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RE: American Heart Association Comments to the Clean Air Scientific Advisory Committee (CASAC) on the Environmental Protection Agency's (EPA) recommendation to strengthen the air quality standards for particulate matter.**Docket OAR-2001-0017**

On behalf of the American Heart Association (AHA), including the American Stroke Association (ASA) and over 24 million AHA/ASA volunteers and supporters, we would like to offer the following comments on the second draft Staff Paper on the National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM).

Cardiovascular diseases (CVD), including heart disease and stroke, are the leading cause of deaths in the US. Growing epidemiological evidence indicates a constant increased risk for CVD in relation to short-term and long-term exposure to PM.

After systematically reviewing the epidemiological evidence and the potential biological mechanisms for the association between air pollutants and CVD and their risk factors, the AHA published a scientific statement in June, 2004 (*Circulation* 2004;109:2655-2671), to make healthcare professionals aware of the increased risk of air pollutants including PM for the occurrence of CVD events.

In an analysis of the American Cancer Society cohort published in 2004, a robust association between long-term PM_{2.5} concentrations and overall cardiovascular mortality was reported. The largest increase in risk was for ischemic heart disease, and the risk for arrhythmia, heart failure, and cardiac arrest mortality were also elevated. This evidence indicates that a more stringent annual average PM_{2.5} standard is needed, as proposed in the draft Staff Paper.

Dozens of studies have reported that short-term elevations in ambient particle levels are capable of evoking cardiac arrhythmias, worsening heart failure, and triggering acute atherosclerotic/ischemic cardiovascular complications. Short-term exposure to elevated PM appears to significantly contribute to increased acute cardiovascular mortality, particularly in certain at-risk subsets of the population. Hospital admissions for several cardiovascular and pulmonary diseases acutely increase in response to higher ambient PM concentrations. These studies support tightening the 24-hour PM_{2.5} standard, as recommended by EPA Staff Scientists.

Air pollution may thus both accelerate the development of coronary atherosclerosis and worsen its sequelae. Some of these effects may occur over time, as with acceleration of the progression of atherosclerosis, or rather abruptly, as with the triggering of an arrhythmia or myocardial infarction by acute inflammatory responses, altered platelet adhesiveness, or perhaps vascular endothelial dysfunction. The well-established causal association between

smoking and heart disease and stroke support the plausibility of an adverse effect of PM on the cardiovascular system.

Because a number of studies have demonstrated associations between particulate air pollution and adverse cardiovascular effects even when levels of ambient PM_{2.5} are within current standards, we specifically call upon EPA to consider more stringent standards for PM_{2.5}.

The existing body of evidence is consistent, coherent and plausible. It suggests that there is a linear dose-response relationship between PM and adverse events. Data from all North American studies define a curve that is without a discernible threshold below which PM concentration poses no health risk to the general public. The strengthened fine PM_{2.5} standards recommended by EPA Staff Scientists would improve CV health and overall health for the general public, especially the health of many disadvantaged socio-economic groups.

1. In conclusion, the AHA and ASA support a more stringent protective health standard for PM_{2.5}. We specifically support the lowering of both the 24-hour and the annual average standards. The ranges suggested in the draft Staff Paper -- between 12-14 µg/m³ for the annual standard, and between 25-35 µg/m³ for the 24-hour standard -- are well supported by the science;
2. We also support strengthening the form of the standards; and,
3. We support the EPA recommendation to allow use of continuous monitors to measure attainment of the standard in addition to current filter-based monitors.

The AHA/ASA feels that it is important to make a concerted effort to educate healthcare providers and at-risk patients alike about both the new standard and the available source of information and about the potential health hazards of elevated air pollution levels. We support the recommendations on the AirNow web site for activity restriction for persons with known heart disease and pulmonary disease, the elderly, and those with diabetes.

Although exposure to ambient air pollution poses smaller relative risks for incident cardiovascular disease than obesity or tobacco smoking, because it is ubiquitous, the absolute number of people affected is enormous, and exposure occurs over an entire lifetime. The evidence implicates prolonged exposure to elevated levels of PM in reducing overall life expectancy on the order of a few years. Cardiovascular causes account for 69 percent of the overall excess in morbidity and mortality.

CASAC should support the EPA staff recommendations, and reach closure on the document, so that EPA and the states may move forward with regulations to expedite the attainment of the NAAQS.

We thank you for the opportunity to provide our comments on such an important health care issue.

Rose Marie Robertson, MD
Chief Science Officer