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Air Pollution and Disease and Gender

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Approximately 1 million people per year die of cardiovascular disease CVD such as myocardial infarction (MI) in the United States, which accounts for over 40% of all deaths. Despite recent advances in its clinical management, the incidence of heart failure has continued to increase during the past decades, and is the most expensive single diagnosis in the United States health care system. It has been reported that when genetically similar populations migrate to a new environment, the CVD risks are altered, suggesting that environmental factors play an important role in the development of heart disease. The effects of exposure to environmental pollutants, including their gender specific effects on cardiovascular health have not been systematically studied, and the underlying pathological mechanisms for O_3-induced cardiac toxicity are not completely understood and remain to be defined.

Sex related differences have been noted in CVD where females have a lower incidence of heart failure, and a higher rate of heart failure survival. On-the-other-hand, some studies have reported increased mortality in women compared with men. Recent data also suggest that women have an increased risk of death due to O_3 air pollution, which is in contrast to reports that short-term variations in gaseous pollutants are associated with an increase in hospitalization for cardiac disease that is not modified by gender. Since pollutants are commonly found as complex mixtures at ground level the overlap and compounding effects of individual air pollutants needs to be considered. We therefore believe this discrepancy, may be due to the type of pollutant exposure and not O_3 exposure specifically.

Identifying the underlying factors for gender based variations in ozone response is very important to recognize at-risk groups who would benefit from preventive strategies. In addition identification of those at risk, their degree of sensitivity will assist with the cost-benefit analysis of "safe" exposure levels in the public health setting. Such studies are timely and have clinical significance related to environment causes of cardiovascular disease, since it will help understand the mechanisms underlying the pathology of ozone induced cardiac injury. Ultimately, the goal is to provide the knowledge required to develop agents for improving the treatment of heart disease and decrease the health care costs as well as mortality associated with cardiac pathologies.

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