Tennessee Birth Defects Registry Report

2008-2012

Tennessee Department of Health | December 2015

Tennessee Department of Health

John J. Dreyzehner, MD, MPH, Commissioner
Bruce Behringer, MPH, Deputy Commissioner
David Reagan, MD, Chief Medical Officer
Lori B. Ferranti, PhD, MSN, MBA, Assistant Commissioner,
Division of Policy, Planning and Assessment

The mission of the Department of Health is to protect, promote and improve the health and prosperity of people in Tennessee.

Tennessee Birth Defects 2008-2012 was prepared by the Tennessee Department of Health, Division of Policy, Planning and Assessment

Table of Contents

List of Figures

List of Tables

Executive Summary

According to the Centers for Disease Control and Prevention, an infant is born every four and half minutes with a birth defect. Tracking where and when birth defects occur and who they affect is the first step in preventing birth defects.

This report is a statewide population-based report produced by the Tennessee Birth Defects Registry (TBDR) detailing the birth prevalence of 47 major birth defects and fetal alcohol syndrome for Tennessee infants born in the years 2008 through 2012. Sections in this report detail counts and rates presented by race, ethnicity, geography, and age of mother. The two most common reported birth defects overall were members of the cardiovascular group: atrial septal defect (ASD), a hole or opening in the upper chambers of the heart, and patent ductus arteriosus (PDA), an opening that failed to close from fetal circulation.

Birth defects can occur during any stage of pregnancy. Most birth defects occur in the first three months of pregnancy and can affect almost any part of the body. Nationally, nearly one out of every 33 babies is born with a birth defect. Some defects are obvious at birth while others may not be apparent until adulthood. Some defects can result in life-long debilitating illnesses or death. Surgery and medical interventions may correct others, but not without cost.

Unfortunately, the underlying causes of individual birth defects are largely unknown, with a high percentage of infant birth defects having no known cause. This leaves many questions about the causes and patterns of birth defects unanswered. Information obtained through monitoring diseases and the surveillance of births defects can assist with the task of addressing these questions. While the direct causes of birth defects are not fully understood, there are known risk factors that affect birth defects prevalence. For example: drinking alcohol during pregnancy, smoking during pregnancy, low blood folate levels, poorly controlled blood sugar levels in diabetic mothers, and maternal infections are all associated with increased risk of having a baby born with a birth defect.

The primary use of data collected by TBDR is to observe patterns and detect changes in the patterns of leading birth defects. The data provides the basis for research studies into the causes of birth defects and provides information to evaluate the effectiveness of birth defects prevention efforts. It also serves as an historic baseline used to evaluate the existence of suspected birth defects clusters. The tracking of birth defects also provides a way to identify and refer babies with birth defects to services and special care they often need.

Tennessee Birth Defects Registry

The Tennessee Birth Defects Registry (TBDR) was established in law (TCA 68-5-506) by the Tennessee State Legislature in June 2000. The TBDR was established with the mission: 1) to providing annual information on birth defects prevalence and trends; 2) to provide information on the possible association of environmental hazards and other potential causes of birth defects; 3) to evaluate current birth defects prevention initiatives, providing guidance and strategies for improving those initiatives; and 4) to provide families of children with birth defects information on public services available to children with birth defects. Since 2003, the program has expanded to provide population-based birth defects surveillance for the entire state of Tennessee. The registry is continually evaluating its effectiveness and the ability to meet the requirements of its initiatives.

Birth Defect Definition

The tracking of these birth defects is recommended by the Centers for Disease Control and Prevention (CDC) and the National Birth Defects Prevention Network (NBDPN). The department does not receive federal funding for participation in the network. Currently, 41 states maintain a birth defects registry or report data to the CDC. Unfortunately, rates across states should not be compared as collection methodology, years collected, and individual definitions vary widely. This report details the birth prevalence of 47 major birth defects for Tennessee infants who were born to resident mothers during the period 2008 through 2012.

Tennessee's Birth defects are classified as major birth defects when they require medical or surgical treatment, have serious adverse effects on health and development, or have a significant cosmetic impact. Additionally, the 47 birth defects can be organized within eight diagnostic categories corresponding to eight major organ systems: 1) Central Nervous System; 2) Eye and Ear; 3) Cardiovascular; 4) Orofacial; 5) Gastrointestinal; 6) Genitourinary; 7) Musculoskeletal; and 8) Chromosomal.

Birth defect counts include: 1) live-born infants diagnosed with a birth defect during the first year of life; and 2) diagnosed fetal-death cases that were at least 500 grams in weight or in the absence of weight at least 22 weeks gestation. As of July 1, 2010, the Department of Health's fetal death definition changed to include cases of at least 350 grams or 20 weeks completed gestation. The fetal death cases for 2011 forward included in this report were covered by the new definition. The denominators used for calculating birth defects rates include only live births and are reported per 10,000 live births.

Overall Tennessee Birth Defects Rates 2008-2012

In Tennessee, an average 81,320 live births occurred annually during 2008 through 2012. Approximately 75% of infants born were white and 20% were black (Table 1). During the same period there were 15,387 (an annual average of 3,077) infants diagnosed with a birth defect. There were 11,313 birth defects among white infants, corresponding to a rate of 368.0 birth defects per 10,000 live births. There were 3,739 birth defects for black infants with a rate of 439.1 per 10,000 live births. Although the number of birth defects was highest for white infants, the black rate per 10,000 live births exceeded the white infant rate for 2008-2012.

Table 1: Live Births by Race, Tennessee 2008-2012

Year	Total	Black	White
2008	85,480	18,148	65,093
2009	82,109	17,360	61,082
2010	79,345	16,599	60,174
2011	79,462	16,482	60,252
2012	80,202	16,560	60,792

Table 2: Tennessee Major Birth Defects by Organ System Counts and Prevalence 2008-2012

Birth Defect	Count	Rate*	LCI	UCI
Cardiovascular	**9,457**	**232.6**	**227.9**	**237.3**
Aortic Valve Stenosis	87	2.1	1.7	2.6
Atrial Septal Defect	5,544	136.4	132.8	139.9
Coarctation of Aorta	301	7.4	6.6	8.2
Common Truncus	40	1.0	0.7	1.3
Double Outlet Right Ventricle (DORV)	53	1.3	1.0	1.7
Ebsteins Anomaly	59	1.5	1.1	1.8
Endocardial Cushion Defect	208	5.1	4.4	5.8
Hypoplastic Left Heart Syndrome	162	4.0	3.4	4.6
Interrupted Aortic Arch (IAA)	11	0.3	0.1	0.4
Pulmonary Valve Atresia & Stenosis	369	9.1	8.1	10.0
Single Ventricle	35	0.9	0.6	1.1
Tetralogy of Fallot	245	6.0	5.3	6.8
Total Anomalous Pulmonary Venous Return	33	0.8	0.5	1.1
Transposition of Great Arteries	211	5.2	4.5	5.9
Tricuspid Valve Atresia & Stenosis	55	1.4	1.0	1.7
Ventricular Septal Defect	2,044	50.3	48.1	52.5
Central Nervous System	**389**	**9.6**	**8.6**	**10.5**
Anencephalus	59	1.5	1.1	1.8

Encephalocele	54	1.3	1.0	1.7
Holoprosencephaly	111	2.7	2.2	3.2
Spina Bifida	165	4.1	3.4	4.7
Chromosomal	**708**	**17.4**	**16.1**	**18.7**
Deletion 22 q11.2	3	0.1	0.0	0.2
Down Syndrome	594	14.6	13.4	15.8
Trisomy 13	32	0.8	0.5	1.1
Trisomy 18	72	1.8	1.4	2.2
Turner Syndrome	7	0.2	0.0	0.3
Ear	**37**	**0.9**	**0.6**	**1.2**
Anotia/Microtia	37	0.9	0.6	1.2
Eye	**145**	**3.6**	**3.0**	**4.1**
Anophthalmia/Microthalmia	52	1.3	0.9	1.6
Congenital Cataract	93	2.3	1.8	2.8
Gastrointestinal	**505**	**12.4**	**11.3**	**13.5**
Biliary Atresia	41	1.0	0.7	1.3
Esophageal Atresia/Tracheoesophageal Fistula	119	2.9	2.4	3.5
Rectal & Large Intestinal Atresia/Stenosis	257	6.3	5.5	7.1
Small intestinal Atresia/Stenosis	88	2.2	1.7	2.6
Genitourinary	**2,666**	**65.6**	**63.1**	**68.1**
Bladder Exstrophy	17	0.4	0.2	0.6
Cloacal Exstrophy	174	4.3	3.6	4.9
Congenital Posterior Urethral Valves	25	0.6	0.4	0.9
Hypospadias**	2,220	106.7	102.3	111.1
Renal Agenesis/Hypoplasia	230	5.7	4.9	6.4
Musculoskeletal	**868**	**21.3**	**19.9**	**22.8**
Clubfoot	275	6.8	6.0	7.6
Diaphragmatic Hernia	171	4.2	3.6	4.8
Gastroschisis	242	6.0	5.2	6.7
Limb Deficiencies (Reduction Defects	69	1.7	1.3	2.1
Omphalocele	111	2.7	2.2	3.2
Orofacial	543	**13.4**	**12.2**	**14.5**
Choanal Atresia	80	2.0	1.5	2.4
Cleft Lip Only (Without Cleft Palate)	37	0.9	0.6	1.2
Cleft Lip with Cleft Palate	93	2.3	1.8	2.8
Cleft Palate Without Cleft Lip	333	8.2	7.3	9.1
Other	**69**	**1.7**	1.3	2.1
Fetal Alcohol Syndrome	69	1.7	1.3	2.1
Total Birth Defects	**15,387**	**378.4**	**372.5**	**384.4**

*Rates are per 100,000; LCI : Lower Confidence Interval; UCI: Upper Confidence Interval

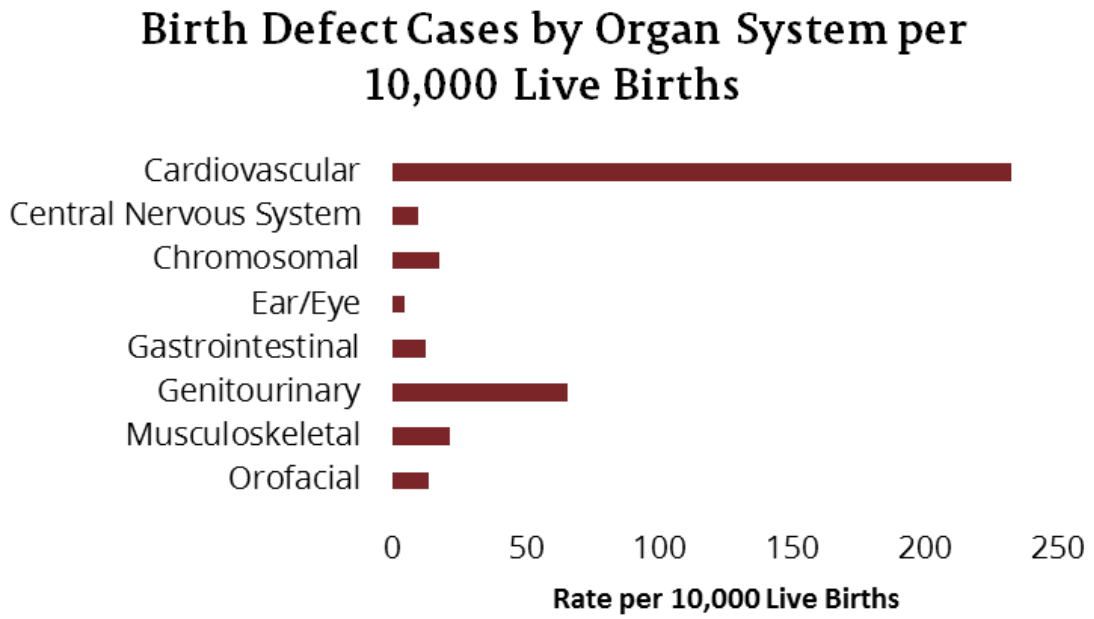
Table 3: Birth Defect Cases per 10,000 Live Births by Race, 2008-2012

	Black			White			Other		
Birth Defect	**Rate**	**LCI**	**UCI**	**Rate**	**LCI**	**UCI**	**Rate**	**LCI**	**UCI**
Cardiovascular	296.2	284.6	307.7	218.9	213.7	224.1	170.1	145.7	194.4
Central nervous system	7.9	6.0	9.8	10.2	9.1	11.3	8.2	2.8	13.5
Chromosomal	17.6	14.8	20.4	17.4	16.0	18.9	19.1	10.9	27.3
Ear/Eye	5.5	3.9	7.1	4.1	3.4	4.9	7.3	2.2	12.3
Fetal Alcohol Syndrome	2.7	1.6	3.8	1.5	1.0	1.9	0.9	-0.9	2.7
Gastrointestinal	10.6	8.4	12.8	13.2	11.9	14.5	6.4	1.6	11.1
Genitourinary	72.6	66.9	78.3	65.0	62.1	67.8	37.3	25.9	48.7
Musculoskeletal	17.4	14.6	20.2	23.1	21.4	24.8	9.1	3.5	14.7
Orofacial	8.7	6.7	10.7	14.8	13.5	16.2	10.9	4.7	17.1
LCI: lower confidence interval; UCI: upper confidence interval									

Table 4: Birth Defect Cases per 10,000 Live Births by Ethnicity, 2008-2012

	Hispanic			Not Hispanic			Unknown		
Birth Defect	**Rate**	**LCI**	**UCI**	**Rate**	**LCI**	**UCI**	**Rate**	**LCI**	**UCI**
Cardiovascular	209.8	195.0	224.7	234.9	229.9	239.8	200.7	40.1	361.2
Central nervous system	12.1	8.5	15.6	9.3	8.3	10.3	-	-	-
Chromosomal	20.5	15.9	25.2	17.1	15.8	18.5	-	-	-
Ear/Eye	4.7	2.4	6.9	4.5	3.8	5.1	-	-	-
Fetal Alcohol Syndrome	-	-	-	1.9	1.4	2.3	-	-	
Gastrointestinal	13.7	9.9	17.5	12.3	11.2	13.4			
Genitourinary	27.7	22.3	33.1	69.3	66.6	71.9	133.8	2.7	264.9
Musculoskeletal	22.2	17.4	27.0	21.3	19.8	22.8	-	-	-
Orofacial	13.1	9.4	16.9	13.4	12.2	14.6	-	-	-
LCI: lower confidence interval; UCI: upper confidence interval									

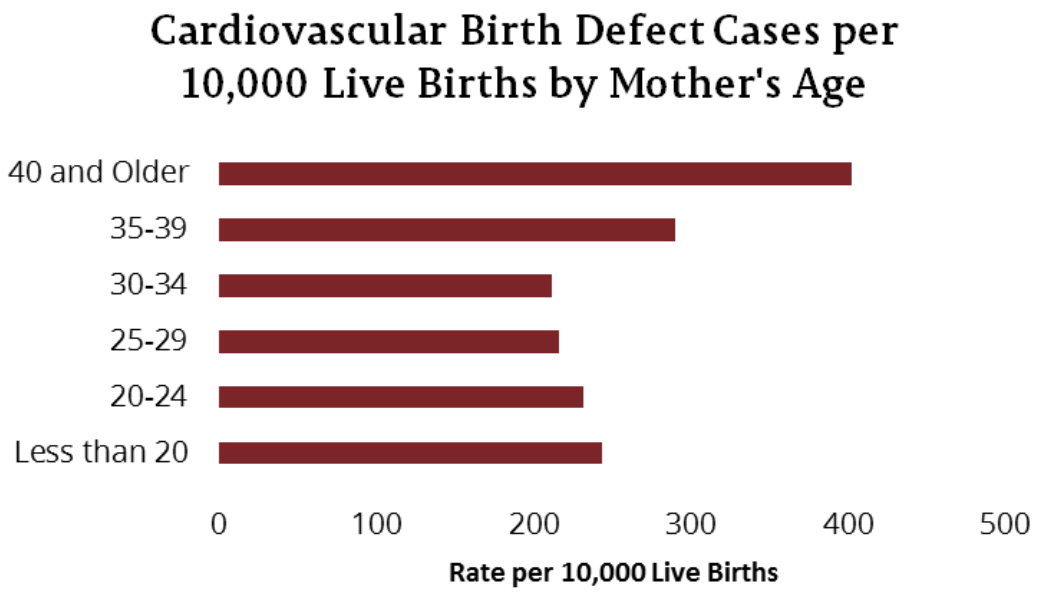
Figure 1: Birth Defect Cases by Organ System



Cardiovascular Birth Defects

Sixty-two percent of all birth defects from 2008-2012 affected the cardiovascular system. There were 9,457 cardiovascular birth defects, corresponding to a rate of 232.6 per 10,000 live births. The next highest organ system was genitourinary at 2,666, or a rate of 65.6 per 10,000 live births (see figure 1). The largest single birth defect in Tennessee is atrial septal defect with 5,544 cases. Since 2008 the atrial septal defect rate for black infants has risen from 164.8 per 10,000 live births to 200.5 in 2012, and the 5-year rate of 195.8 among black infants remains higher than the rate for white infants, which is 122.6.

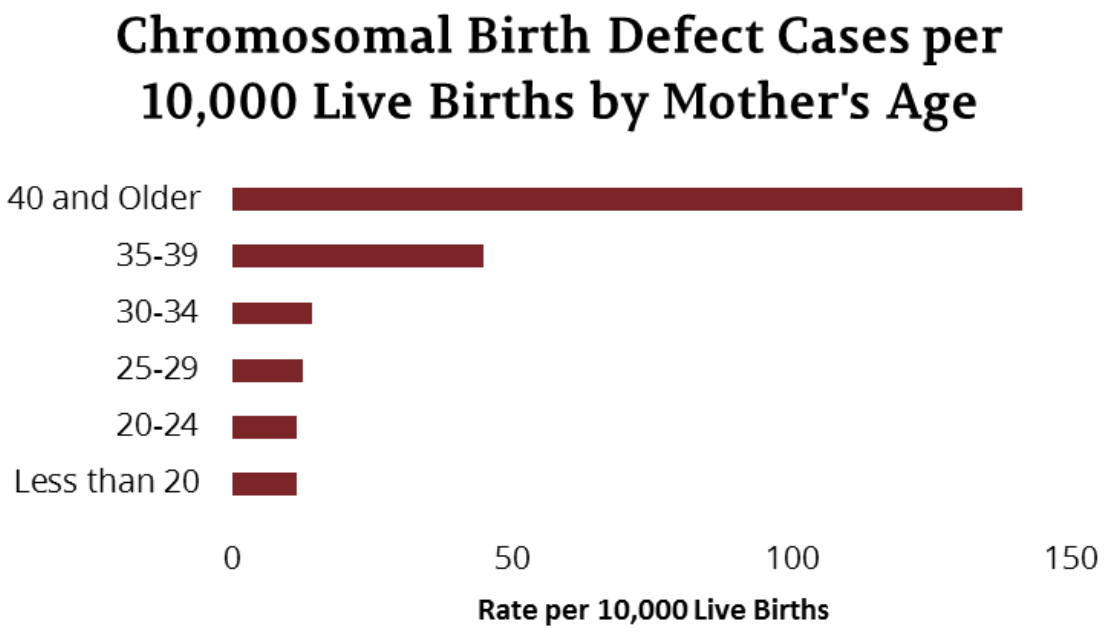
Figure 2: Cardiovascular Birth Defect Cases per 10,000 Live Births by Mother's Age, 2008-2012



Maternal Age

Mother's age is a significant risk factor for certain types of birth defects, with older mothers giving birth to children with birth defects at higher rates. The average rate of chromosomal birth defects to mothers under the age of 35 is 12.2 per 10,000 live births, while mothers aged 35 to 39 years had a rate of 44.9 and mothers aged 40 years or greater had a rate of 141.3 (see figure 3).

Figure 3: Chromosomal Birth Defect Cases per 10,000 Live Births by Mother's Age



Risk Factors and Prevention

Though the causal mechanisms of most birth defects are not fully understood, there are known risk factors that increase the likelihood of giving birth to a baby with a birth defect. Likewise, there are known ways to reduce one's risk of having a baby with a birth defect.

Prevention is the best strategy in public health. A woman can reduce her risk of delivering a baby born with a birth defect or other adverse outcome by taking precautions before and during pregnancy. The best time to start preventing pregnancy related complications is before a woman becomes pregnant. Most of the baby's vital organs and systems are formed in the first four to eight weeks of gestation, often before a woman knows she is pregnant. The majority of birth defects occur in this four to eight week period, and there are a number of actions a woman can take to improve her baby's health. However many of these actions are only effective if begun prior to pregnancy.

Diabetes is a chronic disease affecting an increasing number of mothers. Babies born to mothers with type 1 and type 2 diabetes are at increased risk for: hydrocephaly; anotia/microtia; limb reduction defects; omphalocele; esophageal atresia; cleft lip with and without cleft palate; cleft palate; and hypospadias. Also the increased risk for the heart defects: atrioventricular septal defects; atrial septal defects; total anomalous return; Tetralogy of Fallot; transposition of great arteries; atrial septal defect; and ventricular septal defect. Many of these birth defects may be prevented with prenatal care focused on controlling the diabetic mother's blood sugar levels during pregnancy.

Gestational diabetes is not associated with birth defects, because it develops later in pregnancy than the birth defect inception period. However, babies born to mothers with gestational diabetes are at risk of being born with a condition known as macrosomia, which is an extremely large body. This puts both the mother and baby at risk of serious birth trauma. Babies with macrosomia are also at elevated risk for obesity and developing type 2 diabetes later in life.

Folic Acid is a B-complex vitamin that is proven to be protective against neural tube defects such as anencephalus and spina bifida. It may also provide protection against other birth defects. To be fully effective a woman needs to begin taking the recommended daily dose of 400 micrograms at least a full month before becoming pregnant and continue to take folic acid daily during pregnancy. If a woman finds she is pregnant and has not been taking folic acid, it is best to start taking folic acid immediately and continue to do so thereafter. Folic acid is available in most multivitamins and is sold separately in folic acid tablets.

Don't smoke cigarettes, drink alcohol or use illegal drugs. According to the March of Dimes, babies born to mothers who smoke cigarettes are more likely to be born premature and low birth weight. They are also more likely to be born with cardiovascular, orofacial, gastrointestinal, and musculoskeletal birth defects. There is no amount of alcohol that is safe to drink during pregnancy. When a pregnant woman drinks, the alcohol in her system passes from mother to baby through the placenta and umbilical cord. Drinking too much can cause fetal alcohol syndrome, which is a serious condition involving growth deficiencies; facial abnormalities; central nervous system impairment; behavioral disorder; and intellectual disabilities. Use of street drugs such as amphetamines and ecstasy are also associated with cleft lip; cleft palate; and club foot, as well as reduced head size; and intellectual disabilities.

health outcomes for herself and her baby is to connect with a healthcare provider that is regularly available to assess the woman's health prior to and post conception. Screening, monitoring, and treating common health problems such as high blood pressure and diabetes will help promote a healthy mother and baby; as well as making sure healthcare providers are

Recommendations

Preconception Health

One of the best actions a woman can do to protect against birth defects and other negative aware of any prescription or nonprescription drugs and dietary supplements in use, as many of these could have adverse effects on a fetus. Also important is keeping regular appointments with healthcare providers, so they can monitor a woman's progress and help in dealing with any problems that could affect mother or baby.

Immunizations

Being current on immunizations such as rubella and the flu is important too. Due to vaccinations, rubella also known as German measles is not as common as it once was, but international travel has brought it to the United States in recent years and minor epidemics have occurred among unvaccinated populations. Women who develop rubella during pregnancy risk affecting the fetus and their baby being born with congenital rubella syndrome.

Babies affected by congenital rubella syndrome are at high risk of being born with birth defects of the heart and eyes, micorcephaly and sensorineural deafness. Receiving vaccinations prior to pregnancy protects both the baby and the mother from having to cope with the consequences of preventable infections. Chances of a fetus developing congenital rubella syndrome are estimated as greater than 50 percent, when the mother is infected early in pregnancy. The mumps, measles, rubella (MMR) vaccine is readily available and recommended for every person born after 1957 who has not had rubella. Influenza or the flu is another infection that can be minimized via vaccination.

Infections

Toxoplasmosis is an additional infection to be avoided by women who are or may become pregnant. Babies born to women with a toxoplasmosis infection are at risk for hydrocephalus. Toxoplasmosis is caused by the parasite, Toxoplasma gondii. Toxoplasmosis is spread in several different ways, but cats are the primary vector of infection. Cats are infected from eating infected birds, rodents, and other small animals and pass the bacteria in their feces. For this reason, pregnant women are recommended to have someone else clean the cat litter box, or if they must to wear gloves while doing so, and wash their hands afterwards. Toxoplasma gondii is also spread through persons eating raw or undercooked meat, or handling it and not washing their hands afterwards. It is recommended to wash or peel all fruits and vegetables before eating; to thoroughly wash all cutting boards with soap and water; and to wear gloves when gardening or handling sand from a sandbox.

While there are certain hereditary and genetic factors that cannot be reduced, this information illustrates there are many environmental factors that public health, new mothers to be and health care providers can address together to assist in reducing birth defect occurrences in infants born in Tennessee.

Birth Defects by County

Table 5: Birth Defect Cases by Organ System and County per 10,000 Live Births

County	Count	Rate	Lower 95% CI	Upper 95% CI
Anderson				
Cardiovascular	120	291.1	239.0	343.2
Central Nervous System	7	17.0	4.4	29.6
Chromosomal	7	17.0	4.4	29.6
Gastrointestinal	8	19.4	6.0	32.9
Genitourinary	37	89.8	60.8	118.7
Musculoskeletal	13	31.5	14.4	48.7
Orofacial	7	17.0	4.4	29.6
Total	199	482.8	415.7	549.9
Bedford				
Cardiovascular	43	134.8	94.5	175.0
Central Nervous System	1	3.1	-3.0	9.3
Chromosomal	3	9.4	-1.2	20.0
Gastrointestinal	3	9.4	-1.2	20.0
Genitourinary	17	53.3	27.9	78.6
Musculoskeletal	7	21.9	5.7	38.2
Orofacial	2	6.3	-2.4	15.0
Total	76	238.2	184.6	291.7
Benton				
Cardiovascular	11	131.3	53.7	208.8
Central Nervous System	1	11.9	-11.5	35.3
Chromosomal	3	35.8	-4.7	76.3
Gastrointestinal	1	11.9	-11.5	35.3
Genitourinary	7	83.5	21.7	145.4
Musculoskeletal	1	11.9	-11.5	35.3
Orofacial	2	23.9	-9.2	56.9
Total	26	310.3	191.0	429.5
Bledsoe				
Cardiovascular	4	65.7	1.3	130.0
Ear/Eye	1	16.4	-15.8	48.6
Genitourinary	1	16.4	-15.8	48.6
Musculoskeletal	3	49.3	-6.5	105.0
Orofacial	3	49.3	-6.5	105.0
Total	12	197.0	85.6	308.5
Blount				
Cardiovascular	178	276.1	235.5	316.6
Central Nervous System	7	10.9	2.8	18.9

County	Count	Rate	Lower 95% CI	Upper 95% CI
Chromosomal	9	14.0	4.8	23.1
Ear/Eye	3	4.7	-0.6	9.9
Fetal Alcohol Syndrome	1	1.6	-1.5	4.6
Gastrointestinal	9	14.0	4.8	23.1
Genitourinary	47	72.9	52.1	93.7
Musculoskeletal	13	20.2	9.2	31.1
Orofacial	6	9.3	1.9	16.8
Total	273	423.4	373.2	473.6
Bradley				
Cardiovascular	99	170.5	136.9	204.0
Central Nervous System	6	10.3	2.1	18.6
Chromosomal	7	12.1	3.1	21.0
Ear/Eye	3	5.2	-0.7	11.0
Fetal Alcohol Syndrome	3	5.2	-0.7	11.0
Gastrointestinal	5	8.6	1.1	16.2
Genitourinary	22	37.9	22.1	53.7
Musculoskeletal	11	18.9	7.7	30.1
Orofacial	10	17.2	6.5	27.9
Total	166	285.8	242.3	329.3
Campbell				
Cardiovascular	52	242.0	176.2	307.7
Central Nervous System	3	14.0	-1.8	29.8
Chromosomal	1	4.7	-4.5	13.8
Ear/Eye	2	9.3	-3.6	22.2
Gastrointestinal	2	9.3	-3.6	22.2
Genitourinary	23	107.0	63.3	150.8
Musculoskeletal	5	23.3	2.9	43.7
Orofacial	7	32.6	8.4	56.7
Total	95	442.1	353.2	531.0
Cannon				
Cardiovascular	17	231.6	121.5	341.7
Chromosomal	1	13.6	-13.1	40.3
Ear/Eye	2	27.2	-10.5	65.0
Genitourinary	9	122.6	42.5	202.7
Musculoskeletal	3	40.9	-5.4	87.1
Orofacial	2	27.2	-10.5	65.0
Total	34	463.2	307.5	618.9
Carroll				
Cardiovascular	36	213.3	143.6	282.9
Central Nervous System	1	5.9	-5.7	17.5

County	Count	Rate	Lower 95% CI	Upper 95% CI
Chromosomal	1	5.9	-5.7	17.5
Ear/Eye	1	5.9	-5.7	17.5
Fetal Alcohol Syndrome	2	11.8	-4.6	28.3
Gastrointestinal	1	5.9	-5.7	17.5
Genitourinary	12	71.1	30.9	111.3
Musculoskeletal	5	29.6	3.7	55.6
Orofacial	3	17.8	-2.3	37.9
Total	62	367.3	275.9	458.7
Carter				
Cardiovascular	171	597.9	508.3	687.5
Central Nervous System	1	3.5	-3.4	10.3
Chromosomal	4	14.0	0.3	27.7
Ear/Eye	3	10.5	-1.4	22.4
Gastrointestinal	5	17.5	2.2	32.8
Genitourinary	18	62.9	33.9	92.0
Musculoskeletal	11	38.5	15.7	61.2
Total	213	744.8	644.7	844.8
Cheatham				
Cardiovascular	31	137.0	88.8	185.3
Chromosomal	5	22.1	2.7	41.5
Gastrointestinal	1	4.4	-4.2	13.1
Genitourinary	26	114.9	70.8	159.1
Musculoskeletal	5	22.1	2.7	41.5
Orofacial	4	17.7	0.4	35.0
Total	72	318.3	244.8	391.8
Chester				
Cardiovascular	21	228.8	130.9	326.6
Central Nervous System	1	10.9	-10.5	32.2
Chromosomal	2	21.8	-8.4	52.0
Gastrointestinal	2	21.8	-8.4	52.0
Genitourinary	2	21.8	-8.4	52.0
Musculoskeletal	2	21.8	-8.4	52.0
Orofacial	1	10.9	-10.5	32.2
Total	31	337.7	218.8	456.6
Claiborne				
Cardiovascular	48	292.3	209.6	375.0
Central Nervous System	1	6.1	-5.8	18.0
Chromosomal	1	6.1	-5.8	18.0
Ear/Eye	1	6.1	-5.8	18.0
Gastrointestinal	3	18.3	-2.4	38.9

County	Count	Rate	Lower 95% CI	Upper 95% CI
Genitourinary	8	48.7	15.0	82.5
Musculoskeletal	1	6.1	-5.8	18.0
Orofacial	1	6.1	-5.8	18.0
Total	64	389.8	294.3	485.3
Clay				
Cardiovascular	14	301.1	143.4	458.8
Central Nervous System	1	21.5	-20.6	63.7
Chromosomal	1	21.5	-20.6	63.7
Ear/Eye	1	21.5	-20.6	63.7
Gastrointestinal	1	21.5	-20.6	63.7
Genitourinary	3	64.5	-8.5	137.5
Musculoskeletal	1	21.5	-20.6	63.7
Orofacial	2	43.0	-16.6	102.6
Total	24	516.1	309.6	722.6
Cocke				
Cardiovascular	36	181.8	122.4	241.2
Chromosomal	2	10.1	-3.9	24.1
Fetal Alcohol Syndrome	1	5.1	-4.8	14.9
Gastrointestinal	6	30.3	6.1	54.6
Genitourinary	13	65.7	30.0	101.3
Musculoskeletal	5	25.3	3.1	47.4
Orofacial	5	25.3	3.1	47.4
Total	68	343.4	261.8	425.1
Coffee				
Cardiovascular	61	183.8	137.7	229.9
Central Nervous System	4	12.1	0.2	23.9
Chromosomal	3	9.0	-1.2	19.3
Gastrointestinal	1	3.0	-2.9	8.9
Genitourinary	14	42.2	20.1	64.3
Musculoskeletal	11	33.1	13.6	52.7
Orofacial	4	12.1	0.2	23.9
Total	98	295.3	236.8	353.7
Crockett				
Cardiovascular	18	196.7	105.8	287.6
Central Nervous System	2	21.9	-8.4	52.2
Ear/Eye	1	10.9	-10.5	32.3
Gastrointestinal	2	21.9	-8.4	52.2
Genitourinary	6	65.6	13.1	118.0
Musculoskeletal	2	21.9	-8.4	52.2
Total	31	338.8	219.5	458.1

County	Count	Rate	Lower 95% CI	Upper 95% CI
Cumberland				
Cardiovascular	75	261.5	202.3	320.7
Central Nervous System	3	10.5	-1.4	22.3
Chromosomal	4	13.9	0.3	27.6
Gastrointestinal	7	24.4	6.3	42.5
Genitourinary	18	62.8	33.8	91.8
Musculoskeletal	8	27.9	8.6	47.2
Orofacial	1	3.5	-3.3	10.3
Total	116	404.5	330.9	478.1
Davidson				
Cardiovascular	968	198.6	186.0	211.1
Central Nervous System	47	9.6	6.9	12.4
Chromosomal	102	20.9	16.9	25.0
Ear/Eye	17	3.5	1.8	5.1
Fetal Alcohol Syndrome	9	1.8	0.6	3.1
Gastrointestinal	56	11.5	8.5	14.5
Genitourinary	407	83.5	75.4	91.6
Musculoskeletal	91	18.7	14.8	22.5
Orofacial	66	13.5	10.3	16.8
Total	1763	361.6	344.7	378.5
Decatur				
Cardiovascular	15	266.4	131.6	401.3
Central Nervous System	1	17.8	-17.1	52.6
Chromosomal	1	17.8	-17.1	52.6
Genitourinary	5	88.8	11.0	166.7
Musculoskeletal	1	17.8	-17.1	52.6
Orofacial	2	35.5	-13.7	84.8
Total	25	444.0	270.0	618.1
Dekalb				
Cardiovascular	23	199.7	118.1	281.2
Central Nervous System	4	34.7	0.7	68.8
Chromosomal	11	95.5	39.1	151.9
Genitourinary	5	43.4	5.4	81.4
Musculoskeletal	2	17.4	-6.7	41.4
Orofacial	6	52.1	10.4	93.8
Total	51	442.7	321.2	564.2
Dickson				
Cardiovascular	51	164.6	119.4	209.7
Central Nervous System	4	12.9	0.3	25.6
Chromosomal	7	22.6	5.9	39.3

County	Count	Rate	Lower 95% CI	Upper 95% CI
Gastrointestinal	3	9.7	-1.3	20.6
Genitourinary	36	116.2	78.2	154.1
Musculoskeletal	5	16.1	2.0	30.3
Orofacial	7	22.6	5.9	39.3
Total	113	364.6	297.4	431.9
Dyer				
Cardiovascular	80	319.7	249.7	389.8
Central Nervous System	3	12.0	-1.6	25.6
Chromosomal	7	28.0	7.3	48.7
Ear/Eye	1	4.0	-3.8	11.8
Fetal Alcohol Syndrome	1	4.0	-3.8	11.8
Gastrointestinal	4	16.0	0.3	31.7
Genitourinary	8	32.0	9.8	54.1
Musculoskeletal	7	28.0	7.3	48.7
Orofacial	1	4.0	-3.8	11.8
Total	112	447.6	364.7	530.5
Fayette				
Cardiovascular	64	273.6	206.6	340.7
Central Nervous System	1	4.3	-4.1	12.7
Chromosomal	5	21.4	2.6	40.1
Ear/Eye	3	12.8	-1.7	27.3
Genitourinary	13	55.6	25.4	85.8
Musculoskeletal	4	17.1	0.3	33.9
Orofacial	2	8.6	-3.3	20.4
Total	92	393.3	313.0	473.7
Fentress				
Cardiovascular	17	175.1	91.9	258.3
Central Nervous System	1	10.3	-9.9	30.5
Chromosomal	1	10.3	-9.9	30.5
Gastrointestinal	2	20.6	-7.9	49.1
Genitourinary	6	61.8	12.3	111.2
Musculoskeletal	1	10.3	-9.9	30.5
Orofacial	1	10.3	-9.9	30.5
Total	29	298.7	190.0	407.4
Franklin				
Cardiovascular	36	179.6	121.0	238.3
Chromosomal	1	5.0	-4.8	14.8
Ear/Eye	1	5.0	-4.8	14.8
Fetal Alcohol Syndrome	1	5.0	-4.8	14.8
Gastrointestinal	2	10.0	-3.9	23.8

Genitourinary	12	59.9	26.0	93.8
Musculoskeletal	3	15.0	-2.0	31.9
Orofacial	3	15.0	-2.0	31.9
Total	59	294.4	219.3	369.5
Gibson				
Cardiovascular	92	298.0	237.1	358.9
Central Nervous System	1	3.2	-3.1	9.6
Chromosomal	5	16.2	2.0	30.4
Ear/Eye	2	6.5	-2.5	15.5
Gastrointestinal	3	9.7	-1.3	20.7
Genitourinary	20	64.8	36.4	93.2
Musculoskeletal	10	32.4	12.3	52.5
Orofacial	8	25.9	8.0	43.9
Total	141	456.8	381.4	532.1
Giles				
Cardiovascular	11	70.8	29.0	112.7
Central Nervous System	1	6.4	-6.2	19.1
Chromosomal	4	25.8	0.5	51.0
Genitourinary	11	70.8	29.0	112.7
Musculoskeletal	1	6.4	-6.2	19.1
Orofacial	2	12.9	-5.0	30.7
Total	30	193.2	124.0	262.3
Grainger				
Cardiovascular	22	183.0	106.5	259.5
Central Nervous System	2	16.6	-6.4	39.7
Chromosomal	3	25.0	-3.3	53.2
Gastrointestinal	1	8.3	-8.0	24.6
Genitourinary	8	66.6	20.4	112.7
Musculoskeletal	1	8.3	-8.0	24.6
Orofacial	2	16.6	-6.4	39.7
Total	39	324.5	222.6	426.3
Greene				
Cardiovascular	117	359.0	294.0	424.1
Central Nervous System	4	12.3	0.2	24.3
Chromosomal	8	24.5	7.5	41.6
Ear/Eye	4	12.3	0.2	24.3
Gastrointestinal	9	27.6	9.6	45.7
Genitourinary	22	67.5	39.3	95.7
Musculoskeletal	9	27.6	9.6	45.7
Orofacial	10	30.7	11.7	49.7

Total	183	561.5	480.2	642.9
Grundy				
Cardiovascular	22	279.5	162.7	396.4
Central Nervous System	4	50.8	1.0	100.6
Chromosomal	2	25.4	-9.8	60.6
Gastrointestinal	1	12.7	-12.2	37.6
Genitourinary	4	50.8	1.0	100.6
Musculoskeletal	3	38.1	-5.0	81.3
Orofacial	3	38.1	-5.0	81.3
Total	39	495.6	340.0	651.1
Hamblen				
Cardiovascular	102	251.8	202.9	300.7
Central Nervous System	6	14.8	3.0	26.7
Chromosomal	6	14.8	3.0	26.7
Ear/Eye	2	4.9	-1.9	11.8
Fetal Alcohol Syndrome	3	7.4	-1.0	15.8
Gastrointestinal	8	19.7	6.1	33.4
Genitourinary	18	44.4	23.9	65.0
Musculoskeletal	14	34.6	16.5	52.7
Orofacial	12	29.6	12.9	46.4
Total	171	422.1	358.8	485.4
Hamilton				
Cardiovascular	453	217.2	197.2	237.2
Central Nervous System	21	10.1	5.8	14.4
Chromosomal	39	18.7	12.8	24.6
Ear/Eye	11	5.3	2.2	8.4
Fetal Alcohol Syndrome	7	3.4	0.9	5.8
Gastrointestinal	33	15.8	10.4	21.2
Genitourinary	113	54.2	44.2	64.2
Musculoskeletal	40	19.2	13.2	25.1
Orofacial	28	13.4	8.5	18.4
Total	745	357.3	331.6	382.9
Hancock				
Cardiovascular	4	108.4	2.2	214.6
Central Nervous System	1	27.1	-26.0	80.2
Genitourinary	1	27.1	-26.0	80.2
Musculoskeletal	3	81.3	-10.7	173.3
Total	9	243.9	84.6	403.3
Hardeman				
Cardiovascular	45	305.3	216.1	394.5

Central Nervous System	3	20.4	-2.7	43.4
Chromosomal	2	13.6	-5.2	32.4
Fetal Alcohol Syndrome	1	6.8	-6.5	20.1
Gastrointestinal	2	13.6	-5.2	32.4
Genitourinary	10	67.8	25.8	109.9
Musculoskeletal	5	33.9	4.2	63.7
Orofacial	1	6.8	-6.5	20.1
Total	69	468.1	357.7	578.6
Hardin				
Cardiovascular	37	262.2	177.7	346.7
Chromosomal	3	21.3	-2.8	45.3
Ear/Eye	2	14.2	-5.5	33.8
Gastrointestinal	3	21.3	-2.8	45.3
Genitourinary	17	120.5	63.2	177.8
Musculoskeletal	1	7.1	-6.8	21.0
Orofacial	5	35.4	4.4	66.5
Total	68	481.9	367.4	596.5
Hawkins				
Cardiovascular	114	395.1	322.6	467.7
Central Nervous System	2	6.9	-2.7	16.5
Chromosomal	5	17.3	2.1	32.5
Ear/Eye	5	17.3	2.1	32.5
Gastrointestinal	3	10.4	-1.4	22.2
Genitourinary	19	65.9	36.2	95.5
Musculoskeletal	7	24.3	6.3	42.2
Orofacial	4	13.9	0.3	27.5
Total	159	551.1	465.5	636.8
Haywood				
Cardiovascular	42	368.1	256.8	479.4
Central Nervous System	1	8.8	-8.4	25.9
Chromosomal	1	8.8	-8.4	25.9
Gastrointestinal	2	17.5	-6.8	41.8
Genitourinary	10	87.6	33.3	142.0
Musculoskeletal	2	17.5	-6.8	41.8
Orofacial	2	17.5	-6.8	41.8
Total	60	525.9	392.8	658.9
Henderson				
Cardiovascular	61	359.7	269.4	449.9
Central Nervous System	1	5.9	-5.7	17.5
Chromosomal	1	5.9	-5.7	17.5

Ear/Eye	1	5.9	-5.7	17.5
Fetal Alcohol Syndrome	1	5.9	-5.7	17.5
Gastrointestinal	5	29.5	3.6	55.3
Genitourinary	15	88.4	43.7	133.2
Musculoskeletal	5	29.5	3.6	55.3
Orofacial	2	11.8	-4.6	28.1
Total	92	542.5	431.6	653.3
Henry				
Cardiovascular	28	161.5	101.7	221.3
Central Nervous System	2	11.5	-4.5	27.5
Chromosomal	1	5.8	-5.5	17.1
Gastrointestinal	1	5.8	-5.5	17.1
Genitourinary	13	75.0	34.2	115.7
Musculoskeletal	3	17.3	-2.3	36.9
Orofacial	1	5.8	-5.5	17.1
Total	49	282.6	203.5	361.7
Hickman				
Cardiovascular	13	99.3	45.3	153.3
Central Nervous System	4	30.6	0.6	60.5
Chromosomal	1	7.6	-7.3	22.6
Gastrointestinal	5	38.2	4.7	71.7
Genitourinary	8	61.1	18.8	103.5
Musculoskeletal	6	45.8	9.2	82.5
Orofacial	1	7.6	-7.3	22.6
Total	38	290.3	198.0	382.6
Houston				
Cardiovascular	11	241.2	98.7	383.8
Gastrointestinal	1	21.9	-21.1	64.9
Genitourinary	3	65.8	-8.7	140.2
Musculoskeletal	1	21.9	-21.1	64.9
Total	16	350.9	178.9	522.8
Humphreys				
Cardiovascular	13	127.2	58.1	196.3
Central Nervous System	2	19.6	-7.6	46.7
Gastrointestinal	2	19.6	-7.6	46.7
Genitourinary	9	88.1	30.5	145.6
Musculoskeletal	1	9.8	-9.4	29.0
Orofacial	5	48.9	6.0	91.8
Total	32	313.1	204.6	421.6
Jackson				

Cardiovascular	3	57.4	-7.5	122.3
Chromosomal	1	19.1	-18.4	56.6
Gastrointestinal	1	19.1	-18.4	56.6
Genitourinary	2	38.2	-14.8	91.2
Musculoskeletal	1	19.1	-18.4	56.6
Total	8	153.0	47.0	259.0
Jefferson				
Cardiovascular	71	257.8	197.8	317.8
Central Nervous System	3	10.9	-1.4	23.2
Chromosomal	6	21.8	4.4	39.2
Ear/Eye	2	7.3	-2.8	17.3
Fetal Alcohol Syndrome	2	7.3	-2.8	17.3
Gastrointestinal	4	14.5	0.3	28.8
Genitourinary	9	32.7	11.3	54.0
Musculoskeletal	6	21.8	4.4	39.2
Orofacial	6	21.8	4.4	39.2
Total	109	395.8	321.5	470.1
Johnson				
Cardiovascular	28	359.0	226.0	491.9
Chromosomal	2	25.6	-9.9	61.2
Fetal Alcohol Syndrome	1	12.8	-12.3	37.9
Genitourinary	2	25.6	-9.9	61.2
Musculoskeletal	3	38.5	-5.1	82.0
Total	36	461.5	310.8	612.3
Knox				
Cardiovascular	634	240.8	222.0	259.5
Central Nervous System	26	9.9	6.1	13.7
Chromosomal	43	16.3	11.4	21.2
Ear/Eye	11	4.2	1.7	6.6
Fetal Alcohol Syndrome	7	2.7	0.7	4.6
Gastrointestinal	27	10.3	6.4	14.1
Genitourinary	184	69.9	59.8	80.0
Musculoskeletal	65	24.7	18.7	30.7
Orofacial	29	11.0	7.0	15.0
Total	1026	389.6	365.8	413.5
Lake				
Cardiovascular	10	280.1	106.5	453.7
Chromosomal	1	28.0	-26.9	82.9
Fetal Alcohol Syndrome	1	28.0	-26.9	82.9
Gastrointestinal	1	28.0	-26.9	82.9

Genitourinary	2	56.0	-21.6	133.7
Musculoskeletal	2	56.0	-21.6	133.7
Total	17	476.2	249.8	702.6
Lauderdale				
Cardiovascular	47	278.1	198.6	357.6
Central Nervous System	3	17.8	-2.3	37.8
Chromosomal	2	11.8	-4.6	28.2
Gastrointestinal	2	11.8	-4.6	28.2
Genitourinary	13	76.9	35.1	118.7
Musculoskeletal	6	35.5	7.1	63.9
Orofacial	1	5.9	-5.7	17.5
Total	74	437.9	338.1	537.6
Lawrence				
Cardiovascular	34	121.0	80.3	161.6
Central Nervous System	1	3.6	-3.4	10.5
Chromosomal	4	14.2	0.3	28.2
Gastrointestinal	2	7.1	-2.7	17.0
Genitourinary	18	64.0	34.5	93.6
Musculoskeletal	4	14.2	0.3	28.2
Orofacial	5	17.8	2.2	33.4
Total	68	241.9	184.4	299.4
Lewis				
Cardiovascular	4	58.5	1.2	115.8
Central Nervous System	1	14.6	-14.0	43.3
Ear/Eye	1	14.6	-14.0	43.3
Gastrointestinal	1	14.6	-14.0	43.3
Genitourinary	6	87.7	17.5	157.9
Musculoskeletal	1	14.6	-14.0	43.3
Total	14	204.7	97.5	311.9
Lincoln				
Cardiovascular	16	84.4	43.0	125.7
Central Nervous System	2	10.5	-4.1	25.2
Chromosomal	2	10.5	-4.1	25.2
Ear/Eye	2	10.5	-4.1	25.2
Gastrointestinal	1	5.3	-5.1	15.6
Genitourinary	10	52.7	20.1	85.4
Musculoskeletal	4	21.1	0.4	41.8
Orofacial	3	15.8	-2.1	33.7
Total	40	211.0	145.6	276.4
Loudon				

Cardiovascular	63	236.9	178.4	295.4
Central Nervous System	3	11.3	-1.5	24.0
Chromosomal	6	22.6	4.5	40.6
Ear/Eye	1	3.8	-3.6	11.1
Gastrointestinal	4	15.0	0.3	29.8
Genitourinary	14	52.7	25.1	80.2
Musculoskeletal	7	26.3	6.8	45.8
Orofacial	3	11.3	-1.5	24.0
Total	101	379.8	305.8	453.9
Macon				
Cardiovascular	28	183.0	115.2	250.8
Central Nervous System	1	6.5	-6.3	19.3
Chromosomal	3	19.6	-2.6	41.8
Ear/Eye	1	6.5	-6.3	19.3
Gastrointestinal	3	19.6	-2.6	41.8
Genitourinary	12	78.4	34.1	122.8
Musculoskeletal	3	19.6	-2.6	41.8
Orofacial	1	6.5	-6.3	19.3
Total	52	339.9	247.5	432.2
Madison				
Cardiovascular	228	347.0	301.9	392.0
Central Nervous System	6	9.1	1.8	16.4
Chromosomal	13	19.8	9.0	30.5
Ear/Eye	3	4.6	-0.6	9.7
Gastrointestinal	6	9.1	1.8	16.4
Genitourinary	37	56.3	38.2	74.5
Musculoskeletal	11	16.7	6.8	26.6
Orofacial	7	10.7	2.8	18.5
Total	311	473.3	420.7	525.9
Marion				
Cardiovascular	37	238.1	161.4	314.8
Chromosomal	3	19.3	-2.5	41.2
Gastrointestinal	3	19.3	-2.5	41.2
Genitourinary	10	64.4	24.5	104.2
Musculoskeletal	2	12.9	-5.0	30.7
Orofacial	1	6.4	-6.2	19.0
Total	56	360.4	266.0	454.7
Marshall				
Cardiovascular	30	161.5	103.7	219.2
Central Nervous System	3	16.1	-2.1	34.4

Chromosomal	4	21.5	0.4	42.6
Ear/Eye	1	5.4	-5.2	15.9
Gastrointestinal	4	21.5	0.4	42.6
Genitourinary	13	70.0	31.9	108.0
Musculoskeletal	6	32.3	6.5	58.1
Orofacial	3	16.1	-2.1	34.4
Total	64	344.5	260.1	428.8
Maury				
Cardiovascular	98	172.6	138.4	206.8
Central Nervous System	7	12.3	3.2	21.5
Chromosomal	5	8.8	1.1	16.5
Ear/Eye	2	3.5	-1.4	8.4
Gastrointestinal	6	10.6	2.1	19.0
Genitourinary	50	88.1	63.7	112.5
Musculoskeletal	13	22.9	10.4	35.3
Orofacial	6	10.6	2.1	19.0
Total	187	329.3	282.1	376.5
McMinn				
Cardiovascular	64	221.9	167.5	276.3
Central Nervous System	3	10.4	-1.4	22.2
Chromosomal	3	10.4	-1.4	22.2
Ear/Eye	1	3.5	-3.3	10.3
Fetal Alcohol Syndrome	2	6.9	-2.7	16.5
Gastrointestinal	1	3.5	-3.3	10.3
Genitourinary	14	48.5	23.1	74.0
Musculoskeletal	6	20.8	4.2	37.5
Orofacial	3	10.4	-1.4	22.2
Total	97	336.3	269.4	403.3
McNairy				
Cardiovascular	37	245.5	166.4	324.6
Chromosomal	2	13.3	-5.1	31.7
Gastrointestinal	2	13.3	-5.1	31.7
Genitourinary	13	86.3	39.4	133.2
Musculoskeletal	1	6.6	-6.4	19.6
Orofacial	1	6.6	-6.4	19.6
Total	56	371.6	274.3	468.9
Meigs				
Cardiovascular	3	49.2	-6.5	104.8
Central Nervous System	1	16.4	-15.7	48.5
Gastrointestinal	2	32.8	-12.7	78.2

Genitourinary	5	82.0	10.1	153.8
Musculoskeletal	2	32.8	-12.7	78.2
Total	13	213.1	97.3	329.0
Monroe				
Cardiovascular	59	237.4	176.8	298.0
Central Nervous System	4	16.1	0.3	31.9
Chromosomal	3	12.1	-1.6	25.7
Ear/Eye	1	4.0	-3.9	11.9
Fetal Alcohol Syndrome	1	4.0	-3.9	11.9
Gastrointestinal	4	16.1	0.3	31.9
Genitourinary	19	76.5	42.1	110.8
Musculoskeletal	6	24.1	4.8	43.5
Orofacial	4	16.1	0.3	31.9
Total	101	406.4	327.2	485.7
Montgomery				
Cardiovascular	325	207.2	184.6	229.7
Central Nervous System	18	11.5	6.2	16.8
Chromosomal	26	16.6	10.2	22.9
Ear/Eye	7	4.5	1.2	7.8
Gastrointestinal	27	17.2	10.7	23.7
Genitourinary	103	65.7	53.0	78.3
Musculoskeletal	26	16.6	10.2	22.9
Orofacial	19	12.1	6.7	17.6
Total	551	351.2	321.9	380.5
Moore				
Cardiovascular	2	84.7	-32.7	202.2
Musculoskeletal	2	84.7	-32.7	202.2
Total	4	169.5	3.4	335.6
Morgan				
Cardiovascular	18	183.5	98.7	268.3
Central Nervous System	1	10.2	-9.8	30.2
Chromosomal	1	10.2	-9.8	30.2
Ear/Eye	1	10.2	-9.8	30.2
Gastrointestinal	1	10.2	-9.8	30.2
Genitourinary	12	122.3	53.1	191.5
Musculoskeletal	2	20.4	-7.9	48.6
Orofacial	1	10.2	-9.8	30.2
Total	37	377.2	255.6	498.7
Obion				
Cardiovascular	44	241.0	169.8	312.2

Central Nervous System	1	5.5	-5.3	16.2
Chromosomal	1	5.5	-5.3	16.2
Gastrointestinal	1	5.5	-5.3	16.2
Genitourinary	11	60.2	24.6	95.8
Musculoskeletal	6	32.9	6.6	59.2
Total	64	350.5	264.6	436.4
Overton				
Cardiovascular	25	203.1	123.5	282.7
Central Nervous System	1	8.1	-7.8	24.0
Genitourinary	8	65.0	20.0	110.0
Musculoskeletal	5	40.6	5.0	76.2
Orofacial	2	16.2	-6.3	38.8
Total	41	333.1	231.1	435.0
Perry				
Cardiovascular	9	183.7	63.7	303.7
Gastrointestinal	1	20.4	-19.6	60.4
Genitourinary	1	20.4	-19.6	60.4
Musculoskeletal	3	61.2	-8.1	130.5
Orofacial	1	20.4	-19.6	60.4
Total	15	306.1	151.2	461.0
Pickett				
Cardiovascular	6	285.7	57.1	514.3
Central Nervous System	1	47.6	-45.7	141.0
Gastrointestinal	1	47.6	-45.7	141.0
Genitourinary	3	142.9	-18.8	304.5
Orofacial	1	47.6	-45.7	141.0
Total	12	571.4	248.1	894.7
Polk				
Cardiovascular	12	148.7	64.6	232.8
Central Nervous System	3	37.2	-4.9	79.2
Chromosomal	1	12.4	-11.9	36.7
Gastrointestinal	2	24.8	-9.6	59.1
Genitourinary	6	74.3	14.9	133.8
Musculoskeletal	4	49.6	1.0	98.1
Orofacial	1	12.4	-11.9	36.7
Total	29	359.4	228.6	490.1
Putnam				
Cardiovascular	73	161.5	124.4	198.5
Central Nervous System	5	11.1	1.4	20.8
Chromosomal	6	13.3	2.7	23.9

Ear/Eye	3	6.6	-0.9	14.1
Gastrointestinal	1	2.2	-2.1	6.5
Genitourinary	25	55.3	33.6	77.0
Musculoskeletal	11	24.3	10.0	38.7
Orofacial	7	15.5	4.0	27.0
Total	131	289.8	240.1	339.4
Rhea				
Cardiovascular	40	207.3	143.0	271.5
Central Nervous System	3	15.5	-2.0	33.1
Chromosomal	4	20.7	0.4	41.0
Ear/Eye	1	5.2	-5.0	15.3
Gastrointestinal	5	25.9	3.2	48.6
Genitourinary	9	46.6	16.2	77.1
Musculoskeletal	2	10.4	-4.0	24.7
Orofacial	5	25.9	3.2	48.6
Total	69	357.5	273.2	441.9
Roane				
Cardiovascular	73	288.1	222.0	354.2
Central Nervous System	1	3.9	-3.8	11.7
Chromosomal	1	3.9	-3.8	11.7
Ear/Eye	4	15.8	0.3	31.3
Fetal Alcohol Syndrome	3	11.8	-1.6	25.2
Gastrointestinal	5	19.7	2.4	37.0
Genitourinary	16	63.1	32.2	94.1
Musculoskeletal	7	27.6	7.2	48.1
Orofacial	4	15.8	0.3	31.3
Total	114	449.9	367.3	532.5
Robertson				
Cardiovascular	84	176.0	138.4	213.7
Central Nervous System	2	4.2	-1.6	10.0
Chromosomal	10	21.0	8.0	33.9
Ear/Eye	2	4.2	-1.6	10.0
Gastrointestinal	5	10.5	1.3	19.7
Genitourinary	28	58.7	36.9	80.4
Musculoskeletal	4	8.4	0.2	16.6
Orofacial	5	10.5	1.3	19.7
Total	140	293.4	244.8	342.0
Rutherford				
Cardiovascular	292	155.2	137.4	173.0
Central Nervous System	20	10.6	6.0	15.3

Chromosomal	42	22.3	15.6	29.1
Ear/Eye	6	3.2	0.6	5.7
Fetal Alcohol Syndrome	4	2.1	0.0	4.2
Gastrointestinal	24	12.8	7.7	17.9
Genitourinary	133	70.7	58.7	82.7
Musculoskeletal	47	25.0	17.8	32.1
Orofacial	27	14.3	8.9	19.8
Total	595	316.2	290.8	341.6
Scott				
Cardiovascular	36	269.9	181.7	358.0
Central Nervous System	2	15.0	-5.8	35.8
Chromosomal	4	30.0	0.6	59.4
Ear/Eye	1	7.5	-7.2	22.2
Genitourinary	9	67.5	23.4	111.5
Musculoskeletal	5	37.5	4.6	70.3
Orofacial	1	7.5	-7.2	22.2
Total	58	434.8	322.9	546.7
Sequatchie				
Cardiovascular	17	219.1	114.9	323.2
Chromosomal	1	12.9	-12.4	38.1
Genitourinary	4	51.5	1.0	102.1
Musculoskeletal	2	25.8	-9.9	61.5
Total	24	309.3	185.5	433.0
Sevier				
Cardiovascular	112	209.3	170.5	248.1
Central Nervous System	3	5.6	-0.7	12.0
Chromosomal	5	9.3	1.2	17.5
Ear/Eye	1	1.9	-1.8	5.5
Fetal Alcohol Syndrome	1	1.9	-1.8	5.5
Gastrointestinal	4	7.5	0.1	14.8
Genitourinary	21	39.2	22.5	56.0
Musculoskeletal	6	11.2	2.2	20.2
Orofacial	6	11.2	2.2	20.2
Total	159	297.1	251.0	343.3
Shelby				
Cardiovascular	2067	290.6	278.1	303.1
Central Nervous System	66	9.3	7.0	11.5
Chromosomal	128	18.0	14.9	21.1
Ear/Eye	39	5.5	3.8	7.2
Fetal Alcohol Syndrome	9	1.3	0.4	2.1

Gastrointestinal	81	11.4	8.9	13.9
Genitourinary	424	59.6	53.9	65.3
Musculoskeletal	134	18.8	15.6	22.0
Orofacial	74	10.4	8.0	12.8
Total	3022	424.9	409.7	440.0
Smith				
Cardiovascular	24	218.0	130.8	305.2
Central Nervous System	2	18.2	-7.0	43.3
Chromosomal	2	18.2	-7.0	43.3
Gastrointestinal	5	45.4	5.6	85.2
Genitourinary	4	36.3	0.7	71.9
Musculoskeletal	4	36.3	0.7	71.9
Orofacial	1	9.1	-8.7	26.9
Total	42	381.5	266.1	496.8
Stewart				
Cardiovascular	13	192.9	88.0	297.7
Chromosomal	2	29.7	-11.5	70.8
Gastrointestinal	1	14.8	-14.2	43.9
Genitourinary	4	59.3	1.2	117.5
Musculoskeletal	3	44.5	-5.9	94.9
Orofacial	1	14.8	-14.2	43.9
Total	24	356.1	213.6	498.5
Sullivan				
Cardiovascular	226	282.3	245.5	319.1
Central Nervous System	10	12.5	4.7	20.2
Chromosomal	14	17.5	8.3	26.7
Ear/Eye	4	5.0	0.1	9.9
Fetal Alcohol Syndrome	3	3.7	-0.5	8.0
Gastrointestinal	6	7.5	1.5	13.5
Genitourinary	43	53.7	37.7	69.8
Musculoskeletal	25	31.2	19.0	43.5
Orofacial	17	21.2	11.1	31.3
Total	348	434.7	389.1	480.4
Sumner				
Cardiovascular	194	196.3	168.7	223.9
Central Nervous System	5	5.1	0.6	9.5
Chromosomal	21	21.3	12.2	30.3
Ear/Eye	2	2.0	-0.8	4.8
Fetal Alcohol Syndrome	2	2.0	-0.8	4.8
Gastrointestinal	15	15.2	7.5	22.9

Genitourinary	61	61.7	46.2	77.2
Musculoskeletal	22	22.3	13.0	31.6
Orofacial	11	11.1	4.6	17.7
Total	333	337.0	300.8	373.2
Tipton				
Cardiovascular	86	222.6	175.5	269.6
Central Nervous System	2	5.2	-2.0	12.3
Chromosomal	7	18.1	4.7	31.5
Ear/Eye	1	2.6	-2.5	7.7
Gastrointestinal	2	5.2	-2.0	12.3
Genitourinary	27	69.9	43.5	96.2
Musculoskeletal	5	12.9	1.6	24.3
Orofacial	3	7.8	-1.0	16.5
Total	133	344.2	285.7	402.7
Trousdale				
Cardiovascular	5	111.4	13.7	209.0
Gastrointestinal	2	44.5	-17.2	106.3
Genitourinary	3	66.8	-8.8	142.4
Musculoskeletal	1	22.3	-21.4	65.9
Total	11	245.0	100.2	389.8
Unicoi				
Cardiovascular	45	540.2	382.4	698.1
Central Nervous System	1	12.0	-11.5	35.5
Chromosomal	1	12.0	-11.5	35.5
Ear/Eye	3	36.0	-4.7	76.8
Gastrointestinal	3	36.0	-4.7	76.8
Genitourinary	1	12.0	-11.5	35.5
Musculoskeletal	2	24.0	-9.3	57.3
Total	56	672.3	496.2	848.3
Union				
Cardiovascular	26	226.7	139.5	313.8
Central Nervous System	3	26.2	-3.4	55.8
Ear/Eye	1	8.7	-8.4	25.8
Gastrointestinal	1	8.7	-8.4	25.8
Genitourinary	5	43.6	5.4	81.8
Musculoskeletal	7	61.0	15.8	106.2
Orofacial	5	43.6	5.4	81.8
Total	48	418.5	300.1	536.9
Van Buren				
Cardiovascular	9	320.3	111.0	529.5

Gastrointestinal	1	35.6	-34.2	105.3
Genitourinary	2	71.2	-27.5	169.8
Musculoskeletal	2	71.2	-27.5	169.8
Orofacial	1	35.6	-34.2	105.3
Total	15	533.8	263.7	804.0
Warren				
Cardiovascular	50	205.3	148.4	262.1
Central Nervous System	1	4.1	-3.9	12.2
Chromosomal	3	12.3	-1.6	26.3
Fetal Alcohol Syndrome	1	4.1	-3.9	12.2
Gastrointestinal	3	12.3	-1.6	26.3
Genitourinary	9	36.9	12.8	61.1
Musculoskeletal	10	41.1	15.6	66.5
Orofacial	2	8.2	-3.2	19.6
Total	79	324.3	252.8	395.8
Washington				
Cardiovascular	226	333.8	290.3	377.3
Central Nervous System	4	5.9	0.1	11.7
Chromosomal	10	14.8	5.6	23.9
Ear/Eye	5	7.4	0.9	13.9
Fetal Alcohol Syndrome	1	1.5	-1.4	4.4
Gastrointestinal	10	14.8	5.6	23.9
Genitourinary	32	47.3	30.9	63.6
Musculoskeletal	9	13.3	4.6	22.0
Orofacial	13	19.2	8.8	29.6
Total	310	457.9	406.9	508.9
Wayne				
Cardiovascular	19	251.7	138.5	364.8
Central Nervous System	2	26.5	-10.2	63.2
Chromosomal	2	26.5	-10.2	63.2
Gastrointestinal	1	13.2	-12.7	39.2
Genitourinary	6	79.5	15.9	143.1
Musculoskeletal	4	53.0	1.1	104.9
Orofacial	1	13.2	-12.7	39.2
Total	35	463.6	310.0	617.2
Weakley				
Cardiovascular	40	215.9	149.0	282.8
Central Nervous System	1	5.4	-5.2	16.0
Chromosomal	4	21.6	0.4	42.7
Ear/Eye	1	5.4	-5.2	16.0

Gastrointestinal	1	5.4	-5.2	16.0
Genitourinary	12	64.8	28.1	101.4
Musculoskeletal	1	5.4	-5.2	16.0
Orofacial	4	21.6	0.4	42.7
Total	64	345.4	260.8	430.0
White				
Cardiovascular	13	88.3	40.3	136.2
Central Nervous System	1	6.8	-6.5	20.1
Chromosomal	4	27.2	0.5	53.8
Ear/Eye	1	6.8	-6.5	20.1
Gastrointestinal	3	20.4	-2.7	43.4
Genitourinary	11	74.7	30.5	118.8
Musculoskeletal	3	20.4	-2.7	43.4
Orofacial	8	54.3	16.7	91.9
Total	44	298.7	210.4	387.0
Williamson				
Cardiovascular	179	178.4	152.3	204.6
Central Nervous System	9	9.0	3.1	14.8
Chromosomal	25	24.9	15.2	34.7
Ear/Eye	4	4.0	0.1	7.9
Gastrointestinal	8	8.0	2.4	13.5
Genitourinary	83	82.7	64.9	100.5
Musculoskeletal	12	12.0	5.2	18.7
Orofacial	7	7.0	1.8	12.1
Total	327	326.0	290.6	361.3
Wilson				
Cardiovascular	97	143.6	115.0	172.1
Central Nervous System	2	3.0	-1.1	7.1
Chromosomal	10	14.8	5.6	24.0
Ear/Eye	2	3.0	-1.1	7.1
Fetal Alcohol Syndrome	1	1.5	-1.4	4.4
Gastrointestinal	8	11.8	3.6	20.0
Genitourinary	41	60.7	42.1	79.3
Musculoskeletal	10	14.8	5.6	24.0
Orofacial	8	11.8	3.6	20.0
Total	179	264.9	226.1	303.7
Total Birth Defects	**15,387**	**378.4**	**372.5**	**384.4**

Technical Notes

Data Sources

Currently, the primary data sources for the TBDR are the Hospital Discharge Data System (HDDS) and the Birth, Death, and Fetal Death Statistical Data Systems, which are compiled, processed and stored by the Office of Vital Records and the Office of Health Statistics in the Division of Policy, Planning, and Assessment (PPA). The TBDR is also housed within PPA. The HDDS contains admission-level records for all patients treated in Tennessee licensed hospitals and their outpatient treatment and rehabilitation centers. The TBDR uses these records to track the 47 major birth defects. Infants' HDDS records containing diagnostic codes corresponding to the tracked birth defects are extracted, compiled, and linked with their birth certificate records. The linkages provide validity checks and add information such as maternal risk factors, demographics, and street-level geography that are not available in the HDDS. Diagnostic data are also obtained from the fetal death and death certificate data systems. For the fetal death certificate identified cases, demographic, geographic, and risk factor information are obtained from the fetal death certificate system. For the death certificate identified cases, demographic, geographic, and risk factor information are obtained from the death certificate data system. Together they provide statewide population-based birth defects surveillance for Tennessee.

Data Limitations

The current methodology inhibits timeliness of the data availability and evaluation. This report's data captures those infants born through the data report years and the HDDS data is always one year behind the birth year for finalization. Additional limitations of administrative data systems such as these for birth defects surveillance include coding errors. Some of the diagnostic codes used in the HDDS correspond to both the major and minor variants of a given birth defect. Thus, the coding system used in the HDDS, The International Classification of Diseases Revision 9 Clinical Modification (ICD-9-CM), prevents distinguishing these differences for certain birth defects. This may have the effect of elevating rates for some of the more common birth defects, such as atrial septal defects, which are congenital heart defects, and hypospadias, a common genitourinary defect. However, the upcoming implementation of the ICD-10-CM system should assist in correct coding. Less systematically, there are simple coding errors that result in both non-cases being miscoded as having a birth defect and valid cases not being recorded as having a birth defect

Some options to assist with the current data limitations include required provider reporting similar to newborn screening and neonatal abstinence syndrome (NAS); active surveillance which is very resource and time intensive, and changing administrative collection methodology; each of these options may present new challenges such as poor response rates with provider reporting, prohibitive resourcing needs for active surveillance and others that the department and Advisory Committee will need to consider as it moves forward in its evaluation.

Glossary of Terms

Agenesis Absence of part(s) of the body. Lack of development or failure to develop part(s) of the body.

Alpha-fetoprotein A protein produced by the fetus during gestation. The level of this protein can be measured during the pregnancy. The level of this protein is elevated in pregnancies with neural tube defects and may be decreased in pregnancies with Down syndrome.

Amniocentesis A method of prenatal diagnosis which a small amount of amniotic fluid is withdrawn to obtain fetal cells, which can be tested for the presence of some genetic diseases.

Anencephalus Congenital absence of the skull, with cerebral hemispheres completely missing or reduced to small masses attached to the base of the skull. Anencephaly is not compatible with life.

Aniridia The complete absence of the iris of the eye or a defect of the iris.

Anophthalmia A developmental defect characterized by complete absence of the eyes, or by the presence of vestigial eyes.

Anotia A congenital absence of one or both ears.

Aortic valve stenosis A cardiac anomaly characterized by a narrowing or stricture of the aortic valve.

Aplasia Absence of a tissue or organ due to lack of cell proliferation.

Atresia Absence or closure of a normal opening.

Atrial septal defect A congenital cardiac malformation in which there are one or several openings in the atrial septum (wall between the right and left atria). Most common type is called ostium secundum defect.

Biliary atresia A congenital absence or underdevelopment of one or more of the ducts in the biliary tract.

Bladder exstrophy Incomplete closure of the anterior wall of the bladder and the abdominal cavity. The upper urinary tract is generally normal. Often associated with anorectal and genital malformations.

Congenital cataract An opacity (clouding) of the lens of the eye that has its origin prenatally.

Choanal atresia or stenosis A congenital anomaly in which a bony or membranous formation blocks the passageway between the nose and the pharynx.

Chromosome Threadlike structure in cells that individual genes are arranged along.

Chromosome abnormalities A major group of genetic diseases in which alterations of chromosome number or structure occur and are observable by microscope.

Cleft lip The congenital failure of the fetal components of the lip to fuse or join, forming a groove or fissure in the lip. Infants with this condition can have difficulty feeding and may use assistive devices for feeding. This condition is corrected when the infant can tolerate surgery.

Cleft palate The congenital failure of the palate to fuse properly forming a grooved depression or fissure in the roof of the mouth. This defect varies in degree of severity. The fissure can extend into the hard and soft palate and into the nasal cavities. Infants with this condition have difficulty feeding, and may use assistive devices for feeding. Surgical correction is begun as soon as possible. Children with cleft palates are at high risk for hearing problems due to ear infections.

Coarctation of the aorta Localized narrowing of the aorta. This condition can vary from mild to severe.

Common truncus arteriosus A congenital heart defect in which the common arterial trunk fails to divide into pulmonary artery and aorta.

Confidence interval (95%) The interval that contains the true prevalence (which can only be estimated) 95% of the time.

Congenital Existing at or dating from birth although the defect may not be recognized at the time of birth.

Congenital hip dislocation Location of the head of the femur (bone of the upper leg) outside its normal location in the cup-shaped cavity formed by the hip bones (acetabulum).

Diaphragmatic hernia A failure of the diaphragm to form completely, leaving a hole. Abdominal organs can protrude through the hole into the chest cavity and interfere with development of the heart and lungs. Usually life-threatening and requires emergent surgery.

Down syndrome (Trisomy 21) The chromosomal abnormality characterized by an extra copy of chromosome 21. In rare cases this syndrome is caused by translocation. Down syndrome is characterized by moderate to severe retardation, sloping forehead, small ear canals, flat-bridge of the nose and short fingers and toes. Many infants have congenital heart disease.

Dysgenesis Anomalous or disorganized formation of an organ.

Dysplasia	Disorganized cell structure or arrangement within a tissue or organ.
Ebstein anomaly	A congenital heart defect in which the tricuspid valve is displaced downward into the right ventricle.
Edwards syndrome	See Trisomy 18.
Embryonic period	The first eight weeks after fertilization, during which most, but not all, organs are formed.
Encephalocele	Herniation of the brain through a defect in the skull.
Endocardial cushion defect	In the complete form, a septal defect involving both the upper chambers (atria, atrial septal defect) and lower chambers (ventricles, ventricular septal defect) such that there is a single large atrioventricular septal defect. There are incomplete forms as well.
Epispadias	Displacement of the opening of the urethra (urethral meatus) dorsally and proximally (on top and closer to the body) in relation to the tip of the glans of the penis.
Esophageal stenosis or atresia	A narrowing or incomplete formation of the esophagus. Usually a surgical emergency. Frequently associated with a Tracheoesophageal Fistula.
Extremely low birth weight	Birth weight less than 1,000 grams, regardless of gestational age.
Fetal alcohol syndrome	A constellation of physical abnormalities (including characteristic abnormal facial features and growth retardation), and problems of behavior and cognition in children born to mothers who drank alcohol during pregnancy.
Fetal death (stillborn)	Death prior to complete expulsion or extraction of an infant or fetus of 350 grams or more, or, in absence of weight, of 20 weeks' gestation or greater; death is indicated by the fact that, after expulsion or extraction, the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles (68-3-102).
Fetal period	The period from the ninth week after fertilization through delivery.
Fetal ultrasound	A diagnostic examination of the fetus using ultrasound (sound waves at a frequency above what is detectable to human hearing).
Fistula	An abnormal passage from an internal organ to the body surface or between two internal organs or structures.
Folic acid deficiency	A lack of folic acid in the mother's diet which may lead to an increased risk for neural tube defects. Current recommendations from the March of Dimes indicate that women who are or may become pregnant should take a folic acid supplement to decrease the risk of neural tube defect.
Gastroschisis	A congenital opening of the abdominal wall with protrusion of the intestines. This condition is surgically treated.
Genetic counseling	The delivery of information about the risks, natural history, and management of genetic diseases to patients and/or their families.
Hirschsprung's disease	The congenital absence of autonomic ganglia (nerves controlling involuntary and reflexive movement) in the muscles of the colon. This results in immobility of the intestines and may cause obstruction or stretching of the intestines. This condition is repaired surgically in early childhood by the removal of the affected portion of the intestine.
Holocephalus	The abnormal accumulation of fluid within the spaces of the brain.
Hydrocephalus	The abnormal accumulation of fluid within the skull.
Hyperplasia	Overgrowth characterized by an increase in the number of cells of tissue.
Hypoplasia	A condition of arrested development in which an organ or part remains below the normal size or in an immature state.
Hypoplastic left heart syndrome	Atresia, or a marked hypoplasia, of the aortic valve, atresia or marked hypoplasia for the mitral valve, with hypoplasia of the ascending aorta and underdevelopment of the left ventricle.
Hypospadias	A congenital defect in which the urinary meatus (urinary outlet) is on the underside of the penis or on the perineum (area between the genitals and anus). The urinary sphincters are not defective so incontinence does not occur. The condition may be surgically corrected if needed for cosmetic, urologic, or reproductive reasons.
Infant death	Death of a live-born infant before 12 months of age.
Live birth	Spontaneous delivery of an infant that exhibits signs of life, including a heartbeat, spontaneous breathing, or movement of voluntary muscles. Transient cardiac contractions and fleeting respiratory efforts or gasps are not necessarily considered signs of life by all programs.
Lower limb reduction defects	The congenital absence of a portion of the lower limb. There are two general types of defect, transverse and longitudinal. Transverse defects appear like amputations, or like missing segments of the limb. Longitudinal defects are missing rays of the limb (for example, a missing tibia and great toe).
Low birth weight	Birth weight less than 2,500 grams, regardless of gestational age.
Malformation	A primary morphologic defect resulting from an abnormal developmental process.

Maternal serum screening	A diagnostic method that examines the mother's blood serum for indicators of anomalies in the process of fetal development.
Mental retardation	A condition of below average intellectual ability (IQ less than 70) that is present from birth or infancy.
Microcephaly	Congenital smallness of the head, with corresponding smallness of the brain.
Microphthalmia	The congenital abnormal smallness of one or both eyes. Can occur in the presence of other ocular defects.
Microtia	A small or maldeveloped external ear and atretic or stenotic external auditory canal.
Multifactorial	A term used to describe characteristics or diseases that are caused by a combination of multiple genetic and environmental factors.
Multiple congenital anomaly	Term used to describe the presence of more than one anomaly at birth.
Mutagen	Substance that is known to cause a mutation.
Mutations	Alterations in the sequence of DNA.
Neonatal death	Death of a live-born infant within the first 28 days after birth. ***Early neonatal death*** refers to death during the first 7 days. ***Late neonatal death*** refers to death after 7 days but before 29 days.
Neonatal (newborn) period	The first 28 days following delivery of a live-born infant.
Neural tube defect	A defect resulting from failure of the neural tube to close in the first month of pregnancy. The major conditions include anencephaly, spina bifida, and encephalocele.
Obstructive genitourinary defect	Stenosis or atresia of the urinary tract at any level. Severity of the defect depends largely upon the level of the obstruction. Urine accumulates behind the obstruction.
Omphalocele	The protrusion of intestines into the umbilicus. The defect is usually closed surgically soon after birth.
Patau Syndrome	See Trisomy 13
Patent ductus arteriosus	A blood vessel between the pulmonary artery and the aorta. This is normal in fetal life, but can cause problems after birth, particularly in premature infants.
Periconceptual	At or around the time of conception.
Perinatal	Before, during, or after delivery. The exact time period may vary from 20 to 28 complete weeks of gestation through 7 to 28 days after delivery, depending on the context in which the term is used.
Postnatal	After delivery.
Postterm infant	An infant born after 42 completed weeks of gestation.
Prenatal	Before delivery.
Preterm infant	An infant born before 37 completed weeks of gestation.
Pulmonary artery anomaly	Abnormality in the formation of the pulmonary artery such as stenosis or atresia.
Pulmonary valve atresia or stenosis	Failure of formation of the pulmonary valve or a narrowing or obstruction of the pulmonary valve, resulting in obstruction of blood flow from the right ventricle to the pulmonary artery.
Pyloric stenosis	A narrowing of the outlet from the stomach to the small intestine resulting in complete or partial obstruction of the passage of food and gastric contents.
Rectal and large intestinal atresia/stenosis	Complete or partial occlusion of the lumen of one or more segments of the large intestine and/or rectum.
Reduction defects: lower and upper limbs	The congenital absence of a portion of the lower or upper limbs. There are two general types of defect, transverse and longitudinal. Transverse defects appear like amputations with the complete or partial absence of the arm or leg. Longitudinal defects are missing rays of the limb and may involve the preaxial (thumb or big toe side) or central parts of the arm or leg.
Renal agenesis or dysgenesis	The failure, or deviation, of embryonic development of the kidney.
Spina bifida	An incomplete closure of the vertebral spine (usually posterior) through which spinal cord tissue or membranes (meninges) covering the spine herniated.
Stenosis	A narrowing or constriction the diameter of a bodily passage or orifice.
Stenosis or atresia of the small intestine	A narrowing or incomplete formation of the small intestine obstructing movement through the digestive tract.
Syndrome	A pattern of multiple primary malformations or defects all due to a single underlying cause (for example, Down syndrome).
Teratogen	A substance in the environment that can cause a birth defect.
Term infant	An infant born after 37 complete weeks and before 42 complete weeks of gestation.
Tetralogy of Fallot	The simultaneous presence of a ventricular septal defect, pulmonic stenosis, a malpositioned aorta that overrides the ventricular septum, and right ventricular hypertrophy.

Transposition of the great arteries	A congenital malformation in which the aorta arises from the right ventricle and the pulmonary artery from the left ventricle (opposite of normal), so that the venous return from the peripheral circulation is recirculated without being oxygenated in the lungs. Immediate surgical correction is needed. When this is not associated with other cardiac defects, and not corrected, it is fatal.
Tricuspid valve atresia or stenosis	A congenital cardiac condition characterized by the absence or constriction of the tricuspid valve.
Trisomy	A chromosomal abnormality characterized by one more than the normal number of chromosomes. Normally, cells contain two of each chromosome. In trisomy, cells contain three copies of a specific chromosome.
Trisomy 13 (Patau syndrome)	The chromosomal abnormality caused by an extra chromosome 13. Characterized by impaired midline facial development, cleft lip and palate, polydactyly and severe mental retardation. Most infants do not survive beyond 6 months of life.
Trisomy 18 (Edwards syndrome)	The chromosomal abnormality caused by an extra copy of chromosome 18. It is characterized by mental retardation, growth retardation, low-set ears, skull malformation and short digits. Survival for more than a few months is rare.
Trisomy 21	See Down Syndrome.
Ventricular Septal Defect	A congenital cardiac malformation in which there are one or several openings in the ventricular system (Muscular and fibrous wall between the right and left ventricle or right and left lower chambers of the heart).
Very Low Birth Weight	Birthweight less than 1,500 grams, regardless of gestational age.