Division of Genomics, Perinatal Health, and Chronic Disease Epidemiology

Bureau of Epidemiology

Michigan Department of Community Health

MDCH

Jennifer M. Granholm, Governor

Janet Olszewski, Director

Mission

To provide statewide leadership and expertise essential for integrating genomics and epidemiologic science into maternal, child health, chronic disease and other related public health programs.

Goals

- Assure screening and follow-up of individuals with heritable disorders
- Monitor population health through surveillance and case review systems
- Analyze risk factors to assess disparities in morbidity and mortality
- Evaluate the impact of health programs, interventions, and services
- Promote translation of research and evidence-based prevention strategies into public health policy and practice

Functions

A. Provide statewide leadership to coordinate the integration of genomics that encompasses newborn screening and births defects prevention and follow up into public health functions and other programs

B. Provide statewide epidemiological leadership and expertise to maternal and child health and chronic disease programs to thus assure the translation of research and evidence-based prevention strategies into public health policy and practice

Division of Genomics, Perinatal Health and Chronic Disease Epidemiology Overview

Genomics Unit

The Genomcis/Genetics program supports a network of clinical sites for genetic diagnosis and counseling, as well as provides information about birth defects and inherited diseases. Recently, with federal funding, the program has made considerable progress in developing strategies and partnerships to integrate genomics and the use of family history and similar tools throughout other public health programs, including chronic disease programs.

Newborn Screening Follow Up Unit

The newborn screening program, conducted jointly with the state public health laboratory, provides follow up, medical management, and quality assurance for all Michigan newborn infants identified with forty disorders, such as phenylketonuria, congenital hypothyroidism, galactosemia, biotinidase deficiency, maple syrup urine disease, sickle cell anemia, medium chain acyl-coenzyme A dehydrogenase deficiency, citrullinemia, argininosuccinic aciduria, homocystenuria, and congenital adrenal hyperplasia.

Maternal and Child Health Epidemiology Section

Responsibilities include epidemiological studies and surveillance of adverse maternal-child health outcomes.
Epidemiological analyses are conducted using established data sources, including vital records, registry data, hospitalization data, Pregnancy Risk Assessment Monitoring System (PRAMS), Children's Special Health Care Services program, Hospital discharge data, Medicaid and Women, Infants and Children program, etc.
Specific disease surveillance activities include the Michigan Maternal Mortality Surveillance system designed to identify all deaths that occur in pregnant women or in women who gave birth within the last 12 months.

Chronic Disease Epidemiology Section

Responsibilities include epidemiological studies and surveillance of chronic diseases and health disparities.
Epidemiological analyses are conducted using established data sources, including vital records, registry data, hospitalization data, Behavioral Risk Factor Survey (BRFS), and other administrative databases (e.g., Hospital discharge data, Medicaid and Medicare data sets).
Specific disease surveillance activities include the conduct of the Michigan BRFS, an annual statewide telephone survey of over 3,500 households, the Asthma Mortality Review which identifies risk factors for preventing asthma deaths in children and young adults.

Genomics Unit
Public Health Genomics and Birth Defects Prevention and Follow-up

Our Vision

"Improved health outcomes and enhanced quality of life for the people of Michigan through appropriate use of genetic information, technology, and services"

Core Function and Mission

The Genomics Unit provides assessment, policy development and assurance related to birth defects, genetic disorders, and the use of genomics in public health programs. Program activities help to:

- Coordinate educational activities that increase genetic literacy
- Facilitate early identification and treatment of individuals with birth defects, heritable disorders and genetic susceptibilities
- Foster collaboration to integrate advances in genomic science throughout public health and other systems of care

Key Program Activities

Public Health Genomics

- Coordinate the use of genomics in core public health activities across chronic disease, laboratory and environmental health programs
- Expand the use and evaluation of targeted risk assessment strategies based on genomic tools such as family health history
- Utilize public health databases and surveillance systems to better understand and address the genetic burden of common chronic diseases
- Assess the feasibility of population genetic studies using dried newborn blood spots

Birth Defects Prevention and Follow-up

- Foster awareness of preconceptional health, folic acid and other birth defect prevention strategies
- Promote integration of a genetics component within child health programs
- Collaborate with the Birth Defects Registry to assure that children with birth defects and their families are linked with available services including a medical home

Genetics Education and Resource Center

- Michigan-specific information on topics relating to birth defects and genetics available at: **www.MIGeneticsConnection.org**
- Presentations, workshops and exhibits to educate the health workforce, policy makers and the public about the role of family history and genetic risk factors
- Partner in Michigan's Family-to-Family Health Information and Education Center

MI Genetics Connection

Clinical Genetic Services

- Partnership with Newborn Screening, Children's Special Health Care Services, and chronic disease programs to assure statewide availability and accessibility of risk assessment and genetic services through public health systems and a network of genetic centers and outreach sites

Special Projects

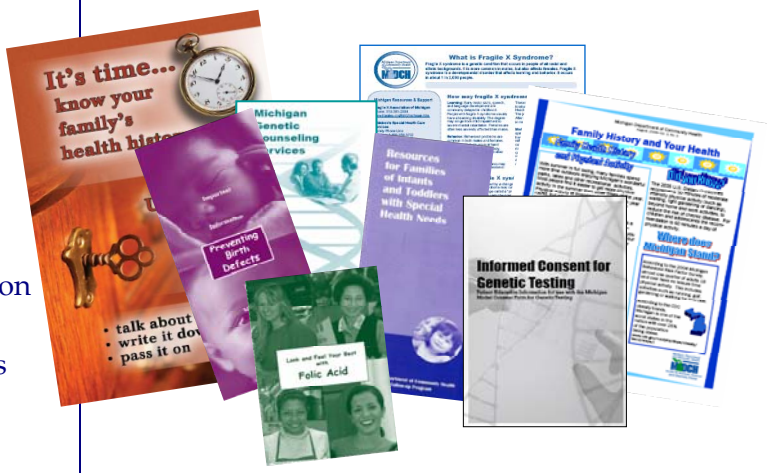
- Birth Defects and Genetic Conditions Toolkit: Resources for Michigan Families and Professionals
- Birth Defects Prevention Month
- Diabetes and Genomics Education Modules
- Dried Blood Spot BioTrust initiative
- Early On® Genetics Education curriculum and CD-ROM
- Family History Resource Kit for Health Care Providers
- "Genetics to Genomics" Teacher Workshops
- Michigan Cancer Genetics Alliance
- Multivitamin Distribution (March of Dimes grant)
- Neural tube defect family history and folic acid follow-up study
- Region 4 Genetics Collaborative
- State Genetics Plan
- Sudden Cardiac Death Surveillance Program

Pamphlets and Informational Materials

1. A State Plan for Michigan: Genetics Through the Life Cycle: Improving Health and Preventing Disease, 2003-2008
2. Babies with Birth Defects: Referral Guide for Michigan Hospitals
3. Family health history fact cards (6)
4. "Family History and Your Health" newsletters
5. Genetic syndrome fact sheets (15)
6. Guide to Genetics Referral
7. Informed Consent for Genetic Testing
8. It's time…know your family's health history poster
9. Look and Feel Your Best with Folic Acid
10. Michigan Genetic Counseling Services
11. Monitoring Infants and Children with Special Health Needs: Birth Defects Prevalence and Mortality in Michigan, 1992-2002
12. Preventing Birth Defects: Important Information for Michigan Families
13. Resources for Families of Infants and Toddlers with Special Needs
14. Special Care for Special Kids: A Guide for Michigan Families

Publications/ Poster Presentations

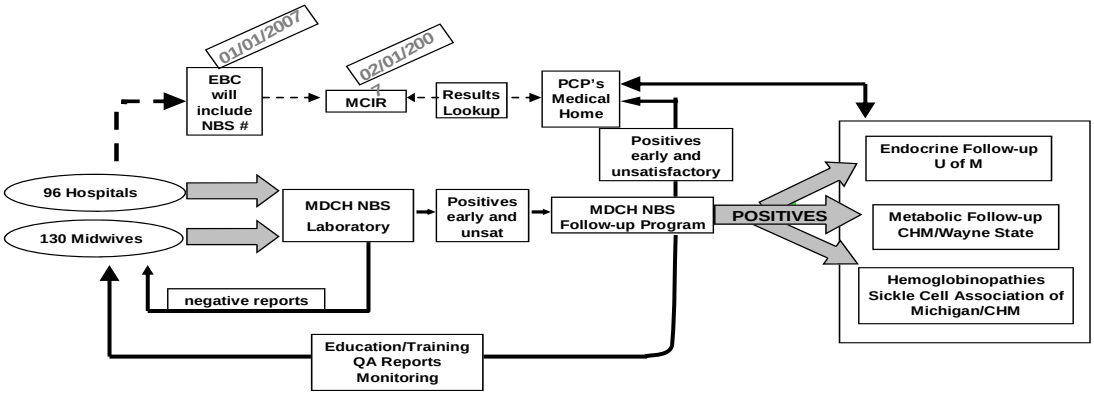
- Genomics and public health: development of Web-based training tools for increasing genomic awareness. Prev Chronic Dis , April 2005. www.cdc.gov/pcd/issues/2005/apr/04_0133.htm
- Collaboration between Birth Defects Registry and Early Hearing Detection and Intervention Program: Better Case Identification, Reporting and Referral Services, Michigan 1997-2003 Data. NBDPN Annual Conference, 2006.
- Family History of Premature Heart Attack or Stroke, Michigan WISEWOMAN Program. CDC National Health Promotion Conference, 2006.
- Incorporating Genomics into Existing State Level Cancer Surveillance System. CDC National Health Promotion Conference, 2006.
- Innovative Partnership to Strengthen Diabetes Health Promotion and Birth Defects Prevention. CDC National Health Promotion Conference, 2006.
- January is Birth Defects Prevention Month! Local Liaison Report. 2006; January: 12-13.
- Survey of Dietetic and Nursing Professionals in Michigan Reveals a Need for Continuing Education on the Role of Folic Acid in Preventing Neural Tube Defects. NBDPN National Meeting 2006.
- Barriers to Access: Results from Focus Groups to Identify Genetic Service Needs in the Community. Community Genet 2007; 10:10-18.
- Exploring the Enrollment of Children with Birth Defects into Children's Special Health Care Services in Michigan. NBDPN Annual Conference, 2007.
- Folic Acid Outreach and Multivitamin Distribution in Selected Michigan Counties at High Risk for Neural Tube Defects. NBDPN Annual Conference 2007.



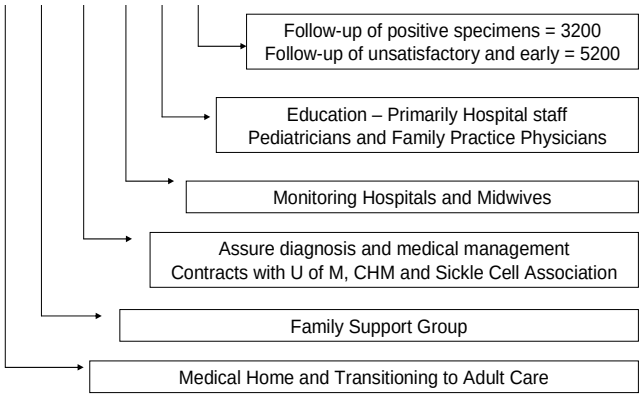
Contact Us Call the offices of the state genetics coordinator toll free at 1-866-852-1247 or (517) 335-8887. Please e-mail genetics@michigan.gov with questions pertaining to genetics and genomics; or BDRFollowup@michigan.gov for birth defects information.

Newborn Screening Follow up Program

Overview



Follow Up



Follow up:

1. Provides short-term follow up for all newborns with unsatisfactory specimens for testing and positive laboratory results
2. Assure that diagnostic and medical management infrastructure is in place
3. Documents long term follow up of diagnosed newborns
4. Monitors the newborn screening process and provides quality assurance for all Michigan hospitals with newborn nursery
5. Provides training and education for health care providers involved in the newborn screening process

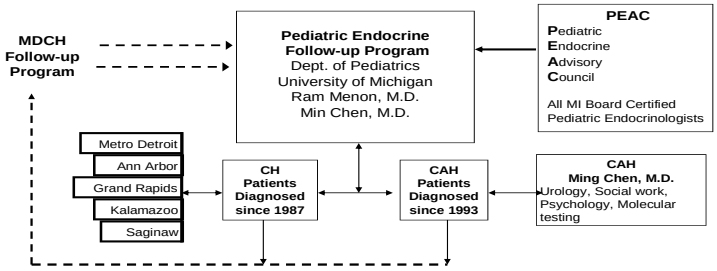
Medical management:

1. Assist laboratory in establishing analyte cut-offs
2. Provides diagnostic algorithms and confirmatory diagnoses for all newborns with positive screening results
3. Assures that all diagnosed newborns receive appropriate medical management services and long-term follow up.

Newborn Screening Follow up Program

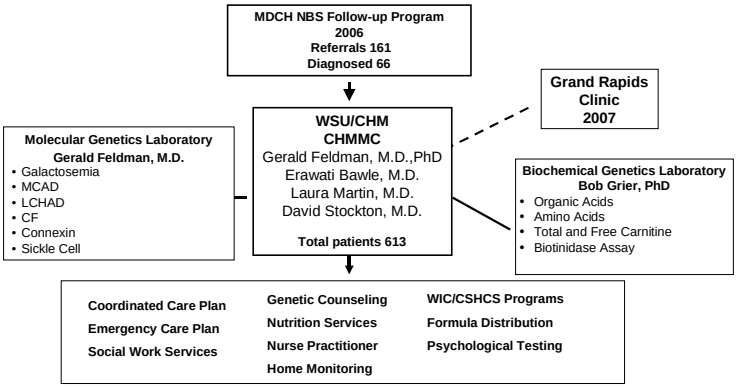
Endocrine Disorders

2006	Positive Screens	Confirmed Cases
CAH	714	3
		1993-2006 84
CH	693	59
		1987-2006 1414



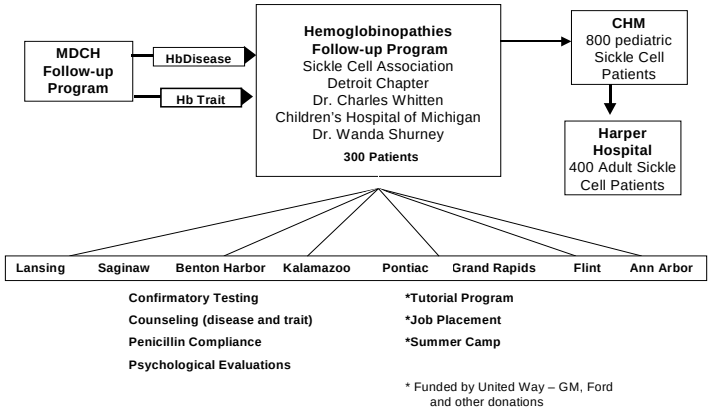
Metabolic Disorders

2006	Positive Screens	Confirmed Cases
PKU	20	15
Other Amino Acid Disorders	31	1
MCAD	10	10
Other Fatty Acid Oxidation Disorders	62	2
Organic Acid Disorders	119	8
Galactosemia	13	11 (10 DG;1 GG)
Biotinidase Def Deficiency	31	20 (16 partial)



Hemoglobinopaties

2006	Positive Screens	Confirmed Cases
S/S		34
S/C		23
S/∃-thal		6
	75	63



* Funded by United Way – GM, Ford and other donations

For more information please visit the NBS program website: http//www.michigan.gov/newbornscreening

Maternal and Child Health Epidemiology Section

Mission:

Provide statewide epidemiological leadership and expertise for the maternal and child health programs that support women and children in Michigan.

We are always working towards seeing evidence-based prevention strategies translated into public health policy and practice by conducting needs assessment, program design, implementation, and evaluation support.

Core activities/epidemiological services:

- Conduct needs assessment analyses
- Design and conduct data analyses to evaluate the impact of public health interventions
- Analyze program data to identify data-related trends, populations at risk, and risk factors related to maternal and child health
- Disseminate data analyses findings to inform program development efforts across MI
- Conduct maternal and child health-related research and represent Michigan at the national conferences/meetings to thus ensure that MI epidemiologists contribute to the advancement of the field of MCH research and practice

Recent Peer Review Publications:

- Lower Rates of Preterm Birth in Women of Arab Ancestry: An Epidemiologic paradox- MI, 1993-2002 (Matern Child Health J, 2007)
- Contribution of Preterm Births to the Population of Michigan's Children's Special Health Care Service Program (J of Registry Management, 2005)
- Impact of Early Hearing Detection & Intervention Program on Detection of Hearing Loss at Birth. (J Educat Audiology, 2005)

Selection of Reports & Fact Sheets:

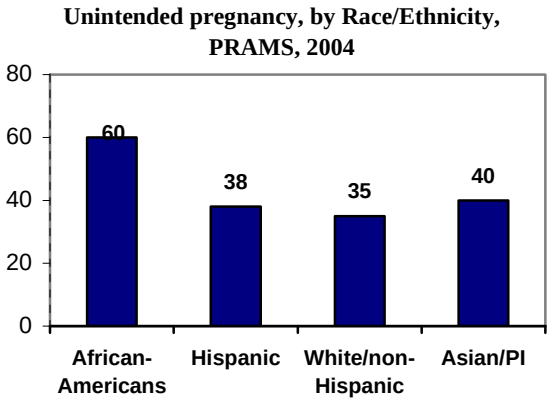
- Pregnancy Risk Assessment Monitoring System (PRAMS) Newsletters
- Women and Infant Children (WIC) Agency Reports
- Birth Defects Newsletters
- Annual Report on Birth Defects in Michigan
- Burden of Oral Disease in Michigan
- PRAMS Annual Reports
- MI Family Planning Report
- State of Michigan Oral Health Plan
- Children and Youth with Special Health Care Needs: Michigan Brief, 2007

Recent Presentations:

- Monitoring Infants and Children with Special Needs: Birth Defects Prevalence and Mortality in MI, 92-02
- Folic Acid Outreach & Multivitamin Distribution in MI Counties at High Risk for Neural Tube Defects
- A Public Health Challenge: SIDS Rates Decline, but Postneonatal death rates remain unchanged, MI 2001-03
- Infant Safe Sleep: Translating Data to Policy and Prevention using Michigan PRAMS data.
- Socioeconomic status and contraceptives use among women with unintended pregnancy
- Lessons Learned from Maternal Mortality Surveillance in MI, 1999-2004
- Early Medicaid Dental Utilization in a Michigan Birth Cohort. 2005
- Overweight in Early Childhood Among Term and Preterm Infants
- The Medical Home: a Role in Reducing Parental Stress
- The Facts about Oral Disease in Michigan
- Binge Drinking and Pregnancy Intention
- Postneonatal Infant Mortality

Maternal and Child Health Epidemiology Section

The MCH Epidemiology Section provides support to a variety of MCH programs targeted to improving the overall health and well being of women and children living in Michigan. Few of the main MCH indicators are listed below:



Unintended Pregnancy: Nearly 40% of all pregnancies in MI are unintended. Among those, 77% are mistimed while the remaining 23% are reportedly unwanted.

Unintended pregnancy is most common among:

- Younger mothers
- Mothers on Medicaid or with no insurance
- African-American mothers

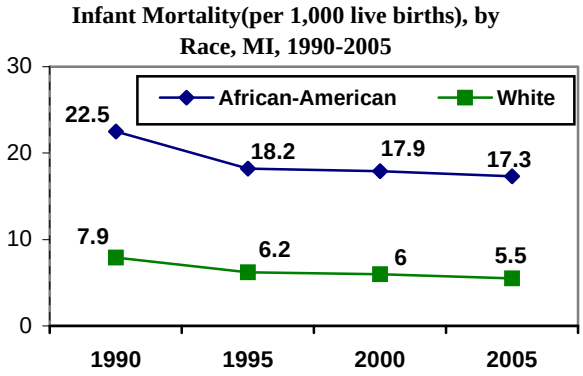
(Source: 2004 PRAMS Annual Report, MDCH, 2007)

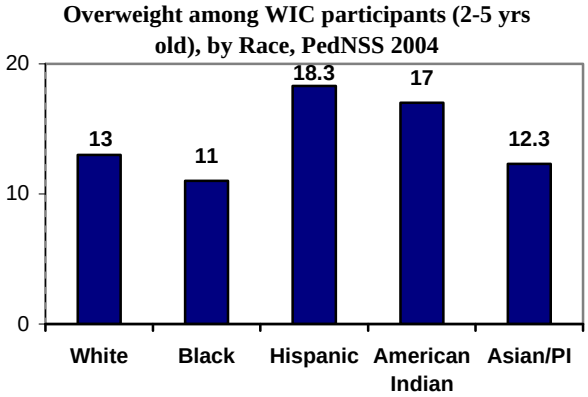
Infant Mortality: Nearly 8 infants per 1,000 live births in the state of MI will die before age 1.

The risk of dying is higher in:

- African-Americans
- Smoking and unmarried mothers
- Mothers who did not receive adequate prenatal care
- Infants weighing ≤ 1499 grams

(Source: 1970 - 2005 Michigan Resident Birth and Death Files, Vital Records & Health Data Development Section, MDCH)





Childhood overweight among WIC participants: In 2004, 13.1% of children aged 2-5 participating in the Women with Infant Children program (WIC) in MI were overweight and an additional 16.1% were at risk of overweight. Between 1995 and 2004 early childhood overweight increased from 9.6% to 13.2% among WIC participants aged 2-5. (Source: 2004 Pediatric Nutrition Surveillance System (PedNSS)

Preterm Birth: In 2004, 12.3% of Michigan babies were born preterm (<37 weeks gestation). Over the last 10 years, the rate of preterm birth has increased by approximately 10% in MI. During 2002-2004, preterm birth rates were highest among African-Americans (18.1%), followed by Native Americans (11.5%), Hispanics (10.8%), and Whites (10.8%). An estimated 28.4% of 2001-2003 enrollees in Michigan's Children's Special Health Care Services program were born preterm. (Source: March of Dimes, Peristats, 2007 and J of Registry Management, 2005)

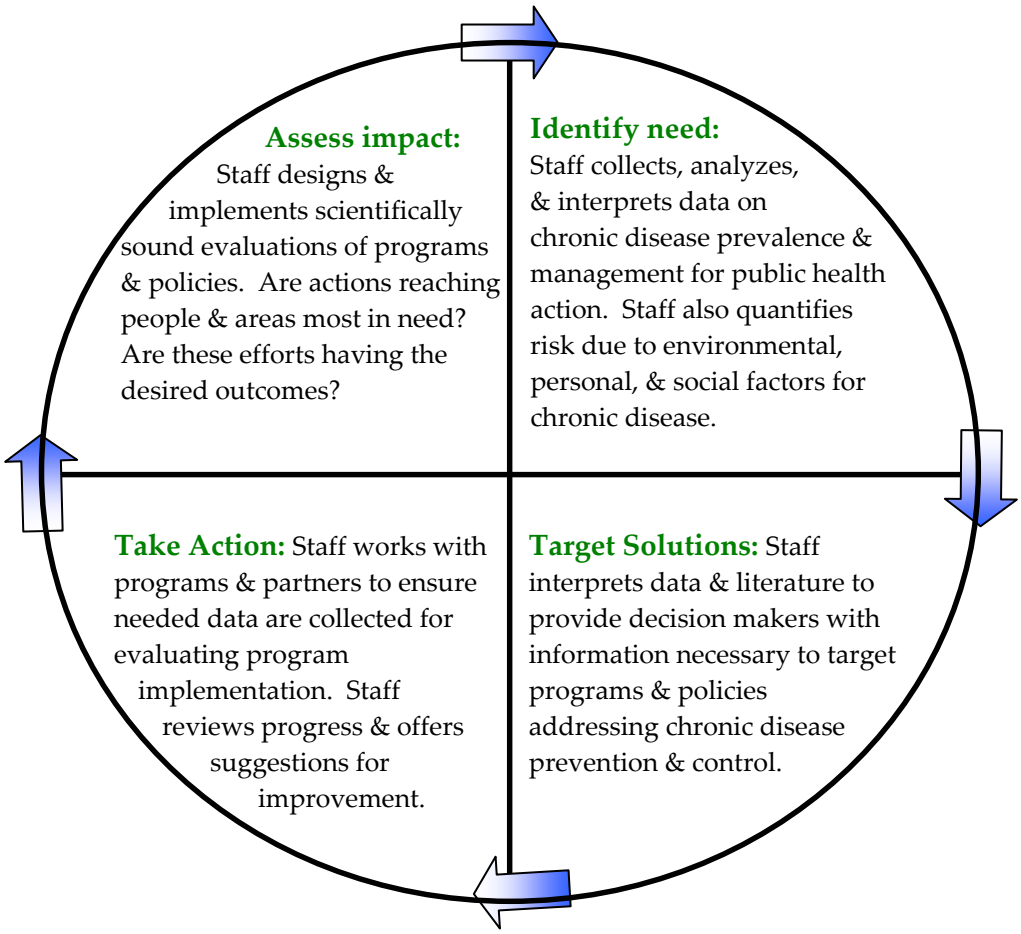
Michigan Maternal and Child Health County Profiles, 1993 - 2002 can be found at:
http://www.michigan.gov/mdch/0,1607,7-132-2944_5327---,00.html
An updated version will be soon available.

Chronic Disease Epidemiology Section

The Section provides epidemiological leadership & expertise to assure translation of research & evidence-based prevention strategies into public health policy & practice. Staff is currently funded to address arthritis/lupus, asthma, diabetes, genomics, & health disparities.

Selected Reports/Fact Sheets

- State of Arthritis in Michigan slide show
- Arthritis fact sheets
- Epidemiology of Asthma in Michigan & Selected Local Areas
- Report on Asthma Deaths among Michigan Individuals 2-35 Years
- Diabetes in Michigan report
- Estimated Number of Persons with Diabetes by County tables
- Color Me Healthy Profile
- African American Male & Hispanic/Latino Health sheets
- Health Disparities by Legislative District fact sheets
- Annual Report of Health Risk Behaviors
- Estimates for Chronic Conditions, Risk Factors, & Preventive Practices by Race/ Ethnicity & Local Health Dept



Sampling of Data Systems

- Behavioral Risk Factor Survey: statewide telephone survey of providing population-based estimates of the prevalence of various behaviors, medical conditions, & preventive practices among Michigan adults.
- Asthma & Sudden Cardiac Death Reviews: investigates circumstances surrounding deaths in children & young adults, in partnership with Michigan State University
- Lupus Registry: collection of incidence and prevalence data for Washtenaw & Wayne County, in partnership with Univ. of Michigan

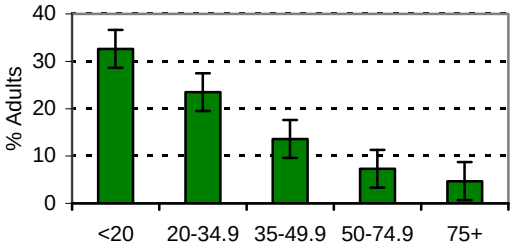
Recent Peer Review Publications (2005-2007)

- Kidney Disease Mortality—Michigan. *Morbidity & Mortality Weekly Review*, 2007.
- Asthma mortality review in Michigan. *Public Health Reports*, 2007.
- Chronic disease-related behaviors & health among African Americans & Hispanics in the REACH Detroit 2010 Community. *Health Promotion Practice*, 2006.
- PBB, PCB, body weight and incidence of adult-onset diabetes mellitus. *Epidemiology*, 2006.
- Self-reported asthma associated with work in 3 states. *J of Asthma*, 2006.
- Developing an asthma tool for schools. *J of School Health*, 2006.
- Using billing data for asthma surveillance in emergency departments. *Pediatrics*, 2006.
- Asthma surveillance using Medicaid claims. *Public Health Reports*, 2005.
- Healthy lifestyle characteristics among US adults. *Arch Internal Medicine*, 2005.

Significant Indicators

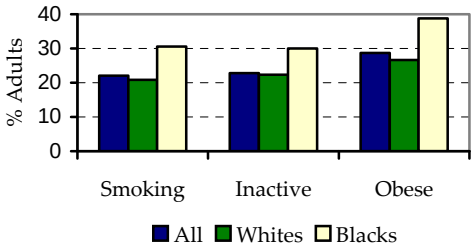
Health Status: 15.2% of Michigan adults report that their health is fair or poor. 23.9% of Michigan adults report being disabled by physical, mental or emotional problems. These indicators tend to decrease with education and income, but increase with age with the exception of days of poor mental health. The percentage of adults reporting that their mental health is fair or poor actually decreases with age. (Source: Preliminary Estimates for Risk Factors and Health Indicators, State of Michigan 2006. www.michigan.gov/brfs)

Poor Health Status by Household Income (Thousands of Dollars), MI Adults, 2006



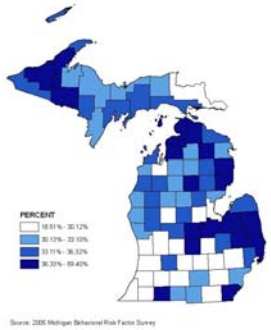
Risk Behaviors: 95% of Michigan adults have at least one risk factor of the top three risk factors for death due to a chronic disease: smoking, an unhealthy weight, lack of physical activity, or a diet lacking in fruit and vegetables. In 2006, 21.9% of adults reported smoking, 22.6% got no physical activity, and 77.2% did not have an adequate intake of fruits and vegetables. 26.5% of adults were obese, a figure that has increased 45% in the past 10 years. The percent of black adults reporting these risk factors is significantly higher than among whites. (Source: Preliminary Estimates for Risk Factors and Health Indicators, State of Michigan 2006. www.michigan.gov/brfs)

Risk Factors by Race, Michigan Adults, 2006

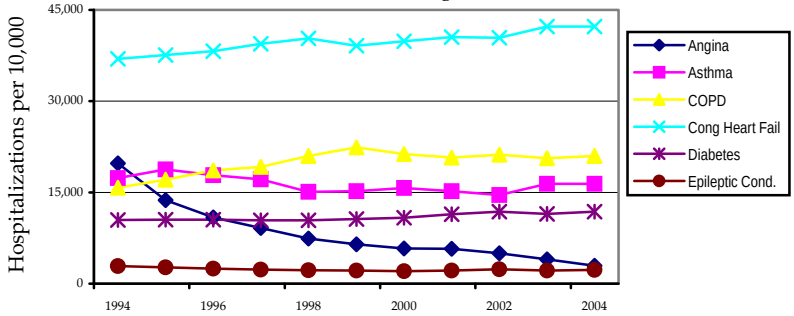


Prevalence: 59.5% of Michigan adults have at least one of the following chronic diseases or conditions: arthritis; asthma; diabetes; epilepsy; heart attack, angina or coronary heart disease; hypertension; high cholesterol; or stroke. One half of these adults have more than one of these conditions. (Source: Estimates for Risk Factors and Health Indicators, State of Michigan 2005. www.michigan.gov/brfs)

Prevalence (%) of Dr-Diagnosed Arthritis by County, Michigan Adults, 2005



Management: There is abundant evidence that chronic disease is not well controlled in Michigan. For example, among adults with diabetes in Michigan, an estimated 67.3% reportedly received at least 2 HgA1c tests, 68.4% a dilated eye exam, and 67.3% a foot exam within the past year. However, only 33.9% reported receiving all three of these services within the past year. This percentage did not vary significantly by sex, race, or age. Similarly, 27.8% of adults reported that they have high blood pressure but 23% of these are not on medication to control their blood pressure. (Source: Estimates for Risk Factors and Health Indicators, State of Michigan 2005. www.michigan.gov/brfs)

Outcomes: Chronic disease causes more than 70% of all deaths in Michigan each year. Chronic diseases directly cause more than 35% of all ambulatory care sensitive hospitalizations. With the exception of angina, rates for the majority of hospitalizations due to chronic disease have not declined significantly since the early 1990s. (Source: Resident Inpatient Files, MDCH Division of Vital Records and Health Statistics)

Rates of Ambulatory Care Sensitive Hospitalization Selected Diseases, Michigan, 1991-2004