

INDICATOR: ASTHMA HOSPITALIZATION RATES IN WAYNE COUNTY, MICHIGAN

Background

Asthma is a chronic lung condition characterized by inflammation in the airways. Chronically inflamed airways are hyperresponsive; they become obstructed and airflow is limited when airways are exposed to various risk factors. This is caused by constriction of bronchial tissue, mucus plugs, and increased inflammation. Episodes or “attacks” of asthma are attributed to exposure to triggers that lead to constriction of the bronchial tissue, resulting in wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning. Asthma cannot be cured, but it can be controlled through avoidance of triggers, monitoring lung function, and appropriate use of medications (National Heart, Lung, and Blood Institute 2006).

Environmental factors that can affect asthma are present in both indoor and outdoor environments. Indoor factors can be irritants (e.g., gases like nitrogen dioxide, volatile and chemical compounds, small particles, tobacco smoke, and household dust) and allergens (e.g., primarily biological material such as pet dander, insect particles, pollen, bacteria, and mold) that cause an immune reaction in people who are sensitive. Outdoor factors are air pollutants that can be separated into two main groups: criteria pollutants and hazardous air pollutants. Criteria pollutants include six compounds (ozone, particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, and lead) of which ozone and particulate matter (or particle pollution) are most commonly linked with triggering symptoms of asthma in patients (Centers for Disease Control and Prevention 2005). Other asthma triggers include weather conditions, certain medications, exercise, strong emotions, foods, respiratory infection and other non-environmental triggers.

Routine air quality monitoring for particulate matter and ozone is performed in southeast Michigan. An American Lung Association (ALA) “State of the Air 2005” report (ALA 2005) showed that Detroit is one of the 25 most polluted U.S. cities by year-round fine particulate matter (particulate matter that is equal to or less than 2.5 μm in diameter [$\text{PM}_{2.5}$]). Furthermore, according to the ALA (ALA 2005), Detroit is also one of the 25 most ozone-polluted cities in the U.S. Clearly, much needs to be done in the Detroit Metropolitan Area to identify environmental factors that contribute to asthma attacks in this region and to reduce exposure to people. Based on asthma research, the U.S. Environmental Protection Agency (2006) has concluded the following:

- Exposure to air pollutants such as ground-level ozone can put both children and adults at greater risk of developing asthma;
- People with asthma are more severely affected by ozone and particulate matter than people without the disease;

- Children may develop allergies that are strongly associated with asthma due to exposure to metals (such as copper and zinc found in particulate matter) and to pollutants such as ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide, and lead at levels below the National Ambient Air Quality Standards; and
- There is greater prevalence and severity of asthma in the poorer socioeconomic groups, which is at least partially attributed to indoor air quality, and possibly to lack of proper nutrition.

Status and Trends

Asthma affects 20 million people in the United States (National Center for Health Statistics 2006). Over 701,000 adults and over 230,000 children currently have asthma in Michigan (Michigan Department of Community Health 2005). On average, rates for hospitalization due to asthma in Wayne County are over 75% higher than in the state of Michigan as a whole (Figure 1). In addition, rates of asthma hospitalization in Wayne County show no appreciable change since 1990, while the asthma rates of hospitalization statewide show an overall decline since 1990 (Figure 1).

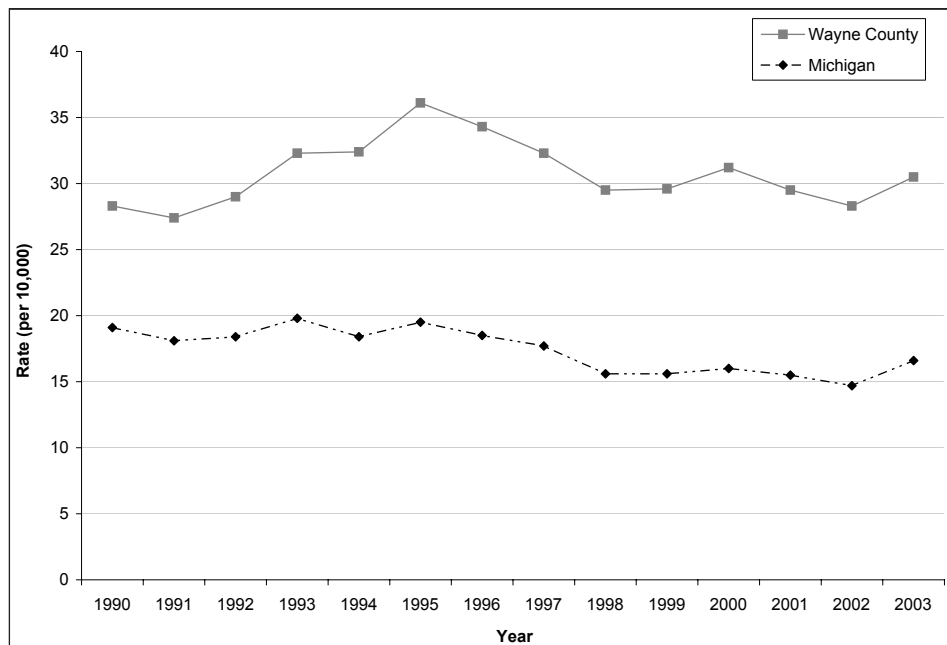


Figure 1. Annual hospitalization rates (age-adjusted) due to asthma (per 10,000 population) for Wayne County and the state of Michigan (all ages) from 1990 to 2003 (data from Michigan Inpatient Database, Bureau of Epidemiology, Michigan Department of Community Health [2005]). Note that asthma hospitalization was defined as a primary discharge diagnosis.

The U.S. Department of Health and Human Services (2000) has developed Healthy People 2010 – a set of disease prevention and health promotion objectives for the nation to achieve by the year 2010. Objective 24-2 of Healthy People 2010 gives the following target rates of asthma hospitalization by age group:

- Age 0-4 years: 25 per 10,000 people

- Age 5-64 years: 7.7 per 10,000 people
- Age ≥ 65 years: 11 per 10,000 people

Based on asthma hospitalization rates for 2000-2002, both Wayne County and the state of Michigan are significantly higher than the Healthy People 2010 targets established for all age groups (Figure 2; Michigan Department of Community Health 2005).

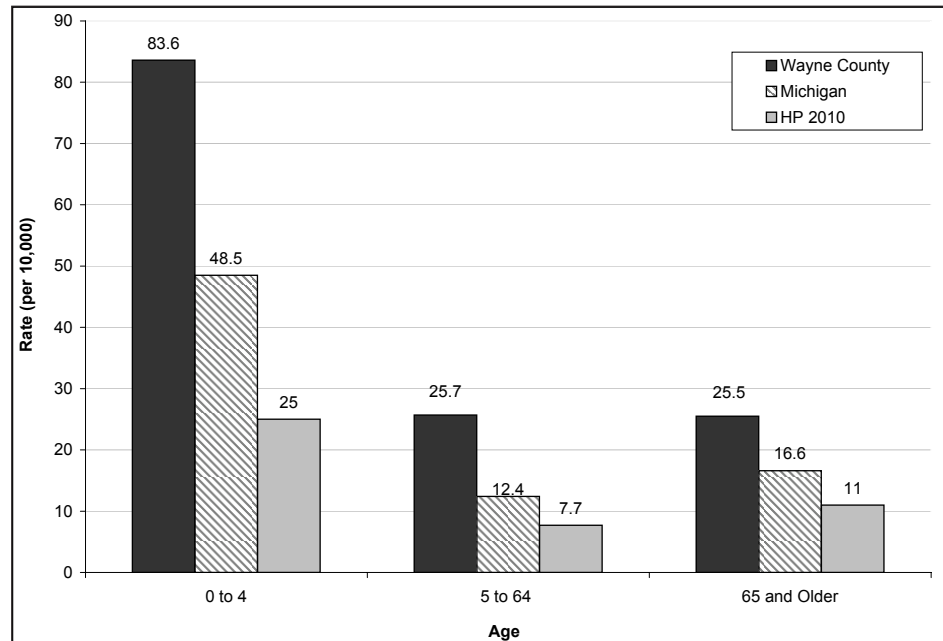


Figure 2. A comparison of asthma hospitalization rates (age-adjusted) in Wayne County and the state of Michigan from 2000-2002 with Healthy People 2010 targets by age group (data from Michigan Inpatient Database, Bureau of Epidemiology, Michigan Department of Community Health [2005]). Note that asthma hospitalization was defined as a primary discharge diagnosis.

Management Next Steps

Rates of asthma hospitalization continue to disproportionately impact Wayne County populations. The initial onset of asthma cannot be cured (Centers for Disease Control and Prevention 2005). However, asthma can be controlled, and people who have asthma can live symptom-free lives. Asthma can be controlled by following a medical management plan and by avoiding contact with known triggers.

The Centers for Disease Control and Prevention created the National Asthma Control Program in 1999. The program supports the goals and objectives of Healthy People 2010 for asthma and is based on the following three public health principles:

1. Surveillance: collecting and analyzing data on an ongoing basis to understand the “who, what, and where” of asthma;
2. Interventions: ensuring that scientific information is translated into public health practices and programs to reduce the burden of asthma; and
3. Partnerships: ensuring that all stakeholders have the opportunity to be involved in developing, implementing, and evaluating local asthma control programs.

Strong research programs in support of management are needed to reach Healthy People 2010 targets for asthma hospitalization. Wayne County needs to decrease hospitalization rates by 70% for age groups 0-4 and 5-64, and by 57% for age group ≥ 65 from 2005 data to reach Healthy People 2010 targets (Figure 2). This requires effective, continuous action on the part of government and public health officials, health care providers, and commitment of people living with asthma who are the ultimate managers of this chronic disease.

Further, to continue management of asthma in Wayne County, it is equally important to acknowledge that quality primary health care and personalized patient education (i.e., instruction on key steps in managing asthma: correct use of medication, avoidance of triggers, and identification and removal of specific environmental factors) are critical milestones to effectively treat, manage and control asthma symptoms, which could greatly improve the quality of life.

Research/Monitoring Needs

To better understand the prevalence of asthma and its consequences, Michigan must continue to improve its ability to collect data on the number of people with asthma for all age groups and populations (e.g., young children and racial/ethnic groups such as Arab American and Hispanic American communities). Michigan must also increase the amount of geographical detail in its data collection, so that effective interventions can be targeted to areas of high asthma burden (Michigan Department of Community Health 2004). Focused monitoring and research in Wayne County neighborhoods that have higher rates of asthma hospitalization are a priority and are currently being conducted by state and local public health officials. Assessing these communities and investigating reasons for higher rates of asthma hospitalization will lead to the development of intervention strategies, targeting of funds, and increasing awareness, education and outreach to not only the communities, but also to primary care providers who have critical contact with patients. These activities will contribute to reducing racial, ethnic, geographic and economic disparities in asthma hospitalization rates.

The U.S. Environmental Protection Agency (2006) published a report highlighting results from current asthma research and describing three high priority research areas that are currently being addressed by federal, state, and local health agencies:

- study certain types of air pollutants and their effects believed to play a greater role in inducing and exacerbating asthma (e.g., fuel combustion and bioaerosols such as indoor molds, and particles from dust mites and cockroaches);
- study factors that increase susceptibility to asthma or factors that increase risk of subgroups of Americans, focusing on genetic factors that could interact with environmental exposure; and
- intervention (e.g., reducing risks from environmental factors, improving indoor air quality, and providing education to affected communities).

References

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Links for More Information

Asthma Initiative of Michigan: <http://www.getastmahelp.org/>

Epidemiology of Asthma in Michigan: Surveillance Report 2004: <http://www.bhsj.org/healthdata/StateReports/AsthmaSurveillance%20report%202004.pdf>

Global Initiative for Asthma: <http://www.ginasthma.com>

Michigan Department of Community Health: <http://www.michigan.gov/mdch>

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