Birth Defects and Other Adverse Pregnancy Outcomes in Illinois 2016-2020

A Report on County-Specific Prevalence

Illinois Department of Public Health
Division of Epidemiologic Studies

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In Illinois, 2016-2020
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Table Of Contents

Index Of Tables

Index Of Figures

Conditions in Newborn Infants for Selected Counties of Residence, 2016-2020

Introduction

Since 1989, the Illinois Department of Public Health (IDPH) Adverse Pregnancy Outcome Reporting System (APORS) has collected information about infants with congenital anomalies (birth defects) and other serious neonatal conditions. This information is collected for two major reasons. First, infants with a congenital anomaly or other problem often need special services to help assure they reach their full potential. Therefore, these babies are referred to their local health departments for follow-up services. Second, the data are collected for surveillance and evaluation purposes. These may include describing disease patterns, tracking trends, and developing education and intervention strategies.

At its inception, APORS relied primarily on reports sent from hospitals to identify cases, but the program has evolved over time and currently uses multiple sources of data as well as active surveillance methods to identify and verify cases. All Illinois hospitals are mandated to report infants with adverse pregnancy outcomes born to women who are Illinois residents. (Perinatal centers in St. Louis also participate.) Birth, death, and fetal death certificates (maintained by IDPH's Division of Vital Records) are an additional data source, allowing APORS to identify infants with certain birth defects or other conditions who were unreported by the hospitals. The IDPH Division of Patient Safety and Quality, which collects patient level discharge data from Illinois acute care hospitals, provides information about children under the age of 2 with a documented birth defect. This allows APORS to identify children whose birth defect diagnosis was made after their newborn stay, or who were unidentified for other reasons.

APORS undertakes systematic active case verification of cases reported to APORS and those identified through other sources. APORS staff members review charts for infants reported with selected serious birth defects. As the charts are reviewed, APORS staff correct and add to information reported by hospitals. The extensive data collection and verification activities assure APORS is the most complete source of data on adverse pregnancy outcomes in Illinois newborns.

Over the years, APORS case definition has been reviewed and revised periodically resulting in conditions being dropped or added at different points in time. Table 1 reflects the number of cases and rates of different neonatal conditions included in the APORS case definition between 2016 and 2020. Since multiple adverse outcomes may coexist, it is possible for an infant to be counted in more than one of the categories in Table 1. While the APORS case definition includes prenatal drug exposure, data is not presented in this report as the prevalence of infants prenatally exposed to controlled substances is subject to testing bias (Fornoff JE *et al.*) and not representative of Illinois newborns. Infants who are reported to APORS are referred to local health departments for follow-up services

Table 1. Frequency of Reported Infants Meeting APORS Case Criteria, 2016-2020

Infants	5-Year Total	Annual Average	Rate[1]	% APORS Cases
Total APORS Cases	54,688	10,937.6	757.3	100.0
Birth Defects	27,355	5,471.0	378.8	50.0
Less Than 31 Weeks Gestational Age	11,898	2,379.6	164.8	21.8
Fetal Deaths	4,065	813.0	56.3	7.4
Died During Newborn Hospitalization	3,281	656.2	45.4	6.0
Intrauterine Growth Restriction	7,242	1,448.4	100.3	13.2
Congenital Infections	3,057	611.4	42.3	5.6
Retinopathy of Prematurity	3,132	626.4	43.4	5.7
Endocrine, Metabolic, or Immune Disorder	1,062	212.4	14.7	1.9
Blood Disorder	476	95.2	6.6	0.9

[1]Rate per 10,000 live births

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

This report includes two sections. The first describes the county-specific prevalence rates of six groups of major birth defects for which APORS staff have reviewed infant charts. In addition, a listing of International Classification of Diseases, Tenth Revision Clinical Modification (ICD-10-CM) diagnosis codes corresponding to each included birth defect is provided, together with a brief description of each defect. The second section provides similar information about other adverse pregnancy outcomes reported to APORS, including those listed in Table 1. Because this report includes data from the beginning of the COVID-19 pandemic, it may serve as an important baseline for future studies exploring the effects of the pandemic on pregnancy outcomes.

Methods

Calculation and Interpretation of Rates and Confidence Intervals

Annual prevalence rates (per 10,000 live births) for selected adverse pregnancy outcomes identified during the newborn hospital stay or associated with a fetal death were calculated as

$$10{,}000 \times \frac{\text{number of infants with selected congenital anomaly}}{\text{number of live births}}$$

The numbers of live births were obtained from the IDPH's master birth files.

Occurrence of a specific adverse outcome is assumed to be a rare event, therefore following a Poisson distribution. Exact confidence intervals were calculated for each rate (Hardeo S & Khurshid A) as

$$\mu_L = \tfrac{1}{2}\,\chi^2_{2x,0.025}$$

$$\mu_U = \tfrac{1}{2}\,\chi^2_{2x+2,\,0.975}$$

Where μ_L and μ_U are lower and upper confidence limits for X, the number of birth defects, and χ^2 is Chi-square deviate at p=0.05 with degrees of freedom specified (either 2X or 2X+2). Where there are many birth defect cases, the confidence interval is narrow, indicating the rate is stable. Where there are few birth defect cases, the confidence interval becomes very wide, indicating the rate is not very stable. A small change in the number of infants born with the specific birth defect could result in a large change in the rate.

To compare two rates, it is important to look at their confidence intervals as well as their values. As a conservative approximation, if two confidence intervals overlap, then there is no evidence the two rates are different. If two confidence intervals do not overlap, then the rates are said to be statistically different. In this report, 95% confidence intervals are used; where the confidence intervals do not overlap the rates are statistically different at the 5% level ($p < 0.05$).

Multiple Comparisons

Since this report examines many adverse outcomes, the corresponding statistical tests are subject to the "multiple comparison problem." For a given birth defect, the observed rate is an estimate of the true birth defect rate in the population. When two rates from different times or groups are compared, statisticians will assert the observed rates are evidence of the groups having differing birth defect rates, if the observed rates are so different that the chance of them coming from the same underlying population is less than 5%. The 5% type I error rate, however, suggests that when 100 comparisons are made, on average, five will be "significantly different," when, in fact, there is no difference between the two groups. Therefore, as more comparisons are made, more may be statistically significant, just by chance. In this report, no explicit corrections of the multiple comparison problem were made; instead, exact probabilities are reported. The smaller the reported probability, the more likely it is that the difference is not simply the result of chance.

Map Illustrations

The maps in this report were created using Tableau 2021.4. The categories were determined using natural breakpoints in the data. The maps are used to create a visual representation of birth defect prevalence rates and do not have any statistical significance associated with them.

Section I

Birth Defects

Birth defects have long been a leading cause of infant mortality in the United States, and they contribute substantially to childhood morbidity and long-term disability. In 2020, birth defects were responsible for 21% of infant deaths in the U.S. (Ely M & Driscoll AK). In Illinois, birth defects were responsible for 19% of infant deaths, ranking as the second leading cause of these deaths (IDPH).

Birth defects can occur at any time during pregnancy, but most occur during the first trimester when fetal development is particularly vulnerable to disruption. The cause of some birth defects is known, but most are thought to be caused by a complex combination of genetic, behavioral and environmental factors (CDC, 12/13/2023). Research is ongoing to more fully understand how these factors interact to cause birth defects.

While not all birth defects are preventable, planning to be as healthy as possible both before and during pregnancy can increase the chances of having a healthy baby. According to the U.S. Centers for Disease Control and Prevention (CDC, 12/13/2023), specific steps that can be taken include:

- Planning for pregnancy ahead of time.
- Seeing a health care provider prior to pregnancy to discuss health conditions, medications, diet, and how to prevent infections.
- Getting enough folic acid daily in the month *before* becoming pregnant as well as during pregnancy.
- Adopting a healthy active lifestyle.
- Avoiding harmful substances (alcohol, smoking, marijuana, illicit drugs).
- Avoiding overheating and treating fevers promptly.
- Beginning prenatal care as soon as you think you might be pregnant.

The life expectancy and quality of life for many individuals with birth defects has improved over the last several decades as new tests and treatments are available. Surgical techniques can correct certain birth defects before a baby is born and hospital neonatal intensive care units are able to provide specialized care and technology.

Between 2016 and 2020, APORS identified 21,656 major birth defects in Illinois newborns at a rate of 299.9 per 10,000 live births. Heart and circulatory system defects were the most identified major defect in Illinois, accounting for 45% of birth defects.

Because a baby may be born with more than one birth defect, he or she may be counted in more than one birth defect group. A baby may even have more than one birth defect from the same birth defect group. Therefore, the data in this report cannot be used to determine the number of children with a particular group of birth defects.

Central Nervous System Defects

Central nervous system defects involve the brain, spinal cord, and associated tissues. These include neural tube defects (anencephaly, spina bifida, and encephalocele), microcephalus, and holoprosencephaly. Because central nervous system defects are very severe, many affected babies will miscarry early in pregnancy. Additionally, since the defects are detectable in pregnancy either by alpha-fetoprotein testing or ultrasound screening, women may elect to terminate the pregnancy.

A description of each defect follows together with Table 2, that gives the five-year prevalence rates for each defect for the state. Table 3 provides five-year prevalence rates for all major central nervous system defects combined by county. The observed rates may be substantially lower than the true rates because APORS does not collect birth defect information from miscarriages or elective abortions. Figures 1 and 2 provide prevalence rates for major central nervous system defects for selected counties in table and map formats, respectively.

Anencephaly is a serious defect that occurs when the upper part of the neural tube fails to close, resulting in the absence of a major portion of the brain, skull, and scalp. It includes craniorachischisis in which there is incomplete closure of both the skull and the spinal column. Nearly all babies born with this condition die soon after birth.

Encephalocele is a defect affecting the skull resulting in the protrusion of the meninges and portions of the brain through a bony midline defect in the skull. High mortality and morbidity are associated with this condition, and overall outcomes depend on the specific site.

Holoprosencephaly is an incomplete formation of the brain into the right and left hemispheres. There are several subtypes of the condition, and it is frequently associated with facial anomalies. The most severe forms result in stillbirth or death shortly after birth. However, outcomes vary depending upon the sub-type and severity of the condition in each individual (National Institutes of Health, 4/23/2020).

Microcephalus is an abnormally small head due to failure of proper brain development during pregnancy. This condition can range from mild to severe and may occur alone or in conjunction with other birth defects. Microcephaly can result in a range of issues, including

seizures, developmental delays, intellectual disability, and feeding, hearing, and vision problems.

Spina bifida is a defect in which part of the spinal cord is exposed because of a bony defect in the vertebral column. It may be associated with hydrocephalus. The degree of disability depends on the extent and location of the malformation.

Table 2. Total Number and Prevalence Rates of Major Central Nervous System Defects in Children Under 2 Years of Age, Illinois, 2016-2020

Defect	ICD-10-CM Codes	Number	Rate[1]	95% CI[2]
Anencephalus	Q00.0-Q00.1	81	1.1	(0.9, 1.4)
Encephalocele	Q01	69	1.0	(0.7, 1.2)
Holoprosencephaly	Q04.2	87	1.2	(1.0, 1.5)
Microcephalus	Q02	1,808	25.0	(23.9, 26.2)
Spina bifida[3]	Q05, Q070.01, Q07.3	249	3.4	(3.0, 3.9)

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

[3] Includes only spina bifida without anencephaly

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Table 3. Total Number and Prevalence Rates of Central Nervous System Defects in Children Under 2 Years of Age by County of Residence, 2016-2020

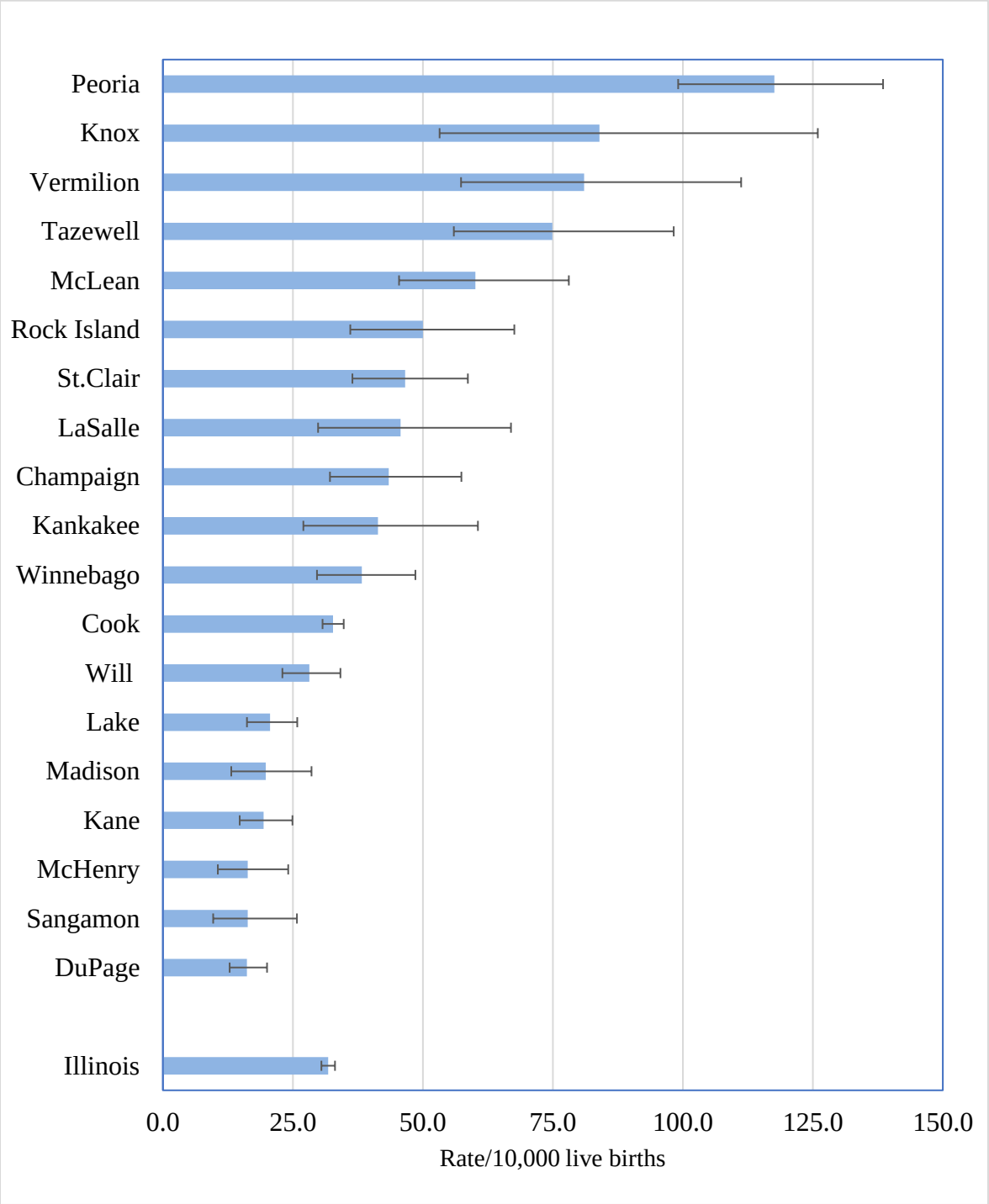
County	Cases	Rate[1]	95% CI[2] Lower	95% CI[2] Upper	County	Cases	Rate[1]	95% CI[2] Lower	95% CI[2] Upper
ILLINOIS	2,294	31.8	30.5	33.1	Lee	4	24.4	6.7	62.5
Adams	8	20.2	8.7	39.8	Livingston	7	33.8	13.6	69.7
Alexander	0	0.0	0.0	115.6	Logan	6	42.7	15.7	92.9
Bond	1	13.3	0.3	74.3	McDonough	13	97.5	51.9	166.8
Boone	3	10.7	2.2	31.2	McHenry	25	16.3	10.6	24.1
Brown	2	65.4	7.9	236.1	McLean	56	60.1	45.4	78.1
Bureau	11	66.8	33.3	119.5	Macon	13	20.3	10.8	34.8
Calhoun	1	45.5	1.2	253.3	Macoupin	4	17.8	4.8	45.5
Carroll	1	14.8	0.4	82.3	Madison	28	19.8	13.1	28.6
Cass	1	11.3	0.3	62.9	Marion	8	33.7	14.5	66.4
Champaign	49	43.4	32.1	57.4	Marshall	5	88.2	28.6	205.8
Christian	1	6.0	0.2	33.6	Mason	5	75.6	24.6	176.5
Clark	0	0.0	0.0	41.8	Massac	0	0.0	0.0	49.8
Clay	3	39.2	8.1	114.6	Menard	0	0.0	0.0	60.6
Clinton	5	24.7	8.0	57.5	Mercer	3	42.5	8.8	124.2
Coles	8	32.9	14.2	64.9	Monroe	3	17.9	3.7	52.4
Cook	1,007	32.7	30.7	34.8	Montgomery	4	27.6	7.5	70.6
Crawford	1	10.1	0.3	56.2	Morgan	5	29.2	9.5	68.2
Cumberland	0	0.0	0.0	58.8	Moultrie	3	32.6	6.7	95.4
DeKalb	13	23.4	12.5	40.0	Ogle	8	30.2	13.0	59.5
DeWitt	5	61.2	19.9	142.8	Peoria	143	117.6	99.1	138.5
Douglas	6	46.5	17.1	101.2	Perry	0	0.0	0.0	37.6
DuPage	82	16.1	12.8	20.0	Piatt	1	11.3	0.3	63.0
Edgar	6	67.7	24.9	147.4	Pike	2	21.1	2.6	76.4
Edwards	0	0.0	0.0	103.6	Pope	0	0.0	0.0	256.2
Effingham	10	44.2	21.2	81.4	Pulaski	0	0.0	0.0	117.5
Fayette	5	41.7	13.5	97.2	Putnam	0	0.0	0.0	150.0
Ford	6	82.8	30.4	180.1	Randolph	3	18.5	3.8	54.2
Franklin	2	9.0	1.1	32.7	Richland	2	23.5	2.8	85.0
Fulton	8	49.1	21.2	96.7	Rock Island	42	50.0	36.0	67.6
Gallatin	0	0.0	0.0	160.4	St.Clair	72	46.6	36.4	58.7
Greene	1	15.7	0.4	87.5	Saline	1	7.0	0.2	38.9
Grundy	9	31.3	14.3	59.4	Sangamon	18	16.3	9.7	25.8
Hamilton	0	0.0	0.0	84.6	Schuyler	1	33.2	0.8	185.1
Hancock	1	10.8	0.3	60.3	Scott	0	0.0	0.0	167.7
Hardin	0	0.0	0.0	235.0	Shelby	2	18.0	2.2	65.1
Henderson	0	0.0	0.0	124.6	Stark	3	99.7	20.6	291.3
Henry	14	55.9	30.6	93.8	Stephenson	4	16.9	4.6	43.2
Iroquois	4	26.4	7.2	67.5	Tazewell	52	74.9	56.0	98.2
Jackson	7	22.5	9.0	46.3	Union	0	0.0	0.0	41.9
Jasper	1	18.1	0.5	100.8	Vermilion	38	81.0	57.3	111.2
Jefferson	6	26.2	9.6	57.0	Wabash	0	0.0	0.0	55.6
Jersey	1	9.4	0.2	52.6	Warren	9	88.5	40.5	168.0
JoDaviess	3	36.8	7.6	107.4	Washington	0	0.0	0.0	50.0
Johnson	1	18.8	0.5	104.5	Wayne	1	10.2	0.3	56.9
Kane	60	19.4	14.8	24.9	White	0	0.0	0.0	53.5
Kankakee	26	41.3	27.0	60.6	Whiteside	6	19.6	7.2	42.7
Kendall	8	10.6	4.6	20.9	Will	103	28.2	23.0	34.1
Knox	23	83.9	53.2	126.0	Williamson	4	11.0	3.0	28.2
Lake	74	20.6	16.2	25.8	Winnebago	67	38.2	29.6	48.6
LaSalle	26	45.7	29.8	66.9	Woodford	10	48.3	23.2	88.8
Lawrence	0	0.0	0.0	51.0					

[1] Per 10,000 live births

[2] 95 % confidence interval for rate

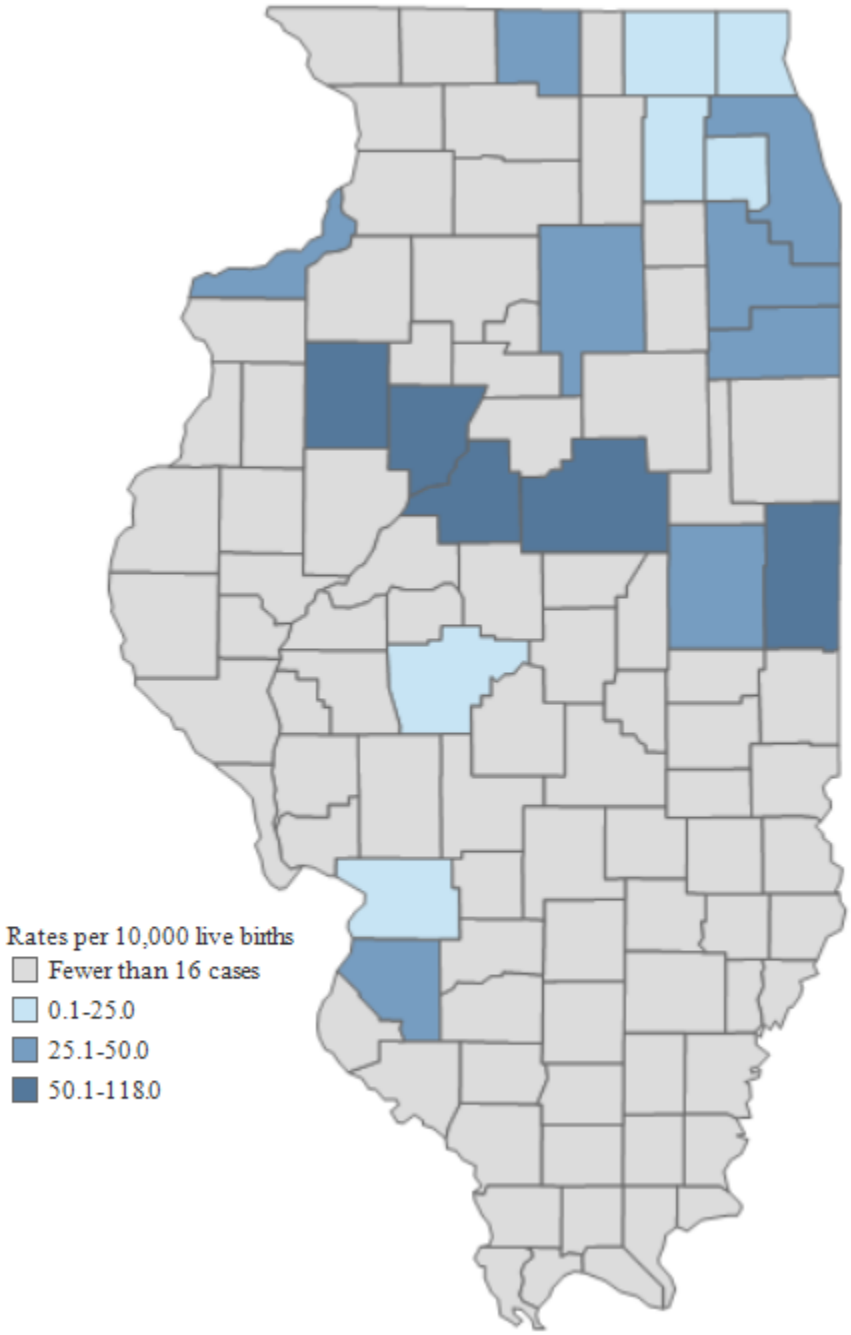
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 1. Prevalence Rates[1] and 95% Confidence Intervals for Major Central Nervous System Defects in Children Under 2 Years of Age by Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 16 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 2. Map of Prevalence Rates for Major Central Nervous System Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Cardiovascular System Defects

Cardiovascular system defects involve the heart and circulatory system. They are the most common group of birth defects in the U.S. and Illinois, with a rate of 132.7 identified cases per 10,000 live births in Illinois during the period of 2016-2020.

Cardiovascular defects can range from mild to severe and some are diagnosed during pregnancy, while others are not discovered until after birth or later in life. CDC estimates about 25% of congenital heart defects are considered critical (CDC, 12/12/2023). Babies born with critical heart defects need intervention, including surgical repair, during the first year of life to restore normal circulation as much as possible. Because of advances in treatment, many with cardiovascular defects can live longer lives. However, they often must maintain regular visits with a doctor throughout their lives as they can develop other health problems over time.

A description of each major defect follows, together with Table 4, which gives the five-year prevalence rates for each defect for the state. Table 5 provides five-year prevalence rates for all major cardiovascular system defects combined by county. Figures 2 and 3 provide prevalence rates for major central nervous system defects for selected counties in map and table formats, respectively.

Aortic valve stenosis is a narrowing or obstruction of the aortic heart valve. This condition can be repaired surgically in some cases.

Atrial septal defect is a hole in the wall between the upper chambers of the heart. The opening may resolve without treatment or may require surgical treatment.

Atrioventricular septal defect is a spectrum of septal defects arising from imperfect fusion of the endocardial cushions in the fetal heart. These defects are repaired surgically.

Coarctation of the aorta is a defect in which the aorta is narrowed somewhere along its length. Surgical correction is recommended even for mild defects.

Common truncus is the failure of the fetal truncus arteriosus to divide into the aorta and pulmonary artery. It can be corrected surgically, usually during the first months of life.

Double outlet right ventricle occurs when both the pulmonary artery and aorta are connected to the right ventricle. Surgical correction is necessary in most cases.

Ebstein anomaly is a deformation or displacement of the tricuspid valve with the septal and posterior leaflets attached to the wall of the right ventricle. Only disabling cases are corrected surgically.

Hypoplastic left heart syndrome is a form of congenital heart disease in which the entire left half of the heart is underdeveloped. This condition can be surgically repaired or treated by transplantation. If not treated, this condition is usually fatal in the first month of life.

Interrupted Aortic Arch is a disruption between the ascending and descending aorta. There are several types classified by where the disruption occurs. Surgical correction is necessary.

Pulmonary valve atresia and stenosis is an absence or narrowing of the valve between the right ventricle and the pulmonary artery. Mild forms are relatively well tolerated and require no intervention. More severe forms are surgically corrected.

Single Ventricle occurs when there is one ventricle, instead of two. There are several forms, the most common being double inlet left ventricle.

Tetralogy of Fallot is a defect consisting of four abnormalities that result in poorly oxygenated blood pumped to the body. It can be treated surgically, usually soon after birth.

Total anomalous pulmonary venous return (TAPVR) occurs when all four pulmonary veins are abnormally connected to the heart. It results in poorly oxygenated blood pumped to the body and must be surgically corrected.

Transposition of great arteries is a defect in which the position of the aorta and the pulmonary artery is transposed. Immediate surgical correction is needed.

Tricuspid atresia or stenosis is the absence or pathological narrowing of the valve between the right atrium and ventricle. Severe cases are corrected surgically.

Ventricular septal defect is a hole in the wall between the lower chambers of the heart. The opening may resolve without treatment or may require surgical treatment.

Table 4. Total Number and Prevalence Rates of Major Cardiovascular System Defects in Children Under 2 Years of Age, Illinois, 2016-2020

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Aortic valve stenosis	Q23.0	217	3.0	(2.6,3.4)
Atrial septal defect	Q21.1[3]	2,703	37.4	(36.0, 38.9)
Atrioventricular septal defect	Q21.2	454	6.3	(5.7,6.9)
Coarctation of aorta	Q25.1	429	5.9	(5.4,6.5)
Common truncus	Q20.0	41	0.6	(0.4,0.8)
Double outlet right ventricle	Q20.1	173	2.4	(2.1 2.8)
Ebstein anomaly	Q22.5	63	0.9	(0.7, 1.1)
Hypoplastic left heart syndrome	Q23.4	223	3.1	(2.7, 3.5)
Interrupted aortic arch	Q25.2, Q25.4	49	0.7	(0.5, 0.9)
Pulmonary valve atresia/stenosis	Q22.0, Q22.1	593	8.2	(7.6, 8.9)
Single ventricle	Q20.4	50	0.7	(0.5, 0.9)
Tetralogy of Fallot	Q21.3	338	4.7	(4.2, 5.2)
Total anomalous pulmonary venous return (TAPVR)	Q26.2	94	1.3	(1.1, 1.6)
Transposition of great arteries	Q20.3, Q20.5	229	3.2	(2.8, 3.6)
Tricuspid valve atresia/stenosis	Q22.4	92	1.3	(1.0, 1.6)
Ventricular septal defect	Q21.0	4,028	55.8	(54.1,57.5)

[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
[3]Does not include patent foramen ovale (PFO)
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Table 5. Total Number and Prevalence Rates of Major Cardiovascular System Defects in Children Under 2 Years of Age by County of Residence, 2016-2020

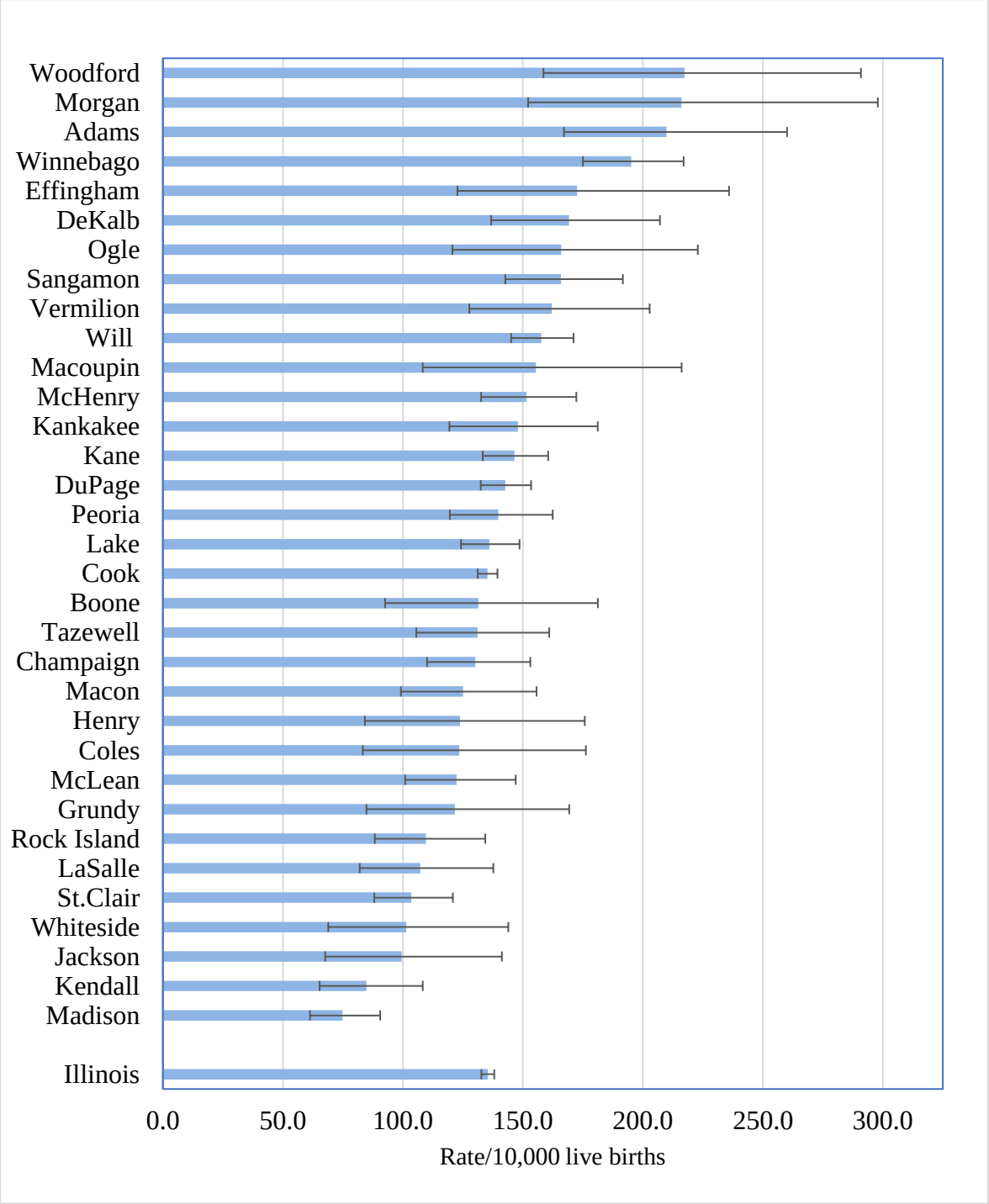
			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	9,776	135.4	132.7	138.1	Lee	22	134.3	84.2	203.3
Adams	83	209.8	167.1	260.1	Livingston	20	96.7	59.0	149.3
Alexander	4	125.4	34.2	321.1	Logan	22	156.5	98.1	236.9
Bond	4	53.3	14.5	136.6	McDonough	20	150.0	91.6	231.7
Boone	37	131.5	92.6	181.2	McHenry	232	151.5	132.6	172.3
Brown	5	163.4	53.1	381.3	McLean	114	122.4	101.0	147.0
Bureau	18	109.3	64.8	172.7	Macon	80	125.1	99.2	155.7
Calhoun	1	45.5	1.2	253.3	Macoupin	35	155.4	108.3	216.1
Carroll	5	73.9	24.0	172.4	Madison	106	74.9	61.3	90.5
Cass	22	248.3	155.6	375.9	Marion	27	113.7	75.0	165.5
Champaign	147	130.3	110.1	153.1	Marshall	8	141.1	60.9	278.0
Christian	28	168.9	112.2	244.1	Mason	4	60.5	16.5	154.9
Clark	3	34.0	7.0	99.4	Massac	0	0.0	0.0	49.8
Clay	4	52.3	14.2	133.9	Menard	16	262.7	150.2	426.7
Clinton	20	98.6	60.2	152.3	Mercer	14	198.3	108.4	332.7
Coles	30	123.5	83.3	176.2	Monroe	15	89.7	50.2	148.0
Cook	4,166	135.2	131.2	139.4	Montgomery	28	193.0	128.2	278.9
Crawford	14	141.1	77.2	236.8	Morgan	37	216.1	152.2	297.9
Cumberland	9	143.5	65.6	272.5	Moultrie	17	185.0	107.8	296.2
DeKalb	94	169.2	136.8	207.1	Ogle	44	166.0	120.6	222.9
DeWitt	9	110.2	50.4	209.1	Peoria	170	139.8	119.6	162.4
Douglas	16	124.0	70.9	201.4	Perry	1	10.2	0.3	56.7
DuPage	725	142.6	132.4	153.4	Piatt	12	135.7	70.1	237.1
Edgar	5	56.4	18.3	131.7	Pike	18	190.3	112.8	300.7
Edwards	0	0.0	0.0	103.6	Pope	6	416.7	152.9	906.9
Effingham	39	172.6	122.7	235.9	Pulaski	1	31.8	0.8	177.4
Fayette	20	166.7	101.8	257.4	Putnam	3	122.0	25.1	356.4
Ford	12	165.5	85.5	289.1	Randolph	21	129.8	80.3	198.4
Franklin	27	122.1	80.4	177.6	Richland	8	94.1	40.6	185.4
Fulton	12	73.6	38.0	128.6	Rock Island	92	109.5	88.3	134.3
Gallatin	1	43.5	1.1	242.2	St.Clair	160	103.5	88.1	120.8
Greene	7	109.9	44.2	226.4	Saline	6	41.8	15.4	91.1
Grundy	35	121.7	84.8	169.3	Sangamon	183	165.8	142.7	191.7
Hamilton	3	68.8	14.2	201.1	Schuyler	4	132.9	36.2	340.3
Hancock	19	205.6	123.8	321.1	Scott	0	0.0	0.0	167.7
Hardin	3	191.1	39.4	558.4	Shelby	18	162.3	96.2	256.5
Henderson	2	67.6	8.2	244.1	Stark	2	66.4	8.0	240.0
Henry	31	123.9	84.2	175.8	Stephenson	25	105.5	68.3	155.8
Iroquois	24	158.2	101.4	235.4	Tazewell	91	131.1	105.6	161.0
Jackson	31	99.5	67.6	141.3	Union	1	11.4	0.3	63.3
Jasper	8	144.7	62.5	285.0	Vermilion	76	162.0	127.7	202.8
Jefferson	25	109.0	70.6	160.9	Wabash	0	0.0	0.0	55.6
Jersey	12	113.3	58.6	197.9	Warren	16	157.3	89.9	255.5
JoDaviess	4	49.0	13.4	125.5	Washington	5	67.8	22.0	158.1
Johnson	3	56.3	11.6	164.5	Wayne	9	91.9	42.0	174.5
Kane	454	146.4	133.3	160.5	White	1	14.5	0.4	80.7
Kankakee	93	147.9	119.4	181.2	Whiteside	31	101.4	68.9	143.9
Kendall	64	84.8	65.3	108.3	Will	577	157.7	145.1	171.1
Knox	28	102.2	67.9	147.7	Williamson	26	71.5	46.7	104.8
Lake	489	136.0	124.2	148.6	Winnebago	342	195.2	175.0	217.0
LaSalle	61	107.2	82.0	137.7	Woodford	45	217.4	158.6	290.9
Lawrence	9	124.5	56.9	236.3					

[1] Per 10,000 live births

[2] 95 % confidence interval for rate

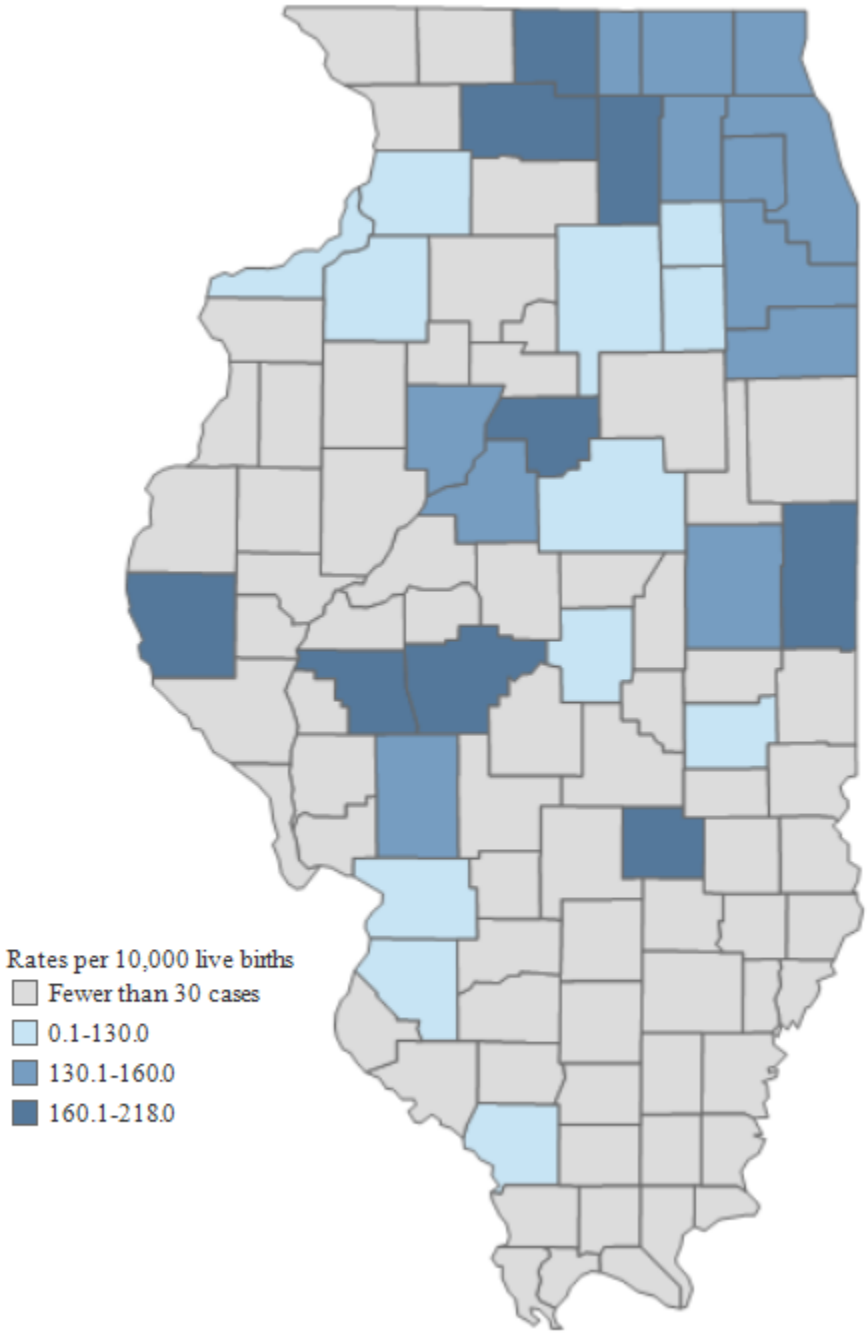
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 3.
Prevalence Rates[1] and 95% Confidence Intervals for Major Cardiovascular System Defects in Children Under 2 Years of Age by Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 30 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 4. Map of Prevalence Rates for Major Cardiovascular System Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

ALIMENTARY TRACT DEFECTS

Alimentary tract defects are made up of orofacial defects (cleft palate and lip, choanal atresia) and gastrointestinal defects (esophageal atresia, rectal and intestinal atresia and stenosis, and pyloric stenosis). Most of these defects can be repaired surgically. A description of each defect follows. Table 6 gives the five-year prevalence rates for each defect for the state. Table 7 provides five-year prevalence rates for all major alimentary tract defects combined by county. Figures 5 and 6 present prevalence rates for major alimentary tract defects for selected counties in table and map and formats, respectively.

Biliary atresia is a congenital absence or closure of the major bile ducts that drain bile from the liver.

Choanal atresia is the narrowing or blockage of the nasal airway by membranous or bony tissue. Bilateral choanal atresia is a surgical emergency.

Cleft lip is the presence of one or two openings in the upper lip resulting from failure of the normal process of fusion of the lip during embryonic development. The opening can range in size and can be on one or both sides of the lip. Rarely, the opening is in the middle of the lip.

Cleft lip and palate are the presence of both cleft and palate.

Cleft palate is an opening in the roof of the mouth (the palate) due to a failure of the palatal shelves to fuse fully during embryonic development.

Esophageal atresia is a defect of the esophagus in which there are two separate sections that do not connect. It often occurs with a *tracheoesophageal fistula*, in which part of the esophagus is connected to the trachea. With these conditions, a baby is not able to pass food to the stomach and may have difficulty breathing. Surgical repair is necessary soon after diagnosis.

Rectal, anal, and large intestinal atresia or stenosis is the absence, abnormal localization, or blockage of the rectum, anus, or large intestine. It may be corrected surgically or bypassed.

Small intestinal atresia/stenosis occurs when there is a partial or complete occlusion in one or more parts of the small intestine. The condition ranges in severity and is diagnosed and treated surgically.

Table 6. Total Number and Prevalence Rates of Major Alimentary Tract Defects in Children Under 2 Years of Age, Illinois, 2016-2020

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Biliary atresia	Q44.2-Q44.3	42	0.6	(0.4, 0.8)
Choanal atresia	Q30.0	110	1.5	(1.3, 1.8)
Cleft lip alone	Q36.0-Q36.9	225	3.1	(2.7, 3.6)
Cleft lip and palate	Q37.0-Q37.9	438	6.1	(5.5, 6.7)
Cleft palate alone	Q35.1-Q35.9	430	6.0	(5.4, 6.5)
Esophageal atresia/ tracheoesophageal fistula	Q39.0-Q39.4	199	2.8	(2.4, 3.2)
Rectal, anal, large intestinal atresia/stenosis	Q42.0-Q42.9	350	4.8	(4.4, 5.4)
Small intestinal atresia/stenosis	Q41.0-Q41.9	260	3.6	(3.2, 4.1)

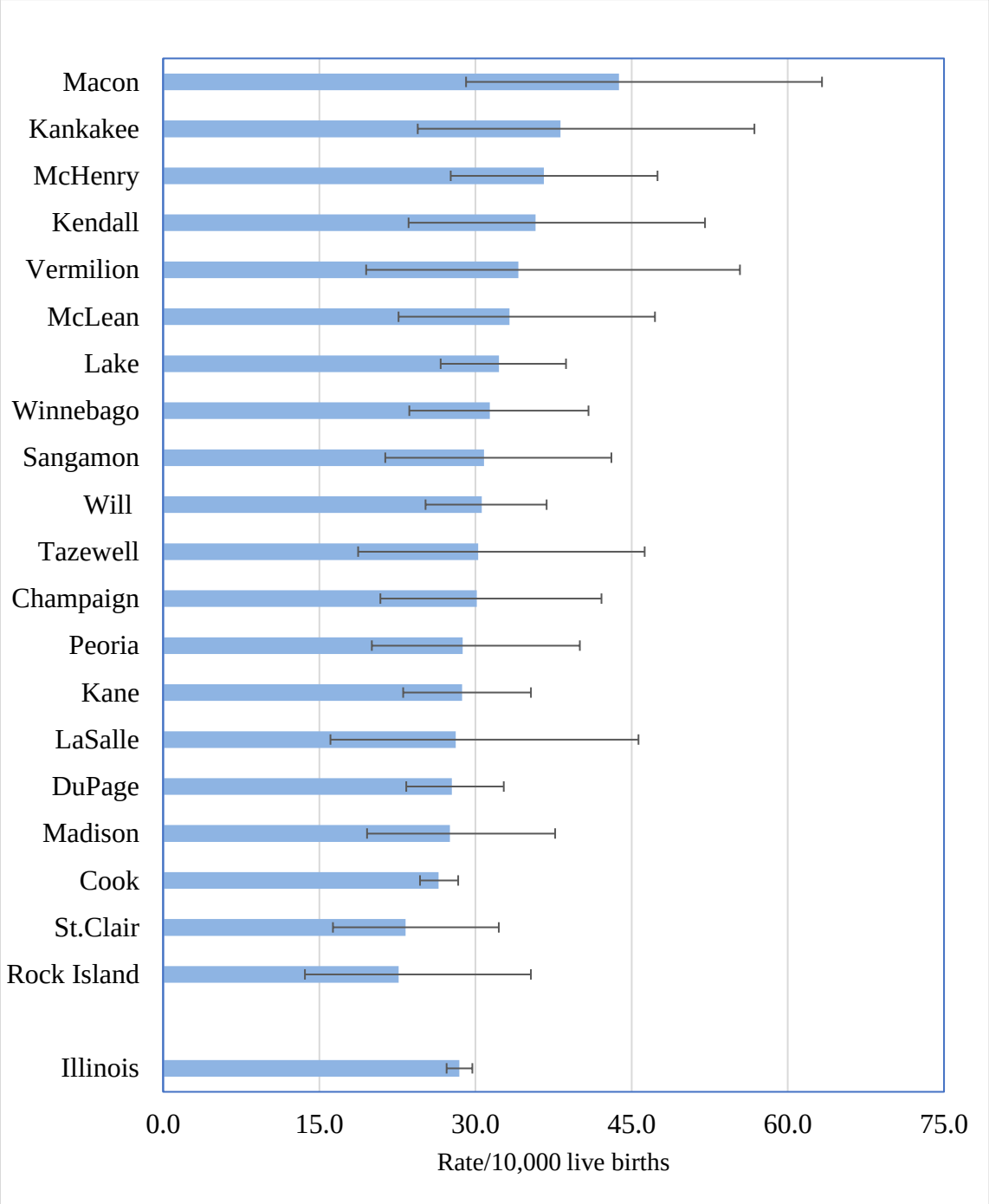
[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Table 7. Total Number and Prevalence Rates of Major Alimentary Tract Defects in Children Under 2 Years of Age by County of Residence, 2016-2020

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	2,054	28.4	27.2	29.7	Lee	3	18.3	3.8	53.5
Adams	15	37.9	21.2	62.5	Livingston	7	33.8	13.6	69.7
Alexander	0	0.0	0.0	115.6	Logan	2	14.2	1.7	51.4
Bond	2	26.7	3.2	96.3	McDonough	1	7.5	0.2	41.8
Boone	5	17.8	5.8	41.5	McHenry	56	36.6	27.6	47.5
Brown	0	0.0	0.0	120.6	McLean	31	33.3	22.6	47.2
Bureau	5	30.4	9.9	70.8	Macon	28	43.8	29.1	63.3
Calhoun	1	45.5	1.2	253.3	Macoupin	5	22.2	7.2	51.8
Carroll	2	29.5	3.6	106.7	Madison	39	27.5	19.6	37.7
Cass	2	22.6	2.7	81.5	Marion	6	25.3	9.3	55.0
Champaign	34	30.1	20.9	42.1	Marshall	3	52.9	10.9	154.6
Christian	4	24.1	6.6	61.8	Mason	2	30.3	3.7	109.3
Clark	2	22.7	2.7	81.9	Massac	2	27.0	3.3	97.6
Clay	4	52.3	14.2	133.9	Menard	2	32.8	4.0	118.6
Clinton	5	24.7	8.0	57.5	Mercer	2	28.3	3.4	102.3
Coles	12	49.4	25.5	86.3	Monroe	4	23.9	6.5	61.3
Cook	815	26.5	24.7	28.3	Montgomery	8	55.1	23.8	108.6
Crawford	3	30.2	6.2	88.4	Morgan	7	40.9	16.4	84.2
Cumberland	3	47.8	9.9	139.8	Moultrie	5	54.4	17.7	127.0
DeKalb	13	23.4	12.5	40.0	Ogle	7	26.4	10.6	54.4
DeWitt	3	36.7	7.6	107.3	Peoria	35	28.8	20.0	40.0
Douglas	1	7.8	0.2	43.2	Perry	3	30.5	6.3	89.3
DuPage	141	27.7	23.4	32.7	Piatt	0	0.0	0.0	41.7
Edgar	1	11.3	0.3	62.9	Pike	4	42.3	11.5	108.3
Edwards	1	28.1	0.7	156.5	Pope	1	69.4	1.8	386.9
Effingham	8	35.4	15.3	69.7	Pulaski	0	0.0	0.0	117.5
Fayette	1	8.3	0.2	46.4	Putnam	0	0.0	0.0	150.0
Ford	2	27.6	3.3	99.7	Randolph	5	30.9	10.0	72.1
Franklin	9	40.7	18.6	77.2	Richland	4	47.1	12.8	120.5
Fulton	10	61.3	29.4	112.8	Rock Island	19	22.6	13.6	35.3
Gallatin	0	0.0	0.0	160.4	St.Clair	36	23.3	16.3	32.2
Greene	2	31.4	3.8	113.4	Saline	4	27.9	7.6	71.4
Grundy	5	17.4	5.6	40.6	Sangamon	34	30.8	21.3	43.1
Hamilton	0	0.0	0.0	84.6	Schuyler	1	33.2	0.8	185.1
Hancock	1	10.8	0.3	60.3	Scott	1	45.5	1.2	253.3
Hardin	0	0.0	0.0	235.0	Shelby	6	54.1	19.9	117.8
Henderson	0	0.0	0.0	124.6	Stark	3	99.7	20.6	291.3
Henry	7	28.0	11.2	57.6	Stephenson	7	29.5	11.9	60.9
Iroquois	7	46.1	18.6	95.1	Tazewell	21	30.3	18.7	46.2
Jackson	12	38.5	19.9	67.3	Union	1	11.4	0.3	63.3
Jasper	2	36.2	4.4	130.6	Vermilion	16	34.1	19.5	55.4
Jefferson	8	34.9	15.1	68.7	Wabash	1	15.1	0.4	83.9
Jersey	2	18.9	2.3	68.2	Warren	3	29.5	6.1	86.2
JoDaviess	1	12.3	0.3	68.3	Washington	1	13.6	0.3	75.5
Johnson	0	0.0	0.0	69.2	Wayne	0	0.0	0.0	37.7
Kane	89	28.7	23.1	35.3	White	1	14.5	0.4	80.7
Kankakee	24	38.2	24.5	56.8	Whiteside	10	32.7	15.7	60.2
Kendall	27	35.8	23.6	52.0	Will	112	30.6	25.2	36.8
Knox	9	32.8	15.0	62.4	Williamson	9	24.8	11.3	47.0
Lake	116	32.3	26.7	38.7	Winnebago	55	31.4	23.6	40.9
LaSalle	16	28.1	16.1	45.7	Woodford	8	38.6	16.7	76.2
Lawrence	1	13.8	0.4	77.1					

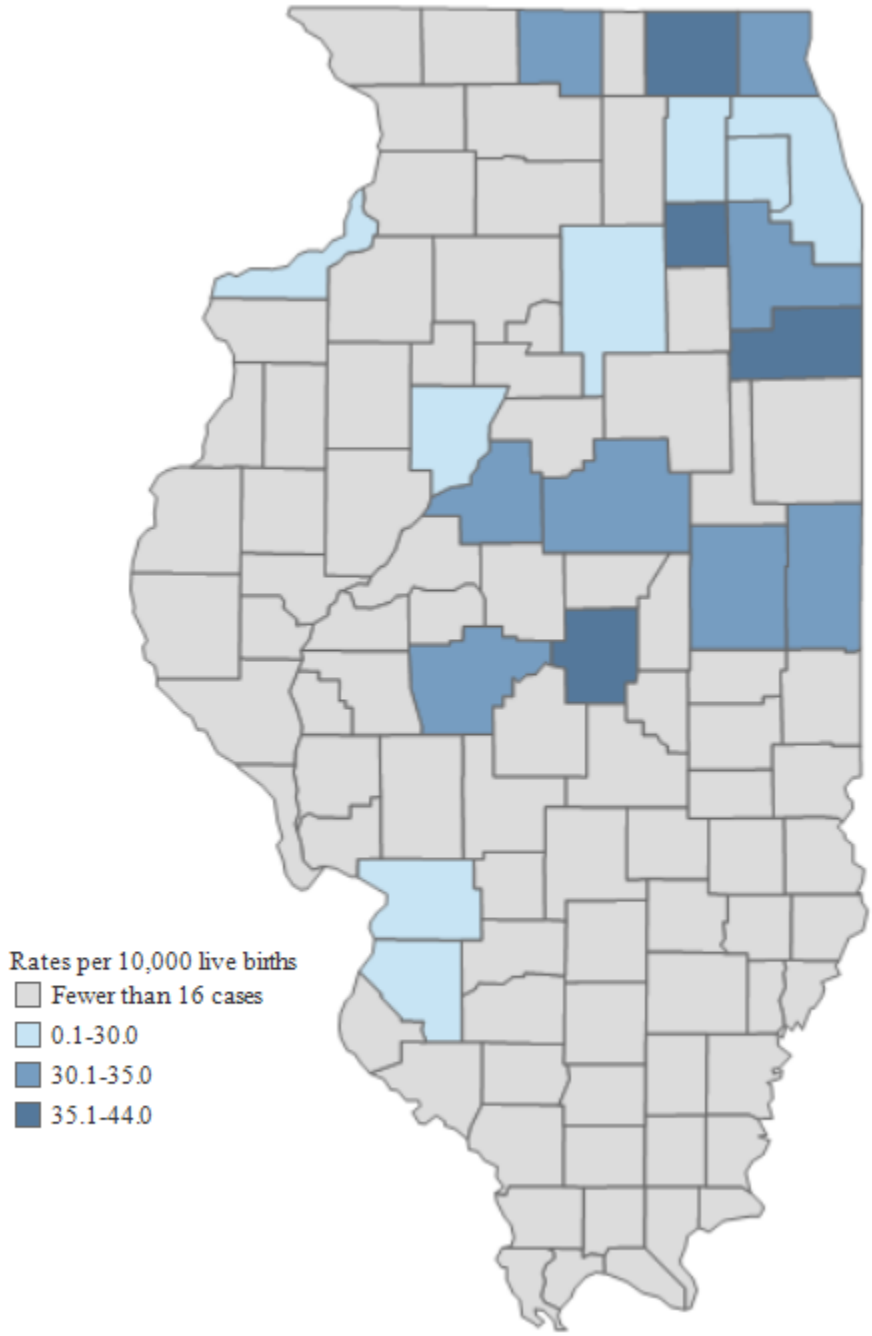
[1] Per 10,000 live births
[2] 95% confidence intervals for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 5. Prevalence Rates[1] and 95% Confidence Intervals for Major Alimentary Tract Defects in Children Under 2 Years of Age by Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 16 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 6. Map of Prevalence Rates for Major Alimentary Tract Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

GENITOURINARY DEFECTS

These defects affect the male and female reproductive organs and urinary tracts. Some are relatively minor, common defects that may be readily repaired by surgery. Others are more serious and potentially life-threatening malformations. A description of each defect follows, together with Table 8, which gives the five-year prevalence rates for each defect for the state. Table 9 provides five-year prevalence rates for all major genitourinary defects combined by county. Figures 7 and 8 present prevalence rates for major genitourinary defects for selected counties in table and map formats, respectively.

Bladder exstrophy occurs when the bladder is formed inside-out. Part of the abdominal wall and bladder wall are missing. This condition is usually repaired surgically.

Cloacal exstrophy is a common cloacal cavity with gut, urethra, and reproductive tracts open with exstrophy of the cavity. This condition usually occurs with other defects, including omphalocele, closed neural tube defects, and imperforate anus. A series of surgeries is necessary to treat this condition.

Congenital posterior urethral valves are congenital obstructing membranes located in the male posterior urethra and are the most common cause of bladder outlet obstruction in males. The condition is treated surgically.

Hypospadias is a relatively common abnormality that appears as an abnormal penile opening on the underside of the penis rather than at the end. The condition may be surgically corrected if needed for cosmetic, urologic, or reproductive reasons.

Renal agenesis/hypoplasia is the absence or maldevelopment of the kidneys; it may be bilateral or unilateral. Newborns with bilateral renal agenesis often die of respiratory failure within a few hours of birth. Unilateral renal agenesis may not be detected during the perinatal period.

Table 8. Total Number and Prevalence Rates of Major Genitourinary System Defects in Children Under 2 Years of Age, Illinois, 2016-2020

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Bladder exstrophy	Q64.10, Q64.19	17	0.2	(0.1, 0.4)
Cloacal Exstrophy	Q64.12	31	0.4	(0.3, 0.6)
Congenital posterior urethral valves	Q64.2	84	1.2	(0.9, 1.4)
Hypospadias	Q54.0-Q54.3, Q54.5-Q54.9	2,651	36.7	(35.3, 38.1)
Renal agenesis/hypoplasia	Q60.0-Q60.6	733	10.2	(9.4, 10.9)

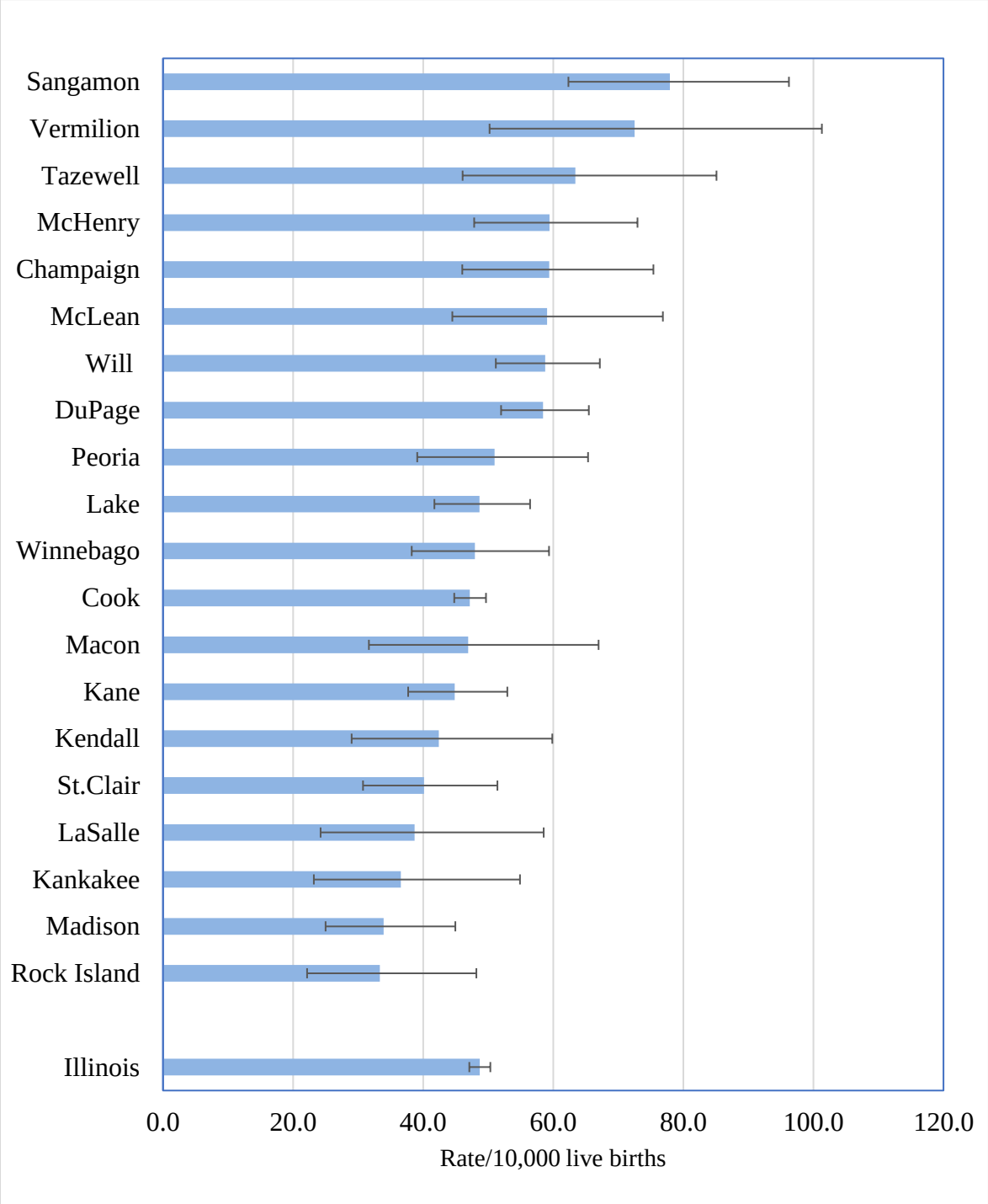
[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023
[1] Per 10,000 live births

Table 9. Total Number and Prevalence Rates of Major Genitourinary Tract Defects in Children Under 2 Years of Age by County of Residence, 2016-2020

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	3,516	48.7	47.1	50.3	Lee	8	48.8	21.1	96.2
Adams	14	35.4	19.3	59.4	Livingston	16	77.3	44.2	125.6
Alexander	1	31.3	0.8	174.7	Logan	4	28.4	7.8	72.8
Bond	2	26.7	3.2	96.3	McDonough	6	45.0	16.5	98.0
Boone	12	42.6	22.0	74.5	McHenry	91	59.4	47.8	73.0
Brown	2	65.4	7.9	236.1	McLean	55	59.0	44.5	76.9
Bureau	8	48.6	21.0	95.7	Macon	30	46.9	31.7	67.0
Calhoun	0	0.0	0.0	167.7	Macoupin	11	48.8	24.4	87.4
Carroll	3	44.3	9.1	129.5	Madison	48	33.9	25.0	44.9
Cass	2	22.6	2.7	81.5	Marion	14	59.0	32.2	98.9
Champaign	67	59.4	46.0	75.4	Marshall	1	17.6	0.4	98.3
Christian	11	66.3	33.1	118.7	Mason	1	15.1	0.4	84.3
Clark	1	11.3	0.3	63.2	Massac	1	13.5	0.3	75.3
Clay	4	52.3	14.2	133.9	Menard	4	65.7	17.9	168.2
Clinton	11	54.2	27.1	97.1	Mercer	1	14.2	0.4	78.9
Coles	14	57.6	31.5	96.7	Monroe	2	12.0	1.4	43.2
Cook	1,453	47.2	44.8	49.7	Montgomery	8	55.1	23.8	108.6
Crawford	2	20.2	2.4	72.8	Morgan	6	35.0	12.9	76.3
Cumberland	3	47.8	9.9	139.8	Moultrie	5	54.4	17.7	127.0
DeKalb	18	32.4	19.2	51.2	Ogle	17	64.2	37.4	102.7
DeWitt	1	12.2	0.3	68.2	Peoria	62	51.0	39.1	65.4
Douglas	9	69.8	31.9	132.4	Perry	4	40.7	11.1	104.3
DuPage	297	58.4	52.0	65.5	Piatt	9	101.8	46.6	193.3
Edgar	0	0.0	0.0	41.6	Pike	6	63.4	23.3	138.0
Edwards	3	84.3	17.4	246.3	Pope	1	69.4	1.8	386.9
Effingham	17	75.2	43.8	120.4	Pulaski	1	31.8	0.8	177.4
Fayette	7	58.3	23.5	120.2	Putnam	5	203.3	66.0	474.3
Ford	3	41.4	8.5	120.9	Randolph	5	30.9	10.0	72.1
Franklin	12	54.2	28.0	94.8	Richland	2	23.5	2.8	85.0
Fulton	5	30.7	10.0	71.6	Rock Island	28	33.3	22.1	48.2
Gallatin	5	217.4	70.6	507.3	St.Clair	62	40.1	30.7	51.4
Greene	1	15.7	0.4	87.5	Saline	7	48.8	19.6	100.6
Grundy	17	59.1	34.4	94.7	Sangamon	86	77.9	62.3	96.2
Hamilton	0	0.0	0.0	84.6	Schuyler	3	99.7	20.6	291.3
Hancock	1	10.8	0.3	60.3	Scott	0	0.0	0.0	167.7
Hardin	0	0.0	0.0	235.0	Shelby	6	54.1	19.9	117.8
Henderson	0	0.0	0.0	124.6	Stark	1	33.2	0.8	185.1
Henry	9	36.0	16.4	68.3	Stephenson	3	12.7	2.6	37.0
Iroquois	5	33.0	10.7	76.9	Tazewell	44	63.4	46.1	85.1
Jackson	13	41.7	22.2	71.4	Union	1	11.4	0.3	63.3
Jasper	2	36.2	4.4	130.6	Vermilion	34	72.5	50.2	101.3
Jefferson	16	69.8	39.9	113.3	Wabash	1	15.1	0.4	83.9
Jersey	0	0.0	0.0	34.8	Warren	5	49.2	16.0	114.7
JoDaviess	3	36.8	7.6	107.4	Washington	0	0.0	0.0	50.0
Johnson	3	56.3	11.6	164.5	Wayne	2	20.4	2.5	73.8
Kane	139	44.8	37.7	52.9	White	4	58.0	15.8	148.4
Kankakee	23	36.6	23.2	54.9	Whiteside	15	49.1	27.5	80.9
Kendall	32	42.4	29.0	59.8	Will	215	58.8	51.2	67.2
Knox	9	32.8	15.0	62.4	Williamson	18	49.5	29.3	78.2
Lake	175	48.7	41.7	56.4	Winnebago	84	47.9	38.2	59.3
LaSalle	22	38.7	24.2	58.5	Woodford	16	77.3	44.2	125.5
Lawrence	0	0.0	0.0	51.0					

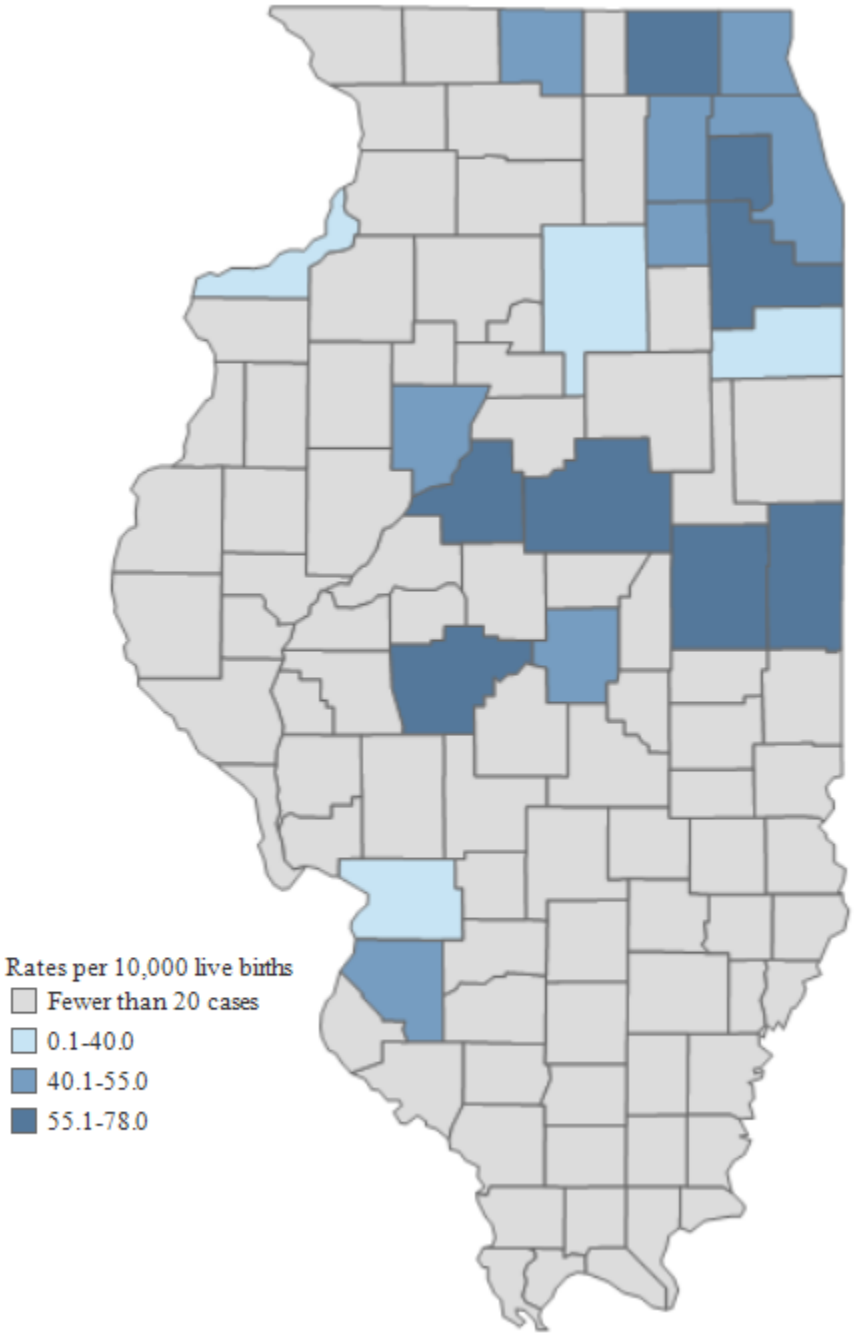
[1]Rate per 10,000 live births
[2] 95% confidence intervals for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 7. Prevalence Rates[1] and 95% Confidence Intervals for Major Genitourinary Defects in Children Under 2 Years of Age by Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 20 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 8. Map of Prevalence Rates for Major Genitourinary Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

MUSCULOSKELETAL DEFECTS

These malformations make up a diverse group of defects affecting the musculoskeletal system. A description of each defect follows, together with Table 10, which gives the five-year prevalence rates for each defect for the state. Table 11 provides five-year prevalence rates for all major musculoskeletal defects combined by county. Figures 9 and 10 present prevalence rates for major musculoskeletal defects for selected counties in table and map formats, respectively.

Abdominal wall defects include gastroschisis (a herniation of the abdominal contents through a defect in the abdominal wall) and omphalocele (protrusion of the intestines or other organs through the belly button in which the organs are covered by a thin layer of tissue). For both conditions, surgery is usually needed soon after birth to put the organs back in the abdomen. For extensive conditions the intervention may be done in stages.

Club foot is a congenital structural foot deformity that may involve the lower leg, ankle and foot joints, ligaments, and tendons. The condition can usually be treated without surgery.

Craniosynostosis occurs when one or more bones in the skull join together prior to full brain development, causing the skull to become misshapen as the brain continues to grow. The condition ranges from mild to severe depending upon how many and which parts of skull have closed. Diagnosis is usually made shortly after birth during a physical exam followed up by imaging for confirmation. Depending upon severity, surgery may be required to allow room for the brain to grow.

Diaphragmatic hernia occurs when contents of the abdomen protrude through a defect in the diaphragm, impeding lung growth. Surgical repair is needed soon after birth.

Reduction deformities may affect upper or lower limbs. They may result in a shortening or absence of one or both limbs.

Table 10. Total Number and Prevalence Rates of Major Musculoskeletal Defects in Children Under 2 Years of Age, Illinois, 2016-2020

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Clubfoot	Q66.0, Q66.89	1,101	15.2	(14.4, 16.2)
Craniosynostosis	Q75.0	390	5.4	(4.9, 6.0)
Diaphragmatic hernia	Q79.0, Q79.1	216	3.0	(2.6, 3.4)
Gastroschisis	Q79.3	269	3.7	(3.3, 4.2)
Limb reduction deformity	Q71.0-Q73.8	357	4.9	(4.4, 5.5)
Omphalocele	Q79.2	156	2.2	(1.8, 2.5)

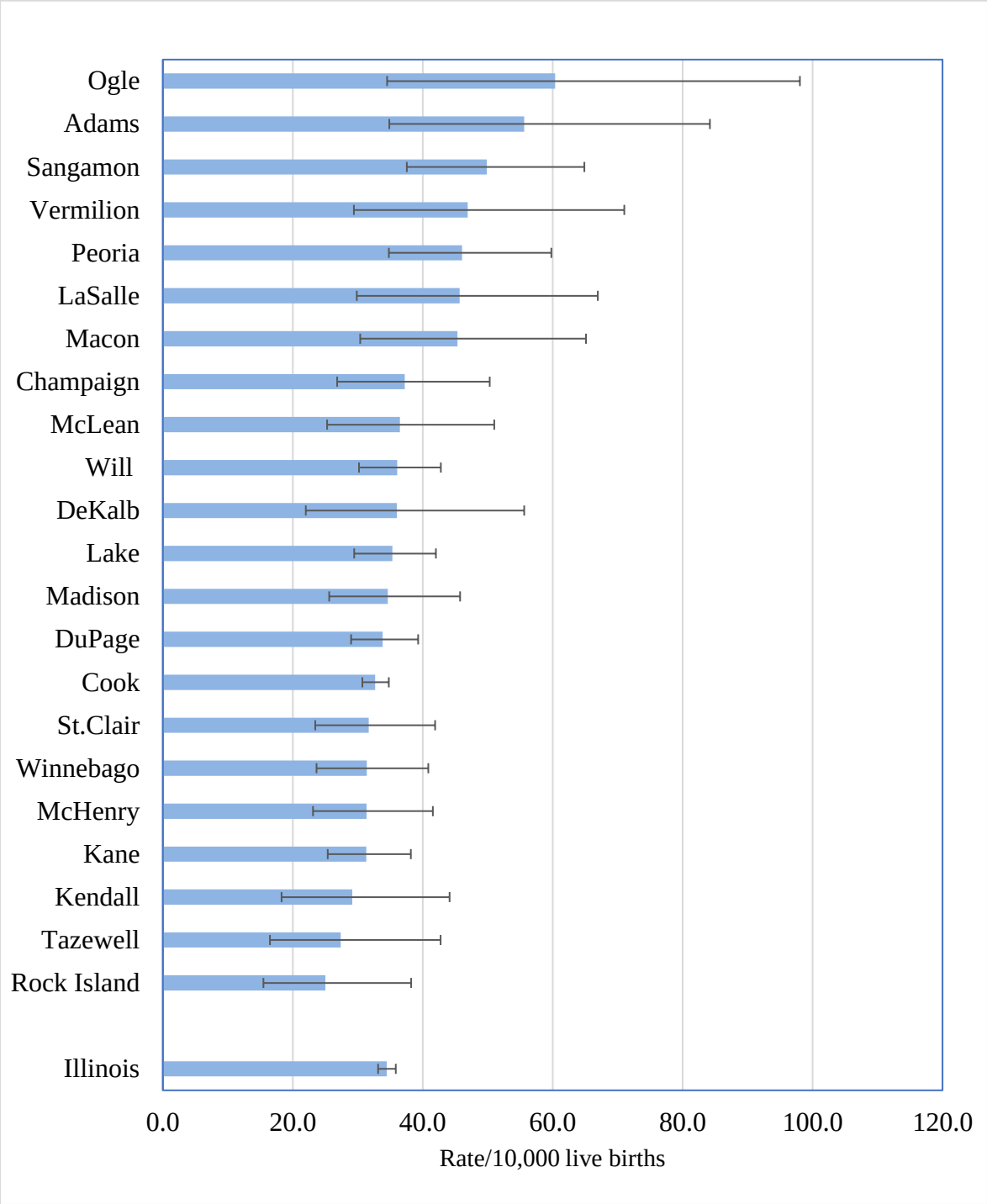
[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Table 11. Total Number and Prevalence Rates of Major Musculoskeletal Defects in Children Under 2 Years of Age by County of Residence, 2016-2020

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	2,489	34.5	33.1	35.8	Lee	9	54.9	25.1	104.3
Adams	22	55.6	34.9	84.2	Livingston	8	38.7	16.7	76.2
Alexander	0	0.0	0.0	115.6	Logan	14	99.6	54.4	167.1
Bond	2	26.7	3.2	96.3	McDonough	1	7.5	0.2	41.8
Boone	8	28.4	12.3	56.0	McHenry	48	31.3	23.1	41.6
Brown	1	32.7	0.8	182.1	McLean	34	36.5	25.3	51.0
Bureau	3	18.2	3.8	53.2	Macon	29	45.3	30.4	65.1
Calhoun	0	0.0	0.0	167.7	Macoupin	11	48.8	24.4	87.4
Carroll	1	14.8	0.4	82.3	Madison	49	34.6	25.6	45.7
Cass	3	33.9	7.0	99.0	Marion	12	50.5	26.1	88.3
Champaign	42	37.2	26.8	50.3	Marshall	2	35.3	4.3	127.4
Christian	8	48.3	20.8	95.1	Mason	8	121.0	52.3	238.5
Clark	1	11.3	0.3	63.2	Massac	0	0.0	0.0	49.8
Clay	5	65.4	21.2	152.5	Menard	0	0.0	0.0	60.6
Clinton	5	24.7	8.0	57.5	Mercer	1	14.2	0.4	78.9
Coles	7	28.8	11.6	59.4	Monroe	2	12.0	1.4	43.2
Cook	1,007	32.7	30.7	34.8	Montgomery	15	103.4	57.9	170.5
Crawford	1	10.1	0.3	56.2	Morgan	9	52.6	24.0	99.8
Cumberland	5	79.7	25.9	186.1	Moultrie	6	65.3	24.0	142.1
DeKalb	20	36.0	22.0	55.6	Ogle	16	60.4	34.5	98.0
DeWitt	6	73.4	27.0	159.8	Peoria	56	46.0	34.8	59.8
Douglas	7	54.3	21.8	111.8	Perry	2	20.4	2.5	73.6
DuPage	172	33.8	29.0	39.3	Piatt	3	33.9	7.0	99.2
Edgar	2	22.6	2.7	81.5	Pike	3	31.7	6.5	92.7
Edwards	0	0.0	0.0	103.6	Pope	0	0.0	0.0	256.2
Effingham	13	57.5	30.6	98.4	Pulaski	2	63.7	7.7	230.1
Fayette	9	75.0	34.3	142.4	Putnam	1	40.7	1.0	226.5
Ford	3	41.4	8.5	120.9	Randolph	5	30.9	10.0	72.1
Franklin	13	58.8	31.3	100.5	Richland	2	23.5	2.8	85.0
Fulton	9	55.2	25.2	104.8	Rock Island	21	25.0	15.5	38.2
Gallatin	1	43.5	1.1	242.2	St.Clair	49	31.7	23.4	41.9
Greene	6	94.2	34.6	205.0	Saline	5	34.9	11.3	81.4
Grundy	3	10.4	2.2	30.5	Sangamon	55	49.8	37.5	64.9
Hamilton	1	22.9	0.6	127.8	Schuyler	1	33.2	0.8	185.1
Hancock	1	10.8	0.3	60.3	Scott	2	90.9	11.0	328.4
Hardin	0	0.0	0.0	235.0	Shelby	9	81.2	37.1	154.1
Henderson	2	67.6	8.2	244.1	Stark	2	66.4	8.0	240.0
Henry	6	24.0	8.8	52.2	Stephenson	2	8.4	1.0	30.5
Iroquois	5	33.0	10.7	76.9	Tazewell	19	27.4	16.5	42.7
Jackson	4	12.8	3.5	32.9	Union	0	0.0	0.0	41.9
Jasper	3	54.2	11.2	158.5	Vermilion	22	46.9	29.4	71.0
Jefferson	15	65.4	36.6	107.9	Wabash	1	15.1	0.4	83.9
Jersey	5	47.2	15.3	110.2	Warren	6	59.0	21.7	128.4
JoDaviess	1	12.3	0.3	68.3	Washington	2	27.1	3.3	97.9
Johnson	1	18.8	0.5	104.5	Wayne	3	30.6	6.3	89.6
Kane	97	31.3	25.4	38.2	White	0	0.0	0.0	53.5
Kankakee	14	22.3	12.2	37.4	Whiteside	7	22.9	9.2	47.2
Kendall	22	29.1	18.3	44.1	Will	132	36.1	30.2	42.8
Knox	9	32.8	15.0	62.4	Williamson	10	27.5	13.2	50.6
Lake	127	35.3	29.4	42.0	Winnebago	55	31.4	23.6	40.9
LaSalle	26	45.7	29.8	66.9	Woodford	11	53.1	26.5	95.1
Lawrence	3	41.5	8.6	121.3					

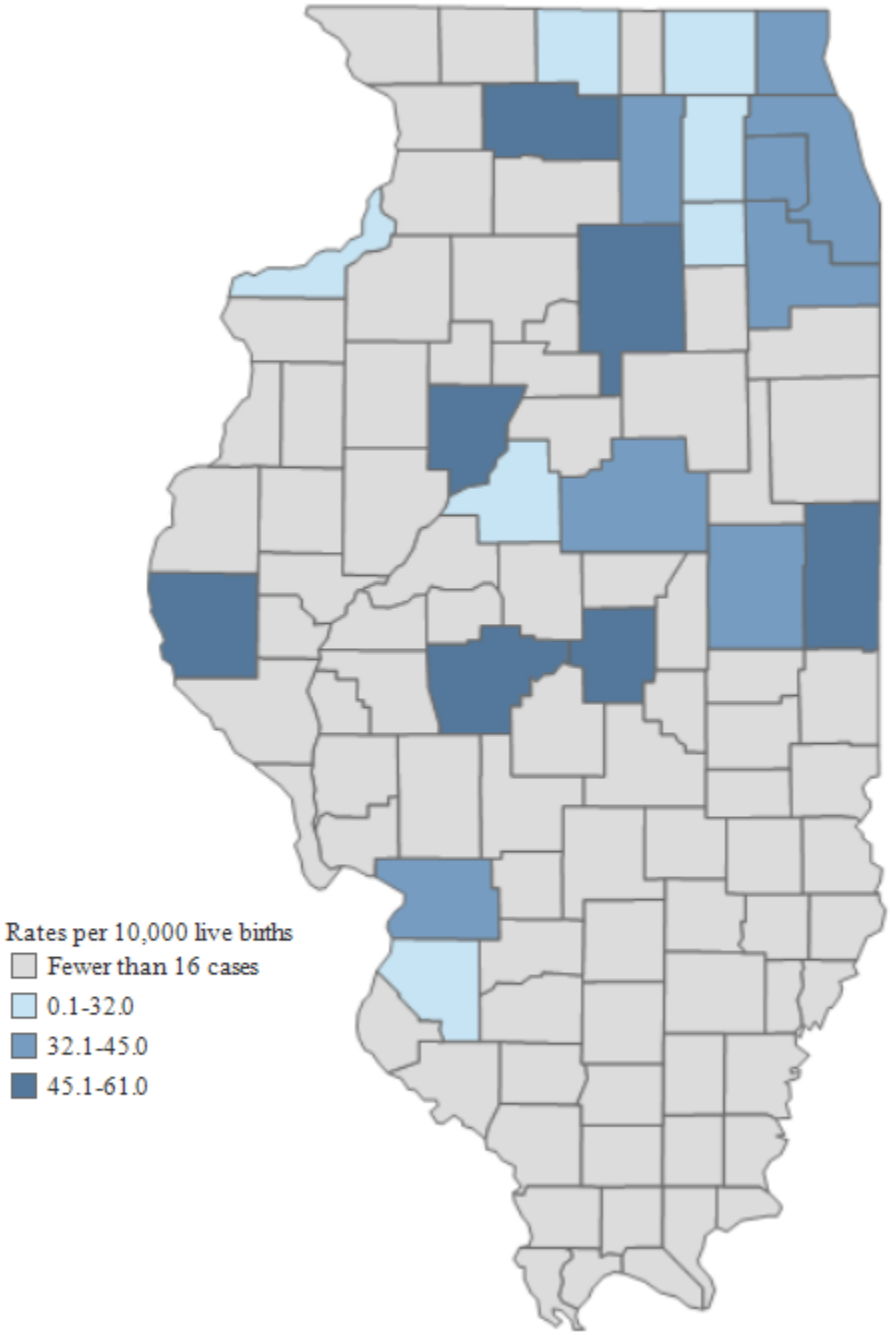
[1] Per 10,000 live births
[2] 95% confidence intervals for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 9. Prevalence Rates[1] and 95% Confidence Intervals for Major Musculoskeletal Defects in Children Under 2 Years of Age by Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 16 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 10. Map of Prevalence Rates for Major Musculoskeletal Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November, 2023

CHROMOSOMAL CONDITIONS

Chromosomal conditions can arise from abnormal numbers of chromosomes or from breaks or deletions in specific fragments of the chromosomes. APORS collects information about three conditions, called "trisomies," in which a baby is born with an extra copy of a specific chromosome. This extra copy affects the growth and development of the body and brain. Congenital heart defects (especially septal defects) are common among these infants and are a major cause of death. APORS also collects information about two syndromes in which genes are either missing, altered, or there is a deletion. A description of each condition collected by APORS follows, together with Table 12, which gives the five-year prevalence rates for each condition for the state. Table 13 provides five-year prevalence rates for all major chromosomal defects combined by county. Figures 11 and 12 present prevalence rates for major chromosomal defects for selected counties in table and map formats, respectively.

Deletion 22q11.2 syndrome is caused by a deletion of a part of chromosome 22 at the location designated q11.2. This deletion causes varying issues in individuals affecting many parts of the body. Heart defects and cleft palate are commonly seen. Other issues include, but are not limited to, immune system issues, kidney abnormalities, gastrointestinal issues, low blood calcium, thrombocytopenia, developmental delay, skeletal irregularities, and facial dysmorphism. Individuals are also more likely than those without the syndrome to have attention-deficit/ hyperactivity disorder (ADHD) and autism spectrum disorder (National Institutes of Health, 04/24/2020).

Down syndrome (trisomy 21) is associated with the presence of a third number 21 chromosome. This causes distinctive physical features, including short stature and a characteristic facial appearance. Most individuals with Down syndrome have mild to moderate intellectual disability. They may also have other health problems, such as hearing loss, sleep apnea, ear infections, and congenital heart defects. Early and ongoing interventions, including speech, physical, and occupational therapies are helpful in assuring all attain their full potential.

Edward syndrome (trisomy 18) is associated with the presence of a third number 18 chromosome. It causes heart and other organ defects, major physical abnormalities, and severe developmental disabilities. Few children afflicted with this disease survive beyond one year of life, and those who do survive usually have profound disabilities.

Patau syndrome (trisomy 13) is associated with the presence of a third number 13 chromosome. Newborns have numerous organ defects, physical abnormalities, and profound developmental disabilities. Most die in the first days or weeks of life due to severe medical problems.

Turner Syndrome is a condition affecting females in which an X chromosome is either missing or altered. Although variable in degree from person to person, distinctive physical features associated with this syndrome include short stature, body edema, loose neck skin, low set

ears, and wide-set eyes. Congenital heart and renal defects and premature loss of ovarian function are common (National Institutes of Health, 4/24/2020).

Table 12. Total Number and Prevalence Rates of Major Chromosomal Defects in Children Under 2 Years of Age, Illinois, 2016-2020

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Deletion 22q11.2	Q93.81	75	1.0	(0.8, 1.3)
Down syndrome (trisomy 21)	Q90.0-Q90.9	1,084	15.0	(14.1, 15.9)
Edward syndrome (trisomy 18)	Q91.0-Q91.3	184	2.5	(2.2, 2.9)
Patau syndrome (trisomy 13)	Q91.4-Q91.7	90	1.2	(1.0, 1.5)
Turner syndrome	Q96.0-Q96.9	94	1.3	(1.1, 1.6)

[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Table 13. Total Number and Prevalence Rates of Chromosomal Defects in Children Under 2 Years of Age by County of Residence, 2016-2020

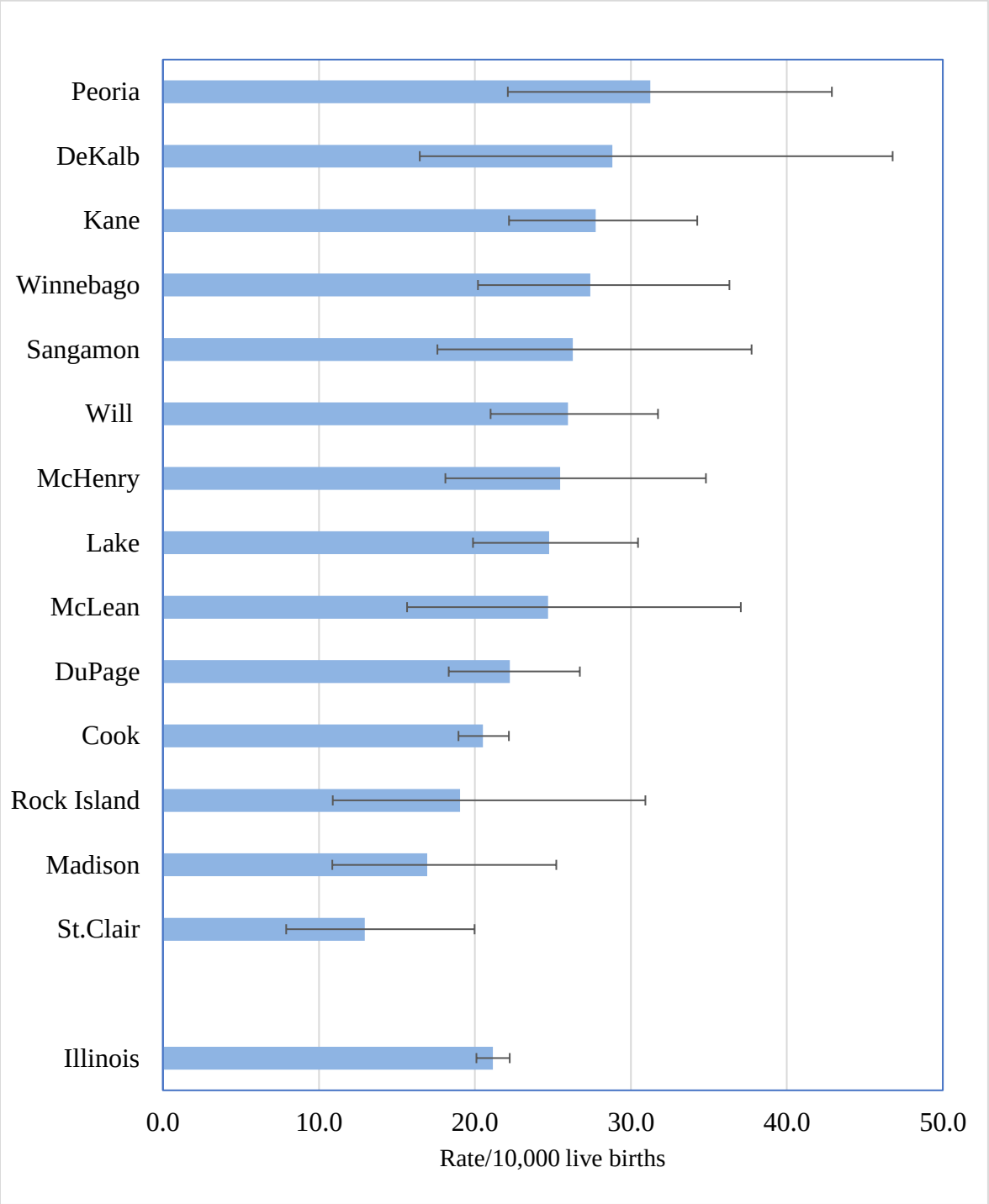
			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	1,527	21.1	20.1	22.2	Lee	4	24.4	6.7	62.5
Adams	4	10.1	2.8	25.9	Livingston	2	9.7	1.2	34.9
Alexander	1	31.3	0.8	174.7	Logan	4	28.4	7.8	72.8
Bond	2	26.7	3.2	96.3	McDonough	2	15.0	1.8	54.2
Boone	1	3.6	0.1	19.8	McHenry	39	25.5	18.1	34.8
Brown	0	0.0	0.0	120.6	McLean	23	24.7	15.7	37.0
Bureau	4	24.3	6.6	62.2	Macon	13	20.3	10.8	34.8
Calhoun	0	0.0	0.0	167.7	Macoupin	3	13.3	2.7	38.9
Carroll	2	29.5	3.6	106.7	Madison	24	16.9	10.9	25.2
Cass	0	0.0	0.0	41.6	Marion	6	25.3	9.3	55.0
Champaign	15	13.3	7.4	21.9	Marshall	1	17.6	0.4	98.3
Christian	3	18.1	3.7	52.9	Mason	1	15.1	0.4	84.3
Clark	0	0.0	0.0	41.8	Massac	0	0.0	0.0	49.8
Clay	0	0.0	0.0	48.2	Menard	2	32.8	4.0	118.6
Clinton	3	14.8	3.1	43.2	Mercer	2	28.3	3.4	102.3
Coles	7	28.8	11.6	59.4	Monroe	2	12.0	1.4	43.2
Cook	632	20.5	18.9	22.2	Montgomery	4	27.6	7.5	70.6
Crawford	3	30.2	6.2	88.4	Morgan	6	35.0	12.9	76.3
Cumberland	0	0.0	0.0	58.8	Moultrie	0	0.0	0.0	40.1
DeKalb	16	28.8	16.5	46.8	Ogle	10	37.7	18.1	69.4
DeWitt	1	12.2	0.3	68.2	Peoria	38	31.2	22.1	42.9
Douglas	6	46.5	17.1	101.2	Perry	1	10.2	0.3	56.7
DuPage	113	22.2	18.3	26.7	Piatt	0	0.0	0.0	41.7
Edgar	1	11.3	0.3	62.9	Pike	3	31.7	6.5	92.7
Edwards	0	0.0	0.0	103.6	Pope	2	138.9	16.8	501.7
Effingham	5	22.1	7.2	51.6	Pulaski	0	0.0	0.0	117.5
Fayette	5	41.7	13.5	97.2	Putnam	0	0.0	0.0	150.0
Ford	1	13.8	0.3	76.9	Randolph	3	18.5	3.8	54.2
Franklin	7	31.6	12.7	65.2	Richland	2	23.5	2.8	85.0
Fulton	1	6.1	0.2	34.2	Rock Island	16	19.0	10.9	30.9
Gallatin	0	0.0	0.0	160.4	St.Clair	20	12.9	7.9	20.0
Greene	1	15.7	0.4	87.5	Saline	1	7.0	0.2	38.9
Grundy	5	17.4	5.6	40.6	Sangamon	29	26.3	17.6	37.7
Hamilton	0	0.0	0.0	84.6	Schuyler	0	0.0	0.0	122.6
Hancock	0	0.0	0.0	39.9	Scott	0	0.0	0.0	167.7
Hardin	0	0.0	0.0	235.0	Shelby	5	45.1	14.6	105.2
Henderson	1	33.8	0.9	188.2	Stark	0	0.0	0.0	122.6
Henry	4	16.0	4.4	40.9	Stephenson	5	21.1	6.9	49.3
Iroquois	5	33.0	10.7	76.9	Tazewell	10	14.4	6.9	26.5
Jackson	5	16.1	5.2	37.5	Union	3	34.1	7.0	99.6
Jasper	0	0.0	0.0	66.7	Vermilion	12	25.6	13.2	44.7
Jefferson	2	8.7	1.1	31.5	Wabash	0	0.0	0.0	55.6
Jersey	1	9.4	0.2	52.6	Warren	4	39.3	10.7	100.7
JoDaviess	0	0.0	0.0	45.2	Washington	2	27.1	3.3	97.9
Johnson	0	0.0	0.0	69.2	Wayne	1	10.2	0.3	56.9
Kane	86	27.7	22.2	34.3	White	0	0.0	0.0	53.5
Kankakee	11	17.5	8.7	31.3	Whiteside	5	16.4	5.3	38.2
Kendall	14	18.5	10.1	31.1	Will	95	26.0	21.0	31.7
Knox	3	10.9	2.3	32.0	Williamson	3	8.3	1.7	24.1
Lake	89	24.8	19.9	30.5	Winnebago	48	27.4	20.2	36.3
LaSalle	4	7.0	1.9	18.0	Woodford	7	33.8	13.6	69.7
Lawrence	0	0.0	0.0	51.0					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

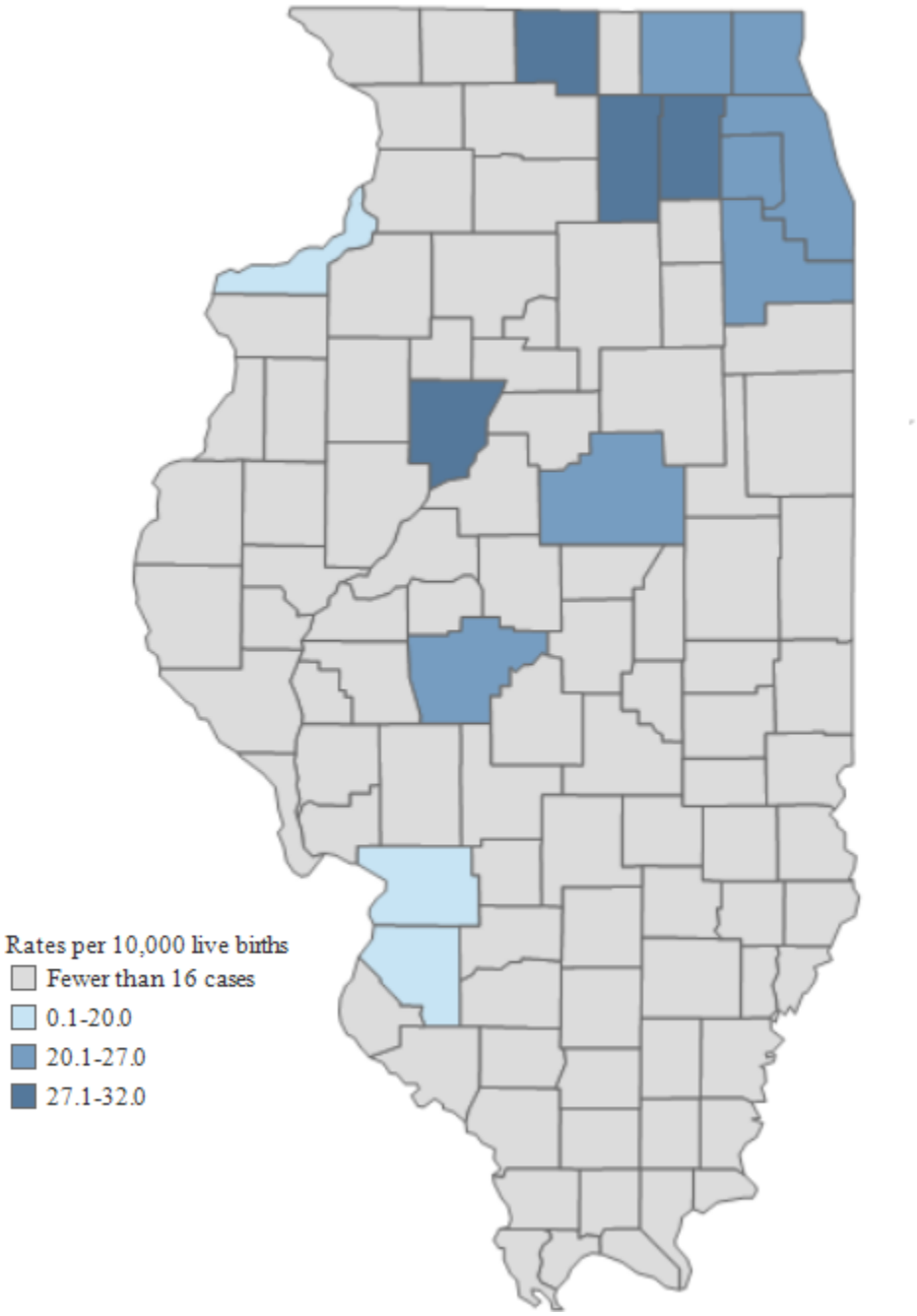
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 11. Prevalence Rates[1] and 95% Confidence Intervals for Major Chromosomal Defects in Children Under 2 Years of Age by Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 16 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 12. Map of Prevalence Rates for Major Chromosomal Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

SECTION II

OTHER ADVERSE PREGNANCY OUTCOMES

PREMATURITY

Infants born before 37 weeks gestation are considered preterm, and the earlier a child is born the greater the risk for a range of health issues related to prematurity. APORS collects information on very preterm infants who are born before 31 weeks of completed gestation. These infants are more susceptible to infections and can have serious conditions, such as intraventricular hemorrhage (bleeding in the brain), patent ductus arteriosus, retinopathy of prematurity, breathing problems, necrotizing enterocolitis, and problems with other organs. Further, they may suffer developmental delays in the longer term (March of Dimes).

While medical advances over the years have increased the survival of extremely premature infants, disorders relating to short gestation and low birth weight remained the second leading cause of infant death in the U.S. and the leading cause of infant death in Illinois in 2020 (16 and 21%, respectively) (Ely M & Driscoll AK and IDPH).

There are several risk factors that can lead to premature births (National Institutes of Health, 12/12/2023). These include, but are not limited to:

- Previous pre-term births.
- Multiple gestation pregnancies.
- Use of assisted reproductive technology.
- Having a short cervix or a cervix that shortens during the second trimester of pregnancy.
- Certain medical conditions, including infections, high blood pressure, and diabetes.
- Being either underweight or obese prior to pregnancy.
- Being of African American or American Indian/Alaska Native race.
- Maternal age either younger than 18 or older than 35.
- Short inter-pregnancy interval.
- Late or no prenatal care.
- Smoking, drinking alcohol, or using illicit drugs during pregnancy.
- Domestic violence and lack of social support.
- Stress.
- Exposure to environmental pollutants.

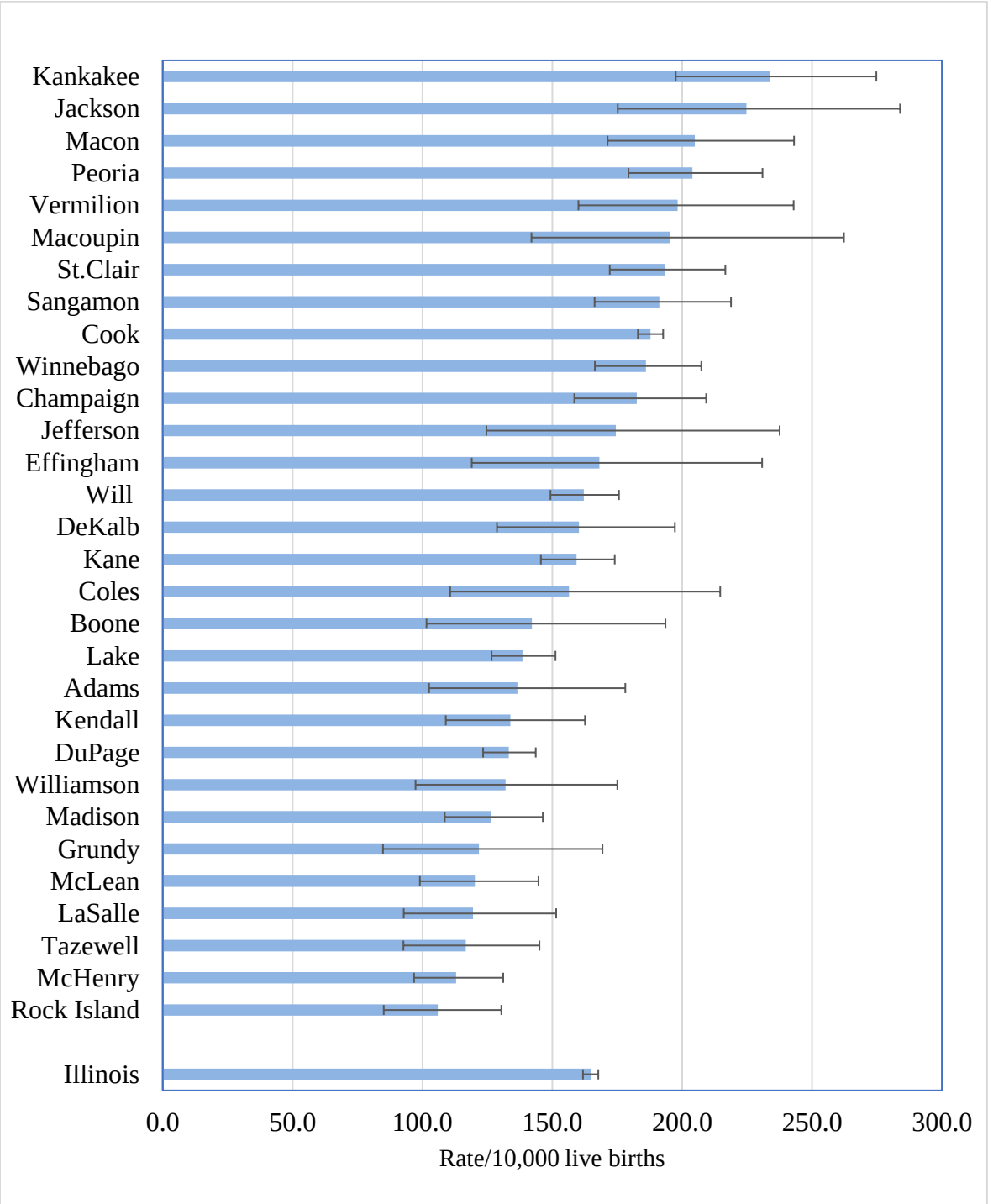
Table 14 provides five-year prevalence rates for infants born before 31 completed weeks of gestation reported to APORS by county, and Figures 13 and 14 present prevalence rates for selected counties in Illinois.

Table 14. Total Number and Prevalence Rates of Infants with Prematurity (<31 Weeks Completed Gestation) by County of Residence, 2016-2020

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	11,898	164.8	161.8	167.7	Lee	12	73.3	37.9	128.0
Adams	54	136.5	102.5	178.1	Livingston	25	120.8	78.2	178.4
Alexander	5	156.7	50.9	365.8	Logan	25	177.8	115.1	262.5
Bond	8	106.7	46.1	210.2	McDonough	24	180.0	115.4	267.9
Boone	40	142.1	101.6	193.6	McHenry	173	113.0	96.8	131.1
Brown	0	0.0	0.0	120.6	McLean	112	120.2	99.0	144.7
Bureau	27	163.9	108.0	238.5	Macon	131	204.8	171.3	243.1
Calhoun	1	45.5	1.2	253.3	Macoupin	44	195.4	142.0	262.3
Carroll	6	88.6	32.5	192.9	Madison	179	126.4	108.6	146.3
Cass	8	90.3	39.0	177.9	Marion	33	139.0	95.7	195.2
Champaign	206	182.5	158.5	209.2	Marshall	3	52.9	10.9	154.6
Christian	22	132.7	83.2	200.9	Mason	10	151.3	72.5	278.2
Clark	3	34.0	7.0	99.4	Massac	9	121.6	55.6	230.9
Clay	11	143.8	71.8	257.3	Menard	7	114.9	46.2	236.8
Clinton	26	128.2	83.7	187.9	Mercer	6	85.0	31.2	185.0
Coles	38	156.4	110.7	214.6	Monroe	6	35.9	13.2	78.1
Cook	5,784	187.8	183.0	192.7	Montgomery	23	158.5	100.5	237.8
Crawford	10	100.8	48.3	185.4	Morgan	34	198.6	137.5	277.5
Cumberland	4	63.8	17.4	163.3	Moultrie	12	130.6	67.5	228.1
DeKalb	89	160.2	128.7	197.2	Ogle	32	120.8	82.6	170.5
DeWitt	17	208.1	121.2	333.2	Peoria	248	203.9	179.3	230.9
Douglas	15	116.3	65.1	191.8	Perry	18	183.3	108.6	289.7
DuPage	677	133.2	123.4	143.6	Piatt	12	135.7	70.1	237.1
Edgar	11	124.2	62.0	222.1	Pike	9	95.1	43.5	180.6
Edwards	2	56.2	6.8	202.9	Pope	0	0.0	0.0	256.2
Effingham	38	168.1	119.0	230.8	Pulaski	5	159.2	51.7	371.6
Fayette	11	91.7	45.8	164.0	Putnam	2	81.3	9.8	293.7
Ford	6	82.8	30.4	180.1	Randolph	28	173.1	115.0	250.1
Franklin	31	140.1	95.2	198.9	Richland	4	47.1	12.8	120.5
Fulton	19	116.6	70.2	182.0	Rock Island	89	106.0	85.1	130.4
Gallatin	2	87.0	10.5	314.1	St.Clair	299	193.4	172.1	216.6
Greene	7	109.9	44.2	226.4	Saline	10	69.7	33.4	128.2
Grundy	35	121.7	84.8	169.3	Sangamon	211	191.2	166.3	218.8
Hamilton	5	114.7	37.2	267.6	Schuyler	3	99.7	20.6	291.3
Hancock	7	75.8	30.5	156.1	Scott	2	90.9	11.0	328.4
Hardin	0	0.0	0.0	235.0	Shelby	10	90.2	43.2	165.8
Henderson	1	33.8	0.9	188.2	Stark	4	132.9	36.2	340.3
Henry	29	115.9	77.6	166.4	Stephenson	29	122.4	82.0	175.8
Iroquois	29	191.2	128.0	274.5	Tazewell	81	116.7	92.7	145.0
Jackson	70	224.7	175.2	283.9	Union	9	102.3	46.8	194.1
Jasper	5	90.4	29.4	211.0	Vermilion	93	198.3	160.0	242.9
Jefferson	40	174.4	124.6	237.5	Wabash	4	60.2	16.4	154.2
Jersey	9	85.0	38.9	161.3	Warren	14	137.7	75.3	231.0
JoDaviess	6	73.5	27.0	160.0	Washington	11	149.1	74.4	266.7
Johnson	7	131.3	52.8	270.6	Wayne	15	153.2	85.8	252.7
Kane	494	159.3	145.6	174.0	White	6	87.0	31.9	189.3
Kankakee	147	233.8	197.5	274.8	Whiteside	16	52.3	29.9	85.0
Kendall	101	133.8	109.0	162.6	Will	593	162.1	149.3	175.7
Knox	30	109.5	73.9	156.3	Williamson	48	132.0	97.3	175.0
Lake	498	138.5	126.6	151.2	Winnebago	326	186.0	166.4	207.4
LaSalle	68	119.5	92.8	151.5	Woodford	30	144.9	97.8	206.9
Lawrence	7	96.8	38.9	199.5					

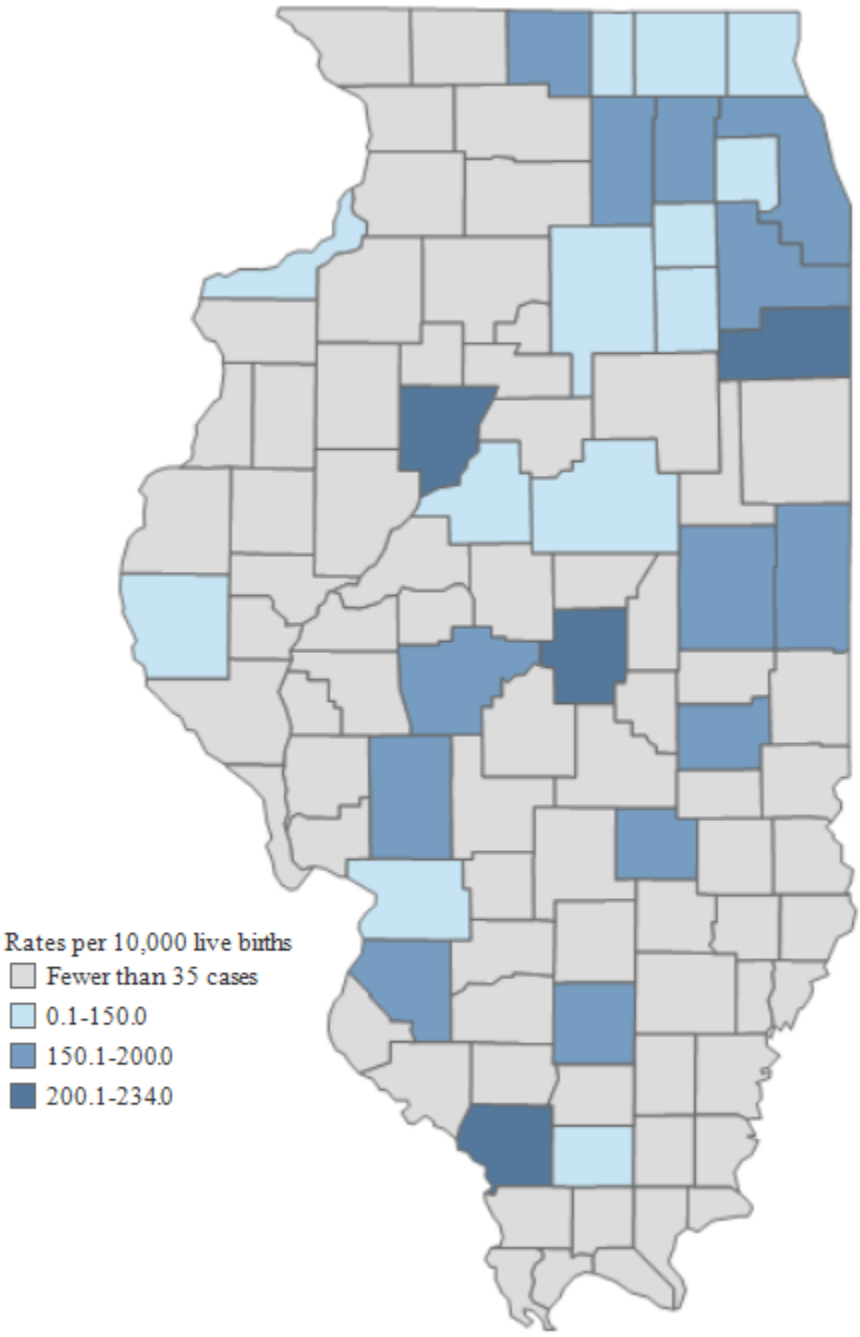
[1] Per 10,000 births (The number for Illinois includes three cases for which county of residence is missing.)
[2] 95 percent confidence intervals
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 13. Prevalence Rates[1] and 95% Confidence Intervals for Infants with Prematurity (<31 Completed Weeks Gestation) by Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 35 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 14. Map of Prevalence Rates for Infants with Prematurity (<31 Completed Weeks Gestation), by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

SERIOUS CONGENITAL INFECTIONS

Congenital infections may be either viral or bacterial. Infants may have been exposed *in utero* (by transfer across the placental barrier) or during delivery. A description of each condition collected by APORS follows, together with Table 15, which gives the five-year prevalence rates for each condition for the state. Table 16 provides five-year prevalence rates for all serious congenital infections combined by county. Figures 15 and 16 present prevalence rates for all serious congenital infections for selected counties in table and map formats, respectively.

Chlamydia is caused by the *Chlamydia trachomatis* bacterium. Infection can lead to dangerous complications during pregnancy and birth. If a pregnant woman is untreated, her baby can develop conjunctivitis (threatening eyesight) or pneumonia. Chlamydia also can lead to premature birth or low birth weight.

Cytomegalovirus (CMV) is a common virus that infects many people but may show no symptoms. Pregnant women can pass the virus to their baby through the placenta when infected for the first time or if infected again during pregnancy. The baby may or may not show signs of infection at birth. Congenital infection may cause hearing loss, intellectual disability, vision loss, and seizures. Tests may be done on a baby within a few weeks of birth to determine whether the baby is infected, and the baby may be treated to lessen the severity of health problems associated with the disease.

Gonorrhea is caused by the *Neisseria gonorrhoeae* bacterium. Gonorrhea can be passed from an infected woman to her newborn infant during delivery, causing neonatal conjunctivitis. Most states require the eyes of newborns to be treated with silver nitrate or other medication immediately after birth to prevent gonococcal infection of the eyes, which can lead to blindness.

Group B streptococcus (GBS) is a bacterium that can be part of normal flora in the body and is carried by about 25% of women. The bacteria can cause pneumonia and meningitis in infants who are exposed during delivery. All pregnant women should be tested for the bacteria, and, if positive, treated with antibiotics during labor to prevent disease in the baby.

Hepatitis B virus (HBV) can be passed to a baby during delivery. A baby may be asymptomatic, but as he or she grows up, liver damage may be present. About 80% of liver cancers are caused by HBV infections. A vaccine has been used since 1982 to prevent hepatitis B.

Herpes in a newborn is usually a result of exposure to the herpes simplex virus II (HSV-2) during vaginal delivery. The infection rate is about 50% in primary maternal infection and about 5% in a recurrent infection. The most common clinical symptom is the presence of cutaneous vesicles. In 20% of cases, there is major systemic involvement, central nervous system involvement, or both. Less than 10% of babies with neurologic disease develop normally. The overall mortality rate among infants with untreated infection is 65%.

Listeriosis is caused by infection with the bacterium *Listeria monocytogenes*; half of all infected newborns will die from the illness. Babies infected during pregnancy may be born prematurely, have a blood infection (sepsis), and may have a serious, whole-body infection called granulomatosis infantisepticum. When a baby is infected during childbirth, symptoms usually appear about two weeks after birth; these babies typically have meningitis or sepsis.

Rubella, or German measles, is caused by the rubella virus. If a woman contracts this virus during pregnancy, the baby may miscarry or be born with birth defects, including deafness, cataracts, heart defects, low birthweight, intellectual disabilities, and damage to the liver and spleen.

Sepsis may be caused by any of several infections. It is reportable if the infection is confirmed and is invasive. Once the organism has invaded the bloodstream, the infection may lead to pneumonia, septicemia, arthritis, endocarditis, or meningitis.

Syphilis (congenital) is caused by the *Treponema pallidum* bacterium. It can infect the baby either by transplacental passage of bacteria or from contact with an infectious lesion during delivery. Congenital syphilis can cause miscarriage, stillbirth, prematurity, or death shortly after birth. Without immediate treatment, infection can cause many health problems in the baby, including deformed bones, anemia, blindness, deafness, enlarged liver and spleen, and meningitis.

Tetanus infection in newborns is caused when an infant is exposed to the bacterium *Clostridium tetani* during delivery. The bacteria produce a neurotoxin that selectively blocks inhibitory nerve transmission from the spinal cord to the muscles, allowing the muscles to go into severe spasm. Without treatment, two out of three newborns with tetanus will die.

Table 15. Total Number and Prevalence Rates of Serious Congenital Infections in Newborn Infants, Illinois, 2016-2020

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Chlamydial infections	A7489, A749, P231	14	0.2	(0.1, 0.3)
Cytomegalovirus	P35.1	171	2.4	(2.0, 2.8)
Gonococcal infections	A5431	3	0.0	(0.0, 0.1)
Group B streptococcus	B95.1, J15.3, P36.0	205	2.8	(2.5, 3.3)
Hepatitis B	P35.3	8	0.1	(0.0, 0.2)
Prenatal exposure to hepatitis B	Z205_B	1,260	17.4	(16.5, 18.4)
Herpes and other infections	P35.2	58	0.8	(0.6, 1.0)
Listeriosis	P37.2	1	0.0	(0.0, 0.1)
Rubella	P35.0	0	0.0	(0.0, 0.1)
Sepsis (confirmed septicemia)	P36.9_C[3], P3639, P364, P365, P368, B377, P3610, P3619, P362, P3630	924	12.8	(12.0, 13.6)
Syphilis	A50.01-A53.9	413	5.7	(5.2, 6.3)
Tetanus neonatorum	A33	0	0.0	(0.0, 0.1)

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

[3]APORS specific code used to distinguish confirmed sepsis from suspected sepsis

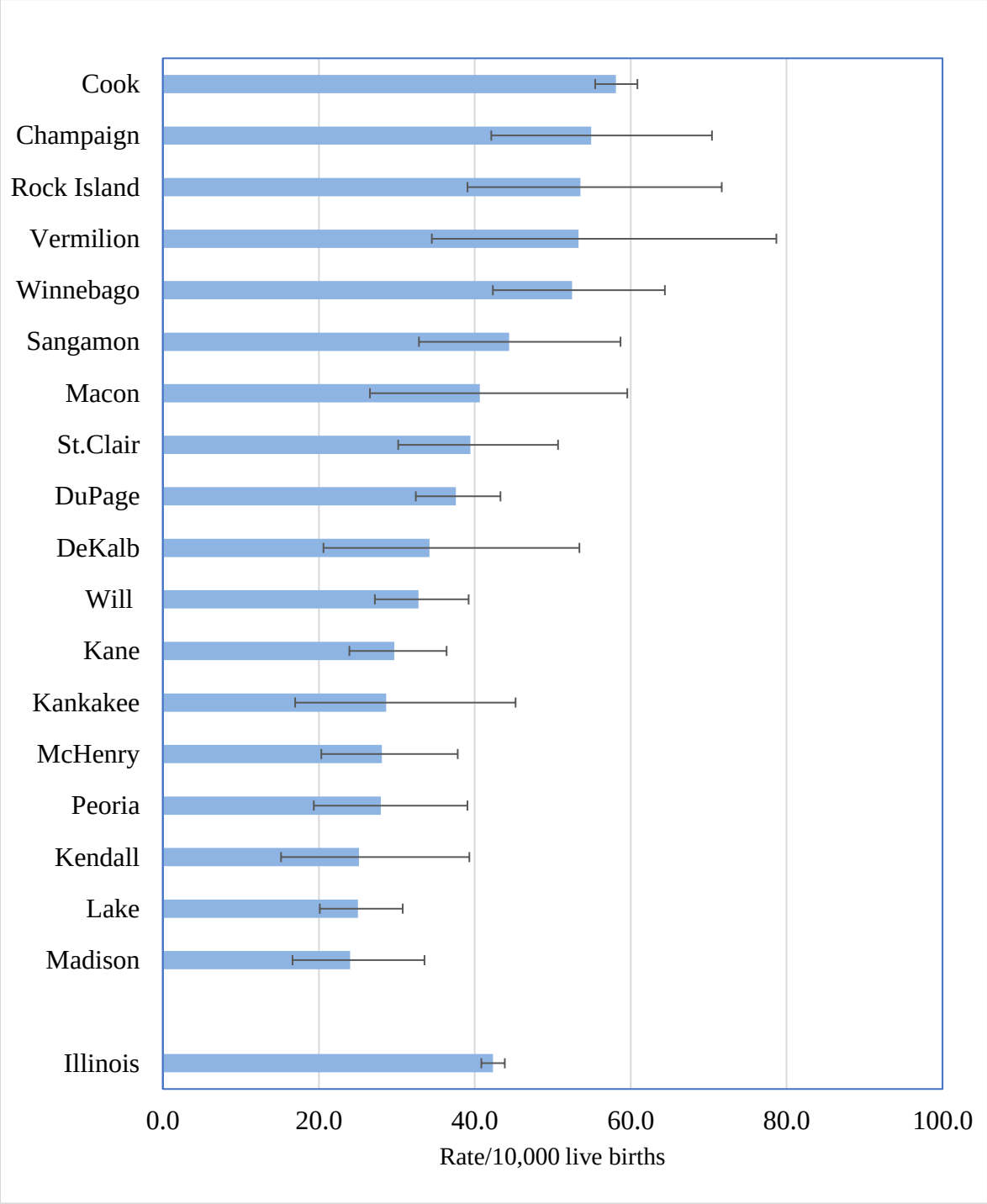
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023.

Table 16. Total Number and Prevalence Rates of Serious Infections in Newborn Infants by County of Residence, 2016-2020

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	3,057	42.3	40.8	43.9	Lee	7	42.7	17.2	88.1
Adams	5	12.6	4.1	29.5	Livingston	3	14.5	3.0	42.4
Alexander	0	0.0	0.0	115.6	Logan	3	21.3	4.4	62.4
Bond	1	13.3	0.3	74.3	McDonough	5	37.5	12.2	87.5
Boone	6	21.3	7.8	46.4	McHenry	43	28.1	20.3	37.8
Brown	0	0.0	0.0	120.6	McLean	13	14.0	7.4	23.9
Bureau	6	36.4	13.4	79.3	Macon	26	40.7	26.6	59.6
Calhoun	1	45.5	1.2	253.3	Macoupin	4	17.8	4.8	45.5
Carroll	3	44.3	9.1	129.5	Madison	34	24.0	16.6	33.6
Cass	3	33.9	7.0	99.0	Marion	4	16.8	4.6	43.1
Champaign	62	54.9	42.1	70.4	Marshall	0	0.0	0.0	65.1
Christian	4	24.1	6.6	61.8	Mason	1	15.1	0.4	84.3
Clark	0	0.0	0.0	41.8	Massac	1	13.5	0.3	75.3
Clay	2	26.1	3.2	94.4	Menard	2	32.8	4.0	118.6
Clinton	6	29.6	10.9	64.4	Mercer	2	28.3	3.4	102.3
Coles	8	32.9	14.2	64.9	Monroe	0	0.0	0.0	22.1
Cook	1,790	58.1	55.4	60.9	Montgomery	1	6.9	0.2	38.4
Crawford	0	0.0	0.0	37.2	Morgan	5	29.2	9.5	68.2
Cumberland	1	15.9	0.4	88.9	Moultrie	0	0.0	0.0	40.1
DeKalb	19	34.2	20.6	53.4	Ogle	12	45.3	23.4	79.1
DeWitt	1	12.2	0.3	68.2	Peoria	34	28.0	19.4	39.1
Douglas	5	38.8	12.6	90.5	Perry	4	40.7	11.1	104.3
DuPage	191	37.6	32.4	43.3	Piatt	1	11.3	0.3	63.0
Edgar	0	0.0	0.0	41.6	Pike	0	0.0	0.0	39.0
Edwards	1	28.1	0.7	156.5	Pope	0	0.0	0.0	256.2
Effingham	5	22.1	7.2	51.6	Pulaski	0	0.0	0.0	117.5
Fayette	1	8.3	0.2	46.4	Putnam	0	0.0	0.0	150.0
Ford	1	13.8	0.3	76.9	Randolph	1	6.2	0.2	34.4
Franklin	6	27.1	10.0	59.0	Richland	0	0.0	0.0	43.4
Fulton	2	12.3	1.5	44.3	Rock Island	45	53.6	39.1	71.7
Gallatin	0	0.0	0.0	160.4	St.Clair	61	39.5	30.2	50.7
Greene	2	31.4	3.8	113.4	Saline	1	7.0	0.2	38.9
Grundy	3	10.4	2.2	30.5	Sangamon	49	44.4	32.8	58.7
Hamilton	0	0.0	0.0	84.6	Schuyler	3	99.7	20.6	291.3
Hancock	1	10.8	0.3	60.3	Scott	0	0.0	0.0	167.7
Hardin	0	0.0	0.0	235.0	Shelby	3	27.1	5.6	79.1
Henderson	0	0.0	0.0	124.6	Stark	0	0.0	0.0	122.6
Henry	7	28.0	11.2	57.6	Stephenson	6	25.3	9.3	55.1
Iroquois	0	0.0	0.0	24.3	Tazewell	13	18.7	10.0	32.0
Jackson	13	41.7	22.2	71.4	Union	1	11.4	0.3	63.3
Jasper	0	0.0	0.0	66.7	Vermilion	25	53.3	34.5	78.7
Jefferson	5	21.8	7.1	50.9	Wabash	0	0.0	0.0	55.6
Jersey	1	9.4	0.2	52.6	Warren	9	88.5	40.5	168.0
JoDaviess	1	12.3	0.3	68.3	Washington	0	0.0	0.0	50.0
Johnson	1	18.8	0.5	104.5	Wayne	2	20.4	2.5	73.8
Kane	92	29.7	23.9	36.4	White	0	0.0	0.0	53.5
Kankakee	18	28.6	17.0	45.2	Whiteside	6	19.6	7.2	42.7
Kendall	19	25.2	15.2	39.3	Will	120	32.8	27.2	39.2
Knox	5	18.2	5.9	42.6	Williamson	7	19.3	7.7	39.7
Lake	90	25.0	20.1	30.8	Winnebago	92	52.5	42.3	64.4
LaSalle	13	22.8	12.2	39.1	Woodford	4	19.3	5.3	49.5
Lawrence	2	27.7	3.4	99.9					

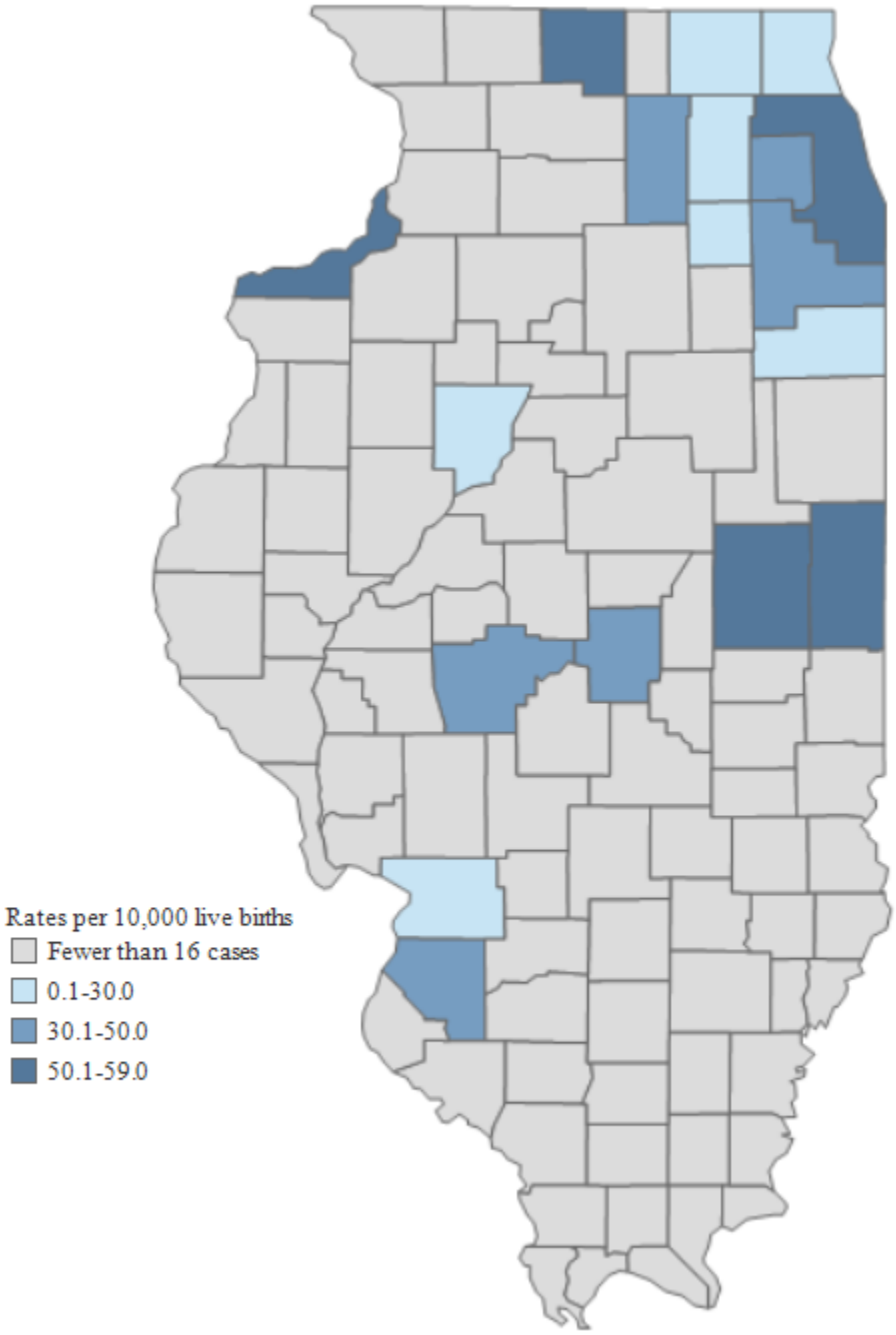
[1] Per 10,000 live births (The number for Illinois includes one case for which county of residence is missing.)
[2] 95% confidence intervals for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 15. Prevalence Rates[1] and 95% Confidence Intervals for Serious Congenital Infections in Newborn Infants for Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 16 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 16. Map of Prevalence Rates for Serious Congenital Infections in Newborn Infants by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

PERINATAL DEATHS

Perinatal deaths refer to a combination of fetal deaths of at least 20 weeks gestation and neonatal deaths (under 28 days old). APORS collects information from hospitals about neonatal deaths that occur while the baby is still in the hospital for the newborn stay. Additionally, information about fetal deaths is obtained from the IDPH's Division of Vital Records. Data on elective abortions are not included. Table 17 provides five-year prevalence rates for perinatal deaths for the state. Table 18 provides five-year prevalence rates for perinatal deaths by county. Figures 17 and 18 present five-year prevalence rates by selected counties in Illinois.

Table 17. Total Number and Prevalence Rates of Perinatal Deaths, Illinois, 2016-2020

Defect	Cases	Rate[1]	95% CI[2]
Fetal deaths	4,065	56.3	(54.6, 58.0)
Deaths during newborn stay	3,281	45.4	(43.9, 47.0)

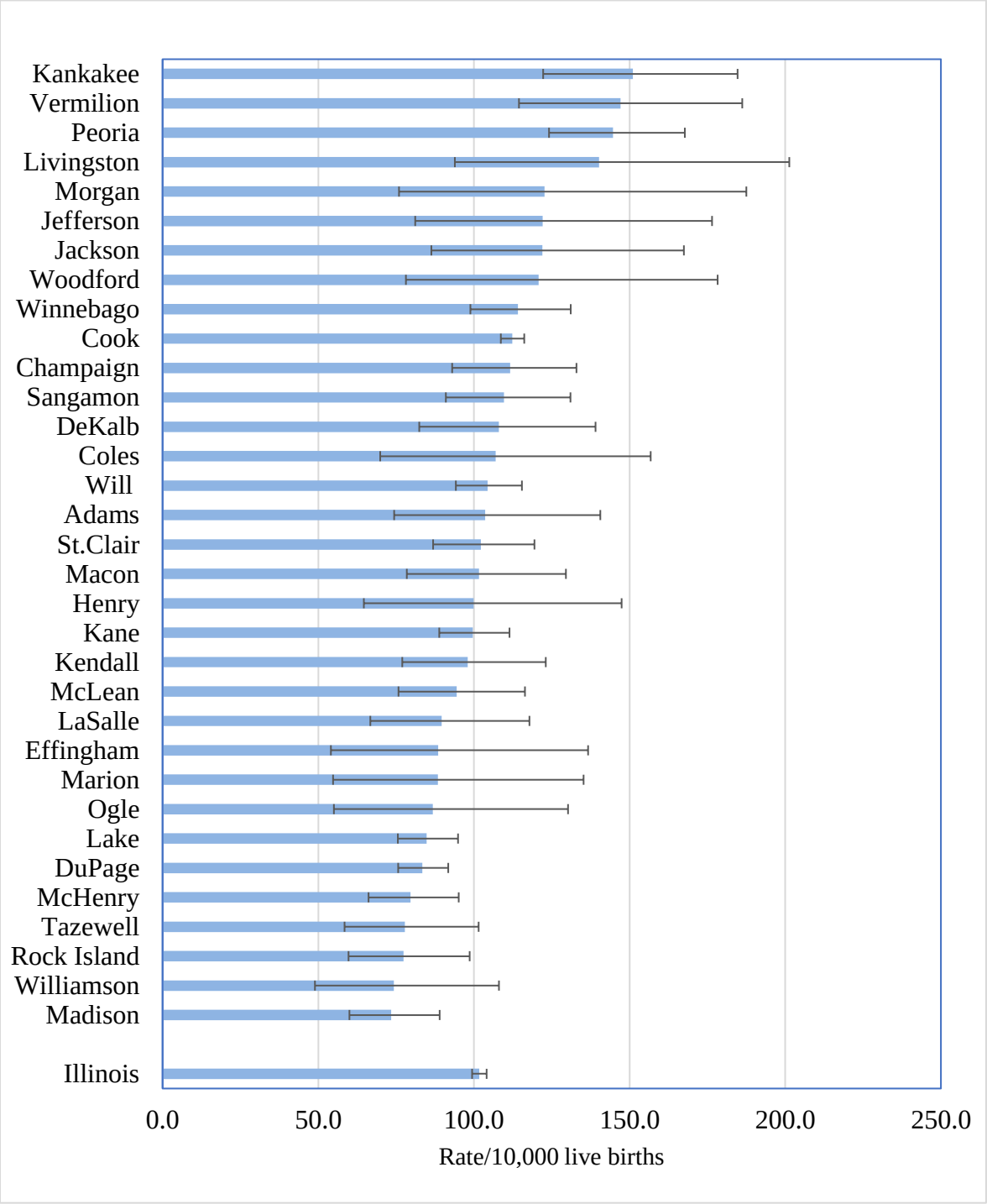
[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023.

Table18. Total Number and Prevalence Rates of Perinatal Deaths by County of Residence, 2016-2020

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	7,346	101.7	99.4	104.1	Lee	12	73.3	37.9	128.0
Adams	41	103.6	74.4	140.6	Livingston	29	140.2	93.9	201.3
Alexander	4	125.4	34.2	321.1	Logan	9	64.0	29.3	121.5
Bond	5	66.7	21.6	155.6	McDonough	17	127.5	74.3	204.2
Boone	14	49.8	27.2	83.5	McHenry	122	79.7	66.2	95.1
Brown	1	32.7	0.8	182.1	McLean	88	94.5	75.8	116.4
Bureau	11	66.8	33.3	119.5	Macon	65	101.6	78.4	129.6
Calhoun	2	90.9	11.0	328.4	Macoupin	15	66.6	37.3	109.9
Carroll	2	29.5	3.6	106.7	Madison	104	73.4	60.0	89.0
Cass	9	101.6	46.4	192.8	Marion	21	88.5	54.8	135.2
Champaign	126	111.7	93.0	132.9	Marshall	4	70.5	19.2	180.6
Christian	17	102.5	59.7	164.2	Mason	10	151.3	72.5	278.2
Clark	1	11.3	0.3	63.2	Massac	3	40.5	8.4	118.5
Clay	7	91.5	36.8	188.5	Menard	5	82.1	26.7	191.6
Clinton	8	39.4	17.0	77.7	Mercer	4	56.7	15.4	145.1
Coles	26	107.0	69.9	156.8	Monroe	4	23.9	6.5	61.3
Cook	3,461	112.4	108.6	116.2	Montgomery	17	117.2	68.3	187.6
Crawford	5	50.4	16.4	117.6	Morgan	21	122.7	75.9	187.5
Cumberland	4	63.8	17.4	163.3	Moultrie	16	174.1	99.5	282.7
DeKalb	60	108.0	82.4	139.1	Ogle	23	86.8	55.0	130.2
DeWitt	9	110.2	50.4	209.1	Peoria	176	144.7	124.1	167.7
Douglas	14	108.5	59.3	182.1	Perry	11	112.0	55.9	200.4
DuPage	424	83.4	75.7	91.8	Piatt	7	79.2	31.8	163.2
Edgar	6	67.7	24.9	147.4	Pike	6	63.4	23.3	138.0
Edwards	2	56.2	6.8	202.9	Pope	1	69.4	1.8	386.9
Effingham	20	88.5	54.1	136.7	Pulaski	3	95.5	19.7	279.2
Fayette	10	83.3	40.0	153.3	Putnam	2	81.3	9.8	293.7
Ford	5	69.0	22.4	160.9	Randolph	9	55.6	25.4	105.6
Franklin	19	85.9	51.7	134.1	Richland	10	117.6	56.4	216.4
Fulton	15	92.0	51.5	151.8	Rock Island	65	77.4	59.7	98.6
Gallatin	1	43.5	1.1	242.2	St.Clair	158	102.2	86.9	119.4
Greene	4	62.8	17.1	160.8	Saline	15	104.6	58.5	172.5
Grundy	19	66.1	39.8	103.2	Sangamon	121	109.6	91.0	131.0
Hamilton	5	114.7	37.2	267.6	Schuyler	1	33.2	0.8	185.1
Hancock	1	10.8	0.3	60.3	Scott	1	45.5	1.2	253.3
Hardin	0	0.0	0.0	235.0	Shelby	10	90.2	43.2	165.8
Henderson	0	0.0	0.0	124.6	Stark	2	66.4	8.0	240.0
Henry	25	99.9	64.6	147.4	Stephenson	17	71.8	41.8	114.9
Iroquois	19	125.2	75.4	195.6	Tazewell	54	77.8	58.4	101.5
Jackson	38	122.0	86.3	167.4	Union	8	90.9	39.2	179.1
Jasper	4	72.3	19.7	185.2	Vermilion	69	147.1	114.5	186.2
Jefferson	28	122.1	81.1	176.5	Wabash	3	45.2	9.3	132.0
Jersey	6	56.7	20.8	123.3	Warren	6	59.0	21.7	128.4
JoDaviess	3	36.8	7.6	107.4	Washington	6	81.3	29.8	177.0
Johnson	3	56.3	11.6	164.5	Wayne	12	122.6	63.3	214.1
Kane	309	99.7	88.9	111.4	White	2	29.0	3.5	104.7
Kankakee	95	151.1	122.2	184.7	Whiteside	13	42.5	22.6	72.7
Kendall	74	98.0	77.0	123.1	Will	382	104.4	94.2	115.4
Knox	12	43.8	22.6	76.5	Williamson	27	74.3	48.9	108.0
Lake	305	84.8	75.6	94.9	Winnebago	200	114.1	98.9	131.1
LaSalle	51	89.6	66.7	117.8	Woodford	25	120.8	78.2	178.3
Lawrence	3	41.5	8.6	121.3					

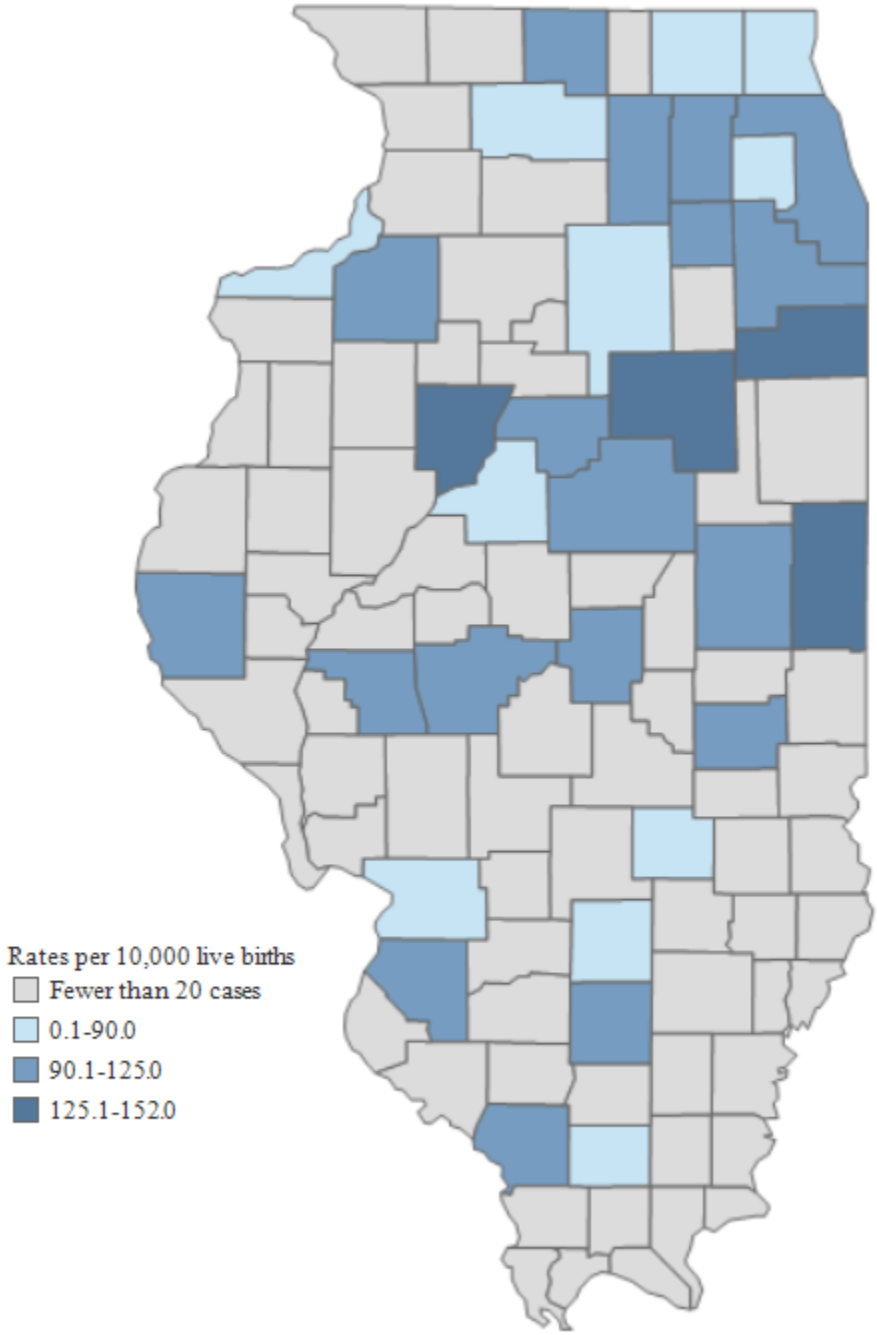
[1] Per 10,000 live births (The number for Illinois includes two cases for which county of residence is missing.)
[2] 95% confidence intervals for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting Systems, November 2023

Figure 17. Prevalence Rates[1] and 95% Confidence Intervals for Perinatal Deaths for Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 20 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 18. Map of Prevalence Rates for Perinatal Deaths by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

ENDOCRINE, METABOLIC, OR IMMUNE DISORDERS

APORS works closely with the IDPH Newborn Metabolic Screening Program to compile information on endocrine, metabolic, and immune disorders in newborns. Descriptions of the conditions follow. Table 19 provides five-year prevalence rates for the state. Table 20 provides five-year prevalence rates by county. Figures 19 and 20 present prevalence rates for endocrine, metabolic, or immune disorders for selected counties in table and map formats, respectively.

Adrenogenital syndrome is a group of disorders that lead to an overproduction of androgens. Female newborns have ambiguous genitalia; male newborns have no obvious abnormality but appear to enter puberty as early as 2 to 3 years of age. Some forms are more severe – in the salt-losing form, babies develop symptoms (dehydration, electrolyte changes, and cardiac arrhythmias) soon after birth. Untreated, this condition can lead to death within days.

Cystic fibrosis is a genetic disease that causes the body to produce an abnormally thick, sticky mucus due to the faulty transport of sodium and chloride within cells lining organs, such as the lungs and pancreas. The thick mucus also obstructs the pancreas, preventing enzymes from reaching the intestines to help digest food. This leads to malnutrition and stunted growth.

Immune deficiency diseases occur when one or more parts of the immune system are missing. There are more than 100 known forms of congenital immune deficiencies (HIV infections do not fit in this category). Many children with immune deficiencies must avoid contagious situations. If a child is diagnosed at birth or soon after with a severe combined immune deficiency, he or she can receive a bone marrow transplant with hopes of reconstituting the missing immune system.

Inborn errors of metabolism include hundreds of genetic disorders affecting metabolism. These errors interfere with the synthesis of proteins, carbohydrates, fats, and enzymes. Absence or excesses of normal or abnormal metabolites can lead to disease and death. Many inborn errors of metabolism are untreatable; others require restrictions or extremely high dosages of certain nutrients.

Neonatal hypothyroidism is characterized by decreased thyroid hormone production at birth. If untreated, hypothyroidism leads to severe defects, including poor vision, developmental disabilities, muscle weakness, and severe lethargy. If diagnosed and treated soon after birth, growth and mental development can proceed relatively normally.

Table 19. Total Number and Prevalence Rates of Endocrine, Metabolic, or Immune Disorders in Newborn Infants, Illinois, 2016-2020

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Adrenogenital syndrome	E25.0-E25.9	32	0.4	(0.3, 0.6)
Cystic fibrosis	E84.0-E84.9	118	1.6	(1.4, 2.0)
Hypothyroidism	E03.0, E03.1	380	5.3	(4.7, 5.8)
Immune deficiency disease	D81.0, D81.9	73	1.0	(0.8, 1.3)
Inborn errors of metabolism	E70-E79	459	6.4	(5.8, 7.0)

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

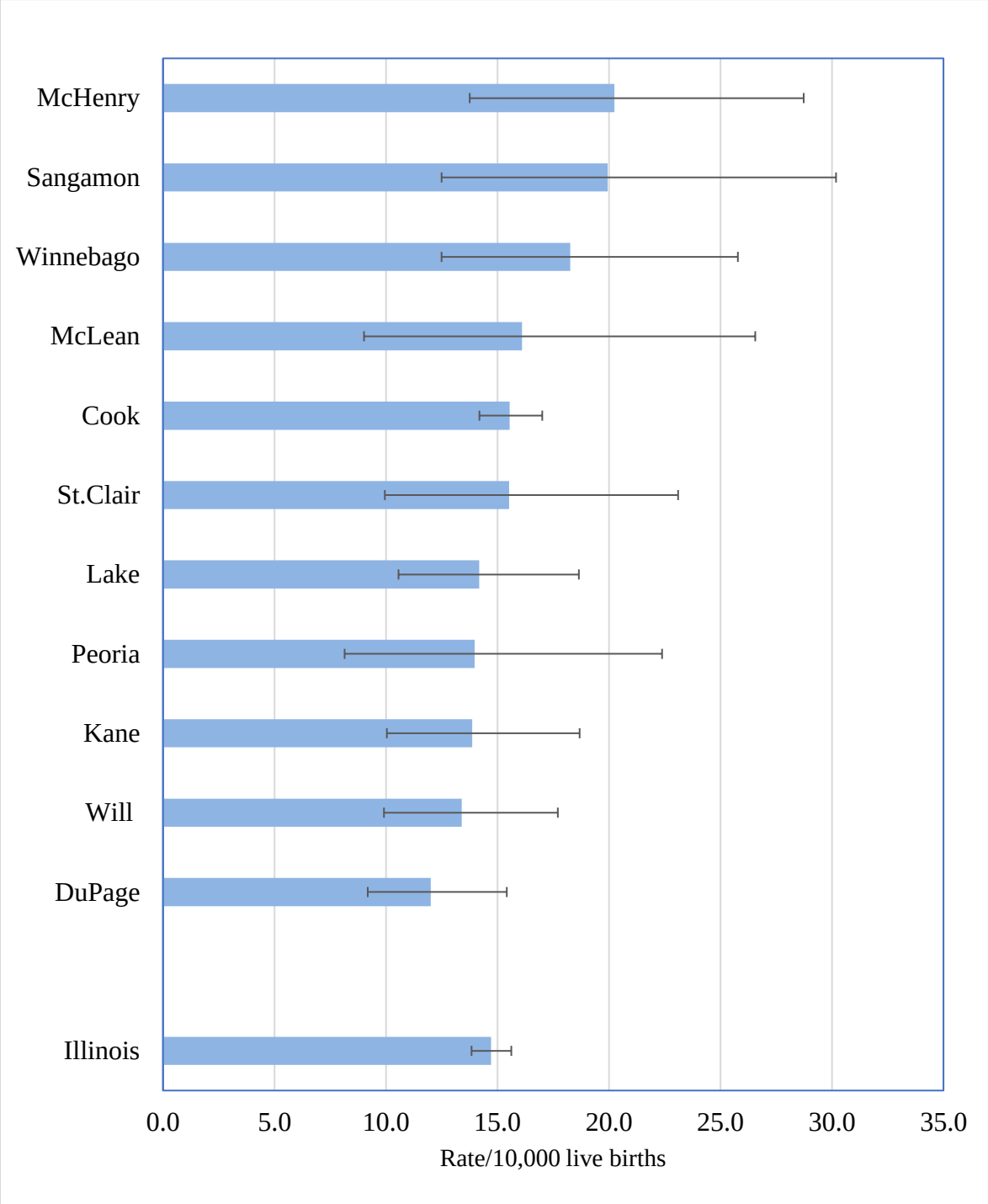
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023.

Table 20. Total Number and Prevalence of Endocrine, Metabolic and Immune Disorders in Newborn Infants by County of Residence, 2016-2020

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	1,062	14.7	13.8	15.6	Lee	2	12.2	1.5	44.1
Adams	2	5.1	0.6	18.3	Livingston	0	0.0	0.0	17.8
Alexander	0	0.0	0.0	115.6	Logan	1	7.1	0.2	39.6
Bond	1	13.3	0.3	74.3	McDonough	1	7.5	0.2	41.8
Boone	3	10.7	2.2	31.2	McHenry	31	20.2	13.8	28.7
Brown	1	32.7	0.8	182.1	McLean	15	16.1	9.0	26.6
Bureau	4	24.3	6.6	62.2	Macon	6	9.4	3.4	20.4
Calhoun	1	45.5	1.2	253.3	Macoupin	1	4.4	0.1	24.7
Carroll	0	0.0	0.0	54.5	Madison	13	9.2	4.9	15.7
Cass	1	11.3	0.3	62.9	Marion	1	4.2	0.1	23.5
Champaign	13	11.5	6.1	19.7	Marshall	0	0.0	0.0	65.1
Christian	5	30.2	9.8	70.4	Mason	0	0.0	0.0	55.8
Clark	0	0.0	0.0	41.8	Massac	0	0.0	0.0	49.8
Clay	4	52.3	14.2	133.9	Menard	2	32.8	4.0	118.6
Clinton	6	29.6	10.9	64.4	Mercer	2	28.3	3.4	102.3
Coles	7	28.8	11.6	59.4	Monroe	1	6.0	0.2	33.3
Cook	479	15.6	14.2	17.0	Montgomery	8	55.1	23.8	108.6
Crawford	1	10.1	0.3	56.2	Morgan	3	17.5	3.6	51.2
Cumberland	2	31.9	3.9	115.2	Moultrie	1	10.9	0.3	60.6
DeKalb	12	21.6	11.2	37.7	Ogle	2	7.5	0.9	27.3
DeWitt	1	12.2	0.3	68.2	Peoria	17	14.0	8.1	22.4
Douglas	2	15.5	1.9	56.0	Perry	1	10.2	0.3	56.7
DuPage	61	12.0	9.2	15.4	Piatt	1	11.3	0.3	63.0
Edgar	2	22.6	2.7	81.5	Pike	2	21.1	2.6	76.4
Edwards	0	0.0	0.0	103.6	Pope	0	0.0	0.0	256.2
Effingham	6	26.5	9.7	57.8	Pulaski	0	0.0	0.0	117.5
Fayette	0	0.0	0.0	30.7	Putnam	0	0.0	0.0	150.0
Ford	2	27.6	3.3	99.7	Randolph	2	12.4	1.5	44.7
Franklin	1	4.5	0.1	25.2	Richland	0	0.0	0.0	43.4
Fulton	1	6.1	0.2	34.2	Rock Island	7	8.3	3.4	17.2
Gallatin	1	43.5	1.1	242.2	St.Clair	24	15.5	9.9	23.1
Greene	2	31.4	3.8	113.4	Saline	1	7.0	0.2	38.9
Grundy	5	17.4	5.6	40.6	Sangamon	22	19.9	12.5	30.2
Hamilton	0	0.0	0.0	84.6	Schuyler	0	0.0	0.0	122.6
Hancock	0	0.0	0.0	39.9	Scott	0	0.0	0.0	167.7
Hardin	0	0.0	0.0	235.0	Shelby	1	9.0	0.2	50.2
Henderson	0	0.0	0.0	124.6	Stark	0	0.0	0.0	122.6
Henry	6	24.0	8.8	52.2	Stephenson	2	8.4	1.0	30.5
Iroquois	0	0.0	0.0	24.3	Tazewell	8	11.5	5.0	22.7
Jackson	8	25.7	11.1	50.6	Union	1	11.4	0.3	63.3
Jasper	1	18.1	0.5	100.8	Vermilion	4	8.5	2.3	21.8
Jefferson	1	4.4	0.1	24.3	Wabash	0	0.0	0.0	55.6
Jersey	1	9.4	0.2	52.6	Warren	2	19.7	2.4	71.0
JoDaviess	1	12.3	0.3	68.3	Washington	1	13.6	0.3	75.5
Johnson	1	18.8	0.5	104.5	Wayne	2	20.4	2.5	73.8
Kane	43	13.9	10.0	18.7	White	1	14.5	0.4	80.7
Kankakee	9	14.3	6.5	27.2	Whiteside	6	19.6	7.2	42.7
Kendall	10	13.2	6.4	24.4	Will	49	13.4	9.9	17.7
Knox	4	14.6	4.0	37.4	Williamson	4	11.0	3.0	28.2
Lake	51	14.2	10.6	18.6	Winnebago	32	18.3	12.5	25.8
LaSalle	13	22.8	12.2	39.1	Woodford	4	19.3	5.3	49.5
Lawrence	2	27.7	3.4	99.9					

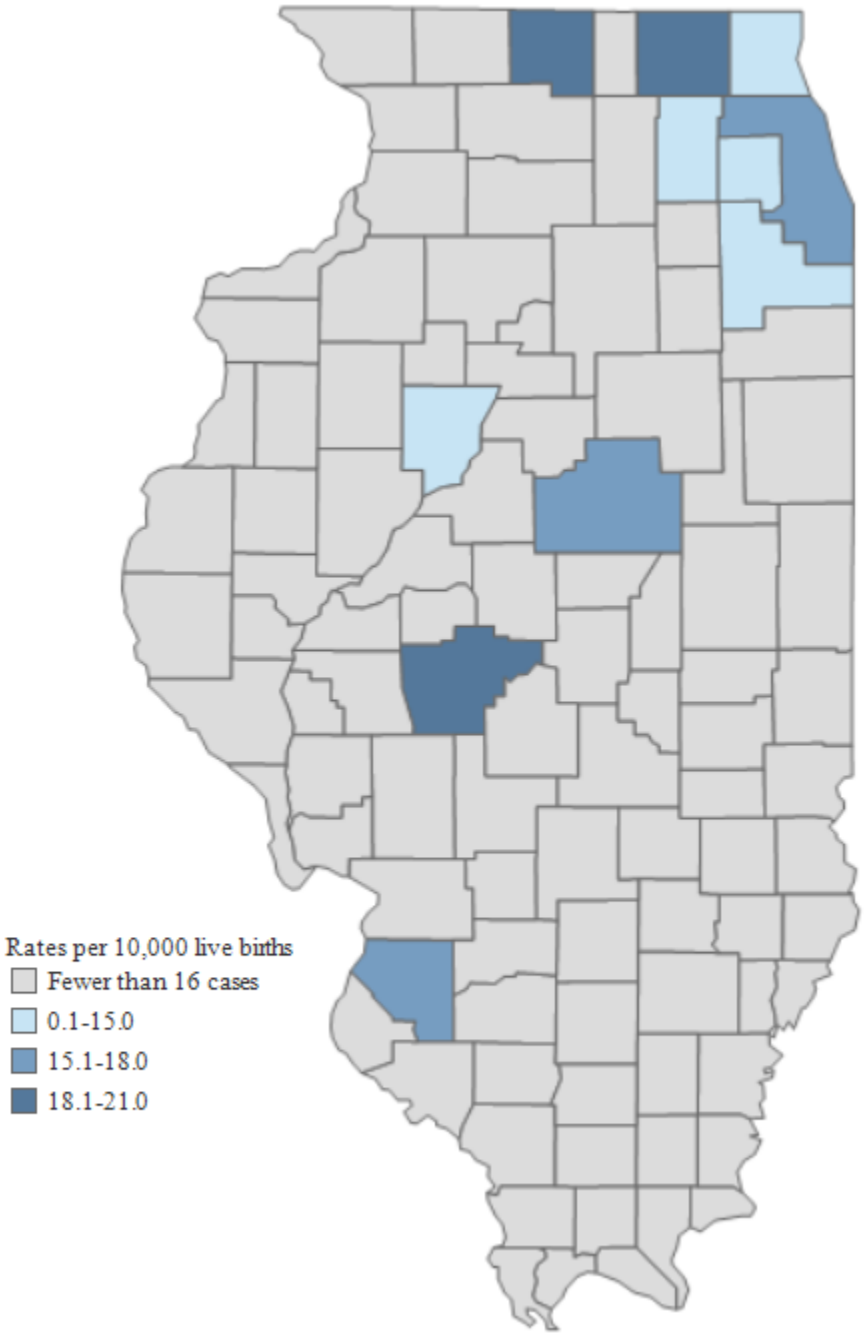
[1] Per 10,000 live births (The number for Illinois includes one case for which county of residence is missing.)
[2] 95% confidence intervals for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting Systems, November 2023

Figure 19. Prevalence Rates[1] and 95% Confidence Intervals For Endocrine, Metabolic, or Immune Disorders in Newborn Infants by Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 16 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 20. Map of Prevalence Rates for Endocrine, Metabolic, or Immune Disorders in Newborn Infants by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

BLOOD DISORDERS

APORS collects information on congenital blood disorders, including anemias, leukemias, and coagulation defects. Descriptions of these conditions follow, together with Table 21, which gives the five-year prevalence rates for each condition for the state. Table 22 provides five-year prevalence rates by county. Figures 21 and 22 present prevalence rates for blood disorders for selected counties in table and map formats, respectively.

Coagulation defects are a group of inherited blood disorders characterized by a deficiency in one or more of the factors that make up the blood clotting system. Each condition may be severe, moderate, or mild. In hemophilia, easy bruising and internal bleeding are characteristic. In the severe forms, repeated bleeding into joints is a problem and can lead to long-term joint damage. Treatment consists of intravenous replacement of the missing clotting factors.

Constitutional aplastic anemia is a hereditary, often fatal bone marrow failure disease that occurs when the bone marrow is hypoplastic. Bone marrow transplantation replaces the defective bone marrow of a patient with healthy cells from a normal donor and can cure the disease in about 80% of cases where a sibling with identical tissue type is the donor. Growth factors are also being used in treatment.

Hereditary hemolytic anemia is a condition characterized by an inadequate number of circulating red blood cells (anemia), caused by premature destruction of red blood cells. There are several types of hereditary hemolytic anemia, including sickle cell anemia, hemoglobin SC disease, sickle beta thalassemia, and spherocytosis. Symptoms include fatigue, shortness of breath, rapid heart rate, and jaundice.

Leukemia is cancer of the blood cells. When it develops, the body produces large numbers of abnormal white blood cells. Acute lymphocytic leukemia is seen most commonly in children. Children with leukemia may have anemia; swollen lymph nodes, liver, or spleen; and bone or joint pain. In acute leukemia, the abnormal cells may collect in the central nervous system leading to headaches, confusion, loss of muscle control, and seizures. Leukemia also can affect the eyes, skin, testicles, digestive tract, kidneys, lungs, or other parts of the body.

Table 21. Total Number and Prevalence Rates of Blood Disorders in Newborn Infants, Illinois, 2016-2020

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Coagulation defects	D65-D68.9	42	0.6	(0.4, 0.8)
Constitutional aplastic anemia	D61.0-D61.9	5	0.1	(0.0, 0.2)
Hereditary hemolytic anemia	D58.0-D58.9, D550, D551, D559, D560-D563, D565, D568, D571, D5720, D5740, D5780	429	5.9	(5.4, 6.5)
Leukemia	C91-C95.92	0	0.0	(0.0, 0.1)

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

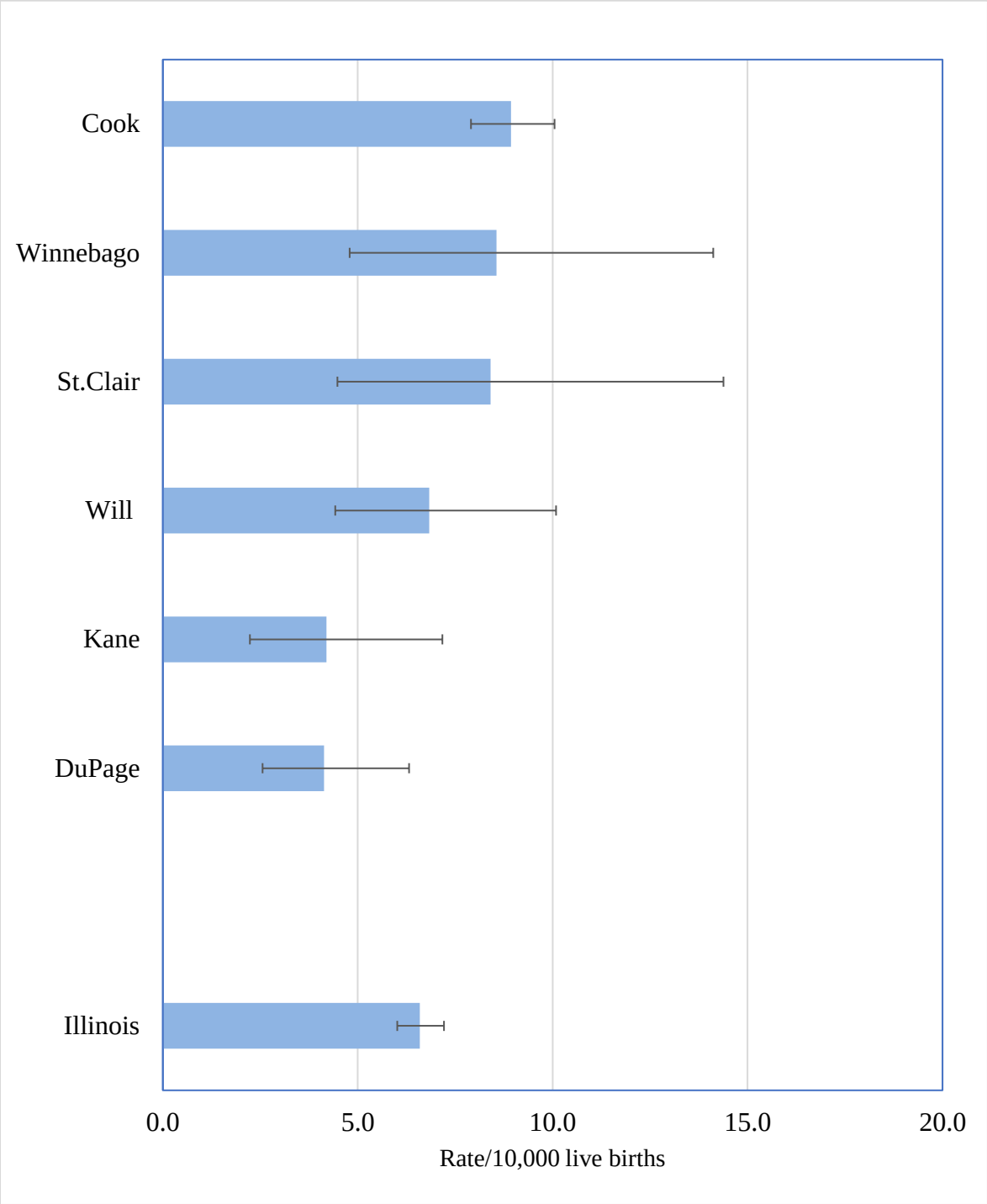
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023.

Table 22. Total Number and Prevalence Rates of Blood Disorders in Newborn Infant by County of Residence, 2016-2020

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	476	6.6	6.0	7.2	Lee	1	6.1	0.2	34.0
Adams	2	5.1	0.6	18.3	Livingston	0	0.0	0.0	17.8
Alexander	0	0.0	0.0	115.6	Logan	0	0.0	0.0	26.2
Bond	0	0.0	0.0	49.2	McDonough	1	7.5	0.2	41.8
Boone	1	3.6	0.1	19.8	McHenry	2	1.3	0.2	4.7
Brown	0	0.0	0.0	120.6	McLean	8	8.6	3.7	16.9
Bureau	0	0.0	0.0	22.4	Macon	11	17.2	8.6	30.8
Calhoun	0	0.0	0.0	167.7	Macoupin	0	0.0	0.0	16.4
Carroll	0	0.0	0.0	54.5	Madison	4	2.8	0.8	7.2
Cass	2	22.6	2.7	81.5	Marion	0	0.0	0.0	15.5
Champaign	14	12.4	6.8	20.8	Marshall	0	0.0	0.0	65.1
Christian	0	0.0	0.0	22.2	Mason	1	15.1	0.4	84.3
Clark	0	0.0	0.0	41.8	Massac	0	0.0	0.0	49.8
Clay	0	0.0	0.0	48.2	Menard	0	0.0	0.0	60.6
Clinton	0	0.0	0.0	18.2	Mercer	0	0.0	0.0	52.3
Coles	0	0.0	0.0	15.2	Monroe	2	12.0	1.4	43.2
Cook	275	8.9	7.9	10.0	Montgomery	1	6.9	0.2	38.4
Crawford	0	0.0	0.0	37.2	Morgan	1	5.8	0.1	32.5
Cumberland	0	0.0	0.0	58.8	Moultrie	0	0.0	0.0	40.1
DeKalb	2	3.6	0.4	13.0	Ogle	1	3.8	0.1	21.0
DeWitt	1	12.2	0.3	68.2	Peoria	11	9.0	4.5	16.2
Douglas	1	7.8	0.2	43.2	Perry	0	0.0	0.0	37.6
DuPage	21	4.1	2.6	6.3	Piatt	1	11.3	0.3	63.0
Edgar	0	0.0	0.0	41.6	Pike	0	0.0	0.0	39.0
Edwards	0	0.0	0.0	103.6	Pope	1	69.4	1.8	386.9
Effingham	0	0.0	0.0	16.3	Pulaski	0	0.0	0.0	117.5
Fayette	0	0.0	0.0	30.7	Putnam	0	0.0	0.0	150.0
Ford	0	0.0	0.0	50.9	Randolph	0	0.0	0.0	22.8
Franklin	0	0.0	0.0	16.7	Richland	0	0.0	0.0	43.4
Fulton	0	0.0	0.0	22.6	Rock Island	4	4.8	1.3	12.2
Gallatin	0	0.0	0.0	160.4	St.Clair	13	8.4	4.5	14.4
Greene	0	0.0	0.0	57.9	Saline	0	0.0	0.0	25.7
Grundy	0	0.0	0.0	12.8	Sangamon	8	7.2	3.1	14.3
Hamilton	0	0.0	0.0	84.6	Schuyler	0	0.0	0.0	122.6
Hancock	1	10.8	0.3	60.3	Scott	0	0.0	0.0	167.7
Hardin	0	0.0	0.0	235.0	Shelby	0	0.0	0.0	33.3
Henderson	0	0.0	0.0	124.6	Stark	0	0.0	0.0	122.6
Henry	0	0.0	0.0	14.7	Stephenson	0	0.0	0.0	15.6
Iroquois	0	0.0	0.0	24.3	Tazewell	1	1.4	0.0	8.0
Jackson	3	9.6	2.0	28.1	Union	0	0.0	0.0	41.9
Jasper	0	0.0	0.0	66.7	Vermilion	7	14.9	6.0	30.8
Jefferson	2	8.7	1.1	31.5	Wabash	0	0.0	0.0	55.6
Jersey	0	0.0	0.0	34.8	Warren	2	19.7	2.4	71.0
JoDaviess	0	0.0	0.0	45.2	Washington	0	0.0	0.0	50.0
Johnson	0	0.0	0.0	69.2	Wayne	0	0.0	0.0	37.7
Kane	13	4.2	2.2	7.2	White	0	0.0	0.0	53.5
Kankakee	4	6.4	1.7	16.3	Whiteside	0	0.0	0.0	12.1
Kendall	2	2.6	0.3	9.6	Will	25	6.8	4.4	10.1
Knox	1	3.6	0.1	20.3	Williamson	0	0.0	0.0	10.1
Lake	9	2.5	1.1	4.8	Winnebago	15	8.6	4.8	14.1
LaSalle	1	1.8	0.0	9.8	Woodford	0	0.0	0.0	17.8
Lawrence	0	0.0	0.0	51.0					

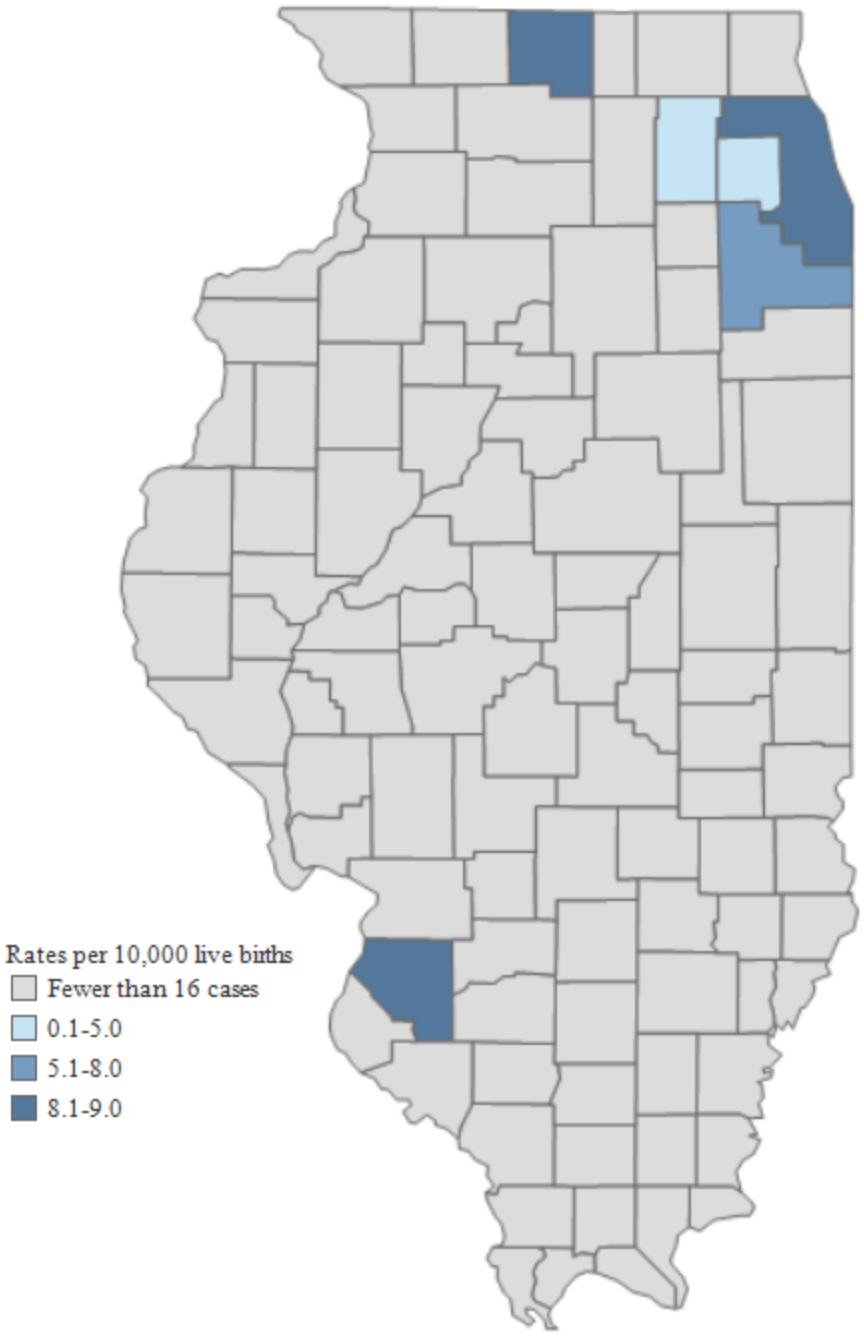
[1] Per 10,000 live births
[2] 95% confidence intervals for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting Systems, November 2023

Figure 21. Prevalence Rates[1] and 95% Confidence Intervals For Blood Disorders in Newborn Infants by Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 16 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 22. Map of Prevalence Rates for Blood Disorders in Newborn Infants by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

OTHER ADVERSE PREGNANCY OUTCOMES

APORS collects information on a variety of other adverse outcomes in newborns. Descriptions of these conditions follow, together with Table 23, which gives the five-year prevalence rates for each condition for the state. Table 24 provides five-year prevalence rates by county. Figures 23 and 24 present prevalence rates for other adverse outcomes for selected counties in table and map formats, respectively.

Bronchopulmonary dysplasia is a chronic lung disease affecting primarily very premature babies who have had oxygen therapy. The severity of the condition varies and may result in such issues as pulmonary hypertension, heart failure, trouble feeding, and delayed development. Treatment is aimed at increasing lung development and reducing further damage (American Lung Association, 2020).

Cerebral lipidoses are inherited genetic defects that result in a deficiency in different enzymes involved with fat storage. The absence of the enzyme prevents the lysosome in the cells of the body from performing its natural recycling function, and various materials are inappropriately stored in the cells of the brain and central nervous system. This leads to a variety of progressive mental and physical deterioration over time. Some patients survive into adulthood, but others with more severe symptoms or conditions die in their teens or earlier.

Endocardial fibroelastosis (EFE) is a rare heart disorder that affects infants and children. It is characterized by a thickening within the muscular lining of the heart chambers due to an increase in the amount of supporting connective tissue and elastic fibers. The symptoms of EFE are related to the overgrowth of fibrous tissues causing abnormal enlargement of the heart (cardiac hypertrophy), especially the left ventricle. Impaired heart and lung function eventually lead to congestive heart failure.

Fetal alcohol syndrome occurs when alcohol ingested by a pregnant woman passes across the placenta to the fetus and adversely affects the development of the baby. This can occur during any trimester, so no amount of alcohol is considered "safe" during any stage of pregnancy. While classic fetal alcohol syndrome is rarely identified in newborns, it is associated with multiple birth defects, including intrauterine growth restriction; delayed development with decreased mental functioning (mild to severe); facial abnormalities (including microcephaly); heart defects; and limb abnormalities of joints, hands, feet, fingers, and toes.

Intrauterine growth restriction (IUGR) occurs when the unborn baby is at or below the 10th weight percentile for his or her gestational age. There are many IUGR risk factors involving the mother and the baby. A mother is at risk for having an infant with IUGR if she has poor weight gain and nutrition during pregnancy, uses substances (like tobacco, narcotics, or alcohol) that can cause abnormal development, or if she has preeclampsia or chronic kidney disease. Additionally, an unborn baby may suffer from IUGR if it is exposed to an infection,

has a birth defect, or has placenta or umbilical cord defects. Babies who suffer from IUGR are at an increased risk for death, hypoglycemia, hypothermia, and abnormal development of the nervous system.

Intraventricular hemorrhage Grade III or IV is a condition that occurs in very premature infants in which there is bleeding into the fluid filled ventricles of the brain. The condition is categorized into four grades depending upon the degree of bleeding, with grades III and IV being the most severe. The severe grades can cause pressure on the brain tissue, hydrocephalus, and possibly death. In the longer term, children may suffer developmental delays and problems with movement (U. S. National Library of Medicine, April 2020).

Neurofibromatosis (NF) is a genetic disease in which patients develop multiple soft tumors under the skin and throughout the nervous system. NF occurs in about 1 of every 4,000 births and may cause speech impairment, learning disabilities, and attention deficit disorder in children, as well as loss of hearing, weakness of facial muscles, headache, poor balance, and uncoordinated walking. Cataracts frequently develop at an unusually early age. The chance of brain tumors developing is unusually high.

Occlusion of cerebral arteries is an obstruction of blood flow in one of the cerebral arteries of the brain. This may cause long-term neurologic and cognitive issues. Outcomes may vary depending upon the site and severity of tissue damage (Wegenaar N *et al* and Fernandez-Lopez D *et al*).

Retinopathy of prematurity (ROP) is an eye disease that occurs in some premature babies. The last 12 weeks of a full-term pregnancy are particularly active for the growth of the fetal eye. In premature infants, the normal growth of the retinal vessels stops, and abnormal new vessels begin to grow and spread in the retina. The infant may become blind. Most infants with mild ROP usually develop normal central vision. However, some may have late complications, including strabismus, amblyopia, myopia, glaucoma, and late onset retinal detachment.

Seizures are abnormal electrical charges in the central nervous system and may indicate a serious underlying issue, thus requiring an immediate clinical and laboratory evaluation to determine the cause. In neonates, the most common cause is hypoxia-ischemia, while other causes include, but are not limited to, inborn errors of metabolism, central nervous system malformations, hemorrhage and infarctions in the brain, and infections. The treatment and prognosis depend on the cause (Victorio C and Panayiotopoulos CP).

Strabismus is a condition in which the eyes do not point in the same direction. Esotropia (crossed eyes) is the most common type of strabismus in infants. Sometimes the eye turn is always in the same eye; however, sometimes the turn alternates from one eye to the other. An eye doctor needs to determine whether the eye turn is true or pseudo strabismus. A baby's eyes should be straight and parallel by 3 or 4 months of age. Strabismus can be

caused by a defect in muscles or the part of the brain that controls eye movement. It is especially common in children who have disorders that affect the brain.

Table 23. Total Number and Prevalence Rates of Other Adverse Pregnancy Outcomes in Newborn Infants, Illinois, 2016-2020

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Bronchopulmonary dysplasia	P27.1	2,125	29.4	(28.2, 30.7)
Cerebral lipidoses	E75.4	0	0.0	(0.0, 0.1)
Endocardial fibroelastosis	I42.4	24	0.3	(0.2, 0.5)
Fetal alcohol syndrome	Q860	17	0.2	(0.1, 0.4)
Intrauterine growth restriction	P059	7,242	100.3	(98.0, 102.6)
Intraventricular hemorrhage (Grade III or IV)	P522.1-P52.22	635	8.8	(8.1, 9.5)
Neurofibromatosis	Q85.0-Q85.09	7	0.1	(0.0, 0.2)
Occlusion of cerebral arteries	I63.30-I63.9, I66.0-I66.9	153	2.1	(1.8, 2.5)
Retinopathy of prematurity	H35.1-H35.179	3,132	43.4	(41.9, 44.9)
Seizures	P90	1,062	14.7	(13.8, 15.6)
Strabismus	H50.0-H50.9	21	0.3	(0.2, 0.4)

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Table 24. Number and Prevalence Rates of Other Adverse Pregnancy Outcomes in Newborn Infants by County of Residence, 2016-2020

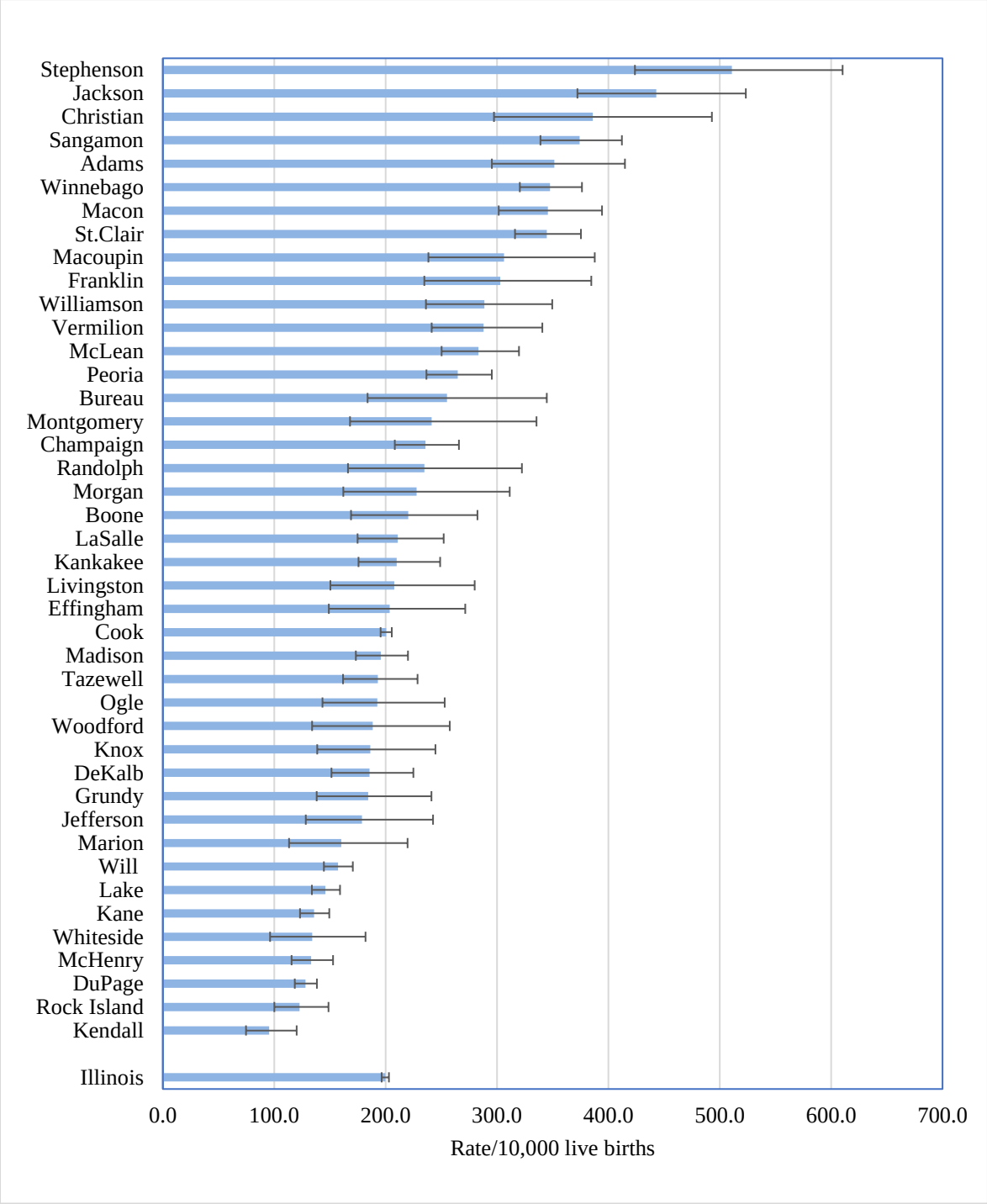
			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	14,418	199.7	196.4	202.9	Lee	24	146.5	93.9	218.0
Adams	139	351.4	295.4	414.9	Livingston	43	207.8	150.4	279.9
Alexander	5	156.7	50.9	365.8	Logan	33	234.7	161.6	329.6
Bond	23	306.7	194.4	460.2	McDonough	34	255.1	176.6	356.4
Boone	62	220.3	168.9	282.4	McHenry	204	133.2	115.6	152.8
Brown	5	163.4	53.1	381.3	McLean	264	283.4	250.3	319.7
Bureau	42	255.0	183.8	344.7	Macon	221	345.6	301.5	394.3
Calhoun	0	0.0	0.0	167.7	Macoupin	69	306.4	238.4	387.8
Carroll	14	206.8	113.1	347.0	Madison	277	195.6	173.3	220.1
Cass	25	282.2	182.6	416.5	Marion	38	160.1	113.3	219.7
Champaign	266	235.7	208.2	265.8	Marshall	12	211.6	109.4	369.7
Christian	64	386.0	297.3	492.9	Mason	13	196.7	104.7	336.3
Clark	3	34.0	7.0	99.4	Massac	16	216.2	123.6	351.1
Clay	5	65.4	21.2	152.5	Menard	19	312.0	187.8	487.2
Clinton	32	157.8	107.9	222.8	Mercer	8	113.3	48.9	223.3
Coles	27	111.1	73.2	161.7	Monroe	13	77.8	41.4	133.0
Cook	6,175	200.5	195.5	205.5	Montgomery	35	241.2	168.0	335.5
Crawford	5	50.4	16.4	117.6	Morgan	39	227.8	162.0	311.4
Cumberland	7	111.6	44.9	230.0	Moultrie	16	174.1	99.5	282.7
DeKalb	103	185.5	151.4	224.9	Ogle	51	192.5	143.3	253.0
DeWitt	27	330.5	217.8	480.8	Peoria	322	264.8	236.6	295.3
Douglas	19	147.3	88.7	230.0	Perry	27	274.9	181.2	400.0
DuPage	651	128.1	118.4	138.3	Piatt	11	124.4	62.1	222.6
Edgar	12	135.4	70.0	236.6	Pike	23	243.1	154.1	364.8
Edwards	0	0.0	0.0	103.6	Pope	1	69.4	1.8	386.9
Effingham	46	203.5	149.0	271.5	Pulaski	10	318.5	152.7	585.7
Fayette	17	141.7	82.5	226.8	Putnam	3	122.0	25.1	356.4
Ford	11	151.7	75.7	271.5	Randolph	38	234.9	166.2	322.4
Franklin	67	302.9	234.7	384.7	Richland	3	35.3	7.3	103.1
Fulton	23	141.1	89.4	211.7	Rock Island	103	122.6	100.1	148.7
Gallatin	5	217.4	70.6	507.3	St.Clair	533	344.8	316.1	375.3
Greene	15	235.5	131.8	388.4	Saline	22	153.4	96.1	232.3
Grundy	53	184.3	138.1	241.1	Sangamon	413	374.2	339.0	412.1
Hamilton	7	160.6	64.5	330.8	Schuyler	11	365.4	182.4	653.9
Hancock	13	140.7	74.9	240.6	Scott	8	363.6	157.0	716.5
Hardin	3	191.1	39.4	558.4	Shelby	23	207.4	131.5	311.2
Henderson	4	135.1	36.8	346.0	Stark	5	166.1	53.9	387.7
Henry	25	99.9	64.6	147.4	Stephenson	121	510.8	423.8	610.3
Iroquois	32	210.9	144.3	297.8	Tazewell	134	193.1	161.8	228.6
Jackson	138	443.0	372.2	523.4	Union	26	295.5	193.0	432.9
Jasper	7	126.6	50.9	260.8	Vermilion	135	287.8	241.3	340.7
Jefferson	41	178.8	128.3	242.6	Wabash	0	0.0	0.0	55.6
Jersey	18	170.0	100.7	268.6	Warren	21	206.5	127.8	315.6
JoDaviess	14	171.6	93.8	287.9	Washington	15	203.3	113.8	335.2
Johnson	8	150.1	64.8	295.7	Wayne	10	102.1	49.0	187.8
Kane	421	135.8	123.1	149.4	White	9	130.4	59.6	247.6
Kankakee	132	209.9	175.6	248.9	Whiteside	41	134.1	96.2	181.9
Kendall	72	95.4	74.6	120.1	Will	575	157.2	144.6	170.5
Knox	51	186.1	138.6	244.7	Williamson	105	288.8	236.2	349.6
Lake	525	146.0	133.8	159.0	Winnebago	609	347.5	320.5	376.3
LaSalle	120	210.9	174.8	252.1	Woodford	39	188.4	134.0	257.6
Lawrence	10	138.3	66.3	254.4					

[1] Per 10,000 live births (The number for Illinois includes four cases for which county of residence is missing.)

[2] 95% confidence interval for rate

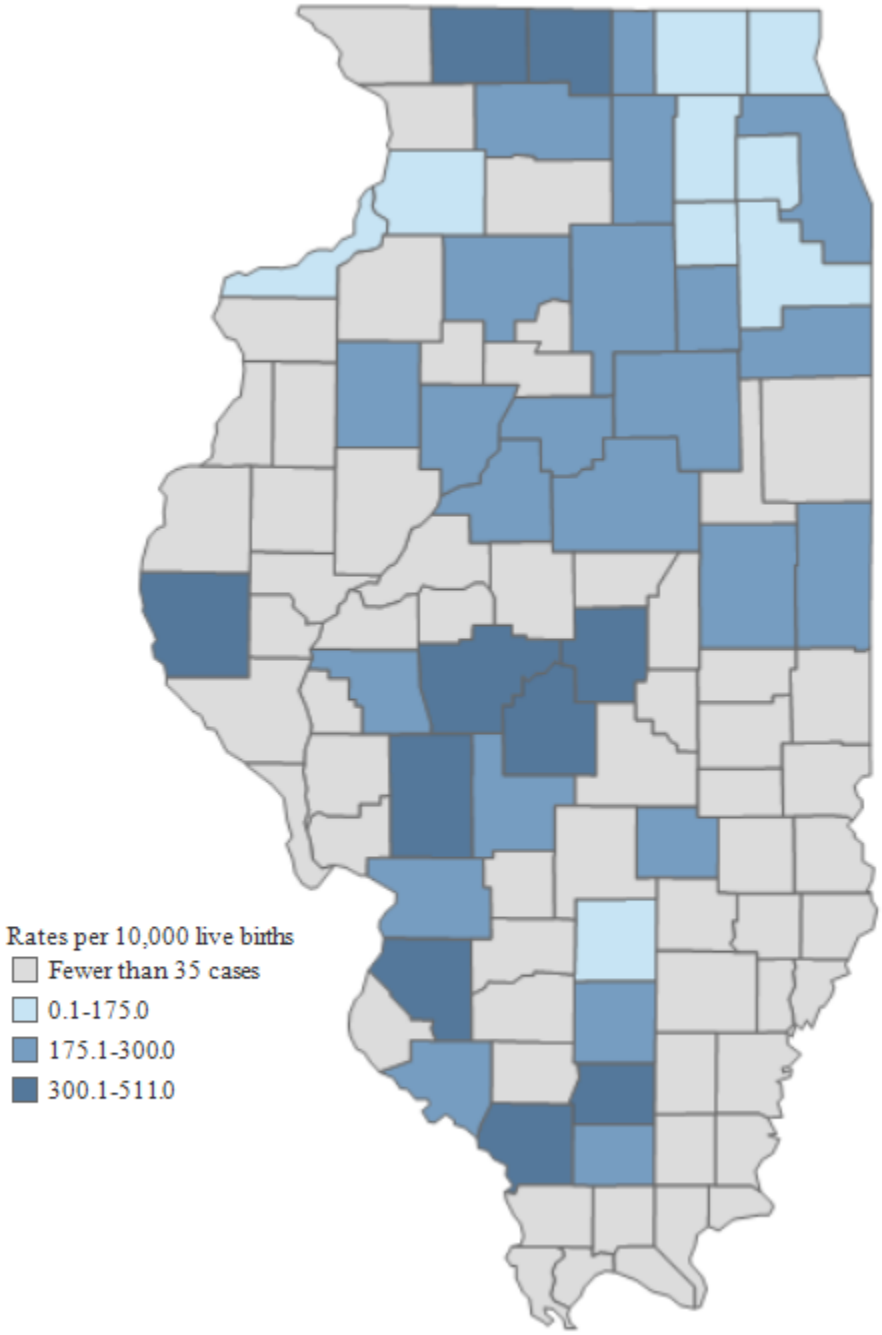
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 23. Prevalence Rates[1] and 95% Confidence Intervals for Other Adverse Pregnancy Outcomes in Newborn Infants by Selected Counties of Residence,[2] 2016-2020



[1] Rates per 10,000 live births
[2] Only counties with 35 or more cases are presented.
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

Figure 24. Map of Prevalence Rates for Newborn Infants with Other Adverse Pregnancy Outcomes, by Selected Counties of Residence, 2016-2020



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, November 2023

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