

Ingham County, MI
A Story of Suppression
Part 3:
Air Quality & Asthma
Indicators

October 31, 2001



About

This Report

In early 2001, PEER was first approached by a number of Ingham County employees to discuss the suppression of reports assessing the overall environmental health of the county and its residents.

A team of people involved with county health issues conducted an extensive analysis of a variety of public health issues. The information they uncovered details past inaction by the county and state officials that have left serious environmental health problems unaddressed. However, after investing many thousands of dollars in the report, the county, fearing negative public backlash, blocked the release of all but one report; a 20 page brochure on water quality. On September 19, 2001 PEER released a 130 page report suppressed by the Health Department, called "The Story of Water Resources at Work." Two weeks later PEER released a second censored report, on Ingham County's food quality. It found that 29% of the County's 898 restaurants and other food establishments had failed a food inspection in 1998.

This third report, **Ingham County: Air Quality & Asthma Indicators** is a compilation of information gathered from Michigan Department of Environmental Quality (MDEQ), Michigan Department of Community Health, the USEPA and other sources. This report combines three topical areas, asthma, outdoor air and indoor air (and indoor environments). This report was in its initial research stage when provided to PEER. Therefore, some information may be missing or incomplete.

PEER offers this suppressed report to the Ingham County community to provide citizens with the tools they need to address air quality problems in their homes and surrounding communities.

To avoid distracting from the message and avoid the prospect of future retaliation, the authors have chosen to remain anonymous. The authors also believe that the facts presented herein speak for themselves. PEER has added a few notes to this edition of the report. They are indicated by [brackets].

PEER is proud to assist conscientious public servants who have dedicated their careers to the protection of our natural resources and to faithful execution of the laws.

Jeff Ruch
PEER Executive Director

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Executive Summary

Asthma has reached epidemic proportions among African American youth in Ingham County. The rate of preventable hospitalizations for black males, aged 1-14 is particularly high, amounting to 64.8 per 10,000. This greatly exceeds the Healthy People 2010 goal of 10 per 10,000. In fact, asthma – a lung disease characterized by wheezing, cough and breathing difficulties -- is the number one source of preventable hospitalizations for all children 18 and younger in Ingham County. The hospitalization rate for children aged 1-14 is 18.1 per 10,000 children, nearly double the Healthy People 2010 goal.

Air quality is the primary determinant of asthma, whether it is air inside the home (filled with dust mites or second-hand smoke) or the air billowing from smokestacks outside one's residence (filled with gases like sulfur dioxide). *And there is plenty of sulfur dioxide spewing in Ingham County – an estimated 10,573 tons in 1996, according to the US Environmental Protection Agency's Emissions Database.*

This report describes what we know about Ingham County's air and discusses how it affects your health. Asthma is just the tip of the iceberg. Hypertension, heart attacks, emphysema, and cancer are all proven byproducts of air pollution. For example, the Environmental Defense Fund (EDF) found that in 1990 Ingham County citizens faced a cancer risk more than 100 times the goal set by the Clean Air Act. This means that *about 26 people in Ingham County got cancer from the local air in 1990.* According to Cathy Simon, a toxicologist with the MDEQ, the EDF estimates are “a fair assessment.”

Since the Clean Air Act of 1970, state and federal government has focused attention on six pollutants: ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, lead and microscopic bits of “particulate matter.” We inhale these toxins -- called the “criteria pollutants” -- daily. They are a byproduct of the industrial age. The good news is that all six of these pollutants have fallen in Ingham County. Nationally tens of thousands of lives are saved each year because of air pollution controls (including 79,000 lives saved from hypertension and 18,000 heart attacks) according to a 1996 EPA report. *Still, the local air is not considered safe. According to the EPA, Ingham County has not been in attainment (safe levels) for well over 99% of the last ten years, including all of 1993-1999.*

Moreover, if you add the other 647 chemical pollutants measured in the federal Toxic Release Inventory (TRI) in 1997, there was a dramatic increase in air pollution of nearly 400,000 pounds emitted from local companies between 1996 and 1997. *One reason for the surge in local air pollution was increased activity at the General Motors (Lansing Body Plant). Its toxic air releases went from 531,608 pounds in 1996 to 869,958 pounds in 1997, an increase of 338,350 pounds, or 64%. This was the 6th highest increase of any facility in the state of Michigan.* We do not have clinical data on the specific health effects to the people in the direction of the plumes

surrounding the plant.

The EPA only regulates the 6 criteria pollutants named above. Escaping regulation are hundreds of TRI toxins, including the top five gases in 1997: Xylene, mixed isomers (299 tons), N-Butyl alcohol (94 tons), Methyl Ethyl Ketone (34 tons), Hydrochloric Acid (30 tons) and Methanol (30 tons).

The principle sources of xylene are in the production, transport, storage and sale of gasoline; manufacture of plastic bottles, polyester fibers. The effects on humans are eye nose and throat irritation, dizziness, excitement, drowsiness, nausea, vomiting, abdominal pain and dermatitis. Data linking these health effects with a specific exposure to this gas is not available. Physicians rarely ask patients about their environments.

Where you live has a strong relationship to your chance of getting diseases like asthma. The highest incidence of asthma occurs in zip code 48915. The rate of asthma hospitalizations for 1-14 year olds there is 50.3 per 10,000. This contrasts with a more typical zip code like 48911, where the rate is just 21.2 per 10,000 for 1-14 year olds. It so happens that the 48915 zip code is located in a more industrialized section of Lansing. We do not know the degree to which toxic release facilities or the indoor air in that area are contributing to the disease. The public health response to these issues has been poor.

Ironically, local data on illness and diseases like asthma, allergies and sick building syndrome are quite limited. ***One would think that Sparrow Hospital and Ingham Regional Medical Center would share emergency room disease data directly with the public or local health professionals so that citizens could better assess who is getting sick and why. But they do not. The state of Michigan does make some disease data available in aggregate form on its web sites, but it is not geo-coded, meaning disease clusters are not discernible (though special data requests sometimes yield results). For years the Mid-Michigan Asthma Coalition has been trying to acquire emergency room data from local hospitals to no avail.***

Restricted access to disease data prevents doctors, health analysts, and environmental professionals from linking facts about toxic exposures to citizen health in Ingham County.

Lansing's citizens might be shocked to learn that our leading utilities are fighting EPA moves to limit their release of toxic gasses. In 1997, the Lansing Board of Water and Light was the top emitter of Sulfur Dioxide and Nitrogen Dioxide, two gases which contribute to asthma, heart disease, pulmonary edema, increased heart and breathing rates, and chronic respiratory disease. According to the EPA, the largest sources of mercury emissions on a national level are coal-fired power plants (33%). ***Ingham County's largest mercury emitter is the LBW, an old coal-fired utility.*** The DEQ estimates that the BWL emitted 145 pounds of mercury in 1993 (the last time that estimates were made). That may not sound like much until one considers that it could take a fraction of a teaspoon to contaminate a small lake to the point that the fish in that lake are unsafe to eat.

Recently environmental scientists and the public have turned their gaze to our indoor air, in home, work or commercial environments. It is now recognized that household problems like indoor molds, poor ventilation and carbon monoxide (leaching from a furnace) account for untold levels of disease and illness.

In 1999 the Ingham County Health Department appeared ready to tackle some of these life and death indoor air issues. In June 1999 administrators labeled 22 indoor air issues as “urgent.” Still, more than two years later the Health Department has remained silent, the public uninformed. Here is some of what that investigation started to uncover before research was stopped [see attachment 1 www.peer.org/michigan/Ingham_co_air_table.html].

- ***Carbon Monoxide (CO).*** In 1998 there were an estimated 1,048-1,253 consumer complaint calls made to contractors and utilities about possible leaks. An estimated 470-613 of these indoor environments had a positive CO leak. Complaints are made when a CO alarm sounds off or when a person experiences symptoms that they attribute to CO gas. The verification of an actual positive detection of CO is made from field visits and routine inspections. Consumer’s Energy is the only organization that tracks complaints. ***Between 1970-1997 there were 155 Carbon Monoxide deaths in Ingham County, (41 unintentional).*** Unintentional deaths have been falling. There were 31 in the ‘70’s but only 3 between 1990 and 1997.
- ***Radon. Approximately 10-12% of returned radon results show radon levels equal to or exceeding the action level of 4 picocuries per liter.*** The National Cancer Institute estimates that radon causes 20,000 to 30,000 deaths a year. Radon – an odorless, invisible gas -- acts synergistically with tobacco smoke, multiplying exponentially the cancer risk for smokers when radon is present. The rate of high radon test reports is about 5% in central/northwest Lansing. The rate of high radon test reports is about 9% overall in the city of Lansing.
- ***Childcare Indoor Infections (and hospital nosocomials).*** Childcare outbreaks are very under-reported. Much communicable disease, such as the common cold and chicken pox, do not come to the attention of the Health Department. There were only 5 childcare infection outbreaks recently (2 in 1992, 2 in 1993 and 1 in 1994). They involved diseases such as Giardiasis and Diarrhea. ***Formal data requests were made to Sparrow and Ingham Regional Medical Center but they refused to release nosocomial data.*** Informants from both hospitals said that infection-related data was complex and that the data was generally non-comparable with other hospitals.
- ***Sick Building Syndrome.*** A condition in which building occupants experience acute health and comfort effects that are apparently linked to the time they spend in the building. Many different symptoms have been associated with SBS, including respiratory complaints, irritation, and fatigue. The Michigan MIOSHA has records of numerous sick building syndrome complaints, but data release requires a Freedom of Information Act request. According to a MIOSHA worker, “years ago we did a lot of [SBS] responses [but our studies showed that] this is not a serious hazard.”

Several health analysts dispute this viewpoint. For example MSU's own Donald Waite, DO, MPH, author of *Environmental Health Hazards, Recognition and Avoidance (1994)* asserts that ***“providing adequate ventilation is the logical solution to most cases of SBS. For buildings where smoking takes place, he recommends that at least 20 feet of outside air per occupant be introduced rather than the customary 5 ft. required by most building codes. This has been resisted because of the added heating and cooling costs,”*** he said.

- ***Noise. The current noise standards were based on research done on young healthy males in the military in the 1930's and 1940's.*** The results may be misleading for other segments of the populations including women, children and young adolescents. The CDC is working to change this. Ingham County receives about 1 noise complaint per month. Typical are loud noise complaints from forging and machining industries, construction sites, steam line clean out, agricultural practices, or traffic/diesel engines. The majority of noise complaints are below the OSHA standard, as measured by the Health Department's noise meter. Most are readily correctable. The number of complaints has increased over the last few years. According to Mike Allen, environmental toxicologist with the Health Department, increased trucking and worker commuting can be a significant noise source. ***“There has also been a shift in the U.S. economy from a warehouse supply system to one based increasingly on next day supply delivery, the volume of trucking per unit of production is increasing [thus an increase in noise],”*** he said.
- ***Asthma's curious “flip-flop in hospitalizations between black males and black females.*** Hospitalizations for black males drop from 64.8 per 10,000 (in ages 1-14) to 13.6 per 10,000 in the 15-49 age group. Conversely, ***hospitalizations for black females rises from 23.6 per 10,000 in the (1-14) age group to 61.1 per 10,000 in the 49 and over group.*** According to Lyon-Callow the state's asthma coordinator, it is not known precisely why there is a flip-flop in the ages, but she suggested a few possible explanations. She said that perhaps boys symptoms are more likely to be recognized than girls; or it may be factor of how much complaining one does; or it could have to do with differential compliance with treatment regimens; or poor case management by the medical provider. She added that the ultimate explanations are unknown at this time. Still, these responses beg the question about the local etiologies of asthma and suggest that more research be conducted to better understand and address this issue.

Citizen researchers should pursue this abandoned environmental health research agenda with all deliberate speed.

**Section 1:
Air Quality &
Asthma Indicators**

Last Updated August 23, 1999

Issue Overview

Asthma is the number one source of preventable hospitalizations for children aged under 18 years of age in Ingham County. The rate of preventable hospitalizations for black males aged 1-14 is particularly high in Ingham County, amounting to 64.8 per 10,000 in that demographic. This greatly exceeds the Healthy People 2010 goal of 10 per 10,000.

Preventable hospitalizations are conditions where timely and effective ambulatory care can decrease hospitalizations by preventing the onset of an illness or condition, controlling an acute episode of an illness or managing a chronic disease or condition.

Asthma is a lung disease with recurrent exacerbations of airway constriction, mucous secretion, and chronic inflammation of the airways, resulting in reduced airflow that causes symptoms of wheezing, cough, chest tightness and difficulty breathing (Healthy People 2010, p. 24-3). It is one of the leading causes of chronic illness in children.

There are an estimated 14.9 million U.S. citizens with asthma and significantly, there has been an 82 percent increase in the asthma rate over the last 15 years (according to Healthy People 2010, p. 25). The literature on asthma is vast, consisting of a wide range of theories on asthma etiology, morbidity, prevention and clinical management issues.

Socioeconomic status, particularly poverty, is a contributing factor to asthma morbidity and mortality. Asthma disproportionately affects children and minority populations. In the U.S., asthma hospitalization and morbidity rates for nonwhites are more than twice those for whites. A number of explanations attempt to account for this, including: high levels of exposure to environmental tobacco smoke and other indoor pollutants, ambient air pollutants (ozone, sulfur dioxide, and particulate matter), environmental allergens, lack of access to quality medical care, poor financial resources and lack of proper disease management. Programs targeted to high-risk populations are critical.

There are high economic costs associated with asthma. According to Weiss et. al. (New England Journal of Medicine, March 26, 1992, p. 862), “although asthma is often considered to be a mild chronic illness treatable with ambulatory care, we found that 43 percent of its economic impact was associated with emergency room use, hospitalization and death.” This amounted to about \$2.6 billion in 1990.

The Environmental Components

Indoor Air pollutants:

High indoor allergen exposures may explain the increased asthma morbidity and mortality (Huss et al 1994). The major indoor allergens in the inner city causing asthma are dust mites and cockroach allergen. Others include animal dander and mold spores (Rosenstreich et al New England Journal of Medicine, May 8, 1997). Many children spend 90% of their time indoors with long exposures to many potentially harmful airborne allergens.

Another source of concern are indoor environments like schools and workplaces. Researchers at the Henry Ford Hospital in Detroit are conducting an environmental assessment of 14 schools in Detroit, checking for mold, plants, upholstered furniture, inadequate air supply and faulty heating systems which can all contribute to problems associated with asthma.

Outdoor air pollutants:

There are differing opinions about the impact of outdoor pollution on asthma. Some feel that it is of little or no consequence; others have conducted research that draws links between outdoor pollutants and asthma. Here is what one researcher, David Bates, of the Department of Epidemiology, University of British Columbia has published on the issue:

Particulate Pollution (PM₁₀): According to Bates (Environmental Health Perspectives, 103:6, 1995) (PM₁₀) has been shown to be related to increased emergency room visits for asthma, increased medication use, increased symptoms and increased hospitalization.

Ozone: Bates (1995) argues that studies have shown that ozone provokes airway inflammation at very low levels

Nitrogen Dioxide: Bates argues that there is little evidence of any direct effect on asthmatics at ambient levels; however he noted that the increases prevalence of asthma in Britain has occurred over a period in which the population was exposed to increasing levels of NO₂.

Michigan Data Initiatives

Local data on asthma is quite limited. It resides primarily in two databases: 1) the Michigan in-hospital database; and 2) the Michigan mortality record database. We have plotted some Ingham County level indicators (attached) that are derived from these sources. According to Bob Wahl, an environmental epidemiologist with the state, “we do not have a good idea of prevalence of asthma” because of the lack of

data on the issue. He was especially concerned about the lack of emergency room data.

There have recently been some important new developments in addressing the asthma issue. Last year the Michigan Department of Community Health, with funding from the CDC, created an Asthma Surveillance Coordinator position, staffed by Sarah Lyon-Callo. Lyon- Callo is conducting research and forging coalitions that will help her gather asthma data in four key areas/methods: 1) capturing severity and out of control asthmatics; 2) adding new questions to the CDC for adults; 3) increasing school-based surveillance; and 4) developing an Emergency Room surveillance system for asthma.

On another front, this past April, 1999, the Mid-Michigan Asthma Coalition was founded by a group of local professionals: Steve Springer of the American Lung Association of Michigan joined with two respiratory therapists (one from Sparrow and the other from Ingham Regional Medical Center) to found the coalition. The coalition met in May and appointed two co-chairs: Dr. Autumn Clos, a pediatric pulmonologist and Dr. Geoff Linz, the chief medical officer at Ingham. There are about 50 participants who have divided into 5 subcommittees: 1) data, 2) public awareness; 3) patient education; 4) professional education and 5) schools. (The next meeting is scheduled for September 29th and we'll be in attendance.)

Ingham County Level Data: (Please see 6 attached graphs) [Note: Only 3 graphs were available for this publication.]

As stated above, asthma is the number one source of preventable hospitalizations for children aged under 18 years of age in Ingham County. Attached are six graphs that illustrate some of the hospitalization and mortality trends for Ingham County. You will note that the County as a whole exceeds the Healthy People Goal by a small fraction and that the rate for all children aged 1-14 exceeds the Healthy People 2010 goal by 8.1 per 10,000 cases.

Of particular cause for alarm is the high level of hospitalizations of asthma among African American boys (ages 1-14). Another area of concern involves the curious "flip-flop" in hospitalizations between black males and black females. Hospitalizations for black males drop from 64.8 per 10,000 (in ages 1-14) to 13.6 per 10,000 in the 15-49 age group. Conversely, hospitalizations for black females rises from 23.6 per 10,000 in the (1-14) age group to 61.1 per 10,000 in the 49 and over group.

According to Lyon-Callow, the state's asthma coordinator, it is not known precisely why there is a flip-flop in the ages, but she suggested a few possible explanations. She said that perhaps boys symptoms are more likely to be recognized than girls; or it may be factor of how much complaining one does; or it could have to do with differential compliance with treatment regimens; or poor case management by the medical provider. She added that the ultimate explanations are unknown at this time.

Still, these responses beg the question about the local etiologies of asthma and suggests that more research be conducted to better understand and address this issue.

Mapping Asthma:

We have received some zip code data on asthma hospitalizations for Ingham County. We shall map these in Arcview as soon as possible.

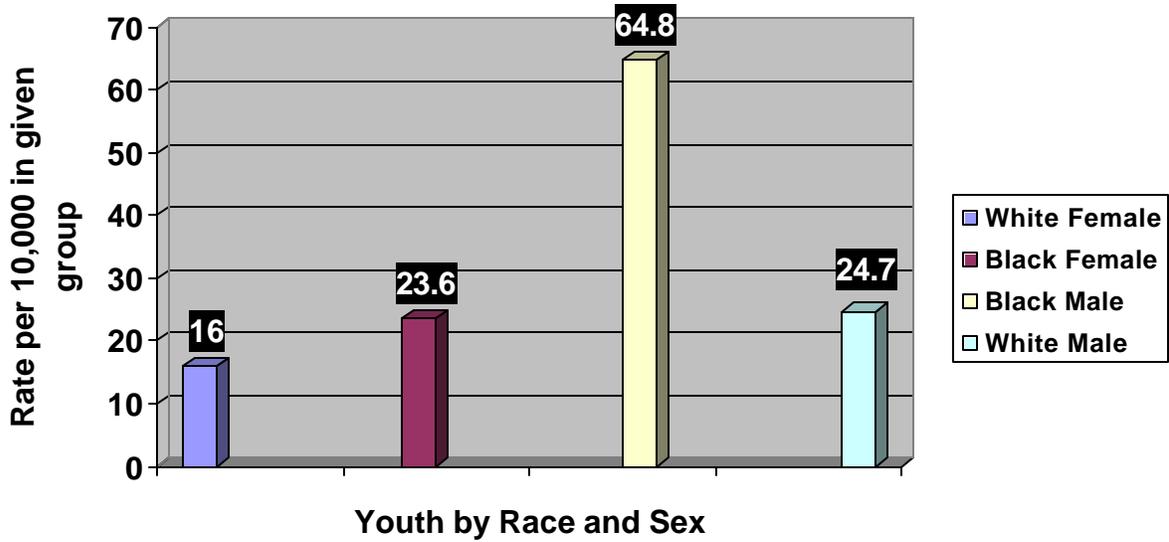
| Ages | 1-14 | | 15-49 | | 49+ | |
|----------------|---------------|-------------|---------------|-------------|---------------|-------------|
| Zipcode | Number | Rate | Number | Rate | Number | Rate |
| 48823 | 74 | 16.9 | 98 | 17.7 | | |
| 48906 | 82 | 17.1 | 126 | 33.9 | 60 | 29.7 |
| 48910 | 186 | 35.2 | 234 | 45.8 | 168 | 41.9 |
| 48911 | 141 | 21.2 | 186 | 31.6 | 108 | 37.1 |
| 48912 | 70 | 26.5 | 111 | 39.9 | 75 | 35.4 |
| 48915 | 96 | 50.3 | 94 | 59.5 | 82 | 56.5 |

Other Possible Asthma Indicators:

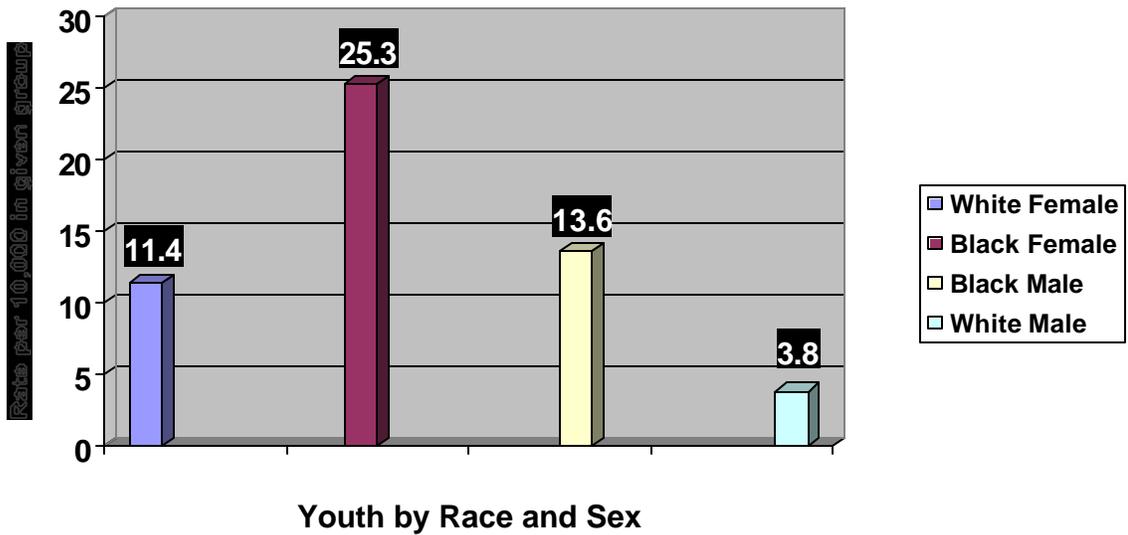
1. Emergency room usage.
2. Estimates of the anti-asthma medications in Ingham County.
3. Loss of school days in Ingham County due to asthma morbidity

Graphs on following pages.

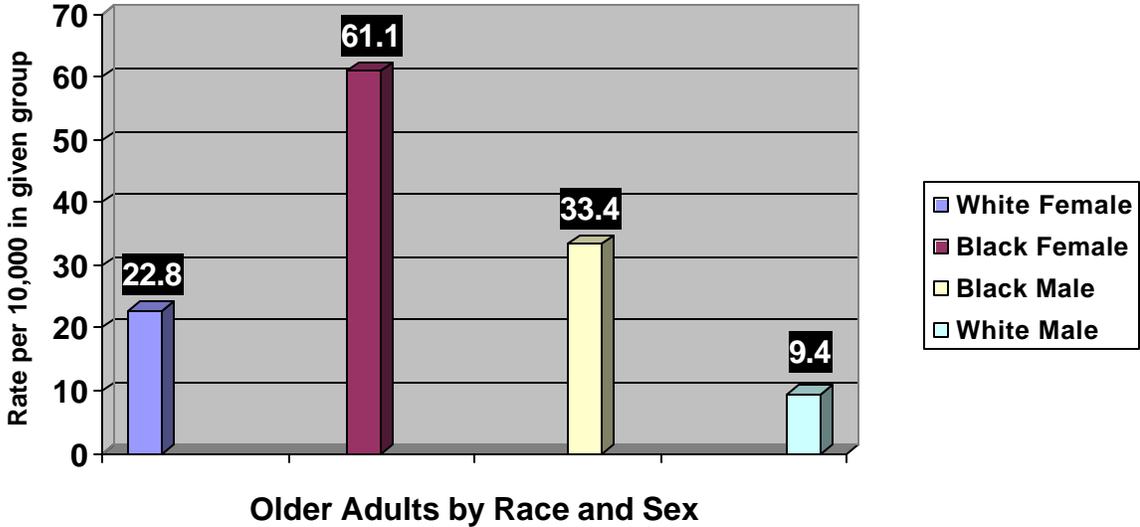
**Rate of Preventable Hospitalizations for Asthma, 1990-97
Ingham County, *Ages 1-14*, By Race and Gender**



**Rate of Preventable Hospitalizations for Asthma, 1990-97
Ingham County, *Ages 15-49*, By Race and Gender**



Rate of Preventable Hospitalizations for Asthma, 1990-97
Ingham County, *Ages 49 and Over*, By Race and Gender



Section 2: Outdoor Air Report

Last Updated: October 29, 1999

Overview

The means for measuring and evaluating air pollution in the U.S., and in Ingham County has been evolving since the introduction of the Clean Air Act in 1970. The issue of air quality in Ingham County is tied to larger ecological, political and economic currents. The data reveals some good news, some bad news and some news that warrants further investigation.

There are four main sources of air pollution:

1. Industrial operations (for example, General Motors auto assembly plant)
2. Combustion of fuels for heating and energy production (For ex., the Board of Water & Light)
3. Solid waste disposal facilities (for example, Granger Landfill)
4. Motor vehicles and other mobile sources (the major source of carbon monoxide pollution).

Air is the largest receptacle for industrial emissions. Of all the toxic chemicals released by industry more than half are released into air. These emissions include about seventy known or suspected carcinogens. When the pollutants from vehicle exhaust and power plants are included into the equation, the number rises much further. Federal and state governments actively regulate six “criteria” pollutants (e.g. sulfur dioxide, see page 16 below for a list and explanation) and 189 hazardous air pollutants. They require Best Available Technology for reducing emissions (usually limited to the original permitting phase of a new facility/production technique). The government also inventories (i.e. keeps a record of without enforcement) about 600 other chemicals through the EPA’s Toxic Release Inventory. This inventory keeps evolving, the government having recently added about 200 more chemicals to the list in 1996.

Overall, Ingham County meets the National Ambient Air Quality Standards (NAAQS) established by the EPA, and has done so for the past decade (with a few days exception for ozone exceedences in the late 1980s and in 1992). However this is merely one -- quite imperfect -- indicator of the status of the air quality of Ingham County, as this report will illustrate. *The reader must keep in mind that the NAAQS only concerns itself with 6 chemicals out of the thousands of chemicals circulating in the air.*

There are three current regulatory developments of note that affect Ingham County. There is a new effort to lower the threshold of particulate matter (PM). The old standard was PM less than 10 microns in diameter. The new level of concern is PM 2.5. This size of matter will enter deeply into the lungs, reaching the tracheobronchial region and the alveoli. When particles become lodged in the alveoli, the

mucocilliary system works very slowly at removing them. *Asthmatics, people with cardiovascular disease, children, and the elderly are considered to be especially sensitive to fine particulate matter.* Ingham County has not had a PM 10 monitor for a number of years (our levels are determined by modeling formulas and estimates). However this year (1999) Ingham County received its first PM 2.5 monitor. Data from the monitor will be available next year.

Another development concerns new regulations for Nitrogen Dioxide emissions (NO2). The Environmental Protection Agency has been attempting to make Michigan and other Midwestern states reduce power plant emissions so that less smog-causing pollution would blow into New York and New Jersey. For many states the new standard would not begin until 2003, for others, 2005. However the Engler administration, along with many Michigan utilities and some other states, have sued the federal government over this regulation. Michigan officials contend that it is unfair for Michigan companies to comply with the new (and expensive) standards when East Coast states have not done as much as Michigan to reduce their own smog. Local environmental critics argue that emissions from these facilities affect human health and should be brought within tighter standards. They also argue that high NO2 emissions increase the regional transport of ground-level ozone.

Much of this NO2 pollution comes from coal-fired power plants. There are three such plants in Ingham County:

| Top Three Polluters of Nitrogen Dioxide, Ingham County, 1997 | |
|---|--|
| 1. The Board of Water and Light's Eckert Station | 4582 tons emitted in 1997. It was ranked 11th in the state. |
| 2. The Lansing Board of Water and Light's Erickson station | 4292 tons emitted in 1997. It was ranked 12th in the state. |
| 3. Michigan State University's Incinerators | 1829 tons in 1997. It was ranked 14th in the state. |

Moreover, the two Lansing Board of water and light plants, being older facilities, are exempt from the new standards. *These two Lansing Board of Water and Light plants emit two or three times more nitrogen oxides and three to four times more sulfur dioxides than a new plant would be allowed to produce.* The plants also emit mercury but are not required to measure the emissions. (According to Joy Taylor, mercury specialist with the DEQ, the only air mercury data available for Ingham County comes from 1993 estimates, when it was estimated that Ingham County emitted 145 pounds, most of it from the above facilities. That year Ingham County ranked 7th in the state for total mercury emissions). It only takes 1/70th of a teaspoon of mercury to contaminate a 25-acre lake to the point where the fish may be unsafe to eat (source Michigan Environmental Council).

Incidentally, the EPA has recently begun a campaign to reduce 12 priority persistent bio-accumulative toxins (PBTs) such as mercury (and DDT and PCBs). PBTs are long lasting substances that build up in the food chain to levels that are harmful to human and ecosystem health. Already the EPA and the American Hospital Association are working as partners to reduce mercury use in hospitals across the U.S.

Third, there is also a new, stricter 8 hour standard for measuring ozone. In 1999, for the first time in years, Ingham County had some individual values that were over the allowable standard. However, according to the DEQ, these were not official exceedences of the standard, which must follow a formula that takes the 3-year average of the fourth highest value to measure exceedences of that standard. Still, the fact that Ingham County experienced some days (e.g. September 3, 1999) when the value of 97 Parts Per Billion (PPB) went beyond the 85 PPB standard, is cause for some reflection.

Ingham County air is not simply a product of local polluters. Air currents swirl in great streams from all over the world to deposit various toxins into the county depositing persistent bioaccumulative compounds such as PCBs (which are still the cause for fish advisories for fish like carp and walleye in Ingham County waters such as the Grand River). Some of our local air comes from Wisconsin, Indiana and Illinois. But the Great Lakes Basin receives air from the world over and a banned substance like DDT can be found in Ingham County air from sources as far away as Thailand where it is common use.

Organization of the Report

This report is divided into five sections:

- 1) NAAQS (point source data)**
- 2) Pollutant Standards Index (ambient)**
- 3) Toxics Release Inventory (TRI, point source data)**
- 4) Special Note on Health Effects**
- 5) Specific review of critical issues and hot spots in Ingham County**

One very important point to keep in mind for understanding air pollution data is that there are two main levels of data collection:

- A.) One is for ambient (or surrounding) air.
- B.) The other is for point source emissions (most often industrial stacks).

1. National Ambient Air Quality Standards (NAAQS)

Some good news regarding Emissions

A. Michigan's estimated emissions for six criteria pollutants have dropped since 1974

With the introduction of the Federal Clean Air Act in 1970, there has been much improvement in some areas of Michigan's air quality. The Clean Air Act requires states to prepare and maintain emission inventories of six major pollution sources, using standard EPA calculation methods. These are called the National Ambient Air Quality Standards. Unfortunately there are only standards for six "criteria" pollutants (listed below). The database compiles information from over 2,000 facilities and nearly 19,000 emission points (Environmental Quality Report, 1999).

| The six major pollutants covered by the Clean Air Act | |
|---|---|
| 1. Ground level Ozone (smog) | Human made sources of this photochemical compound come from a combination of Nitric Oxide, NO ₂ , Volatile Organic Compounds (VOCs), 90-degree days and photochemical oxidation. Among the major health effects are asthma, chronic obstructive pulmonary disorder and congestive heart failure. |
| 2. Lead | Human made sources include auto exhaust, coal combustion, metal smelters, and incineration of municipal solid waste. Among human health effects are the threat to the mental development of infants and children. |
| 3. Sulfur Dioxide | This is brought on by the combustion of fossil fuel like coal. It contributes to acid rain and is a trigger for people with asthma. |
| 4. Nitrogen Dioxide | This comes from the burning of fossil fuels and power plants. It may contribute to COPD* and influenza. |
| 5. Particulate Matter | Fugitive dust from numerous sources such as industry, construction, agriculture. It contributes to respiratory and heart disease. |
| 6. Carbon Monoxide | This comes principally from automobile exhaust and is a contributor to COPD, and congestive heart failure. |

COPD= chronic obstructive pulmonary disease, a type of asthma

Nationally, there were significant decreases in emissions for five of those six pollutants between 1970 and 1997. Carbon monoxide was down 32 percent, lead down 98 percent, volatile organic compounds down 38 percent, particulate matter down 75 percent and sulfur dioxide down 35 percent (Source: NOAH, the New York On-line Access to Health, a project affiliated with City University of New York).

SEE ATTACHMENT #1, POLLUTION EMISSION ESTIMATES 1974-1997 (for Michigan)

[Note: this table was unavailable for this PEER publication.]

According to the EPA in a 1996 report, tens of thousands of lives are saved each year because of air pollution controls (including 79,000 lives saved from hypertension and 18,000 heart attacks). They argue that trillions of dollars have been saved since 1970.

B. Ingham County's Recent Air Emissions of Criteria Pollutants

At this time we only have data for 1995-1997

SEE ATTACHMENT #2: CRITERIA POLLUTANT EMISSIONS FROM POINT SOURCES, INGHAM COUNTY MICHIGAN [Note: this attachment was unavailable for this PEER publication.]

Assuming that Ingham County reflects state-level trends, five of the six criteria pollutants have dropped since 1974. However, from the data that we acquired from the DEQ, we can see that over a three-year period there have been increases in sulfur dioxide (SO₂) and nitrogen dioxide (NO₂) in Ingham County.

The Lansing Board of Water and Light (Eckert facility) accounted for a significant share in the rise of NO₂ emissions during this time, increasing 31% from 3,497 tons to 4,582 tons. (Please note that in constructing this report we discovered that the DEQ Air Quality Division did not provide records for the Lansing Board of Water and Light's Erickson station; acquired those numbers from another source. Will integrate them ASAP.)

SEE ATTACHMENT #3 LANSING BOARD OF WATER AND LIGHT NITROGEN DIOXIDE EMISSIONS [Note: This table was unavailable for this PEER publication.]

The stack emission levels are reported voluntarily to the DEQ. There used to be 10,000 facilities in the system that reported to the Air Quality Division; however that has recently been reduced to about 2,000. An informant said that this made data collection more efficient. "We follow the 80/20 rule." We are concerned about the loss of critical data/enforcement actions on facilities emitting criteria pollutants. There are 165 facilities reporting in the Shiawassee District. Ingham County currently has 21 sites reporting. Most of these sites are also Toxic Release Inventory sites. Also, there is a disparity between the number of sites permitted for air quality in Ingham County, and those sites monitored for criteria pollutants. In 1999 there are 328 permitted facilities in Ingham County (Greg Serrano, Permit Section with DEQ is preparing an Excel spreadsheet of those), but only 21 were monitored. This may be because the others were not of any consequence. (Am currently following up on this.)

2. Pollutant Standards Index

This index was created by the EPA to provide a simple, uniform way to report daily air pollution concentrations. It is a vehicle for government agencies to advise the public about the health effects

associated with various levels of pollution and to advise precautionary steps.

Approximately 126 million people in the U.S. live in areas designated as non-attainment (not passing) for one or more of the six criteria pollutants. As noted above, Ingham County has not been in attainment (safe levels) for well over 99% of the last ten years, including all of 1993-1999.

For a review of how 8 metropolitan statistical areas fared (including Lansing/East Lansing) with this measure, please refer to:

SEE ATTACHMENT #4 POLLUTION STANDARD INDEX 1987-1997 [Note: this table was unavailable for this PEER publication.]

But also note that Ingham County has had almost no ambient air monitors for its recent history. The only monitors we have now are for ozone and PM2.5 (just installed).

SEE ATTACHMENT #5 TO SEE THE LACK OF MONITORS FOR THE LANSING AREA...IN THIS CASE FOR SO2 [Note: this table was unavailable for this PEER publication.]

Note that there was not data for Ingham County. For a more recent (and detailed appraisal of how Ingham County fared, see:

SEE ATTACHMENT # 6 ENVIRONMENTAL PROFILE FOR INGHAM COUNTY (PAGES 1 AND 2) [Note: this table was unavailable for this PEER publication.]

This material is available over the Web on the EPA's web site. Note the semi-circle scale on page 1, which places Ingham County in the moderate value of air quality. For a more detailed summation see page 2 which provides an index value on a daily basis for each of the daily pollutants. According to the graph, Ingham County's highest daily values were for carbon monoxide and ozone.

It is important to keep in mind that these are ambient (or surrounding) levels of criteria pollutants. For a graphic illustration of these ambient pollutants for Ingham County:

SEE ATTACHMENT #7 TONS OF CRITERIA POLLUTANTS INGHAM COUNTY [Note: this graphic was unavailable for this PEER publication.]

Below is the data for which this chart was based:

**Ambient Tons of Criteria Air Pollutant Emissions
for Ingham County, Michigan**

| Year | Sulfur Dioxide | Nitrogen Dioxide | Volatile Organic Compounds | Carbon Monoxide | Particulate matter 10 |
|-------------|-----------------------|-------------------------|-----------------------------------|------------------------|------------------------------|
| 1986 | 16,410 | 21,820 | 24,192 | 114,044 | 20,588 |
| 1987 | 17,765 | 20,029 | 22,645 | 99,143 | 21,228 |
| 1988 | 18,955 | 22,117 | 22,764 | 104,679 | 21,853 |
| 1989 | 19,593 | 22,827 | 21,816 | 100,859 | 22,633 |
| 1990 | 25,848 | 23,586 | 20,245 | 90,644 | 13,321 |
| 1991 | 15,355 | 21,124 | 19,826 | 97,176 | 13,221 |
| 1992 | 14,889 | 22,493 | 21,507 | 103,461 | 13,833 |
| 1993 | 13,576 | 21,583 | 20,311 | 104,640 | 13,177 |
| 1994 | 11,376 | 20,952 | 20,899 | 107,836 | 12,633 |
| 1995 | 11,309 | 20,782 | 19,386 | 92,476 | 11,457 |
| 1996 | 10,593 | 19,268 | 18,797 | 91,368 | 11,673 |

Source: USEPA National Emissions Trends Database

Note: Volatile organic compounds (including hydrocarbons) are another product of incomplete combustion, and when exposed to sunlight are involved in the chemical reactions which lead to the formation of ozone.

Ingham County only has ambient air monitors for ozone and for PM2.5 (new this year). To the best of my knowledge the above figures were calculated using complex formulas and estimates. Ingham County needs to have more ambient monitors.

Proposed Action steps related to Carbon Monoxide

You will note that the highest ambient level of a pollutant was for carbon monoxide. Motor vehicles

account for more than half the total amount of human-made air pollution in the United States today. Vehicle emissions account for approximately 77 percent of the carbon monoxide (CO), more than 35.6 percent of the volatile organic compounds (including hydrocarbons) and forty-five percent of the nitrogen oxides (NOx) in our nation's air (NOAH 1999).

Like the rest of the country, Ingham County residents are highly dependent on the automobile (another way of saying this is that there are few governmental incentives to promote public transportation within the region). The Tri-County Regional Planning Commission has been collecting data (from the Census and other areas) that monitor this increased reliance on the automobile.

Between 1985 and 1996 Ingham County gained more than twenty thousand additional licensed passenger vehicles, growing from 158,914 vehicles in 1985 to 179,537 vehicles in 1996, an increase of more than 20,000 vehicles on the road in just over a decade.

SEE ATTACHMENT #8 POPULATION, LICENSED DRIVERS & VEHICLES INGHAM COUNTY [Note: this graphic was unavailable for this PEER publication.]

The number of vehicles per household has risen sharply in Ingham County between 1980 and 1990, from 1.29 vehicles per household to 1.66. This was an increase of 29 percent.

SEE ATTACHMENT #9 VEHICLES PER HOUSEHOLD [Note: this table was unavailable for this PEER publication.]

The EPA is preparing to unveil its long-anticipated standards to reduce air pollution from cars. Those are expected to include reducing sulfur in gasoline, tightening emission standards and removing a loophole that allows sport-utility vehicles to defy emissions standards, experts say. The Roundtable could consider making a policy recommendation on this issue.

One of the policy recommendations of Healthy People 2010 is to track and encourage alternate means of travel like biking, walking and public transportation. They recommend a 10.8 percent increase in both bicycling and walking; a 3.6 percent in the percentage of people who use public transportation and a 150% increase in the number of Americans who telecommute.

Here are the Geographic Mobility statistics for workers 16 and over from the 1990 U.S. census:

| Means of Transportation | Number | Percentage |
|---------------------------------|---------|------------|
| Workers 16 years and over | 136,581 | -- |
| Car truck or van | 116,946 | 86% |
| ➤ drove alone | 102,184 | 87.3% |
| ➤ Carpooled | 14,762 | 12.7% |
| ➤ Persons per car, truck or van | 1.07 | N/A |
| Public Transportation | 3,003 | 2% |
| Motorcycle | 129 | .009% |
| Bicycle | 1,515 | 1% |
| Walked | 10,289 | 8% |
| Other Means | 738 | .05% |
| Worked at Home | 3,808 | 3% |

Source: U.S. Census

Note: Need to gather some trend data in this area.

3. Toxic Release Inventory

Under Federal law, the Environmental Protection Agency developed the Toxic Release Inventory (TRI) which is the only database that reports levels of emissions of toxic compounds in Michigan. Industries that emitted more than the threshold levels of certain compounds are required to report these emissions to the EPA. The latest TRI report reflects national levels of 647 chemicals that were emitted into the air, water and land and injected underground during 1996.

In 1996 Michigan ranked 13th of fifty states in total air emissions in pounds (46,202,166 pounds). However the TRI database does not account for population exposure or estimate risk levels. Also, the database is extremely limited in capturing all of the pollution sources. For example it does not inventory: motor vehicles, service businesses like dry cleaners and auto service stations, many kinds of industrial activity (such as oil wells), sewage treatment plants, hospitals, airports, agricultural application of pesticides and releases from contaminated sites like landfills. Utilities like the Board of Water and Light were only added this year.

SEE ATTACHMENT #10 AIR TOXIC INVENTORY, INGHAM COUNTY 1995-1997

[Note: this table was unavailable for this PEER publication.]

You will note that there was a dramatic increase [of air pollution] between 1996 and 1997 of nearly 400,000 tons [errata: pounds] One reason for the increase was increased activity at the General Motors (Lansing Body Plant). It increased its air releases from 531,608 tons. [errata: pounds] in 1996 to 869,958 tons [errata: pounds] in 1997, an increase of 338,350 tons, or 64%. The increase represented the 6th highest increase of any facility in the state of Michigan.

Here is a breakdown of the chemical by media:

**Chemical Rankings by Media - Ingham County Totals (in pounds)
Toxic Release Inventory**

| Chemical Name | 1995 (20 FACILITIES) | 1996 (16 FACILITIES) | 1997 (15 FACILITIES) |
|------------------------|---------------------------------|---------------------------------|---------------------------------|
| XYLENE (MIXED ISOMERS) | 712,720 | 362,240 | 598,141 |
| N-BUTYL ALCOHOL | 180,000 | 211,900 | 188,222 |
| METHYL ETHYL KETONE | 109,300 | 46,200 | 68,689 |
| HYDROCHLORIC ACID | 1,000 | -- | 61,000 |
| METHANOL | 82,225 | 59,600 | 59,950 |
| 1,2,4-TRIMETHYBENZENE | 24,110 | 27,370 | 54,967 |
| METHYL ISOBUTYL KETONE | 80,000 | 41,000 | 37,436 |
| ETHYLBENZENE | 10,107 | 13,400 | 36,282 |
| N-HEXANE | 6,250 | 2,264 | 35,577 |
| CERTAIN GLYCOL ETHERS | 158,260 | 84,400 | 31,488 |

| | | | |
|---------------------|------------------|----------------|------------------|
| STYRENE | 29,358 | 21,550 | 21,400 |
| TOLUENE | 45,756 | 14,085 | 15,639 |
| AMMONIA | 5,391 | 5,391 | 5,391 |
| DICHLOROMETHANE | 254 | 794 | 1,887 |
| DIISOCYANATES | 295 | 667 | 786 |
| ZINC COMPOUNDS | 0 | 250 | 253 |
| COPPER COMPOUNDS | 2,100 | 261 | 231 |
| NITRIC ACID | 10 | 10 | 10 |
| NICKEL COMPOUNDS | 0 | 5 | 5 |
| HYDROGEN FLUORIDE | 5 | 5 | 5 |
| MANGANESE COMPOUNDS | 0 | 2 | 4 |
| Total: | 1,447,141 | 891,394 | 1,217,363 |

SEE ATTACHMENT #11 FOR A PIE CHART OF AIR RELEASES BY CHEMICAL, 1997
[Note: this table was unavailable for this PEER publication.]

You will note that the dominant chemical released into the air was Xylene, at nearly 50%.

Health effects of Xylene: The principle sources of Xylene are in the production, transport, storage and sale of gasoline; manufacture of plastic bottles, polyester fibers. The effects on humans are eye nose and throat irritation, dizziness, excitement, drowsiness, nausea, vomiting, abdominal pain and dermatitis.

A search of Medline reveals thousands of articles investigating the dispersions and health effects of Xylene. We can pursue this issue in more detail if the Roundtable thinks that it is warranted.

A number of the TRI chemicals are also on the Hazardous Chemical Pollutant List (HAPS). For

example, Xylene is a HAP.

It's important to underscore that there are no standards for the HAPS (only for the 6 criteria pollutants). Significantly, according to Cathy Simon, a toxicologist with the DEQ, toxic air contaminants like Xylene are only evaluated (i.e. regulated) during the original permitting process. She and her staff pursue an "incremental approach" by which they seek to keep new facilities within screening guidelines, **but only when they originally apply for a permit.** In order to issue a permit, the researchers conduct a modeling investigation using a "mass balance" approach (determining what is going into the production) and then applying an emission factor to estimate the amount of the targeted pollutant. Then they produce dispersion models, looking at what comes out of the stack and then predict airborne concentration based on that figure. If the modeling predicts amounts and dispersions that exceed the screening guidelines, they work with the facility to try and create a mechanism to bring them into compliance. The Clean Air act and Amendment regulate 189 hazardous air pollutants (HAPS) and require Best Available Control Technology (BACT) and Maximum Available Control Technology (MACT) for reducing emissions with a rolling calendar. According to Simon, "we rarely deny a permit."

Afterwards the toxins are monitored by another division within DEQ, **but they are not evaluated.**

Just as significant for our evaluation is the fact that Ingham County once had some HAP monitors (in the late 1980s), that showed readings for some chemicals that, if applied to today's standards, would have exceeded screening levels. According to Cathy Simon those chemical were benzene, formaldehyde and butadiene, at least two of which are carcinogens. We need to track down more information on this development, and consider petitioning for more local HAPS monitors. According to a DEQ source, these monitors were taken down primarily due to cost reasons.

Note: Awaiting data from Ruth Bordelt, the state's TRI liaison, that will provide a breakdown of the toxic chemicals for each of the 15 TRI facilities currently in Ingham County.

4. Special Note on Health Effects:

It is important to keep in mind that, "an emission does not equal an exposure." Before a person can be affected, the substances are diluted and dispersed through the atmosphere, where some may be transformed into other substances or deposited before exposure occurs. To provide a more meaningful indicator of exposure, emission data can be input into a dispersion model (i.e.: a plume) capable of estimating ambient concentrations. There is much data that we do not know because the air is not being measured. We might consider finding an area in Ingham County that warrants further investigation for plumes.

Still, the Environmental Defense Fund has taken TRI data and made some calculations about the health effects of air pollution for Ingham County that, according to experts like Cathy Simon, toxicologist with

the DEQ, “is a fair assessment.”

SEE ATTACHMENT # 12 WELCOME TO SCORECARD! [Note: this table was unavailable for this PEER publication.]

The EDF argues that in 1990 Ingham County faced a cancer risk more than 100 times the goal set by the Clean Air Act (this means that about 100 per million can be expected to die from the local air, that amounts to about 26 people in Ingham County). According to a source, the DEQ takes EDF studies seriously and employs them as a vehicle to help prioritize some of their activities.

An area currently being researched by state policy makers is children and health as it relates to air pollution and other areas. Governor Engler asked the MICHIGAN ENVIRONMENTAL SCIENCE BOARD to form a CHILDREN'S STANDARDS INVESTIGATION PANEL. Among the topics it will examine over the next six months: effects of pesticides on children, whether air pollution plays a role in the growing rate of childhood asthma in Detroit, childhood lead poisoning from paint and dust, childhood cancer clusters near hazardous waste sites, and the effect on children of pollution in well water, particularly on farms. Our own Dr. Mike Kamrin has been affiliated with one of these studies. In one study, the group was responding to an Environmental Defense Fund study on PM2.5.

When we meet on Tuesday, we should have some statistics on asthma, COPD and congestive heart failure.

There is some data on an area of concern by the Michigan Public Health Institute’s Framework document: three air-borne fungi that are of concern: blastomycosis, Coccidiomycosis and histoplasmosis. Here is a 6 year breakdown of their incidence in Ingham County:

| Disease | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 6 Yr. Mean |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------|
| Blastomycosis | 0 | 0 | 0 | 0 | 1 | 0 | 0.17 |
| Coccidiomycosis | 2 | 0 | 1 | 0 | 0 | 0 | 0.5 |
| Histoplasmosis | 3 | 2 | 0 | 2 | 4 | 5 | 2.7 |

Evidently these incidences are not that significant for Ingham County.

I also came across an interesting study on air pollution inside the car, by the California Environmental Protection Agency.

5. Specific review of critical issues and hot spots in Ingham County

When we meet on Tuesday, we will summarize the major issues regarding air pollution as they relate to Ingham County. But for now here's some data on the major pollution emitters.

SEE ATTACHMENTS #13 TO 20 FOR DATA ON SOME INDIVIDUAL POLLUTERS.

[Note: this table was unavailable for this PEER publication.]

I shall also present some data from Enviromapper which shows the proximity of TRI facilities to populated areas and schools in zip codes of concern (especially 48915, the site of the highest rate of asthma for African American youth in the county.)

SEE ATTACHMENT #21 FOR A MAP OF TRI SITES NEAR OR WITHIN THAT ZIP CODE. [Note: this table was unavailable for this PEER publication.]

This is merely a descriptive pursuit, no scientific implications are intended (though we may wish to pursue this line of inquiry later.)

Section 3: ODORS and NOISE

Last Updated October 29, 1999

(Please Note: This section is still quite preliminary. We have many avenues of investigation underway and have much more data to add to this section.)

In most cases, community odor problems are more likely to be nuisances rather than immediate health hazards. Odor perception is a subjective response to what people detect, through their sense of smell, in the air they breathe. Odor problems are most often associated with organic compounds. Complaints that are not related to farming practices can be directed to Michigan Department of Environmental Quality regional districts or local government agencies such as Ingham County Health Department, Environmental Health Division. Complaints concerning potential or actual environment problems or nuisance conditions arising from farming practices can be directed to the Right to Farm (RTF) Environmental Response Program, Office of Pollution Prevention, Michigan Department of Agriculture. The City of Lansing Building and Safety Division handles complaints that are specific nuisances such as a neighbor not cleaning up dog feces or allowing garbage to rot.

The agriculture industry has been changing over the last fifty years. The trend toward larger facilities has resulted in increased numbers of animals in livestock operations, creating challenges dealing with manure and odor management. Odors can be an annoyance or a nuisance to neighbors. A manure management system is a coordinated combination of structural components and management practices necessary to control and use manure and other by-products of livestock production in a manner that minimizes adverse impacts on the environment; this includes manure production, collection, storage, treatment, transfer, and utilization processes. (We'll investigate the Right to Farm Act in more detail here. According to one source, the principle source of agricultural complaints come from neighboring farmers! We shall also elaborate the relationship between corporate farms and odors.)

Material Safety Data Sheets (MSDS) for chemicals used in any business or industry have an "odor threshold" category. However, there is no reliable scientific test to measure odor. As a standard procedure the threshold is measured by taking 10 people, exposing them to varying levels of odor. At the point at which 5 of the individuals smell the odor and 5 do not, that is considered the threshold. This is still a developing field of research. Research has shown that women on average have a more acute sense of smell than men; they tend not to lose this sense of smell as they get older as quickly as men. Women tend to be most acutely sensitive during adolescence, pregnancy, and after menopause. Also sensitivity to odor has a genetic component, with persons of Asiatic backgrounds generally having the most acute sense of smell.

Odor threshold analysis has been done for many compounds in which the odor is considered a safety factor. It has also been done with many commercially available products. It is not required by law for products manufactured in the U.S. and has not been done for the vast majority of chemicals. Odor threshold analysis has also been used by the MDEQW to assess odor nuisance complaints concerning factories. Here in Lansing, the GM Lansing Car Assembly plant near Sexton High School has used odor threshold analysis in defining the extent of odor dispersals.

Ingham County Health Department

In Ingham County we receive approximately 4-5 odor complaints per month. Approximately 2/3 of these complaints are indoor air complaints, 1/3 are outdoor air. The majority of these complaints are found, by the Health Department, not to be hazardous to health. The number of complaints received is higher in the spring and fall. This is probably due to more outdoor ventilation in the spring (more outdoor air complaints) and closing up of buildings in the fall (more indoor air complaints).

Outdoor air odor complaints in Ingham County have included complaints of neighboring industries such as factories (GM Plants) and other smaller businesses such as beauty salons (acrylic nail glue) and beer breweries. Representatives from the Environmental Health Division will visit the location and recommend solutions to the problem such as increased or improved design of ventilation systems to exhaust the fumes/odors effectively. Approximately 1/3 of the complaints are concerning agricultural practices and pesticide application. These are normally referred to the Michigan Department of Agriculture. (More data coming from MDA) Another third of the complaints are of “neighbor’s” wood stoves.

Of the indoor air odor complaints, approximately half are biological in nature: molds and mildew. The other half are furnace problems and indoor use of various chemicals. The numbers of complaints in Ingham County have remained pretty stable in the last few years. Our informants in the Ingham County Health Department feel that the large majority of odor complaints are non-toxic. He feels that it is primarily a “quality of life” issue.

Noise Interview with Mike Allen:

The National Safety Council hosted a conference on Noise a few weeks ago. Materials have been requested from that conference that may be helpful to us.

The CDC is increasingly more involved with the issue of noise pollution. In the coming year 2000 there will be more research done. The current noise standards were based on research done on young healthy males in the military in the 1930's and 1940's. The results may be misleading for other segments of the population including women, children and young adolescents.

Citing more current research, NIOSH (National Institute for Occupational Safety and Health) has

recommended a lowering of the OSHA (Occupational Safety and Health Administration) established PEL (Permissible Exposure Limit).

Equally important, at a conference in November of last year, the CDC in association with OSHA and NIOSH have begun a new public awareness campaign. This campaign is focused mainly on the workplace but will include messages targeting families. The conference highlighted several findings, including that current occupational exposure levels may be insufficiently protective and that there is a far greater acceptance of occupational noise by both management and workers than other types of potentially harmful factors. The occupations to be targeted will include many industries traditionally considered “noisy” as well as some under-recognized ones, such as farms.

The CDC campaign will target work place noise but there is growing consensus that non-occupational noise (music, recreational vehicles, home equipment such as leaf blowers and snow removal equipment, nearby construction, etc.) are contributing to an increasing incidence of hearing loss in young adults with no significant occupational exposure.

In Ingham County we receive, on average, about 1 complaint per month. These may be complaints of loud noise from forging and machining industries, construction sites, steam line clean out, agricultural practices, or traffic/diesel engines. Ingham County Health Department does have a noise meter. The majority of complaints are below the OSHA PEL. Most are readily correctable. The number of complaints has increased over the last few years.

For most industrial plant sites, noise from production activities is minimal at the property line and should not be a problem for surrounding neighborhoods. However, the traffic of both trucking and worker commuting can be a significant noise source. The continued expansion of the economy may increase noise levels in two ways. The increase in jobs, of course, corresponds to an increase in commuting. There has also been a shift in the U.S. general economy from a warehouse supply system to one based increasingly on next day supply delivery; the volume of trucking per unit of production is increasing.

If the complaint is determined to be more of a nuisance than a threat to public health, Ingham County will first try to broker a solution or compromise in the situation. If unresolved, the complaint is referred to the municipality with jurisdiction. Most municipalities have “nuisance” ordinances. These usually include provision for noise problems.

There are two types of “pie chart” analysis for noise. One would be what are the most significant sources of noise in the typical outdoor (school, work, traffic) environment. A second type of breakdown would be the types of complaints usually received at the Health Department.

The breakdown in calls received, reviewing phone logs from fall 1996 thru Dec 1998 would be:

| type/source | number | % |
|---|---------------|----------|
| diesel truck | 10 | 36 % |
| nearby industrial/commercial/traffic activity | 6 | 21 % |
| construction | 5 | 18 % |
| home equipment | 4 | 14 % |
| farm equipment | 3 | 11 % |
| total | 28 | 100 |

**Attachment 2:
Tobacco Use
Tobacco Smoke and Teen Smoking Indicators**

Last Updated August 20, 1999

Issue Overview

How is it Environmental?

One question that many people might ask when we say that tobacco smoke and teen smoking are part of our environmental health assessment is, “but what’s that have to do with the environment? Isn’t that more of a personal choice issue?”

With secondhand smoke, and its associated 4,000 chemicals invading the nostrils of all those within range of a lighted cigarette, clearly the issue has both dimensions. The central purpose of this assessment is to focus on the environmental aspects of the issue, and there is a consensus that environmental tobacco smoke (ETS) (or secondhand tobacco smoke) is the paramount issue.

Indeed, the current strategy has been to adopt a population-based approach to tobacco reduction. Here’s what *Healthy People 2010* says about it: “Efforts to reduce tobacco use in the U.S. have shifted from focusing primarily on smoking cessation for individuals to focusing more on population-based interventions that emphasizes prevention of initiation and reduction of exposure to environmental tobacco smoke.”

Mothers, Infants, Children and ETS

According to the Michigan Department of Community Health, nationally, tobacco smoke contributes to 150,000 to 300,000 respiratory infections in babies every year. These infections are the cause of 7,500 to 15,000 hospital stays annually. ETS also causes a higher rate of throat infections; causes up to 26,000 new cases of childhood asthma every year; exacerbates asthma in up to 1 million children; causes a permanent decrease in lung function; causes up to 80% more wheezing, coughing, and production of sputum than normal; and leads to more repeated ear infections. In addition, a mother’s smoking is also associated with Sudden Infant Death Syndrome (SIDS) or crib death, the main cause of death in babies between one month and one year of age.

A Brief History of Tobacco Reduction Actions and Ordinances in Ingham County

In April of 1989 the Michigan Tobacco Reduction Task Force was convened by the Michigan Department of Public Health. The Task Force report “Tobacco-Free Michigan 2000,” published in 1990, provided the framework for the statewide campaign to cut Michigan’s smoking rate in half.

In 1991 the Michigan Department of Public Health applied for and received an ASSIST (American Stop Smoking Intervention Study) contract through the National Cancer Institute. Michigan was one of 17 states chosen for the grant and Ingham County is one of the eight sites in Michigan that received this award. As a model for tobacco reduction, ASSIST stresses change in the social environment through policy, media, and coalition-building. Populations at risk are prioritized for tobacco reduction efforts. These activities are carried out through schools, worksites, health care facilities, community groups and the media. In Ingham County Amy Moore is the ASSIST Program Coordinator. She also staffs the Capital Area Partnership Impacting Tobacco and Lifestyles (“Capital Coalition”).

In 1990-1991 Ingham County Health Department gathered data on sales of tobacco to minors using minor children accompanied by department staff. The investigation revealed that 78% of proprietors made illegal sales to minors. In 1993, in response to this study, Ingham County passed an ordinance requiring all tobacco retailers to obtain a license before they are permitted to sell tobacco. Penalties were established for tobacco sales to minors.

The ordinance key points are:

- ❖ Licensing required for all tobacco retailers
- ❖ Unlawful to sell tobacco to a minor or for a minor to attempt to purchase tobacco
 - Retailer must request ID from purchaser
- ❖ Tobacco vending machines prohibited unless machine is located on the premises of the retail establishment and in plain view of retailer or can only be operated by a remote control locking device.
- ❖ No distribution of cigarettes or tobacco products at no or nominal cost unless a temporary permit is obtained
- ❖ Retailers and purchasers violating the ordinance provisions shall be fined or imprisoned according to ordinance.

In 1993 illegal sales of tobacco decreased to 30% after the passage of the ordinance. Since then Ingham County has kept this rate well below 30% due to continued enforcement. Civil enforcement is the responsibility of the Health Education Division of the ICHD. The Ingham County Health Department manages the database of licensed tobacco retailers, inspection and enforcement actions. Retailers are licensed for a 3-year period. There are currently just under 500 retail establishments licensed.

A 1993 report by the US Environmental Protection Agency declared secondhand smoke a known human carcinogen. This report along with support from the anti-tobacco coalitions and the Legislature provided the catalyst for development of improved policies across the state. Later that year Act 242 was passed by the Michigan Legislature as an amendment to the food service licensing section of the Public Health Code. The act expanded the amount of nonsmoking seating in food service establishments to at least 50% of the total seating in those that seat 50 or more customers. Recognizing that any smoking allowed in restaurants may be harmful to patrons, local coalitions have published literature

encouraging 100% smoke-free restaurants. The Michigan Guide to Smoke-Free Restaurants lists those restaurants that have chosen to be 100% smoke free. This has grown from a listing of less than 200 restaurants in 1994 to over 1,800 in 1997.

Smoking in Other Public Buildings

A political movement was spawned to ban or restrict smoking in a wide array of public buildings. Governor John Engler's Executive Order in 1992 declared all state government buildings, with the exception of residential buildings, smoke free. This state mandate has served as an example for other worksites statewide. In 1993 the Michigan Legislature required all licensed child care centers or child-caring institutions, group day care homes and family day care homes to ban smoking.

In 1993 the Michigan Legislature passed a law prohibiting tobacco use in public school buildings at all times and on school grounds when classes are in session. With the encouragement and support of the Capital Coalition, the majority of Ingham County school districts (82%) have voluntarily chosen a 24-hour smoke-free policy. But two schools districts do not abide by this policy: the Lansing School District and the Webberville School District. Loopholes in the law allow for tobacco use in certain areas and at certain times. Smoking is allowed after 6 PM on school property during days school is in session and all times that school is out of session, including summer vacation and weekends.

Many colleges and universities have voluntarily chosen to go smoke-free. Michigan State University and Lansing Community College are among those offering smoke-free options.

In 1994 the Ingham County Health Department helped to form the Capital Coalition, the Capital Area Partnership Impacting Tobacco And Lifestyles. At this point in time, the Capital Coalition is working in the following areas:

- **Worksite:** To pass a county ordinance making private worksites, restaurants and bars smoke free, to encourage individuals to request smoke free accommodations and to assist businesses in becoming smoke free.
- **Health Care:** to encourage health care insurance providers to pay for smoking cessation advice by medical staff, as well as counseling, referrals and resources, and to encourage health care providers to advise smoking cessation to their patients.
- **Community Environment:** To ban point of sale tobacco advertising, restrict tobacco distribution by requiring tobacco be sold only from behind the counter, to disallow temporary tobacco licenses to community-based events and events held at locations owned by municipalities, to educate community members and the legislature of the success of the Ingham County Retailer Licensing Regulation.

- Schools: To encourage referrals to Willow Teen Plaza's "Introduction to Smoking Cessation" program as an alternative to suspension for smoking students, to promote a 24-hour smoke free policy to all capital area school districts, to recruit high school teens and adult advisors to the "Teens Against Tobacco Use (TATU)" training in the Fall of 1999.

- Membership: To celebrate World No Tobacco Day, May 31, recruit prospective members (especially racially diverse populations, youth and blue collar members), to the Capital Coalition who serve low income, less educated, smoking patients and smokeless tobacco users.

The Ingham County Board of Commissioners is currently considering 2 model ordinances proposed by the Coalition; one would eliminate smoking in the workplace, the other in restaurants and bars. California has successfully banned smoking in restaurants and bars statewide. Marquette City in Michigan has passed an ordinance requiring workplaces and public places including restaurants to be smoke-free. However, there is a court appeal currently in progress regarding restaurants. This has successfully frozen the process of this ordinance in Ingham County (as well as in other municipalities) until a decision has been made in this case. The Board of Commissioners will also be considering recommendations from the Board of Health in this matter.

Attachment 3: Infectious Diseases

Last Updated January 10, 2000

Good News

1. Infectious disease rates are generally low in Ingham County. They are tracked and recorded by the ICHD and the state. Follow-up is thorough where indicated.
2. Vaccine preventable diseases in Ingham County are decreasing due to outreach efforts.
3. Tuberculosis rates are low. Detected cases are aggressively followed-up.

Bad News

1. Influenza pandemic preparedness, for a highly virulent strain, is not what we would like. A response scenario such as is proposed by the CDC, which integrates health agencies with hospitals, first responders, essential service providers (power plant and water works), morticians, should be developed.
2. Bioterrorism Preparedness. The good news is that a task force has been formed. The bad news is that they have a long way to go in this enormous task.

Continuing Research

1. Nosocomial infection rates at local hospitals have been requested and hopefully they will be forthcoming soon.
2. Vaccine preventable diseases. The actual numbers and rates must be compiled.
3. Influenza. Numbers of vaccines administered. Possible side effects explored.
4. Tuberculosis. Compile more facts and figures for Ingham County.

Narrative

Tuberculosis rates in Ingham County have remained relatively stable over recent years. See the Communicable Disease Report Sheets for Ingham County. The county is proud of its policy of aggressive case finding and follow-up care. The nurses follow a detailed protocol and because of these policies the county is well protected. Most, if not all, of the cases detected each year are foreign-born. They are either refugees or MSU students arriving from foreign countries.

Tuberculosis Cases in Ingham County

| | |
|------|----|
| 1993 | 18 |
| 1994 | 12 |
| 1995 | 8 |
| 1996 | 12 |
| 1997 | 12 |

Cases are identified when ill persons present to a physician or Emergency Room with symptoms. Or when social workers or others become suspicious because of signs related to TB, or when a TB test shows a positive. ICHD administers over 6,000 TB skin tests per year. All foreign-born persons seeking assistance at ICHD are routinely tested. When a person is found to test positive ICHD nurses undertake aggressive follow-up by ascertaining that medications are properly taken, and also in finding and testing contacts of the cases, to identify others who have been exposed.

Hepatitis C (HCV) Hepatitis C is a viral infection of the liver. It surfaced as a big problem in the U.S. as a result of contaminated blood transfusions predating 1992. About 90% of cases in the U.S. occurred as a result of this. Routine screening for HCV was instituted in 1992.

The Ingham County Health Department has a more highly evolved policy towards Hepatitis C than most other Michigan counties, and does more than is required by the state. The state only requires reporting of acute cases of HCV whereas the ICHD documents all detected cases. Ingham County's progressive policy focuses on immunizing cases of HCV for Hepatitis A and B. The serious liver damage caused by the existing HCV infection would progress to a severe, possibly fatal extent, if the sufferer became super-infected with Hepatitis A or B viruses.

Of the 188 Hepatitis C cases, 44 have received the immunization against Hep A and B. Some of these have insurance or Medicaid which covered the costs of the vaccines. Others are uninsured. Some are Health Department clients and others have attending physicians. The ICHD seeks to work with vaccine manufacturers to secure vaccinations sufficient to treat the remaining cases, so that their damaged livers may be preserved from further destruction by other strains of the Hepatitis virus. The problem of affordable access to the vaccination is an issue that must be addressed.

The Health Department needs funding to make telephone follow-up contact with the HCV cases, to recommend the Hepatitis A and B vaccinations. Hep B vaccine is free. But Hep A vaccine is expensive and requires 2 doses. The vaccines confer protection for about 7 years.

A new objective of the Health Department is computer mapping of disease cases as they arise. All reportable diseases will be mapped.

In general, the communicable disease situation in Ingham County is stable. Rates are fairly low, not deviating significantly from the baseline levels. And patient follow-up by the Health Department's nurses is consistent and thorough.

Attachment 4: Nosocomial Infections

Last Updated January 10, 2000

Over 150 years ago, a Hungarian physician, Dr. Ignaz Semmelweis, discovered that “childbed fever,” an infection that commonly killed women who had just given birth, was being spread by the unwashed hands of attending doctors. Today, the problem of hospital-acquired, or nosocomial infection is still a principle source of adverse medical care outcomes. Nosocomial infections occur at a rate of about 5 or 6 infections per 100 admissions. It costs the U.S. annually about \$4.5 billion. Nosocomial infections account for 50% of major complications of hospitalization. The remaining are medication errors, patient falls and other non-infectious adverse events.

The CDC estimates that better infection control could have prevented at least a third of nosocomials.

The trend towards progressively shorter inpatient stays over the last 20 years has resulted in a 36% increase in the rate of nosocomial infections per 1,000 patient days. In 1975 the rate of infection per 1,000 patient days was 7.2. In 1998 it jumped to 9.8.

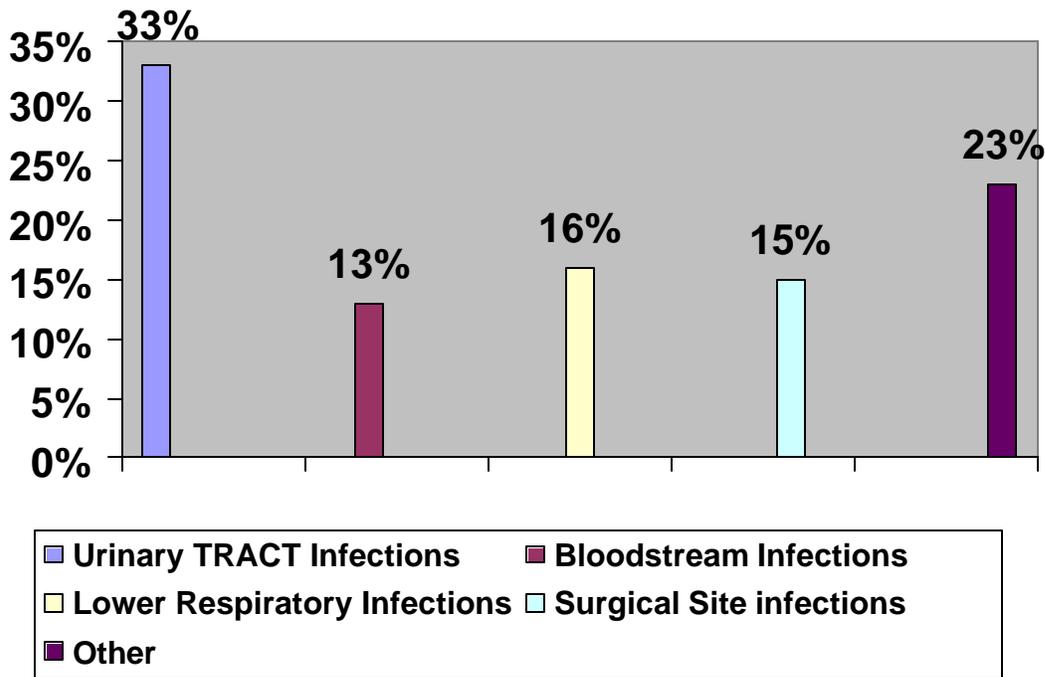
Some major forces involved in nosocomial infections are:

- 1) Widespread use of antibiotics which has resulted in the emergence of new and resistant strains of bacteria;
- 2) Improper hand washing (a recent study found that only 17% of physicians treating patients at Duke University Medical Center’s Intensive Care Unit washed their hands appropriately.
- 3) Environmental Surfaces may be contaminated. A recent Lancet study titled, “What’s on Doctors’ ball point pens?” showed that bacterial contamination of writing tools is common (transferred from hands).
- 4) Increasingly immuno-compromised patients. The shift of surgical care to outpatient centers leaves the sickest patients in the hospitals. Hospitals, in turn, are becoming transformed into large ICUs. This shift has led to a greater prevalence of vascular access-associated bloodstream infections and ventilator-associated pneumonias.

Here is a portrait of the data:

| SITES OF NOSOCOMIAL INFECTIONS | | | | | |
|--------------------------------|---------------|----------------|------------------------------|------------------------|-------|
| Year | Urinary Tract | Surgical Wound | Lower Respiratory infections | Bloodstream infections | Other |
| 1975 | 42% | 24% | 10% | 5% | 19% |
| 1990-96 | 34% | 17% | 13% | 14% | 21% |

DISTRIBUTION OF NOSOCOMIAL INFECTIONS



Source: Microbiology Review 1993 pp. 6:428

**Attachment 5: Occupational Injuries and Illnesses
for the Tri-County Area (Clinton, Ingham and Eaton Counties)
Sorted by Industry with the Highest Incidence Rate
1997**

| Industry | Standard Industrial Classification (SIC) Code | 1997 Employment (Using Third Quarter Employment for the Tri County Region) | Incidence Rate (%) (Derived from Bureau of Labor Statistics Survey Data) | Estimated Number of Workers Injured or Made Ill in the Tri-County Region in 1997 |
|---|--|---|--|---|
| Transportation Equipment | 37 | 16,376 | 19.1 | 3,138 |
| Fabricated Metal Industries | 34 | 2,024 | 17.5 | 354 |
| Primary Metal | 33 | 830 | 17.2 | 143 |
| Food and Kindred Products | 20 | 856 | 16.6 | 142 |
| Apparel, Other Textile Products | 23 | 448 | 16.2 | 73 |
| Transportation by Air | 45 | 798 | 15.8 | 126 |
| Stone, Clay and Glass Products | 32 | 451 | 15.2 | 69 |
| Public Administration (Executive, legislative, and general) | 91 | 4,884 | 15.1 | 738 |
| Construction | 16 | 225 | 15.0 | 34 |
| Furniture and Fixtures | 25 | 103 | 14.8 | 15 |

**Occupational Injuries and Illnesses
for the Tri-County Area (Clinton, Ingham and Eaton Counties)
Sorted by Industry/Sector with the Highest Number of Affected Employees
1997**

| Industry | Standard Industrial Classification (SIC) Code | 1997 Employment (Using Third Quarter Employment for the Tri County Region) | Incidence Rate (%) (Derived from Bureau of Labor Statistics Survey Data) | Estimated Number of Workers Injured or Made Ill in the Tri-County Region in 1997 |
|---|--|---|---|---|
| Transportation Equipment | 37 | 16,376 | 19.1 | 3,138 |
| Eating and Drinking Places | 58 | 15,200 | 9.2 | 1,389 |
| Construction | 15, 16, 17 | 8,791 | 10.3 | 902 |
| Local Govt.: Educational Services Primarily elementary and secondary schools) | 82 | 13,422 | 5.8 | 778 |
| Local Govt.: Public Administration (Executive, legislative, and general) | 91 | 4,884 | 15.1 | 738 |
| General | 53 | 6,652 | 10.3 | 685 |

| Industry | Standard Industrial Classification (SIC) Code | 1997 Employment (Using Third Quarter Employment for the Tri County Region) | Incidence Rate (%) (Derived from Bureau of Labor Statistics Survey Data) | Estimated Number of Workers Injured or Made Ill in the Tri-County Region in 1997 |
|-------------------------------|---|---|---|---|
| Merchandise Stores | | | | |
| State Education | 82 (Includes Colleges, universities, professional schools, and technical institutes. Michigan State University has the greatest proportion of employees) | 21,600 | 2.9 | 626 |
| Food Stores | 54 | 6,010 | 7.4 | 444 |
| Business Services | 73 | 11,913 | 3.6 | 429 |
| Wholesale Trade-durable goods | 50 | 5,386 | 7.3 | 393 |

Attachment 6: Fleas

Diane Gorch 3-16-98

Contacts:

Mel Poplar
Pesticide and Plant Management
Michigan Department of Agriculture
373-1087

The flea problem has declined dramatically due to the use of “program pills”, systemic control programs prescribed by veterinarians. Other flea treatments and information available to pet owners have also improved and are likely to have contributed to the decline in the problem.

Most pest control companies are not getting many calls. In previous years a company might receive about 200 calls per summer; that has now decreased to about 10 calls per summer.

(Note that due to favorable temperature and humidity conditions and other factors, the height of “flea season” is in August and September).

Pest Control Companies surveyed:

The Bug Man
Bob Yoakum
676-6669

The number of flea calls had declined in the past few years. In 1998 about 12 flea jobs were done. The number reflects a gradual decline from about 50 calls per year, 5 years ago.

Eradico
David
351-6085

Flea season is at its worst in Aug-Sept. He estimates that they had 5-10 calls last year, but he cannot compare to other years since he was not at this office then.

Orkin
485-1784

The secretary came up with a very unscientific consensus that they did about 70 calls last year for fleas, in the Ingham-Livingston-Jackson-Eaton-Clinton county area. She could not break it down to Ingham

Co.

Michigan Pest Control Association
(810) 498-8480

Attachment 7: Carbon Monoxide (CO)

Diane Gorch

Mike Allen
Toxicologist
Ingham County Health Department
887-4529

Indoor air calls, including complaints about CO come in to our department and are dealt with accordingly.

At least half of the complaints about CO can be resolved by telephone consultations (per Mike Allen). In these cases, Mike troubleshoots and advises about methods of remediation. There is no central filing system or computer database to record or track CO complaints and the outcome of the consultation or site visit. Currently, the information ends up in various places.

Homeowner complaints: any documentation of the problem will be filed by location in Mike's office, or if the CO problem is major, it may be filed in the EH Township files.

Businesses: the problem is always documented. The report is filed in the business's file.

Note: errors in information retrieval may arise due to current filing practices. If, for example, Business A files a complaint, which is found to result from a condition present in Business B, the data may end up being filed in Business A's file, and no file on Business B may exist. Any subsequent queries about Business B would not produce a record of the complaint report.

Mike has as a goal for this year to establish a tracking system of calls received. He currently has no official record of how many indoor air/CO calls come in, nor of their resolution.

He estimates that about 5-8 calls per month result in field visits, and at least 10 calls per week are resolved using telephone consultation. There is seasonal variation in the number of calls received, with more frequent calls in the cold months. Mike estimates that, compared to population distribution, more calls come in from out-county areas.

Another hindrance to data collection and retention is that the CO monitor that Mike currently uses gives a digital readout, with no down-loadable memory. No print outs can be made or downloaded at this time. At least 50% of field visits have no written documentation as to the CO levels, and the problem was remedied during the visit.

Other resources:

Gary Biddinger
Chief Mechanical Inspector
City of Lansing Building Safety Division
483-4373

Complaints received by the City are usually referred to heating/mechanical contractors or to Consumers Energy (CE) for remediation. The contractors only report back to the City if a problem has been detected which must be “red tagged” because the homeowner refuses to remediate it.

Such referrals as the City gets are not computerized and are hard to track. They are filed by the year, after the CO-causing condition is abated.

There have been about 7 cases in about 14 years. There have been no deaths in the last 5 years resulting from mechanical equipment.

Gary referred me to several contractors for information, some of whom were interviewed herein.

Mike Courter
Service Manager
Hager Fox Heating and Air Conditioning
482-5501

Their present computer system cannot retrieve the exact number of CO calls.

Mike estimates that they receive 15-20 calls in a typical season where a customer has an alarm or has experienced symptoms. He could not estimate how many calls were based on symptoms.

During routine service work, their service men check for CO using sensitive testing equipment. They detect many more problems in this manner. These service visits often arise from “No heat” or other furnace problems experienced by the homeowner.

Mike Eberhart
Service Department
Applegate Heating and Air Conditioning Co.
349-9200

Actual numbers cannot be retrieved, due to paper filing system.

Mike Estimates that 10-20 calls come in per month, during the months of October thru January about CO alarms or symptoms. About 2-5 of those are false alarms, due to faulty detectors or improper positioning of detectors in the home.

Most household CO is detected during “no heat” or other furnace service calls, where their service men do routine CO testing.

Sources of CO in the home were listed as:

- Cracked heat exchanger (accounting for about 1/4 of CO complaints).
- Plugged furnace vents, flue vents, or chimney vents, failed draft inducer motors on newer furnace systems, (collectively accounting for another 1/2 of CO complaints)
- Back drafting of fireplace or fireplace/water heater flues in heavy atmospheric conditions or
- down draft winds.
- Use of space heaters (kerosene) or generators in confined spaces, such as a garage
- Running cars in a garage, even if the door is open (with an in-coming wind).

Gary Dody and Sherry

A-1 Mechanical

327-4328

Calls are received about CO detectors going off. Three quarters of calls are false alarms. More CO is found on routine furnace service calls than from detectors.

In a typical heating season, about 25 confirmed CO instances are called in from the Greater Lansing area (including Clinton and Eaton County areas).

Karen Kingsbury

Consumers Energy

374-2300

Information is reported from the Lansing area Headquarters, which covers the areas of Ingham County (all), and the proximal parts of Eaton and Clinton Counties (comprising about 10-15% of data).

Service orders for CO complaints (action coded as CO) were issued as follows:

1997 -- 939

1998 -- 625

February 1998 -- 180

February 1999 -- 112

No information yet on how many calls were false alarms.

Mike Allen says that Consumers Energy (CE) used to respond to any and all complaints. However, they now require that

1. A CO monitor must have gone off. (A report of symptoms is not sufficient.)
2. The complainant must be a customer of CE
3. The complainant's detector must be a CE brand detector or a \$45 charge is required. If it is a CE brand detector, there is one free visit.

Bob Ceru
Michigan State University
355-5146

University may have data gathered in buildings on Campus.

Estimated Case Magnitude of CO problem in Ingham County

| | | | |
|------------|------|-------------|----------------|
| MSU | 1996 | Reports = 7 | Detected CO= 0 |
| | 1997 | 7 | 2 |
| | 1998 | | |