



Community Action to Promote Healthy Environments: Community Academic Partnership to Improve Air Quality in Detroit

Case Study of Research Priority Setting with Community Input



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Environmental Justice**
Fostering Clean, Healthy and Safe Communities

Air Quality in Detroit

Historically, Detroit has faced challenges with air quality

Multiple pollutant sources

Large exposed population

Adverse health outcomes associated with air pollutants

Vulnerable communities

Opportunity to improve air quality and reduce health inequities



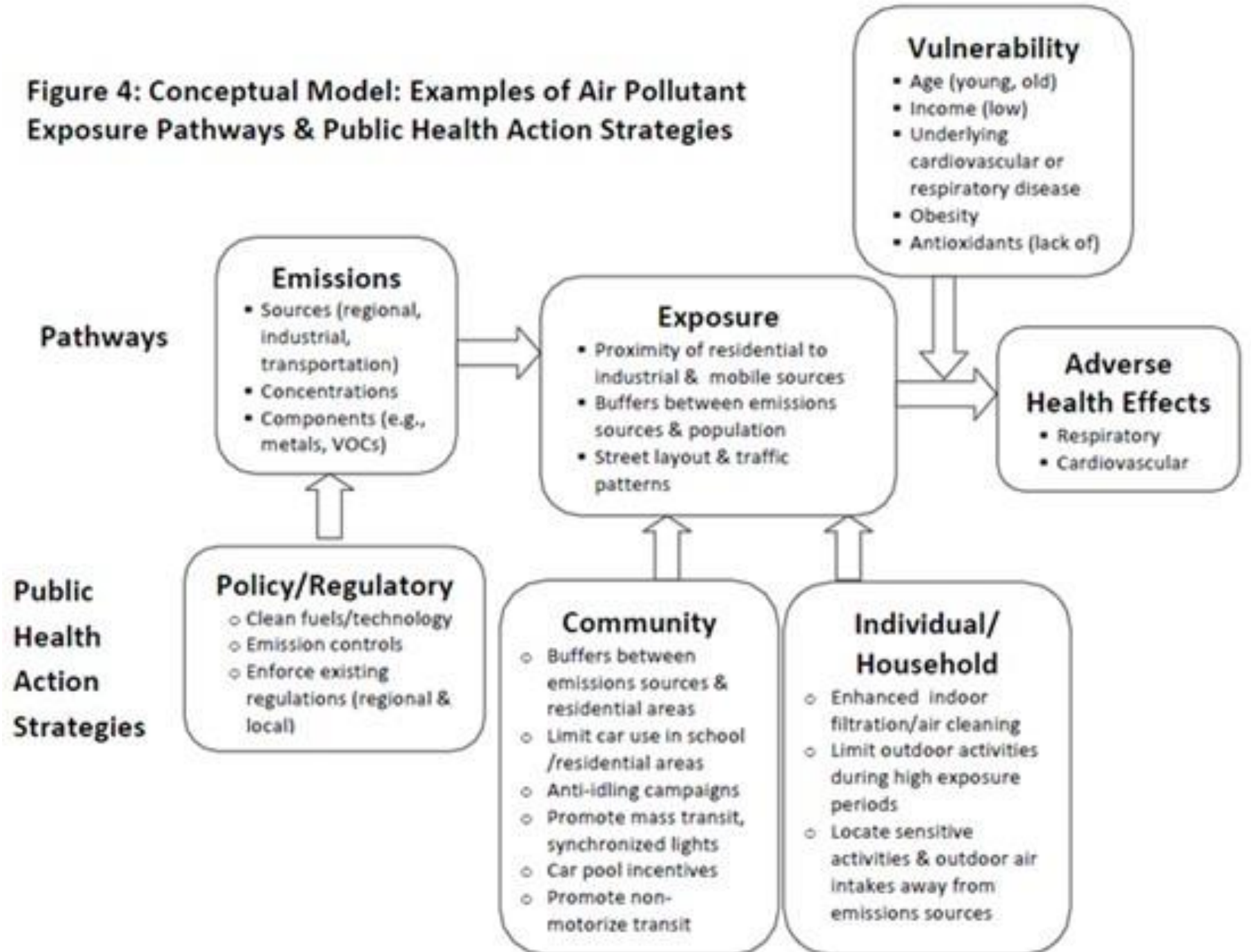


Air Quality Science

Key concepts

- Emissions
- Dispersion
- Monitoring
- Exposures
- Attributed risk
- Health Impact assessment
- Vulnerability
- Susceptibility
- Controls

Figure 4: Conceptual Model: Examples of Air Pollutant Exposure Pathways & Public Health Action Strategies



Sulfur Dioxide in Detroit

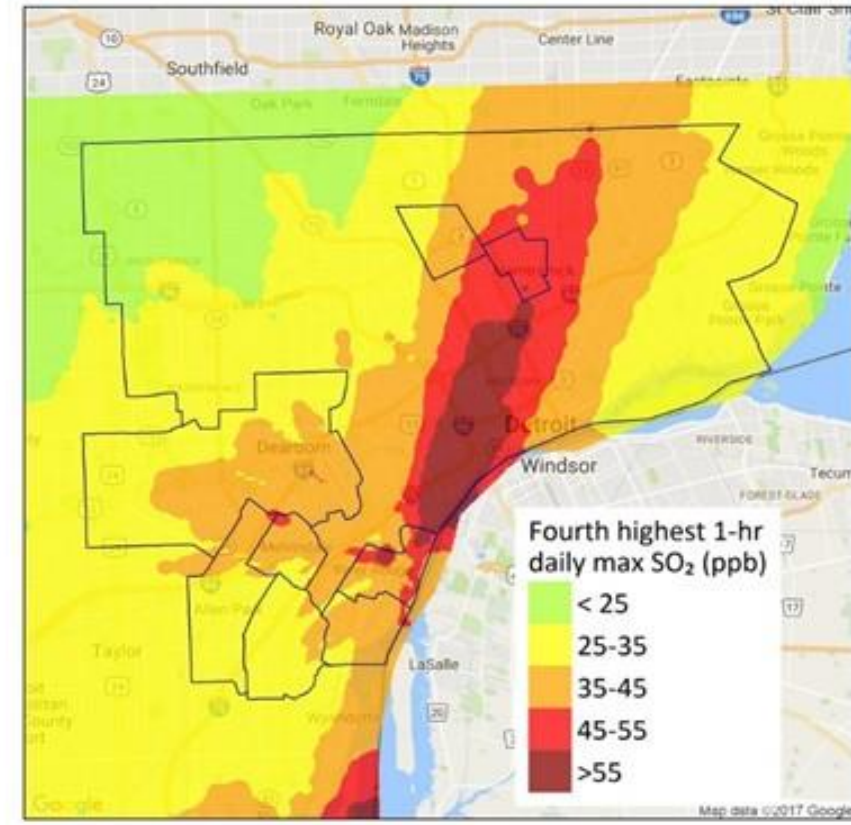
SO₂ levels exceed National Ambient Air Quality Standards, and portions of Detroit are designated as non-attainment

Determine health impact using emission inventories, dispersion models, health impact assessment.

Children are most susceptible: SO₂ causes 67 hospitalizations for asthma and COPD, 100 ED visits of children for asthma attacks, and 6,000 to 26,000 cases of asthma exacerbation.



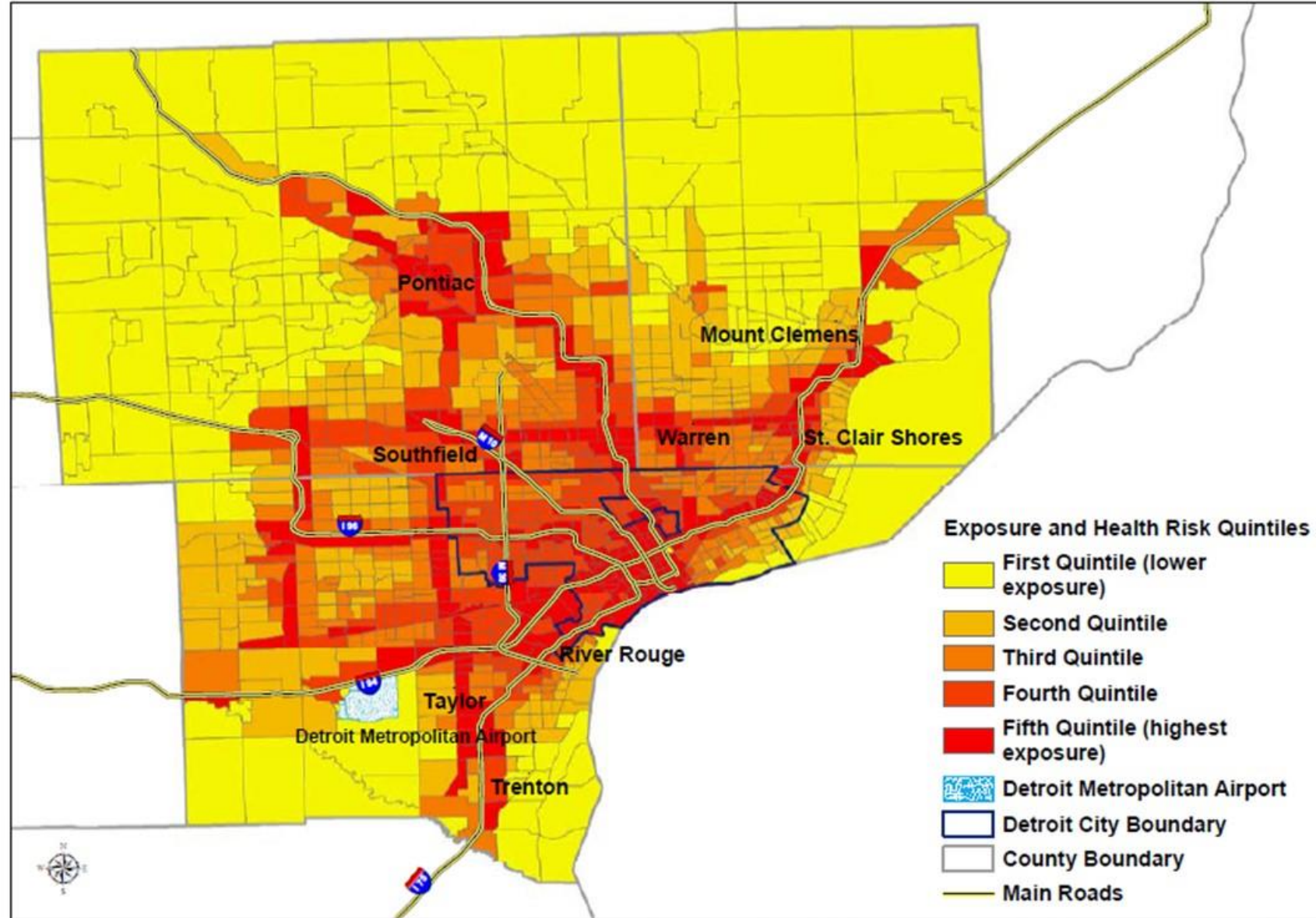
Boundaries of the SO₂ non-attainment area, and locations of major point sources of SO₂.



4th highest 1-hr SO₂ concentrations in Detroit area based on dispersion modeling.



FIGURE 1: Diesel PM exposure, cancer and respiratory risk attributable to air pollution in the Detroit metropolitan area.



Cumulative impact polygons (CI) include: residential areas, child care facilities, health care facilities, schools and playgrounds. Exposure and Health risk include: 2011 NATA estimates of respiratory risk, cancer risk and diesel PM (non-cancer) concentration.



Quantified Health Impacts

Annual health burden attributable to ambient exposures to PM_{2.5}, O₃, SO₂ and NO₂ from regional, point, on-road mobile, and area sources

Outcome (cases per year)	Age Group	Exposure source				Total ¹
		Regional	Point	Mobile	Area	
Premature mortality	< 1, ≥ 30 years	560	20	30	90	690
Hospitalizations ²	All ages	1200	120	350	150	1,800
Asthma ED visit	< 18 years	2600	160	450	170	3,400
Asthma symptom days	6 - 14 years	310,000	23,000	57,000	49,000	440,000
Restricted activity days ³	All ages	1,300,000	18,000	21,000	65,000	1,400,000
Total DALYs (years)		11,000	440	560	1,600	13,000
Monetized impact (\$million)		5,500	230	280	850	6,900

¹ Impact estimates have been rounded to two significant figures

² Includes hospitalizations for asthma, COPD, cardiovascular disease, and pneumonia and non-fatal heart attacks.

³ Includes minor restricted activity days, work loss days, and school absences.

These effects occur disproportionately in Detroit and surrounding areas with high concentrations of poverty, African American and Latino residents





The “Top Ten” CAPHE Public Health Action Plan Strategies

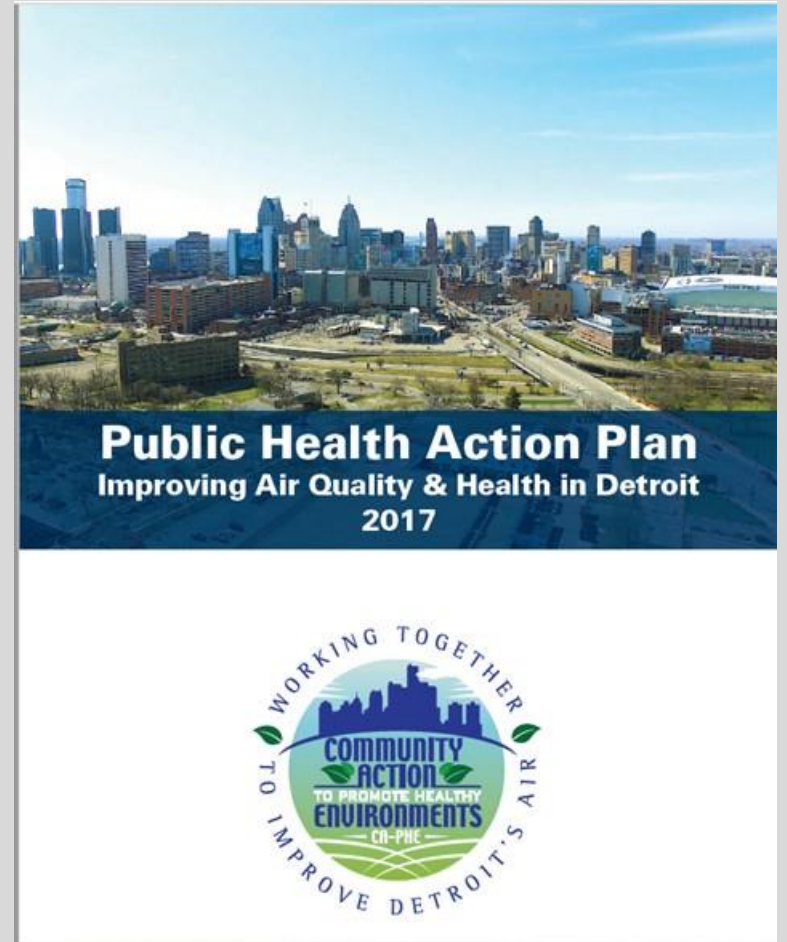
1. **Point source controls** – control and reduce emissions at industrial facilities
2. **Renewable energy** – replace fossil fuels with non-polluting solar and wind energy
3. **Diesel engine retrofits** – fix or replace older and polluting diesel engines in buses and other equipment
4. **Idling controls** – idling engines waste fuel and money and reducing idling reduces emissions
5. **Clean fuels** -- replace fossil fuels with cleaner fuels like biodiesel
6. **Transit and transportation control measures** – improve mobility to reduce congestion and emissions
7. **Indoor air filters** – install filters in buildings to effectively reduce PM_{2.5} levels
8. **Buffers and barriers** –separate schools, residences and other places from highways and industry
9. **Enhanced compliance and enforcement of air quality rules** – enforce stricter laws to reform polluters
10. **Enhanced ambient monitoring** – document pollution problems to raise awareness and identify solutions

<http://caphedetroit.sph.umich.edu/public-health-action-plan/>



See evidence-based recommendations for:

- Point source controls
- Diesel engine retrofits
- Idling controls
- Clean fuels
- Transportation control measures
- Indoor air filters
- Buffers & barriers
- Compliance & enforcement
- Monitoring





Partnership among researchers, community, citizens

- 1. Identified and developed strategies**
- 2. Set priorities among 10 strategies/25 recommendations**
 - Which to support, amplify or lead?
- 3. Develop capacity**
 - Media, policy advocacy, community organizing training
 - Toolkits
- 4. Implementation**
 - Awareness building, education, youth engagement and outreach
 - Networking/coalition building, synergy
 - Resources, funding
- 5. Minigrants**
 - Support a variety of air quality related activity

Mini-Grant Program
APPLICATION

2017



Sponsored By:

Community Action to Promote Healthy Environments
(CAPHE)

CAPHE partners include: Community Action Against Asthma, Detroit Community-Academic Urban Research Center, Detroit Hispanic Development Corporation, Detroiters Working for Environmental Justice, Green Door Initiative, Healthy Environments Partnership, Michigan Department of Environmental Quality, Sierra Club, Southwest Detroit Environmental Vision, University of Michigan School of Public Health, & Wayne State University Law School.

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For more information about CAPHE, please visit our website at <http://caphedetroit.sph.umich.edu/>



NEXT STEPS: CAPHE engage our many partners (e.g., URC, CAAA, HEP, Greendoor Initiative, SDEV, DWEJ, WSU, DHDC, Sierra Club, DFC) to develop & implement campaigns, interventions & policies to promote recommendations in the public health action plan. This includes development of youth capacity to engage in environmental decision making, community organizing, and policy education training.





Where are we?

	Year 1	Year 2	Year 3	Year 4	Year 5
Aim 1: Strengthen & support capacity of partners					
Support & enhance capacity of Core Team (CT)	█	█	█	█	█
Formalize & strengthen SC working relationships	█	█	█	█	█
Build capacity re environmental health literacy: CT & SC	█	█	█	█	█
Aim 2: Identify pollutant sources/assess mitigation strategies					
Determine & quantify sources of air pollution in Detroit	█	█	█		
Examine strategies to reduce air pollutants & vulnerability	█	█	█		
Estimate health & other benefits of selected strategies		█	█	█	
Aim 3: Develop Public Health Action Plan (PHAP)					
Create summaries: Strategies reduce air pollution/health effects	█	█	█		
Convene Public Health Action Planning Team (PHAPT)			█		
Develop Public Health Action Plan (PHAP)			█		
Develop & coordinate PHAP implementation strategy			█	█	█
Aim 4: Promote Adoption and Implementation of PHAP					
Develop & disseminate materials describing the PHAP			█	█	█
Conduct training on the PHAP with partner organizations			█	█	█
Develop & implement competitive mini-grant program			█	█	█
Promote environmental health literacy & action: Community				█	█
Conduct policy advocacy training: Community members				█	█
Meet with decision makers: Encourage PHAP adoption				█	█
Aim 5: Conduct process & outcome evaluation					
Document PHAP process & activities	█	█	█		
Document implementation plan process & product			█	█	█
Evaluate policy advocacy training			█	█	█
Evaluate mini-grant process & products			█	█	█
Evaluate campaigns, interventions & policies to promote PHAP			█	█	█
Feed back evaluation results to SC: Discuss/adjust as needed		█	█	█	█



Thank you!

