METROPOLITAN ATLANTA CONGENITAL DEFECTS PROGRAM

2004 ANNUAL REPORT

birth defect surveillance programs research monitoring and evaluation

MACDP

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

CDC

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Department of Health and Human Services

Centers for Disease Control and Prevention

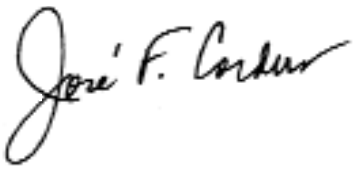
National Center on Birth Defects and Developmental Disabilities

It is my great pleasure to introduce this 2004 biennial report on the Metropolitan Atlanta Congenital Defects Program (MACDP). For over 35 years, the Centers for Disease Control and Prevention has developed valuable partnerships throughout the metropolitan Atlanta area to create and maintain MACDP, a birth defects monitoring program that is a model for other programs around the nation. This report is based on work done at CDC's National Center on Birth Defects and Developmental Disabilities for the benefit of all concerned citizens.

CDC has emphasized its commitment to the goal of reducing infant mortality in the United States. As birth defects continue to be the leading cause of infant mortality, MACDP remains one of the most critical components in furthering this goal. For birth defects prevention strategies to be effective, a strong monitoring program is needed. In Georgia, MACDP serves this purpose, and we are proud that the state was awarded an "A" by the Trust for America's Health in its review of state-based birth defects surveillance programs. We are also proud of the wealth of data that MACDP provides for researchers who work to uncover more causes of birth defects.

We hope that this report will be useful to all involved with the prevention of birth defects, and we thank you for your interest in this critical public health issue. In working together and sharing information and ideas, we move one step closer to ensuring the health of all babies.

Sincerely,



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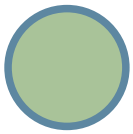


Impact of birth defects

Birth defects are the leading cause of infant mortality in the United States, accounting for 20% of all infant deaths. Of about 120,000 U.S. babies born each year with a birth defect, nearly 6,000 die during their first year of life. In addition, birth defects are the fifth leading cause of years of potential life lost and contribute substantially to childhood morbidity and long-term disability. Birth defects also account for 30% of all pediatric hospital admissions. Annual costs for birth defect-related conditions are nearly $2 billion. Because the causes of about 70% of all birth defects are unknown, there continues to be concern about whether environmental pollutants cause birth defects, developmental disabilities, or other adverse reproductive outcomes. There are additional questions about the potential contribution of various occupational hazards, genetic and dietary factors, medications, and personal behaviors to cause birth defects.

National Vital Statistics Report, vol. 52, 2003

History of MACDP

The Metropolitan Atlanta Congenital Defects Program (MACDP) was established in 1967 by the Centers for Disease Control and Prevention with Emory University and the Georgia Mental Health Institute as the nation's first and most highly regarded population-based active ascertainment birth defects surveillance program, which means the CDC does not wait for defects to be reported by hospitals, but rather goes to the hospitals and clinics to monitor records for all births. For over 35 years, MACDP has served multiple purposes which include monitoring the incidence of birth defects, serving as a data source for a variety of epidemiologic studies, developing and evaluating intervention and prevention strategies, and providing data for health policy decisions. MACDP also acts as the model for many state-based programs and as a resource for the development of uniform methods and approaches to birth defect surveillance.

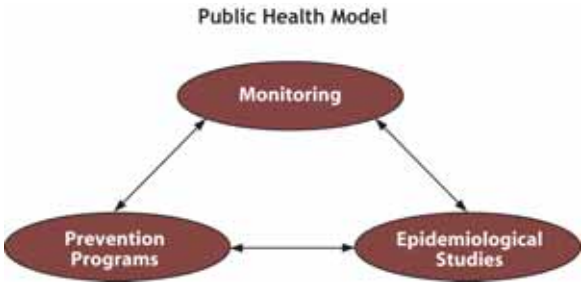
MACDP serves as a training ground for a large number of professionals active in birth defects epidemiology, including CDC Epidemic Intelligence Service Officers, visiting scientists, fellows, preventive medicine residents, and medical and public health students. Such training serves to build professional capacity in birth defects epidemiology in state health departments, federal agencies, universities, and private industry.

MACDP also serves as the source of case data for one of ten centers participating in the National Birth Defects Prevention Study (NBDPS). The NBDPS is the largest case-control studies ever conducted to evaluate the role of environmental and genetic factors in the occurrence of birth defects.

Program Goals

The primary goals of MACDP have remained consistent for over 35 years:

- Monitor, regularly and systematically, births of malformed infants and fetuses in the population for changes in incidence or unusual patterns suggestive of environmental influences, including drugs, infections, and chemical and physical agents
- Develop and maintain a case registry for use in epidemiologic and genetic studies
- Quantify the morbidity and mortality associated with birth defects
- Provide data for education and health policy decisions leading to prevention
- Serve as a model for birth defects monitoring programs in the United States and in other countries and provide a training ground for birth defects investigators



An effective surveillance system is an important tool to:

- **Detect trends and birth defect clusters**
- **Identify risk factors for birth defects**
- **Guide and assess the progress of prevention**
- **Coordinate with special health care delivery services**
- **Educate and advocate**

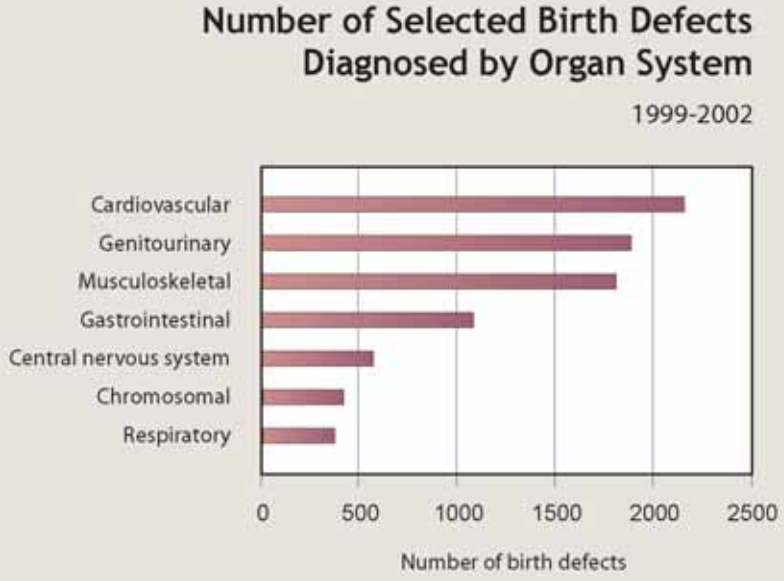
Birth Defects Monitoring

MACDP has monitored over 1.1 million births since 1967 and has information on over 41,000 children born with birth defects. Monitoring is a critical component of the public health system. MACDP data are used to observe unusual patterns and to detect changes in the occurrence of birth defects. These data provide the basis for research studies into the cause of birth defects and also serve to evaluate the impact of prevention programs.

Authority

Birth defects are reportable diseases in Georgia. CDC is authorized by the Division of Public Health, Georgia Department of Human Resources to collect data on birth defects in Atlanta.

Babies and children born with birth defects are identified by a systematic review of hospital records for all births to residents of the five-county metropolitan area in, or infant referrals to, the area's approximately 19 hospitals and through vital records maintained by the State of Georgia. The highest level of confidentiality is maintained for all identifying information. The data are protected by the Privacy Act of 1974 and by an Assurance of Confidentiality that is granted by the Director of the CDC. MACDP was approved by CDC's Institutional Review Board in 1998.



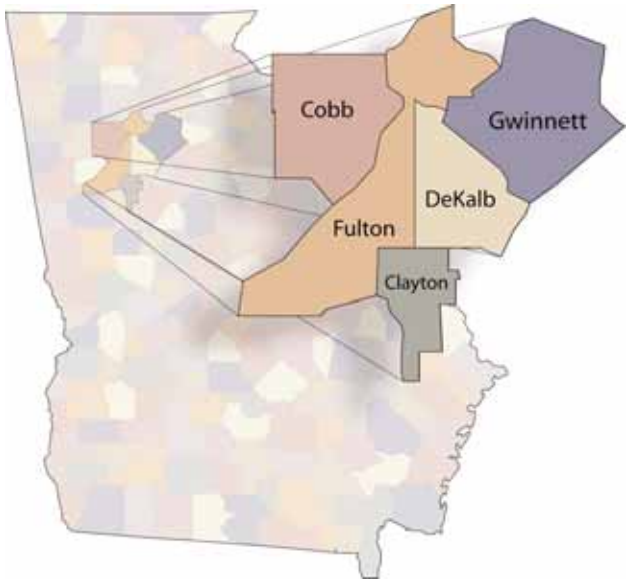
Methods

The surveillance system covers five counties in the metropolitan Atlanta area (Clayton, Cobb, DeKalb, Fulton, and Gwinnett) with an estimated population of 2.9 million and an estimated 50,000 annual births. As the Atlanta area has grown, the central 5-county region has become increasingly more urban and the racial and ethnic composition has changed significantly over time. Since MACDP began monitoring birth defects, the percentage of births to non-whites has risen from 27% to 48%.

The key to the success of MACDP has been its multiple case sources. Unlike a passive monitoring system, which relies on voluntary reporting, specially trained MACDP staff visit hospitals and clinics throughout the metropolitan Atlanta area to ensure the inclusion of all births affected by a birth defect. MACDP also links with other data bases such as birth and death certificates and cytogenetic laboratories. Diverse and comprehensive data sources improve as certainment, help eliminate duplicate counts, and improve accuracy of data.

MACDP Case Definition

- **Infant or fetus whose mother is a resident of five-county metropolitan Atlanta area at the time of birth.**
- **Infant or fetus with a birth defect on list of standard diagnoses.**
- **Infant or fetus with a birth defect diagnosed by the child's sixth birthday.**
- **Live, stillborn, or terminated infant or fetus with a gestational age greater than or equal to 20 weeks.**



Improving Health

In addition to the creation of a data base to conduct birth defect research, MACDP benefits the community of metropolitan Atlanta through a partnership with the Georgia Division of Public Health's Birth Defects Reporting and Information Systems (GBDRIS). The Children 1st program provides a state-wide collaborative system for referrals to programs and services for at-risk children. Children 1st refers families to other public health programs including Babies Can't Wait (BCW), Children with Special Needs and Children's Medical Services (CMS). GBDRIS combines birth defect data collected statewide with data provided by MACDP and works with Children 1st to ensure that all children eligible for servies receive them.

Annual meeting

The National Center on Birth Defects and Developmental Disabilities & MACDP will be hosting the *2nd Annual Birth Defects Monitoring in Georgia – Partners' Meeting*, which will be held on September 23, 2004, in Atlanta, Georgia. More information can be obtained by emailing MACDP@cdc.gov or visiting http://www.cdc.gov/ncbddd/bd/bdsurv.htm.

For inquiries regarding this document or MACDP, please email MACDP@cdc.gov.

Selected birth defects counts and rates, 1999-2002

Rates are per 10,000 live births

	1999		2000		2001		2002		1999-2002	
	Cases	Rates	Cases	Rates	Cases	Rates	Cases	Rates	Cases	Rates
Central Nervous System										
Spina bifida	6	1.3	11	2.2	15	3.0	18	3.6	50	2.5
Encephalocele	9	1.9	<5	0.0	<5	0.8	6	1.2	19	1.0
Anencephalus	12	2.6	13	2.6	8	1.6	5	1.0	38	1.9
Cardiovascular										
Atrial septal defects	105	22.3	127	25.4	126	24.8	127	25.1	485	24.5
Patent ductus arteriosus	145	30.8	133	26.6	166	32.7	148	29.3	592	29.9
Ventricular septal defects	198	42.1	212	42.4	223	43.9	220	43.5	853	43.0
Pulmonary valve anomalies	28	6.0	42	8.4	38	7.5	34	6.7	142	7.2
Coarctation of aorta	25	5.3	26	5.2	32	6.3	33	6.5	116	5.8
Aortic valve anomalies	11	2.3	11	2.2	9	1.8	19	3.8	50	2.5
Transposition of great arteries	23	4.9	36	7.2	29	5.7	29	5.7	117	5.9
Fallot's tetralogy	20	4.3	19	3.8	17	3.4	32	6.3	88	4.4
Persistent truncus arteriosus	<5	0.9	<5	0.8	<5	0.6	<5	0.6	14	0.7
Orofacial										
Cleft lip w/wo cleft palate	40	8.5	45	9.0	35	6.9	45	8.9	165	8.3
Cleft palate	36	7.7	45	9.0	38	7.5	25	4.9	144	7.3
Musculoskeletal										
Clubfoot	78	16.6	54	10.8	62	12.2	65	12.9	259	13.1
Reduction defect of upper limb	15	3.2	29	5.8	19	3.7	21	4.2	84	4.2
Reduction defect of lower limb	6	1.3	10	2.0	10	2.0	5	1.0	31	1.6
Chromosomal										
Down syndrome	65	13.8	62	12.4	79	15.6	64	12.7	270	13.6
Trisomy 18	17	3.6	7	1.4	12	2.4	15	3.0	51	2.6
Trisomy 13	7	1.5	7	1.4	5	1.0	8	1.6	27	1.4
Genitourinary										
Hypospadias*	173	71.9	159	62.8	142	55.1	171	66.4	645	63.9
Primary	60	24.9	65	25.7	60	23.3	62	24.1	247	24.5
Secondary	52	21.6	36	14.0	31	12.0	32	12.4	151	15.0
Tertiary	8	3.3	7	2.8	13	5.0	15	5.8	43	4.3
Epispadias*	<5	0.4	<5	0.0	<5	0.8	<5	1.2	6	0.6

* Rates are per 10,000 male live births

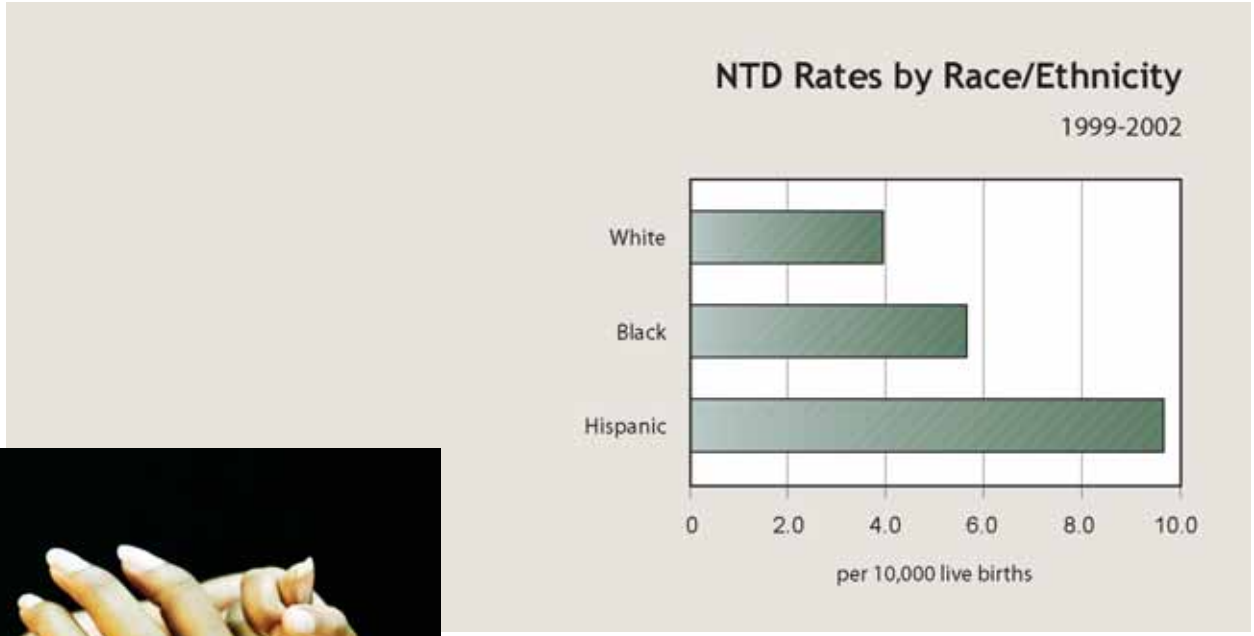
Neural Tube defects

Neural tube defects (NTDs) are congenital malformations of the central nervous system (i.e., the brain and spinal cord) in which the neural tube, which is the foundation of the central nervous system, fails to close properly in the first 28 days following conception. NTDs result in physical and neurological impairments, which are disabling and in some cases fatal. Those surviving with an NTD face enormous financial and emotional burdens in addition to life long physical disabilities.

A strong majority of NTD affected pregnancies are suspected before the child is born by measuring the level of alphafetoprotien (AFP) in the mother's blood through a test included in the "triple screen", which is performed between 15-20 weeks of pregnancy. This protein is secreted by the fetus's liver and, if the fetus has an NTD, leaks through the defect and becomes elevated in the mother's bloodstream. If the AFP is high, an ultrasound can confirm the diagnosis and determine the extent of the defect.

An inadequate intake or abnormal metabolism of folate can be a risk factor for NTDs. Research studies suggest that if all women of childbearing age consumed 400 micrograms of folic acid every day, rates of children born with an NTD would drop by 50%-70%. Because NTDs form in the first 28 days following conception, before most women know they are pregnant, it is critical for women to to start getting enough folic acid before becoming pregnant. The U.S. Public Health Service recommends that all women of childbearing age who are capable of becoming pregnant consume 400 micrograms of synthetic folic acid daily either through supplements, such as a multivitamin, or through food fortified with folic acid.

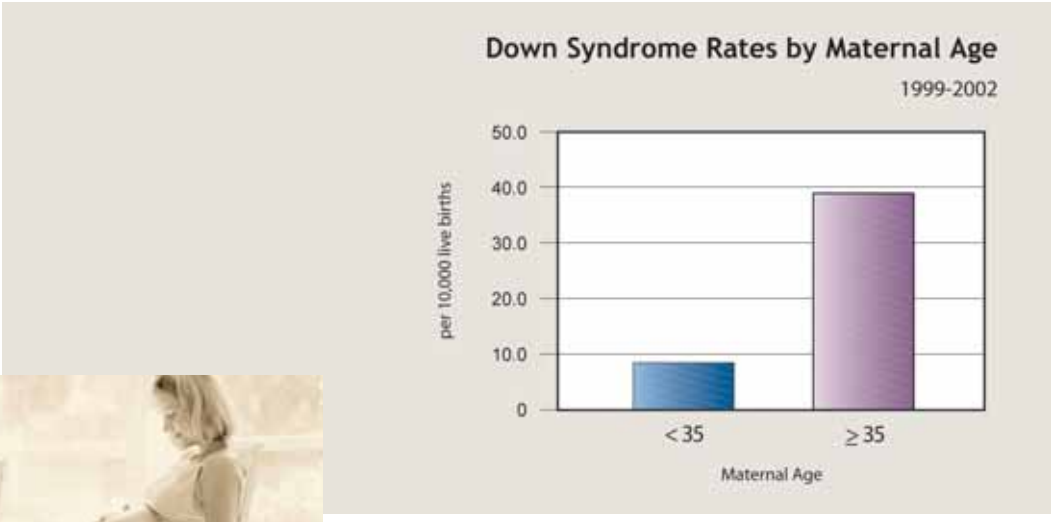
By 1998, all fortified cereal grains in the United States were required to contain folic acid as part of an NTD prevention strategy. Data from MACDP and several other birth defects registries were used to evaluate the impact of this program. To highlight the success of folic acid fortification as a public health strategy, the Morbidity and Mortality Weekly Report (MMWR 53(17);362-365. 2004.) recently published numbers indicating that over 1,000 cases per year of NTDs have been prevented since fortification became mandatory. Culturally distinct dietary habits, along with potential genetic differences, may contribute to differences in rates of NTDs among racial and ethnic groups.



Down Syndrome

Down Syndrome, or Trisomy 21, is the most common chromosomal disorder in children and the leading cause of mental retardation. A person typically has 23 pairs of chromosomes, but babies with Down syndrome are born with an extra chromosome number 21.

Although all the risk factors for Down syndrome are not yet known, maternal age at the time of pregnancy is the strongest and most common risk factor. The most dramatic increase in risk comes with a maternal age of 35 or older. In the Atlanta area, women over the age of 34 have three times the rate of infants with Down syndrome than women under 34. Concern is increased because of the growing proportion of women who are giving birth over the age of 35. Between 1990 and 2002, that proportion increased from 10% to 16%.



Chromosomal disorders such as Down syndrome can be diagnosed postnatally through blood tests and prenatally through a diagnostic test such as an amniocentesis, which tests cells in the fluid surrounding the fetus. There are many clinical signs of Down syndrome including a variety of physical characteristics and cognitive delays.

National Down Syndrome Study

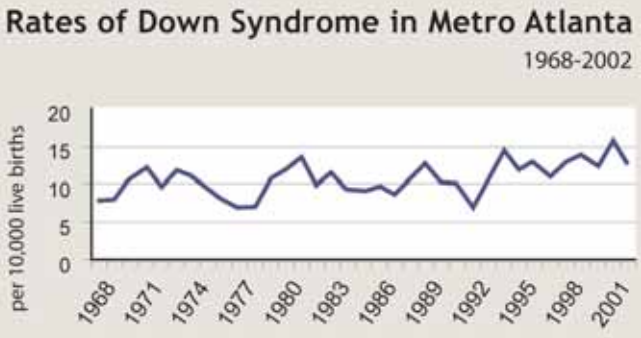
The chromosomal basis of Down syndrome was identified more than 40 years ago. Surprisingly, there is still little known about why this chromosomal error occurs and why an extra chromosome leads to the symptoms associated with Down syndrome.

The National Down Syndrome Project is a population-based study started in 2001 at Emory University in Atlanta, Georgia. Emory University collaborates with the CDC in Atlanta and with researchers in five other states across the U.S. to better understand Down syndrome and its associated birth defects.

To achieve these goals, parents are asked to complete an interview covering health and pregnancy history, family's health history, and environmental exposures, and to donate a blood sample or cheek cell swab on themselves and their child. These data are used to better understand the significant association of the mother's age and trisomy 21.

The study combines cytogenetic, molecular genetic, clinical and epidemiological tools to examine the mother's age and other health related factors and features of the chromosomes during the formation of the eggs (e.g., recombination pattern). These same tools are used along with the resources from the Human Genome Project to identify genetic and environmental risk factors for Down syndrome-associated birth defects.

Since January 2001, over 1,400 families from Georgia, California, Arkansas, Iowa, New Jersey, and New York have participated in the National Down Syndrome Project.

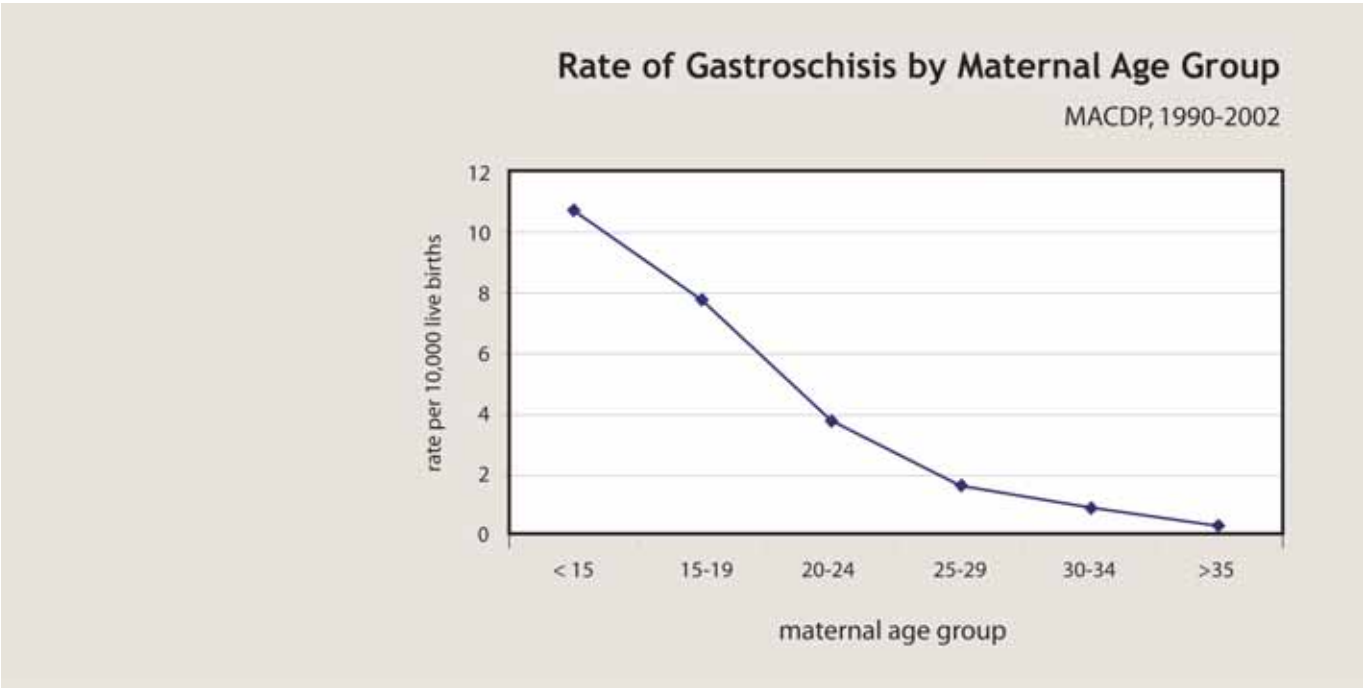


Gastroschisis

Gastroschisis is a birth defect that causes a small hole in the abdominal wall, allowing for the protrusion of the digestive and other abdominal organs to the outside of the body. Over 60% of children with gastroschisis are diagnosed prenatally. Gastroschisis can be detected on routine second semester ultrasound and can be suspected through the maternal serum alphafetalprotein (MSAFP) screen. Because there is no strong link with chromosomal abnormalities, more invasive tests are not typically done when gastroschisis is the only defect noted, which is true for over 70% of children born with gastroschisis.

A child born with gastroschisis will undergo corrective treatment within days of the birth. Treatment of gastroschisis involves corrective surgery to place the protruding organs inside the body and repair the abdominal wall. The survival rate of children born with this defect is 90%-95%. Although special feeding will be needed in the short-term, the long-term outlook after surgery is very good and only a small percentage of children will require additional surgery.

Recent reports have suggested that rates of gastroschisis have been on the rise in regions throughout the world. The cause of the defect is unknown, but studies have begun to identify risk factors for gastroschisis. The most interesting of these is young maternal age. Rates of gastroschisis are highest among young mothers, particularly teenage mothers. The reason for this is unclear, but some studies have suggested it may be due to lifestyle and high-risk behaviors, such as smoking cigarettes, drinking alcohol, and taking illegal drugs while pregnant.

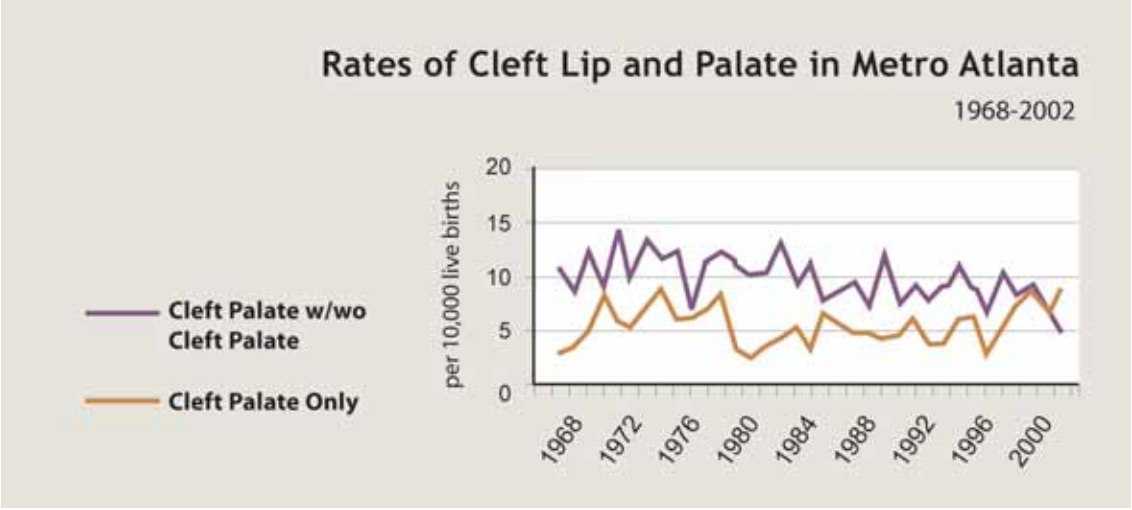


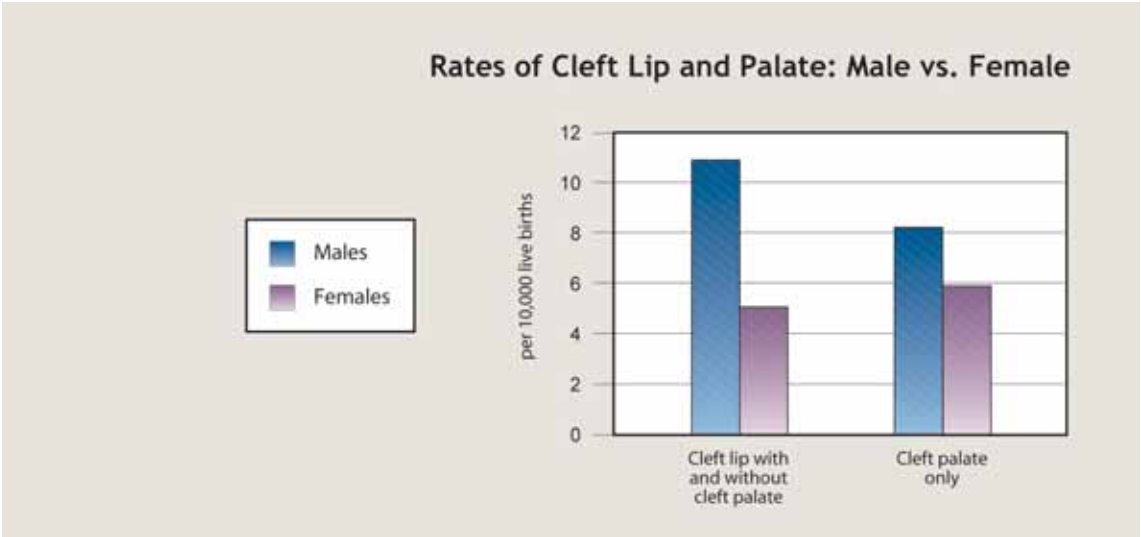
Orofacial Clefts

Clefts of the lip and palate occur when structures of the mouth fail to develop properly. These defects typically occur early in fetal development between four and ten weeks after conception. Cleft lip and palate may occur separately or together. A cleft lip involves the space between the upper lip and the nostrils, and clefts of the palate may occur in the front of the palate, which involves underlying bone, or in the back area involving soft tissue. Infants born with a cleft typically undergo surgery and receive speech therapy and orthodontia care.

Orofacial clefts affect about one of every 680 metropolitan Atlanta children from 1999-2002. The cause of clefts is still not known, but studies indicate that both genetic and environmental factors may play a role. Current research is examing each of these as well as any potential relationships between the two.

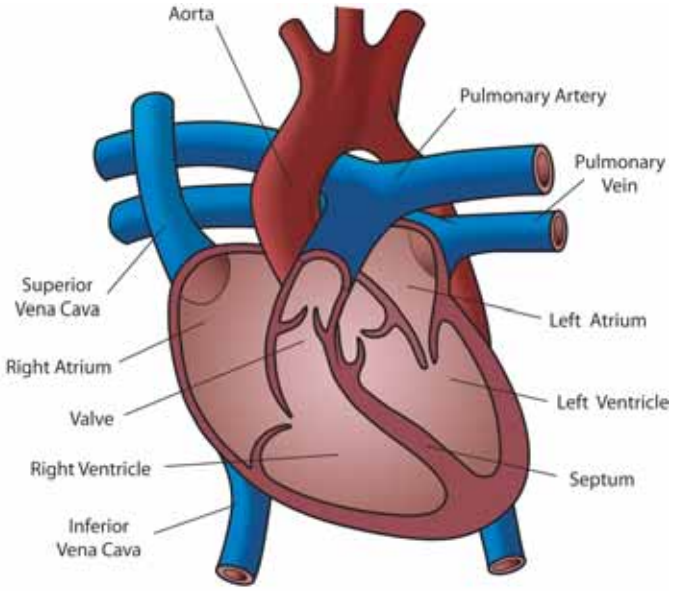
Studies using MACDP data have shown that multivitamin use may reduce the risk of some facial clefts. CDC researchers noted a 48% reduction in cleft lip with and without cleft palate among births to mothers who began taking a multivitamin by the first month following conception.





Congenital Heart Defects

Congenital abnormalities of the heart affect more infants born in Georgia than any other type of birth defect. One of every 120 babies born in the metropolitan Atlanta is born with a congenital heart defect. While many defects are not considered severe, defects of the heart are responsible for more infant deaths than any other birth defect. In many cases, the intensive treatment during the first years to correct the abnormality is followed by a lifetime of costly care.

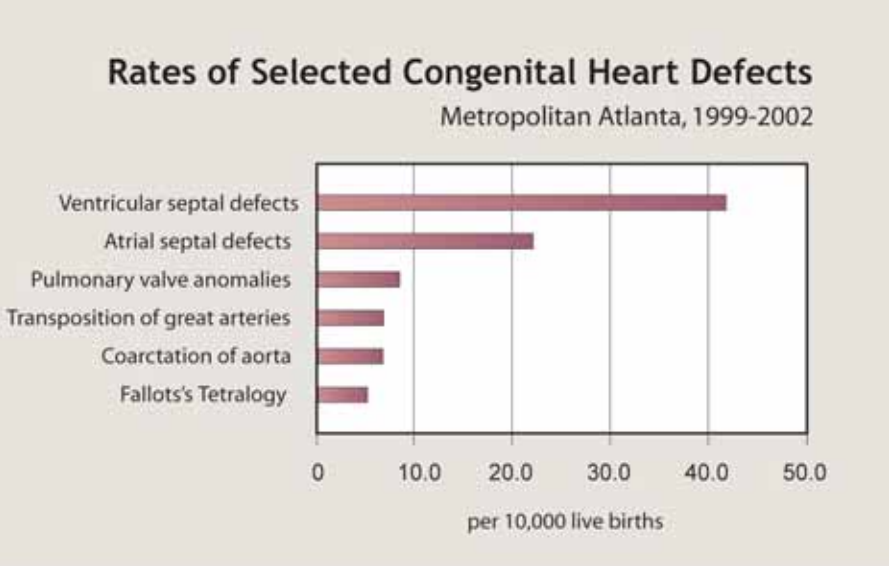


In most cases, it is not known what causes congenital heart defects; however, a condition like Down syndrome may affect multiple organs in the body including the heart. Other possible risk factors are viral infections, genetics (i.e., a family member with a congenital heart defect), maternal consumption of alcohol, maternal diabetes, some prescribed medications, and some recreational drugs.

The two most common types of heart defects are ventricular septal defect (VSD) and atrial septal defect (ASD). In both cases, a hole in the wall between the heart chambers disrupts the flow of blood and oxygen to the body. In some cases, clinical symptoms result that need to be corrected surgically. The severity and necessity of treatment are dependent on the size of the opening.

Rates for VSD and ASD have risen in recent years mainly due to more widespread use of sophisticated technology to detect these defects.

Though less common, other heart conditions such as Tetralogy of Fallot and transposition of the great arteries are much more serious and complex to treat. Approximately four to five children per 10,000 are affected by each of these defects.



Research Projects & Publications

In addition to serving as a surveillance system, MACDP also provides invaluable data to ongoing research efforts to identify risk factors for birth defects. Below are a few brief examples of some recent projects using data from MACDP.

Obesity and overweight as risk factors for birth defects.

Some studies have a suggested that prepregnancy obesity and overweight could be a risk factor for neural tube defects and some heart defects, but little had been done to associate obesity and overweight with other birth defects. Using MACDP data, CDC researchers found that when compared to average-weight women, obese women had a 3½-fold increased risk for having a child with a neural tube defect or omphalocele, an abdominal wall defect. Obese women were twice as likely to have a child with a heart defect or multiple defects than were average-eight women. Overweight women were twice as likely as average-weight women to have an infant with a heart defect and twice as likely to have an infant with multiple defects. These higher risks underline the need for obesity prevention efforts to insure women are at a healthy weight women before they become pregnant.
Pediatrics. 2003;111:1152-8.

Maternal illness, fever, medication use, and the risk of birth defects.

Using MACDP data, researchers investigated whether having an illness, fever or medication use during the first trimester increased the risk for congenital renal anomalies. They found that maternal illness was associated with a 70% increased risk and fever was associated with an 80% increased risk for congenital renal anomalies. Among medications used during the first trimester, nonprescription aspirin-containing medication had the strongest association with a 3½-fold increased risk for congenital renal anomalies.
Birth Defects Research Part A: Clinical & Molecular Teratology. 2003;67:911-8.

Survival of infants with encephalocele.

A CDC study investigated the survival of a cohort of liveborn infants in metropolitan Atlanta diagnosed with encephalocele from 1979 through 1998. The survival rate to age 20 was 67%, with 76% of deaths occurring on the first day of life. Factors associated with increased risk of death were low birth weight, having multiple defects, and black race. For those born with low birth weight, survival improved over the nineteen year study period.
Paediatrics Perinatal Epidemiology. 2003;17:40-8.

Survival among children with congenital diaphragmatic hernia.

This birth defect occurs when the diaphragm does not fully form and allows abdominal organs to enter the chest cavity which can prevent the lungs from growing normally. Using data from MACDP, researchers investigated the survival of those children born between 1968-1999. Survival to one year of age increased from 19% during the earliest time period (1968-1971) to 54% for those born in the most recent time period covered by the study (1996-1999). During the last 10 years of the study, infants of low birth weight or those who had a syndrome (i.e. Trisomy 18 or 21) were more likely to die than other infants with congenital diaphragmatic hernia. The study also suggests that those with more severe congenital diaphragmatic hernia may be at greater risk of death.
Birth Defects Research Part A: Clinical & Molecular Teratology. 2003;67:261-7.

Improving your chances for a healthy pregnancy

"Is it safe to have an occasional drink of alcohol?"

No, there is no safe level of alcohol you can drink during pregnancy. There is an increasing number of research studies that demonstrate that even light drinking has an adverse effect on the mental and physical development of your child [a,b]. Drinking alcohol during pregnancy can hurt a baby's brain, heart, kidneys, and other organs.

Some babies exposed to alcohol during pregnancy have fetal alcohol syndrome, or FAS. These babies have faces that do not look "normal" and may be born smaller and weigh less at birth than other babies. Some babies with FAS will have mental retardation and others will have a hard time learning and controlling the way they act. These problems do not go away. They last a life time.

Even if a baby does not have FAS, the baby may be born with other learning and behavioral problems as a result of drinking while pregnant.

Tobacco Use & Pregnancy

Tobacco use has been determined to be a risk factor for birth defects, particularly oral facial clefts[c]. In addition to birth defects, smoking may have other negative effects on a developing baby. The Surgeon General reported the following risks associated with smoking and being exposed to "second hand" smoke[d]:

- Women smokers, like men smokers, are at increased risk of cancer, cardiovascular disease, and pulmonary disease, but women smokers also experience unique risks related to menstrual and reproductive function
- Women who smoke have increased risk of conception delay and for primary and secondary infertility
- Women who smoke may have a modest increase in risks for ectopic pregnancy and spontaneous abortion
- Smoking during pregnancy is associated with increased risk for premature rupture of membranes, abruptio placentae (placenta separation from the uterus), and placenta previal (abnormal location of the placenta), which can cause massive hemorrhaging during delivery; smoking is also associated with a modest increase in risk for preterm delivery
- Infants born to women who smoke during pregnancy have a lower average birth weight and are more likely to be small for gestational age than infants born to women who do not smoke. Low birth weight is associated with increased risk for neonatal, perinatal, and infant morbidity and mortality. The longer the mother smokes during pregnancy, the greater the effect on the infant's birth weight
- The risk for perinatal mortality, both stillbirths and neonatal deaths, and the risk for sudden infant death syndrome (SIDS) are higher for the offspring of women who smoke during pregnancy
- Infants born to women who are exposed to environmental tobacco smoke (ETS) during pregnancy may have a small decrement in birth weight and a slightly increased risk for intrauterine growth retardation than infants born to women who are not exposed to ETS
- Women who smoke are less likely to breast-feed their infants than are women who do not

a Willford at al. Alcoholism: Clinical and Experimental Research. 28:497-507 (2004)
b Day et al. Alcoholism: Clinical and Experimental Research. 26:1584-1591 (2002)
c Little et al. Tobacco smoking and oral clefts: a meta-analysis. Bull World Health Organ. 82(3):213-8. (2004).
d Women and Smoking: A Report of the Surgeon General (2001)

Additional steps to a healthy pregnancy

Preconception

It is important to plan for your baby's health before you are pregnant. Consult your health-care provider to discuss preconception and prenatal care. If you think you may already be pregnant, see your health-care provider as soon as possible.

Take folic acid daily both before pregnancy and during the first few months. Consumption of 400 micrograms of folic acid can reduce the risk of birth defects of the brain and spine, but only if taken before and during the first weeks of development.

Tell your health care provider about any history of problems with pregnancy or birth defects in your family.

Eat a healthy diet! It is best to be within 15 pounds of your ideal weight before pregnancy, if possible. Being over-weight or underweight during pregnancy may lead to problems. Consult your health-care provider before making changes in your diet.

Get all needed vaccines before you become pregnant. Consult your health-care provider for guidelines about the use of vaccines during pregnancy.

During your pregnancy

Take iron supplements during your pregnancy, as prescribed by your health-care provider, to reduce the risk of anemia.

Exercise during pregnancy can benefit both you and your baby by lessening discomfort and fatigue, providing a sense of well-being, and speeding recovery after delivery. Always check with your health-care provider before beginning any kind of exercise, especially during pregnancy.

Make sure that medical conditions such as diabetes, epilepsy, and high blood pressure are treated and kept under control both before and during pregnancy. Some medications may need to be changed or adjusted during pregnancy.

Consult your health-care provider about any prescription or over-the-counter drugs you are taking or may consider taking during pregnancy. Over-the-counter cough and cold remedies may contain alcohol or other ingredients that should be avoided during pregnancy.

Avoid X rays while pregnant or when planning a pregnancy. If you must have dental work or diagnostic tests, tell your dentist or physician that you are pregnant so that extra care can be taken.

Avoid exposure to toxic chemicals such as cleaning solvents, lead, mercury, some insecticides, paint, and paint fumes.

Please consult your doctor on any issue regarding your pregnancy.

Additional Resources

National Center on Birth Defects and Developmental Disabilities
http://www.cdc.gov/ncbddd/
Phone: (404) 498-3800

CDC Office of Genomics and Disease Prevention
http://www.cdc.gov/genetics/default.htm

Georgia's Children 1st Program
http://www.ph.dhr.state.ga.us/programs/childrenfirst/index.shtml

Children's Health Network -
Congenital Heart Disease Information & Resources
http://www.tchin.org
Phone: (215) 493-3068

International Clearinghouse for Birth Defects Monitoring Systems
www.icbd.org

March of Dimes, Georgia
http://www.marchofdimesga.com
Phone:(404)350-9800

National Birth Defects Prevention Network
http://www.nbdpn.org/

National Down Syndrome Society
http://www.ndss.org

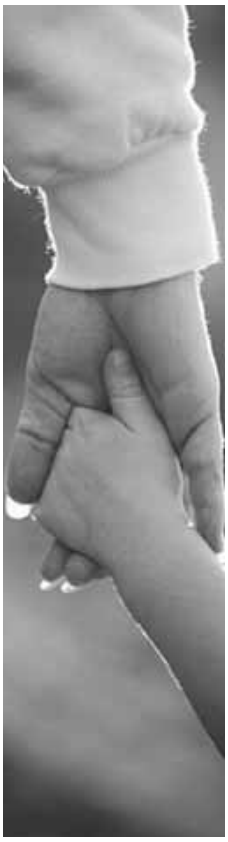
National Organization for Rare Disorders
http://www.rarediseases.org

Forum on Child and Family Statistics
www.childstats.gov

National Society of Genetic Counselors
www.ncgc.org

SMILES
http://www.cleft.org/

* These resources are provided solely as a service to our users. These links do not constitute an endorsement of these organizations or their programs by the CDC or the federal government, and none should be inferred. CDC is not responsible for the content of the individual organization Web pages found at these sites.



Acknowledgements

The MACDP and the National Center on Birth Defects and Developmental Disabilities would like to thank all the participating hospitals and clinics for their invaluable assistance in the gathering of birth defect data. It is this partnership that helps create the premier birth defects surveillance system in the country.

Atlanta Medical Center
Children's Healthcare of Atlanta at Egleston
Children's Healthcare of Atlanta at Scottish Rite
Crawford Long Hospital
DeKalb Medical Center
Emory Dunwoody Medical Center
Emory Eastside Medical Center
Emory Genetics Laboratory
Emory Parkway Medical Center
Grady Memorial/Hughes Spalding Children's Hospital
Gwinnett Medical Center
Genzyme Genetics
North Fulton Regional Hospital
Northside Hospital
Piedmont Hospital
Sibley Heart Center at Children's Healthcare of Atlanta
South Fulton Medical Center
Southern Regional Medical Center
Southwest Hospital & Medical Center
WellStar Cobb Hospital
WellStar Kennestone Hospital

MACDP

Metropolitan Atlanta Congenital Defect Program