

Evaluating the Health Risk Due to Heat of At-risk Populations in Two Michigan Communities

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Introduction

In 2010, the Michigan Climate and Health Adaptation Plan was developed and includes a focus on extreme heat and populations at increased risk of health effects from the heat.

High risk populations include the elderly and very young, low-income, urban, those with chronic health conditions, and those lacking social or community supports.

Background

The climate is warming and weather events are becoming more extreme. Heat is the number one weather related killer in the US, with approximately 400 people dying in the U.S. each year from exposure to heat.¹

Climate change is also affecting Michigan. Michigan is experiencing a higher number of days with extreme high temperatures creating conditions conducive to heat illness and death.²

Heat, combined with increased ozone and air particulates, can exacerbate chronic health conditions such as asthma and cardiac disease. During heat waves, there is excess morbidity due to chronic health conditions precipitated by the additional stress of heat. Certain medications can increase heat risk as well.³

In Michigan:

- About 5 deaths per year are directly attributable to heat.⁴
- About 230 people per year are hospitalized with heat-related diagnoses. Over 65% are male, and over 40% are 65 years of age or older.²
- The number of allergy and asthma-related hospitalizations has steadily increased from about 70,040 in 2001 to 114,155 in 2009; some of the increase may be associated with climate change.²

1. Centers for Disease Control and Prevention. Heat-Related Deaths – United States, 1999-2003. MMWR 2006;55:796-798.
2. Michigan Department of Community Health. Indicators of the Potential Climate Change Effects on Public Health – Michigan Results. Draft, 2012.
3. Centers for Disease Control and Prevention. Climate and Health: Health Effects. www.cdc.gov/climatechange/effects. 2010
4. Michigan Department of Community Health. Unpublished data.

Project Objectives

- Test the utility and feasibility of the surveys to collect information regarding local health departments' heat vulnerable populations.
- Use the surveys as a mechanism to provide education and resources regarding heat health and risk to local residents.
- Use the survey results to develop protective strategies for the most heat vulnerable populations.

Methods

Heat vulnerability surveys of at-risk populations were developed and piloted from May – August 2011 by Ingham and Washtenaw County health departments. The surveys collected information on each population's knowledge of heat risk and protective factors, barriers to protective behavior, demographics and other characteristics (such as mobility, chronic health conditions, and medications).

Ingham County Survey

- Led by Ingham County Health Department; publicized and conducted by 6 community-based organizations
 - **Target: 1,000 adults who are low income, minority, elderly and/or refugee**
- Paper surveys distributed to clients in person, by mail and at organized events such as:
 - Farmers' markets, food pantries, soup kitchens, senior social events, canvassing
- 4 pages, 20 multiple-choice questions; anonymous
- Survey translated into Spanish, Arabic, Somali
- **In total, 1,731 surveys were collected.**

Washtenaw County Survey

- Led, publicized and conducted by Washtenaw County Public Health Department
 - **Target: 1,000 adults who are low income, minority, elderly, non-English-speaking, homeless, and/or rural**
- Used on-line and paper surveys distributed to clients in person, at service sites and at organized events such as:
 - libraries, clinics, farmers' markets, homeless centers, food pantries, soup kitchens, senior centers
- 7 pages, 36 multiple-choice questions; anonymous
- Survey translated into Spanish, French, Traditional Chinese, Arabic
- **In total, 1,451 surveys were collected.**

Results

Figure 1: Annual household income from all sources, **Ingham County** residents.

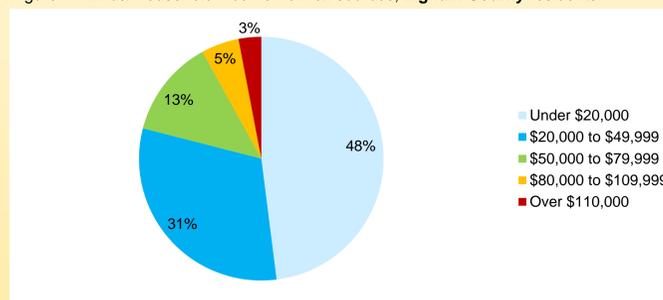


Figure 2: Annual household income from all sources, **Washtenaw County** residents.

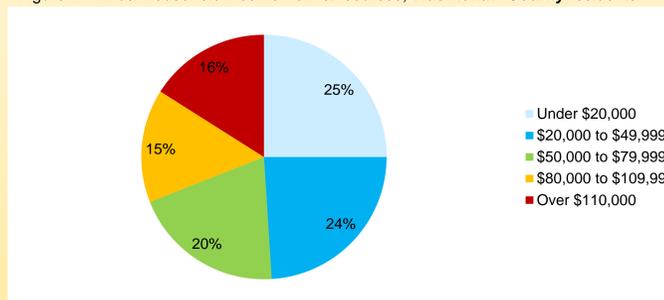


Figure 3: Resources for coping with heat events among Ingham and Washtenaw County residents, by income.

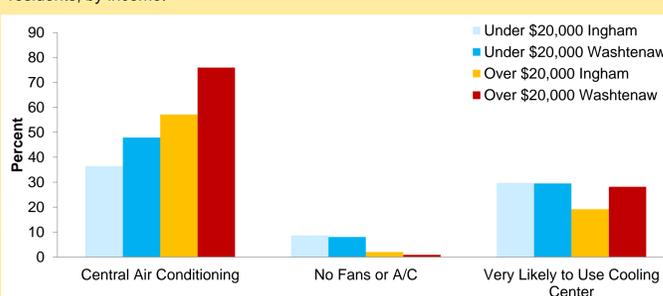


Figure 4: Likely mode of transportation to somewhere cooler during a heat wave among Ingham and Washtenaw County residents, by income.

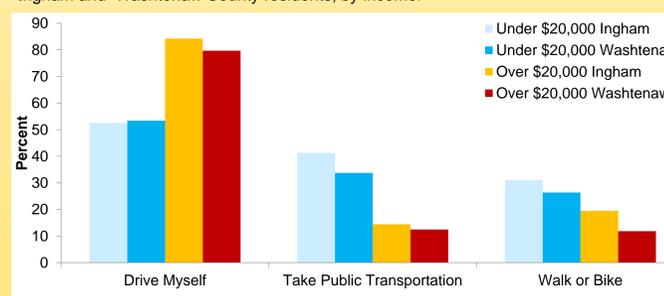


Figure 5: Chronic disease prevalence and medication use that increases heat risk among Ingham and Washtenaw County residents, by income.

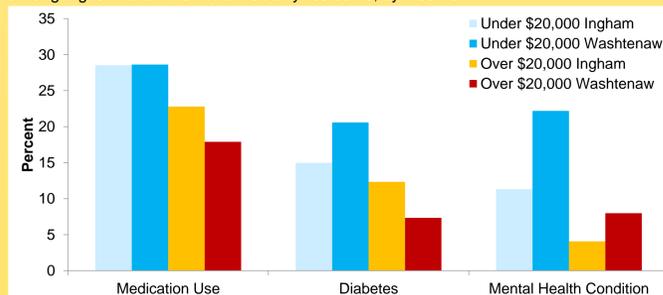
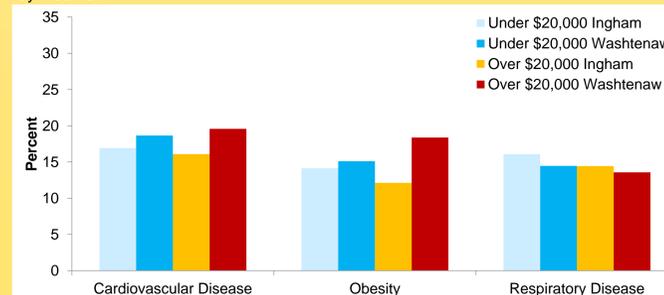


Figure 6: Chronic disease prevalence among Ingham and Washtenaw County residents, by income.



Population Demographics

Washtenaw County

- 6th largest county in Michigan; 344,791 residents
- 82% in county reside in urban areas, 18% in rural
- 26% non-White: 12.7% Black, 7.9% Asian, 4.0% Latino
- 11.1% foreign-born; 14.1% non-English speakers
- 10.1% over age 65
- 13.7% below poverty level

Ingham County

- 7th largest county in Michigan; 280,895 residents
- 87% in county reside in urban areas, 13% in rural
- 27.6% non-White: 11.8% Black, 5.2% Asian, 7.3% Latino
- 8.2% foreign-born; 11.4% non-English speakers
- 10.5% over age 65
- 20.0% below poverty level

Discussion

Results from both communities indicate very low income (<\$20,000/year) respondents:

- Have fewer resources for coping with extreme heat events, including less access to air conditioning, and are more reliant on cooling centers.
- Are less likely to be able to drive themselves somewhere cooler in an extreme heat event and are more dependent on public transportation.
- Have higher heat risk due to chronic disease prevalence (especially mental health, diabetes and medication use).

Limitations of this analysis include:

- Respondents were a 'convenience sample' and not necessarily representative of the entire community.
- Differences in survey designs and methods limit cross-county comparability of results.

Next steps:

- Conduct further analyses to evaluate relationships among income, race/ethnicity and heat health risk factors.
- Disseminate results to community groups.
- Develop educational and other protective strategies with local health departments and community groups to reduce vulnerable populations' heat health risk.



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Participating organizations in Ingham County include: Southside Lansing Community Development Association, Allen Neighborhood Center, Northwest Initiative, Southside Community Coalition, Lansing Latino Health Alliance, Greater Lansing African American Health Institute, Tri-County Office on Aging, Native American Outreach Program, Family Outreach Services, Public Health Nursing, and Emergency Preparedness

Participating organizations in Washtenaw County include: WCPHD Adult, Immunization and WIC Clinics, Hope Clinic, Ypsilanti UM Nurse Managed Care Centers, Arab American Cultural Center, Ypsilanti Ann Arbor Area District Library, City of Ann Arbor public schools/universities, local Head Start, Delonis Center, Shelter Association of Washtenaw County and Avalon Housing