September 28, 2011

Comments to Michigan Senate Economic Development Committee

Submitted by: Amy Schultz, University of Michigan School of Public Health

Testimony on health impacts of air quality in southwest Detroit based on original research by faculty of the University of Michigan Healthy Environments Partnership

The Healthy Environments Partnership (HEP)*: HEP is a community-based participatory research partnership that develops, implements, and evaluates interventions in Detroit, Michigan to reduce racial and socioeconomic disparities in cardiovascular disease (CVD).

In 2008, the mortality rate due to cardiovascular disease in Detroit was 329 per 100,000 population, more than double the national rate of 187 per 100,000. The Healthy Environments Partnership conducts research to understand environmental contributions to the excess cardiovascular mortality experienced by residents of Detroit.

There is substantial evidence that exposure to air pollution in the form of fine particle matter less than 2.5 microns in diameter (PM2.5) is linked to increased risk of cardiovascular disease. Low to moderate income communities, and particularly communities of color, are more likely to be exposed to air pollutants and their harmful effects on health.

Findings from HEP's research in Detroit indicate that exposure to high levels of harmful air pollutants contributes to Detroit residents' increased risk of cardiovascular disease. Risks are particularly high for residents of Southwest Detroit, who are exposed to higher levels of airborne particulate matter (air pollution) than residents of other areas of the city, due to the density of automobile and diesel truck traffic, and industrial facilities in that area of the city.

Specifically, for each 10 micrograms per cubic meter increase in PM2.5, residents of Detroit neighborhoods experienced a 3.2 point (millimeters of mercury) increase in systolic blood pressure, a major risk factor for cardiovascular disease.

For residents of Southwest Detroit, the area of Detroit with the highest levels of PM2.5, the same increase in PM2.5 was associated with an 8.6 point increase in systolic blood pressure – more than twice the increase in risk in the city as a whole.

These increases in blood pressure are visible at levels of PM2.5 well below current U.S. Environmental Protection Agency National Ambient Air Quality Standards.

Given the already high levels of PM2.5 found in Southwest Detroit, and their implications for the heart and lung health of residents:

- The potential impact of programs, policies, or land use decisions on airborne particulate matter and the health of residents in surrounding communities should be assessed in advance;
    - If decisions are made to move forward on programs, policies or land use decisions that will increase particulate matter, strategies should be enacted to reduce the negative effects on health in surrounding communities (e.g., reducing diesel emissions, minimizing idling, minimizing proximity of trucking routes to residential neighborhoods);
    - Particular attention should be given to the protecting vulnerable community residents, including children and elderly residents (e.g., avoiding proximity to schools).
- The long term effects on health should be monitored over time;

- The cumulative health effects of multiple environmental exposures (e.g., industrial facilities, transportation routes, coal fired emissions) should be considered;

- Efforts should be made to equitably distribute health risks and benefits.

*The Healthy Environments Partnership includes representatives from Brightmoor Community Center, Detroit Department of Health and Wellness Promotion, Detroit Hispanic Development Corporation, Friends of Parkside, Henry Ford Health System, Warren/Conner Development Corporation, and the University of Michigan School of Public Health.

The following references provide additional information regarding air quality and cardiovascular health in Detroit:

*Dvonch, J.T., Kannan, S., Schulz, A.J., Keeler, G.J., Mentz, G., House, J., et al. (2009). Acute effects of ambient particulate matter on blood pressure: Differential effects across urban communities. *Hypertension* 53(5), 853-859.

*Kannan, S., Dvonch, J.T., Schulz, A.J., Israel, B.A., Mentz, G., House, J.S., et al. (2009). Exposure to fine particulate matter and acute effects on blood pressure: Effect modification by measures of obesity and location. *Journal of Epidemiology & Community Health*, online first *doi:10.1136/jech.2008.081836.*

Healthy Environments Partnership

The Healthy Environments Partnership (HEP) Supports Action to Equitably Protect Communities from Air Pollutants & Their Health Effects

HEP is a community-based participatory research project.

Partners include:

- Brightmoor Community Center
- Community Partner at Large
- Detroit Department of Health and Wellness Promotion
- Detroit Hispanic Development Corporation
- Friends of Parkside
- Henry Ford Health System
- Warren Conner Development Coalition
- University of Michigan School of Public Health

The Healthy Environments Partnership

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POLICY RECOMMENDATIONS

Assess the impact of programs, policies, and land use decision on airborne particulate matter and the health of residents in surrounding communities.

Require decision makers to consider strategies to reduce the negative effects of air pollution on health (e.g., reducing diesel emissions, minimizing idling and proximity of trucking routes to residential neighborhoods) and include public health professionals in determining city planning and transportation decisions.

Support National Ambient Air Quality Standards for particulate matter that protect health and ensure enforcement at the State and local level.

State and local governments can work with National agencies to develop and enforce policies that will ensure safer, cleaner environments and protect residents' health. National agencies can work with localities to clean up existing polluting sources and minimize adverse health effects.

Enact state-wide school siting policies that protect children from environmental pollution

Require a minimum distance between school sites and pollution sources such as highways, factories, airports, rail lines, and other potential environmental hazards. Fund air filtration systems for existing schools that report high levels of pollution.

Monitor the long-term effects of fine particulate matter on health over time, and equitably distribute risks and benefits.

Use scientific data to determine the cumulative health effects of air pollution. Calculate the associated health care costs to show the long-term impact on communities and to inform future decisions.

Citations:

Kannan S, Dvonch JT, Schulz AJ, Israel BA, Mentz G, House JS, Max P, Reyes AG. 'Exposure to Fine Particulate Matter and Acute Effects on Blood Pressure: Effect Modification by Measures of Obesity and Location'. *Journal of Epidemiology and Community Health. 2009; 0:1-8.*

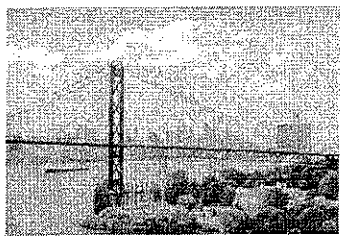
Dvonch JT, Kannan S, Schulz AJ, Keeler GJ, Mentz G, House JS, Benjamin A, Max P, Bard RL, Brook RD. 'Acute effect of ambient particulate matter on blood pressure: differential effects across urban communities'. *Hypertension. 2009; 53(5): 853-9*

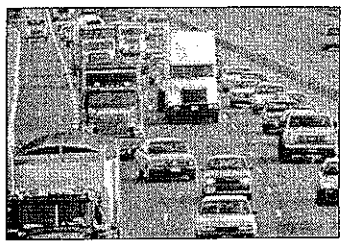
Last Updated August 2011

The Healthy Environments Partnership is an affiliated project of the Detroit Community-Academic Urban Research Center.

HEP Overview: Established in 2000, HEP is a community-based participatory research partnership that develops, implements, and evaluates interventions in Detroit, Michigan to reduce racial and socioeconomic disparities in cardiovascular disease (CVD). HEP is funded through the National Institute of Environmental Health Sciences and the National Center on Minority Health and Health Disparities.

Background: Exposure to harmful air pollutants contributes to Detroit residents' increased risk of cardiovascular disease (CVD)





- In 2008, the cardiovascular disease mortality rate (per 100,000 population) in Detroit was 329, more than double the national rate of 187.
- Exposure to air pollution can result in asthma and other respiratory illnesses and is directly linked to increased risk of CVD.
- Detroit residents are exposed to $PM_{2.5}$ from Ohio River Valley coal combustion emissions, as well as local motor vehicles, steel and automotive industries, oil combustion, and waste incineration.
- Residents of Southwest Detroit are more likely to be exposed to $PM_{2.5}$ than residents living in other areas of the city, due to the density of traffic and industrial facilities in Southwest Detroit.

HEP Research Findings: Exposure to $PM_{2.5}$ is associated with increased blood pressure.

- The mean level of $PM_{2.5}$ across study sites in Detroit were at the current U.S. Environmental Protection Agency (EPA) National Ambient Air Quality Standards (NAAGS). Concentrations of $PM_{2.5}$ in Southwest Detroit are significantly higher (about 20%) than those.
- Short term increases in $PM_{2.5}$ levels less than the current daily EPA NAAGS were significantly associated with increased systolic blood pressure.
- Increases in systolic blood pressure were more than two times larger in Southwest Detroit, the study area with the highest levels of $PM_{2.5}$.
- Increases in systolic blood pressure of the size found in this study are well established to substantially increase the risk of heart attacks and stroke.

The Healthy Environments Partnership

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The Healthy Environments Partnership Urges Congress to Protect Low-income Communities of Color from Exposure to the Harmful Effects of Air Pollutants

Project Overview

- The Healthy Environments Partnership (HEP) is a community-based participatory research project comprised of multiple partners including Brightmoor Community Center, Detroit Department of Health and Wellness Promotion, Detroit Hispanic Development Corporation, Friends of Parkside, Henry Ford Health System, Rebuilding Communities, Inc., and the University of Michigan School of Public Health. For more information about HEP contact Sharon Sand at (734) 763-0017.
- Established in 2000 through funding from the National Institute of Environmental Health Sciences, **HEP develops, implements, and evaluates interventions in Detroit, Michigan to reduce racial/ethnic and socioeconomic inequities in cardiovascular disease.**

Background: Exposure to harmful air pollutants contributes to Detroit residents' increased risk of cardiovascular disease

- Exposure to air pollution in the form of fine particular matter ≤ 2.5 micrometers in diameter ($PM_{2.5}$) is linked to increased risk of cardiovascular disease.
- Detroit residents are exposed to $PM_{2.5}$ from Ohio River Valley coal combustion emissions, motor vehicles, steel and automotive industries, oil combustion, and waste incineration.
- Residents of the predominantly Latino community of Southwest Detroit are more likely to be exposed to sources of $PM_{2.5}$ than residents living in other areas of the city, due to the density of traffic and industrial facilities in their community.
- Exposure to harmful air pollutants is associated with poor health outcomes. In 2000, the cardiovascular disease mortality rate (per 100,000 population) in Detroit was 418, nearly double the national rate of 258. Southwest Detroit reported a rate of 462; the Eastside neighborhood reported a rate of 596.

Research Findings: Exposure to $PM_{2.5}$ is associated with increased blood pressure, especially among adults living in communities with elevated exposure

- A 10-$\mu g/m^3$ increase in exposure to $PM_{2.5}$ is associated with a 3.2 mm Hg increase in systolic blood pressure. High blood pressure is a major risk factor for cardiovascular disease.
- For residents of Southwest Detroit, the community with highest levels of $PM_{2.5}$, a 10-$\mu g/m^3$ increase in exposure to $PM_{2.5}$ is associated with a 8.6 mm Hg increase in systolic blood pressure.
- The increases in systolic blood pressure observed are visible even at levels of $PM_{2.5}$ below current U.S. Environmental Protection Agency National Ambient Air Quality Standards (65 $\mu g/m^3$).
- These findings corroborate and extend the research on the harmful effects of $PM_{2.5}$ and the substantial body of evidence that low-income communities of color are more likely to be exposed to sources of air pollutants.

Policy considerations to protect low-income communities of color from exposure to the harmful effects of air pollutants include:

- A review and revision of current standards for $PM_{2.5}$ and other pollutants. Scientific evidence suggests that current standards may not be protecting vulnerable populations.
- A requirement to conduct health impact assessments informed by affected communities and consistent with existing scientific evidence for land-use related projects, policies, and programs.
- A prevention-oriented research agenda to understand the cumulative effects of air pollutants and develop tools to reduce exposure to this environmental risk to vulnerable populations.

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