



**MICHIGAN DEPARTMENT OF HEALTH & HUMAN SERVICES**  
Division for Vital Records and Health Statistics  
Michigan Birth Defects Registry

**BIRTH DEFECTS IN MICHIGAN**  
All Cases Reported and Processed by May 28, 2022



Gretchen Whitmer, Governor  
Elizabeth Hertel, Director

LANSING, MICHIGAN  
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# Birth Defects Prevalence and Mortality Tables

## Division for Vital Records & Health Statistics Michigan Department of Health & Human Services

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The Michigan Birth Defects Registry was established as a statewide reporting system in 1992 to develop statistical data on birth defects; to conduct birth defect surveillance; to conduct studies of birth defect causes and prevention; and to insure the families of children with birth defects receive appropriate support services.

This statistical abstract provides a series of tables derived from the Michigan Birth Defects Registry, including birth defect prevalence data and birth defects-related mortality through 2019. Selected high points concerning these data are:

### ► Birth Defect Cases and Case Rates

In the years 2018 and 2019, there were 14,544 and 15,561 cases of birth defects reported for children under one year of age, respectively. The 2018-2019 average rate was about 1,381 cases per 10,000 resident live births. Not all birth defects are reported when the child is an infant, and for those born during 2019, there was an additional 1,146 cases reported for children in the second year of life. Therefore, for infants born in 2019, there were 1,548.1 birth defects per 10,000 resident live births. Between 2015 to 2019, the five-year average prevalence rate for two-year olds based upon reported cases was about 1,249.2 per 10,000 live births. Because birth defect prevalence rates tend to be oscillatory in nature, it can be difficult to detect an overall trend from recent data. However, it should be noted that the birth defect rates in 2014, 2018 and 2019 are the highest birth defects rates reported in a decade. (See Table 1.)

### ► Infant Death Rates

In 2019, infants born with a birth defect were over 2 times more likely to die than other infants. The infant death rate for children born in 2019 with a reportable birth defect was 12.2 per 1,000, but the overall infant death rate was 6.6 per 1,000 resident infants born in Michigan during the same year. Birth defect mortality rates are showing a gradual, uneven decline since the 1990s and 2000s, even though birth defect prevalence rates are not declining. (See Table 5-A.)

### ► Mortality Risk

A higher mortality risk can be expected for children with birth defects well beyond the first year of life. The cumulative mortality rate for resident children under 5 years of age born during 2015 was 8.0 per 1,000. Children born during 2015 with a birth defect had a cumulative mortality rate of 26.4 per 1,000 by the end of the fifth year of life. The mortality rate differential remains high throughout early childhood. For children under the age of 18 years, the mortality rates for children born with birth defects are almost 5 times higher than other children; 52.8 per 1,000 for children with birth defects versus 12.0 per 1,000 for children generally. The significantly higher mortality rate for children with birth defects underscores the seriousness of these conditions. (See Table 7-A.)

### ► Birth Defects By Diagnostic Code Groups

The two most common diagnostic categories reported in 2019 were musculoskeletal system defects (2,523 cases) and heart and circulatory system defects (2,936 cases). Genital and urinary systems defects were also very high at 2,091 cases. Congenital anomalies of the integument remained above 1,000 cases for the last five years, but rising to 2,106 in 2019; close to the 10 year high in 2014 of 2,249 cases.. (See Table 13.)

With regard to mortality, the number of deaths between 2017-2019 for children with heart and circulatory anomalies was 312, about 3 times that of other leading causes of birth defect related deaths. Infant mortality rates were highest for the chromosomal anomalies (73.1 per 1,000 born with the defect) and for central nervous system anomalies (54.4 per 1,000), based upon mortality among the 2017-2019 birth cohorts. (See Table 25.) Mortality rates averaged over six years allow for the stable estimates of birth defect death rates by detailed diagnostic code groups. Birth defects mortality were highest for certain rare congenital anomalies: Anencephalus was 900 per 1,000, Trisomy 13 (Patau Syndrome) was 750 per 1,000 and Trisomy 18 (Edward Syndrome) was 576.5 per 1,000. (See Table 26.)

Table 14 displays detailed condition counts.

## Data Quality Considerations

Changes in the number of birth defect cases may reflect a change in birth defect reporting or identification, rather than a change in trend. In particular, during the late 1990s, certain reporting and diagnostic practices contributed to the number of cases identified. The changes by year are delineated below:

**2010:** A change in ICD-9 CM coding added unique codes for Gastroschisis and Omphalocele in October of 2009. This is the cause of the missing values in the reported frequencies for these conditions as listed under the diagnostic grouping "I03 Gastroschisis (756.73) and Omphalocele (756.72)."

**1998:** Increases in frequency of endocrine and metabolic disorders since 1998 are due to coordination of case reporting with the Newborn Metabolic Screening Program.

**1997:** The increased number of cases diagnosed with hearing deficiency in evidence since 1997 is related directly to a rapid increase in screening of Michigan newborns for hearing loss by birthing hospitals.

**1996:** A change in ICD-9 CM coding added unique codes for hypospadias and epispadias in October of 1996. This is the cause of the discontinuity in the reported frequencies for these conditions as listed under the diagnostic grouping "H04 Hypospadias and Epispadias (752.61, 752.62)."

## Completeness and Over-reporting

The completeness of the data presented in these tables is affected by three factors that relate to data accuracy and comparability. It is essential that these factors be considered in using the information particularly when comparing frequencies over time or between geographic areas. These factors are:

**Inconsistent or Incomplete Reporting** - There is evidence that some of the facilities required to provide these reports are not reporting all the cases that should be reported. This problem can be expected to affect the completeness of the data within the specific regions of the state where these facilities are located. Very low birth defects frequencies and significant shifts in the number of reported cases can be expected for counties where such problems exist. Work beginning in 1999 to identify and resolve problems of under-reporting resulted in actual case counts increasing due to more complete information.

**Over Reporting** - The ongoing review of reports received has identified that in certain hospitals a report that a child has a reportable condition will be submitted, but the diagnosis is later ruled out and the original report is not corrected accordingly. This can cause an over count of the number of cases. This problem can be expected to vary by facility which, in turn, can lead to geographic variations in case frequency counts for those areas where such facilities are located.

**Resident Interstate Information Exchange is Lacking** - There is presently no exchange of data with neighboring states relative to children born with birth defects. Such exchange does occur with vital records and cancer information. The effect of this lack of a resident information exchange is that birth defects cases are unreported whenever a Michigan child is diagnosed with or treated for a birth defect in a facility that is not within Michigan. This problem will cause an undercount of the actual number of cases and can be expected to significantly affect the completeness of reports for counties whose residents commonly travel outside Michigan for their health care. It is due to the lack of interstate resident information exchange that rates are calculated only for resident children who are also born in Michigan.

## Symbols Used In Tables

--- Data not available.

- A dash indicates quantity zero.

\* An asterisk indicates unstable rates that would be produced from small numbers. The figure does not meet standards of reliability or precision.

**Table 1**  
**Michigan Birth Defect Cases and Prevalence Rates**  
**Michigan Resident Children**  
**All Cases Reported and Processed by May 28, 2022**  
**Live Births during 2005 through 2019**

<b>Birth Year</b>	<b>Resident Live Births Born in Michigan</b>	<b>Children Diagnosed within One Year</b>	<b>Prevalence Rate at One Year</b>	<b>Children Diagnosed within Two Years</b>	<b>Prevalence Rate at Two Years</b>
All Years	1,744,645	180,605	1,035.2	201,137	1,152.9
2005	127,518	11,224	880.2	12,580	986.5
2006	127,537	11,791	924.5	13,273	1,040.7
2007	125,172	9,979	797.2	11,456	915.2
2008	121,231	9,767	805.7	10,693	882.0
2009	117,309	8,070	687.9	9,389	800.4
2010	114,717	9,721	847.4	11,041	962.5
2011	114,159	10,703	937.6	12,254	1,073.4
2012	112,708	11,496	1,020.0	13,184	1,169.7
2013	113,732	12,993	1,142.4	14,721	1,294.4
2014	114,460	15,395	1,345.0	16,810	1,468.6
2015	113,211	12,632	1,115.8	14,159	1,250.7
2016	113,374	14,089	1,242.7	15,120	1,333.6
2017	111,507	12,640	1,133.6	13,947	1,250.8
2018	110,093	14,544	1,321.1	15,803	1,435.4
2019	107,917	15,561	1,441.9	16,707	1,548.1

**Notes: Frequencies** include all children reported with a birth defect who were born in Michigan. **Rates** are per 10,000 Michigan resident live births. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details. **Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies and rates at one year and at two years serve to indicate the time from the birth of the child to the diagnosis of the condition.

**Table 2-A  
Birth Defects Cases by Time to Diagnosis and Birth Year  
Michigan Resident Cases, 1992 - 2019**

Year	Time to Diagnosis		
	All Cases	Under 1 Year	Between 1 & 2 Years
<b>Total</b>	<b>357,244</b>	<b>320,585</b>	<b>36,659</b>
2010-2019	143,761	129,789	13,972
2000-2009	115,913	102,316	13,597
1992-1999	80,968	72,514	8,454
2019	16,707	15,561	1,146
2018	15,802	14,543	1,259
2017	13,947	12,640	1,307
2016	15,120	14,089	1,031
2015	14,159	12,632	1,527
2014	16,812	15,397	1,415
2013	14,721	12,993	1,728
2012	13,187	11,499	1,688
2011	12,256	10,705	1,551
2010	11,050	9,730	1,320
2009	9,398	8,078	1,320
2008	10,702	9,776	926
2007	11,462	9,985	1,477
2006	13,287	11,805	1,482
2005	12,592	11,234	1,358
2004	11,478	10,001	1,477
2003	11,157	9,951	1,206
2002	11,708	10,407	1,301
2001	12,348	10,747	1,601
2000	11,781	10,332	1,449
1999	10,586	9,187	1,399
1998	9,652	8,381	1,271
1997	9,396	8,432	964
1996	9,462	8,558	904
1995	9,508	8,479	1,029
1994	10,681	9,809	872
1993	10,773	9,895	878
1992	10,910	9,773	1,137

**Table 2-B**  
**Average Birth Defects Cases Per Year, by Time to Diagnosis and Birth Year**  
**Michigan Resident Cases, 1992 - 2019**

Year	Time to Diagnosis		
	All Cases	Under 1 Year	Between 1 & 2 Years
<b>Total</b>	<b>13,231.3</b>	<b>11,873.5</b>	<b>1,357.7</b>
2010-2019	14,376.1	12,978.9	1,397.2
2000-2009	11,591.3	10,231.6	1,359.7
1992-1999	10,121.0	9,064.3	1,056.8

**Notes:**

Conditions are reportable if identified within the first two years of a child's life. The frequencies at one year and at two years serve to indicate the time from the birth of the child to the diagnosis of the condition.

Birth defect statistics sometimes reflect trends related to data reporting or new testing. See [Data Quality Considerations](#) for further details.

**Table 3**  
**Birth Defects Cases by Leading Diagnostic Groups and by Birth Year Interval**  
**Michigan Resident Children 2003 through 2019**  
**Three Year Moving Total Prevalence**

Diagnostic Code Group	Birth Year Interval														
	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
<b>Heart &amp; Circulatory System</b>	<b>8,722</b>	<b>9,070</b>	<b>8,915</b>	<b>8,625</b>	<b>7,807</b>	<b>7,236</b>	<b>6,797</b>	<b>7,031</b>	<b>7,336</b>	<b>8,018</b>	<b>7,951</b>	<b>8,430</b>	<b>8,005</b>	<b>8,251</b>	<b>8,412</b>
Congenital Anomalies	7,995	8,318	8,120	7,807	7,012	6,483	6,092	6,285	6,533	7,190	7,197	7,715	7,368	7,651	7,851
Other Conditions	1,249	1,321	1,408	1,458	1,364	1,332	1,284	1,465	1,573	1,701	1,595	1,593	1,470	1,467	1,427
<b>Musculoskeletal System</b>	<b>6,474</b>	<b>6,817</b>	<b>7,151</b>	<b>6,570</b>	<b>5,509</b>	<b>4,969</b>	<b>5,230</b>	<b>6,219</b>	<b>7,073</b>	<b>8,013</b>	<b>7,804</b>	<b>7,517</b>	<b>6,493</b>	<b>6,953</b>	<b>7,102</b>
Congenital Anomalies	6,467	6,814	7,146	6,565	5,504	4,964	5,222	6,211	7,063	8,004	7,795	7,512	6,491	6,952	7,102
Other Conditions	9	5	7	7	8	9	13	13	15	14	11	6	2	1	-
<b>Genital &amp; Urinary Systems</b>	<b>5,810</b>	<b>5,968</b>	<b>5,905</b>	<b>5,413</b>	<b>4,629</b>	<b>4,036</b>	<b>4,106</b>	<b>4,520</b>	<b>5,120</b>	<b>5,660</b>	<b>5,823</b>	<b>6,000</b>	<b>5,613</b>	<b>5,812</b>	<b>6,045</b>
Congenital Anomalies	5,750	5,905	5,841	5,367	4,594	4,002	4,061	4,461	5,050	5,581	5,712	5,827	5,360	5,454	5,618
Other Conditions	172	178	160	135	128	147	172	187	218	283	389	552	681	861	999
<b>Gastrointestinal System</b>	<b>4,105</b>	<b>4,165</b>	<b>4,110</b>	<b>3,993</b>	<b>3,606</b>	<b>3,324</b>	<b>3,065</b>	<b>3,135</b>	<b>3,212</b>	<b>3,421</b>	<b>3,353</b>	<b>3,375</b>	<b>3,036</b>	<b>2,945</b>	<b>2,848</b>
Congenital Anomalies	2,035	2,184	2,213	2,218	2,019	1,824	1,658	1,595	1,629	1,694	1,618	1,675	1,566	1,585	1,536
Other Conditions	2,294	2,233	2,158	2,048	1,832	1,726	1,606	1,749	1,819	1,986	1,968	1,891	1,627	1,528	1,491
<b>Eye</b>	<b>3,280</b>	<b>3,325</b>	<b>3,315</b>	<b>3,202</b>	<b>2,947</b>	<b>2,689</b>	<b>2,560</b>	<b>2,598</b>	<b>2,848</b>	<b>3,117</b>	<b>3,289</b>	<b>3,164</b>	<b>2,665</b>	<b>2,640</b>	<b>2,738</b>
Congenital Anomalies	1,142	1,075	1,014	964	943	917	923	942	1,114	1,295	1,437	1,373	1,166	1,160	1,262
Other Conditions	2,377	2,479	2,534	2,471	2,248	2,008	1,887	1,903	2,035	2,125	2,160	2,062	1,740	1,715	1,693
<b>Central Nervous System</b>	<b>2,501</b>	<b>2,588</b>	<b>2,535</b>	<b>2,463</b>	<b>2,290</b>	<b>2,200</b>	<b>2,169</b>	<b>2,256</b>	<b>2,404</b>	<b>2,678</b>	<b>2,832</b>	<b>3,113</b>	<b>2,872</b>	<b>2,847</b>	<b>2,649</b>
Congenital Anomalies	1,644	1,709	1,658	1,605	1,482	1,407	1,354	1,377	1,466	1,631	1,775	2,012	1,927	1,840	1,674
Other Conditions	1,207	1,273	1,263	1,208	1,120	1,065	1,109	1,181	1,270	1,389	1,423	1,496	1,296	1,344	1,285
<b>Maternal Exposures</b>	<b>778</b>	<b>877</b>	<b>835</b>	<b>836</b>	<b>785</b>	<b>890</b>	<b>1,026</b>	<b>1,247</b>	<b>1,465</b>	<b>1,892</b>	<b>2,080</b>	<b>2,701</b>	<b>2,819</b>	<b>3,205</b>	<b>2,887</b>
<b>Integument Anomalies</b>	<b>1,378</b>	<b>2,361</b>	<b>2,402</b>	<b>3,126</b>	<b>3,056</b>	<b>3,433</b>	<b>3,155</b>	<b>2,771</b>	<b>3,495</b>	<b>4,669</b>	<b>5,175</b>	<b>4,939</b>	<b>3,746</b>	<b>3,545</b>	<b>4,287</b>
<b>Respiratory System Anomalies</b>	<b>2,190</b>	<b>2,477</b>	<b>2,668</b>	<b>2,411</b>	<b>1,767</b>	<b>1,369</b>	<b>1,357</b>	<b>1,539</b>	<b>1,631</b>	<b>1,870</b>	<b>1,923</b>	<b>2,023</b>	<b>1,853</b>	<b>1,897</b>	<b>1,898</b>
<b>Other Reportable Conditions</b>	<b>6,064</b>	<b>5,874</b>	<b>5,624</b>	<b>5,095</b>	<b>4,642</b>	<b>6,317</b>	<b>8,278</b>	<b>10,740</b>	<b>11,608</b>	<b>12,828</b>	<b>13,162</b>	<b>13,807</b>	<b>13,726</b>	<b>15,146</b>	<b>15,636</b>
<b>One or More Reportable Conditions</b>	<b>30,955</b>	<b>32,820</b>	<b>32,843</b>	<b>31,390</b>	<b>27,683</b>	<b>27,439</b>	<b>28,413</b>	<b>31,848</b>	<b>35,110</b>	<b>39,802</b>	<b>40,920</b>	<b>42,013</b>	<b>39,278</b>	<b>41,228</b>	<b>42,740</b>

**Notes:**

**Frequencies** include all children reported with a birth defect who were born in Michigan and whose mother was a resident of Michigan at the time of birth. This enables the calculation of birth defects prevalence rates. Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Conditions** are reportable if identified within the first two years of a child's life. The frequencies at one year and at two years serve to indicate the time from the birth of the child to the diagnosis of the condition. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Table 4-A**  
**Deaths Among Children with Birth Defects by Time to Death and Birth Year**  
**Michigan Birth Defects Registry**  
**All Cases Reported and Processed by May 28, 2022**  
**Live Births during 2001 through 2019**

Time to Death	Birth Year																			
	All Deaths	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All Ages	7,776	567	520	576	524	532	494	410	453	444	343	355	382	420	398	336	301	288	228	205
Infant	6,300	421	414	467	403	418	388	320	356	353	280	288	316	348	335	293	256	256	198	190
1 to 2 Years	427	32	22	29	35	21	19	27	21	19	20	22	18	17	29	22	21	19	23	---
2 to 3 Years	210	10	9	12	13	15	11	16	11	17	10	10	12	18	8	6	14	8	---	---
3 to 4 Years	130	6	7	3	9	9	9	5	13	7	6	9	8	13	7	8	5	---	---	---
4 to 5 Years	84	6	3	4	2	5	4	8	4	8	4	9	6	8	5	4	---	---	---	---
5 to 6 Years	85	6	4	1	7	10	11	7	5	6	5	3	5	8	4	---	---	---	---	---
6 to 7 Years	68	4	4	3	4	7	6	3	7	9	5	1	5	2	---	---	---	---	---	---
7 to 8 Years	64	4	5	4	7	4	7	4	5	5	4	2	6	---	---	---	---	---	---	---
8 to 9 Years	56	7	2	6	2	7	6	4	5	6	1	4	---	---	---	---	---	---	---	---
9 to 10 Years	41	3	2	3	-	3	1	1	11	4	4	---	---	---	---	---	---	---	---	---
10 to 11 Years	57	11	7	3	9	4	4	5	7	4	---	---	---	---	---	---	---	---	---	---
11 to 12 Years	43	11	7	1	3	2	5	3	5	---	---	---	---	---	---	---	---	---	---	---
12 to 13 Years	41	7	3	6	9	3	8	2	---	---	---	---	---	---	---	---	---	---	---	---
13 to 14 Years	48	7	9	7	6	6	7	---	---	---	---	---	---	---	---	---	---	---	---	---
14 to 15 Years	33	8	6	6	3	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15 to 16 Years	36	11	4	4	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16 to 17 Years	29	7	3	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17 to 18 Years	24	6	9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

**Notes:** Death frequencies are the total deaths by age interval among children born with a birth defect who were born in Michigan and whose mother was a resident at the time of the child's birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.  
**Tripple dashes (---)** indicate category not applicable.

**Table 4-B**  
**Deaths Among Children by Time to Death and Birth Year**  
**Michigan Live Birth Registry**  
**All Cases Reported and Processed by May 28, 2022**  
**Live Births during 2001 through 2019**

Time to Death	Birth Year																			
	All Deaths	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All Ages	21,456	1,586	1,516	1,540	1,442	1,399	1,274	1,294	1,150	1,146	1,002	997	1,026	979	944	909	855	851	783	763
Infant	17,008	1,102	1,076	1,135	1,029	1,043	958	1,052	920	917	830	812	846	808	785	774	750	763	708	700
1 to 2 Years	961	64	51	61	69	47	52	61	41	52	44	53	42	43	49	48	43	43	44	---
2 to 3 Years	520	33	32	33	31	30	25	34	27	36	23	22	25	34	19	29	28	25	---	---
3 to 4 Years	398	26	30	22	22	24	24	19	30	15	16	21	24	27	31	28	15	---	---	---
4 to 5 Years	282	26	13	16	15	17	17	16	15	21	13	24	22	17	19	16	---	---	---	---
5 to 6 Years	242	22	14	11	17	22	22	15	10	17	14	10	15	20	15	---	---	---	---	---
6 to 7 Years	192	17	17	10	10	13	13	8	13	15	13	12	18	10	---	---	---	---	---	---
7 to 8 Years	168	16	14	12	14	11	10	10	15	12	9	11	16	---	---	---	---	---	---	---
8 to 9 Years	154	13	14	15	9	17	15	9	8	16	9	9	---	---	---	---	---	---	---	---
9 to 10 Years	155	12	10	9	12	13	13	14	20	16	15	---	---	---	---	---	---	---	---	---
10 to 11 Years	150	20	19	5	16	14	15	13	19	12	---	---	---	---	---	---	---	---	---	---
11 to 12 Years	133	21	19	6	13	13	21	10	10	---	---	---	---	---	---	---	---	---	---	---
12 to 13 Years	143	17	21	13	25	18	19	12	---	---	---	---	---	---	---	---	---	---	---	---
13 to 14 Years	169	23	24	20	25	29	27	---	---	---	---	---	---	---	---	---	---	---	---	---
14 to 15 Years	189	30	37	23	28	37	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15 to 16 Years	196	45	37	31	31	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16 to 17 Years	213	54	35	49	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17 to 18 Years	183	45	53	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

**Notes:** Death frequencies include deaths by age interval among all children who were born in Michigan and whose mother was a resident at the time of the child's birth. This enables the calculation of mortality rates among these children that are comparable with similar rates for children with birth defects. Triple dashes (---) indicate category not applicable.

**Table 5-A**  
**Mortality Rates Among Children with Birth Defects by Time to Death and Birth Year**  
**Michigan Birth Defects Registry**  
**All Cases Reported and Processed by May 28, 2022**  
**Live Births during 2001 through 2019**

Time to Death	Birth Year																			
	Mortality Rate	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All Ages	35.1	52.8	50.0	57.9	52.4	47.4	41.9	41.1	46.4	55.0	35.3	33.2	33.2	32.3	25.9	26.6	21.4	22.8	15.7	13.2
Infant	28.4	39.2	39.8	47.0	40.3	37.2	32.9	32.1	36.4	43.7	28.8	26.9	27.5	26.8	21.8	23.2	18.2	20.3	13.6	12.2
1 to 2 Years	1.9	3.0	2.1	2.9	3.5	1.9	1.6	2.7	2.2	2.4	2.1	2.1	1.6	1.3	1.9	1.7	1.5	1.5	1.6	---
2 to 3 Years	0.9	0.9	0.9	1.2	1.3	1.3	0.9	1.6	1.1	2.1	1.0	0.9	1.0	1.4	0.5	0.5	1.0	0.6	---	---
3 to 4 Years	0.6	0.6	0.7	*	0.9	0.8	0.8	*	1.3	0.9	0.6	0.8	0.7	1.0	0.5	0.6	*	---	---	---
4 to 5 Years	0.4	0.6	*	*	*	*	*	0.8	*	1.0	*	0.8	0.5	0.6	*	*	---	---	---	---
5 to 6 Years	0.4	0.6	*	*	0.7	0.9	0.9	0.7	*	0.7	*	*	*	0.6	*	---	---	---	---	---
6 to 7 Years	0.3	*	*	*	*	0.6	0.5	*	0.7	1.1	*	*	*	*	---	---	---	---	---	---
7 to 8 Years	0.3	*	*	*	0.7	*	0.6	*	*	*	*	*	*	0.5	---	---	---	---	---	---
8 to 9 Years	0.3	0.7	*	0.6	*	0.6	0.5	*	*	0.7	*	*	---	---	---	---	---	---	---	---
9 to 10 Years	0.2	*	*	*	-	*	*	*	*	1.1	*	*	---	---	---	---	---	---	---	---
10 to 11 Years	0.3	1.0	0.7	*	0.9	*	*	*	*	0.7	*	---	---	---	---	---	---	---	---	---
11 to 12 Years	0.2	1.0	0.7	*	*	*	*	*	*	*	---	---	---	---	---	---	---	---	---	---
12 to 13 Years	0.2	0.7	*	0.6	0.9	*	0.7	*	---	---	---	---	---	---	---	---	---	---	---	---
13 to 14 Years	0.2	0.7	0.9	0.7	0.6	0.5	0.6	---	---	---	---	---	---	---	---	---	---	---	---	---
14 to 15 Years	0.1	0.7	0.6	0.6	*	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15 to 16 Years	0.2	1.0	*	*	*	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16 to 17 Years	0.1	0.7	*	1.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17 to 18 Years	0.1	0.6	0.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

**Notes:** Rates are per 1,000 cases. **Birth defect mortality rates** divides all deaths of children reported with a birth defect and dying within the age interval, by the total number of births with reported birth defects and born by Michigan resident mothers in that birth year. Children who died were born in Michigan and their mother was a resident at time of birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Symbols:** --- Category not applicable. \* Figure does not meet standards of reliability or precision. • 0.0 Quantity more than zero but less than 0.05.

**Table 5-B**  
**Mortality Rates Among All Michigan Children by Time to Death and Birth Year**  
**Michigan Live Birth Registry**  
**All Cases Reported and Processed by May 28, 2022**  
**Live Births during 2001 through 2019**

Time to Death	Birth Year																			
	Mortality Rate	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All Ages	9.6	12.0	11.8	11.9	11.3	11.1	10.1	10.5	9.6	9.9	8.8	8.8	9.2	8.7	8.3	8.1	7.6	7.7	7.2	7.2
Infant	7.6	8.4	8.4	8.8	8.0	8.3	7.6	8.5	7.7	7.9	7.3	7.2	7.6	7.2	6.9	6.9	6.7	6.9	6.5	6.6
1 to 2 Years	0.4	0.5	0.4	0.5	0.5	0.4	0.4	0.5	0.3	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	---
2 to 3 Years	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	---	---
3 to 4 Years	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.1	---	---	---
4 to 5 Years	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.1	---	---	---	---
5 to 6 Years	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	---	---	---	---
6 to 7 Years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	---	---	---	---	---
7 to 8 Years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	---	---	---	---	---	---	---
8 to 9 Years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	---	---	---	---	---	---	---	---
9 to 10 Years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	---	---	---	---	---	---	---	---	---
10 to 11 Years	0.1	0.2	0.1	*	0.1	0.1	0.1	0.1	0.2	0.1	---	---	---	---	---	---	---	---	---	---
11 to 12 Years	0.1	0.2	0.1	0.0	0.1	0.1	0.2	0.1	0.1	---	---	---	---	---	---	---	---	---	---	---
12 to 13 Years	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.1	---	---	---	---	---	---	---	---	---	---	---	---
13 to 14 Years	0.1	0.2	0.2	0.2	0.2	0.2	0.2	---	---	---	---	---	---	---	---	---	---	---	---	---
14 to 15 Years	0.1	0.2	0.3	0.2	0.2	0.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15 to 16 Years	0.1	0.3	0.3	0.2	0.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16 to 17 Years	0.1	0.4	0.3	0.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17 to 18 Years	0.1	0.3	0.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

**Notes:** Rates are per 1,000 cases. **Mortality rates** divides all childhood deaths within the age interval by the total number of births born by Michigan resident mothers in that birth year. Children who died were born in Michigan and their mother was a resident at time of birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Symbols:** --- Category not applicable. \* Figure does not meet standards of reliability or precision. • 0.0 Quantity more than zero but less than 0.05.

**Table 6-A**  
**Cumulative Deaths Among Children with Birth Defects by Time to Death and Birth Year**  
**Michigan Birth Defects Registry**  
**All Cases Reported and Processed by May 28, 2022**  
**Live Births during 2001 through 2019**

Time to Death	Birth Year																			
	All Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All Ages	7,776	567	520	576	524	532	494	410	453	444	343	355	382	420	398	336	301	288	228	205
Infant	6,300	421	414	467	403	418	388	320	356	353	280	288	316	348	335	293	256	256	198	190
1 to 2 Years	6,727	453	436	496	438	439	407	347	377	372	300	310	334	365	364	315	277	275	221	---
2 to 3 Years	6,937	463	445	508	451	454	418	363	388	389	310	320	346	383	372	321	291	283	---	---
3 to 4 Years	7,067	469	452	511	460	463	427	368	401	396	316	329	354	396	379	329	296	---	---	---
4 to 5 Years	7,151	475	455	515	462	468	431	376	405	404	320	338	360	404	384	333	---	---	---	---
5 to 6 Years	7,236	481	459	516	469	478	442	383	410	410	325	341	365	412	388	---	---	---	---	---
6 to 7 Years	7,304	485	463	519	473	485	448	386	417	419	330	342	370	414	---	---	---	---	---	---
7 to 8 Years	7,368	489	468	523	480	489	455	390	422	424	334	344	376	---	---	---	---	---	---	---
8 to 9 Years	7,424	496	470	529	482	496	461	394	427	430	335	348	---	---	---	---	---	---	---	---
9 to 10 Years	7,465	499	472	532	482	499	462	395	438	434	339	---	---	---	---	---	---	---	---	---
10 to 11 Years	7,522	510	479	535	491	503	466	400	445	438	---	---	---	---	---	---	---	---	---	---
11 to 12 Years	7,565	521	486	536	494	505	471	403	450	---	---	---	---	---	---	---	---	---	---	---
12 to 13 Years	7,606	528	489	542	503	508	479	405	---	---	---	---	---	---	---	---	---	---	---	---
13 to 14 Years	7,654	535	498	549	509	514	486	---	---	---	---	---	---	---	---	---	---	---	---	---
14 to 15 Years	7,687	543	504	555	512	520	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15 to 16 Years	7,723	554	508	559	517	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16 to 17 Years	7,752	561	511	569	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17 to 18 Years	7,776	567	520	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

**Notes:** Death frequencies are the total deaths by age interval among children born with a birth defect who were born in Michigan and whose mother was a resident at the time of the child's birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details. Tripple dashes (---) indicate category not applicable.

**Table 6-B**  
**Cumulative Deaths Among Children by Time to Death and Birth Year**  
**Michigan Live Birth Registry**  
**All Cases Reported and Processed by May 28, 2022**  
**Live Births during 2001 through 2019**

Time to Death	Birth Year																			
	All Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All Ages	21,456	1,586	1,516	1,540	1,442	1,399	1,274	1,294	1,150	1,146	1,002	997	1,026	979	944	909	855	851	783	763
Infant	17,008	1,102	1,076	1,135	1,029	1,043	958	1,052	920	917	830	812	846	808	785	774	750	763	708	700
1 to 2 Years	17,969	1,166	1,127	1,196	1,098	1,090	1,010	1,113	961	969	874	865	888	851	834	822	793	806	752	---
2 to 3 Years	18,489	1,199	1,159	1,229	1,129	1,120	1,035	1,147	988	1,005	897	887	913	885	853	851	821	831	---	---
3 to 4 Years	18,887	1,225	1,189	1,251	1,151	1,144	1,059	1,166	1,018	1,020	913	908	937	912	884	879	836	---	---	---
4 to 5 Years	19,169	1,251	1,202	1,267	1,166	1,161	1,076	1,182	1,033	1,041	926	932	959	929	903	895	---	---	---	---
5 to 6 Years	19,411	1,273	1,216	1,278	1,183	1,183	1,098	1,197	1,043	1,058	940	942	974	949	918	---	---	---	---	---
6 to 7 Years	19,603	1,290	1,233	1,288	1,193	1,196	1,111	1,205	1,056	1,073	953	954	992	959	---	---	---	---	---	---
7 to 8 Years	19,771	1,306	1,247	1,300	1,207	1,207	1,121	1,215	1,071	1,085	962	965	1,008	---	---	---	---	---	---	---
8 to 9 Years	19,925	1,319	1,261	1,315	1,216	1,224	1,136	1,224	1,079	1,101	971	974	---	---	---	---	---	---	---	---
9 to 10 Years	20,080	1,331	1,271	1,324	1,228	1,237	1,149	1,238	1,099	1,117	986	---	---	---	---	---	---	---	---	---
10 to 11 Years	20,230	1,351	1,290	1,329	1,244	1,251	1,164	1,251	1,118	1,129	---	---	---	---	---	---	---	---	---	---
11 to 12 Years	20,363	1,372	1,309	1,335	1,257	1,264	1,185	1,261	1,128	---	---	---	---	---	---	---	---	---	---	---
12 to 13 Years	20,506	1,389	1,330	1,348	1,282	1,282	1,204	1,273	---	---	---	---	---	---	---	---	---	---	---	---
13 to 14 Years	20,675	1,412	1,354	1,368	1,307	1,311	1,231	---	---	---	---	---	---	---	---	---	---	---	---	---
14 to 15 Years	20,864	1,442	1,391	1,391	1,335	1,348	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15 to 16 Years	21,060	1,487	1,428	1,422	1,366	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16 to 17 Years	21,273	1,541	1,463	1,471	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17 to 18 Years	21,456	1,586	1,516	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

**Notes:** Death frequencies include deaths by age interval among all children who were born in Michigan and whose mother was a resident at the time of the child's birth. This enables the calculation of mortality rates among these children that are comparable with similar rates for children with birth defects. Triple dashes (---) indicate category not applicable.

**Table 7-A**  
**Cumulative Mortality Rates Among Children with**  
**Birth Defects by Time to Death and Birth Year**  
**Michigan Birth Defects Registry**  
**All Cases Reported and Processed by May 28, 2022**  
**Live Births during 2001 through 2019**

Time to Death	Adjusted Cumulative Rate	Birth Year																		
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All Ages	41.2	52.7	50.0	57.2	51.7	46.3	41.2	40.6	46.1	54.3	34.9	32.5	32.7	31.9	25.2	26.4	21.0	22.4	15.2	12.2
Infant	28.4	39.2	39.8	47.0	40.3	37.2	32.9	32.1	36.4	43.7	28.8	26.9	27.5	26.8	21.8	23.2	18.2	20.3	13.6	12.2
1 to 2 Years	30.5	42.2	41.9	49.9	43.8	39.1	34.5	34.8	38.6	46.1	30.9	29.0	29.1	28.1	23.6	24.9	19.7	21.8	15.2	---
2 to 3 Years	31.6	43.1	42.8	51.1	45.1	40.4	35.5	36.4	39.7	48.2	31.9	29.9	30.1	29.5	24.2	25.4	20.7	22.4	---	---
3 to 4 Years	32.3	43.6	43.5	51.4	46.0	41.3	36.2	36.9	41.1	49.1	32.5	30.7	30.8	30.5	24.6	26.0	21.0	---	---	---
4 to 5 Years	32.8	44.2	43.7	51.8	46.2	41.7	36.6	37.7	41.5	50.1	32.9	31.6	31.3	31.1	24.9	26.4	---	---	---	---
5 to 6 Years	33.4	44.8	44.1	51.9	46.9	42.6	37.5	38.4	42.0	50.8	33.4	31.9	31.8	31.7	25.2	---	---	---	---	---
6 to 7 Years	33.9	45.1	44.5	52.2	47.3	43.2	38.0	38.7	42.7	51.9	33.9	32.0	32.2	31.9	---	---	---	---	---	---
7 to 8 Years	34.4	45.5	45.0	52.6	48.0	43.6	38.6	39.1	43.2	52.5	34.4	32.1	32.7	---	---	---	---	---	---	---
8 to 9 Years	34.9	46.2	45.2	53.2	48.2	44.2	39.1	39.5	43.7	53.3	34.5	32.5	---	---	---	---	---	---	---	---
9 to 10 Years	35.3	46.4	45.4	53.5	48.2	44.5	39.2	39.6	44.8	53.8	34.9	---	---	---	---	---	---	---	---	---
10 to 11 Years	35.9	47.5	46.1	53.8	49.1	44.8	39.5	40.1	45.6	54.3	---	---	---	---	---	---	---	---	---	---
11 to 12 Years	36.4	48.5	46.7	53.9	49.4	45.0	39.9	40.4	46.1	---	---	---	---	---	---	---	---	---	---	---
12 to 13 Years	37.0	49.1	47.0	54.5	50.3	45.3	40.6	40.6	---	---	---	---	---	---	---	---	---	---	---	---
13 to 14 Years	37.7	49.8	47.9	55.2	50.9	45.8	41.2	---	---	---	---	---	---	---	---	---	---	---	---	---
14 to 15 Years	38.4	50.5	48.5	55.8	51.2	46.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15 to 16 Years	39.2	51.5	48.8	56.2	51.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16 to 17 Years	40.2	52.2	49.1	57.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17 to 18 Years	41.3	52.8	50.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

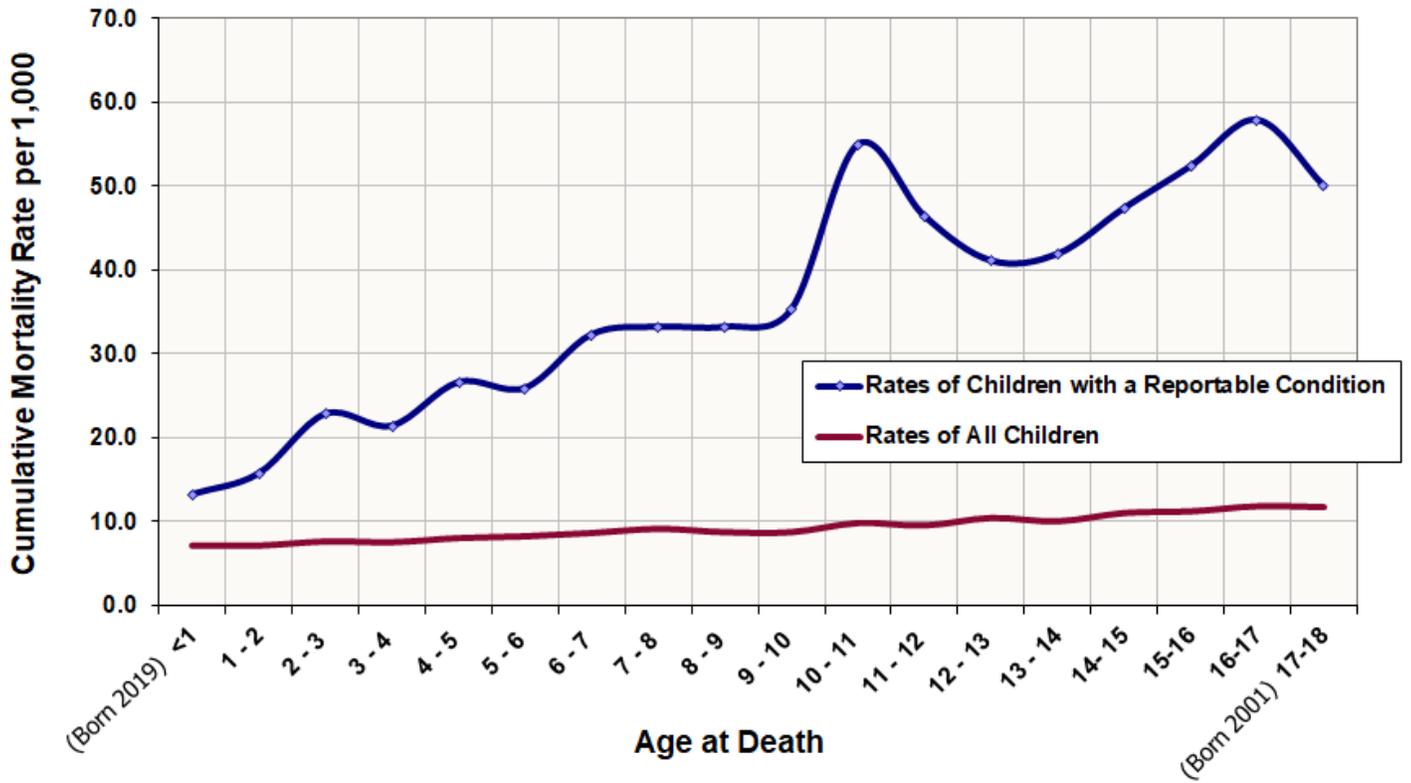
**Notes:** Rates are per 1,000 Live Births. **Birth defect cumulative mortality rates** are calculated by dividing all deaths of children reported with a birth defect and dying within or before the age interval, by the total number of births with reported birth defects and born by Michigan resident mothers in that birth year. Children who died were born in Michigan and their mother was a resident at time of birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details. Tripple dashes (---) indicate category not applicable.

**Table 7-B**  
**Cumulative Mortality Rates Among All Michigan Children by Time to Death and Birth Year**  
**Michigan Live Birth Registry**  
**All Cases Reported and Processed by May 28, 2022**  
**Live Births during 2001 through 2019**

Time to Death	Adjusted Cumulative Rate	Birth Year																		
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All Ages	11.8	12.0	11.8	11.4	10.7	10.7	9.8	10.3	9.4	9.7	8.7	8.6	9.0	8.5	8.1	8.0	7.5	7.5	6.9	6.6
Infant	7.6	8.4	8.4	8.8	8.0	8.3	7.6	8.5	7.7	7.9	7.3	7.2	7.6	7.2	6.9	6.9	6.7	6.9	6.5	6.6
1 to 2 Years	8.0	8.9	8.8	9.3	8.6	8.7	8.0	9.0	8.0	8.4	7.7	7.7	7.9	7.6	7.4	7.3	7.1	7.3	6.9	---
2 to 3 Years	8.3	9.1	9.1	9.5	8.8	8.9	8.2	9.3	8.2	8.7	7.9	7.9	8.2	7.9	7.5	7.6	7.3	7.5	---	---
3 to 4 Years	8.5	9.3	9.3	9.7	9.0	9.1	8.4	9.4	8.5	8.8	8.1	8.1	8.4	8.1	7.8	7.8	7.5	---	---	---
4 to 5 Years	8.7	9.5	9.4	9.8	9.1	9.2	8.5	9.6	8.6	9.0	8.2	8.3	8.6	8.3	8.0	8.0	---	---	---	---
5 to 6 Years	8.8	9.7	9.5	9.9	9.2	9.4	8.7	9.7	8.7	9.1	8.3	8.4	8.7	8.4	8.1	---	---	---	---	---
6 to 7 Years	8.9	9.8	9.6	10.0	9.3	9.5	8.8	9.7	8.8	9.3	8.4	8.5	8.9	8.5	---	---	---	---	---	---
7 to 8 Years	9.0	9.9	9.7	10.1	9.4	9.6	8.9	9.8	8.9	9.4	8.5	8.6	9.0	---	---	---	---	---	---	---
8 to 9 Years	9.2	10.0	9.9	10.2	9.5	9.7	9.0	9.9	9.0	9.5	8.6	8.6	---	---	---	---	---	---	---	---
9 to 10 Years	9.3	10.1	9.9	10.2	9.6	9.8	9.1	10.0	9.2	9.6	8.7	---	---	---	---	---	---	---	---	---
10 to 11 Years	9.4	10.3	10.1	10.3	9.7	9.9	9.2	10.1	9.3	9.7	---	---	---	---	---	---	---	---	---	---
11 to 12 Years	9.5	10.4	10.2	10.3	9.8	10.0	9.4	10.2	9.4	---	---	---	---	---	---	---	---	---	---	---
12 to 13 Years	9.7	10.6	10.4	10.4	10.0	10.2	9.6	10.3	---	---	---	---	---	---	---	---	---	---	---	---
13 to 14 Years	9.9	10.7	10.6	10.6	10.2	10.4	9.8	---	---	---	---	---	---	---	---	---	---	---	---	---
14 to 15 Years	10.2	11.0	10.9	10.8	10.4	10.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15 to 16 Years	10.6	11.3	11.2	11.0	10.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16 to 17 Years	11.1	11.7	11.4	11.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17 to 18 Years	11.8	12.0	11.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

**Notes:** Rates are per 1,000 Live Births. **Mortality rates** are calculated by dividing all childhood deaths within or before the age interval by the total number of births born by Michigan resident mothers in that birth year. Children who died were born in Michigan and their mother was a resident at time of birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.  
 Triple dashes (---) indicate category not applicable.

**Figure 1. Crude Cumulative Mortality Rates,  
Michigan Children with a Reportable Condition versus All Children  
Michigan Births between 2001-2019**



**Table 8**  
**Birth Defect Numbers & Prevalence Rates by Summary Diagnostic Code Group and**  
**By Race & Hispanic Ancestry of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**

**Birth Defects**

Diagnostic Grouping	Number by Race						Prevalence Rate by Race					
	Total	White	Black	Native American	Asian	Hispanic	Total	White	Black	Native American	Asian	Hispanic
A Central Nervous System Birth Defects	3,686	2,282	948	9	95	238	55.6	50.2	74.5	26.0	37.1	52.3
B Eye Birth Defects	2,635	1,776	486	4	119	147	39.8	39.0	38.2	*	46.5	32.3
C Ear, Face & Neck Birth Defects	2,758	1,666	682	8	88	235	41.6	36.6	53.6	23.1	34.4	51.7
D Heart & Circulatory System Birth Defects	15,566	9,841	3,834	70	388	998	234.9	216.3	301.3	202.5	151.5	219.4
E Respiratory System Birth Defects	3,921	2,321	1,110	13	78	252	59.2	51.0	87.2	37.6	30.4	55.4
F Cleft Palate and Cleft Lip	1,133	831	147	7	33	77	17.1	18.3	11.6	20.3	12.9	16.9
G Birth Defects of the Upper Alimentary Canal/ Digestive System	3,211	2,276	588	8	67	201	48.5	50.0	46.2	23.1	26.2	44.2
H Genital & Urinary Systems Birth Defects	11,445	7,784	2,198	19	353	695	172.7	171.1	172.7	55.0	137.8	152.8
I Musculoskeletal System Birth Defects	14,614	9,584	3,196	39	486	863	220.5	210.7	251.2	112.8	189.7	189.7
J Integument Birth Defects	9,226	2,977	4,493	21	687	651	139.2	65.4	353.1	60.8	268.2	143.1
K Chromosomal Anomalies	1,783	1,238	313	6	49	124	26.9	27.2	24.6	17.4	19.1	27.3
L Other and Unspecified Birth Defects	17,059	10,317	4,134	59	1,061	1,108	257.4	226.8	324.9	170.7	414.2	243.5

**Table 8**  
**Birth Defect Numbers & Prevalence Rates by Summary Diagnostic Code Group and**  
**By Race & Hispanic Ancestry of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	Number by Race						Prevalence Rate by Race					
	Total	White	Black	Native American	Asian	Hispanic	Total	White	Black	Native American	Asian	Hispanic
M Infectious Conditions Occurring in the Perinatal Period	377	164	183	1	4	15	5.7	3.6	14.4	*	*	3.3
N Familial/Congenital Neoplasms	89	43	35	-	3	6	1.3	0.9	2.8	-	*	1.3
O Endocrine/Metabolic Disorders	5,296	3,236	1,327	21	237	299	79.9	71.1	104.3	60.8	92.5	65.7
P Diseases of the Blood & Blood Forming Organs	2,684	701	1,770	7	51	84	40.5	15.4	139.1	20.3	19.9	18.5
Q Other Diseases of the Central and Peripheral Nervous System	2,781	1,716	725	12	81	156	42.0	37.7	57.0	34.7	31.6	34.3
R Other Diseases of the Eye	3,755	2,479	876	13	87	205	56.7	54.5	68.8	37.6	34.0	45.1
S Hearing Deficiency	5,788	3,172	1,793	11	224	340	87.3	69.7	140.9	31.8	87.4	74.7
T Other Diseases of the Heart & Circulatory System	3,020	1,862	811	12	57	200	45.6	40.9	63.7	34.7	22.3	44.0
U Other Diseases of the Gastrointestinal System	3,382	2,139	854	11	78	188	51.0	47.0	67.1	31.8	30.4	41.3
V Other Diseases of the Genital and Urinary Systems	1,551	1,056	248	1	56	126	23.4	23.2	19.5	*	21.9	27.7
X Other Musculoskeletal System Diseases	6	3	3	-	-	-	0.1	*	*	-	-	-
Y Maternal Exposures Affecting Fetus	5,588	3,723	1,484	48	20	269	84.3	81.8	116.6	138.9	7.8	59.1
One or More Reportable Diagnosis	84,753	50,587	22,748	267	3,351	5,284	1,279.0	1,111.9	1,787.7	772.6	1,308.2	1,161.4

**Notes:**

**Race or Hispanic Ancestry:** Race without mention of Hispanic ancestry, or Hispanic ancestry with or without mention of race.

**Rates** Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Symbols:** \* : Figure does not meet standards of reliability or precision. • -: A dash represents quantity zero. • 0.0: Quantity more than zero but less than 0.05.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 9**  
**Birth Defect Numbers & Prevalence Rates by Detailed Diagnostic Code Group and**  
**By Race & Hispanic Ancestry of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**

**Birth Defects**

Diagnostic Grouping	Number by Race						Prevalence Rate by Race					
	Total	White	Black	Native American	Asian	Hispanic	Total	White	Black	Native American	Asian	Hispanic
A Central Nervous System (All)	3,686	2,282	948	9	95	238	55.6	50.2	74.5	26.0	37.1	52.3
A01 Anencephalus	50	35	8	-	2	5	0.8	0.8	0.6	-	*	*
A02 Spina Bifida w/o Anencephaly	260	183	37	-	4	28	3.9	4.0	2.9	-	*	6.2
A03 Hydrocephalus w/o Spina Bifida	481	279	148	2	9	24	7.3	6.1	11.6	*	3.5	5.3
A04 Encephalocele	70	42	17	-	2	7	1.1	0.9	1.3	-	*	1.5
A05 Microcephalus	1,138	578	413	2	34	66	17.2	12.7	32.5	*	13.3	14.5
A06 Holoprosencephaly	---	---	---	---	---	---	---	---	---	---	---	---
A99 Other CNS Anomalies	2,276	1,524	468	5	53	153	34.3	33.5	36.8	*	20.7	33.6
B Eye (All)	2,635	1,776	486	4	119	147	39.8	39.0	38.2	*	46.5	32.3
B01 Anophthalmos /Microphthalmos	93	65	20	1	4	2	1.4	1.4	1.6	*	*	*
B02 Congenital Cataract	127	79	34	1	3	5	1.9	1.7	2.7	*	*	*
B03 Aniridia	23	16	5	-	2	-	0.3	0.4	*	-	*	-
B99 Other Eye Anomalies	2,492	1,681	450	3	117	142	37.6	36.9	35.4	*	45.7	31.2
C Ear, Face and Neck (All)	2,758	1,666	682	8	88	235	41.6	36.6	53.6	23.1	34.4	51.7
C01 Aotia/Microtia	146	95	18	1	4	19	2.2	2.1	1.4	*	*	4.2
C99 Other Ear, Face & Neck Anomalies	2,717	1,639	680	7	88	228	41.0	36.0	53.4	20.3	34.4	50.1
D Heart & Circulatory System (All)	15,566	9,841	3,834	70	388	998	234.9	216.3	301.3	202.5	151.5	219.4
D01 Common Truncus	74	37	22	-	3	9	1.1	0.8	1.7	-	*	2.0
D02 Transposition of Great Vessels	252	182	42	-	5	16	3.8	4.0	3.3	-	*	3.5
D03 Tetralogy of Fallot	332	211	82	1	10	19	5.0	4.6	6.4	*	3.9	4.2
D04 Ventricular Septal Defect	3,435	2,286	703	11	88	245	51.8	50.2	55.2	31.8	34.4	53.8
D05 Atrial Septal Defect	10,009	6,157	2,626	48	248	659	151.1	135.3	206.4	138.9	96.8	144.8
D06 Atrioventricular Septal Defect (Endocardial Cushion Defect)	347	231	71	2	10	22	5.2	5.1	5.6	*	3.9	4.8
D07 Pulmonary Valve Atresi& Stenosis	693	439	180	4	10	44	10.5	9.6	14.1	*	3.9	9.7
D08 Tricuspid Valve Atresi& Stenosis	72	48	14	-	2	7	1.1	1.1	1.1	-	*	1.5
D09 Ebstein's Anomaly	35	27	5	1	1	1	0.5	0.6	*	*	*	*
D10 Aortic Valve Stenosis	148	114	22	2	3	6	2.2	2.5	1.7	*	*	1.3
D11 Hypoplastic Left Heart Syndrome	252	175	45	4	4	18	3.8	3.8	3.5	*	*	4.0
D12 Patent Ductus Arteriosus	5,380	3,130	1,624	22	147	328	81.2	68.8	127.6	63.7	57.4	72.1
D13 Coarctation of Aorta	516	375	91	2	8	28	7.8	8.2	7.2	*	3.1	6.2
D14 Pulmonary Artery Anomalies	1,187	733	318	2	22	84	17.9	16.1	25.0	*	8.6	18.5
D15 Interrupted Aortic Arch	36	26	7	2	-	-	0.5	0.6	0.6	*	-	-
D16 Total Anomalous Pulmonary Venous Return (or connection)	73	50	10	-	3	9	1.1	1.1	0.8	-	*	2.0
D17 Double Outlet Right Ventricle	182	107	50	-	5	13	2.7	2.4	3.9	-	*	2.9
D18 Common Ventricel	133	76	38	-	4	11	2.0	1.7	3.0	-	*	2.4
D99 Other Heart & Circulatory System Anomalies	5,361	3,550	1,117	23	147	378	80.9	78.0	87.8	66.6	57.4	83.1

**Table 9**  
**Birth Defect Numbers & Prevalence Rates by Detailed Diagnostic Code Group and**  
**By Race & Hispanic Ancestry of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**  
**(Continued)**

Birth Defects

Diagnostic Grouping	Number by Race						Prevalence Rate by Race					
	Total	White	Black	Native American	Asian	Hispanic	Total	White	Black	Native American	Asian	Hispanic
E Respiratory System (All)	3,921	2,321	1,110	13	78	252	59.2	51.0	87.2	37.6	30.4	55.4
E01 Lung Agenesis/ Hypoplasia	441	269	114	1	9	37	6.7	5.9	9.0	*	3.5	8.1
E02 Choanal Atresia	118	81	22	1	1	12	1.8	1.8	1.7	*	*	2.6
E99 Other Respiratory System Anomalies	3,515	2,064	1,013	11	72	218	53.0	45.4	79.6	31.8	28.1	47.9
F Cleft Palate & Cleft Lip	1,133	831	147	7	33	77	17.1	18.3	11.6	20.3	12.9	16.9
F01 Cleft Palate	641	452	90	7	16	48	9.7	9.9	7.1	20.3	6.2	10.6
F02 Cleft Lip w & w/o Cleft Palate	667	488	93	-	20	44	10.1	10.7	7.3	-	7.8	9.7
G Upper Alimentary Caanal/ Digestive System (All)	3,211	2,276	588	8	67	201	48.5	50.0	46.2	23.1	26.2	44.2
G01 Esophageal Atresia/ Tracheoesophageal Fistula	144	110	25	-	5	3	2.2	2.4	2.0	-	*	*
G02 Rectal & Large Intestinal Atresia/Stenosis	266	190	36	-	13	20	4.0	4.2	2.8	-	5.1	4.4
G03 Pyloric Stenosis	1,059	792	142	2	12	85	16.0	17.4	11.2	*	4.7	18.7
G04 Hirshsprung's Disease (congenital megacolon)	359	233	83	2	14	21	5.4	5.1	6.5	*	5.5	4.6
G05 Biliary Atresia	88	45	34	1	2	4	1.3	1.0	2.7	*	*	*
G99 Other Upper Alimentary Canal /Digestive System Anomalies	1,675	1,177	332	4	40	88	25.3	25.9	26.1	*	15.6	19.3
H Genital & Urinary Systems	11,445	7,784	2,198	19	353	695	172.7	171.1	172.7	55.0	137.8	152.8
H01 Renal Agenesis/ Hypoplasia	438	298	98	2	7	18	6.6	6.5	7.7	*	2.7	4.0
H02 Bladder Exstrophy & Cloacal Exstrophy	18	13	2	-	-	3	0.3	0.3	*	-	-	*
H03 Obstructive Genitourinary Defects	2,859	2,021	397	7	105	227	43.1	44.4	31.2	20.3	41.0	49.9
H04 Hypospadias	2,511	1,881	408	3	49	87	37.9	41.3	32.1	*	19.1	19.1
H05 Epispadias	88	55	27	-	2	3	1.3	1.2	2.1	-	*	*
H99 Other Genital & Urinary System Anomalies	7,239	4,710	1,598	13	217	444	109.2	103.5	125.6	37.6	84.7	97.6

**Table 9**  
**Birth Defect Numbers & Prevalence Rates by Detailed Diagnostic Code Group and**  
**By Race & Hispanic Ancestry of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**  
**(Continued)**

Birth Defects

Diagnostic Grouping	Number by Race						Prevalence Rate by Race					
	Total	White	Black	Native American	Asian	Hispanic	Total	White	Black	Native American	Asian	Hispanic
I Musculoskeletal System (All)	14,614	9,584	3,196	39	486	863	220.5	210.7	251.2	112.8	189.7	189.7
I01 Upper Limb Reduction Deformities	141	102	28	–	2	9	2.1	2.2	2.2	–	*	2.0
I02 Lower Limb Reduction Deformities	130	89	30	–	4	5	2.0	2.0	2.4	–	*	*
I03a Exomphalos/Omphalocele	240	89	128	–	7	9	3.6	2.0	10.1	–	2.7	2.0
I03b Gastroschisis	273	196	40	3	4	26	4.1	4.3	3.1	*	*	5.7
I03c Prune Belly Syndrome, Congenital Hernia of Bladder	156	88	57	–	3	7	2.4	1.9	4.5	–	*	1.5
I04 Congenital Hip Dislocation	523	384	75	2	13	27	7.9	8.4	5.9	*	5.1	5.9
I05 Diaphragmatic Hernia	211	147	34	1	4	16	3.2	3.2	2.7	*	*	3.5
I99 Other Musculoskeletal System	13,584	8,944	2,920	34	462	805	205.0	196.6	229.5	98.4	180.4	176.9
J Integument (All)	9,226	2,977	4,493	21	687	651	139.2	65.4	353.1	60.8	268.2	143.1
K Chromosomal Anomalies	1,783	1,238	313	6	49	124	26.9	27.2	24.6	17.4	19.1	27.3
K01 Trisomy 13	40	22	12	–	1	3	0.6	0.5	0.9	–	*	*
K02 Down Syndrome	824	557	144	2	24	72	12.4	12.2	11.3	*	9.4	15.8
K03 Trisomy 18	85	58	18	–	4	3	1.3	1.3	1.4	–	*	*
K04 Chromosome 22q11.2 Deletion Syndrome	70	46	11	1	2	8	1.1	1.0	0.9	*	*	1.8
K05 Turner Syndrome	76	57	10	1	1	2	1.1	1.3	0.8	*	*	*
K99 Other Chromosomal Anomalies	762	544	133	3	21	43	11.5	12.0	10.5	*	8.2	9.5
L Other and Unspecified Birth Defects	17,059	10,317	4,134	59	1,061	1,108	257.4	226.8	324.9	170.7	414.2	243.5

**Table 9**  
**Birth Defect Numbers & Prevalence Rates by Detailed Diagnostic Code Group and**  
**By Race & Hispanic Ancestry of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	Number by Race						Prevalence Rate by Race						
	Total	White	Black	Native American	Asian	Hispanic	Total	White	Black	Native American	Asian	Hispanic	
M Infectious Conditions													
Occurring in the Perinatal Period	377	164	183	1	4	15	5.7	3.6	14.4	*	*		3.3
M01 Syphilis	86	8	68	–	1	5	1.3	0.2	5.3	–	*		*
M02 Other Infections	286	150	116	1	3	10	4.3	3.3	9.1	*	*		2.2
M03 Zika Virus Disease	6	6	–	–	–	–	0.1	0.1	–	–	–		–
N Familial/Congenital Neoplasms	89	43	35	–	3	6	1.3	0.9	2.8	–	*		1.3
O Endocrine/Metabolic Disorders	5,296	3,236	1,327	21	237	299	79.9	71.1	104.3	60.8	92.5		65.7
P Diseases of the Blood & Blood Forming Organs	2,684	701	1,770	7	51	84	40.5	15.4	139.1	20.3	19.9		18.5
Q Other Diseases of the Central and Peripheral Nervous System	2,781	1,716	725	12	81	156	42.0	37.7	57.0	34.7	31.6		34.3
R Other Diseases of the Eye	3,755	2,479	876	13	87	205	56.7	54.5	68.8	37.6	34.0		45.1
S Hearing Deficiency	5,788	3,172	1,793	11	224	340	87.3	69.7	140.9	31.8	87.4		74.7
T Other Diseases of the Heart & Circulatory System	3,020	1,862	811	12	57	200	45.6	40.9	63.7	34.7	22.3		44.0
U Other Diseases of the Gastrointestinal System	3,382	2,139	854	11	78	188	51.0	47.0	67.1	31.8	30.4		41.3
V Other Diseases of the Genital and Urinary Systems	1,551	1,056	248	1	56	126	23.4	23.2	19.5	*	21.9		27.7
X Other Musculoskeletal System Diseases	6	3	3	–	–	–	0.1	*	*	–	–		–
Y Maternal Exposures Affecting Fetus	5,588	3,723	1,484	48	20	269	84.3	81.8	116.6	138.9	7.8		59.1
Y01 Newborn Affected by Maternal use of Alcohol	99	49	40	1	–	8	1.5	1.1	3.1	*	–		1.8
Y02 Fetal Alcohol Syndrome	–	–	–	–	–	–	–	–	–	–	–		–
Y99 Other Maternal Exposures Affecting the Fetus	5,509	3,683	1,452	46	20	265	83.1	81.0	114.1	133.1	7.8		58.2
One or More Reportable Diagnosis	84,753	50,587	22,748	267	3,351	5,284	1,279.0	1,111.9	1,787.7	772.6	1,308.2		1,161.4

**Notes:**  
**Race or Hispanic Ancestry:** Race without mention of Hispanic ancestry, or Hispanic ancestry with or without mention of race.

**Rates** Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Symbols:** \* : Figure does not meet standards of reliability or precision. • –: A dash represents quantity zero. • 0.0: Quantity more than zero but less than 0.05.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD–9–CM. (See Birth Defect Groups and ICD–9–CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD–10–CM. (See Birth Defect Groups and ICD–10–CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 10**  
**Birth Defect Numbers & Prevalence Rates by Summary Diagnostic Code Group and**  
**Age of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**

**Birth Defects**

Diagnostic Grouping	Number of Birth Defects by Age						Prevalence Rate by Age					
	Total	15-19	20-24	25-29	30-34	35 & Over	Total	15-19	20-24	25-29	30-34	35 & Over
A Central Nervous System Birth Defects	3,686	261	835	1,065	954	568	55.6	76.9	59.4	51.1	52.0	59.3
B Eye Birth Defects	2,635	128	500	732	800	475	39.8	37.7	35.6	35.2	43.6	49.6
C Ear, Face & Neck Birth Defects	2,758	138	557	819	762	481	41.6	40.6	39.6	39.3	41.5	50.2
D Heart & Circulatory System Birth Defects	15,566	910	3,331	4,633	4,044	2,645	234.9	268.0	236.9	222.5	220.3	276.0
E Respiratory System Birth Defects	3,921	200	912	1,201	1,011	596	59.2	58.9	64.9	57.7	55.1	62.2
F Cleft Palate and Cleft Lip	1,133	41	264	337	323	168	17.1	12.1	18.8	16.2	17.6	17.5
G Birth Defects of the Upper Alimentary Canal/ Digestive System	3,211	206	779	995	766	463	48.5	60.7	55.4	47.8	41.7	48.3
H Genital & Urinary Systems Birth Defects	11,445	590	2,317	3,551	3,153	1,833	172.7	173.8	164.8	170.5	171.8	191.3
I Musculoskeletal System Birth Defects	14,614	780	2,969	4,371	4,136	2,353	220.5	229.7	211.2	209.9	225.3	245.5
J Integument Birth Defects	9,226	649	2,426	2,745	2,170	1,233	139.2	191.1	172.5	131.8	118.2	128.7
K Chromosomal Anomalies	1,783	79	288	407	438	569	26.9	23.3	20.5	19.5	23.9	59.4
L Other and Unspecified Birth Defects	17,059	688	3,034	5,099	5,150	3,081	257.4	202.6	215.8	244.9	280.6	321.5

**Table 10**  
**Birth Defect Numbers & Prevalence Rates by Summary Diagnostic Code Group and**  
**Age of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	Number of Birth Defects by Age						Prevalence Rate by Age					
	Total	15-19	20-24	25-29	30-34	35 & Over	Total	15-19	20-24	25-29	30-34	35 & Over
M Infectious Conditions Occurring in the Perinatal Period	377	52	123	96	63	43	5.7	15.3	8.7	4.6	3.4	4.5
N Familial/Congenital Neoplasms	89	6	19	29	21	14	1.3	1.8	1.4	1.4	1.1	1.5
O Endocrine/Metabolic Disorders	5,296	276	1,117	1,600	1,454	849	79.9	81.3	79.4	76.8	79.2	88.6
P Diseases of the Blood & Blood Forming Organs	2,684	220	783	799	574	306	40.5	64.8	55.7	38.4	31.3	31.9
Q Other Diseases of the Central and Peripheral Nervous System	2,781	163	601	771	768	477	42.0	48.0	42.7	37.0	41.8	49.8
R Other Diseases of the Eye	3,755	214	789	1,105	1,024	623	56.7	63.0	56.1	53.1	55.8	65.0
S Hearing Deficiency	5,788	303	1,215	1,713	1,575	981	87.3	89.2	86.4	82.3	85.8	102.4
T Other Diseases of the Heart & Circulatory System	3,020	173	716	897	801	433	45.6	51.0	50.9	43.1	43.6	45.2
U Other Diseases of the Gastrointestinal System	3,382	185	717	1,011	916	551	51.0	54.5	51.0	48.6	49.9	57.5
V Other Diseases of the Genital and Urinary Systems	1,551	68	284	467	462	270	23.4	20.0	20.2	22.4	25.2	28.2
X Other Musculoskeletal System Diseases	6	1	2	1	2	-	0.1	*	*	*	*	-
Y Maternal Exposures Affecting Fetus	5,588	285	1,415	1,895	1,326	663	84.3	83.9	100.6	91.0	72.2	69.2
<b>One or More Reportable Diagnosis</b>	<b>84,753</b>	<b>4,550</b>	<b>18,115</b>	<b>25,800</b>	<b>22,958</b>	<b>13,305</b>	<b>1,279.0</b>	<b>1,340.1</b>	<b>1,288.4</b>	<b>1,239.1</b>	<b>1,250.8</b>	<b>1,388.3</b>

**Notes:**

**Mothers' Age:** Counts of birth defects for mothers ages 15-19 years old include mothers who were less than 15; Prevalence rates are for mothers less than 19 per 10,000 mothers ages 15-19.

**Rates** Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Symbols:** \*: Figure does not meet standards of reliability or precision. • -: A dash represents quantity zero. • 0.0: Quantity more than zero but less than 0.05.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 11**  
**Birth Defect Numbers & Prevalence Rates by Detailed Diagnostic Code Group and**  
**Age of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**

**Birth Defects**

Diagnostic Grouping	Number by Age						Prevalence Rate by Age					
	Total	15-19	20-24	25-29	30-34	35 & Over	Total	15-19	20-24	25-29	30-34	35 & Over
A Central Nervous System (All)	3,686	261	835	1,065	954	568	55.6	76.9	59.4	51.1	52.0	59.3
A01 Anencephalus	50	4	13	16	10	7	0.8	*	0.9	0.8	0.5	0.7
A02 Spina Bifida w/o Anencephaly	260	19	57	79	51	54	3.9	5.6	4.1	3.8	2.8	5.6
A03 Hydrocephalus w/o Spina Bifida	481	38	121	129	120	72	7.3	11.2	8.6	6.2	6.5	7.5
A04 Encephalocele	70	4	15	21	19	11	1.1	*	1.1	1.0	1.0	1.1
A05 Microcephalus	1,138	97	280	338	266	155	17.2	28.6	19.9	16.2	14.5	16.2
A06 Holoprosencephaly	---	---	---	---	---	---	---	---	---	---	---	---
A99 Other CNS Anomalies	2,276	140	486	653	632	364	34.3	41.2	34.6	31.4	34.4	38.0
B Eye (All)	2,635	128	500	732	800	475	39.8	37.7	35.6	35.2	43.6	49.6
B01 Anophthalmos /Microphthalmos	93	10	14	22	29	18	1.4	2.9	1.0	1.1	1.6	1.9
B02 Congenital Cataract	127	9	24	36	37	21	1.9	2.7	1.7	1.7	2.0	2.2
B03 Aniridia	23	-	7	3	8	5	0.3	-	0.5	*	0.4	*
B99 Other Eye Anomalies	2,492	120	473	690	762	447	37.6	35.3	33.6	33.1	41.5	46.6
C Ear, Face and Neck (All)	2,758	138	557	819	762	481	41.6	40.6	39.6	39.3	41.5	50.2
C01 Anotia/Microtia	146	4	34	44	38	26	2.2	*	2.4	2.1	2.1	2.7
C99 Other Ear, Face & Neck Anomalies	2,717	136	549	803	751	477	41.0	40.1	39.0	38.6	40.9	49.8
D Heart & Circulatory System (All)	15,566	910	3,331	4,633	4,044	2,645	234.9	268.0	236.9	222.5	220.3	276.0
D01 Common Truncus	74	7	14	22	20	11	1.1	2.1	1.0	1.1	1.1	1.1
D02 Transposition of Great Vessels	252	12	54	73	78	35	3.8	3.5	3.8	3.5	4.2	3.7
D03 Tetralogy of Fallot	332	21	67	110	85	49	5.0	6.2	4.8	5.3	4.6	5.1
D04 Ventricular Septal Defect	3,435	182	681	1,006	932	633	51.8	53.6	48.4	48.3	50.8	66.0
D05 Atrial Septal Defect	10,009	602	2,207	2,944	2,561	1,693	151.1	177.3	157.0	141.4	139.5	176.7
D06 Atrioventricular Septal Defect (Endocardial Cushion Defect)	347	17	54	84	99	92	5.2	5.0	3.8	4.0	5.4	9.6
D07 Pulmonary Valve Atresi& Stenosis	693	51	159	198	174	111	10.5	15.0	11.3	9.5	9.5	11.6
D08 Tricuspid Valve Atresi& Stenosis	72	9	18	14	22	9	1.1	2.7	1.3	0.7	1.2	0.9
D09 Ebstein's Anomaly	35	2	10	9	10	4	0.5	*	0.7	0.4	0.5	*
D10 Aortic Valve Stenosis	148	6	29	41	40	32	2.2	1.8	2.1	2.0	2.2	3.3
D11 Hypoplastic Left Heart Syndrome	252	16	63	72	66	35	3.8	4.7	4.5	3.5	3.6	3.7
D12 Patent Ductus Arteriosus	5,380	335	1,131	1,609	1,372	931	81.2	98.7	80.4	77.3	74.7	97.1
D13 Coarctation of Aorta	516	23	121	151	136	85	7.8	6.8	8.6	7.3	7.4	8.9
D14 Pulmonary Artery Anomalies	1,187	68	261	338	311	209	17.9	20.0	18.6	16.2	16.9	21.8
D15 Interrupted Aortic Arch	36	-	8	12	9	7	0.5	-	0.6	0.6	0.5	0.7
D16 Total Anomalous Pulmonary Venous Return (or connection)	73	3	20	28	15	7	1.1	*	1.4	1.3	0.8	0.7
D17 Double Outlet Right Ventricle	182	12	45	47	57	21	2.7	3.5	3.2	2.3	3.1	2.2
D18 Common Ventricel	133	6	29	39	36	23	2.0	1.8	2.1	1.9	2.0	2.4
D99 Other Heart & Circulatory System Anomalies	5,361	277	1,082	1,603	1,462	935	80.9	81.6	77.0	77.0	79.7	97.6

**Table 11**  
**Birth Defect Numbers & Prevalence Rates by Detailed Diagnostic Code Group and**  
**Age of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**  
**(Continued)**  
**Birth Defects**

Diagnostic Grouping	Number by Age						Prevalence Rate by Age					
	Total	15-19	20-24	25-29	30-34	35 & Over	Total	15-19	20-24	25-29	30-34	35 & Over
E Respiratory System (All)	3,921	200	912	1,201	1,011	596	59.2	58.9	64.9	57.7	55.1	62.2
E01 Lung Agenesis/ Hypoplasia	441	26	88	135	121	71	6.7	7.7	6.3	6.5	6.6	7.4
E02 Choanal Atresia	118	7	29	32	35	15	1.8	2.1	2.1	1.5	1.9	1.6
E99 Other Respiratory System Anomalies	3,515	175	829	1,078	895	537	53.0	51.5	59.0	51.8	48.8	56.0
F Cleft Palate & Cleft Lip	1,133	41	264	337	323	168	17.1	12.1	18.8	16.2	17.6	17.5
F01 Cleft Palate	641	25	141	186	192	97	9.7	7.4	10.0	8.9	10.5	10.1
F02 Cleft Lip w & w/o Cleft Palate	667	27	158	197	187	98	10.1	8.0	11.2	9.5	10.2	10.2
G Upper Alimentary Caanal/ Digestive System (All)	3,211	206	779	995	766	463	48.5	60.7	55.4	47.8	41.7	48.3
G01 Esophageal Atresia/ Tracheoesophageal Fistula	144	8	30	36	45	25	2.2	2.4	2.1	1.7	2.5	2.6
G02 Rectal & Large Intestinal Atresia/Stenosis	266	8	59	82	67	50	4.0	2.4	4.2	3.9	3.7	5.2
G03 Pyloric Stenosis	1,059	84	300	310	237	128	16.0	24.7	21.3	14.9	12.9	13.4
G04 Hirshsprung's Disease (congenital megacolon)	359	13	73	126	88	59	5.4	3.8	5.2	6.1	4.8	6.2
G05 Biliary Atresia	88	7	26	21	20	14	1.3	2.1	1.8	1.0	1.1	1.5
G99 Other Upper Alimentary Canal /Digestive System Anomalies	1,675	100	381	530	410	252	25.3	29.5	27.1	25.5	22.3	26.3
H Genital & Urinary Systems	11,445	590	2,317	3,551	3,153	1,833	172.7	173.8	164.8	170.5	171.8	191.3
H01 Renal Agenesis/ Hypoplasia	438	26	97	146	100	69	6.6	7.7	6.9	7.0	5.4	7.2
H02 Bladder Exstrophy & Cloacal Exstrophy	18	-	3	6	8	1	0.3	-	*	0.3	0.4	*
H03 Obstructive Genitourinary Defects	2,859	145	514	899	789	512	43.1	42.7	36.6	43.2	43.0	53.4
H04 Hypospadias	2,511	119	499	802	715	375	37.9	35.0	35.5	38.5	39.0	39.1
H05 Epispadias	88	1	23	26	27	11	1.3	*	1.6	1.2	1.5	1.1
H99 Other Genital & Urinary System Anomalies	7,239	386	1,498	2,207	2,009	1,138	109.2	113.7	106.5	106.0	109.5	118.7

**Table 11**  
**Birth Defect Numbers & Prevalence Rates by Detailed Diagnostic Code Group and**  
**Age of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**  
**(Continued)**

Birth Defects

Diagnostic Grouping	Number by Age						Prevalence Rate by Age					
	Total	15-19	20-24	25-29	30-34	35 & Over	Total	15-19	20-24	25-29	30-34	35 & Over
I Musculoskeletal System (All)	14,614	780	2,969	4,371	4,136	2,353	220.5	229.7	211.2	209.9	225.3	245.5
I01 Upper Limb Reduction Deformities	141	8	38	36	41	18	2.1	2.4	2.7	1.7	2.2	1.9
I02 Lower Limb Reduction Deformities	130	8	27	42	26	27	2.0	2.4	1.9	2.0	1.4	2.8
I03a Exomphalos/Omphalocele	240	18	59	78	57	28	3.6	5.3	4.2	3.7	3.1	2.9
I03b Gastroschisis	273	68	99	72	25	9	4.1	20.0	7.0	3.5	1.4	0.9
I03c Prune Belly Syndrome, Congenital Hernia of Bladder	156	15	36	44	35	26	2.4	4.4	2.6	2.1	1.9	2.7
I04 Congenital Hip Dislocation	523	22	103	163	163	72	7.9	6.5	7.3	7.8	8.9	7.5
I05 Diaphragmatic Hernia	211	16	44	56	60	35	3.2	4.7	3.1	2.7	3.3	3.7
I99 Other Musculoskeletal System	13,584	661	2,708	4,065	3,906	2,239	205.0	194.7	192.6	195.2	212.8	233.6
J Integument (All)	9,226	649	2,426	2,745	2,170	1,233	139.2	191.1	172.5	131.8	118.2	128.7
K Chromosomal Anomalies	1,783	79	288	407	438	569	26.9	23.3	20.5	19.5	23.9	59.4
K01 Trisomy 13	40	5	7	9	9	10	0.6	*	0.5	0.4	0.5	1.0
K02 Down Syndrome	824	24	94	146	192	366	12.4	7.1	6.7	7.0	10.5	38.2
K03 Trisomy 18	85	2	10	9	18	46	1.3	*	0.7	0.4	1.0	4.8
K04 Chromosome 22q11.2 Deletion Syndrome	70	4	13	26	17	10	1.1	*	0.9	1.2	0.9	1.0
K05 Turner Syndrome	76	6	18	22	15	15	1.1	1.8	1.3	1.1	0.8	1.6
K99 Other Chromosomal Anomalies	762	42	162	213	202	143	11.5	12.4	11.5	10.2	11.0	14.9
L Other and Unspecified Birth Defects	17,059	688	3,034	5,099	5,150	3,081	257.4	202.6	215.8	244.9	280.6	321.5

**Table 11**  
**Birth Defect Numbers & Prevalence Rates by Detailed Diagnostic Code Group and**  
**Age of Mother**  
**Michigan Resident Children Born in Michigan During 2014 – 2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Birth Defect Totals & Birth Defect Prevalence Rates**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	Number by Age						Prevalence Rate by Age					
	Total	15-19	20-24	25-29	30-34	35 & Over	Total	15-19	20-24	25-29	30-34	35 & Over
M Infectious Conditions												
Occurring in the Perinatal Period	377	52	123	96	63	43	5.7	15.3	8.7	4.6	3.4	4.5
M01 Syphilis	86	5	20	26	14	21	1.3	*	1.4	1.2	0.8	2.2
M02 Other Infections	286	47	102	69	45	23	4.3	13.8	7.3	3.3	2.5	2.4
M03 Zika Virus Disease	6	-	1	1	4	-	0.1	-	*	*	*	-
N Familial/Congenital Neoplasms	89	6	19	29	21	14	1.3	1.8	1.4	1.4	1.1	1.5
O Endocrine/Metabolic Disorders	5,296	276	1,117	1,600	1,454	849	79.9	81.3	79.4	76.8	79.2	88.6
P Diseases of the Blood & Blood Forming Organs	2,684	220	783	799	574	306	40.5	64.8	55.7	38.4	31.3	31.9
Q Other Diseases of the Central and Peripheral Nervous System	2,781	163	601	771	768	477	42.0	48.0	42.7	37.0	41.8	49.8
R Other Diseases of the Eye	3,755	214	789	1,105	1,024	623	56.7	63.0	56.1	53.1	55.8	65.0
S Hearing Deficiency	5,788	303	1,215	1,713	1,575	981	87.3	89.2	86.4	82.3	85.8	102.4
T Other Diseases of the Heart & Circulatory System	3,020	173	716	897	801	433	45.6	51.0	50.9	43.1	43.6	45.2
U Other Diseases of the Gastrointestinal System	3,382	185	717	1,011	916	551	51.0	54.5	51.0	48.6	49.9	57.5
V Other Diseases of the Genital and Urinary Systems	1,551	68	284	467	462	270	23.4	20.0	20.2	22.4	25.2	28.2
X Other Musculoskeletal System Diseases	6	1	2	1	2	-	0.1	*	*	*	*	-
Y Maternal Exposures Affecting Fetus	5,588	285	1,415	1,895	1,326	663	84.3	83.9	100.6	91.0	72.2	69.2
Y01 Newborn Affected by Maternal use of Alcohol	99	2	21	20	29	26	1.5	*	1.5	1.0	1.6	2.7
Y02 Fetal Alcohol Syndrome	---	---	---	---	---	---	---	---	---	---	---	---
Y99 Other Maternal Exposures Affecting the Fetus	5,509	283	1,402	1,875	1,303	643	83.1	83.4	99.7	90.0	71.0	67.1
One or More Reportable Diagnosis	84,753	4,550	18,115	25,800	22,958	13,305	1,279.0	1,340.1	1,288.4	1,239.1	1,250.8	1,388.3

**Notes:**

**Mothers' Age:** Counts of birth defects for mothers ages 15-19 years old include mothers who were less than 15; Prevalence rates are for mothers less than 19 per 10,000 mothers ages 15-19.

**Rates** Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Symbols:** \* : Figure does not meet standards of reliability or precision. • -: A dash represents quantity zero. • 0.0: Quantity more than zero but less than 0.05.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 12**  
**Number and Rate of Congenital Anomalies Associated with Congenital Infections<sup>1</sup>**  
**Potentially Affecting the Fetus**  
**Cases Diagnosed within Two Years from Birth,**  
**Michigan Residents 2006–2020**

Year of Birth	Live Births	Congenital Anomalies that may be associated with Congenital Zika and other Congenital Infections <sup>1</sup>															
		Total Inclusion Conditions		CMV		Herpes Simplex <sup>2</sup>		Rubella		Syphilis		Toxoplasmosis <sup>2</sup>		Zika <sup>3</sup>		Other Congenital Infections	
		Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
2006	127,537	54	4.2	16	1.3	---	---	1	0.1	13	1.0	---	---	---	---	24	1.9
2007	125,172	32	2.6	14	1.1	---	---	1	0.1	3	0.2	---	---	---	---	14	1.1
2008	121,231	58	4.8	9	0.7	---	---	1	0.1	25	2.1	---	---	---	---	23	1.9
2009	117,309	67	5.7	20	1.7	---	---	1	0.1	26	2.2	---	---	---	---	20	1.7
2010	114,717	47	4.1	14	1.2	---	---	8	0.7	9	0.8	---	---	---	---	16	1.4
2011	114,159	50	4.6	20	1.8	---	---	1	0.1	8	0.7	---	---	---	---	21	1.8
2012	112,708	75	6.9	15	1.3	---	---	-	-	13	1.2	---	---	---	---	47	4.2
2013	113,732	68	6.3	17	1.5	---	---	1	0.1	21	1.8	---	---	---	---	29	2.5
2014	114,460	88	8.0	32	2.8	---	---	-	-	29	2.5	---	---	---	---	27	2.4
2015	113,211	71	6.3	18	1.6	7	---	-	-	12	1.1	1	---	-	---	33	2.9
2016	113,374	81	7.1	14	1.2	17	1.5	1	0.1	7	0.6	3	0.3	-	-	39	3.4
2017	111,507	73	6.5	17	1.5	12	1.1	0	0.0	4	0.4	-	-	-	-	40	3.6
2018	110,093	132	12	30	2.7	9	0.8	-	-	4	*	1	*	-	-	88	8.0
2019	107,917	169	15.7	31	2.9	15	1.4	-	-	14	1.3	-	-	-	-	109	10.1
2020 <sup>P</sup>	104,150	124	11.9	23	2.2	5	0.5	-	-	12	1.2	2	*	-	-	82	7.9

**Notes:**

<sup>1</sup> Congenital infections list in "Congenital Code Groupings" table. These infections are based on ICD-9-CM/ICD-10-CM groupings. For details, see table: Congenital Infection Code Groupings.

<sup>2</sup>ICD-9-CM was used to classify cases reported before October 2015. There were no specific ICD-9-CM codes for congenital herpes simplex virus (HSV) or congenital toxoplasmosis infection. In ICD-9-CM, these infections, and other rare congenital infections, are categorized under "771.2 Other congenital infections"; and cannot be differentiated. **After October 2015, this data was collected using ICD-10-CM codes. Numbers in 2015 for these infections represent partial data.**

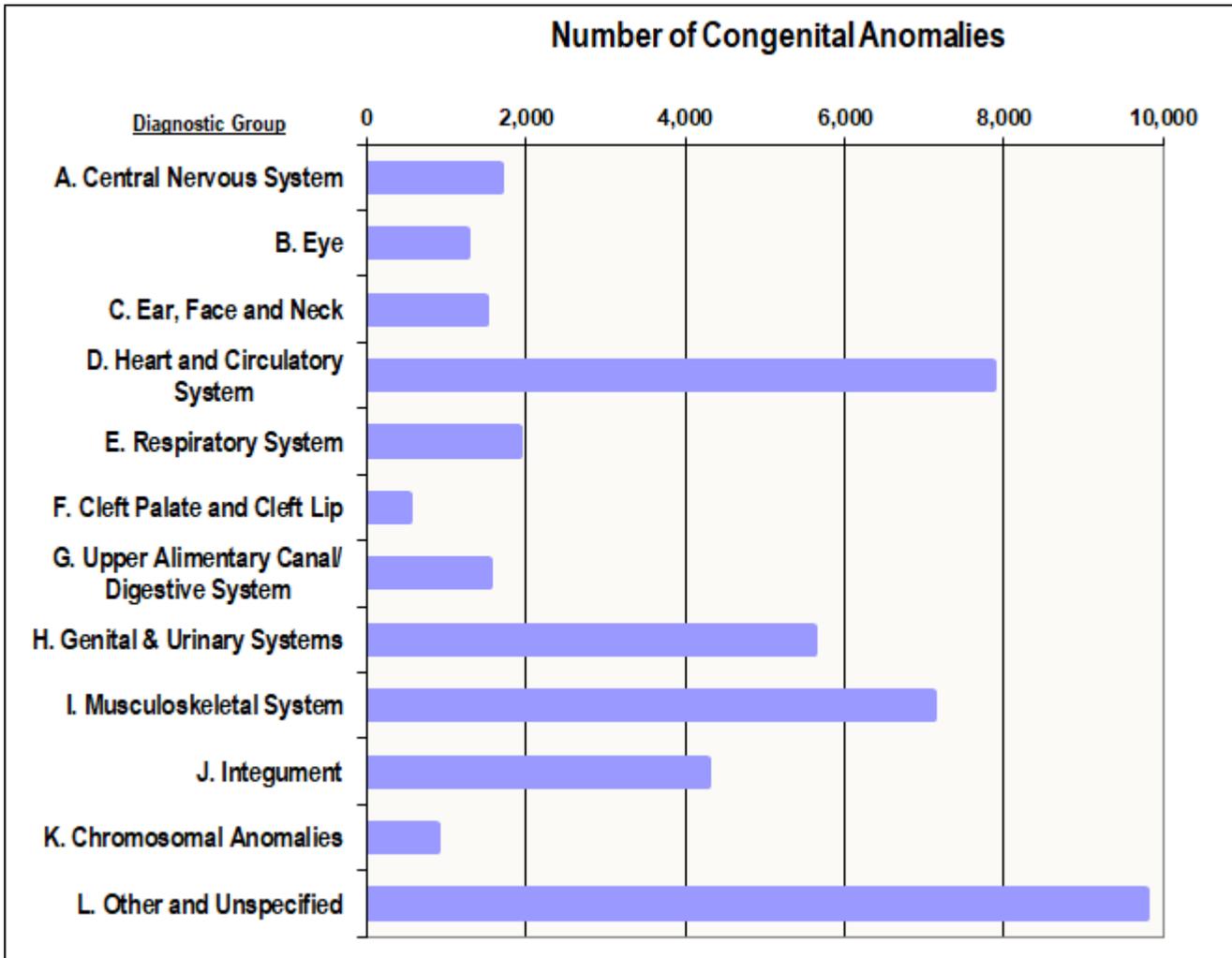
<sup>3</sup>Between 2011-2015 Zika infections were estimated using matching of the infant or the mother from other sources. After 2015, the Zika case counts are estimated using only Michigan inpatient or outpatient reports.

<sup>P</sup>2020 birth defect counts are provisional.

Birth prevalence rate = occurrences per 10,000 live births.

Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

Figure 2-A  
 Total Congenital Anomalies by Summary Diagnostic Code Group, 2017-2019,  
 Michigan Resident Children Born in Michigan  
 Cases Diagnosed within One Year from Birth



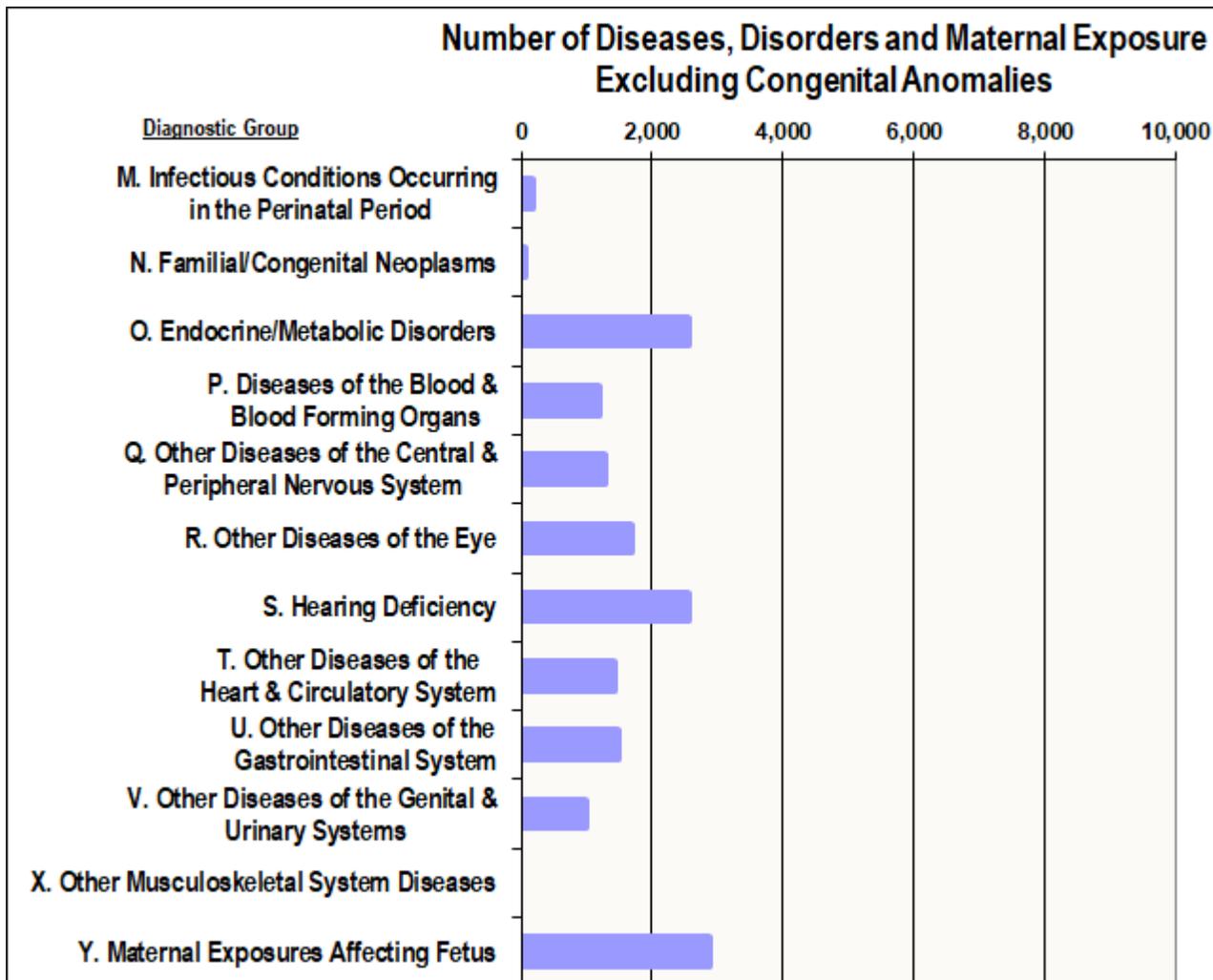
**Notes:**

**Frequencies** include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 2-B  
 Total Diseases, Disorders and Maternal Exposures by  
 Summary Diagnostic Code Group, 2017-2019,  
 Michigan Resident Children Born in Michigan  
 Cases Diagnosed within One Year from Birth



**Notes:**

**Frequencies** include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 13**  
**Birth Defects by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
A Central Nervous System Birth Defects	8,217	560	580	518	507	457	443	454	480	532	619	3,067	624	769	534	537	603
B Eye Birth Defects	5,680	377	321	316	327	300	290	333	319	462	514	2,121	461	398	307	455	500
C Ear, Face & Neck Birth Defects	4,608	263	204	188	217	170	180	193	197	238	334	2,424	412	530	434	527	521
D Heart & Circulatory System Birth Defects	36,702	2,775	2,846	2,499	2,462	2,051	1,970	2,071	2,244	2,218	2,728	12,838	2,251	2,736	2,381	2,534	2,936
E Respiratory System Birth Defects	9,589	748	1,048	872	491	404	474	479	586	566	718	3,203	639	666	548	683	667
F Cleft Palate and Cleft Lip	2,867	205	228	205	186	214	170	174	171	181	201	932	224	171	175	201	161
G Birth Defects of the Upper Alimentary Canal/ Digestive System	8,877	682	814	717	687	615	522	521	552	556	586	2,625	476	613	477	495	564
H Genital & Urinary Systems Birth Defects	26,338	2,009	2,017	1,815	1,535	1,244	1,223	1,594	1,644	1,812	2,125	9,320	1,775	1,927	1,658	1,869	2,091
I Musculoskeletal System Birth Defects	33,787	2,301	2,501	2,344	1,720	1,440	1,804	1,978	2,429	2,656	2,919	11,695	2,220	2,373	1,898	2,681	2,523
J Integument Birth Defects	18,556	629	1,274	499	1,353	1,204	876	1,075	820	1,600	2,249	6,977	1,326	1,364	1,056	1,125	2,106
K Chromosomal Anomalies	4,521	316	324	288	315	296	300	281	313	305	299	1,484	281	314	295	291	303
L Other and Unspecified Birth Defects	27,187	622	490	392	260	205	1,926	1,872	2,148	2,213	2,611	14,448	2,290	2,376	2,739	3,600	3,443

**Table 13**  
**Birth Defects by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
M Infectious Conditions Occurring in the Perinatal Period	914	44	51	32	85	68	46	55	81	75	94	283	62	60	46	48	67
N Familial/Congenital Neoplasms	227	19	19	20	20	5	10	15	15	15	13	76	20	11	16	13	16
O Endocrine/Metabolic Disorders	10,689	575	603	500	603	471	565	558	748	770	918	4,378	831	997	778	828	944
P Diseases of the Blood & Blood Forming Organs	5,646	328	310	261	310	252	336	374	370	421	515	2,169	489	498	372	400	410
Q Other Diseases of the Central and Peripheral Nervous System	6,379	434	437	392	379	349	337	423	421	426	542	2,239	455	499	342	503	440
R Other Diseases of the Eye	10,332	850	846	838	787	623	598	666	639	730	756	2,999	674	632	434	649	610
S Hearing Deficiency	12,018	562	534	462	521	454	612	974	1,008	1,103	1,192	4,596	803	1,247	907	940	699
T Other Diseases of the Heart & Circulatory System	7,333	433	515	460	483	421	428	435	602	536	563	2,457	496	534	440	493	494
U Other Diseases of the Gastrointestinal System	9,085	782	702	674	672	486	568	552	629	638	719	2,663	611	561	455	512	524
V Other Diseases of the Genital and Urinary Systems	2,076	62	59	39	37	52	58	62	67	89	127	1,424	173	252	256	353	390
X Other Musculoskeletal System Diseases	37	1	3	3	1	4	4	5	4	6	4	2	1	1	-	-	-
Y Maternal Exposures Affecting Fetus	8,778	313	317	205	314	266	310	450	487	528	877	4,711	675	1,149	995	1,061	831
One or More Reportable Diagnosis	180,145	11,158	11,747	9,938	9,705	8,040	9,694	10,679	11,475	12,956	15,371	69,382	12,593	14,049	12,636	14,543	15,561

**Notes:**

**Frequencies** include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defect prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

Columns do not add to total live births diagnosed with birth defects. Some cases include diagnosis with multiple birth defects, and each birth defect diagnosis was counted in each appropriate grouping.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 14**  
**Birth Defects by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
A Central Nervous System (All)	8,217	560	580	518	507	457	443	454	480	532	619	3,067	624	769	534	537	603
A01 Anencephalus	169	12	14	7	18	15	10	15	12	16	11	39	10	8	6	7	8
A02 Spina Bifida w/o Anencephaly	765	67	70	62	67	41	57	50	50	41	46	214	46	39	50	35	44
A03 Hydrocephalus w/o Spina Bifida	1,495	142	135	140	127	112	97	92	88	81	85	396	79	111	62	66	78
A04 Encephalocele	182	22	13	14	11	10	6	9	14	13	9	61	20	15	6	11	9
A05 Microcephalus	2,282	135	148	141	100	107	119	122	109	163	185	953	176	220	141	201	215
A06 Holoprosencephaly	---	---	---	---	---	---	---	---	---	---	---	---	---	9	5	6	5
A99 Other CNS Anomalies	4,499	255	280	243	251	227	206	222	280	259	346	1,930	416	536	342	295	341
B Eye (All)	5,680	377	321	316	327	300	290	333	319	462	514	2,121	461	398	307	455	500
B01 Anophthalmos /Microphthalmos	274	26	24	23	22	14	18	19	13	22	11	82	13	21	17	18	13
B02 Congenital Cataract	361	38	22	27	31	16	29	30	19	22	14	113	22	26	26	16	23
B03 Aniridia	52	6	2	4	3	-	4	3	4	3	6	17	2	3	2	3	7
B99 Other Eye Anomalies	5,309	343	301	283	297	284	262	306	303	438	495	1,997	434	368	281	439	475
C Ear, Face and Neck (All)	4,608	263	204	188	217	170	180	193	197	238	334	2,424	412	530	434	527	521
C01 Anotia/Microtia	305	15	15	18	19	16	19	24	19	14	11	135	27	29	24	31	24
C99 Other Ear, Face & Neck Anomalies	4,525	259	203	182	211	166	174	187	190	236	333	2,384	403	524	431	514	512

**Table 14**  
**Birth Defects by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
D Heart & Circulatory System (All)	36,702	2,775	2,846	2,499	2,462	2,051	1,970	2,071	2,244	2,218	2,728	12,838	2,251	2,736	2,381	2,534	2,936
D01 Common Truncus	227	17	18	15	22	7	22	18	18	16	17	57	15	11	8	15	8
D02 Transposition of Great Vessels	693	67	55	41	46	44	48	45	50	45	53	199	48	47	39	30	35
D03 Tetralogy of Fallot	942	70	75	62	81	49	71	73	64	65	59	273	60	67	43	60	43
D04 Ventricular Septal Defect	8,008	596	574	529	552	418	440	459	538	467	606	2,829	522	593	507	589	618
D05 Atrial Septal Defect	20,481	1,246	1,296	1,077	1,174	1,011	957	1,168	1,312	1,231	1,732	8,277	1,377	1,796	1,564	1,592	1,948
D06 Atrioventricular Septal Defect (Endocardial Cushion Defect)	953	71	81	64	69	56	62	70	71	62	65	282	57	59	64	52	50
D07 Pulmonary Valve Atresi& Stenosis	1,884	179	170	149	138	95	127	112	126	95	122	571	114	124	122	95	116
D08 Tricuspid Valve Atresi& Stenosis	224	23	11	19	22	11	18	17	17	14	19	53	8	8	12	10	15
D09 Ebstein's Anomaly	127	13	11	8	13	7	9	9	13	9	9	26	9	6	5	5	1
D10 Aortic Valve Stenosis	391	34	31	31	28	21	20	28	29	21	27	121	28	33	23	17	20
D11 Hypoplastic Left Heart Syndrome	719	64	49	54	48	56	37	44	62	53	51	201	41	44	31	37	48
D12 Patent Ductus Arteriosus	12,243	971	977	815	829	624	600	727	731	589	983	4,397	764	1,012	843	796	982
D13 Coarctation of Aorta	1,246	80	95	86	88	56	66	74	95	90	99	417	77	99	87	81	73
D14 Pulmonary Artery Anomalies	2,967	303	313	256	257	230	204	128	46	43	64	1,123	143	222	167	278	313
D15 Interrupted Aortic Arch	121	6	12	4	12	11	11	8	14	7	7	29	5	5	1	10	8
D16 Total Anomalous Pulmonary Venous Return (or connection)	222	24	22	8	17	14	17	11	19	17	14	59	14	13	15	8	9
D17 Double Outlet Right Ventricle	451	31	30	30	27	28	39	25	32	27	34	148	35	31	28	28	26
D18 Common Ventricel	325	22	23	18	25	14	29	14	29	18	24	109	21	23	18	24	23
D99 Other Heart & Circulatory System Anomalies	13,320	1,020	1,178	992	930	786	758	701	795	799	985	4,376	836	843	749	928	1,020

**Table 14**  
**Birth Defects by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
E Respiratory System (All)	9,589	748	1,048	872	491	404	474	479	586	566	718	3,203	639	666	548	683	667
E01 Lung Agenesis/ Hypoplasia	1,150	96	78	63	75	87	110	74	65	61	109	332	60	86	47	60	79
E02 Choanal Atresia	315	24	18	16	18	22	23	20	26	30	23	95	20	22	12	19	22
E99 Other Respiratory System Anomalies	8,482	653	975	810	423	312	366	404	522	502	618	2,897	584	588	509	620	596
F Cleft Palate & Cleft Lip	2,867	205	228	205	186	214	170	174	171	181	201	932	224	171	175	201	161
F01 Cleft Palate	1,716	127	135	131	119	133	103	95	108	124	129	512	127	93	87	106	99
F02 Cleft Lip w & w/o Cleft Palate	1,662	114	129	109	100	117	111	112	110	93	117	550	127	98	89	133	103
G Upper Alimentary Caanal/ Digestive System (All)	8,877	682	814	717	687	615	522	521	552	556	586	2,625	476	613	477	495	564
G01 Esophageal Atresia/ Tracheoesophageal Fistula	421	43	35	40	29	14	29	29	26	32	28	116	21	19	26	21	29
G02 Rectal & Large Intestinal Atresia/Stenosis	794	62	75	55	54	46	59	59	50	68	52	214	40	52	40	33	49
G03 Pyloric Stenosis	2,777	195	234	208	239	217	156	156	178	135	186	873	169	219	170	150	165
G04 Hirshsprung's Disease (congenital megacolon)	695	36	38	34	36	24	49	44	37	38	36	323	51	76	59	61	76
G05 Biliary Atresia	210	12	13	11	14	14	12	18	16	12	8	80	13	20	15	18	14
G99 Other Upper Alimentary Canal /Digestive System Anomalies	4,798	388	463	411	362	334	261	274	304	326	340	1,335	239	285	222	277	312
H Genital & Urinary Systems	26,338	2,009	2,017	1,815	1,535	1,244	1,223	1,594	1,644	1,812	2,125	9,320	1,775	1,927	1,658	1,869	2,091
H01 Renal Agenesis/ Hypoplasia	1,052	72	63	82	84	52	58	55	63	85	89	349	56	78	58	66	91
H02 Bladder Exstrophy & Cloacal Exstrophy	43	6	4	1	3	3	2	1	-	5	3	15	4	3	2	1	5
H03 Obstructive Genitourinary Defects	5,371	330	308	291	280	206	204	275	318	300	441	2,418	419	483	446	522	548
H04 Hypospadias	5,994	469	327	362	426	343	363	440	357	396	479	2,032	402	454	362	413	401
H05 Epispadias	172	13	11	6	11	11	4	5	10	13	8	80	10	19	11	14	26
H99 Other Genital & Urinary System Anomalies	17,635	1,434	1,550	1,343	973	820	796	1,055	1,163	1,262	1,436	5,803	1,133	1,205	1,022	1,134	1,309

**Table 14**  
**Birth Defects by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
I Musculoskeletal System (All)	33,787	2,301	2,501	2,344	1,720	1,440	1,804	1,978	2,429	2,656	2,919	11,695	2,220	2,373	1,898	2,681	2,523
I01 Upper Limb Reduction Deformities	424	28	28	38	38	29	34	32	28	28	31	110	19	32	22	22	15
I02 Lower Limb Reduction Deformities	392	37	35	25	21	32	22	32	34	24	30	100	14	22	22	23	19
I03a Exomphalos/Omphalocele	---	---	---	---	---	---	23	21	27	16	15	225	21	31	46	83	44
I03b Gastroschisis	---	---	---	---	---	---	63	55	44	41	53	220	41	56	36	53	34
I03c Prune Belly Syndrome, Congenital Hernia of Bladder	679	82	95	85	72	59	31	20	30	49	34	122	12	23	27	24	36
I04 Congenital Hip Dislocation	1,713	127	167	108	155	142	126	143	124	98	89	434	93	95	76	69	101
I05 Diaphragmatic Hernia	558	36	52	42	38	45	41	39	26	28	47	164	34	41	25	30	34
I99 Other Musculoskeletal System	31,033	2,110	2,276	2,171	1,535	1,247	1,599	1,776	2,244	2,491	2,739	10,845	2,093	2,197	1,728	2,475	2,352
J Integument (All)	18,556	629	1,274	499	1,353	1,204	876	1,075	820	1,600	2,249	6,977	1,326	1,364	1,056	1,125	2,106
K Chromosomal Anomalies	4,521	316	324	288	315	296	300	281	313	305	299	1,484	281	314	295	291	303
K01 Trisomy 13	131	17	8	10	10	9	7	12	10	8	10	30	6	6	9	4	5
K02 Down Syndrome	2,244	176	183	147	159	141	175	141	156	142	144	680	123	136	161	129	131
K03 Trisomy 18	234	16	19	15	23	18	11	17	15	15	16	69	25	11	10	13	10
K04 Chromosome 22q11.2 Deletion Syndrome	---	---	---	7	11	6	7	7	9	10	6	64	6	17	8	17	16
K05 Turner Syndrome	155	10	20	14	10	7	4	5	3	6	9	67	6	15	11	13	22
K99 Other Chromosomal Anomalies	1,914	120	107	122	124	139	113	130	148	149	132	630	123	140	109	126	132
L Other and Unspecified Birth Defects	27,187	622	490	392	260	205	1,926	1,872	2,148	2,213	2,611	14,448	2,290	2,376	2,739	3,600	3,443

**Table 14**  
**Birth Defects by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
M Infectious Conditions Occurring in the Perinatal Period	914	44	51	32	85	68	46	55	81	75	94	283	62	60	46	48	67
M01 Syphilis	223	14	13	5	28	26	9	8	14	20	30	56	14	15	9	4	14
M02 Other Infections	677	30	38	27	57	43	37	45	63	51	58	228	49	45	37	44	53
M03 Zika Virus Disease	17	-	-	-	-	-	-	2	5	4	6	-	-	-	-	-	-
N Familial/Congenital Neoplasms	227	19	19	20	20	5	10	15	15	15	13	76	20	11	16	13	16
O Endocrine/Metabolic Disorders	10,689	575	603	500	603	471	565	558	748	770	918	4,378	831	997	778	828	944
P Diseases of the Blood & Blood Forming Organs	5,646	328	310	261	310	252	336	374	370	421	515	2,169	489	498	372	400	410
Q Other Diseases of the Central and Peripheral Nervous System	6,379	434	437	392	379	349	337	423	421	426	542	2,239	455	499	342	503	440
R Other Diseases of the Eye	10,332	850	846	838	787	623	598	666	639	730	756	2,999	674	632	434	649	610
S Hearing Deficiency	12,018	562	534	462	521	454	612	974	1,008	1,103	1,192	4,596	803	1,247	907	940	699
T Other Diseases of the Heart & Circulatory System	7,333	433	515	460	483	421	428	435	602	536	563	2,457	496	534	440	493	494
U Other Diseases of the Gastrointestinal System	9,085	782	702	674	672	486	568	552	629	638	719	2,663	611	561	455	512	524
V Other Diseases of the Genital and Urinary Systems	2,076	62	59	39	37	52	58	62	67	89	127	1,424	173	252	256	353	390
X Other Musculoskeletal System Diseases	37	1	3	3	1	4	4	5	4	6	4	2	1	1	-	-	-
Y Maternal Exposures Affecting Fetus	8,778	313	317	205	314	266	310	450	487	528	877	4,711	675	1,149	995	1,061	831
Y01 Newborn Affected by Maternal use of Alcohol	204	20	20	13	5	6	10	9	9	13	16	83	11	20	11	20	21
Y02 Fetal Alcohol Syndrome	---	---	---	---	---	---	---	---	---	---	---	---	---	11	4	6	9
Y99 Other Maternal Exposures Affecting the Fetus	8,600	293	298	197	310	261	301	435	479	517	863	4,646	669	1,133	985	1,046	813
One or More Reportable Diagnosis	180,145	11,158	11,747	9,938	9,705	8,040	9,694	10,679	11,475	12,956	15,371	69,382	12,593	14,049	12,636	14,543	15,561

**Notes:**

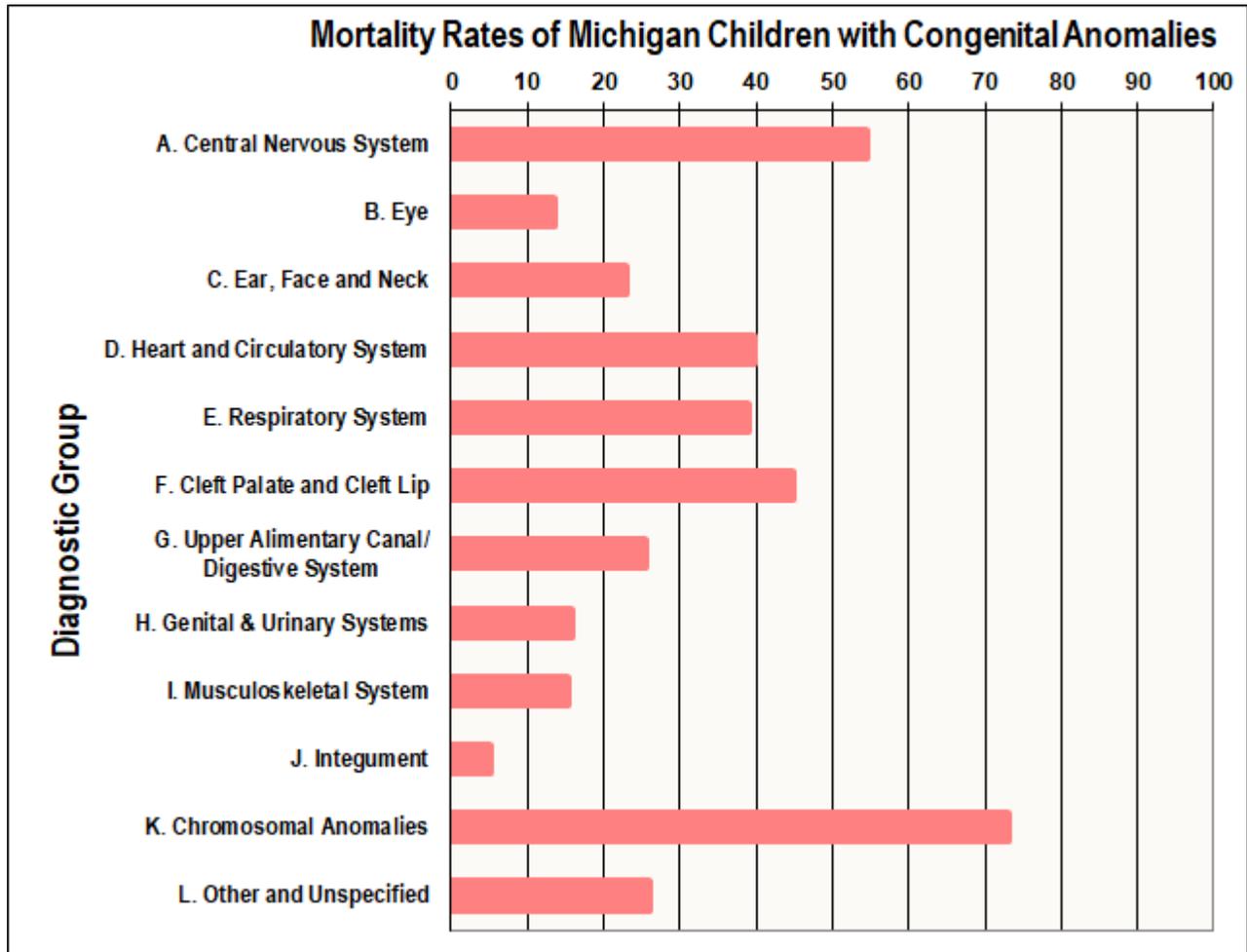
**Frequencies** include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defect prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

Columns do not add to summary group totals, nor column totals, due to cases with multiple diagnosed conditions that cross diagnostic groupings

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 3-A  
 Total Congenital Anomalies by Summary Diagnostic Code Group, 2017-2019,  
 Michigan Resident Children Born in Michigan  
 Cases Diagnosed within One Year from Birth



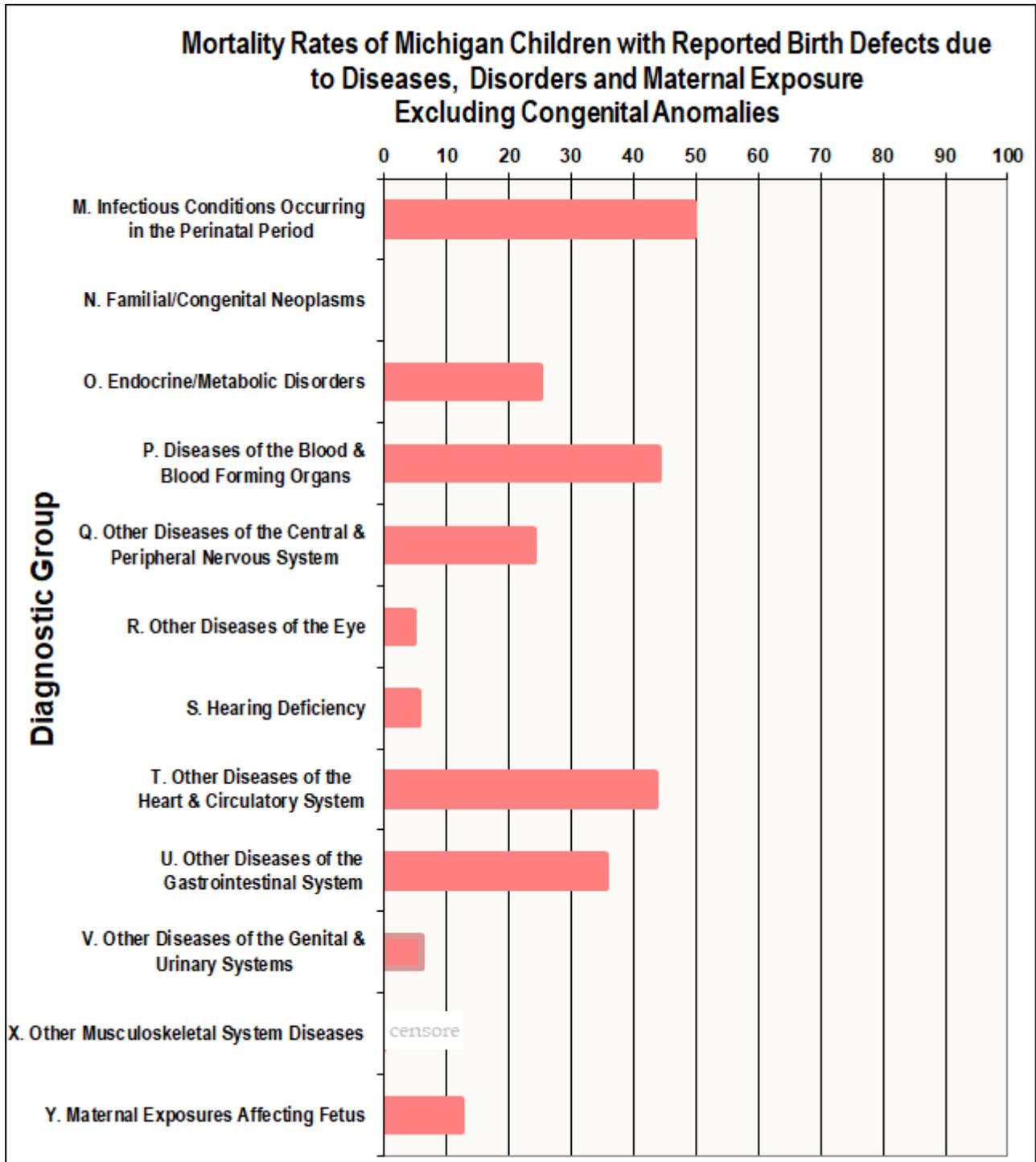
**Notes:**

**Frequencies** include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 3-B  
 Total Diseases, Disorders and Maternal Exposures by  
 Summary Diagnostic Code Group, 2017–2019,  
 Michigan Resident Children Born in Michigan  
 Cases Diagnosed within One Year from Birth



**Notes:**  
**Rates** are Per 1,000 Michigan Born Resident Live Births. Rates represent the infant mortality rate for children with a diagnosed birth defect. The rates include all deaths within the first year of life to children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

\*Not calculated. Rates are not calculated when the birth defect resulted in fewer than six deaths.

**Conditions** are reportable if identified within the first two years of a child's life. The mortality data in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 15**  
**Birth Defect Prevalence Rates by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
A Central Nervous System Birth Defects	47.7	44.4	46.0	41.9	42.3	39.4	39.1	40.3	42.9	47.3	54.7	55.8	55.7	68.6	48.5	49.4	56.6
B Eye Birth Defects	32.9	29.9	25.5	25.6	27.3	25.9	25.6	29.5	28.5	41.1	45.4	38.6	41.1	35.5	27.9	41.9	46.9
C Ear, Face & Neck Birth Defects	26.7	20.9	16.2	15.2	18.1	14.7	15.9	17.1	17.6	21.2	29.5	44.1	36.8	47.3	39.4	48.5	48.9
D Heart & Circulatory System Birth Defects	212.8	220.3	225.9	202.1	205.5	177.0	173.8	183.6	200.5	197.3	241.1	233.6	200.8	244.2	216.2	233.1	275.6
E Respiratory System Birth Defects	55.6	59.4	83.2	70.5	41.0	34.9	41.8	42.5	52.4	50.4	63.4	58.3	57.0	59.5	49.8	62.8	62.6
F Cleft Palate and Cleft Lip	16.6	16.3	18.1	16.6	15.5	18.5	15.0	15.4	15.3	16.1	17.8	17.0	20.0	15.3	15.9	18.5	15.1
G Birth Defects of the Upper Alimentary Canal/ Digestive System	51.5	54.1	64.6	58.0	57.3	53.1	46.1	46.2	49.3	49.5	51.8	47.8	42.5	54.7	43.3	45.5	52.9
H Genital & Urinary Systems Birth Defects	152.7	159.5	160.1	146.8	128.1	107.4	107.9	141.3	146.9	161.2	187.8	169.6	158.4	172.0	150.6	172.0	196.3
I Musculoskeletal System Birth Defects	195.9	182.6	198.5	189.6	143.5	124.3	159.2	175.4	217.1	236.3	257.9	212.8	198.1	211.8	172.4	246.7	236.8
J Integument Birth Defects	107.6	49.9	101.1	40.4	112.9	103.9	77.3	95.3	73.3	142.4	198.7	127.0	118.3	121.8	95.9	103.5	197.7
K Chromosomal Anomalies	26.2	25.1	25.7	23.3	26.3	25.6	26.5	24.9	28.0	27.1	26.4	27.0	25.1	28.0	26.8	26.8	28.4
L Other and Unspecified Birth Defects	157.7	49.4	38.9	31.7	21.7	17.7	169.9	166.0	192.0	196.9	230.7	262.9	204.3	212.1	248.7	331.2	323.2

**Table 15**  
**Birth Defect Prevalence Rates by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
M Infectious Conditions Occurring in the Perinatal Period	5.3	3.5	4.0	2.6	7.1	5.9	4.1	4.9	7.2	6.7	8.3	5.2	5.5	5.4	4.2	4.4	6.3
N Familial/Congenital Neoplasms	1.3	1.5	1.5	1.6	1.7	*	0.9	1.3	1.3	1.3	1.1	1.4	1.8	1.0	1.5	1.2	1.5
O Endocrine/Metabolic Disorders	62.0	45.6	47.9	40.4	50.3	40.7	49.9	49.5	66.8	68.5	81.1	79.7	74.1	89.0	70.6	76.2	88.6
P Diseases of the Blood & Blood Forming Organs	32.7	26.0	24.6	21.1	25.9	21.8	29.6	33.2	33.1	37.5	45.5	39.5	43.6	44.5	33.8	36.8	38.5
Q Other Diseases of the Central and Peripheral Nervous System	37.0	34.4	34.7	31.7	31.6	30.1	29.7	37.5	37.6	37.9	47.9	40.7	40.6	44.5	31.1	46.3	41.3
R Other Diseases of the Eye	59.9	67.5	67.1	67.8	65.7	53.8	52.8	59.1	57.1	64.9	66.8	54.6	60.1	56.4	39.4	59.7	57.3
S Hearing Deficiency	69.7	44.6	42.4	37.4	43.5	39.2	54.0	86.4	90.1	98.1	105.3	83.6	71.6	111.3	82.4	86.5	65.6
T Other Diseases of the Heart & Circulatory System	42.5	34.4	40.9	37.2	40.3	36.3	37.8	38.6	53.8	47.7	49.7	44.7	44.3	47.7	40.0	45.4	46.4
U Other Diseases of the Gastrointestinal System	52.7	62.1	55.7	54.5	56.1	42.0	50.1	48.9	56.2	56.8	63.5	48.5	54.5	50.1	41.3	47.1	49.2
V Other Diseases of the Genital and Urinary Systems	12.0	4.9	4.7	3.2	3.1	4.5	5.1	5.5	6.0	7.9	11.2	25.9	15.4	22.5	23.2	32.5	36.6
X Other Musculoskeletal System Diseases	0.2	*	*	*	*	*	*	*	*	0.5	*	*	*	*	-	-	-
Y Maternal Exposures Affecting Fetus	50.9	24.8	25.2	16.6	26.2	23.0	27.4	39.9	43.5	47.0	77.5	85.7	60.2	102.6	90.4	97.6	78.0
One or More Reportable Diagnosis	1,044.7	885.6	932.4	803.7	809.9	694.0	855.4	946.9	1,025.4	1,152.7	1,358.3	1,262.7	1,123.5	1,254.1	1,147.5	1,338.0	1,460.7

**Notes:**

**Rates** Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Symbols:** \* : Figure does not meet standards of reliability or precision. • -: A dash represents quantity zero. • 0.0: Quantity more than zero but less than 0.05.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 16**  
**Birth Defect Prevalence Rates by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
A Central Nervous System (All)	47.7	44.4	46.0	41.9	42.3	39.4	39.1	40.3	42.9	47.3	54.7	55.8	55.7	68.6	48.5	49.4	56.6
A01 Anencephalus	1.0	1.0	1.1	0.6	1.5	1.3	0.9	1.3	1.1	1.4	1.0	0.7	0.9	0.7	0.5	0.6	0.8
A02 Spina Bifida w/o Anencephaly	4.4	5.3	5.6	5.0	5.6	3.5	5.0	4.4	4.5	3.6	4.1	3.9	4.1	3.5	4.5	3.2	4.1
A03 Hydrocephalus w/o Spina Bifida	8.7	11.3	10.7	11.3	10.6	9.7	8.6	8.2	7.9	7.2	7.5	7.2	7.0	9.9	5.6	6.1	7.3
A04 Encephalocele	1.1	1.7	1.0	1.1	0.9	0.9	0.5	0.8	1.3	1.2	0.8	1.1	1.8	1.3	0.5	1.0	0.8
A05 Microcephalus	13.2	10.7	11.7	11.4	8.3	9.2	10.5	10.8	9.7	14.5	16.3	17.3	15.7	19.6	12.8	18.5	20.2
A06 Holoprosencephaly	---	---	---	---	---	---	---	---	---	---	---	---	---	0.8	*	0.6	*
A99 Other CNS Anomalies	26.1	20.2	22.2	19.7	20.9	19.6	18.2	19.7	25.0	23.0	30.6	35.1	37.1	47.8	31.1	27.1	32.0
B Eye (All)	32.9	29.9	25.5	25.6	27.3	25.9	25.6	29.5	28.5	41.1	45.4	38.6	41.1	35.5	27.9	41.9	46.9
B01 Anophthalmos /Microphthalmos	1.6	2.1	1.9	1.9	1.8	1.2	1.6	1.7	1.2	2.0	1.0	1.5	1.2	1.9	1.5	1.7	1.2
B02 Congenital Cataract	2.1	3.0	1.7	2.2	2.6	1.4	2.6	2.7	1.7	2.0	1.2	2.1	2.0	2.3	2.4	1.5	2.2
B03 Aniridia	0.3	0.5	*	*	*	-	*	*	*	*	0.5	0.3	*	*	*	*	0.7
B99 Other Eye Anomalies	30.8	27.2	23.9	22.9	24.8	24.5	23.1	27.1	27.1	39.0	43.7	36.3	38.7	32.8	25.5	40.4	44.6
C Ear, Face and Neck (All)	26.7	20.9	16.2	15.2	18.1	14.7	15.9	17.1	17.6	21.2	29.5	44.1	36.8	47.3	39.4	48.5	48.9
C01 Anotia/Microtia	1.8	1.2	1.2	1.5	1.6	1.4	1.7	2.1	1.7	1.2	1.0	2.5	2.4	2.6	2.2	2.9	2.3
C99 Other Ear, Face & Neck Anomalies	26.2	20.6	16.1	14.7	17.6	14.3	15.4	16.6	17.0	21.0	29.4	43.4	36.0	46.8	39.1	47.3	48.1

**Table 16**  
**Birth Defect Prevalence Rates by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
D Heart & Circulatory System (All)	212.8	220.3	225.9	202.1	205.5	177.0	173.8	183.6	200.5	197.3	241.1	233.6	200.8	244.2	216.2	233.1	275.6
D01 Common Truncus	1.3	1.3	1.4	1.2	1.8	0.6	1.9	1.6	1.6	1.4	1.5	1.0	1.3	1.0	0.7	1.4	0.8
D02 Transposition of Great Vessels	4.0	5.3	4.4	3.3	3.8	3.8	4.2	4.0	4.5	4.0	4.7	3.6	4.3	4.2	3.5	2.8	3.3
D03 Tetralogy of Fallot	5.5	5.6	6.0	5.0	6.8	4.2	6.3	6.5	5.7	5.8	5.2	5.0	5.4	6.0	3.9	5.5	4.0
D04 Ventricular Septal Defect	46.4	47.3	45.6	42.8	46.1	36.1	38.8	40.7	48.1	41.5	53.5	51.5	46.6	52.9	46.0	54.2	58.0
D05 Atrial Septal Defect	118.8	98.9	102.9	87.1	98.0	87.3	84.4	103.6	117.2	109.5	153.0	150.6	122.9	160.3	142.0	146.5	182.9
D06 Atrioventricular Septal Defect (Endocardial Cushion Defect)	5.5	5.6	6.4	5.2	5.8	4.8	5.5	6.2	6.3	5.5	5.7	5.1	5.1	5.3	5.8	4.8	4.7
D07 Pulmonary Valve Atresia & Stenosis	10.9	14.2	13.5	12.0	11.5	8.2	11.2	9.9	11.3	8.5	10.8	10.4	10.2	11.1	11.1	8.7	10.9
D08 Tricuspid Valve Atresia & Stenosis	1.3	1.8	0.9	1.5	1.8	0.9	1.6	1.5	1.5	1.2	1.7	1.0	0.7	0.7	1.1	0.9	1.4
D09 Ebstein's Anomaly	0.7	1.0	0.9	0.6	1.1	0.6	0.8	0.8	1.2	0.8	0.8	0.5	0.8	0.5	*	*	*
D10 Aortic Valve Stenosis	2.3	2.7	2.5	2.5	2.3	1.8	1.8	2.5	2.6	1.9	2.4	2.2	2.5	2.9	2.1	1.6	1.9
D11 Hypoplastic Left Heart Syndrome	4.2	5.1	3.9	4.4	4.0	4.8	3.3	3.9	5.5	4.7	4.5	3.7	3.7	3.9	2.8	3.4	4.5
D12 Patent Ductus Arteriosus	71.0	77.1	77.5	65.9	69.2	53.9	52.9	64.5	65.3	52.4	86.9	80.0	68.2	90.3	76.6	73.2	92.2
D13 Coarctation of Aorta	7.2	6.3	7.5	7.0	7.3	4.8	5.8	6.6	8.5	8.0	8.7	7.6	6.9	8.8	7.9	7.5	6.9
D14 Pulmonary Artery Anomalies	17.2	24.0	24.8	20.7	21.4	19.9	18.0	11.3	4.1	3.8	5.7	20.4	12.8	19.8	15.2	25.6	29.4
D15 Interrupted Aortic Arch	0.7	0.5	1.0	*	1.0	0.9	1.0	0.7	1.3	0.6	0.6	0.5	*	*	*	0.9	0.8
D16 Total Anomalous Pulmonary Venous Return (or connection)	1.3	1.9	1.7	0.6	1.4	1.2	1.5	1.0	1.7	1.5	1.2	1.1	1.2	1.2	1.4	0.7	0.8
D17 Double Outlet Right Ventricle	2.6	2.5	2.4	2.4	2.3	2.4	3.4	2.2	2.9	2.4	3.0	2.7	3.1	2.8	2.5	2.6	2.4
D18 Common Ventricel	1.9	1.7	1.8	1.5	2.1	1.2	2.6	1.2	2.6	1.6	2.1	2.0	1.9	2.1	1.6	2.2	2.2
D99 Other Heart & Circulatory System Anomalies	77.2	81.0	93.5	80.2	77.6	67.8	66.9	62.2	71.0	71.1	87.0	79.6	74.6	75.3	68.0	85.4	95.7

**Table 16**  
**Birth Defect Prevalence Rates by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
E Respiratory System (All)	55.6	59.4	83.2	70.5	41.0	34.9	41.8	42.5	52.4	50.4	63.4	58.3	57.0	59.5	49.8	62.8	62.6
E01 Lung Agenesis/ Hypoplasia	6.7	7.6	6.2	5.1	6.3	7.5	9.7	6.6	5.8	5.4	9.6	6.0	5.4	7.7	4.3	5.5	7.4
E02 Choanal Atresia	1.8	1.9	1.4	1.3	1.5	1.9	2.0	1.8	2.3	2.7	2.0	1.7	1.8	2.0	1.1	1.7	2.1
E99 Other Respiratory System Anomalies	49.2	51.8	77.4	65.5	35.3	26.9	32.3	35.8	46.6	44.7	54.6	52.7	52.1	52.5	46.2	57.0	55.9
F Cleft Palate & Cleft Lip	16.6	16.3	18.1	16.6	15.5	18.5	15.0	15.4	15.3	16.1	17.8	17.0	20.0	15.3	15.9	18.5	15.1
F01 Cleft Palate	10.0	10.1	10.7	10.6	9.9	11.5	9.1	8.4	9.7	11.0	11.4	9.3	11.3	8.3	7.9	9.8	9.3
F02 Cleft Lip w & w/o Cleft Palate	9.6	9.0	10.2	8.8	8.3	10.1	9.8	9.9	9.8	8.3	10.3	10.0	11.3	8.7	8.1	12.2	9.7
G Upper Alimentary Caanal/ Digestive System (All)	51.5	54.1	64.6	58.0	57.3	53.1	46.1	46.2	49.3	49.5	51.8	47.8	42.5	54.7	43.3	45.5	52.9
G01 Esophageal Atresia/ Tracheoesophageal Fistula	2.4	3.4	2.8	3.2	2.4	1.2	2.6	2.6	2.3	2.8	2.5	2.1	1.9	1.7	2.4	1.9	2.7
G02 Rectal & Large Intestinal Atresia/Stenosis	4.6	4.9	6.0	4.4	4.5	4.0	5.2	5.2	4.5	6.0	4.6	3.9	3.6	4.6	3.6	3.0	4.6
G03 Pyloric Stenosis	16.1	15.5	18.6	16.8	19.9	18.7	13.8	13.8	15.9	12.0	16.4	15.9	15.1	19.5	15.4	13.8	15.5
G04 Hirshsprung's Disease (congenital megacolon)	4.0	2.9	3.0	2.7	3.0	2.1	4.3	3.9	3.3	3.4	3.2	5.9	4.6	6.8	5.4	5.6	7.1
G05 Biliary Atresia	1.2	1.0	1.0	0.9	1.2	1.2	1.1	1.6	1.4	1.1	0.7	1.5	1.2	1.8	1.4	1.7	1.3
G99 Other Upper Alimentary Canal /Digestive System Anomalies	27.8	30.8	36.7	33.2	30.2	28.8	23.0	24.3	27.2	29.0	30.0	24.3	21.3	25.4	20.2	25.5	29.3
H Genital & Urinary Systems	152.7	159.5	160.1	146.8	128.1	107.4	107.9	141.3	146.9	161.2	187.8	169.6	158.4	172.0	150.6	172.0	196.3
H01 Renal Agenesis/ Hypoplasia	6.1	5.7	5.0	6.6	7.0	4.5	5.1	4.9	5.6	7.6	7.9	6.4	5.0	7.0	5.3	6.1	8.5
H02 Bladder Exstrophy & Cloacal Exstrophy	0.2	0.5	*	*	*	*	*	*	-	*	*	0.3	*	*	*	*	*
H03 Obstructive Genitourinary Defects	31.1	26.2	24.4	23.5	23.4	17.8	18.0	24.4	28.4	26.7	39.0	44.0	37.4	43.1	40.5	48.0	51.4
H04 Hypospadias	34.8	37.2	26.0	29.3	35.6	29.6	32.0	39.0	31.9	35.2	42.3	37.0	35.9	40.5	32.9	38.0	37.6
H05 Epispadias	1.0	1.0	0.9	0.5	0.9	0.9	*	*	0.9	1.2	0.7	1.5	0.9	1.7	1.0	1.3	2.4
H99 Other Genital & Urinary System Anomalies	102.3	113.8	123.0	108.6	81.2	70.8	70.2	93.5	103.9	112.3	126.9	105.6	101.1	107.6	92.8	104.3	122.9

**Table 16**  
**Birth Defect Prevalence Rates by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

Birth Defects

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
I Musculoskeletal System (All)	195.9	182.6	198.5	189.6	143.5	124.3	159.2	175.4	217.1	236.3	257.9	212.8	198.1	211.8	172.4	246.7	236.8
I01 Upper Limb Reduction Deformities	2.5	2.2	2.2	3.1	3.2	2.5	3.0	2.8	2.5	2.5	2.7	2.0	1.7	2.9	2.0	2.0	1.4
I02 Lower Limb Reduction Deformities	2.3	2.9	2.8	2.0	1.8	2.8	1.9	2.8	3.0	2.1	2.7	1.8	1.2	2.0	2.0	2.1	1.8
I03a Exomphalos/Omphalocele	---	---	---	---	---	---	2.0	1.9	2.4	1.4	1.3	4.1	1.9	2.8	4.2	7.6	4.1
I03b Gastroschisis	---	---	---	---	---	---	5.6	4.9	3.9	3.6	4.7	4.0	3.7	5.0	3.3	4.9	3.2
I03c Prune Belly Syndrome, Congenital Hernia of Bladder	3.9	6.5	7.5	6.9	6.0	5.1	2.7	1.8	2.7	4.4	3.0	2.2	1.1	2.1	2.5	2.2	3.4
I04 Congenital Hip Dislocation	9.9	10.1	13.3	8.7	12.9	12.3	11.1	12.7	11.1	8.7	7.9	7.9	8.3	8.5	6.9	6.3	9.5
I05 Diaphragmatic Hernia	3.2	2.9	4.1	3.4	3.2	3.9	3.6	3.5	2.3	2.5	4.2	3.0	3.0	3.7	2.3	2.8	3.2
I99 Other Musculoskeletal System	180.0	167.5	180.6	175.6	128.1	107.6	141.1	157.5	200.5	221.6	242.0	197.4	186.7	196.1	156.9	227.7	220.8
J Integument (All)	107.6	49.9	101.1	40.4	112.9	103.9	77.3	95.3	73.3	142.4	198.7	127.0	118.3	121.8	95.9	103.5	197.7
K Chromosomal Anomalies	26.2	25.1	25.7	23.3	26.3	25.6	26.5	24.9	28.0	27.1	26.4	27.0	25.1	28.0	26.8	26.8	28.4
K01 Trisomy 13	0.8	1.3	0.6	0.8	0.8	0.8	0.6	1.1	0.9	0.7	0.9	0.5	0.5	0.5	0.8	*	*
K02 Down Syndrome	13.0	14.0	14.5	11.9	13.3	12.2	15.4	12.5	13.9	12.6	12.7	12.4	11.0	12.1	14.6	11.9	12.3
K03 Trisomy 18	1.4	1.3	1.5	1.2	1.9	1.6	1.0	1.5	1.3	1.3	1.4	1.3	2.2	1.0	0.9	1.2	0.9
K04 Chromosome 22q11.2 Deletion Syndrome	---	---	---	0.6	0.9	0.5	0.6	0.6	0.8	0.9	0.5	1.2	0.5	1.5	0.7	1.6	1.5
K05 Turner Syndrome	0.9	0.8	1.6	1.1	0.8	0.6	*	*	*	0.5	0.8	1.2	0.5	1.3	1.0	1.2	2.1
K99 Other Chromosomal Anomalies	11.1	9.5	8.5	9.9	10.3	12.0	10.0	11.5	13.2	13.3	11.7	11.5	11.0	12.5	9.9	11.6	12.4
L Other and Unspecified Birth Defects	157.7	49.4	38.9	31.7	21.7	17.7	169.9	166.0	192.0	196.9	230.7	262.9	204.3	212.1	248.7	331.2	323.2

**Table 16**  
**Birth Defect Prevalence Rates by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
M Infectious Conditions																	
Occurring in the Perinatal Period	5.3	3.5	4.0	2.6	7.1	5.9	4.1	4.9	7.2	6.7	8.3	5.2	5.5	5.4	4.2	4.4	6.3
M01 Syphilis	1.3	1.1	1.0	*	2.3	2.2	0.8	0.7	1.3	1.8	2.7	1.0	1.2	1.3	0.8	*	1.3
M02 Other Infections	3.9	2.4	3.0	2.2	4.8	3.7	3.3	4.0	5.6	4.5	5.1	4.1	4.4	4.0	3.4	4.0	5.0
M03 Zika Virus Disease	0.1	-	-	-	-	-	-	*	*	*	0.5	-	-	-	-	-	-
N Familial/Congenital Neoplasms	1.3	1.5	1.5	1.6	1.7	*	0.9	1.3	1.3	1.3	1.1	1.4	1.8	1.0	1.5	1.2	1.5
O Endocrine/Metabolic Disorders	62.0	45.6	47.9	40.4	50.3	40.7	49.9	49.5	66.8	68.5	81.1	79.7	74.1	89.0	70.6	76.2	88.6
P Diseases of the Blood & Blood Forming Organs	32.7	26.0	24.6	21.1	25.9	21.8	29.6	33.2	33.1	37.5	45.5	39.5	43.6	44.5	33.8	36.8	38.5
Q Other Diseases of the Central and Peripheral Nervous System	37.0	34.4	34.7	31.7	31.6	30.1	29.7	37.5	37.6	37.9	47.9	40.7	40.6	44.5	31.1	46.3	41.3
R Other Diseases of the Eye	59.9	67.5	67.1	67.8	65.7	53.8	52.8	59.1	57.1	64.9	66.8	54.6	60.1	56.4	39.4	59.7	57.3
S Hearing Deficiency	69.7	44.6	42.4	37.4	43.5	39.2	54.0	86.4	90.1	98.1	105.3	83.6	71.6	111.3	82.4	86.5	65.6
T Other Diseases of the Heart & Circulatory System	42.5	34.4	40.9	37.2	40.3	36.3	37.8	38.6	53.8	47.7	49.7	44.7	44.3	47.7	40.0	45.4	46.4
U Other Diseases of the Gastrointestinal System	52.7	62.1	55.7	54.5	56.1	42.0	50.1	48.9	56.2	56.8	63.5	48.5	54.5	50.1	41.3	47.1	49.2
V Other Diseases of the Genital and Urinary Systems	12.0	4.9	4.7	3.2	3.1	4.5	5.1	5.5	6.0	7.9	11.2	25.9	15.4	22.5	23.2	32.5	36.6
X Other Musculoskeletal System Diseases	0.2	*	*	*	*	*	*	*	*	0.5	*	*	*	*	-	-	-
Y Maternal Exposures Affecting Fetus	50.9	24.8	25.2	16.6	26.2	23.0	27.4	39.9	43.5	47.0	77.5	85.7	60.2	102.6	90.4	97.6	78.0
Y01 Newborn Affected by Maternal use of Alcohol	1.2	1.6	1.6	1.1	*	0.5	0.9	0.8	0.8	1.2	1.4	1.5	1.0	1.8	1.0	1.8	2.0
Y02 Fetal Alcohol Syndrome	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	*	0.6	0.8
Y99 Other Maternal Exposures Affecting the Fetus	49.9	23.3	23.7	15.9	25.9	22.5	26.6	38.6	42.8	46.0	76.3	84.6	59.7	101.1	89.4	96.2	76.3
One or More Reportable Diagnosis	1,044.7	885.6	932.4	803.7	809.9	694.0	855.4	946.9	1,025.4	1,152.7	1,358.3	1,262.7	1,123.5	1,254.1	1,147.5	1,338.0	1,460.7

**Notes:**

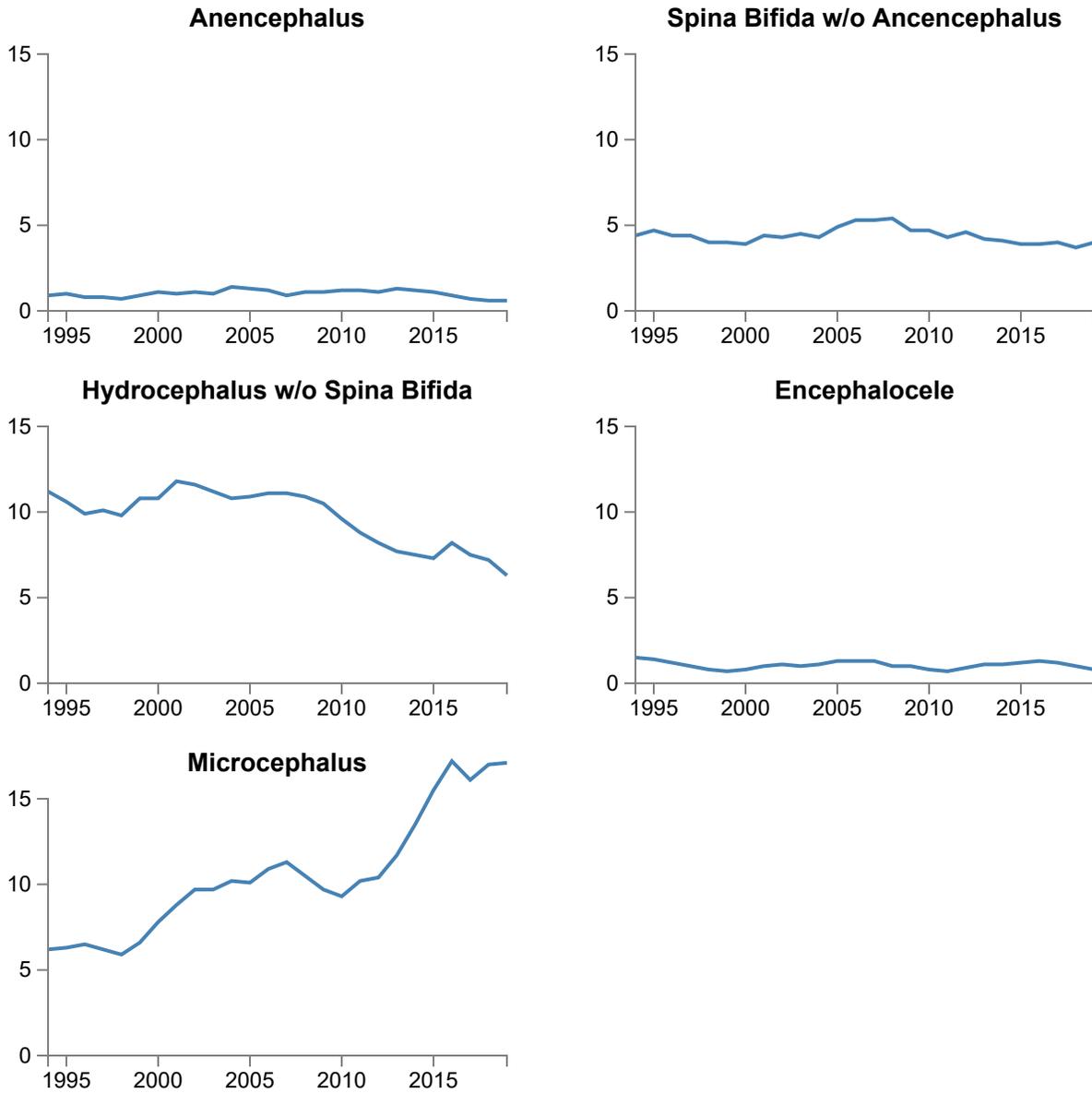
**Rates** are per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

\*: A rate is not calculated when there are fewer than 6 events, because the width of the confidence interval would negate any usefulness for comparative purposes.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 4. Trends in the Prevalence Rates of Central Nervous System Defects  
Michigan Residents, 1994 – 2019



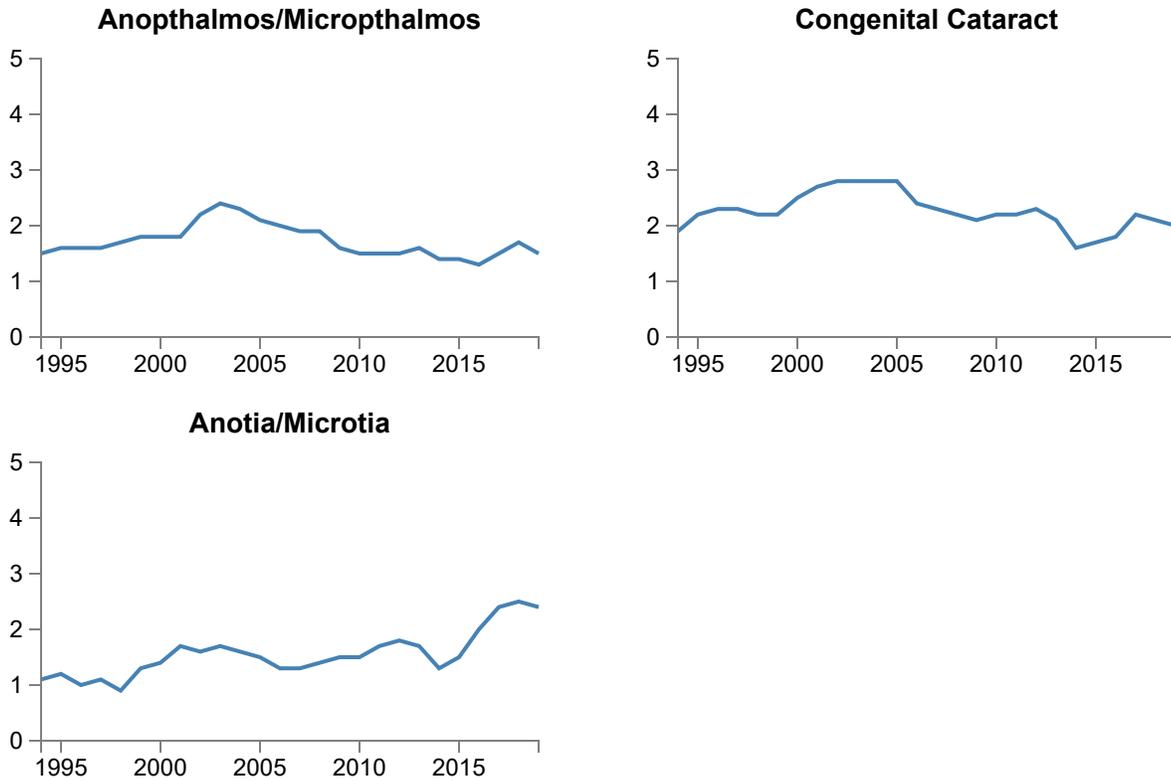
**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Unstable Rates:** In order to produce a meaningful graph, some single-year, unreliable rates were smoothed using additional years of data.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 5. Trends in the Prevalence Rates of Eye & Ear Defects  
Michigan Residents, 1994 – 2019

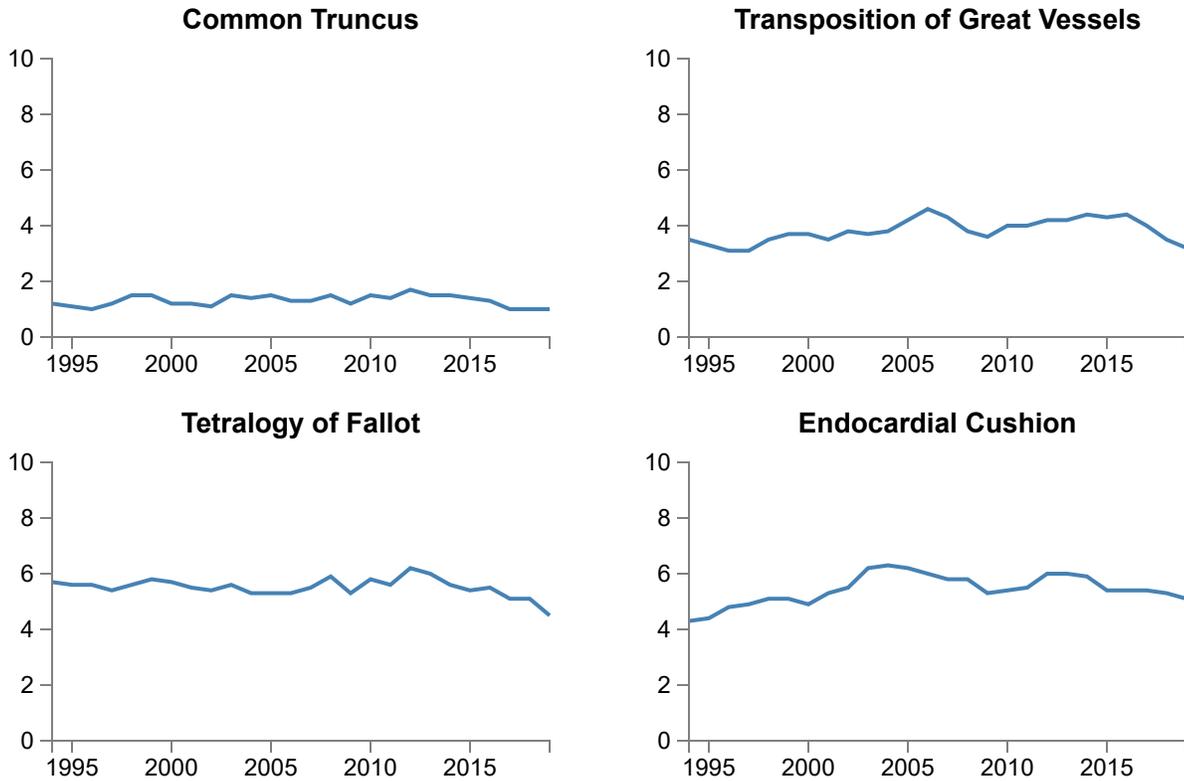


**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 6-A. Trends in the Prevalence Rates of Cardiac Defects  
Michigan Residents, 1994 - 2019

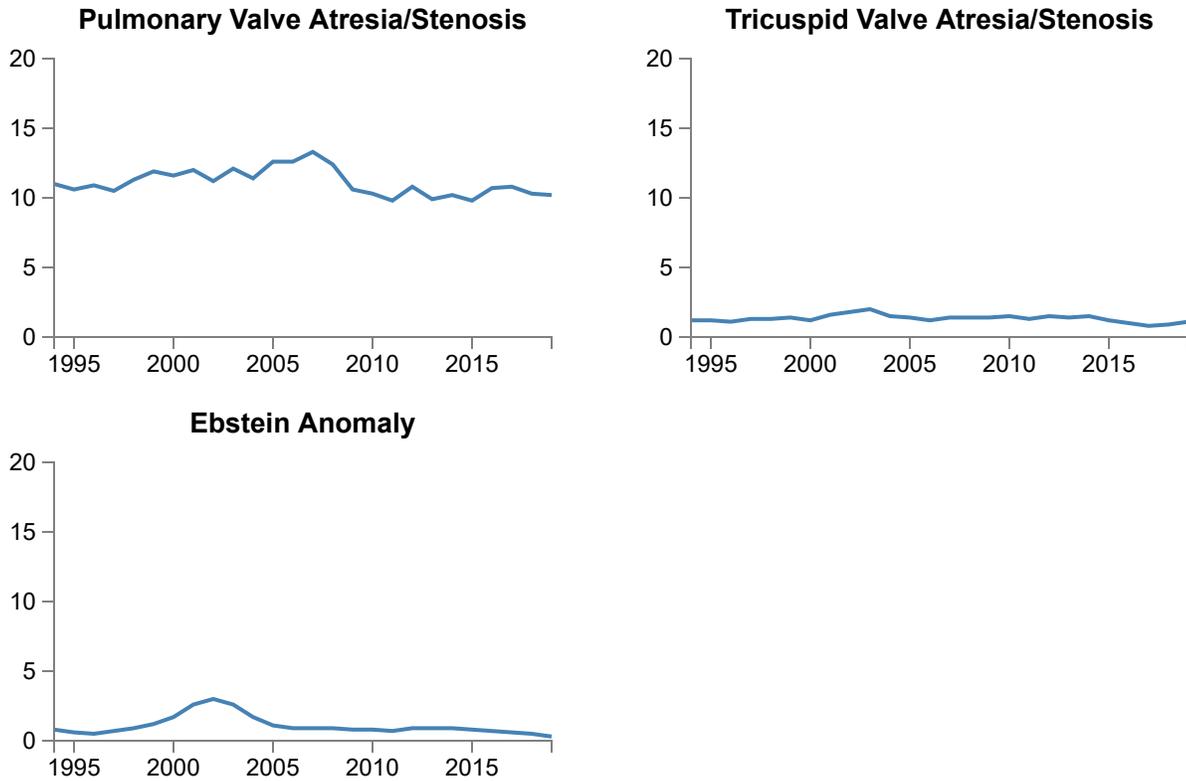


**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 6-B. Trends in the Prevalence Rates of Cardiac Defects  
Michigan Residents, 1994 – 2019

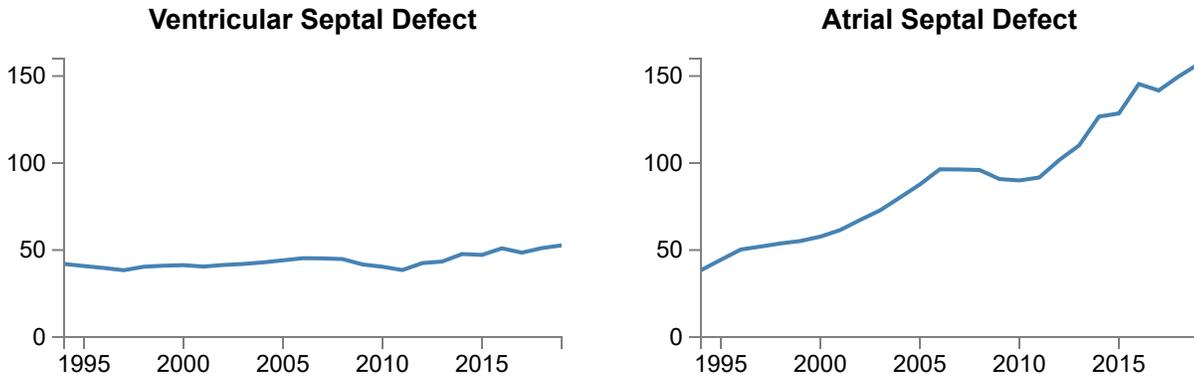


**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 6-C. Trends in the Prevalence Rates of Cardiac Defects  
Michigan Residents, 1994 – 2019

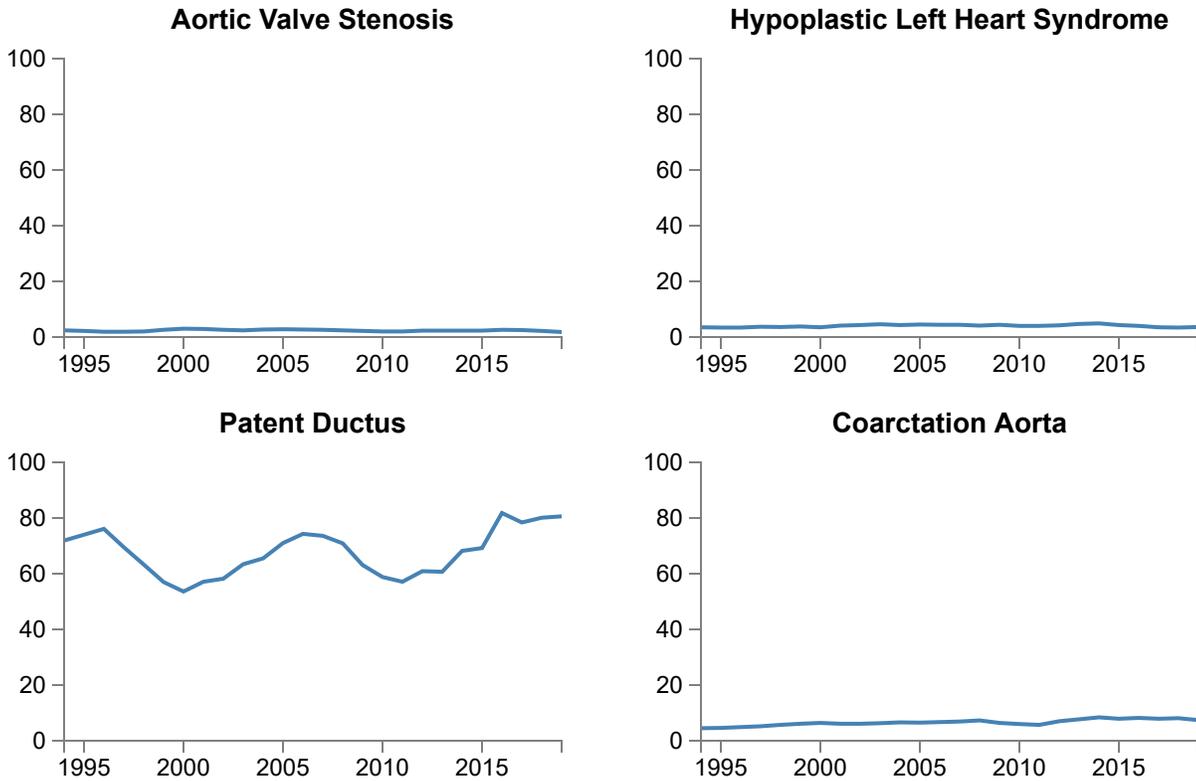


**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 7. Trends in the Prevalence Rates of Circulatory Defects  
Michigan Residents, 1994 – 2019

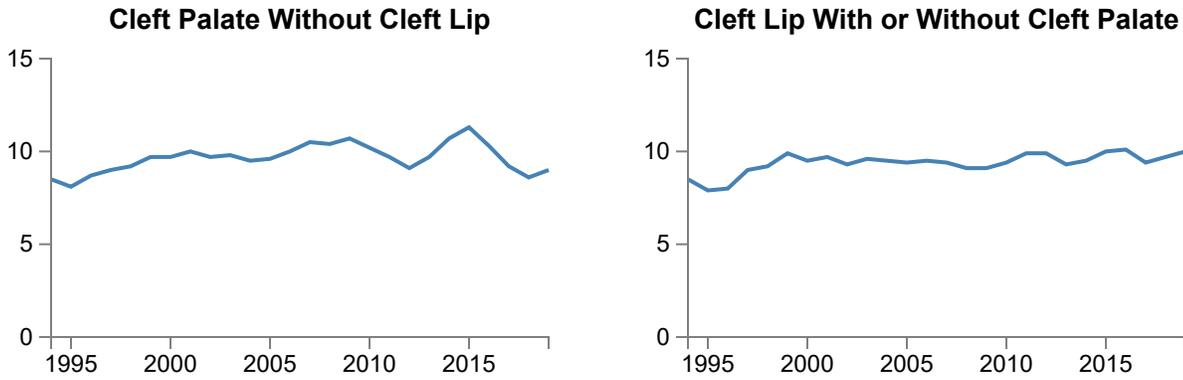


**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 8. Trends in the Prevalence Rates of Oral Defects  
Michigan Residents, 1994 – 2019

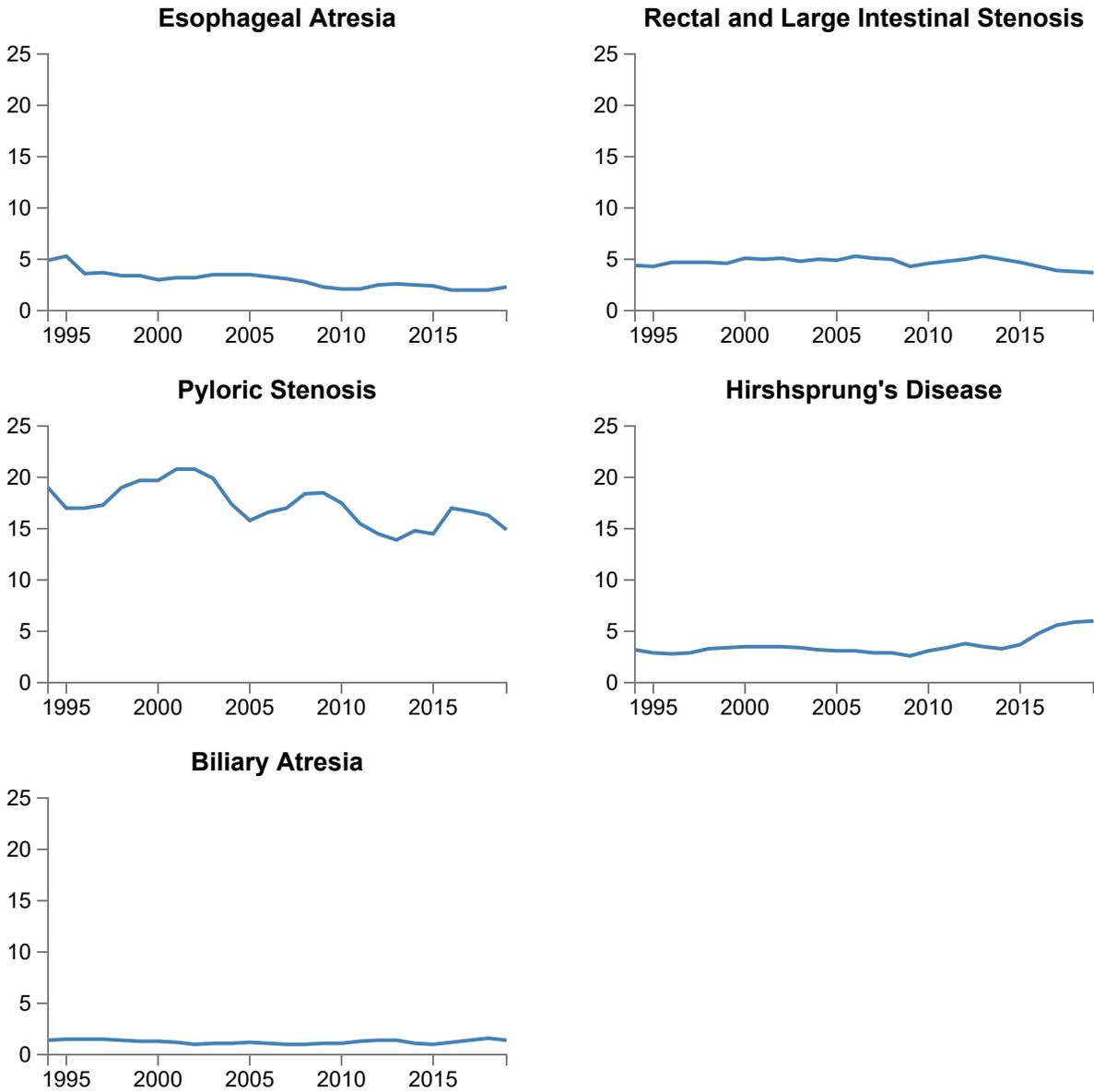


**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 9. Trends in the Prevalence Rates of Gastrointestinal Defects  
Michigan Residents, 1994 – 2019

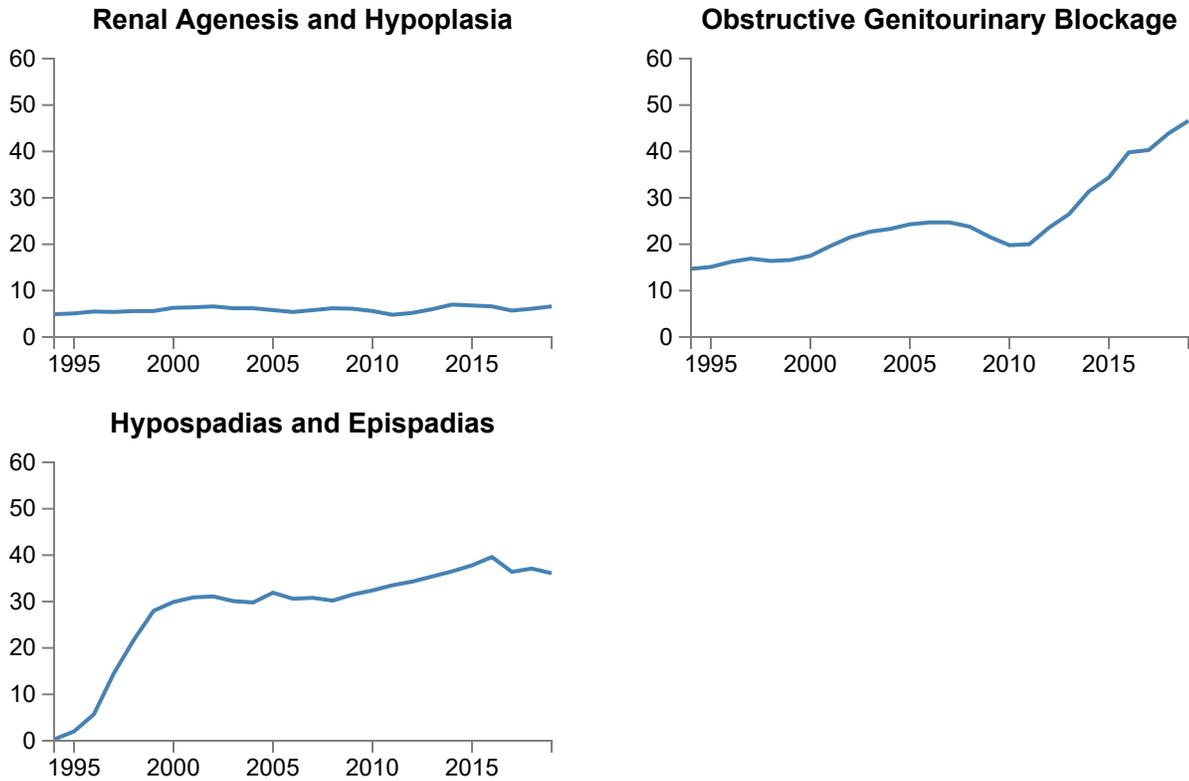


**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 10. Trends in the Prevalence Rates of Genitourinary Defects  
Michigan Residents, 1994 – 2019

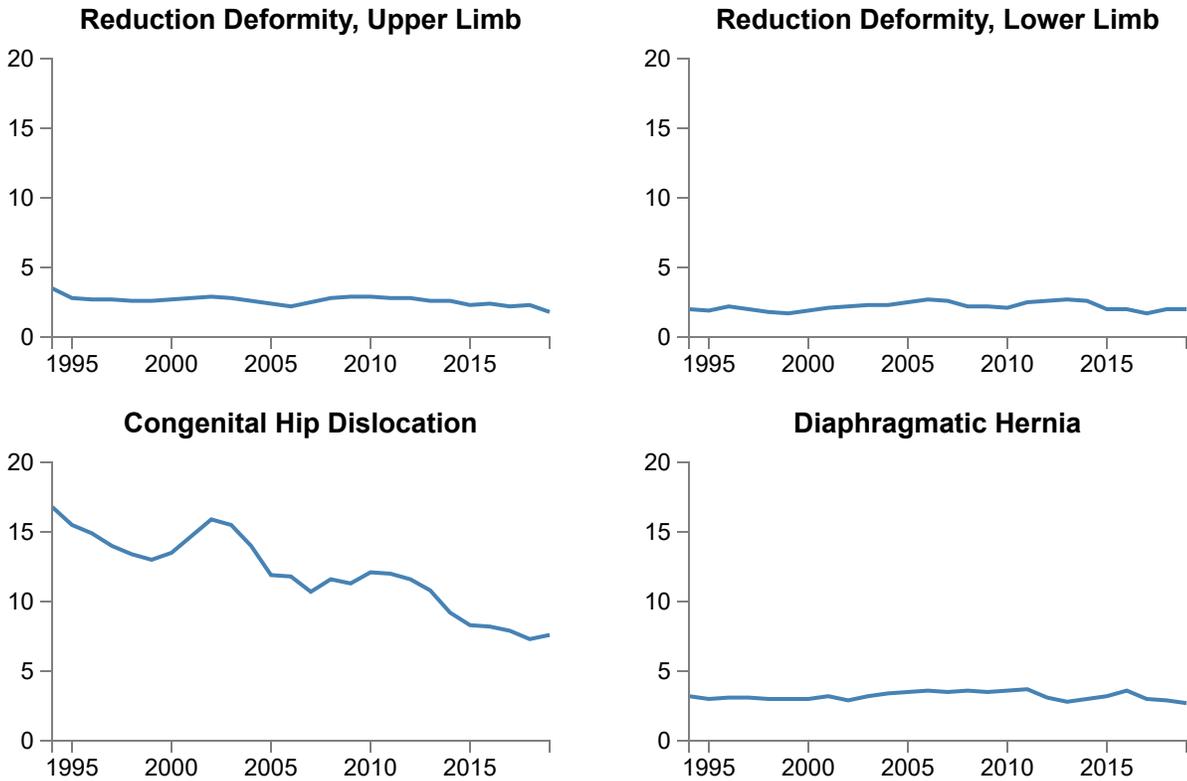


**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 11. Trends in the Prevalence Rates of Musculoskeletal Defects  
Michigan Residents, 1994 – 2019

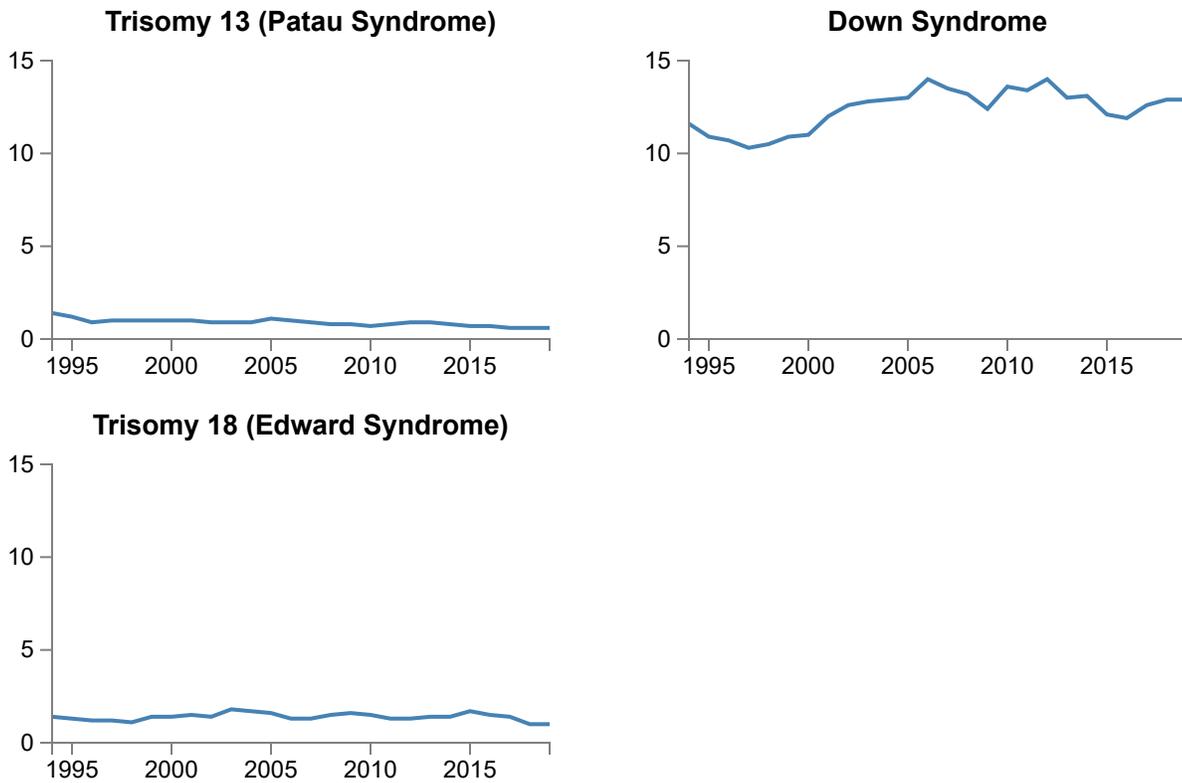


**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Figure 12. Trends in the Prevalence Rates of Chromosomal Defects  
Michigan Residents, 1994 – 2019



**Notes:** Rates Are Per 10,000 Michigan Born Resident Live Births. Rates include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Unstable Rates:** In order to produce a meaningful graph, some single-year, unreliable rates were smoothed using additional years of data.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies used to calculate the rates in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 17**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
A Central Nervous System Birth Defects	667	66	63	52	55	44	46	26	37	50	43	185	51	43	28	27	36
B Eye Birth Defects	101	8	7	7	8	3	6	4	7	5	9	37	9	11	8	5	4
C Ear, Face & Neck Birth Defects	122	14	2	8	11	6	7	4	5	1	6	58	11	13	12	13	9
D Heart & Circulatory System Birth Defects	2,141	195	171	159	191	171	125	112	139	147	150	581	137	132	113	94	105
E Respiratory System Birth Defects	644	74	69	57	48	34	40	31	39	37	61	154	40	40	23	19	32
F Cleft Palate and Cleft Lip	146	12	14	13	11	15	6	7	10	5	7	46	10	12	7	12	5
G Birth Defects of the Upper Alimentary Canal/ Digestive System	304	31	27	28	31	21	18	19	17	23	19	70	19	12	17	10	12
H Genital & Urinary Systems Birth Defects	644	58	45	53	66	55	31	44	36	33	55	168	42	37	31	27	31
I Musculoskeletal System Birth Defects	744	74	61	56	57	42	52	36	44	44	58	220	52	60	45	28	35
J Integument Birth Defects	107	6	8	4	5	7	5	5	2	9	9	47	12	13	8	6	8
K Chromosomal Anomalies	510	57	31	30	47	41	28	34	30	35	42	135	40	30	30	17	18
L Other and Unspecified Birth Defects	1,056	47	48	41	37	27	77	91	112	120	90	366	58	53	96	95	64

**Table 17**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
M Infectious Conditions Occurring in the Perinatal Period	60	4	5	2	4	10	1	5	4	3	7	15	2	5	1	1	6
N Familial/Congenital Neoplasms	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
O Endocrine/Metabolic Disorders	406	15	31	13	24	21	21	21	37	27	52	144	39	41	33	13	18
P Diseases of the Blood & Blood Forming Organs	274	22	21	10	18	20	21	16	15	19	27	85	18	15	22	12	18
Q Other Diseases of the Central and Peripheral Nervous System	161	12	11	14	7	10	7	7	10	11	8	64	17	16	16	8	7
R Other Diseases of the Eye	136	19	18	21	25	9	4	3	7	7	5	18	8	2	3	3	2
S Hearing Deficiency	66	5	4	5	4	4	3	3	3	2	8	25	8	3	7	3	4
T Other Diseases of the Heart & Circulatory System	453	31	46	36	30	37	20	28	36	34	35	120	32	26	19	20	23
U Other Diseases of the Gastrointestinal System	372	31	26	17	34	33	28	20	20	30	31	102	27	22	19	14	20
V Other Diseases of the Genital and Urinary Systems	22	1	-	-	1	-	-	2	1	1	3	13	2	5	3	2	1
X Other Musculoskeletal System Diseases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y Maternal Exposures Affecting Fetus	156	6	14	3	13	8	5	10	13	14	13	57	9	12	11	11	14
One or More Reportable Diagnosis	4,611	409	383	317	354	351	273	271	300	342	330	1,281	291	251	253	242	244

**Notes:**

**Frequencies** include all deaths within the first year of life to children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defect mortality rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details. Columns do not add to total infant deaths born with birth defects. Some cases include diagnosis with multiple birth defects, and each birth defect diagnosis was counted in each appropriate grouping. Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 18**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
A Central Nervous System (All)	667	66	63	52	55	44	46	26	37	50	43	185	51	43	28	27	36
A01 Anencephalus	146	11	12	7	15	13	9	9	10	15	9	36	9	7	5	7	8
A02 Spina Bifida w/o Anencephaly	28	5	4	3	2	2	4	1	-	2	1	4	-	-	1	2	1
A03 Hydrocephalus w/o Spina Bifida	186	24	19	14	16	13	12	5	10	13	9	51	12	14	11	4	10
A04 Encephalocele	25	6	3	2	2	1	-	1	2	-	-	8	2	3	-	3	-
A05 Microcephalus	122	9	11	11	6	8	6	7	3	4	10	47	12	11	6	9	9
A06 Holoprosencephaly	---	---	---	---	---	---	---	---	---	---	---	---	---	3	1	3	2
A99 Other CNS Anomalies	222	16	16	18	10	9	15	6	16	15	13	88	24	22	13	10	19
B Eye (All)	101	8	7	7	8	3	6	4	7	5	9	37	9	11	8	5	4
B01 Anophthalmos /Microphthalmos	32	3	1	4	3	-	1	2	1	2	3	12	3	5	1	3	-
B02 Congenital Cataract	16	2	1	2	2	-	1	1	1	-	-	6	-	3	2	1	-
B03 Aniridia	3	1	-	-	-	-	-	-	-	1	-	1	-	-	1	-	-
B99 Other Eye Anomalies	66	5	7	3	5	3	4	1	6	2	7	23	7	5	4	3	4
C Ear, Face and Neck (All)	122	14	2	8	11	6	7	4	5	1	6	58	11	13	12	13	9
C01 Anotia/Microtia	15	-	-	1	2	-	2	1	-	-	-	9	3	4	1	1	-
C99 Other Ear, Face & Neck Anomalies	114	14	2	8	10	6	6	3	5	1	6	53	9	11	12	12	9

**Table 18**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
D Heart & Circulatory System (All)	2,141	195	171	159	191	171	125	112	139	147	150	581	137	132	113	94	105
D01 Common Truncus	40	2	2	3	7	-	5	3	2	2	3	11	5	4	2	-	-
D02 Transposition of Great Vessels	74	6	7	3	6	7	6	5	6	2	8	18	6	2	3	5	2
D03 Tetralogy of Fallot	84	5	5	5	11	10	3	6	8	5	7	19	8	4	2	3	2
D04 Ventricular Septal Defect	389	26	29	26	48	23	22	16	21	14	32	132	35	28	23	21	25
D05 Atrial Septal Defect	901	62	54	62	86	56	44	45	51	49	79	313	71	73	67	48	54
D06 Atrioventricular Septal Defect (Endocardial Cushion Defect)	123	13	7	10	9	10	6	4	4	7	10	43	10	9	14	5	5
D07 Pulmonary Valve Atresi& Stenosis	109	10	10	6	17	6	5	5	11	5	5	29	10	4	6	3	6
D08 Tricuspid Valve Atresi& Stenosis	29	1	2	1	6	1	-	3	-	1	2	12	3	1	3	2	3
D09 Ebstein's Anomaly	24	2	3	2	2	3	2	2	3	2	1	2	1	-	1	-	-
D10 Aortic Valve Stenosis	37	4	4	2	5	2	1	4	5	-	2	8	1	3	2	2	-
D11 Hypoplastic Left Heart Syndrome	226	19	21	18	17	28	10	14	16	25	11	47	16	13	6	8	4
D12 Patent Ductus Arteriosus	1,033	99	81	83	103	58	49	56	56	47	87	314	62	79	54	57	62
D13 Coarctation of Aorta	146	12	17	13	8	8	4	12	9	5	16	42	8	7	7	9	11
D14 Pulmonary Artery Anomalies	157	14	7	15	19	19	11	4	3	3	1	61	11	15	12	9	14
D15 Interrupted Aortic Arch	23	-	4	1	4	5	1	2	2	1	1	2	1	-	-	1	-
D16 Total Anomalous Pulmonary Venous Return (or connection)	39	3	3	2	5	3	2	1	4	4	1	11	2	3	5	1	-
D17 Double Outlet Right Ventricle	71	5	7	9	4	3	7	2	4	1	4	25	8	5	4	4	4
D18 Common Ventricel	35	1	4	1	9	3	2	2	2	3	-	8	2	3	2	-	1
D99 Other Heart & Circulatory System Anomalies	1,160	95	84	67	100	101	80	76	81	94	84	298	74	55	56	55	58

**Table 18**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Birth Defects**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
E Respiratory System (All)	644	74	69	57	48	34	40	31	39	37	61	154	40	40	23	19	32
E01 Lung Agenesis/ Hypoplasia	379	49	30	25	25	17	29	21	20	21	47	95	22	27	13	13	20
E02 Choanal Atresia	24	1	1	1	2	1	3	1	3	3	2	6	2	4	-	-	-
E99 Other Respiratory System Anomalies	264	28	39	32	25	17	9	10	16	14	15	59	16	9	12	7	15
F Cleft Palate & Cleft Lip	146	12	14	13	11	15	6	7	10	5	7	46	10	12	7	12	5
F01 Cleft Palate	53	3	4	6	5	9	3	1	3	1	4	14	5	4	2	1	2
F02 Cleft Lip w & w/o Cleft Palate	80	7	9	7	2	5	3	5	8	3	3	28	4	9	3	9	3
G Upper Alimentary Caanal/ Digestive System (All)	304	31	27	28	31	21	18	19	17	23	19	70	19	12	17	10	12
G01 Esophageal Atresia/ Tracheoesophageal Fistula	52	5	2	6	4	3	1	3	4	6	3	15	4	3	5	1	2
G02 Rectal & Large Intestinal Atresia/Stenosis	54	7	4	4	4	2	2	3	6	5	5	12	3	2	2	3	2
G03 Pyloric Stenosis	5	1	1	-	-	-	1	-	1	-	-	1	-	1	-	-	-
G04 Hirshsprung's Disease (congenital megacolon)	16	-	1	-	1	-	-	2	1	1	1	9	-	1	4	1	3
G05 Biliary Atresia	14	1	1	1	1	3	-	-	-	2	-	5	1	1	1	1	1
G99 Other Upper Alimentary Canal /Digestive System Anomalies	203	22	20	19	25	14	17	13	7	13	15	38	13	5	9	4	7
H Genital & Urinary Systems	644	58	45	53	66	55	31	44	36	33	55	168	42	37	31	27	31
H01 Renal Agenesis/ Hypoplasia	151	12	9	17	18	15	9	7	12	10	11	31	7	7	5	4	8
H02 Bladder Exstrophy & Cloacal Exstrophy	4	2	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
H03 Obstructive Genitourinary Defects	155	12	10	8	15	14	5	8	8	8	11	56	15	14	11	9	7
H04 Hypospadias	63	7	2	8	7	3	2	2	3	1	8	20	6	3	4	3	4
H05 Epispadias	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-
H99 Other Genital & Urinary System Anomalies	405	38	30	37	37	31	22	32	19	18	37	104	29	25	20	14	16

**Table 18**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

Birth Defects

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
I Musculoskeletal System (All)	744	74	61	56	57	42	52	36	44	44	58	220	52	60	45	28	35
I01 Upper Limb Reduction Deformities	22	2	3	1	3	-	1	4	1	-	1	6	1	4	1	-	-
I02 Lower Limb Reduction Deformities	20	2	2	-	-	2	-	1	3	2	2	6	1	2	1	1	1
I03a Exomphalos/Omphalocele	---	---	---	---	---	---	4	2	8	2	3	16	2	8	2	4	-
I03b Gastroschisis	---	---	---	---	---	---	4	4	2	1	6	13	4	3	-	4	2
I03c Prune Belly Syndrome, Congenital Hernia of Bladder	66	12	8	8	6	7	6	4	5	5	4	1	-	1	-	-	-
I04 Congenital Hip Dislocation	16	2	-	1	-	-	2	-	-	-	1	10	3	1	4	1	1
I05 Diaphragmatic Hernia	146	10	9	9	12	10	9	9	11	12	16	39	12	13	6	1	7
I99 Other Musculoskeletal System	518	54	45	42	40	28	34	21	22	28	34	170	38	41	40	24	27
J Integument (All)	107	6	8	4	5	7	5	5	2	9	9	47	12	13	8	6	8
K Chromosomal Anomalies	510	57	31	30	47	41	28	34	30	35	42	135	40	30	30	17	18
K01 Trisomy 13	94	13	4	5	8	6	4	8	9	7	9	21	4	4	7	3	3
K02 Down Syndrome	127	15	6	10	16	10	6	6	2	13	13	30	7	6	9	4	4
K03 Trisomy 18	148	11	14	7	15	14	7	13	9	9	10	39	20	7	6	4	2
K04 Chromosome 22q11.2 Deletion Syndrome	---	---	---	-	2	-	-	-	2	1	-	1	-	1	-	-	-
K05 Turner Syndrome	5	1	1	-	-	-	-	-	-	-	-	3	-	1	1	-	1
K99 Other Chromosomal Anomalies	174	23	8	10	7	15	14	16	13	12	12	44	10	11	8	7	8
L Other and Unspecified Birth Defects	1,056	47	48	41	37	27	77	91	112	120	90	366	58	53	96	95	64

**Table 18**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2005–2019,**  
**Cases Diagnosed within One Year from Birth**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	2005 to 2019	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 to 2019	2015	2016	2017	2018	2019
M Infectious Conditions Occurring in the Perinatal Period	60	4	5	2	4	10	1	5	4	3	7	15	2	5	1	1	6
M01 Syphilis	3	1	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-
M02 Other Infections	57	3	5	2	3	9	1	5	4	3	7	15	2	5	1	1	6
M03 Zika Virus Disease	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N Familial/Congenital Neoplasms	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
O Endocrine/Metabolic Disorders	406	15	31	13	24	21	21	21	37	27	52	144	39	41	33	13	18
P Diseases of the Blood & Blood Forming Organs	274	22	21	10	18	20	21	16	15	19	27	85	18	15	22	12	18
Q Other Diseases of the Central and Peripheral Nervous System	161	12	11	14	7	10	7	7	10	11	8	64	17	16	16	8	7
R Other Diseases of the Eye	136	19	18	21	25	9	4	3	7	7	5	18	8	2	3	3	2
S Hearing Deficiency	66	5	4	5	4	4	3	3	3	2	8	25	8	3	7	3	4
T Other Diseases of the Heart & Circulatory System	453	31	46	36	30	37	20	28	36	34	35	120	32	26	19	20	23
U Other Diseases of the Gastrointestinal System	372	31	26	17	34	33	28	20	20	30	31	102	27	22	19	14	20
V Other Diseases of the Genital and Urinary Systems	22	1	-	-	1	-	-	2	1	1	3	13	2	5	3	2	1
X Other Musculoskeletal System Diseases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y Maternal Exposures Affecting Fetus	156	6	14	3	13	8	5	10	13	14	13	57	9	12	11	11	14
Y01 Newborn Affected by Maternal use of Alcohol	2	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	-
Y02 Fetal Alcohol Syndrome	---	---	---	---	---	---	---	---	---	---	---	---	---	1	-	-	-
Y99 Other Maternal Exposures Affecting the Fetus	154	6	14	3	13	8	5	10	13	13	13	56	9	11	11	11	14
One or More Reportable Diagnosis	4,611	409	383	317	354	351	273	271	300	342	330	1,281	291	251	253	242	244

**Notes:**

**Frequencies** include all deaths within the first year of life to children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defect mortality rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details. Columns do not add to total infant deaths born with birth defects. Some cases include diagnosis with multiple birth defects, and each birth defect diagnosis was counted in each appropriate grouping. Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 19**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2000–2019,**  
**Cases Diagnosed within One Year from Birth**  
**Three-year Infant Mortality Totals**

Birth Defects

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
A Central Nervous System Birth Defects	166	195	204	210	200	181	170	151	145	116	109	113	130	144	137	122	98	91
B Eye Birth Defects	31	33	35	29	28	22	22	18	17	13	17	16	21	23	29	28	24	17
C Ear, Face & Neck Birth Defects	26	28	29	34	27	24	21	25	24	17	16	10	12	18	30	36	38	34
D Heart & Circulatory System Birth Defects	567	618	600	607	546	525	521	521	487	408	376	398	436	434	419	382	339	312
E Respiratory System Birth Defects	211	224	242	240	219	200	174	139	122	105	110	107	137	138	141	103	82	74
F Cleft Palate and Cleft Lip	34	46	55	51	46	39	38	39	32	28	23	22	22	22	29	29	31	24
G Birth Defects of the Upper Alimentary Canal/ Digestive System	96	107	113	110	100	86	86	80	70	58	54	59	59	61	50	48	39	39
H Genital & Urinary Systems Birth Defects	175	201	211	197	165	156	164	174	152	130	111	113	124	130	134	110	95	89
I Musculoskeletal System Birth Defects	192	204	212	228	208	191	174	155	151	130	132	124	146	154	170	157	133	108
J Integument Birth Defects	20	20	16	15	19	18	17	16	17	17	12	16	20	30	34	33	27	22
K Chromosomal Anomalies	146	151	153	167	135	118	108	118	116	103	92	99	107	117	112	100	77	65
L Other and Unspecified Birth Defects	185	202	221	206	175	136	126	105	141	195	280	323	322	268	201	207	244	255

**Table 19**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2000–2019,**  
**Cases Diagnosed within One Year from Birth**  
**Three-year Infant Mortality Totals**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
M Infectious Conditions Occurring in the Perinatal Period	20	24	25	17	13	11	11	16	15	16	10	12	14	12	14	8	7	8
N Familial/Congenital Neoplasms	2	1	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-
O Endocrine/Metabolic Disorders	82	86	78	65	67	59	68	58	66	63	79	85	116	118	132	113	87	64
P Diseases of the Blood & Blood Forming Organs	45	42	37	46	52	53	49	48	59	57	52	50	61	64	60	55	49	52
Q Other Diseases of the Central and Peripheral Nervous System	31	31	28	30	30	37	32	31	24	24	24	28	29	36	41	49	40	31
R Other Diseases of the Eye	66	73	68	68	60	58	64	55	38	16	14	17	19	20	15	13	8	8
S Hearing Deficiency	14	23	24	23	15	14	13	13	11	10	9	8	13	18	19	18	13	14
T Other Diseases of the Heart & Circulatory System	119	99	102	97	109	113	112	103	87	85	84	98	105	101	93	77	65	62
U Other Diseases of the Gastrointestinal System	92	105	99	92	80	74	77	84	95	81	68	70	81	88	80	68	55	53
V Other Diseases of the Genital and Urinary Systems	1	2	3	3	2	1	1	1	1	2	3	4	5	6	10	10	10	6
X Other Musculoskeletal System Diseases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y Maternal Exposures Affecting Fetus	33	30	25	23	26	23	30	24	26	23	28	37	40	36	34	32	34	36
One or More Reportable Diagnosis	1,253	1,289	1,267	1,267	1,188	1,109	1,054	1,022	978	895	844	913	972	963	872	795	746	739

**Notes:**

**Frequencies** include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects mortality rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details. Columns do not add to diagnostic group totals nor column totals due to cases with multiple diagnosed conditions that cross diagnostic groupings.

**Conditions** are reportable if identified within the first two years of a child's life. The mortality data in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Table 20  
 Infant Deaths of Michigan Children with Reported Birth Defects  
 by Detailed Diagnostic Code Group and Birth Year,  
 Michigan Resident Children Born in Michigan During 2000–2019,  
 Cases Diagnosed within One Year from Birth  
 Three-year Infant Mortality Totals

Diagnostic Grouping	Birth Defects																	
	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
A Central Nervous System (All)	166	195	204	210	200	181	170	151	145	116	109	113	130	144	137	122	98	91
A01 Anencephalus	42	36	47	43	41	30	34	35	37	31	28	34	34	33	25	21	19	20
A02 Spina Bifida w/o Anencephaly	10	13	11	15	14	12	9	7	8	7	5	3	3	3	1	1	3	4
A03 Hydrocephalus w/o Spina Bifida	51	63	59	65	64	57	49	43	41	30	27	28	32	34	35	37	29	25
A04 Encephalocele	6	7	8	13	12	11	7	5	3	2	3	3	2	2	5	5	6	3
A05 Microcephalus	23	33	37	31	29	31	28	25	20	21	16	14	17	26	33	29	26	24
A06 Holoprosencephaly	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	7	6
A99 Other CNS Anomalies	45	60	59	62	50	50	44	37	34	30	37	37	44	52	59	59	45	42
B Eye (All)	31	33	35	29	28	22	22	18	17	13	17	16	21	23	29	28	24	17
B01 Anophthalmos /Microphthalmos	12	10	9	7	8	8	8	7	4	3	4	5	6	8	11	9	9	4
B02 Congenital Cataract	4	6	4	4	3	5	5	4	3	2	3	2	1	—	3	5	6	3
B03 Aniridia	—	—	—	1	1	1	—	—	—	—	—	1	1	1	—	1	1	1
B99 Other Eye Anomalies	18	20	24	22	23	15	15	11	12	8	11	9	15	16	19	16	12	11
C Ear, Face and Neck (All)	26	28	29	34	27	24	21	25	24	17	16	10	12	18	30	36	38	34
C01 Anotia/Microtia	2	3	3	3	1	1	3	3	4	3	3	1	—	3	7	8	6	2
C99 Other Ear, Face & Neck Anomalies	25	28	28	33	26	24	20	24	22	15	14	9	12	16	26	32	35	33
D Heart & Circulatory System (All)	567	618	600	607	546	525	521	521	487	408	376	398	436	434	419	382	339	312
D01 Common Truncus	7	8	6	7	6	7	12	10	12	8	10	7	7	10	12	11	6	2
D02 Transposition of Great Vessels	11	13	22	21	23	16	16	16	19	18	17	13	16	16	16	11	10	10
D03 Tetralogy of Fallot	24	18	20	21	18	15	21	26	24	19	17	19	20	20	19	14	9	7
D04 Ventricular Septal Defect	102	104	115	108	96	81	103	97	93	61	59	51	67	81	95	86	72	69
D05 Atrial Septal Defect	153	185	184	192	169	178	202	204	186	145	140	145	179	199	223	211	188	169
D06 Atrioventricular Septal Defect (Endocardial Cushion Defect)	25	28	30	38	32	30	26	29	25	20	14	15	21	27	29	33	28	24
D07 Pulmonary Valve Atresi& Stenosis	31	31	25	28	26	26	33	29	28	16	21	21	21	20	19	20	13	15
D08 Tricuspid Valve Atresi& Stenosis	11	7	5	3	3	4	9	8	7	4	3	4	3	6	6	7	6	8
D09 Ebstein's Anomaly	21	13	8	3	6	7	7	7	7	7	7	7	6	4	2	2	1	1
D10 Aortic Valve Stenosis	7	6	4	8	11	10	11	9	8	7	10	9	7	3	6	6	7	4
D11 Hypoplastic Left Heart Syndrome	60	58	46	47	51	58	56	63	55	52	40	55	52	52	40	35	27	18
D12 Patent Ductus Arteriosus	203	243	253	292	260	263	267	244	210	163	161	159	190	196	228	195	190	173
D13 Coarctation of Aorta	23	24	30	33	40	42	38	29	20	24	25	26	30	29	31	22	23	27
D14 Pulmonary Artery Anomalies	48	49	41	44	31	36	41	53	49	34	18	10	7	15	27	38	36	35
D15 Interrupted Aortic Arch	14	13	15	8	9	5	9	10	10	8	5	5	4	3	2	1	1	1
D16 Total Anomalous Pulmonary Venous Return (or connection)	10	9	7	6	7	8	10	10	10	6	7	9	9	7	6	10	9	6
D17 Double Outlet Right Ventricle	19	17	14	12	14	21	20	16	14	12	13	7	9	13	17	17	13	12
D18 Common Ventricel	8	14	12	9	6	6	14	13	14	7	6	7	5	5	5	7	5	3
D99 Other Heart & Circulatory System Anomalies	295	325	315	302	273	246	251	268	281	257	237	251	259	252	213	185	166	169

Table 20

(Continued)

## Birth Defects

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
E Respiratory System (All)	211	224	242	240	219	200	174	139	122	105	110	107	137	138	141	103	82	74
E01 Lung Agenesis/ Hypoplasia	134	137	142	149	121	104	80	67	71	67	70	62	88	90	96	62	53	46
E02 Choanal Atresia	4	3	1	1	2	3	4	4	6	5	7	7	8	7	8	6	4	-
E99 Other Respiratory System Anomalies	80	94	113	104	105	99	96	74	51	36	35	40	45	45	40	37	28	34
F Cleft Palate & Cleft Lip	34	46	55	51	46	39	38	39	32	28	23	22	22	22	29	29	31	24
F01 Cleft Palate	15	20	23	18	14	13	15	20	17	13	7	5	8	10	13	11	7	5
F02 Cleft Lip w & w/o Cleft Palate	13	18	26	27	28	23	18	14	10	13	16	16	14	10	16	16	21	15
G Upper Alimentary Canal/ Digestive System (All)	96	107	113	110	100	86	86	80	70	58	54	59	59	61	50	48	39	39
G01 Esophageal Atresia/ Tracheoesophageal Fistula	14	18	20	20	15	13	12	13	8	7	8	13	13	13	10	12	9	8
G02 Rectal & Large Intestinal Atresia/Stenosis	9	12	18	22	21	15	12	10	8	7	11	14	16	13	10	7	7	7
G03 Pyloric Stenosis	8	6	5	5	3	2	1	-	1	1	2	1	1	-	1	1	1	-
G04 Hirschsprung's Disease (congenital megacolon)	6	6	2	1	1	1	2	1	1	2	3	4	3	2	2	5	6	8
G05 Biliary Atresia	4	3	3	2	3	3	3	5	4	3	-	2	2	3	2	3	3	3
G99 Other Upper Alimentary Canal /Digestive System Anomalies	66	75	83	79	73	61	64	58	56	44	37	33	35	41	33	27	18	20
H Genital & Urinary Systems	175	201	211	197	165	156	164	174	152	130	111	113	124	130	134	110	95	89
H01 Renal Agenesis/ Hypoplasia	47	51	55	47	35	38	44	50	42	31	28	29	33	28	25	19	16	17
H02 Bladder Exstrophy & Cloacal Exstrophy	-	-	-	2	2	2	-	1	2	2	1	-	-	-	-	-	-	-
H03 Obstructive Genitourinary Defects	26	34	45	43	36	30	33	37	34	27	21	24	27	34	40	40	34	27
H04 Hypospadias	21	22	24	23	20	17	17	18	12	7	7	6	12	15	17	13	10	11
H05 Epispadias	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
H99 Other Genital & Urinary System Anomalies	118	135	139	129	112	105	104	105	90	85	73	69	74	84	91	74	59	50

Table 20

(Continued)

## Birth Defects

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
I Musculoskeletal System (All)	192	204	212	228	208	191	174	155	151	130	132	124	146	154	170	157	133	108
I01 Upper Limb Reduction Deformities	5	6	8	9	9	6	7	4	4	5	6	5	2	2	6	6	5	1
I02 Lower Limb Reduction Deformities	4	3	5	5	7	4	2	2	2	3	4	6	7	5	5	4	4	3
I03a Exomphalos/Omphalocele	---	---	---	---	---	---	---	---	---	---	14	12	13	7	13	12	14	6
I03b Gastroschisis	---	---	---	---	---	---	---	---	---	---	10	7	9	11	13	7	7	6
I03c Prune Belly Syndrome, Congenital Hernia of Bladder	17	24	22	30	26	28	22	21	19	17	15	14	14	9	5	1	1	-
I04 Congenital Hip Dislocation	5	3	2	3	3	3	1	1	2	2	2	-	1	4	5	8	6	6
I05 Diaphragmatic Hernia	34	41	41	39	29	28	30	31	31	28	29	32	39	40	41	31	20	14
I99 Other Musculoskeletal System	142	143	159	167	161	141	127	110	102	83	77	71	84	100	113	119	105	91
J Integument (All)	20	20	16	15	19	18	17	16	17	17	12	16	20	30	34	33	27	22
K Chromosomal Anomalies	146	151	153	167	135	118	108	118	116	103	92	99	107	117	112	100	77	65
K01 Trisomy 13	27	25	28	34	27	22	17	19	18	18	21	24	25	20	17	15	14	13
K02 Down Syndrome	47	49	45	46	35	31	32	36	32	22	14	21	28	33	26	22	19	17
K03 Trisomy 18	37	45	39	40	35	32	36	36	36	34	29	31	28	39	37	33	17	12
K04 Chromosome 22q11.2 Deletion Syndrome	---	---	---	---	---	---	---	2	2	-	2	3	3	1	1	1	1	-
K05 Turner Syndrome	1	-	1	2	3	2	1	-	-	-	-	-	-	-	1	2	2	2
K99 Other Chromosomal Anomalies	48	53	57	64	44	41	25	32	36	45	43	41	37	34	33	29	26	23
L Other and Unspecified Birth Defects	185	202	221	206	175	136	126	105	141	195	280	323	322	268	201	207	244	255

Table 20  
**Infant Deaths of Michigan Children with Reported Birth Defects  
 by Detailed Diagnostic Code Group and Birth Year,  
 Michigan Resident Children Born in Michigan During 2000–2019,  
 Cases Diagnosed within One Year from Birth  
 Three-year Infant Mortality Totals  
 (Continued)**

Other Reportable Conditions

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
M Infectious Conditions Occurring in the Perinatal Period	20	24	25	17	13	11	11	16	15	16	10	12	14	12	14	8	7	8
M01 Syphilis	1	2	2	2	1	1	1	2	2	1	-	-	-	-	-	-	-	-
M02 Other Infections	19	22	23	15	12	10	10	14	13	15	10	12	14	12	14	8	7	8
M03 Zika Virus Disease	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N Familial/Congenital Neoplasms	2	1	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-
O Endocrine/Metabolic Disorders	82	86	78	65	67	59	68	58	66	63	79	85	116	118	132	113	87	64
P Diseases of the Blood & Blood Forming Organs	45	42	37	46	52	53	49	48	59	57	52	50	61	64	60	55	49	52
Q Other Diseases of the Central and Peripheral Nervous System	31	31	28	30	30	37	32	31	24	24	24	28	29	36	41	49	40	31
R Other Diseases of the Eye	66	73	68	68	60	58	64	55	38	16	14	17	19	20	15	13	8	8
S Hearing Deficiency	14	23	24	23	15	14	13	13	11	10	9	8	13	18	19	18	13	14
T Other Diseases of the Heart & Circulatory System	119	99	102	97	109	113	112	103	87	85	84	98	105	101	93	77	65	62
U Other Diseases of the Gastrointestinal System	92	105	99	92	80	74	77	84	95	81	68	70	81	88	80	68	55	53
V Other Diseases of the Genital and Urinary Systems	1	2	3	3	2	1	1	1	1	2	3	4	5	6	10	10	10	6
X Other Musculoskeletal System Diseases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y Maternal Exposures Affecting Fetus	33	30	25	23	26	23	30	24	26	23	28	37	40	36	34	32	34	36
Y01 Newborn Affected by Maternal use of Alcohol	1	2	3	2	1	-	-	-	-	-	-	1	1	2	1	1	-	-
Y02 Fetal Alcohol Syndrome	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Y99 Other Maternal Exposures Affecting the Fetus	32	28	22	21	25	23	30	24	26	23	28	36	39	35	33	31	33	36
One or More Reportable Diagnosis	1,253	1,289	1,267	1,267	1,188	1,109	1,054	1,022	978	895	844	913	972	963	872	795	746	739

**Notes:**  
**Frequencies** include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.  
 Columns do not add to diagnostic group totals nor column totals due to cases with multiple diagnosed conditions that cross diagnostic groupings.  
**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies in this table represent cases diagnosed within the first year of life.  
 Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.)  
 Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 21**  
**Mortality Rates of Michigan Children with Reported Birth Defects**  
**by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2000–2019,**  
**Cases Diagnosed within One Year from Birth**  
**Moving Three-year Mortality Rates**

**Birth Defects**

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
A Central Nervous System Birth Defects	107.0	124.2	126.2	127.7	117.0	109.2	105.9	101.9	103.1	85.7	79.2	77.1	79.7	81.1	68.1	63.3	53.3	54.4
B Eye Birth Defects	26.9	28.4	30.2	25.4	26.0	21.7	22.8	19.1	18.5	14.1	18.0	14.4	16.2	16.0	21.1	24.0	20.7	13.5
C Ear, Face & Neck Birth Defects	37.0	40.1	43.6	49.8	40.3	36.6	34.5	43.5	42.3	31.3	28.1	15.9	15.6	18.3	23.5	26.2	25.5	22.9
D Heart & Circulatory System Birth Defects	78.5	82.7	77.7	75.9	65.6	64.7	66.7	74.3	75.1	67.0	59.8	60.9	60.6	60.3	54.3	51.8	44.3	39.7
E Respiratory System Birth Defects	119.1	112.4	117.5	109.6	88.4	75.0	72.2	78.7	89.1	77.4	71.5	65.6	73.3	71.8	69.7	55.6	43.2	39.0
F Cleft Palate and Cleft Lip	53.6	70.0	87.6	81.5	73.0	61.1	61.4	64.5	56.1	50.2	44.7	41.8	39.8	36.3	48.7	50.9	56.7	44.7
G Birth Defects of the Upper Alimentary Canal/ Digestive System	40.8	47.4	53.2	54.1	45.8	38.9	38.8	39.6	38.4	35.0	33.9	36.2	34.8	37.7	29.9	30.7	24.6	25.4
H Genital & Urinary Systems Birth Defects	29.9	35.6	37.5	34.3	27.9	26.7	30.6	37.9	38.0	32.0	24.9	22.4	22.2	22.8	23.0	20.5	17.4	15.8
I Musculoskeletal System Birth Defects	28.7	30.3	32.7	35.3	30.5	26.7	26.5	28.2	30.4	24.9	21.3	17.6	18.2	19.8	22.6	24.2	19.1	15.2
J Integument Birth Defects	22.4	22.6	15.3	10.9	8.0	7.5	5.4	5.2	5.0	5.4	4.3	4.6	4.3	5.8	6.9	8.8	7.6	5.1
K Chromosomal Anomalies	167.8	169.5	170.9	181.3	143.9	127.2	116.5	131.3	127.3	117.4	102.9	110.1	116.7	132.2	125.3	112.4	85.6	73.1
L Other and Unspecified Birth Defects	90.2	94.5	109.0	103.3	99.1	90.4	110.3	122.5	59.0	48.7	47.1	51.8	46.2	37.7	27.6	28.0	28.0	26.1

**Table 21**  
**Mortality Rates of Michigan Children with Reported Birth Defects**  
**by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 2000–2019,**  
**Cases Diagnosed within One Year from Birth**  
**Moving Three-year Mortality Rates**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
M Infectious Conditions Occurring in the Perinatal Period	93.0	112.7	142.9	114.1	100.8	86.6	65.5	86.5	75.4	94.7	54.9	56.9	56.0	51.9	64.8	47.6	45.5	49.7
N Familial/Congenital Neoplasms	*	*	-	-	-	*	*	*	-	-	-	-	-	-	-	-	-	-
O Endocrine/Metabolic Disorders	51.1	54.6	51.5	42.0	40.8	35.2	39.9	36.8	40.3	39.5	42.2	40.9	47.6	46.8	48.1	43.4	33.4	25.1
P Diseases of the Blood & Blood Forming Organs	60.3	54.7	47.0	54.2	58.4	59.0	55.6	58.3	65.7	59.3	48.1	42.9	46.7	44.9	39.9	40.5	38.6	44.0
Q Other Diseases of the Central and Peripheral Nervous System	27.3	27.7	24.3	24.9	23.6	29.3	26.5	27.7	22.5	21.6	20.3	22.0	20.9	25.3	27.4	37.8	29.8	24.1
R Other Diseases of the Eye	29.9	32.9	29.9	28.6	24.2	22.9	25.9	24.5	18.9	8.5	7.4	8.4	8.9	9.3	7.3	7.5	4.7	4.7
S Hearing Deficiency	8.6	13.3	15.0	15.1	9.7	9.0	8.6	9.0	6.9	4.9	3.5	2.6	3.9	5.8	5.9	6.1	4.2	5.5
T Other Diseases of the Heart & Circulatory System	81.8	72.4	79.1	77.7	82.5	80.3	76.8	75.5	65.3	66.2	57.3	62.3	61.7	63.3	58.4	52.4	44.3	43.4
U Other Diseases of the Gastrointestinal System	36.7	43.3	43.2	40.1	35.8	34.3	37.6	45.9	55.0	50.4	38.9	38.5	40.8	44.7	42.3	41.8	36.0	35.5
V Other Diseases of the Genital and Urinary Systems	*	*	*	*	*	*	*	*	*	*	*	*	*	15.4	18.1	14.7	11.6	6.0
X Other Musculoskeletal System Diseases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y Maternal Exposures Affecting Fetus	31.4	33.9	33.3	29.6	29.6	27.5	35.9	30.6	29.2	22.4	22.5	25.3	21.1	17.3	12.6	11.4	10.6	12.5
One or More Reportable Diagnosis	40.1	41.7	42.0	40.9	36.2	33.8	33.6	36.9	35.6	31.5	26.5	26.0	24.4	23.5	20.8	20.2	18.1	17.3

**Notes:**  
**Rates** are Per 1,000 Michigan Born Resident Live Births. Rates represent the infant mortality rate for children with a diagnosed birth defect. The rates include all deaths within the first year of life to children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

\*: Figure does not meet standards of reliability or precision.

**Conditions** are reportable if identified within the first two years of a child's life. The mortality data in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Table 22  
Mortality Rates of Michigan Children with Reported Birth Defects  
by Detailed Diagnostic Code Group and Birth Year,  
Michigan Resident Children Born in Michigan During 2000–2019,  
Cases Diagnosed within One Year from Birth  
Moving Three-year Mortality Rates

Birth Defects

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
A Central Nervous System (All)	107.0	124.2	126.2	127.7	117.0	109.2	105.9	101.9	103.1	85.7	79.2	77.1	79.7	81.1	68.1	63.3	53.3	54.4
A01 Anencephalus	976.7	900.0	886.8	860.0	891.3	909.1	871.8	875.0	860.5	775.0	756.8	790.7	871.8	891.9	862.1	875.0	904.8	952.4
A02 Spina Bifida w/o Anencephaly	59.5	74.7	65.9	80.2	69.3	60.3	45.2	41.2	48.5	47.3	*	*	*	*	*	*	*	*
A03 Hydrocephalus w/o Spina Bifida	111.8	144.2	141.5	155.5	151.3	136.7	121.9	113.5	122.0	99.7	97.5	107.3	126.0	138.8	127.3	146.8	121.3	121.4
A04 Encephalocele	142.9	175.0	190.5	260.0	244.9	224.5	184.2	*	*	*	*	*	*	*	*	*	187.5	*
A05 Microcephalus	60.2	87.1	94.4	79.9	70.0	73.1	72.0	71.8	61.3	60.3	45.7	35.5	37.2	49.6	56.8	54.0	46.3	43.1
A06 Holoprosencephaly	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	350.0	375.0
A99 Other CNS Anomalies	68.4	83.8	76.9	78.6	61.7	64.3	56.8	51.3	49.7	45.8	52.3	48.6	49.7	50.9	45.5	45.6	38.4	42.9
B Eye (All)	26.9	28.4	30.2	25.4	26.0	21.7	22.8	19.1	18.5	14.1	18.0	14.4	16.2	16.0	21.1	24.0	20.7	13.5
B01 Anophthalmos /Microphthalmos	139.5	106.4	102.3	87.5	106.7	109.6	115.9	118.6	*	*	*	*	130.4	173.9	244.4	176.5	160.7	*
B02 Congenital Cataract	*	55.0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	88.2	*
B03 Aniridia	-	-	-	*	*	*	-	-	-	-	-	*	*	*	*	*	*	*
B99 Other Eye Anomalies	17.2	19.1	22.9	21.2	23.2	16.2	17.0	12.7	14.2	9.4	12.6	8.6	12.1	11.7	14.6	14.8	11.0	9.2
C Ear, Face and Neck (All)	37.0	40.1	43.6	49.8	40.3	36.6	34.5	43.5	42.3	31.3	28.1	15.9	15.6	18.3	23.5	26.2	25.5	22.9
C01 Anotia/Microtia	*	*	*	*	*	*	*	*	*	*	*	*	*	*	104.5	100.0	71.4	*
C99 Other Ear, Face & Neck Anomalies	36.5	40.9	43.3	49.3	39.5	37.3	33.6	42.9	39.9	28.5	25.4	14.7	15.8	16.5	20.6	23.6	23.8	22.6

Table 22  
Mortality Rates of Michigan Children with Reported Birth Defects  
by Detailed Diagnostic Code Group and Birth Year,  
Michigan Resident Children Born in Michigan During 2000–2019,  
Cases Diagnosed within One Year from Birth  
Moving Three-year Mortality Rates  
(Continued)

Birth Defects

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
D Heart & Circulatory System (All)	78.5	82.7	77.7	75.9	65.6	64.7	66.7	74.3	75.1	67.0	59.8	60.9	60.6	60.3	54.3	51.8	44.3	39.7
D01 Common Truncus	155.6	135.6	113.2	122.8	120.0	140.0	218.2	227.3	235.3	170.2	172.4	134.6	137.3	208.3	279.1	323.5	176.5	*
D02 Transposition of Great Vessels	73.8	90.9	149.7	130.4	132.9	98.2	112.7	122.1	137.7	131.4	118.9	92.9	108.1	109.6	108.1	82.1	86.2	96.2
D03 Tetralogy of Fallot	113.2	82.9	98.0	102.4	90.0	72.5	96.3	135.4	119.4	98.4	81.7	94.1	106.4	108.7	102.2	82.4	52.9	47.9
D04 Ventricular Septal Defect	62.6	63.7	69.6	63.9	55.7	47.7	62.2	64.7	66.0	46.3	41.1	34.8	41.6	50.8	55.2	53.0	42.6	40.3
D05 Atrial Septal Defect	57.7	65.4	59.6	57.1	46.1	49.2	56.9	62.5	59.2	46.2	40.7	39.1	41.9	45.9	45.5	44.5	38.0	33.1
D06 Atrioventricular Septal Defect (Endocardial Cushion Defect)	115.2	116.7	124.0	160.3	139.7	138.9	121.5	153.4	133.7	106.4	69.0	73.9	106.1	146.7	160.2	183.3	160.0	144.6
D07 Pulmonary Valve Atresi& Stenosis	70.3	65.8	57.1	58.0	54.3	52.2	72.2	75.9	77.8	47.9	57.5	63.1	61.2	60.4	52.8	55.6	38.1	45.0
D08 Tricuspid Valve Atresi& Stenosis	152.8	90.9	*	*	*	*	173.1	153.8	137.3	*	*	*	*	146.3	171.4	250.0	200.0	216.2
D09 Ebstein's Anomaly	176.5	127.5	123.1	*	176.5	218.8	218.8	250.0	241.4	280.0	225.8	225.8	193.5	*	*	*	*	*
D10 Aortic Valve Stenosis	68.6	63.2	*	74.8	107.8	104.2	122.2	112.5	115.9	101.4	129.9	115.4	90.9	*	68.2	71.4	95.9	*
D11 Hypoplastic Left Heart Syndrome	352.9	324.0	280.5	273.3	307.2	347.3	370.9	398.7	390.1	379.6	279.7	345.9	313.3	358.6	294.1	301.7	241.1	155.2
D12 Patent Ductus Arteriosus	88.6	98.6	100.3	107.3	92.1	95.2	101.9	107.6	102.3	83.5	78.2	77.7	82.5	83.9	82.6	74.5	71.7	66.0
D13 Coarctation of Aorta	96.2	98.4	117.2	133.1	156.3	160.9	141.3	126.1	95.2	122.4	106.4	100.4	105.6	109.0	112.7	83.7	86.1	112.0
D14 Pulmonary Artery Anomalies	56.7	55.9	49.2	52.6	35.8	41.3	49.6	71.3	70.9	60.5	47.6	46.1	45.8	60.0	62.9	71.4	54.0	46.2
D15 Interrupted Aortic Arch	229.5	254.9	312.5	250.0	300.0	*	321.4	370.4	294.1	266.7	*	*	*	*	*	*	*	*
D16 Total Anomalous Pulmonary Venous Return (or connection)	243.9	214.3	155.6	117.6	120.7	148.1	212.8	256.4	208.3	142.9	148.9	191.5	180.0	155.6	146.3	238.1	250.0	187.5
D17 Double Outlet Right Ventricle	218.4	207.3	170.7	142.9	166.7	230.8	229.9	188.2	148.9	130.4	135.4	83.3	96.8	135.4	170.0	180.9	149.4	146.3
D18 Common Ventricel	190.5	229.5	187.5	130.4	96.8	95.2	212.1	228.1	205.9	122.8	83.3	114.8	*	*	*	112.9	*	*
D99 Other Heart & Circulatory System Anomalies	107.9	111.9	98.8	93.7	80.7	77.1	81.0	99.0	113.6	114.5	105.1	109.4	100.4	96.2	80.0	76.2	65.9	62.7

Table 22  
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Cases Diagnosed within One Year from Birth  
Moving Three-year Mortality Rates  
(Continued)

Birth Defects

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
E Respiratory System (All)	119.1	112.4	117.5	109.6	88.4	75.0	72.2	78.7	89.1	77.4	71.5	65.6	73.3	71.8	69.7	55.6	43.2	39.0
E01 Lung Agenesis/ Hypoplasia	542.5	434.9	401.1	408.2	418.7	438.8	370.4	297.8	261.0	247.2	281.1	310.0	374.5	391.3	376.5	321.2	274.6	247.3
E02 Choanal Atresia	"	"	"	"	"	"	"	"	95.2	"	101.4	92.1	101.3	95.9	123.1	111.1	"	-
E99 Other Respiratory System Anomalies	53.7	56.7	66.2	56.8	47.9	40.6	43.5	47.9	46.3	33.3	27.1	28.0	27.4	26.4	22.3	22.0	16.3	19.7
F Cleft Palate & Cleft Lip	53.6	70.0	87.6	81.5	73.0	61.1	61.4	64.5	56.1	50.2	44.7	41.8	39.8	36.3	48.7	50.9	56.7	44.7
F01 Cleft Palate	39.4	52.2	63.0	48.8	36.7	33.1	39.0	52.2	47.9	39.3	22.9	"	22.2	26.3	37.2	35.8	24.5	"
F02 Cleft Lip w & w/o Cleft Palate	35.5	48.1	70.8	74.6	77.8	65.3	53.3	42.9	30.5	38.2	48.0	50.8	43.8	29.7	46.8	51.0	65.6	46.2
G Upper Alimentary Caanal/ Digestive System (All)	40.8	47.4	53.2	54.1	45.8	38.9	38.8	39.6	38.4	35.0	33.9	36.2	34.8	37.7	29.9	30.7	24.6	25.4
G01 Esophageal Atresia/ Tracheoesophageal Fistula	112.0	132.4	147.1	149.3	121.0	110.2	115.4	156.6	111.1	97.2	95.2	149.4	151.2	160.5	147.1	181.8	136.4	105.3
G02 Rectal & Large Intestinal Atresia/Stenosis	45.0	64.2	94.2	117.0	103.4	78.1	65.2	64.5	50.3	42.7	65.5	79.1	94.1	81.3	69.4	53.0	56.0	57.4
G03 Pyloric Stenosis	9.8	7.8	"	"	"	"	"	-	"	"	"	"	"	-	"	"	"	-
G04 Hirschsprung's Disease (congenital megacolon)	44.1	45.1	"	"	"	"	"	"	"	"	"	"	"	"	"	"	30.6	40.8
G05 Biliary Atresia	"	"	"	"	"	"	"	"	"	"	-	"	"	"	"	"	"	"
G99 Other Upper Alimentary Canal /Digestive System Anomalies	55.8	65.8	73.6	71.0	59.7	48.3	51.8	52.4	58.5	50.6	44.1	36.5	36.1	45.3	38.2	36.2	23.0	24.7
H Genital & Urinary Systems	29.9	35.6	37.5	34.3	27.9	26.7	30.6	37.9	38.0	32.0	24.9	22.4	22.2	22.8	23.0	20.5	17.4	15.8
H01 Renal Agenesis/ Hypoplasia	179.4	209.9	232.1	211.7	170.7	175.1	192.1	229.4	216.5	187.9	159.1	142.9	139.2	121.7	112.1	99.0	79.2	79.1
H02 Bladder Exstrophy & Cloacal Exstrophy	-	-	-	"	"	"	-	"	"	"	"	-	-	-	-	-	-	-
H03 Obstructive Genitourinary Defects	30.7	38.5	50.1	46.1	38.3	32.3	37.5	47.6	49.3	39.4	26.3	26.9	25.5	29.3	29.8	29.7	23.4	17.8
H04 Hypospadias	17.2	18.8	20.9	18.8	17.2	14.7	15.2	15.9	10.6	6.1	6.0	5.0	9.7	11.7	12.7	10.7	8.1	9.4
H05 Epispadias	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	"	"
H99 Other Genital & Urinary System Anomalies	27.3	32.4	33.4	30.6	25.4	24.3	26.9	33.5	34.8	31.8	24.2	19.8	19.2	21.9	24.1	22.0	17.6	14.4

Table 22  
Mortality Rates of Michigan Children with Reported Birth Defects  
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Michigan Resident Children Born in Michigan During 2000–2019,  
Cases Diagnosed within One Year from Birth  
Moving Three-year Mortality Rates  
(Continued)

Birth Defects

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019
I Musculoskeletal System (All)	28.7	30.3	32.7	35.3	30.5	26.7	26.5	28.2	30.4	24.9	21.3	17.6	18.2	19.8	22.6	24.2	19.1	15.2
I01 Upper Limb Reduction Deformities	*	55.6	79.2	97.8	107.1	63.8	67.3	*	*	*	63.8	*	*	*	73.2	82.2	*	*
I02 Lower Limb Reduction Deformities	*	*	*	*	68.0	*	*	*	*	*	*	66.7	79.5	*	*	*	*	*
I03a Exomphalos/Omphalocele	---	---	---	---	---	---	---	---	---	---	197.2	187.5	224.1	134.6	194.0	122.4	87.5	34.7
I03b Gastroschisis	---	---	---	---	---	---	---	---	---	---	61.7	50.0	65.2	81.5	86.7	52.6	48.3	48.8
I03c Prune Belly Syndrome, Congenital Hernia of Bladder	89.0	120.0	107.8	128.2	101.6	106.9	87.3	97.2	117.3	154.5	185.2	141.4	123.9	94.7	*	*	*	-
I04 Congenital Hip Dislocation	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	30.3	25.0	24.4
I05 Diaphragmatic Hernia	293.1	325.4	313.0	293.2	213.2	215.4	227.3	248.0	250.0	224.0	273.6	344.1	386.1	367.0	336.1	310.0	208.3	157.3
I99 Other Musculoskeletal System	23.9	23.7	27.2	28.5	26.0	21.5	21.2	22.2	23.3	18.0	13.7	10.9	11.2	13.7	16.1	19.8	16.4	13.9
J Integument (All)	22.4	22.6	15.3	10.9	8.0	7.5	5.4	5.2	5.0	5.4	4.3	4.6	4.3	5.8	6.9	8.8	7.6	5.1
K Chromosomal Anomalies	167.8	169.5	170.9	181.3	143.9	127.2	116.5	131.3	127.3	117.4	102.9	110.1	116.7	132.2	125.3	112.4	85.6	73.1
K01 Trisomy 13	771.4	735.3	777.8	790.7	729.7	628.6	607.1	655.2	692.3	642.9	724.1	800.0	892.9	833.3	772.7	714.3	736.8	722.2
K02 Down Syndrome	94.6	98.6	90.5	92.6	65.7	61.3	65.4	80.5	67.4	48.1	29.7	47.8	63.3	80.7	64.5	52.4	44.6	40.4
K03 Trisomy 18	672.7	642.9	600.0	655.7	686.3	640.0	631.6	642.9	692.3	739.1	674.4	659.6	608.7	696.4	711.5	717.4	500.0	363.6
K04 Chromosome 22q11.2 Deletion Syndrome	---	---	---	---	---	---	---	*	*	-	*	*	*	*	*	*	*	-
K05 Turner Syndrome	*	-	*	*	*	*	*	-	-	-	-	-	-	-	*	*	*	*
K99 Other Chromosomal Anomalies	147.2	158.2	169.6	179.8	133.3	117.5	70.8	83.1	95.7	117.8	110.0	96.0	86.2	84.2	83.5	78.0	69.3	62.7
L Other and Unspecified Birth Defects	90.2	94.5	109.0	103.3	99.1	90.4	110.3	122.5	59.0	48.7	47.1	51.8	46.2	37.7	27.6	28.0	28.0	26.1

**Table 22**  
**Mortality Rates of Michigan Children with Reported Birth Defects**  
**by Detailed Diagnostic Code Group and Birth Year,**  
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**Cases Diagnosed within One Year from Birth**  
**Moving Three-year Mortality Rates**  
**(Continued)**

Other Reportable Conditions

Diagnostic Grouping	2000 to 2002	2001 to 2003	2002 to 2004	2003 to 2005	2004 to 2006	2005 to 2007	2006 to 2008	2007 to 2009	2008 to 2010	2009 to 2011	2010 to 2012	2011 to 2013	2012 to 2014	2013 to 2015	2014 to 2016	2015 to 2017	2016 to 2018	2017 to 2019	
M Infectious Conditions Occurring in the Perinatal Period	93.0	112.7	142.9	114.1	100.8	86.6	65.5	86.5	75.4	94.7	54.9	56.9	56.0	51.9	64.8	47.6	45.5	49.7	
M01 Syphilis	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
M02 Other Infections	136.7	170.5	193.3	153.1	123.7	105.3	82.0	110.2	94.9	120.0	69.0	75.5	81.4	75.9	92.1	61.1	55.6	59.7	
M03 Zika Virus Disease	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
N Familial/Congenital Neoplasms	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
O Endocrine/Metabolic Disorders	51.1	54.6	51.5	42.0	40.8	35.2	39.9	36.8	40.3	39.5	42.2	40.9	47.6	46.8	48.1	43.4	33.4	25.1	
P Diseases of the Blood & Blood Forming Organs	60.3	54.7	47.0	54.2	58.4	59.0	55.6	58.3	65.7	59.3	48.1	42.9	46.7	44.9	39.9	40.5	38.6	44.0	
Q Other Diseases of the Central and Peripheral Nervous System	27.3	27.7	24.3	24.9	23.6	29.3	26.5	27.7	22.5	21.6	20.3	22.0	20.9	25.3	27.4	37.8	29.8	24.1	
R Other Diseases of the Eye	29.9	32.9	29.9	28.6	24.2	22.9	25.9	24.5	18.9	8.5	7.4	8.4	8.9	9.3	7.3	7.5	4.7	4.7	
S Hearing Deficiency	8.6	13.3	15.0	15.1	9.7	9.0	8.6	9.0	6.9	4.9	3.5	2.6	3.9	5.8	5.9	6.1	4.2	5.5	
T Other Diseases of the Heart & Circulatory System	81.8	72.4	79.1	77.7	82.5	80.3	76.8	75.5	65.3	66.2	57.3	62.3	61.7	63.3	58.4	52.4	44.3	43.4	
U Other Diseases of the Gastrointestinal System	36.7	43.3	43.2	40.1	35.8	34.3	37.6	45.9	55.0	50.4	38.9	38.5	40.8	44.7	42.3	41.8	36.0	35.5	
V Other Diseases of the Genital and Urinary Systems	*	*	*	*	*	*	*	*	*	*	*	*	*	*	15.4	18.1	14.7	11.6	6.0
X Other Musculoskeletal System Diseases	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Y Maternal Exposures Affecting Fetus	31.4	33.9	33.3	29.6	29.6	27.5	35.9	30.6	29.2	22.4	22.5	25.3	21.1	17.3	12.6	11.4	10.6	12.5	
Y01 Newborn Affected by Maternal use of Alcohol	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Y02 Fetal Alcohol Syndrome	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Y99 Other Maternal Exposures Affecting the Fetus	32.1	33.3	31.2	28.8	30.4	29.2	37.3	31.3	29.8	23.1	23.0	25.2	21.0	17.1	12.4	11.1	10.4	12.7	
One or More Reportable Diagnosis	40.1	41.7	42.0	40.9	36.2	33.8	33.6	36.9	35.6	31.5	26.5	26.0	24.4	23.5	20.8	20.2	18.1	17.3	

**Notes:**

**Rates** are per 1,000 Michigan Born Resident Live Births. Rates represent the infant mortality rate for children with a diagnosed birth defect. The rates include all deaths within the first year of life to children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies in this table represent cases diagnosed within the first year of life.

\*: Figure does not meet standards of reliability or precision.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD–9–CM. (See Birth Defect Groups and ICD–9–CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD–10–CM. (See Birth Defect Groups and ICD–10–CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 23**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 1999–2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Infant Mortality Totals**

Birth Defects

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
A Central Nervous System Birth Defects	372	376	395	385	380	351	326	286	260	258	246	253	250	252	242	228
B Eye Birth Defects	59	60	61	57	51	46	39	35	35	33	34	40	45	49	47	46
C Ear, Face & Neck Birth Defects	51	60	55	53	55	52	48	38	41	34	29	34	40	48	56	64
D Heart & Circulatory System Birth Defects	1,164	1,174	1,164	1,125	1,128	1,067	1,012	929	897	885	844	810	817	818	773	731
E Respiratory System Birth Defects	465	451	443	442	414	358	322	279	249	229	242	248	248	240	220	215
F Cleft Palate and Cleft Lip	84	85	92	94	89	85	71	66	62	54	50	45	51	51	53	53
G Birth Defects of the Upper Alimentary Canal/ Digestive System	202	206	207	199	196	180	156	144	134	129	117	115	109	107	100	89
H Genital & Urinary Systems Birth Defects	371	372	366	367	361	339	308	294	285	265	254	241	247	234	225	223
I Musculoskeletal System Birth Defects	409	420	412	403	402	363	342	304	287	275	276	286	294	303	287	278
J Integument Birth Defects	34	35	39	34	32	35	35	34	28	33	37	42	50	53	57	56
K Chromosomal Anomalies	311	313	286	271	275	253	234	211	210	215	210	209	211	207	194	177
L Other and Unspecified Birth Defects	398	391	377	357	332	280	277	321	385	464	517	548	524	529	512	456

**Table 23**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 1999–2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Infant Mortality Totals**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
M Infectious Conditions Occurring in the Perinatal Period	37	37	37	36	28	29	26	27	26	27	30	22	26	22	19	22
N Familial/Congenital Neoplasms	2	2	1	1	1	1	1	1	1	-	-	-	-	-	-	-
O Endocrine/Metabolic Disorders	151	147	153	137	133	125	125	131	137	151	179	197	217	229	205	196
P Diseases of the Blood & Blood Forming Organs	94	91	94	90	95	100	112	106	100	109	118	116	110	116	113	112
Q Other Diseases of the Central and Peripheral Nervous System	59	61	61	65	62	61	61	56	55	52	53	60	69	78	76	72
R Other Diseases of the Eye	130	134	133	126	132	115	96	80	69	55	35	34	32	32	28	23
S Hearing Deficiency	33	37	38	38	36	28	25	23	22	19	23	27	27	31	31	33
T Other Diseases of the Heart & Circulatory System	235	216	208	215	209	212	200	197	187	185	190	185	191	182	166	155
U Other Diseases of the Gastrointestinal System	186	184	185	173	169	164	169	158	152	165	162	156	150	149	143	133
V Other Diseases of the Genital and Urinary Systems	4	4	4	4	4	3	2	3	4	5	7	9	14	15	16	16
X Other Musculoskeletal System Diseases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y Maternal Exposures Affecting Fetus	62	56	56	48	53	50	49	53	52	63	63	64	71	72	70	70
<b>One or More Reportable Diagnosis</b>	<b>2,518</b>	<b>2,520</b>	<b>2,477</b>	<b>2,376</b>	<b>2,321</b>	<b>2,210</b>	<b>2,087</b>	<b>1,949</b>	<b>1,866</b>	<b>1,891</b>	<b>1,867</b>	<b>1,807</b>	<b>1,785</b>	<b>1,767</b>	<b>1,709</b>	<b>1,611</b>

**Notes:**

**Frequencies** include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects mortality rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details. Columns do not add to diagnostic group totals nor column totals due to cases with multiple diagnosed conditions that cross diagnostic groupings.

**Conditions** are reportable if identified within the first two years of a child's life. The mortality data in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Table 24  
 Infant Deaths of Michigan Children with Reported Birth Defects  
 by Detailed Diagnostic Code Group and Birth Year,  
 Michigan Resident Children Born in Michigan During 1999–2019,  
 Cases Diagnosed within One Year from Birth  
 Six-year Infant Mortality Totals

Birth Defects																
Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
A Central Nervous System (All)	372	376	395	385	380	351	326	286	260	258	246	253	250	252	242	228
A01 Anencephalus	86	85	77	77	77	76	67	65	63	71	65	61	59	55	52	45
A02 Spina Bifida w/o Anencephaly	27	25	27	23	24	21	20	16	12	11	10	8	4	4	6	5
A03 Hydrocephalus w/o Spina Bifida	111	116	127	116	114	107	98	79	70	69	62	61	63	69	63	60
A04 Encephalocele	15	19	19	19	20	17	14	9	8	6	4	5	8	7	8	8
A05 Microcephalus	57	54	62	68	59	54	51	49	41	34	38	42	47	46	52	57
A06 Holoprosencephaly	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
A99 Other CNS Anomalies	104	107	110	109	106	87	84	74	74	71	74	89	96	103	97	101
B Eye (All)	59	60	61	57	51	46	39	35	35	33	34	40	45	49	47	46
B01 Anophthalmos /Microphthalmos	18	19	18	17	15	15	12	11	11	9	9	12	16	15	17	15
B02 Congenital Cataract	7	8	9	9	9	7	8	7	7	5	3	3	5	6	6	6
B03 Aniridia	---	1	1	1	1	1	1	---	---	1	1	1	1	2	2	1
B99 Other Eye Anomalies	39	40	43	39	37	34	27	23	22	21	23	27	28	31	28	30
C Ear, Face and Neck (All)	51	60	55	53	55	52	48	38	41	34	29	34	40	48	56	64
C01 Anotia/Microtia	5	5	4	4	6	4	5	6	6	5	3	6	8	8	9	9
C99 Other Ear, Face & Neck Anomalies	49	58	54	52	53	50	46	35	38	31	27	30	35	44	51	59
D Heart & Circulatory System (All)	1,164	1,174	1,164	1,125	1,128	1,067	1,012	929	897	885	844	810	817	818	773	731
D01 Common Truncus	14	14	14	13	19	16	19	20	20	19	15	20	19	18	16	14
D02 Transposition of Great Vessels	33	32	36	38	37	39	35	34	33	32	34	33	29	27	26	26
D03 Tetralogy of Fallot	50	45	36	35	42	44	39	40	43	43	39	37	38	34	29	26
D04 Ventricular Septal Defect	224	210	200	196	211	193	174	164	156	144	128	140	146	153	153	164
D05 Atrial Septal Defect	325	345	354	362	394	373	364	347	344	331	324	339	368	390	387	392
D06 Atrioventricular Septal Defect (Endocardial Cushion Defect)	60	63	60	60	64	61	55	46	43	40	41	41	44	54	55	53
D07 Pulmonary Valve Atresia & Stenosis	64	59	57	51	61	55	54	49	50	49	37	41	40	41	33	34
D08 Tricuspid Valve Atresia & Stenosis	14	14	10	9	12	11	11	13	11	11	7	9	10	10	12	14
D09 Ebstein's Anomaly	26	24	19	15	10	13	14	14	14	14	13	11	9	8	5	3
D10 Aortic Valve Stenosis	15	15	17	14	19	20	18	18	19	17	14	13	15	13	10	10
D11 Hypoplastic Left Heart Syndrome	113	107	109	104	103	114	113	108	103	110	104	92	95	87	79	58
D12 Patent Ductus Arteriosus	465	495	503	516	559	504	473	430	405	369	353	357	387	385	386	401
D13 Coarctation of Aorta	60	56	64	72	71	69	62	62	54	46	54	54	57	52	52	58
D14 Pulmonary Artery Anomalies	95	92	80	77	85	84	85	75	71	59	41	33	37	45	51	62
D15 Interrupted Aortic Arch	24	22	22	20	17	19	15	17	15	15	12	8	7	5	4	3
D16 Total Anomalous Pulmonary Venous Return (or connection)	18	16	16	15	16	17	18	16	17	19	15	14	15	19	16	12
D17 Double Outlet Right Ventricle	32	31	31	35	32	30	35	32	29	21	21	26	24	26	26	29
D18 Common Venotrikel	16	17	20	18	23	19	20	21	19	21	12	11	12	12	10	8
D99 Other Heart & Circulatory System Anomalies	597	597	598	561	553	541	527	508	505	532	516	489	464	444	418	382

Table 24  
(Continued)  
Birth Defects

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
E Respiratory System (All)	465	451	443	442	414	358	322	279	249	229	242	248	248	240	220	215
E01 Lung Agenesis/ Hypoplasia	299	283	258	246	229	188	175	147	137	133	155	160	158	150	143	142
E02 Choanal Atresia	5	5	5	4	5	6	9	9	11	13	13	14	15	14	11	8
E99 Other Respiratory System Anomalies	179	184	199	212	200	179	150	132	109	91	81	80	80	82	73	74
F Cleft Palate & Cleft Lip	84	85	92	94	89	85	71	66	62	54	50	45	51	51	53	53
F01 Cleft Palate	34	33	34	36	33	34	30	28	27	22	21	17	18	19	17	18
F02 Cleft Lip w & w/o Cleft Palate	39	40	46	49	45	42	33	31	30	26	27	26	32	30	31	31
G Upper Alimentary Canal/ Digestive System (All)	202	206	207	199	196	180	156	144	134	129	117	115	109	107	100	89
G01 Esophageal Atresia/ Tracheoesophageal Fistula	34	34	33	33	32	28	21	19	21	21	20	21	23	25	22	18
G02 Rectal & Large Intestinal Atresia/Stenosis	30	31	33	33	34	31	23	19	21	22	23	24	24	23	20	17
G03 Pyloric Stenosis	13	13	9	7	6	3	3	2	2	2	2	2	2	2	1	1
G04 Hirshsprung's Disease (congenital megacolon)	8	7	7	3	3	2	2	4	4	5	5	5	6	8	8	10
G05 Biliary Atresia	6	6	6	6	5	8	7	6	5	6	5	3	4	5	6	5
G99 Other Upper Alimentary Canal /Digestive System Anomalies	140	145	148	144	143	131	117	108	95	89	79	78	66	62	59	53
H Genital & Urinary Systems	371	372	366	367	361	339	308	294	285	265	254	241	247	234	225	223
H01 Renal Agenesis/ Hypoplasia	98	94	86	93	91	85	80	75	78	71	64	56	54	52	44	42
H02 Bladder Exstrophy & Cloacal Exstrophy	1	2	2	2	2	3	4	2	2	2	2	1	-	-	-	-
H03 Obstructive Genitourinary Defects	65	69	70	75	76	73	64	60	58	58	54	55	64	67	68	67
H04 Hypospadias	37	44	42	41	40	38	29	24	25	18	19	22	23	25	25	28
H05 Epispadias	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
H99 Other Genital & Urinary System Anomalies	253	247	247	244	233	217	195	189	178	159	159	157	160	148	143	141

Table 24  
(Continued)  
Birth Defects

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
I Musculoskeletal System (All)	409	420	412	403	402	363	342	304	287	275	276	286	294	303	287	278
I01 Upper Limb Reduction Deformities	13	14	15	14	16	13	10	12	10	9	7	8	11	8	7	7
I02 Lower Limb Reduction Deformities	9	9	10	9	7	9	6	5	6	8	10	9	11	11	9	8
I03a Exomphalos/Omphalocele	---	---	---	---	---	---	---	---	---	---	---	21	25	25	21	19
I03b Gastroschisis	---	---	---	---	---	---	---	---	---	---	---	21	20	16	18	19
I03c Prune Belly Syndrome, Congenital Hernia of Bladder	42	47	50	50	52	47	47	39	36	33	31	24	19	15	10	5
I04 Congenital Hip Dislocation	8	8	6	5	4	4	5	3	3	2	3	6	5	9	10	11
I05 Diaphragmatic Hernia	74	73	70	69	69	60	59	58	60	63	67	69	73	70	60	55
I99 Other Musculoskeletal System	299	309	304	300	294	271	243	210	187	173	167	177	184	203	205	204
J Integument (All)	34	35	39	34	32	35	35	34	28	33	37	42	50	53	57	56
K Chromosomal Anomalies	311	313	286	271	275	253	234	211	210	215	210	209	211	207	194	177
K01 Trisomy 13	59	61	52	50	51	46	40	35	40	42	43	41	41	40	34	30
K02 Down Syndrome	93	93	84	76	78	71	63	54	50	53	50	47	47	50	52	43
K03 Trisomy 18	86	77	80	71	76	71	68	70	65	67	62	68	68	61	56	49
K04 Chromosome 22q11.2 Deletion Syndrome	---	---	---	---	---	---	---	---	4	5	3	3	4	4	2	1
K05 Turner Syndrome	2	3	3	3	3	3	2	1	-	-	-	-	1	2	2	3
K99 Other Chromosomal Anomalies	104	112	97	98	89	76	77	70	75	77	82	77	74	66	60	56
L Other and Unspecified Birth Defects	398	391	377	357	332	280	277	321	385	464	517	548	524	529	512	456

**Table 24**  
**Infant Deaths of Michigan Children with Reported Birth Defects**  
**by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 1999–2019,**  
**Cases Diagnosed within One Year from Birth**  
**Six-year Infant Mortality Totals**  
**(Continued)**

Other Reportable Conditions

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
M Infectious Conditions Occurring in the Perinatal Period	37	37	37	36	28	29	26	27	26	27	30	22	26	22	19	22
M01 Syphilis	2	3	3	3	3	3	3	2	2	2	1	-	-	-	-	-
M02 Other Infections	35	34	34	33	25	26	23	25	24	25	29	22	26	22	19	22
M03 Zika Virus Disease	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N Familial/Congenital Neoplasms	2	2	1	1	1	1	1	1	1	-	-	-	-	-	-	-
O Endocrine/Metabolic Disorders	151	147	153	137	133	125	125	131	137	151	179	197	217	229	205	196
P Diseases of the Blood & Blood Forming Organs	94	91	94	90	95	100	112	106	100	109	118	116	110	116	113	112
Q Other Diseases of the Central and Peripheral Nervous System	59	61	61	65	62	61	61	56	55	52	53	60	69	78	76	72
R Other Diseases of the Eye	130	134	133	126	132	115	96	80	69	55	35	34	32	32	28	23
S Hearing Deficiency	33	37	38	38	36	28	25	23	22	19	23	27	27	31	31	33
T Other Diseases of the Heart & Circulatory System	235	216	208	215	209	212	200	197	187	185	190	185	191	182	166	155
U Other Diseases of the Gastrointestinal System	186	184	185	173	169	164	169	158	152	165	162	156	150	149	143	133
V Other Diseases of the Genital and Urinary Systems	4	4	4	4	4	3	2	3	4	5	7	9	14	15	16	16
X Other Musculoskeletal System Diseases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y Maternal Exposures Affecting Fetus	62	56	56	48	53	50	49	53	52	63	63	64	71	72	70	70
Y01 Newborn Affected by Maternal use of Alcohol	5	3	3	3	2	1	-	-	-	1	1	2	2	2	2	1
Y02 Fetal Alcohol Syndrome	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Y99 Other Maternal Exposures Affecting the Fetus	58	53	53	45	51	49	49	53	52	62	62	63	69	70	68	69
One or More Reportable Diagnosis	2,518	2,520	2,477	2,376	2,321	2,210	2,087	1,949	1,866	1,891	1,867	1,807	1,785	1,767	1,709	1,611

**Notes:**

**Frequencies** include all children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. This enables the calculation of birth defects prevalence rates. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details. Columns do not add to diagnostic group totals nor column totals due to cases with multiple diagnosed conditions that cross diagnostic groupings.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

**Table 25**  
**Mortality Rates of Michigan Children with Reported Birth Defects**  
**by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 1999–2019,**  
**Cases Diagnosed within One Year from Birth**  
**Moving Six-year Mortality Rates**

**Birth Defects**

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
A Central Nervous System Birth Defects	120.0	117.6	120.5	117.6	117.0	110.0	106.4	96.7	90.9	89.8	82.4	80.3	71.9	70.8	66.9	61.9
B Eye Birth Defects	25.9	26.1	27.3	26.2	24.2	22.8	20.2	18.5	18.6	16.2	15.3	16.8	18.1	19.9	18.1	17.5
C Ear, Face & Neck Birth Defects	39.2	43.3	40.2	40.2	42.6	41.8	39.3	33.0	35.8	28.5	22.1	21.9	21.0	22.4	22.6	23.2
D Heart & Circulatory System Birth Defects	79.2	77.1	73.7	71.0	71.4	69.6	69.3	66.8	67.5	68.0	63.5	60.1	57.3	56.2	52.1	47.0
E Respiratory System Birth Defects	127.9	113.9	99.1	93.5	90.0	84.4	79.8	74.0	75.3	76.3	75.0	71.6	67.9	64.5	57.6	54.8
F Cleft Palate and Cleft Lip	65.2	67.5	71.5	74.2	71.5	68.8	58.8	56.1	55.4	49.3	45.0	40.1	45.5	45.4	46.0	46.8
G Birth Defects of the Upper Alimentary Canal/ Digestive System	45.5	46.9	46.6	45.9	46.1	42.8	38.6	37.2	37.1	37.4	34.9	35.8	33.0	32.8	31.2	27.7
H Genital & Urinary Systems Birth Defects	32.9	32.1	31.7	32.0	32.5	32.3	31.3	31.2	31.5	29.3	26.3	23.7	22.7	21.4	20.2	19.5
I Musculoskeletal System Birth Defects	32.2	31.9	30.4	29.6	30.8	29.5	28.2	25.8	24.5	22.9	20.9	20.4	20.2	20.9	19.5	19.0
J Integument Birth Defects	17.6	15.4	12.0	9.9	7.1	6.5	6.0	5.4	4.8	4.8	4.7	5.3	5.9	6.3	6.5	6.1
K Chromosomal Anomalies	175.7	174.8	156.4	148.7	148.8	137.7	127.2	117.0	117.1	118.8	117.1	117.5	117.7	114.6	108.7	99.3
L Other and Unspecified Birth Defects	103.7	96.7	96.6	101.1	105.8	106.7	71.1	62.4	56.6	53.8	47.1	42.0	38.8	36.8	32.3	26.7

**Table 25**  
**Mortality Rates of Michigan Children with Reported Birth Defects**  
**by Summary Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 1999–2019,**  
**Cases Diagnosed within One Year from Birth**  
**Moving Six-year Mortality Rates**  
**(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
M Infectious Conditions Occurring in the Perinatal Period	95.1	101.6	108.2	119.2	88.3	92.4	79.8	80.1	70.8	65.9	71.6	53.3	60.9	52.6	49.4	58.4
N Familial/Congenital Neoplasms	*	*	*	*	*	*	*	*	*	-	-	-	-	-	-	-
O Endocrine/Metabolic Disorders	49.4	46.6	47.6	42.9	40.9	38.9	37.7	39.7	39.8	40.6	44.4	44.9	45.0	45.4	40.0	37.0
P Diseases of the Blood & Blood Forming Organs	62.8	57.1	56.7	53.3	54.9	58.4	62.3	57.5	52.5	52.8	52.0	46.3	41.2	43.5	41.9	41.7
Q Other Diseases of the Central and Peripheral Nervous System	25.5	26.1	25.5	26.9	25.7	25.5	26.2	24.2	23.9	22.3	21.2	23.0	24.9	29.1	27.5	25.9
R Other Diseases of the Eye	28.8	29.2	28.3	26.2	27.2	24.3	21.1	18.4	16.6	13.6	8.7	8.4	7.8	8.3	7.2	6.1
S Hearing Deficiency	11.6	11.7	11.6	12.0	11.8	9.4	7.9	6.5	5.5	4.1	4.3	4.7	4.3	5.0	5.0	5.7
T Other Diseases of the Heart & Circulatory System	82.4	79.9	77.4	79.7	77.2	79.0	73.0	71.8	66.1	63.7	63.7	60.5	60.3	57.4	54.2	51.3
U Other Diseases of the Gastrointestinal System	38.6	38.3	39.7	38.9	38.9	40.3	43.5	43.2	42.4	46.5	45.1	42.0	40.4	41.2	40.9	39.3
V Other Diseases of the Genital and Urinary Systems	*	*	*	*	*	*	*	*	*	*	15.4	15.6	18.2	15.6	12.8	10.3
X Other Musculoskeletal System Diseases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y Maternal Exposures Affecting Fetus	34.0	30.6	31.8	30.3	32.8	30.1	28.4	28.5	25.6	26.8	21.6	19.2	17.0	15.3	13.2	12.5
One or More Reportable Diagnosis	41.8	40.5	38.9	37.7	37.2	36.5	34.6	32.6	31.3	30.2	27.4	24.8	23.1	22.3	20.8	19.0

**Notes:**

**Rates** are Per 1,000 Michigan Born Resident Live Births. Rates represent the infant mortality rate for children with a diagnosed birth defect. The rates include all deaths within the first year of life to children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

\*: Figure does not meet standards of reliability or precision.

**Conditions** are reportable if identified within the first two years of a child's life. The mortality data in this table represent cases diagnosed within the first year of life.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.)

Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

Table 26  
Mortality Rates of Michigan Children with Reported Birth Defects  
by Detailed Diagnostic Code Group and Birth Year,  
Michigan Resident Children Born in Michigan During 1999–2019,  
Cases Diagnosed within One Year from Birth  
Moving Six-year Mortality Rates

Birth Defects

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
A Central Nervous System (All)	120.0	117.6	120.5	117.6	117.0	110.0	106.4	96.7	90.9	89.8	82.4	80.3	71.9	70.8	66.9	61.9
A01 Anencephalus	924.7	914.0	895.3	895.3	865.2	883.7	881.6	822.8	818.2	825.6	822.8	824.3	819.4	873.0	896.6	900.0
A02 Spina Bifida w/o Anencephaly	78.9	70.4	71.8	62.8	62.2	56.5	54.9	46.1	36.7	35.9	35.1	27.6	*	*	23.3	*
A03 Hydrocephalus w/o Spina Bifida	125.1	132.7	147.7	139.1	139.0	133.4	130.1	112.4	106.7	115.6	111.7	116.9	117.5	136.4	130.2	124.7
A04 Encephalocele	187.5	206.5	213.5	208.8	227.3	202.4	184.2	142.9	125.0	95.2	*	*	100.0	90.9	108.1	114.3
A05 Microcephalus	76.7	70.1	78.2	83.3	75.9	70.9	68.0	66.5	58.7	47.2	47.2	48.1	48.2	46.3	47.9	50.1
A06 Holoprosencephaly	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
A99 Other CNS Anomalies	75.9	73.9	72.1	70.6	67.8	56.8	57.5	51.8	51.8	49.1	48.1	51.5	46.6	47.3	44.2	44.4
B Eye (All)	25.9	26.1	27.3	26.2	24.2	22.8	20.2	18.5	18.6	16.2	15.3	16.8	18.1	19.9	18.1	17.5
B01 Anophthalmos /Microphthalmos	111.8	114.5	106.5	105.6	100.7	111.9	94.5	91.7	100.9	83.3	92.8	125.0	161.6	154.6	166.7	161.3
B02 Congenital Cataract	32.9	36.7	45.0	46.4	48.4	42.4	49.1	45.2	46.1	*	*	*	*	46.5	47.6	47.2
B03 Aniridia	-	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*
B99 Other Eye Anomalies	18.9	19.2	21.1	19.7	19.3	18.3	15.3	13.3	12.7	11.1	11.0	12.1	11.9	13.4	11.4	12.0
C Ear, Face and Neck (All)	39.2	43.3	40.2	40.2	42.6	41.8	39.3	33.0	35.8	28.5	22.1	21.9	21.0	22.4	22.6	23.2
C01 Anotia/Microtia	*	*	*	*	54.5	*	*	54.1	52.2	*	*	52.6	64.5	64.5	66.2	61.6
C99 Other Ear, Face & Neck Anomalies	38.7	42.8	40.2	40.3	41.9	41.1	38.5	31.2	34.2	26.6	21.0	19.7	18.7	20.8	20.9	21.7

Table 26  
Mortality Rates of Michigan Children with Reported Birth Defects  
by Detailed Diagnostic Code Group and Birth Year,  
Michigan Resident Children Born in Michigan During 1999–2019,  
Cases Diagnosed within One Year from Birth  
Moving Six-year Mortality Rates  
(Continued)

Birth Defects

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
D Heart & Circulatory System (All)	79.2	77.1	73.7	71.0	71.4	69.6	69.3	66.8	67.5	68.0	63.5	60.1	57.3	56.2	52.1	47.0
D01 Common Truncus	140.0	137.3	128.4	126.2	169.6	170.2	188.1	196.1	196.1	184.5	153.1	188.7	200.0	211.8	195.1	189.2
D02 Transposition of Great Vessels	115.8	103.2	113.9	122.6	122.1	128.3	116.3	121.9	120.4	115.1	119.3	114.2	100.7	95.7	99.2	103.2
D03 Tetralogy of Fallot	117.9	107.9	86.3	85.2	99.3	112.2	95.6	97.3	107.5	106.7	102.4	94.4	97.9	95.0	81.9	78.3
D04 Ventricular Septal Defect	68.6	63.2	59.6	58.5	63.1	59.9	56.0	55.2	53.1	50.1	43.7	46.2	45.8	47.3	46.6	47.7
D05 Atrial Septal Defect	58.7	57.4	54.5	54.0	57.0	53.9	53.8	51.9	51.4	48.3	43.7	43.6	42.7	43.3	41.6	39.2
D06 Atrioventricular Septal Defect (Endocardial Cushion Defect)	133.0	138.8	127.9	131.0	141.9	145.9	136.5	114.4	109.7	102.6	106.2	105.9	114.6	142.9	153.2	152.7
D07 Pulmonary Valve Atresia & Stenosis	70.0	63.9	60.0	54.5	64.9	63.9	62.9	61.9	66.9	70.7	54.7	58.9	57.7	58.3	49.1	49.1
D08 Tricuspid Valve Atresia & Stenosis	115.7	110.2	82.6	81.1	112.1	114.6	105.8	132.7	105.8	111.1	72.9	96.8	120.5	128.2	169.0	194.4
D09 Ebstein's Anomaly	153.8	150.0	139.7	154.6	137.0	209.7	229.5	245.6	237.3	233.3	232.1	189.7	163.6	156.9	*	*
D10 Aortic Valve Stenosis	68.5	71.8	86.3	70.0	96.4	109.9	109.1	113.2	121.0	115.6	95.9	85.0	90.4	80.7	67.1	67.6
D11 Hypoplastic Left Heart Syndrome	344.5	312.9	315.9	314.2	318.9	351.9	366.9	375.0	342.2	366.7	343.2	319.4	322.0	308.5	307.4	230.2
D12 Patent Ductus Arteriosus	97.0	98.7	95.1	97.6	104.6	99.0	98.2	94.1	93.6	90.0	83.0	81.2	80.5	78.2	77.4	74.5
D13 Coarctation of Aorta	120.7	115.0	128.0	139.3	137.3	142.0	131.6	133.3	116.1	98.1	112.5	107.8	106.7	95.1	97.6	112.4
D14 Pulmonary Artery Anomalies	58.1	54.7	45.9	45.2	51.1	52.2	54.4	54.0	63.3	65.0	57.3	52.5	57.3	65.7	55.6	52.2
D15 Interrupted Aortic Arch	240.0	236.6	271.6	285.7	283.3	333.3	267.9	293.1	250.0	238.1	206.9	153.8	152.2	*	*	*
D16 Total Anomalous Pulmonary Venous Return (or connection)	185.6	173.9	160.0	151.5	163.3	175.3	176.5	179.8	197.7	200.0	163.0	152.2	170.5	206.5	197.5	164.4
D17 Double Outlet Right Ventricle	200.0	181.3	186.7	202.3	187.1	177.5	189.2	178.8	160.2	118.0	113.5	135.4	130.4	139.0	142.1	159.3
D18 Common Ventricel	164.9	153.2	162.6	141.7	170.4	159.7	152.7	170.7	147.3	162.8	93.8	81.5	93.0	90.2	78.1	60.2
D99 Other Heart & Circulatory System Anomalies	103.1	100.2	95.1	88.0	87.5	88.8	93.0	95.0	101.8	111.6	107.0	100.3	93.6	88.7	81.3	71.3

Table 26  
Mortality Rates of Michigan Children with Reported Birth Defects  
by Detailed Diagnostic Code Group and Birth Year,  
Michigan Resident Children Born in Michigan During 1999–2019,  
Cases Diagnosed within One Year from Birth  
Moving Six-year Mortality Rates  
(Continued)

Birth Defects

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
E Respiratory System (All)	127.9	113.9	99.1	93.5	90.0	84.4	79.8	74.0	75.3	76.3	75.0	71.6	67.9	64.5	57.6	54.8
E01 Lung Agenesis/ Hypoplasia	490.2	462.4	427.2	416.2	394.1	365.8	343.8	301.8	289.0	281.8	306.3	334.0	347.3	350.5	338.1	322.0
E02 Choanal Atresia	*	*	*	*	*	50.8	74.4	76.9	88.0	93.5	90.3	98.6	106.4	105.3	87.3	67.8
E99 Other Respiratory System Anomalies	59.9	55.4	51.7	51.2	49.5	47.9	42.4	40.1	38.4	36.0	29.7	26.7	24.9	24.7	21.3	21.1
F Cleft Palate & Cleft Lip	65.2	67.5	71.5	74.2	71.5	68.8	58.8	56.1	55.4	49.3	45.0	40.1	45.5	45.4	46.0	46.8
F01 Cleft Palate	44.5	44.0	44.5	47.5	43.8	44.5	40.1	39.1	39.2	32.3	30.3	24.8	26.6	28.4	25.5	28.1
F02 Cleft Lip w & w/o Cleft Palate	51.7	54.9	62.7	68.2	64.3	61.2	48.5	45.7	45.5	40.4	40.9	38.8	48.7	47.3	47.2	46.5
G Upper Alimentary Canal/ Digestive System (All)	45.5	46.9	46.6	45.9	46.1	42.8	38.6	37.2	37.1	37.4	34.9	35.8	33.0	32.8	31.2	27.7
G01 Esophageal Atresia/ Tracheoesophageal Fistula	129.8	131.3	126.9	129.9	134.5	135.3	110.5	108.0	125.7	132.1	126.6	127.3	148.4	164.5	149.7	125.0
G02 Rectal & Large Intestinal Atresia/Stenosis	77.1	79.9	84.6	86.2	91.4	86.6	65.5	54.6	65.0	65.5	68.9	73.2	74.8	76.2	70.2	63.9
G03 Pyloric Stenosis	8.7	9.1	6.4	5.4	4.7	*	*	*	*	*	*	*	*	*	*	*
G04 Hirshsprung's Disease (congenital megacolon)	30.1	27.5	28.1	*	*	*	*	*	*	*	*	*	21.3	26.9	24.9	27.9
G05 Biliary Atresia	65.2	69.0	71.4	75.0	*	97.6	92.1	73.2	*	69.8	*	*	*	*	69.8	*
G99 Other Upper Alimentary Canal /Digestive System Anomalies	62.2	63.2	62.6	60.3	60.9	56.2	52.7	51.3	48.8	47.8	43.0	44.7	37.3	36.1	34.9	31.6
H Genital & Urinary Systems	32.9	32.1	31.7	32.0	32.5	32.3	31.3	31.2	31.5	29.3	26.3	23.7	22.7	21.4	20.2	19.5
H01 Renal Agenesis/ Hypoplasia	200.0	194.2	192.0	204.8	201.8	200.9	194.6	190.4	198.0	178.8	159.2	137.9	126.8	121.2	101.9	95.9
H02 Bladder Exstrophy & Cloacal Exstrophy	*	*	*	*	*	*	*	*	*	*	*	*	-	-	-	-
H03 Obstructive Genitourinary Defects	38.7	38.8	38.4	41.1	42.0	42.5	39.5	38.4	36.8	36.6	31.0	28.1	28.6	27.8	26.0	23.4
H04 Hypospadias	15.6	18.0	18.0	17.8	17.1	16.6	12.7	10.6	10.9	7.7	8.0	9.0	9.1	10.2	10.0	11.2
H05 Epispadias	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*
H99 Other Genital & Urinary System Anomalies	30.4	28.9	28.8	28.7	28.8	28.8	28.2	28.9	28.9	26.2	24.3	22.9	22.1	20.5	19.9	19.5

Table 26  
Mortality Rates of Michigan Children with Reported Birth Defects  
by Detailed Diagnostic Code Group and Birth Year,  
Michigan Resident Children Born in Michigan During 1999–2019,  
Cases Diagnosed within One Year from Birth  
Moving Six-year Mortality Rates  
(Continued)

Birth Defects

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
I Musculoskeletal System (All)	32.2	31.9	30.4	29.6	30.8	29.5	28.2	25.8	24.5	22.9	20.9	20.4	20.2	20.9	19.5	19.0
I01 Upper Limb Reduction Deformities	61.6	68.3	78.1	71.8	81.6	68.8	51.3	60.3	50.3	47.6	38.5	46.5	64.7	50.0	45.5	49.6
I02 Lower Limb Reduction Deformities	52.3	48.9	51.8	48.6	39.5	49.7	34.9	*	36.1	48.5	57.5	57.7	70.5	75.3	66.7	61.5
I03a Exomphalos/Omphalocele	---	---	---	---	---	---	---	---	---	---	---	170.7	190.8	160.3	99.1	79.2
I03b Gastroschisis	---	---	---	---	---	---	---	---	---	---	---	70.7	69.0	59.0	64.3	69.6
I03c Prune Belly Syndrome, Congenital Hernia of Bladder	104.0	110.6	109.6	107.3	107.0	99.6	110.8	107.7	121.2	126.4	139.0	136.4	113.1	85.7	59.2	*
I04 Congenital Hip Dislocation	7.1	7.4	5.7	*	*	*	*	*	*	*	*	8.9	*	15.7	19.2	21.0
I05 Diaphragmatic Hernia	286.8	293.2	267.2	264.4	260.4	229.9	232.3	225.7	259.7	290.3	296.5	320.9	339.5	348.3	292.7	260.7
I99 Other Musculoskeletal System	26.5	26.2	24.9	24.2	24.8	24.3	22.2	19.8	17.7	15.9	13.8	13.7	13.6	15.0	14.9	15.0
J Integument (All)	17.6	15.4	12.0	9.9	7.1	6.5	6.0	5.4	4.8	4.8	4.7	5.3	5.9	6.3	6.5	6.1
K Chromosomal Anomalies	175.7	174.8	156.4	148.7	148.8	137.7	127.2	117.0	117.1	118.8	117.1	117.5	117.7	114.6	108.7	99.3
K01 Trisomy 13	797.3	782.1	732.4	704.2	718.3	697.0	655.7	625.0	689.7	750.0	767.9	773.6	788.5	816.3	790.7	750.0
K02 Down Syndrome	95.6	93.6	81.6	75.8	79.1	72.4	64.2	57.1	54.4	58.0	55.6	53.3	55.8	58.0	62.3	52.2
K03 Trisomy 18	682.5	663.8	661.2	617.4	644.1	663.6	666.7	679.6	656.6	676.8	673.9	686.9	686.9	663.0	622.2	576.5
K04 Chromosome 22q11.2 Deletion Syndrome	---	---	---	---	---	---	---	---	*	*	*	*	*	*	*	*
K05 Turner Syndrome	*	*	*	*	*	*	*	*	—	—	—	—	*	*	*	*
K99 Other Chromosomal Anomalies	154.1	164.2	145.9	143.1	125.5	106.3	106.2	95.2	96.6	95.9	101.1	96.9	90.0	82.4	77.0	73.5
L Other and Unspecified Birth Defects	103.7	96.7	96.6	101.1	105.8	106.7	71.1	62.4	56.6	53.8	47.1	42.0	38.8	36.8	32.3	26.7

**Table 26**  
**Mortality Rates of Michigan Children with Reported Birth Defects**  
**by Detailed Diagnostic Code Group and Birth Year,**  
**Michigan Resident Children Born in Michigan During 1999–2019,**  
**Cases Diagnosed within One Year from Birth**  
**Moving Six-year Mortality Rates**  
**(Continued)**

Other Reportable Conditions

Diagnostic Grouping	1999 to 2004	2000 to 2005	2001 to 2006	2002 to 2007	2003 to 2008	2004 to 2009	2005 to 2010	2006 to 2011	2007 to 2012	2008 to 2013	2009 to 2014	2010 to 2015	2011 to 2016	2012 to 2017	2013 to 2018	2014 to 2019
M Infectious Conditions																
Occurring in the Perinatal Period	95.1	101.6	108.2	119.2	88.3	92.4	79.8	80.1	70.8	65.9	71.6	53.3	60.9	52.6	49.4	58.4
M01 Syphilis	*	*	*	*	*	*	*	*	*	*	*	-	-	-	-	-
M02 Other Infections	134.1	143.5	150.4	154.2	113.6	116.1	99.1	101.2	88.2	84.5	97.6	72.6	83.6	72.6	66.9	76.9
M03 Zika Virus Disease	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N Familial/Congenital Neoplasms	*	*	*	*	*	*	*	*	*	-	-	-	-	-	-	-
O Endocrine/Metabolic Disorders	49.4	46.6	47.6	42.9	40.9	38.9	37.7	39.7	39.8	40.6	44.4	44.9	45.0	45.4	40.0	37.0
P Diseases of the Blood & Blood Forming Organs	62.8	57.1	56.7	53.3	54.9	58.4	62.3	57.5	52.5	52.8	52.0	46.3	41.2	43.5	41.9	41.7
Q Other Diseases of the Central and Peripheral Nervous System	25.5	26.1	25.5	26.9	25.7	25.5	26.2	24.2	23.9	22.3	21.2	23.0	24.9	29.1	27.5	25.9
R Other Diseases of the Eye	28.8	29.2	28.3	26.2	27.2	24.3	21.1	18.4	16.6	13.6	8.7	8.4	7.8	8.3	7.2	6.1
S Hearing Deficiency	11.6	11.7	11.6	12.0	11.8	9.4	7.9	6.5	5.5	4.1	4.3	4.7	4.3	5.0	5.0	5.7
T Other Diseases of the Heart & Circulatory System	82.4	79.9	77.4	79.7	77.2	79.0	73.0	71.8	66.1	63.7	63.7	60.5	60.3	57.4	54.2	51.3
U Other Diseases of the Gastrointestinal System	38.6	38.3	39.7	38.9	38.9	40.3	43.5	43.2	42.4	46.5	45.1	42.0	40.4	41.2	40.9	39.3
V Other Diseases of the Genital and Urinary Systems	*	*	*	*	*	*	*	*	*	*	15.4	15.6	18.2	15.6	12.8	10.3
X Other Musculoskeletal System Diseases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y Maternal Exposures Affecting Fetus	34.0	30.6	31.8	30.3	32.8	30.1	28.4	28.5	25.6	26.8	21.6	19.2	17.0	15.3	13.2	12.5
Y01 Newborn Affected by Maternal use of Alcohol	*	*	*	*	*	*	-	-	-	*	*	*	*	*	*	*
Y02 Fetal Alcohol Syndrome	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Y99 Other Maternal Exposures Affecting the Fetus	33.7	30.7	31.8	30.1	33.2	30.8	29.5	29.4	26.2	26.9	21.7	19.3	16.8	15.1	13.0	12.5
One or More Reportable Diagnosis	41.8	40.5	38.9	37.7	37.2	36.5	34.6	32.6	31.3	30.2	27.4	24.8	23.1	22.3	20.8	19.0

**Notes:**

**Rates** are per 1,000 Michigan Born Resident Live Births. Rates represent the infant mortality rate for children with a diagnosed birth defect. The rates include all deaths within the first year of life to children reported with a birth defect who were born in Michigan and whose mother was a resident at the time of birth. Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

**Conditions** are reportable if identified within the first two years of a child's life. The prevalence frequencies in this table represent cases diagnosed within the first year of life.

\*: Figure does not meet standards of reliability or precision.

Prior to October 2015, **diagnoses** were coded using the 9th revision to the International Classification of Diseases - ICD-9-CM. (See Birth Defect Groups and ICD-9-CM Diagnosis Codes for the codes used to categorize birth defects.) After October 2015, the Birth Defect registry coded diagnoses using ICD-10-CM. (See Birth Defect Groups and ICD-10-CM Diagnosis Codes for the codes used to categorize birth defects.) Diagnostic Code Groupings used in analysis of birth defects are defined by the Centers for Disease Control.

## Appendix A

Up until October 2015, the Michigan Birth Defects registry used the 9th revision to the International Classification of Diseases (ICD-9-CM) to code diagnosis. After October 2015, the registry used ICD-10-CM to code diagnosis. Diagnostic Code Groupings used for congenital anomaly codes were established by the [Centers for Disease Control](#).

### Code Groups for Birth Defects and Other Reportable Conditions by ICD-10-CM Diagnosis Codes

#### Birth Defects

Diagnostic Grouping and Description	ICD-10-CM Code
<b>A. Central Nervous System</b>	<b>G90.1, Q00-Q07</b>
A01. Anencephalus	Q00.0, Q00.1
A02. Spina Bifida w/o Anencephaly	
A03. Hydrocephalus w/o Spina Bifida	Q03
A04. Encephalocele	Q01
A05. Microcephalus	Q02
A06. Holoprosencephaly	Q04.2
<b>B. Eye</b>	<b>Q10 - Q15, Q13.81, Q13.89</b>
B01. Anophthalmos/Microphthalmos	Q11.0 - Q11.2
B02. Congenital Cataract	Q12.0
B03. Aniridia	Q13.1
<b>C. Ear, Face and Neck</b>	<b>Q16-Q18</b>
C01. Anotia/Microtia	Q16.0, Q17.2
<b>D. Heart and Circulatory System</b>	<b>P29.3, P29.30, P29.38, Q20 - Q28, Q27.30 - Q27.39</b>
D01. Common Truncus	Q20.0
D02. Transposition of Great Vessels	Q20.2 Q20.3, Q20.5
D03. Tetralogy of Fallot	Q21.3
D04. Ventricular Septal Defect	Q21.0
D05. Atrial Septal Defect	Q21.1
D06. Endocardial Cushion Defect	Q21.2
D07. Pulmonary Valve Atresia and Stenosis	Q22.0, Q22.1
D08. Tricuspid Valve Atresia and Stenosis	Q22.4, Q22.6, Q22.8, Q22.9
D09. Ebstein's Anomaly	Q22.5
D10. Aortic Valve Stenosis	Q23.0
D11. Hypoplastic Left Heart Syndrome	Q23.4
D12. Patent Ductus Arteriosus	Q25.0
D13. Coarctation of Aorta	Q25.1
D14. Pulmonary Artery Anomalies	Q25.5, Q25.6, Q25.71, Q25.72, Q25.79
D15. Interrupted Aortic Arch	Q25.21
D16. Total Anomalous Pulmonary Venous Return	Q26.2
D17. Double Outlet Right Ventricle	Q20.1
D18. Single Ventricle	Q20.4

**Appendix A Code Groups for Birth Defects and Other Reportable Conditions  
by ICD-10-CM Diagnosis Codes  
(Continued)**

Birth Defects

Diagnostic Grouping and Description	ICD-10-CM Code
<b>E. Respiratory System</b>	<b>Q30-Q34</b>
E01. Lung Agenesis/Hypoplasia	Q33.2, Q33.3, Q33.6
E02. Choanal Atresia	Q30.0
<b>F. Cleft Palate and Cleft Lip</b>	<b>Q35.1-Q37.9</b>
F01. Cleft Palate	Q35.1, Q35.3, Q36.5, Q35.7, Q36.9
F02. Cleft Lip w and w/o Cleft Palate	Q36.0, Q36.1, Q36.9, Q37.1 - Q37.9
<b>G. Upper Alimentary Canal/ Digestive System</b>	<b>Q38-Q37</b>
G01. Esophageal Atresia/ Tracheoesophageal Fistula	Q39.0 - Q39.4
G02. Rectal and Large Intestinal Atresia/Stenosis	Q42.1 - Q42.3, Q42.8 - Q42.9
G03. Pyloric Stenosis	Q40.0
G04. Hirshsprung's Disease (congenital megacolon)	Q43.1, Q43.2
G05. Biliary Atresia	Q44.2, Q44.3
<b>H. Genital and Urinary Systems</b>	<b>Q50.1 - Q64.9, Q50.01 - Q64.79, Q51.810 - Q51.828, Q53.111 - Q53.112, Q53.211 - Q53.212, Q53.23, R39.83 - R39.84</b>
H01. Renal Agenesis/Hypoplasia	Q60.0 - Q60.6
H02. Bladder Exstrophy	Q64.10, Q64.12, Q64.19
H03. Obstructive Genitourinary Defects	Q62.0, Q62.10 - Q62.12, Q62.2, Q62.31 - Q62.32, Q62.39, Q64.2, Q64.31 - Q64.33, Q64.39
H04. Hypospadias & Epispadias	Q54.0 - Q54.3, Q54.8 - Q54.9
H05. Epispadias	Q64.0
<b>I. Musculoskeletal System</b>	<b>Q65.1 - Q79.9, Q65.01 - Q79.59, Q71.811 - Q72.899, Q76.411 - Q76.429</b>
I01. Upper Limb Reduction Deformities	Q71.811 - Q71.813, Q71.819, Q71.891 - Q71.899, Q71.90 - Q71.93, Q71.00 - Q71.03, Q71.10 - Q71.13, Q71.20 - Q71.23, Q71.40 - Q71.43, Q71.50 - Q71.53, Q71.30 - Q71.33
I02. Lower Limb Reduction Deformities	Q72.811 - Q72.813, Q72.819, Q72.891 - Q72.893, Q72.899, Q72.00 - Q72.03, Q72.90 - Q72.93, Q72.10 - Q72.13, Q72.50 - Q72.53, Q72.60 - Q72.63, Q72.30 - Q72.33, Q72.70 - Q72.73
I03. Gastroschisis/Omphalocele	Q79.2-Q79.3
I03(a) Omphalocele	Q79.2
I03(b) Gastroschisis	Q79.3
I03(c) Other and Unspecified Abdominal Wall Anomalies	Q79.4, Q79.51
I04. Congenital Hip Dislocation	Q65.00, Q65.1-Q65.2
I05. Diaphragmatic Hernia	Q79.0-Q79.1

**Appendix A Code Groups for Birth Defects and Other Reportable Conditions  
by ICD-10-CM Diagnosis Codes  
(Continued)**

Birth Defects

Diagnostic Grouping and Description	ICD-10-CM Code
<b>J. Integument</b>	<b>Q80-Q82, Q83.0 - Q83.8, Q84</b>
<b>K. Chromosomal Anomalies</b>	<b>Q90- Q99, Q93.81, Q93.88, Q93.89</b>
K01. Trisomy 13	Q91.7
K02. Down Syndrome	Q90
K03. Trisomy 18	Q91.0 - Q91.7
K04. Deletion 22 q21	Q93.81
K05. Turner Syndrome	Q96.0 – Q96.9
<b>L. Other and Unspecified Congenital Anomalies</b>	<b>Q80-Q84, Q85.1 - Q99.2, Q78.71 - Q89.09, Q87.410 - Q87.418</b>

**Code Groups for Birth Defects and Other Reportable Conditions  
by ICD-10-CM Diagnosis Codes  
(Continued)**

**Other Reportable Conditions**

Diagnostic Grouping and Description	ICD-10-CM Code
<b>M. Infectious Conditions Occurring in the Perinatal Period</b>	<b>A50, A50.01 - A50.49, P35 - P37</b>
M01. Syphilis	A50.01 - A50.08, A50.1, A50.2, A50.9, A50.31, A50.40 - A50.49
M02. Other Infections	P35.0 - P35.8, P37
M03. Zika Virus Disease	A92.5
<b>N. Familial/Congenital Neoplasms</b>	<b>Q85.00, Q85.01, Q85.02</b>
<b>O. Endocrine/Metabolic Disorders</b>	C96.5, C96.6, D81, D81.810, D81.89, D82, D84.1, E00, E20.8, E20.9, E21.0 - E21.3, E23.0, E23.6, E25, E27.1, E27.2, E27.40, E27.49, E27.8, E29, E34.3, E70.0, E70.1, E70.20 - E70.30, E72, E70.310 - E70.339, E70.5 - E70.9, E71.0, E71.110 - E71.128, E71.19, E71.2, E71.310 - E71.318, E71.32, E71.39, E71.40- E71.43, E71.440, E71.448, E71.50, E71.53, E71.510 - E71.529, E71.540 - E71.548, E72.10 - E72.19, E70.40 - E70.49, E72.20 - E72.29, E72.3, E72.4, E72.50 - E72.59, E72.8, E72.9, E74.00 - E74.09, E74.20 - E74.29, E74.10 - E74.19, E74.31, E74.39, E74.4, E74.52, E74.53, E74.8, E74.9, E76.01 - E76.03, E76.1 - E76.9, E76.210, E76.211, E76.219, E76.22, E76.29, E78.0 - E78.6, E75.21, E75.22, E75.240 - E75.249, E77, E78.70, E78.79 - E78.89, E78.9, E80.3 - E80.7, E88.2, E88.89, C88.0, D47.2, D89.0, D89.1, E20.1, E83.10, E83.19, E83.30 - E83.39, E84.0 - E84.9, E84.11, E84.19, E88.01, E88.09, E80.0 - E80.7, E80.21, E80.29, E79.1, E79.8, E85.0 - E85.9, E88.40 - E88.49, E88.89, E88.9, H49.811 - H49.819, E85.81 - E85.89
<b>P. Diseases of the Blood &amp; Blood Forming Organs</b>	D47.3, D55, D56, D57.1, D57.3, D57.00 - D57.02, D57.20, D57.40, D57.80, D57.211 - D57.219, D57.411 - D57.419, D57.811 - D57.819, D58.0, D58.1, D61.01, D61.09, D61.82, D65 - D67, D68, D68.31 - D68.32
<b>Q. Other Diseases of the Central and Peripheral Nervous System</b>	F84.0, E75.00 - E75.09, E75.10 - E75.19, E75.4, G11.0, G11.4, G12.0, G24.1, G31.9, G31.89, G40.401, G40.409, G40.411, G40.419, G51.0 - G51.9, G52.7, G60, G70.1 - G70.9, G70.00, G70.01, G70.80, G70.81, G71.0, G71.2, G71.11 - G71.19, G72.2, G72.3, G72.9, G73.3, G73.7, G80, G90.9, G91.2, G93.0, G94

**Appendix A Code Groups for Birth Defects and Other Reportable Conditions  
by ICD–10–CM Diagnosis Codes  
(Continued)**

Other Reportable Conditions

Diagnostic Grouping and Description	ICD-10-CM Code
<b>R. Other Diseases of the Eye</b>	H30.93, H35.23, H35.50 - H35.54, H47.22, H49.00 - H49.03, H49.10 - H49.13, H49.20 - H49.23, H49.30 - H49.33, H49.40 - H49.43, H49.881 - H49.889, H50.00 - H50.08, H50.011, H50.012, H50.021, H50.022, H50.031, H50.032, H50.041, H50.042, H50.10 - H50.18, H50.111, H50.112, H50.121, H50.122, H50.131, H50.132, H50.141, H50.142, H50.30 - H50.34, H50.311, H50.312, H50.331, H50.332, H50.40 - H50.43, H50.21, H50.22, H50.411, H50.412, H50.50 - H50.55, H50.60, H50.69, H50.611, H50.612, H50.811, H50.812, H50.89, H51.0 - H51.9, H51.11, H51.12, H51.20 - H51.23, H53.009, H53.019 - H53.039, H54.0 - H54.8, H54.0X33- H54.0X35, H54.0X43 - H54.0X45, H54.0X53 - H54.0X55, H54.10, H54.1131 - H54.1132, H54.1141 - H54.1142, H54.1213 - H54.1215, H54.1223 - H54.1225, H54.X11 - H54.X12, H54.X21 - H54.X22, H54.1151 - H54.1152, H54.40 - H54.42, H54.413A - H54.415A, H54.42A3 - H54.42A5, H54.50 - H54.52, H54.511A - H54.512A, H54.52A1 - H54.52A2, H54.60 - H54.62, H54.7, H55.00 - H55.09, H55.81, H55.89
<b>S. Hearing Deficiency</b>	H90.0 - H90.8, H90.A11 - H90.A12, H90.11, H90.12, H90.A21 - H90.A22, H90.A31 - H90.A32, H90.41, H90.42, H90.71, H90.72, H91.8X1 - H91.8X9, H91.90 - H91.93, Q16.1 - Q16.9
<b>T. Other Diseases of the Heart &amp; Circulatory System</b>	I42.1 - I42.8, I43, I44.0 - I44.7, I44.30, I44.39, I44.60, I44.69, I45.2 - I45.9, I45.10 - I45.81, I45.89, I47.1 - I47.9, I48.0, I48.1, I49.1 - I49.2, I49.5 - I49.9, R00.1, I63.50, I66.9, I66.09, I66.19, I66.29, I66.30, I73.81, I82.0
<b>U. Other Diseases of the Gastrointestinal System</b>	K00, K01.0, K01.1, K31.4, K40.0, K40.00, K40.01, K40.10, K40.11, K40.20, K40.21, K40.3, K40.30, K40.31, K40.40, K40.41, K40.90, K40.91, K41.00, K41.01, K41.10, K41.11, K41.20, K41.21, K41.30, K41.31, K41.40, K41.41, K41.90, K41.91, K42.0 - K46.0, K42.1 - K46.1, K42.9 - K46.9, K43.19, K43.2, K43.7, K45.8, K56.2, K56.60, K60.3 - K60.5, K62.4, K63.2, M26.00 - N26.09, M26.10 - M26.19
<b>V. Other Diseases of the Genital and Urinary Systems</b>	N13.4, N13.5, N13.9, N28.82 - N28.89, N32.1, N32.2, N35.9, N36.0, N82
<b>W. Other Fetal/Placental Anomalies</b>	This grouping has been discontinued.
<b>X. Other Musculoskeletal System Diseases</b>	M85.2
<b>Y. Maternal Exposures Affecting Fetus</b>	P00.2, P04.3, P04.8, P96.1, P04.41, P04.49, Q86.1 - Q86.8 Y01. Newborn Affected by Maternal Use of Alcohol P04.3 Y02. Fetal Alcohol Syndrome



**Appendix B**  
**Congenital Code Groups by ICD-9-CM/ICD-10-CM Diagnosis Codes**

Congenital Infection	ICD-9-CM	ICD-10-CM
Cytomegalovirus (CMV)	771.1	P35.1
Herpes Simplex	†	P35.2
Rubella	771.0	P35.0
Syphilis	090, 090.0-090.49, 090.9	A50.01-A50.09, A50.1, A50.45, A50.31, A50.40, A50.42, A50.45, A50.9
Toxoplasmosis	†	P37.1
Other Congenital Infections*	771.2	P35.0, P35.1, P35.2, P35.3, P35.8, P35.9, P37.0, P37.2, P37.3, P37.4, P37.5, P37.8, P37.9
Zika Virus**		P35.4

**Notes:**

† ICD-9-CM was used to classify cases reported before October 2015.

In ICD-9-CM, certain rare congenital infections are categorized under: 771.2 Other congenital infections, and cannot be differentiated.

\*\*\* P35.0 - Congenital rubella syndrome, P35.1 - Congenital cytomegalovirus infection, P35.2 - Congenital herpes viral [herpes simplex] infection, P35.3 - Congenital viral hepatitis, P35.8 - Other congenital viral diseases, P35.9 - Congenital viral disease, unspecified, P37.0 - Other congenital infectious and parasitic diseases, P37.1 - Congenital toxoplasmosis, P37.2 - Neonatal (disseminated) listeriosis, P37.3 - Congenital falciparum malaria, P37.4 - Other congenital malaria, P37.5 - Neonatal candidiasis, P37.8 - Other specified congenital infectious and parasitic diseases, P37.9 - Congenital infectious or parasitic disease, unspecified

\*\*\*\* Effective 10-01-2018

Birth defect statistics sometimes reflect trends related to data reporting or new testing. See Data Quality Considerations for further details.

## Appendix C

Up until October 2015, the Michigan Birth Defects registry used the 9th revision to the International Classification of Diseases (ICD-9-CM) to code diagnosis. After October 2015, the registry used ICD-10-CM to code diagnosis. Diagnostic Code Groupings used for congenital anomaly codes were established by the [Centers for Disease Control](#).

### Code Groups for Birth Defects and Other Reportable Conditions by ICD-9-CM Diagnosis Codes

#### Birth Defects

Diagnostic Grouping and Description	ICD-9-CM Code
<b>A. Central Nervous System</b>	<b>740-742</b>
A01. Anencephalus	740.0, 740.1
A02. Spina Bifida w/o Anencephaly	741.0, 741.9, w/o 740.0 or 740.1
A03. Hydrocephalus w/o Spina Bifida	742.3 w/o 741.0 or 741.9
A04. Encephalocele	742.0
A05. Microcephalus	742.1
<b>B. Eye</b>	<b>743</b>
B01. Anophthalmos/Microphthalmos	743.00-743.06, 743.10-743.12
B02. Congenital Cataract	743.30 - 743.34
B03. Aniridia	743.45
<b>C. Ear, Face and Neck</b>	<b>744</b>
C01. Anotia/Microtia	744.01, 744.23
<b>D. Heart and Circulatory System</b>	<b>745-747</b>
D01. Common Truncus	745.0
D02. Transposition of Great Vessels	745.10, 745.11, 745.12, 745.19
D03. Tetralogy of Fallot	745.2
D04. Ventricular Septal Defect	745.4
D05. Atrial Septal Defect	745.5
D06. Endocardial Cushion Defect	745.60, 745.61, 745.69
D07. Pulmonary Valve Atresia and Stenosis	746.01, 746.02
D08. Tricuspid Valve Atresia and Stenosis	746.1
D09. Ebstein's Anomaly	746.2
D10. Aortic Valve Stenosis	746.3
D11. Hypoplastic Left Heart Syndrome	746.7
D12. Patent Ductus Arteriosus	747.0
D13. Coarctation of Aorta	747.10
D14. Pulmonary Artery Anomalies	747.3
D15. Interrupted Aortic Arch	747.11
D16. Total Anomalous Pulmonary Venous Return	747.41
D17. Double Outlet Right Ventricle	745.11
D18. Single Ventricle	745.3
<b>E. Respiratory System</b>	<b>748</b>
E01. Lung Agenesis/Hypoplasia	748.5
E02. Choanal Atresia	748.0

**Appendix C Code Groups for Birth Defects and Other Reportable Conditions  
by ICD-9-CM Diagnosis Codes  
(Continued)**

Birth Defects

Diagnostic Grouping and Description	ICD-9-CM Code
<b>F. Cleft Palate and Cleft Lip</b>	<b>749</b>
F01. Cleft Palate	749.00 - 749.04 w/o Cleft Lip 749.1 or 749.2
F02. Cleft Lip w and w/o Cleft Palate	749.1, 749.2
<b>G. Upper Alimentary Canal/ Digestive System</b>	<b>750-751</b>
G01. Esophageal Atresia/ Tracheoesophageal Fistula	750.3
G02. Rectal and Large Intestinal Atresia/Stenosis	751.2
G03. Pyloric Stenosis	750.5
G04. Hirshsprung's Disease (congenital megacolon)	751.3
G05. Biliary Atresia	751.61
<b>H. Genital and Urinary Systems</b>	<b>752 - 753</b>
H01. Renal Agenesis/Hypoplasia	753.0
H02. Bladder Exstrophy	753.5
H03. Obstructive Genitourinary Defects	753.20-753.29, 753.6
H04. Hypospadias & Epispadias	752.61, 752.62
H05. Epispadias	752.62
<b>I. Musculoskeletal System</b>	<b>754 - 756</b>
I01. Upper Limb Reduction Deformities	755.20 - 755.29
I02. Lower Limb Reduction Deformities	755.30 - 755.39
I03. Gastroschisis/Omphalocele	756.7
I03(a) Omphalocele	756.72
I03(b) Gastroschisis	756.73
I03(c) Other and Unspecified Abdominal Wall Anomalies	756.79
I04. Congenital Hip Dislocation	754.30, 754.31, 754.35
I05. Diaphragmatic Hernia	756.6
<b>J. Integument</b>	<b>757</b>
<b>K. Chromosomal Anomalies</b>	<b>758</b>
K01. Trisomy 13	758.1
K02. Down Syndrome	758.0
K03. Trisomy 18	758.2
<b>L. Other and Unspecified Congenital Anomalies</b>	<b>759</b>

**Code Groups for Birth Defects and Other Reportable Conditions  
by ICD-9-CM Diagnosis Codes  
(Continued)**

**Other Reportable Conditions**

<b>Diagnostic Grouping and Description</b>	<b>ICD-9-CM Code</b>
<b>M. Infectious Conditions Occurring in the Perinatal Period</b>	<b>090.0 - 090.9, 771.0 - 771.2</b>
M01. Syphilis	090.0-090.9
M02. Other Infections	771.0 - 771.2
M03. Zika Virus Disease	_____
<b>N. Familial/Congenital Neoplasms</b>	<b>237.70 - 237.73, 237.79</b>
<b>O. Endocrine/Metabolic Disorders</b>	<b>243, 252.1, 253.2, 253.8, 255.2, 255.8, 257.8, 259.4, 270.0 - 273.9, 275.3, 275.09, 277.0 - 277.9, 279.11, 279.2</b>
<b>P. Diseases of the Blood &amp; Blood Forming Organs</b>	<b>282.0 - 282.9, 284.0, 286.0 - 286.9, 287.3</b>
<b>Q. Other Diseases of the Central and Peripheral Nervous System</b>	<b>330.1, 331.7, 331.89, 331.9, 334.1, 334.2, 335.0, 337.9, 343.0 - 343.9, 345.6, 348.0, 352.6, 356.0 - 356.9, 358.0 - 359.9</b>
<b>R. Other Diseases of the Eye</b>	<b>362.60 - 362.66, 363.20, 369.00 - 369.9, 377.16, 378.0 - 378.9, 379.50 - 379.59</b>
<b>S. Hearing Deficiency</b>	<b>389.00-389.08, 389.10-389.14, 389.18, 389.2, 389.8, 389.9, 744.00-744.05, 744.09</b>
<b>T. Other Diseases of the Heart &amp; Circulatory System</b>	<b>425.0 - 425.4, 426.0, 426.10 - 427.42, 427.81 - 427.9, 434.0 - 434.9, 453.0</b>
<b>U. Other Diseases of the Gastrointestinal System</b>	<b>520.0 - 520.9, 524.00 - 524.19, 537.1, 550.00 - 550.93, 553.00 - 553.9, 560.2, 560.9, 565.1, 569.2, 569.81</b>
<b>V. Other Diseases of the Genital and Urinary Systems</b>	<b>593.3, 593.5, 593.82, 596.1, 596.2, 598.9, 599.1, 599.6, 619.0 - 619.9</b>
<b>W. Other Fetal/Placental Anomalies</b>	<b>653.7, 658.8</b>
<b>X. Other Musculoskeletal System Diseases</b>	<b>733.3</b>
<b>Y. Maternal Exposures Affecting Fetus</b>	<b>760</b>
Y01. Newborn Affected by Maternal Use of Alcohol	760.71
Y02. Fetal Alcohol Syndrome	760.71