemiology* **13**: 394-401.

Heinrich, J., Hoelscher, B., and Wichmann, H.E. (2000). Decline of Ambient Air Pollution and Respiratory Symptoms in Children. *American Journal of Respiratory Critical Care Medicine* **161**: 1930-1936.

Hurley, Fintan. (2004). Does Reducing Air Pollution Really Lead to Improvements in Health? Excerpt from a report entitled *Evaluation of the Air Quality Strategy prepared for the Department for Environment, Food and Rural Affairs in the United Kingdom*. The full report will be published in the coming months at <http://www.defra.gov.uk>.

Lan, Q., Chapman, R.S., Schreinemachers, D.M., Tian, L., and He, X. (2002). Household Stove Improvement and Risk of Lung Cancer in Xuanwei, China. *Journal of the National Cancer Institute* **94**: 826-836.

Leksell, Ingemar and Rabl, Ari. (2001). Air Pollution and Mortality: Quantification and Valuation of Years of Life Lost. *Risk Analysis* **21**: 843-857.

Roosli, M., Kunzli, N. and Braun-Fahrlander, C. (2004). Use of Air Pollution “Intervention-Type” Studies in Health Risk Assessment. *Abstract presented at the 16th Conference of the International Society for Environmental Epidemiology*, August 1 – 4, 2004.

Schwartz, Joel and Laden, Francine. (2004). Dose, Time and Death: Association with PM_{2.5} in Cohort Study. *Presentation to 16th Conference of the International Society for Environmental Epidemiology*, August 1 – 4, 2004.

NOTICE

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