BIRTH DEFECTS AND OTHER ADVERSE PREGNANCY OUTCOMES IN ILLINOIS 2013-2017

A REPORT ON COUNTY-SPECIFIC PREVALENCE

Illinois Department of Public Health
Division of Epidemiologic Studies

June 2020

ACKNOWLEDGMENTS

This report was possible because of the special efforts of many individuals and organizations. Thanks are due to the following Adverse Pregnancy Outcomes Reporting System (APORS) staff:

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Support

This publication was supported by Grant/Cooperative Agreement Number U50DD004947 from the U.S. Centers for Disease Control and Prevention. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the U.S. Centers for Disease Control and Prevention.

Suggested Citation

Sandidge T, Fornoff JE, Shen T. Birth Defects and Other Adverse Pregnancy Outcomes in Illinois 2013-2017. Epidemiologic Report Series 20:09. Illinois Department of Public Health, June 2020.

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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 the 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 2013 and 2017. 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, 2013-2017

Infants	5-Year Total	Annual Average	Rate[1]	% APORS Cases
Total APORS Cases	52,726	10,545.2	678.2	100.0
Birth Defects	25,351	5,070.2	326.1	48.1
Less than 31 weeks gestational age	13,170	2,634.0	169.4	25.0
Fetal Deaths	4,442	888.4	57.1	8.4
Died During Newborn Hospitalization	3,596	719.2	46.3	6.8
Intrauterine Growth Restriction	6,243	1,248.6	80.3	11.8
Congenital Infections	3,341	668.2	43.0	6.3
Retinopathy of Prematurity	3,225	645.0	41.5	6.1
Endocrine, Metabolic or Immune Disorder	1,245	249.0	16.0	2.4
Blood Disorder	628	125.6	8.1	1.2

[1] Rate per 10,000 live births

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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.

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 2018.2. The categories were determined using natural break-points 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 2017, birth defects were responsible for 20.6% of infant deaths in the U.S. (Ely M & Driscoll AK). In Illinois birth defects were responsible for 18.4% of infant deaths, ranking as the second leading cause of these deaths (IDPH, 2020).

Known causes of birth defects include one or a combination of the following:

- Genetic disorders.
- Exposures to chemicals, medications, or other substances during pregnancy.
- Certain infections during pregnancy that expose the baby to viruses or bacteria.
- Lack of certain nutrients before and during pregnancy, such as folic acid.

The stage of fetal development at the time of exposure to one of the latter three causes is critical, as fetal development is particularly vulnerable to disruption in the first trimester of pregnancy. Despite an increasing understanding of factors that give rise to birth defects, the cause of most birth defects is complex and remains unknown.

While not all birth defects are preventable, a woman can plan to try to be as healthy as possible both before and during pregnancy to increase her chances of having a healthy baby. According to the U.S. Centers for Disease Control and Prevention (CDC) in 2019, specific steps she can take include:

- Adopting a healthy active lifestyle.
- Avoiding harmful substances (alcohol, smoking, marijuana, illicit drugs).
- Getting enough folic acid daily.
- Seeing a health care provider prior to pregnancy to discuss health conditions, medications, diet, and how to prevent infections.
- Beginning prenatal care as soon as she thinks she is 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 neonatal intensive care units are able to provide specialized care and technology.

Between 2013 and 2017, APORS identified 19,897 major birth defects in Illinois newborns at a rate of 255.9 per 10,000 live births. Heart and circulatory system defects were the most commonly identified major defect in Illinois, accounting for 44.1% of birth defects examined in this report.

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 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, 2013-2017

Defect	ICD-10-CM Codes	Number	Rate[1]	95% CI[2]
Anencephalus	Q00.0-Q00.1	113	1.5	(1.2, 1.7)
Encephalocele	Q01	68	0.9	(0.7, 1.1)
Holoprosencephaly	Q04.2	84	1.1	(0.9, 1.3)
Microcephalus	Q02	1,082	13.9	(13.1, 14.8)
Spina bifida[3]	Q05,Q070.01,Q07.3	250	3.2	(2.8, 3.6)

[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, March 2020

Table 3. Total Number and Prevalence Rates of Major Central Nervous System Defects in Children Under 2 Years of Age by County of Residence, 2013-2017

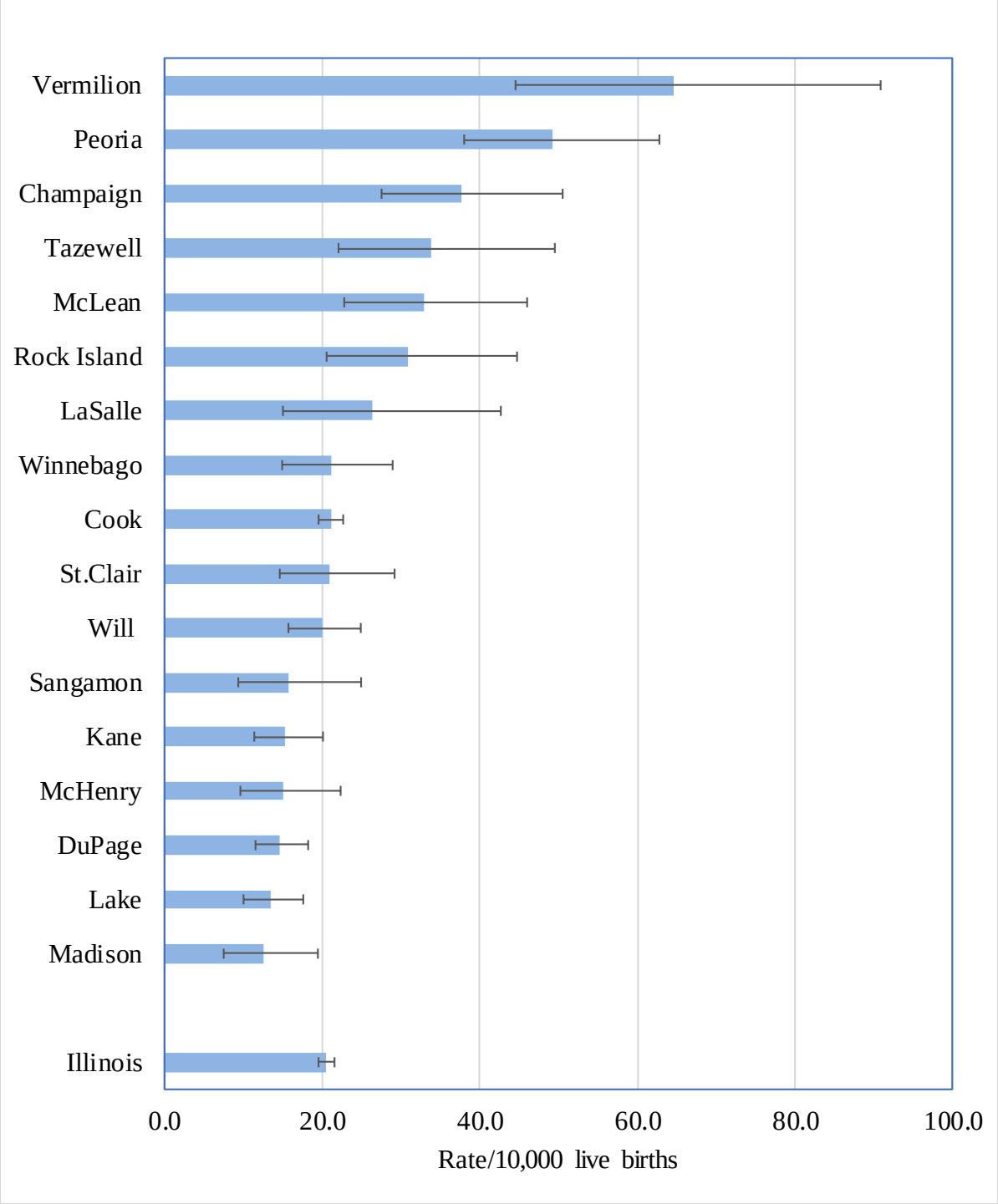
			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	1,597	20.5	19.5	21.6	Lee	1	5.7	0.1	31.9
Adams	6	14.4	5.3	31.3	Livingston	3	15.1	3.1	44.1
Alexander	1	22.3	0.6	124.4	Logan	5	32.7	10.6	76.4
Bond	0	0.0	0.0	48.1	McDonough	7	49.9	20.0	102.7
Boone	4	13.6	3.7	34.8	McHenry	24	15.0	9.6	22.4
Brown	1	33.9	0.9	188.9	McLean	34	32.9	22.8	46.0
Bureau	8	45.8	19.8	90.3	Macon	12	17.9	9.2	31.2
Calhoun	0	0.0	0.0	151.2	Macoupin	4	17.7	4.8	45.2
Carroll	0	0.0	0.0	51.7	Madison	19	12.5	7.5	19.5
Cass	0	0.0	0.0	43.4	Marion	7	28.5	11.4	58.7
Champaign	45	37.8	27.5	50.5	Marshall	1	15.8	0.4	87.9
Christian	0	0.0	0.0	21.9	Mason	2	29.6	3.6	106.9
Clark	2	22.1	2.7	79.7	Massac	0	0.0	0.0	46.3
Clay	2	26.0	3.1	93.8	Menard	0	0.0	0.0	60.6
Clinton	1	4.7	0.1	26.3	Mercer	2	27.2	3.3	98.4
Coles	8	31.5	13.6	62.1	Monroe	2	11.7	1.4	42.3
Cook	713	21.1	19.6	22.7	Montgomery	2	13.4	1.6	48.3
Crawford	1	9.5	0.2	52.7	Morgan	3	16.1	3.3	46.9
Cumberland	0	0.0	0.0	56.4	Moultrie	1	10.4	0.3	58.0
DeKalb	11	18.9	9.4	33.8	Ogle	4	15.1	4.1	38.8
DeWitt	2	23.3	2.8	84.2	Peoria	65	49.3	38.0	62.8
Douglas	6	45.5	16.7	99.0	Perry	0	0.0	0.0	34.3
DuPage	78	14.6	11.5	18.2	Piatt	2	22.2	2.7	80.4
Edgar	3	33.0	6.8	96.6	Pike	0	0.0	0.0	39.8
Edwards	0	0.0	0.0	96.6	Pope	0	0.0	0.0	267.3
Effingham	4	17.6	4.8	45.0	Pulaski	0	0.0	0.0	108.2
Fayette	3	24.1	5.0	70.5	Putnam	0	0.0	0.0	144.7
Ford	3	40.2	8.3	117.4	Randolph	1	5.9	0.1	32.7
Franklin	2	8.3	1.0	30.1	Richland	0	0.0	0.0	37.8
Fulton	6	34.9	12.8	76.0	Rock Island	28	31.0	20.6	44.8
Gallatin	0	0.0	0.0	129.4	St. Clair	35	21.0	14.6	29.2
Greene	2	30.3	3.7	109.3	Saline	5	31.1	10.1	72.7
Grundy	9	29.8	13.6	56.5	Sangamon	18	15.8	9.4	25.0
Hamilton	0	0.0	0.0	86.0	Schuyler	4	138.4	37.7	354.4
Hancock	1	10.4	0.3	57.8	Scott	0	0.0	0.0	153.1
Hardin	0	0.0	0.0	239.5	Shelby	2	16.1	2.0	58.3
Henderson	0	0.0	0.0	108.8	Stark	2	61.9	7.5	223.7
Henry	13	48.6	25.9	83.1	Stephenson	4	16.2	4.4	41.4
Iroquois	3	19.7	4.1	57.7	Tazewell	26	33.8	22.1	49.5
Jackson	3	8.7	1.8	25.4	Union	0	0.0	0.0	39.5
Jasper	0	0.0	0.0	65.6	Vermilion	33	64.7	44.6	90.9
Jefferson	5	20.1	6.5	46.8	Wabash	0	0.0	0.0	53.0
Jersey	1	9.5	0.2	52.8	Warren	3	27.5	5.7	80.3
JoDaviess	3	33.9	7.0	99.2	Washington	0	0.0	0.0	45.6
Johnson	2	37.5	4.5	135.5	Wayne	1	9.8	0.2	54.5
Kane	51	15.3	11.4	20.1	White	0	0.0	0.0	45.8
Kankakee	10	15.0	7.2	27.7	Whiteside	6	18.9	7.0	41.2
Kendall	12	15.0	7.7	26.1	Will	77	19.9	15.7	24.9
Knox	12	42.1	21.8	73.5	Williamson	1	2.5	0.1	14.1
Lake	52	13.4	10.0	17.6	Winnebago	38	21.1	14.9	29.0
LaSalle	16	26.3	15.0	42.7	Woodford	5	23.0	7.5	53.6
Lawrence	1	12.1	0.3	67.6					

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

[2] 95 % confidence interval for rate

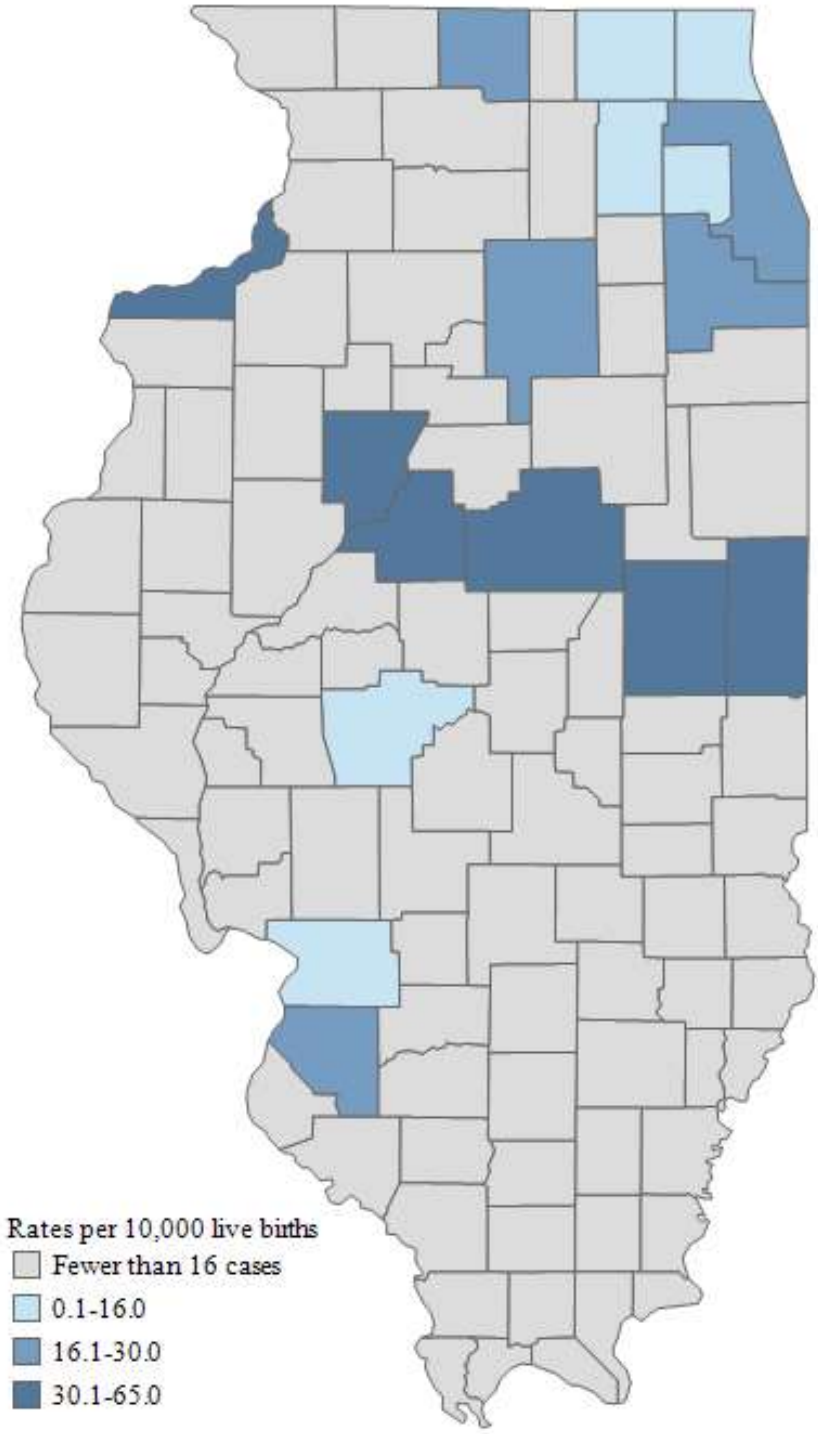
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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] 2013-2017



[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, March 2020

Figure 2. Map of Prevalence Rates for Major Central Nervous System Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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 112.9 identified cases per 10,000 live births in Illinois during the period of 2013-2017.

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, 01/31/2019). 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 and 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, 2013 – 2017

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Aortic valve stenosis	Q23.0	178	2.3	(2.0, 2.7)
Atrial septal defect	Q21.1[3]	2,071	26.6	(25.5, 27.8)
Atrioventricular septal defect	Q21.2	407	5.2	(4.7,5.8)
Coarctation of aorta	Q25.1	400	5.1	(4.7,5.7)
Common truncus	Q20.0	40	0.5	(0.4,0.7)
Double outlet right ventricle	Q20.1	162	2.1	(1.8, 2.4)
Ebstein anomaly	Q22.5	55	0.7	(0.5, 0.9)
Hypoplastic left heart syndrome	Q23.4	183	2.4	(2.0, 2.7)
Interrupted aortic arch	Q25.2, Q25.4	49	0.6	(0.5, 0.8)
Pulmonary valve atresia/stenosis	Q22.0, Q22.1	525	6.8	(6.2, 7.4)
Single ventricle	Q20.4	45	0.6	(0.4, 0.8)
Tetralogy of Fallot	Q21.3	321	4.1	(3.7, 4.6)
Total anomalous pulmonary venous return (TAPVR)	Q26.2	94	1.2	(1.0, 1.5)
Transposition of great arteries	Q20.3, Q20.5	206	2.6	(2.3, 3.0)
Tricuspid valve atresia/stenosis	Q22.4	89	1.1	(0.9, 1.4)
Ventricular septal defect	Q21.0	3,954	50.9	(49.3,52.5)

[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, March 2020

Table 5. Total Number and Prevalence Rates of Major Cardiovascular System Defects in Children Under 2 Years of Age by County of Residence, 2013-2017

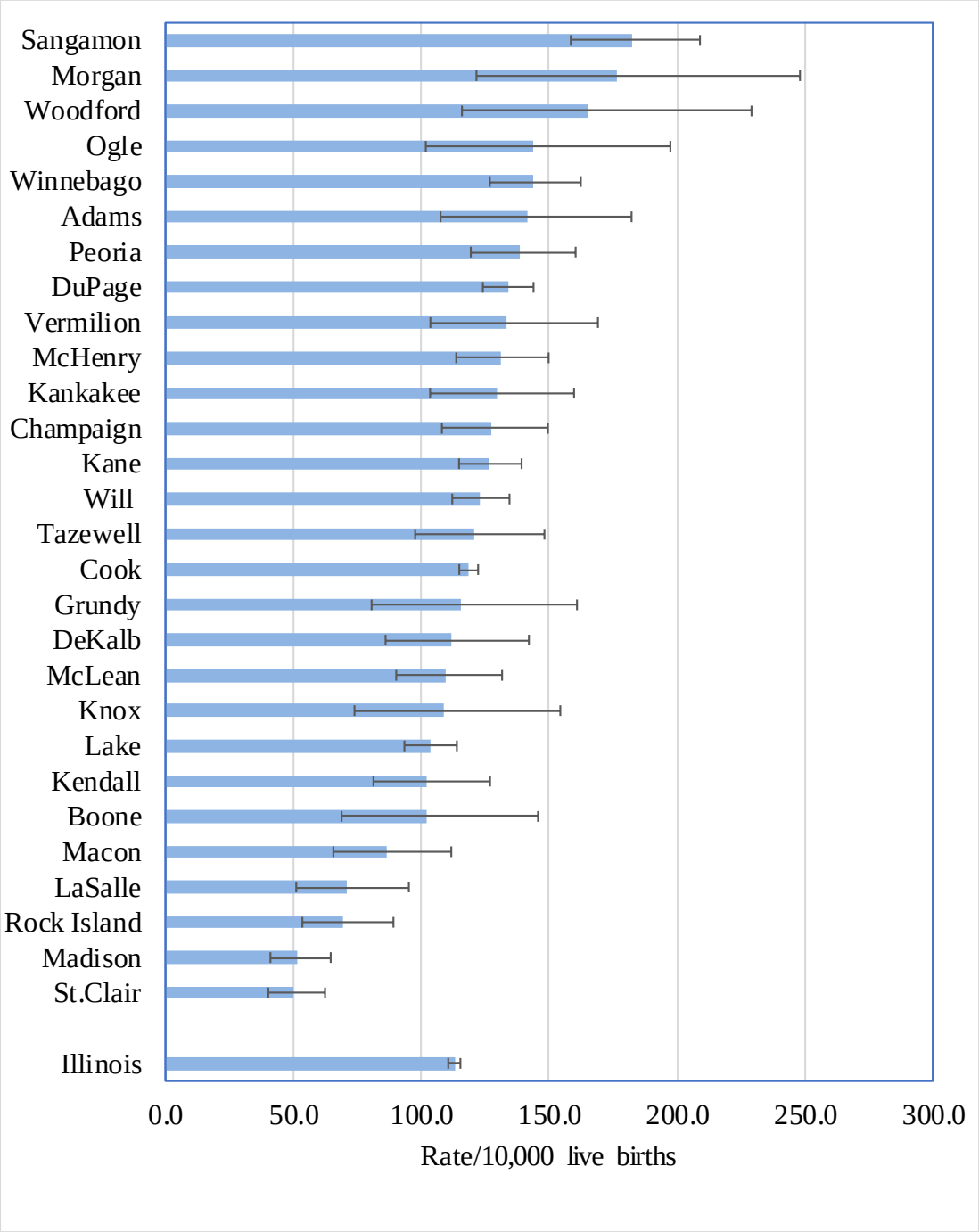
County	Cases	Rate[1]	95% CI[2] Lower	95% CI[2] Upper	County	Cases	Rate[1]	95% CI[2] Lower	95% CI[2] Upper
ILLINOIS	8,779	112.9	110.6	115.3	Lee	17	97.4	56.7	155.9
Adams	59	141.3	107.6	182.2	Livingston	26	130.7	85.3	191.4
Alexander	1	22.3	0.6	124.4	Logan	20	130.9	80.0	202.1
Bond	3	39.1	8.1	114.3	McDonough	20	142.5	87.0	220.0
Boone	30	102.0	68.8	145.7	McHenry	209	130.8	113.7	149.8
Brown	3	101.7	21.0	297.2	McLean	113	109.5	90.2	131.6
Bureau	20	114.6	70.0	177.0	Macon	58	86.5	65.6	111.8
Calhoun	0	0.0	0.0	151.2	Macoupin	17	75.1	43.7	120.2
Carroll	1	14.0	0.4	78.1	Madison	79	51.8	41.0	64.6
Cass	16	188.2	107.6	305.7	Marion	7	28.5	11.4	58.7
Champaign	152	127.6	108.1	149.5	Marshall	5	78.9	25.6	184.0
Christian	23	136.3	86.4	204.5	Mason	3	44.4	9.2	129.7
Clark	4	44.2	12.0	113.0	Massac	0	0.0	0.0	46.3
Clay	4	51.9	14.2	133.0	Menard	12	197.0	101.8	344.2
Clinton	6	28.3	10.4	61.7	Mercer	12	163.5	84.5	285.6
Coles	19	74.9	45.1	116.9	Monroe	7	41.0	16.5	84.5
Cook	4,010	118.5	114.9	122.2	Montgomery	22	147.1	92.2	222.6
Crawford	8	75.7	32.7	149.1	Morgan	33	176.7	121.6	248.1
Cumberland	5	76.5	24.8	178.4	Moultrie	13	135.4	72.1	231.6
DeKalb	65	111.5	86.0	142.1	Ogle	38	143.8	101.8	197.4
DeWitt	17	198.1	115.4	317.2	Peoria	183	138.8	119.4	160.4
Douglas	19	144.0	86.7	224.9	Perry	3	27.9	5.7	81.5
DuPage	714	133.7	124.1	143.9	Piatt	7	77.9	31.3	160.4
Edgar	9	99.1	45.3	188.2	Pike	13	140.1	74.6	239.6
Edwards	0	0.0	0.0	96.6	Pope	0	0.0	0.0	267.3
Effingham	25	109.9	71.1	162.2	Pulaski	1	29.3	0.7	163.4
Fayette	11	88.4	44.1	158.2	Putnam	1	39.2	1.0	218.5
Ford	5	66.9	21.7	156.2	Randolph	8	47.0	20.3	92.6
Franklin	13	54.1	28.8	92.5	Richland	5	51.2	16.6	119.4
Fulton	15	87.3	48.9	144.0	Rock Island	63	69.7	53.5	89.1
Gallatin	2	70.2	8.5	253.5	St. Clair	84	50.4	40.2	62.4
Greene	6	90.8	33.3	197.6	Saline	8	49.8	21.5	98.2
Grundy	35	115.7	80.6	160.9	Sangamon	208	182.4	158.5	209.0
Hamilton	0	0.0	0.0	86.0	Schuyler	3	103.8	21.4	303.4
Hancock	15	155.6	87.1	256.6	Scott	4	166.0	45.2	425.0
Hardin	3	194.8	40.2	569.3	Shelby	21	169.4	104.8	258.9
Henderson	4	118.0	32.1	302.1	Stark	1	31.0	0.8	172.5
Henry	16	59.8	34.2	97.1	Stephenson	16	64.7	37.0	105.0
Iroquois	24	157.9	101.2	234.9	Tazewell	93	121.0	97.6	148.2
Jackson	17	49.3	28.7	78.9	Union	1	10.7	0.3	59.7
Jasper	4	71.2	19.4	182.2	Vermilion	68	133.4	103.6	169.1
Jefferson	15	60.2	33.7	99.2	Wabash	0	0.0	0.0	53.0
Jersey	2	18.9	2.3	68.4	Warren	7	64.1	25.8	132.1
JoDaviess	2	22.6	2.7	81.7	Washington	2	24.7	3.0	89.3
Johnson	1	18.8	0.5	104.5	Wayne	2	19.6	2.4	70.6
Kane	422	126.6	114.8	139.2	White	0	0.0	0.0	45.8
Kankakee	86	129.4	103.5	159.8	Whiteside	20	63.2	38.6	97.5
Kendall	82	102.2	81.3	126.9	Will	475	122.9	112.1	134.5
Knox	31	108.8	73.9	154.4	Williamson	6	15.2	5.6	33.1
Lake	400	103.3	93.4	113.9	Winnebago	259	143.8	126.8	162.4
LaSalle	43	70.7	51.1	95.2	Woodford	36	165.5	115.9	229.1
Lawrence	1	12.1	0.3	67.6					

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

[2] 95% confidence interval for rate

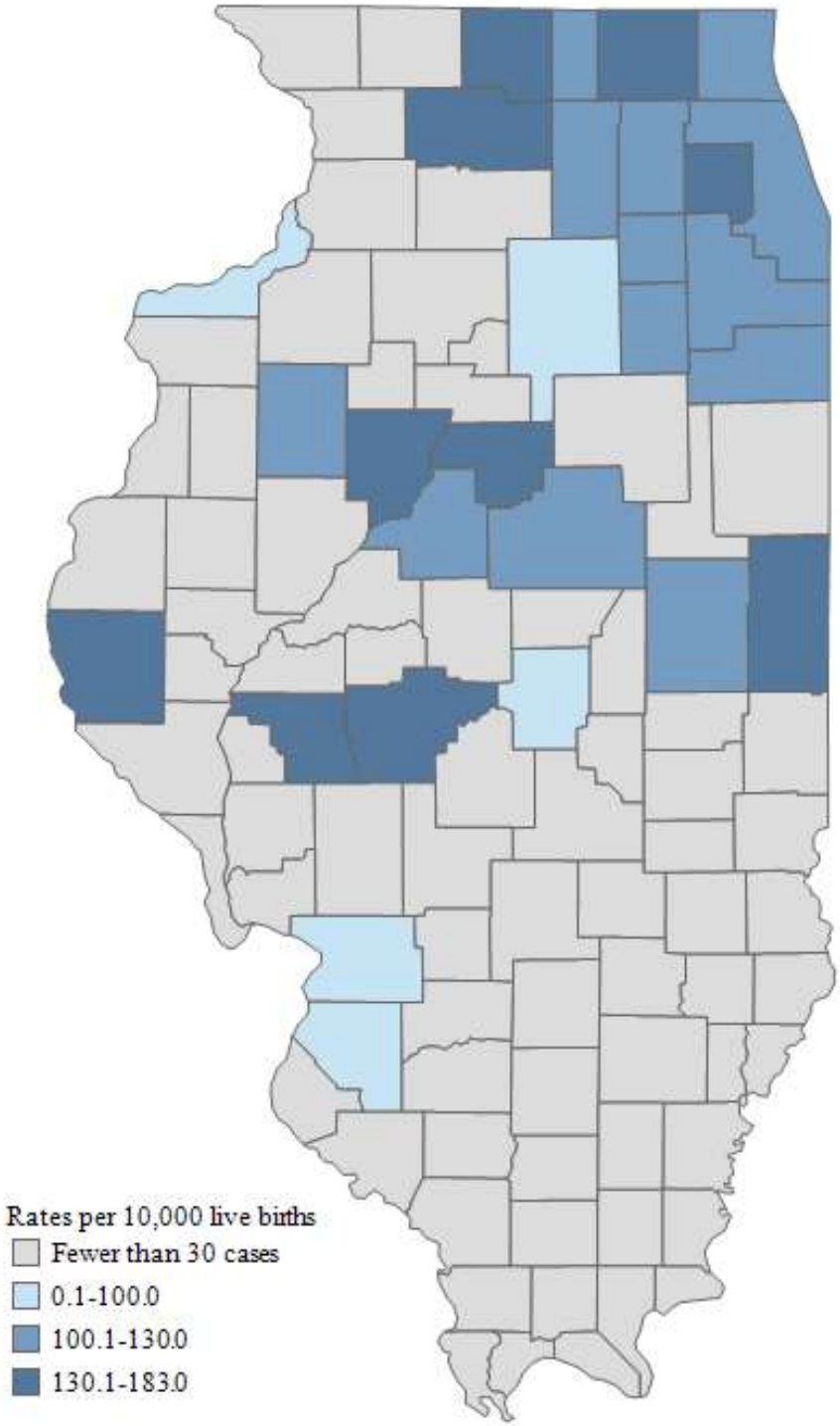
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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] 2013-2017



[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, March 2020

Figure 4. Map of Prevalence Rates for Major Cardiovascular System Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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 is 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, 2013-2017

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Biliary atresia	Q44.2-Q44.3	36	0.5	(0.3, 0.6)
Choanal atresia	Q30.0	107	1.4	(1.1, 1.7)
Cleft lip alone	Q36.0-Q36.9	232	3.0	(2.6, 3.4)
Cleft lip and palate	Q37.0-Q37.9	476	6.1	(5.6, 6.7)
Cleft palate alone	Q35.1-Q35.9	461	5.9	(5.4, 6.5)
Esophageal atresia/ tracheoesophageal fistula	Q39.0-Q39.4	200	2.6	(2.2, 3.0)
Rectal, anal, large intestinal atresia/stenosis	Q42.0-Q42.9	314	4.0	(3.6, 4.5)
Small intestinal atresia/stenosis	Q41.0-Q41.9	261	3.4	(3.0, 3.8)

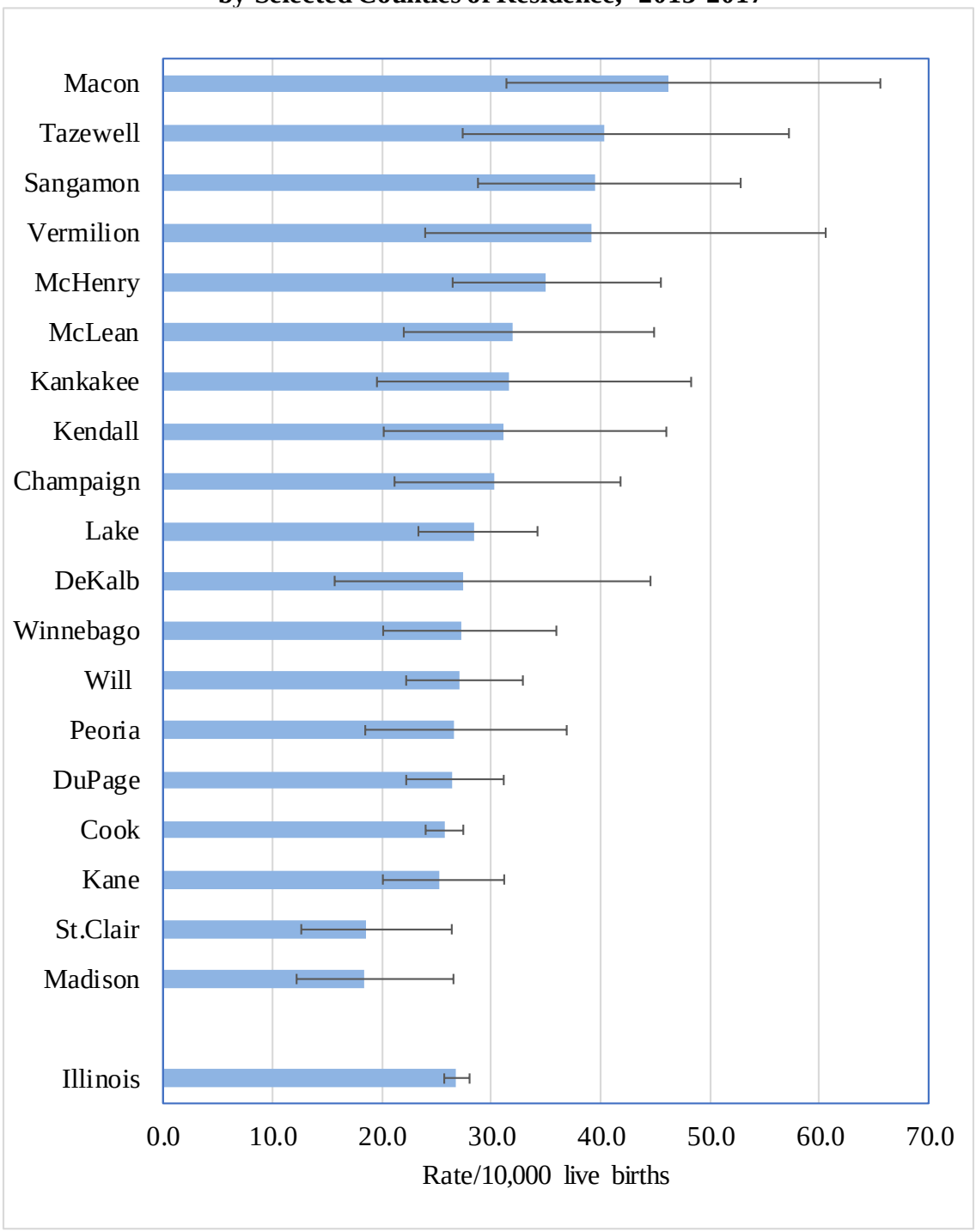
[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

Table 7. Total Number and Prevalence Rates of Major Alimentary Tract Defects in Children Under 2 Years of Age by County of Residence, 2013-2017

			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	2,087	26.8	25.7	28.0	Lee	3	17.2	3.5	50.2
Adams	6	14.4	5.3	31.3	Livingston	7	35.2	14.1	72.5
Alexander	1	22.3	0.6	124.4	Logan	6	39.3	14.4	85.5
Bond	4	52.2	14.2	133.5	McDonough	5	35.6	11.6	83.1
Boone	9	30.6	14.0	58.1	McHenry	56	35.1	26.5	45.5
Brown	0	0.0	0.0	125.0	McLean	33	32.0	22.0	44.9
Bureau	2	11.5	1.4	41.4	Macon	31	46.2	31.4	65.6
Calhoun	1	41.0	1.0	228.3	Macoupin	5	22.1	7.2	51.5
Carroll	1	14.0	0.4	78.1	Madison	28	18.4	12.2	26.6
Cass	3	35.3	7.3	103.1	Marion	7	28.5	11.4	58.7
Champaign	36	30.2	21.2	41.8	Marshall	5	78.9	25.6	184.0
Christian	4	23.7	6.5	60.7	Mason	1	14.8	0.4	82.4
Clark	1	11.0	0.3	61.5	Massac	0	0.0	0.0	46.3
Clay	2	26.0	3.1	93.8	Menard	1	16.4	0.4	91.5
Clinton	4	18.9	5.1	48.4	Mercer	2	27.2	3.3	98.4
Coles	10	39.4	18.9	72.5	Monroe	0	0.0	0.0	21.6
Cook	869	25.7	24.0	27.5	Montgomery	3	20.1	4.1	58.6
Crawford	0	0.0	0.0	34.9	Morgan	6	32.1	11.8	69.9
Cumberland	2	30.6	3.7	110.5	Moultrie	7	72.9	29.3	150.2
DeKalb	16	27.4	15.7	44.6	Ogle	8	30.3	13.1	59.7
DeWitt	3	35.0	7.2	102.2	Peoria	35	26.5	18.5	36.9
Douglas	3	22.7	4.7	66.5	Perry	3	27.9	5.7	81.5
DuPage	141	26.4	22.2	31.1	Piatt	1	11.1	0.3	62.0
Edgar	1	11.0	0.3	61.4	Pike	3	32.3	6.7	94.5
Edwards	0	0.0	0.0	96.6	Pope	0	0.0	0.0	267.3
Effingham	5	22.0	7.1	51.3	Pulaski	0	0.0	0.0	108.2
Fayette	2	16.1	1.9	58.1	Putnam	0	0.0	0.0	144.7
Ford	2	26.8	3.2	96.7	Randolph	7	41.1	16.5	84.7
Franklin	11	45.8	22.9	81.9	Richland	3	30.7	6.3	89.7
Fulton	8	46.6	20.1	91.8	Rock Island	13	14.4	7.7	24.6
Gallatin	2	70.2	8.5	253.5	St. Clair	31	18.6	12.6	26.4
Greene	2	30.3	3.7	109.3	Saline	9	56.0	25.6	106.4
Grundy	5	16.5	5.4	38.6	Sangamon	45	39.5	28.8	52.8
Hamilton	1	23.3	0.6	129.9	Schuyler	0	0.0	0.0	127.6
Hancock	1	10.4	0.3	57.8	Scott	1	41.5	1.1	231.2
Hardin	1	64.9	1.6	361.8	Shelby	8	64.5	27.9	127.1
Henderson	1	29.5	0.7	164.4	Stark	5	154.8	50.3	361.2
Henry	10	37.4	17.9	68.7	Stephenson	5	20.2	6.6	47.2
Iroquois	11	72.4	36.1	129.5	Tazewell	31	40.3	27.4	57.2
Jackson	10	29.0	13.9	53.3	Union	0	0.0	0.0	39.5
Jasper	1	17.8	0.5	99.1	Vermilion	20	39.2	24.0	60.6
Jefferson	6	24.1	8.8	52.4	Wabash	1	14.4	0.4	80.1
Jersey	2	18.9	2.3	68.4	Warren	6	54.9	20.2	119.6
JoDaviess	2	22.6	2.7	81.7	Washington	0	0.0	0.0	45.6
Johnson	4	75.0	20.4	192.1	Wayne	2	19.6	2.4	70.6
Kane	84	25.2	20.1	31.2	White	0	0.0	0.0	45.8
Kankakee	21	31.6	19.6	48.3	Whiteside	13	41.0	21.9	70.2
Kendall	25	31.2	20.2	46.0	Will	105	27.2	22.2	32.9
Knox	2	7.0	0.8	25.3	Williamson	7	17.8	7.1	36.6
Lake	110	28.4	23.3	34.2	Winnebago	49	27.2	20.1	36.0
LaSalle	13	21.4	11.4	36.5	Woodford	8	36.8	15.9	72.5
Lawrence	0	0.0	0.0	44.8					

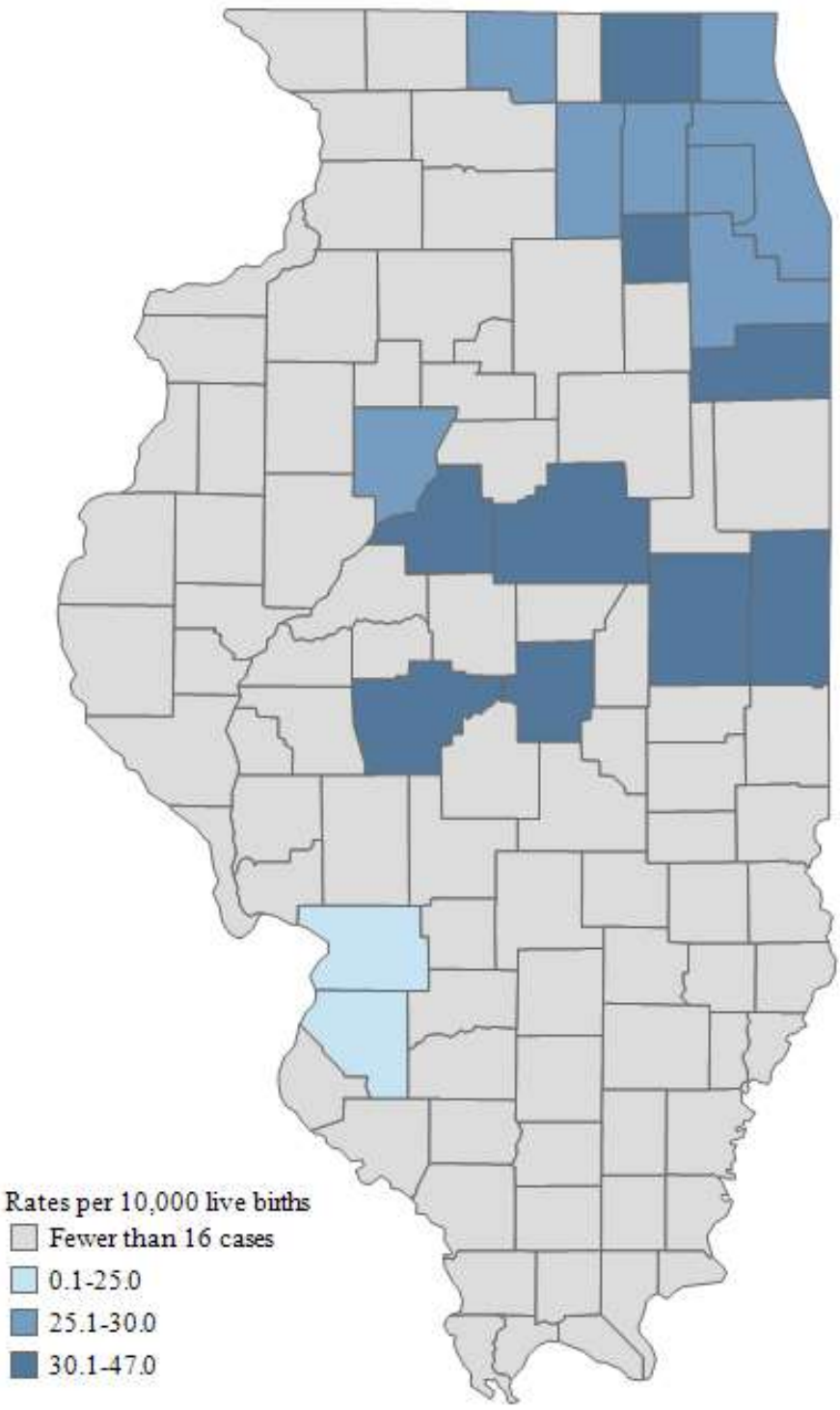
[1] Per 10,000 live births (The number for Illinois includes one case for which county of residence is missing)
[2] 95% confidence intervals for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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] 2013-2017



[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, March 2020

Figure 6. Map of Prevalence Rates for Major Alimentary Tract Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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 is a congenital obstructing membrane located in the male posterior urethra and is 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, 2013-2017

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	25	0.3	(0.2, 0.5)
Congenital posterior urethral valves	Q64.2	82	1.1	(0.8, 1.3)
Hypospadias	Q54.0-Q54.3, Q54.5-Q54.9	2,537	32.6	(31.4, 33.9)
Renal agenesis/hypoplasia	Q60.0-Q60.6	655	8.4	(7.8, 9.1)

[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Table 9. Total Number and Prevalence Rates of Major Genitourinary System Defects in Children Under 2 Years of Age by County of Residence, 2013-2017

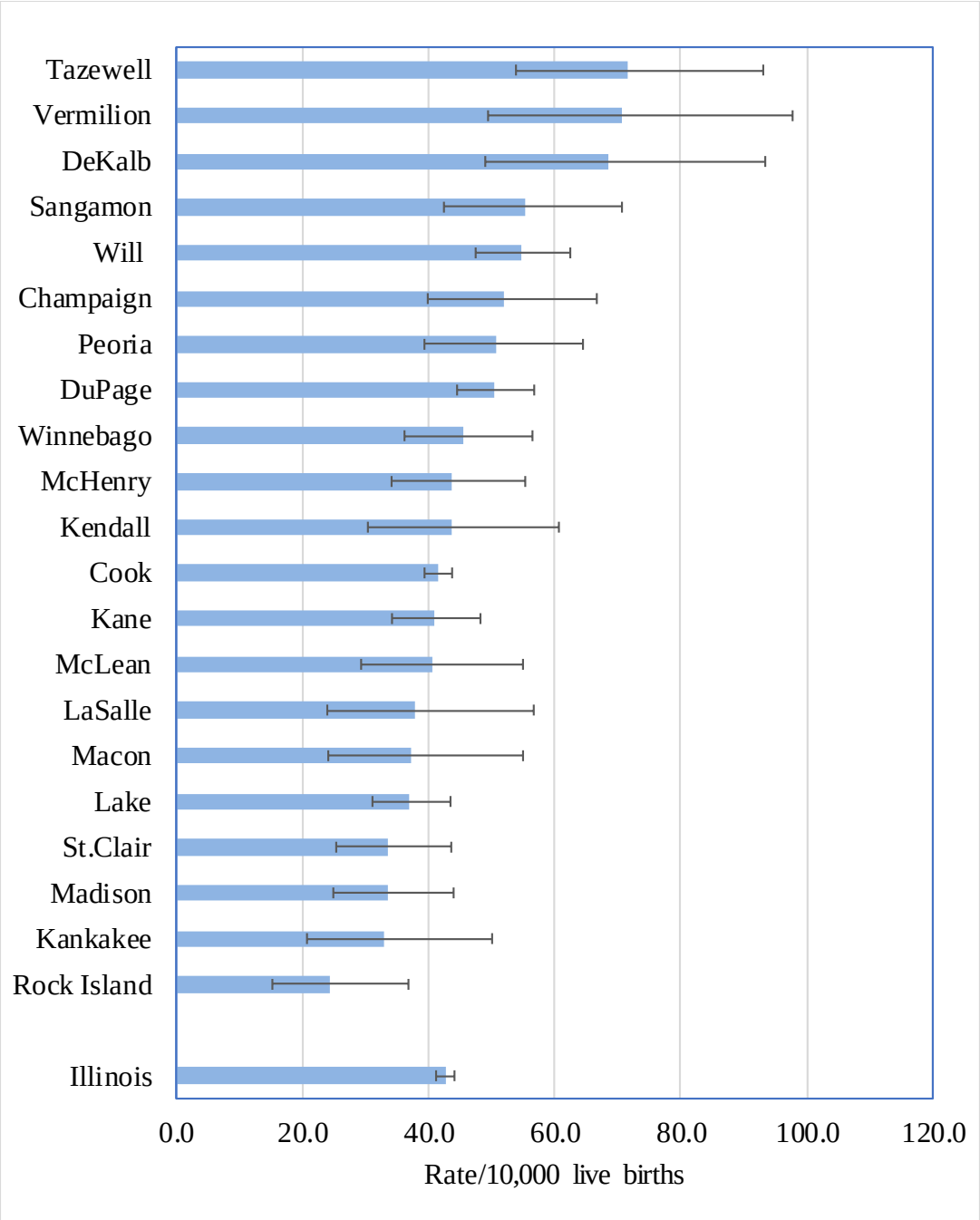
			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	3,316	42.7	41.2	44.1	Lee	9	51.5	23.6	97.9
Adams	14	33.5	18.3	56.2	Livingston	12	60.3	31.2	105.3
Alexander	1	22.3	0.6	124.4	Logan	11	72.0	35.9	128.8
Bond	3	39.1	8.1	114.3	McDonough	4	28.5	7.8	72.9
Boone	13	44.2	23.5	75.6	McHenry	70	43.8	34.2	55.4
Brown	1	33.9	0.9	188.9	McLean	42	40.7	29.3	55.0
Bureau	8	45.8	19.8	90.3	Macon	25	37.3	24.1	55.0
Calhoun	0	0.0	0.0	151.2	Macoupin	13	57.4	30.6	98.1
Carroll	5	70.1	22.8	163.7	Madison	51	33.5	24.9	44.0
Cass	3	35.3	7.3	103.1	Marion	10	40.7	19.5	74.8
Champaign	62	52.0	39.9	66.7	Marshall	0	0.0	0.0	58.2
Christian	10	59.2	28.4	108.9	Mason	1	14.8	0.4	82.4
Clark	1	11.0	0.3	61.5	Massac	0	0.0	0.0	46.3
Clay	0	0.0	0.0	47.9	Menard	6	98.5	36.2	214.4
Clinton	6	28.3	10.4	61.7	Mercer	2	27.2	3.3	98.4
Coles	12	47.3	24.4	82.6	Monroe	1	5.9	0.1	32.6
Cook	1,405	41.5	39.4	43.8	Montgomery	4	26.7	7.3	68.5
Crawford	1	9.5	0.2	52.7	Morgan	6	32.1	11.8	69.9
Cumberland	2	30.6	3.7	110.5	Moultrie	3	31.3	6.4	91.3
DeKalb	40	68.6	49.0	93.4	Ogle	11	41.6	20.8	74.5
DeWitt	3	35.0	7.2	102.2	Peoria	67	50.8	39.4	64.5
Douglas	8	60.7	26.2	119.5	Perry	2	18.6	2.3	67.1
DuPage	269	50.4	44.5	56.8	Piatt	8	89.0	38.4	175.3
Edgar	2	22.0	2.7	79.6	Pike	4	43.1	11.7	110.4
Edwards	0	0.0	0.0	96.6	Pope	1	72.5	1.8	403.7
Effingham	8	35.2	15.2	69.3	Pulaski	0	0.0	0.0	108.2
Fayette	6	48.2	17.7	105.0	Putnam	2	78.4	9.5	283.3
Ford	3	40.2	8.3	117.4	Randolph	4	23.5	6.4	60.1
Franklin	12	50.0	25.8	87.3	Richland	3	30.7	6.3	89.7
Fulton	11	64.0	32.0	114.6	Rock Island	22	24.3	15.2	36.8
Gallatin	1	35.1	0.9	195.5	St. Clair	56	33.6	25.4	43.6
Greene	3	45.4	9.4	132.6	Saline	3	18.7	3.9	54.6
Grundy	18	59.5	35.3	94.0	Sangamon	63	55.3	42.5	70.7
Hamilton	1	23.3	0.6	129.9	Schuyler	0	0.0	0.0	127.6
Hancock	3	31.1	6.4	90.9	Scott	1	41.5	1.1	231.2
Hardin	0	0.0	0.0	239.5	Shelby	7	56.5	22.7	116.3
Henderson	0	0.0	0.0	108.8	Stark	1	31.0	0.8	172.5
Henry	6	22.4	8.2	48.8	Stephenson	6	24.3	8.9	52.8
Iroquois	7	46.1	18.5	94.9	Tazewell	55	71.5	53.9	93.1
Jackson	8	23.2	10.0	45.7	Union	0	0.0	0.0	39.5
Jasper	1	17.8	0.5	99.1	Vermilion	36	70.6	49.5	97.8
Jefferson	6	24.1	8.8	52.4	Wabash	1	14.4	0.4	80.1
Jersey	0	0.0	0.0	34.9	Warren	6	54.9	20.2	119.6
JoDaviess	2	22.6	2.7	81.7	Washington	3	37.1	7.6	108.4
Johnson	4	75.0	20.4	192.1	Wayne	0	0.0	0.0	36.1
Kane	136	40.8	34.2	48.3	White	2	24.8	3.0	89.7
Kankakee	22	33.1	20.7	50.1	Whiteside	10	31.6	15.1	58.1
Kendall	35	43.6	30.4	60.7	Will	211	54.6	47.5	62.5
Knox	19	66.7	40.1	104.1	Williamson	18	45.7	27.1	72.2
Lake	143	36.9	31.1	43.5	Winnebago	82	45.5	36.2	56.5
LaSalle	23	37.8	24.0	56.7	Woodford	14	64.4	35.2	108.0
Lawrence	0	0.0	0.0	44.8					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

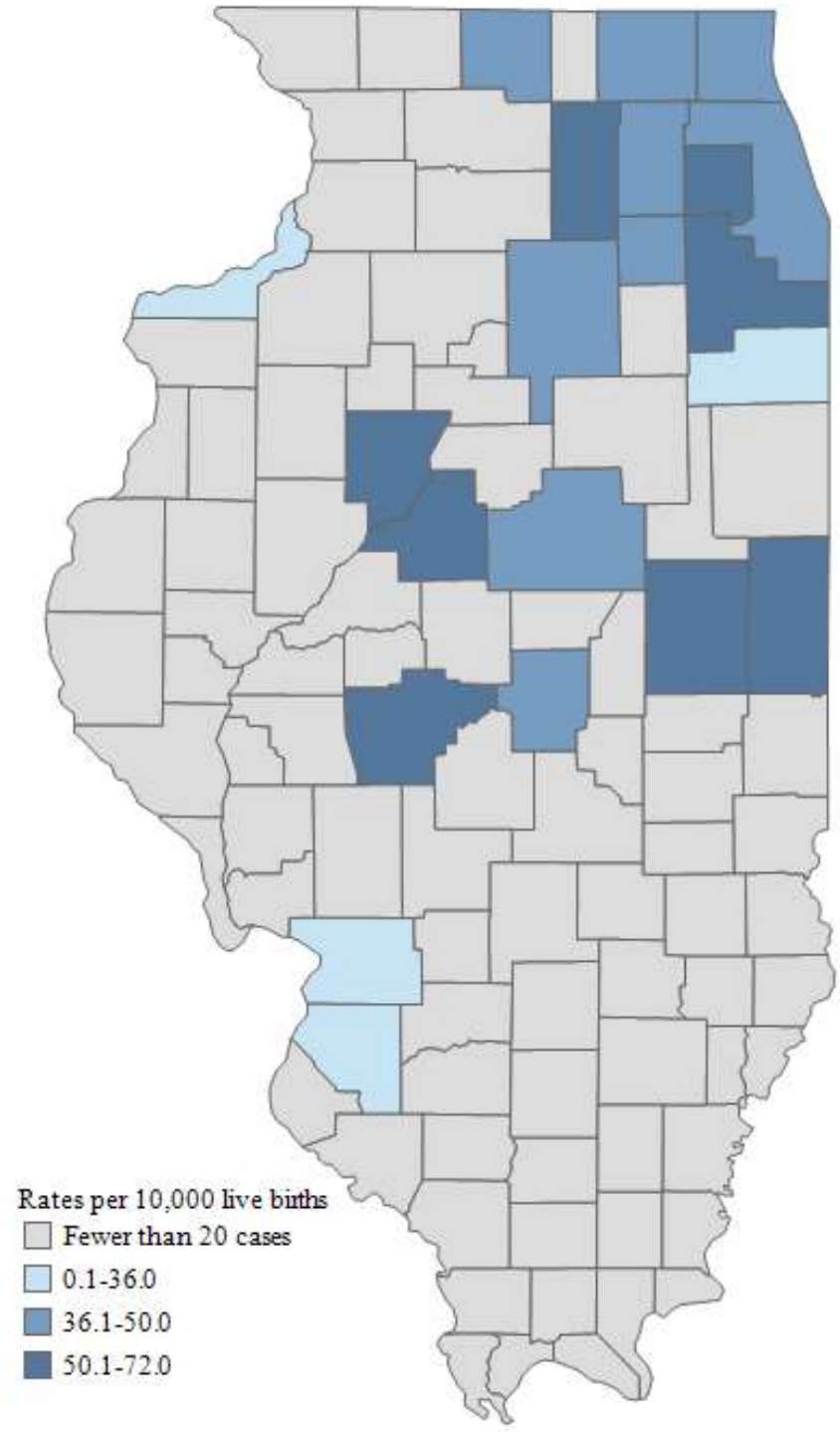
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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] 2013-2017



[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, March 2020

Figure 8. Map of Prevalence Rates for Major Genitourinary Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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, 2013-2017

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Clubfoot	Q66.0, Q66.89	1,086	14.0	(13.2, 14.8)
Craniosynostosis	Q75.0	378	4.9	(4.4, 5.4)
Diaphragmatic hernia	Q79.0, Q79.1	238	3.1	(2.7, 3.5)
Gastroschisis	Q79.3	287	3.7	(3.3, 4.1)
Limb reduction deformity	Q71.0-Q73.8	361	4.6	(4.2, 5.1)
Omphalocele	Q79.2	158	2.0	(1.7, 2.4)

[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

Table 11. Total Number and Prevalence Rates of Major Musculoskeletal Defects in Children Under 2 Years of Age by County of Residence, 2013-2017

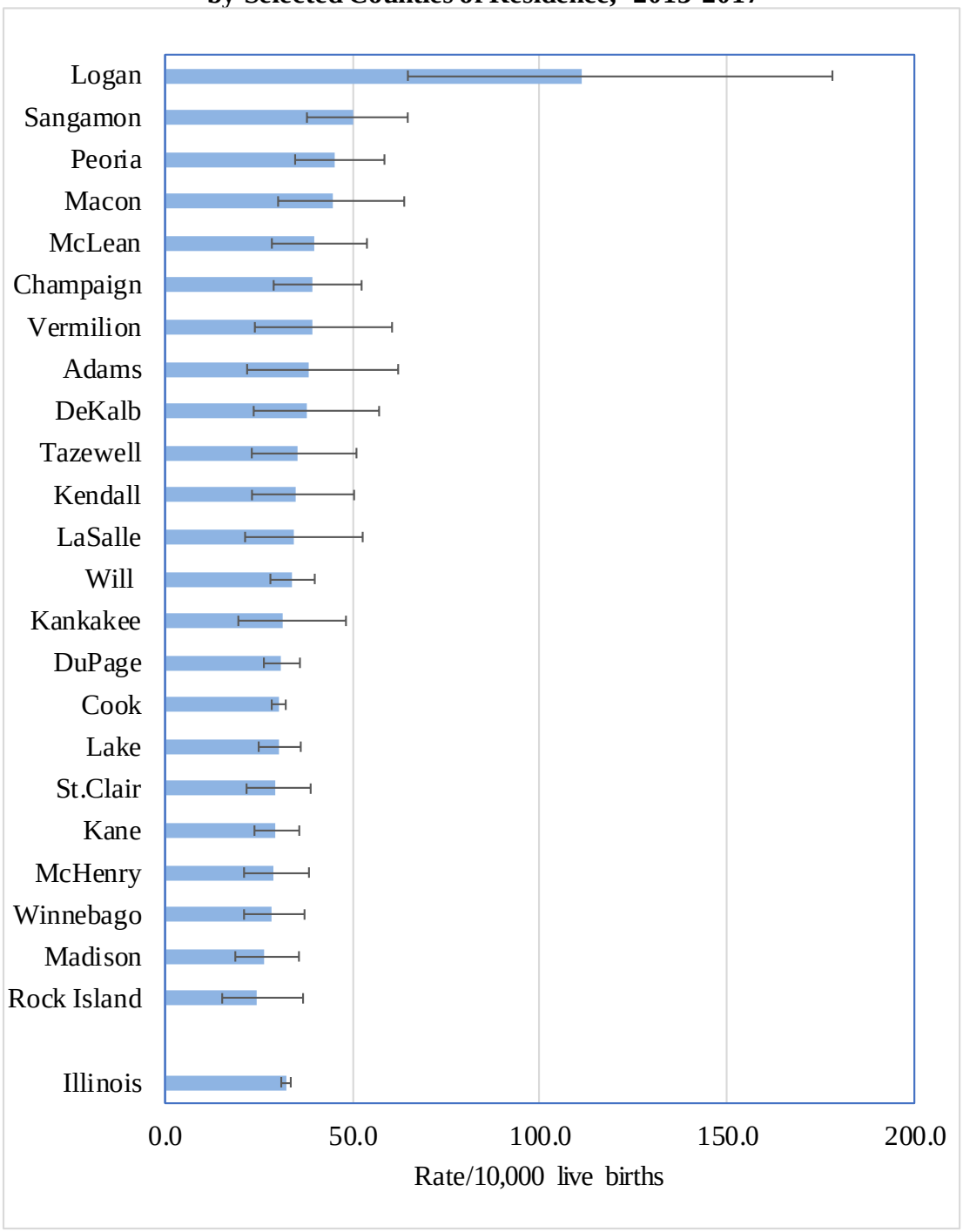
			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	2,508	32.3	31.0	33.5	Lee	10	57.3	27.5	105.3
Adams	16	38.3	21.9	62.2	Livingston	9	45.2	20.7	85.9
Alexander	0	0.0	0.0	82.3	Logan	17	111.3	64.8	178.1
Bond	2	26.1	3.2	94.2	McDonough	5	35.6	11.6	83.1
Boone	11	37.4	18.7	66.9	McHenry	46	28.8	21.1	38.4
Brown	1	33.9	0.9	188.9	McLean	41	39.7	28.5	53.9
Bureau	6	34.4	12.6	74.8	Macon	30	44.7	30.2	63.8
Calhoun	0	0.0	0.0	151.2	Macoupin	8	35.3	15.2	69.6
Carroll	1	14.0	0.4	78.1	Madison	40	26.2	18.7	35.7
Cass	1	11.8	0.3	65.5	Marion	11	44.7	22.3	80.0
Champaign	47	39.4	29.0	52.5	Marshall	3	47.3	9.8	138.3
Christian	9	53.3	24.4	101.2	Mason	8	118.3	51.1	233.2
Clark	1	11.0	0.3	61.5	Massac	0	0.0	0.0	46.3
Clay	4	51.9	14.2	133.0	Menard	0	0.0	0.0	60.6
Clinton	5	23.6	7.7	55.1	Mercer	1	13.6	0.3	75.9
Coles	9	35.5	16.2	67.3	Monroe	1	5.9	0.1	32.6
Cook	1,025	30.3	28.5	32.2	Montgomery	7	46.8	18.8	96.4
Crawford	1	9.5	0.2	52.7	Morgan	6	32.1	11.8	69.9
Cumberland	4	61.2	16.7	156.6	Moultrie	6	62.5	22.9	136.0
DeKalb	22	37.7	23.6	57.1	Ogle	9	34.1	15.6	64.7
DeWitt	4	46.6	12.7	119.4	Peoria	60	45.5	34.7	58.6
Douglas	13	98.6	52.5	168.5	Perry	3	27.9	5.7	81.5
DuPage	165	30.9	26.4	36.0	Piatt	5	55.6	18.1	129.8
Edgar	1	11.0	0.3	61.4	Pike	3	32.3	6.7	94.5
Edwards	1	26.2	0.7	145.9	Pope	1	72.5	1.8	403.7
Effingham	15	65.9	36.9	108.7	Pulaski	1	29.3	0.7	163.4
Fayette	7	56.3	22.6	115.9	Putnam	1	39.2	1.0	218.5
Ford	2	26.8	3.2	96.7	Randolph	6	35.2	12.9	76.7
Franklin	12	50.0	25.8	87.3	Richland	1	10.2	0.3	57.0
Fulton	8	46.6	20.1	91.8	Rock Island	22	24.3	15.2	36.8
Gallatin	0	0.0	0.0	129.4	St. Clair	49	29.4	21.7	38.9
Greene	5	75.6	24.6	176.5	Saline	8	49.8	21.5	98.2
Grundy	8	26.4	11.4	52.1	Sangamon	57	50.0	37.9	64.8
Hamilton	1	23.3	0.6	129.9	Schuyler	1	34.6	0.9	192.8
Hancock	3	31.1	6.4	90.9	Scott	0	0.0	0.0	153.1
Hardin	0	0.0	0.0	239.5	Shelby	5	40.3	13.1	94.1
Henderson	1	29.5	0.7	164.4	Stark	2	61.9	7.5	223.7
Henry	12	44.9	23.2	78.4	Stephenson	5	20.2	6.6	47.2
Iroquois	7	46.1	18.5	94.9	Tazewell	27	35.1	23.1	51.1
Jackson	10	29.0	13.9	53.3	Union	1	10.7	0.3	59.7
Jasper	3	53.4	11.0	156.0	Vermilion	20	39.2	24.0	60.6
Jefferson	10	40.1	19.2	73.8	Wabash	0	0.0	0.0	53.0
Jersey	5	47.3	15.4	110.5	Warren	5	45.8	14.9	106.9
JoDaviess	1	11.3	0.3	63.0	Washington	1	12.4	0.3	68.9
Johnson	4	75.0	20.4	192.1	Wayne	0	0.0	0.0	36.1
Kane	98	29.4	23.9	35.8	White	1	12.4	0.3	69.2
Kankakee	21	31.6	19.6	48.3	Whiteside	8	25.3	10.9	49.8
Kendall	28	34.9	23.2	50.5	Will	130	33.6	28.1	40.0
Knox	11	38.6	19.3	69.1	Williamson	6	15.2	5.6	33.1
Lake	117	30.2	25.0	36.2	Winnebago	51	28.3	21.1	37.2
LaSalle	21	34.5	21.4	52.7	Woodford	11	50.6	25.2	90.5
Lawrence	0	0.0	0.0	44.8					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

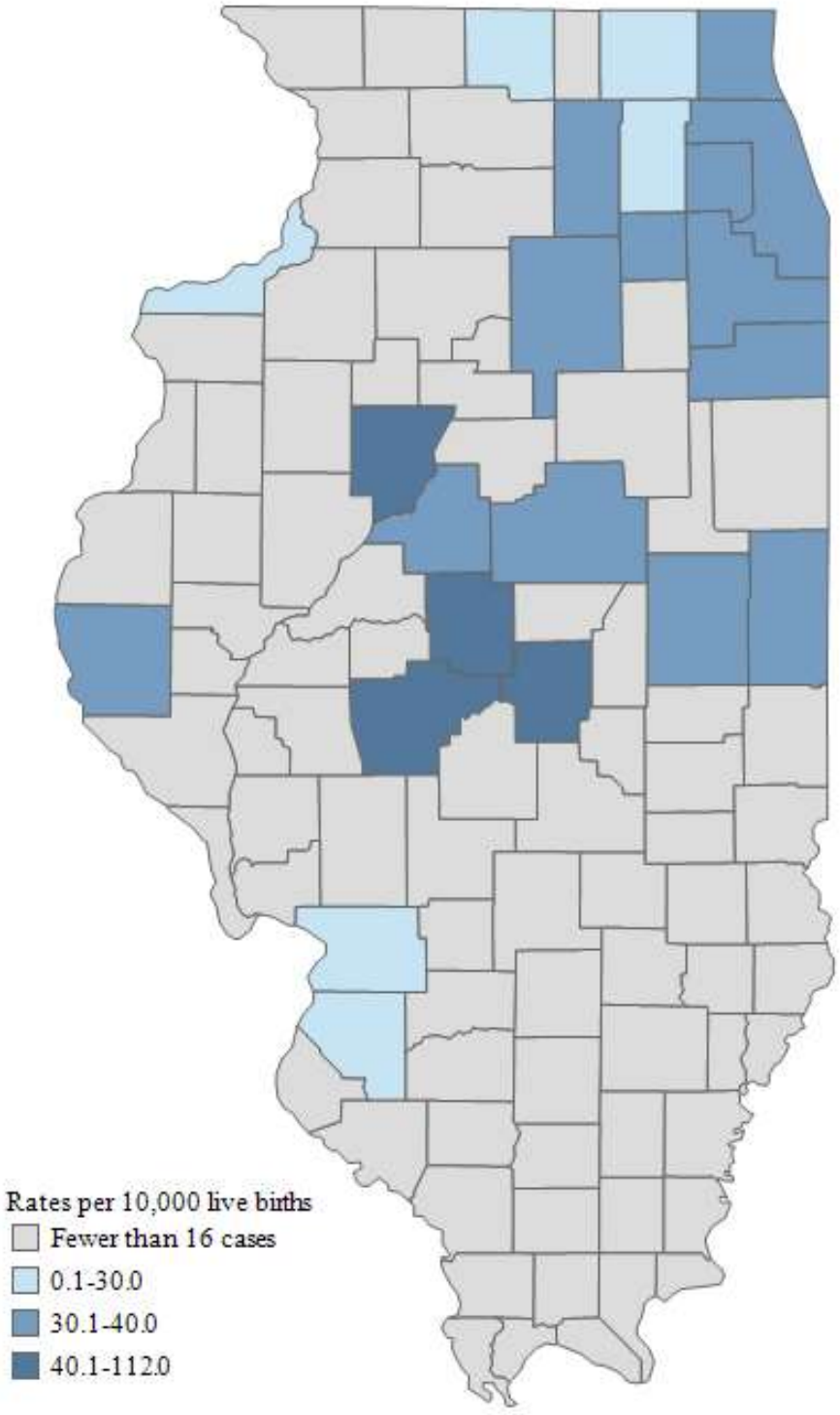
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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] 2013-2017



[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, March 2020

Figure 10. Map of Prevalence Rates for Major Musculoskeletal Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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, 2013 – 2017

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Deletion 22q11.2	Q93.81	86	1.1	(0.9, 1.4)
Down syndrome (trisomy 21)	Q90.0-Q90.9	1,128	14.5	(13.7, 15.4)
Edward syndrome (trisomy 18)	Q91.0-Q91.3	214	2.8	(2.4, 3.1)
Patau syndrome (trisomy 13)	Q91.4-Q91.7	95	1.2	(1.0, 1.5)
Turner syndrome	Q96.0-Q96.9	87	1.1	(0.9, 1.4)

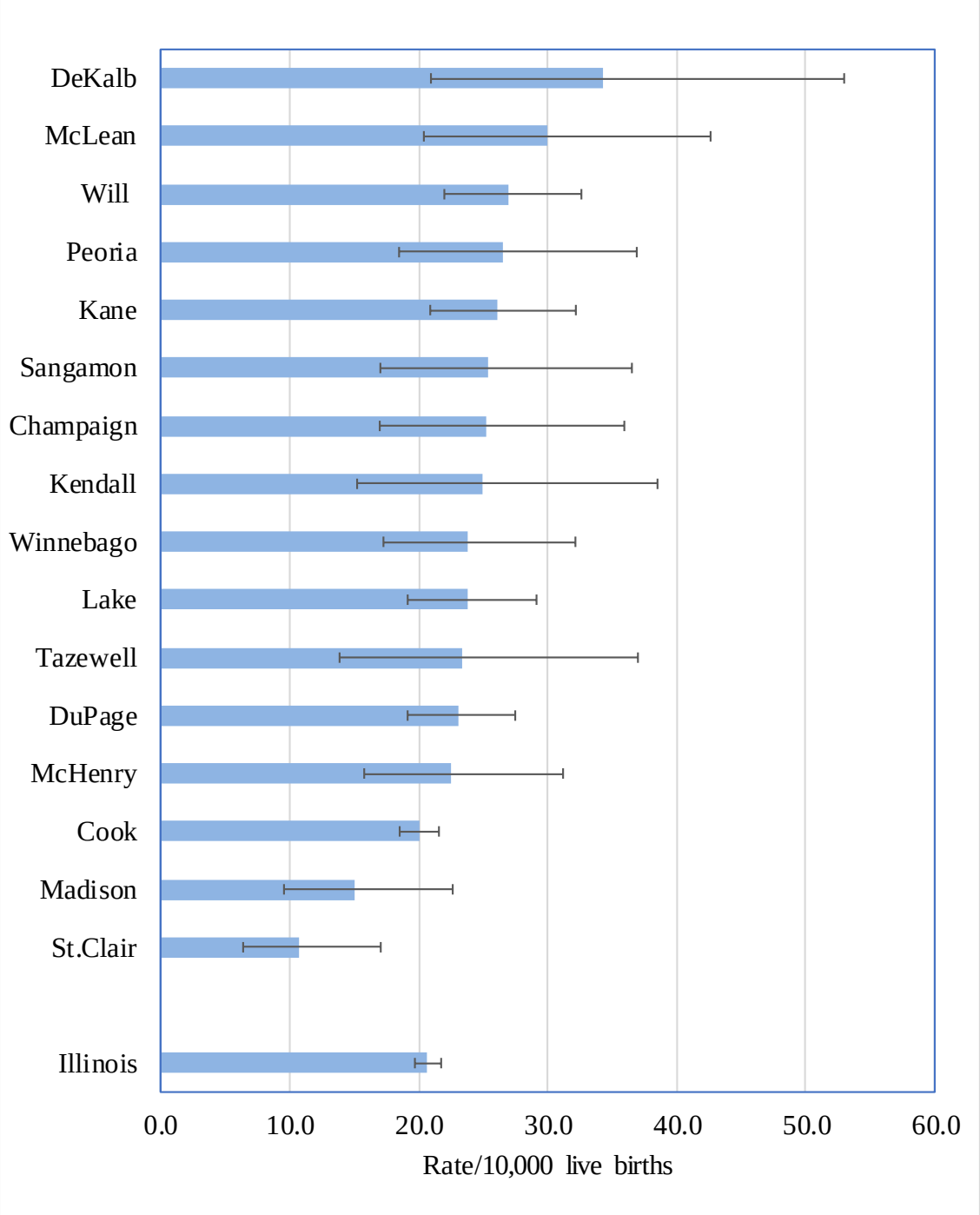
[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

Table 13. Total Number and Prevalence Rates of Major Chromosomal Defects in Children Under 2 Years of Age by County of Residence, 2013-2017

			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	1,610	20.7	19.7	21.7	Lee	5	28.6	9.3	66.8
Adams	7	16.8	6.7	34.5	Livingston	3	15.1	3.1	44.1
Alexander	0	0.0	0.0	82.3	Logan	3	19.6	4.0	57.4
Bond	2	26.1	3.2	94.2	McDonough	1	7.1	0.2	39.7
Boone	9	30.6	14.0	58.1	McHenry	36	22.5	15.8	31.2
Brown	0	0.0	0.0	125.0	McLean	31	30.0	20.4	42.6
Bureau	3	17.2	3.5	50.2	Macon	13	19.4	10.3	33.1
Calhoun	0	0.0	0.0	151.2	Macoupin	2	8.8	1.1	31.9
Carroll	1	14.0	0.4	78.1	Madison	23	15.1	9.6	22.6
Cass	1	11.8	0.3	65.5	Marion	3	12.2	2.5	35.7
Champaign	30	25.2	17.0	35.9	Marshall	1	15.8	0.4	87.9
Christian	5	29.6	9.6	69.1	Mason	1	14.8	0.4	82.4
Clark	0	0.0	0.0	40.7	Massac	0	0.0	0.0	46.3
Clay	0	0.0	0.0	47.9	Menard	3	49.3	10.2	144.0
Clinton	0	0.0	0.0	17.4	Mercer	1	13.6	0.3	75.9
Coles	5	19.7	6.4	46.0	Monroe	0	0.0	0.0	21.6
Cook	677	20.0	18.5	21.6	Montgomery	0	0.0	0.0	24.7
Crawford	2	18.9	2.3	68.4	Morgan	6	32.1	11.8	69.9
Cumberland	1	15.3	0.4	85.2	Moultrie	2	20.8	2.5	75.3
DeKalb	20	34.3	21.0	53.0	Ogle	7	26.5	10.7	54.6
DeWitt	2	23.3	2.8	84.2	Peoria	35	26.5	18.5	36.9
Douglas	6	45.5	16.7	99.0	Perry	0	0.0	0.0	34.3
DuPage	123	23.0	19.1	27.5	Piatt	0	0.0	0.0	41.0
Edgar	0	0.0	0.0	40.6	Pike	3	32.3	6.7	94.5
Edwards	0	0.0	0.0	96.6	Pope	0	0.0	0.0	267.3
Effingham	5	22.0	7.1	51.3	Pulaski	0	0.0	0.0	108.2
Fayette	4	32.2	8.8	82.3	Putnam	0	0.0	0.0	144.7
Ford	0	0.0	0.0	49.4	Randolph	0	0.0	0.0	21.7
Franklin	5	20.8	6.8	48.6	Richland	1	10.2	0.3	57.0
Fulton	4	23.3	6.3	59.6	Rock Island	10	11.1	5.3	20.3
Gallatin	2	70.2	8.5	253.5	St. Clair	18	10.8	6.4	17.1
Greene	0	0.0	0.0	55.8	Saline	1	6.2	0.2	34.7
Grundy	9	29.8	13.6	56.5	Sangamon	29	25.4	17.0	36.5
Hamilton	0	0.0	0.0	86.0	Schuyler	0	0.0	0.0	127.6
Hancock	2	20.7	2.5	74.9	Scott	0	0.0	0.0	153.1
Hardin	0	0.0	0.0	239.5	Shelby	1	8.1	0.2	44.9
Henderson	0	0.0	0.0	108.8	Stark	0	0.0	0.0	114.2
Henry	7	26.2	10.5	53.9	Stephenson	2	8.1	1.0	29.2
Iroquois	4	26.3	7.2	67.4	Tazewell	18	23.4	13.9	37.0
Jackson	4	11.6	3.2	29.7	Union	1	10.7	0.3	59.7
Jasper	0	0.0	0.0	65.6	Vermilion	12	23.5	12.2	41.1
Jefferson	6	24.1	8.8	52.4	Wabash	1	14.4	0.4	80.1
Jersey	2	18.9	2.3	68.4	Warren	2	18.3	2.2	66.2
JoDaviess	1	11.3	0.3	63.0	Washington	1	12.4	0.3	68.9
Johnson	1	18.8	0.5	104.5	Wayne	1	9.8	0.2	54.5
Kane	87	26.1	20.9	32.2	White	0	0.0	0.0	45.8
Kankakee	12	18.1	9.3	31.5	Whiteside	3	9.5	2.0	27.7
Kendall	20	24.9	15.2	38.5	Will	104	26.9	22.0	32.6
Knox	3	10.5	2.2	30.8	Williamson	3	7.6	1.6	22.2
Lake	92	23.8	19.2	29.1	Winnebago	43	23.9	17.3	32.2
LaSalle	8	13.1	5.7	25.9	Woodford	6	27.6	10.1	60.0
Lawrence	1	12.1	0.3	67.6					

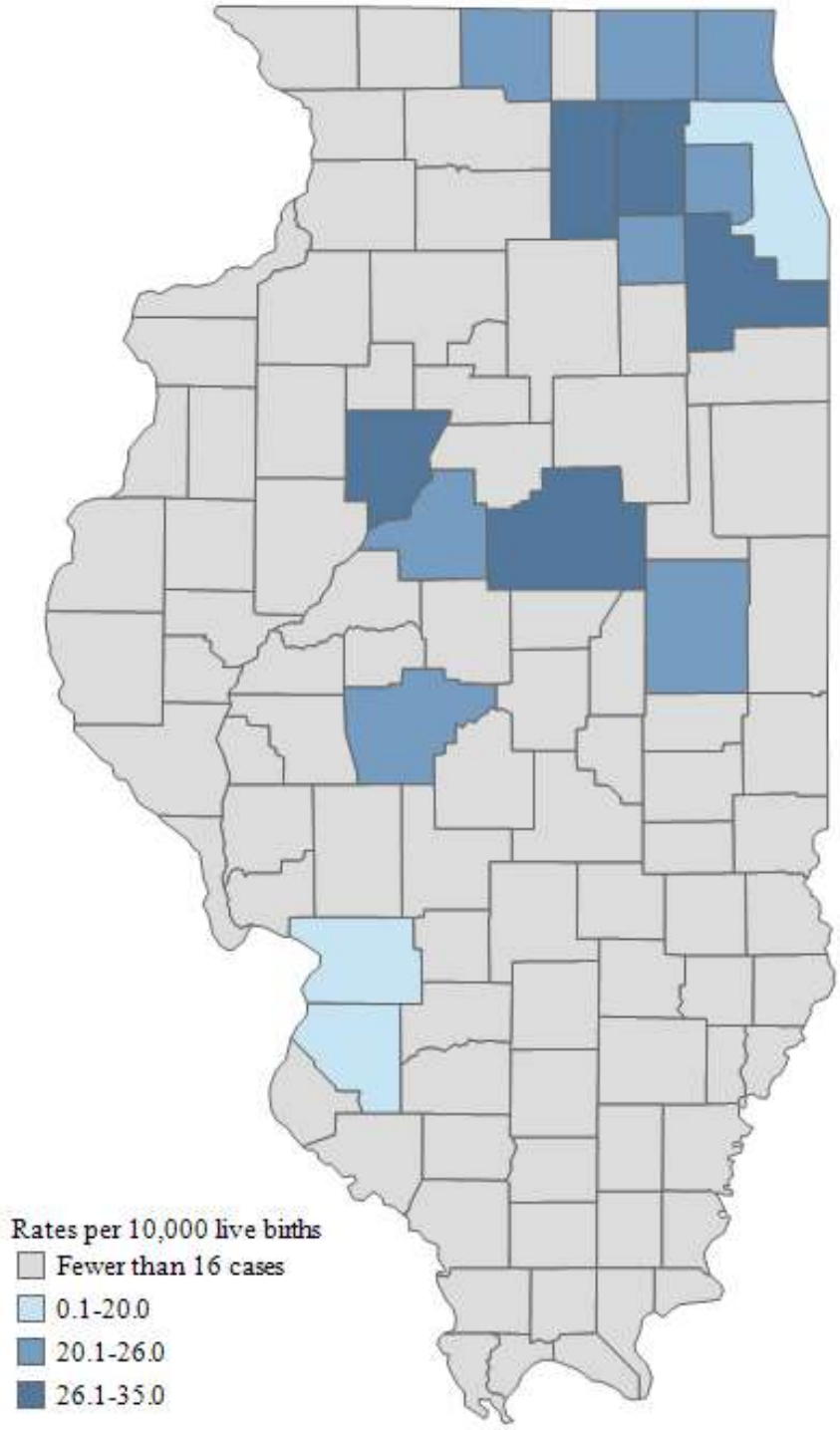
[1] Per 10,000 live births (The number for Illinois includes one case for which county of residence is missing.)
[2] 95% confidence intervals for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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] 2013-2017



[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, March 2020

Figure 12. Map of Prevalence Rates for Major Chromosomal Defects in Children Under 2 Years of Age by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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 remain the second leading cause of infant death in the U.S. and the leading cause of infant death in Illinois (16.8 and 25.8% respectively) (Ely M & Driscoll AK and IDPH, 2020).

There are several risk factors that can lead to premature births. The National Institutes of Health reported March 1, 2019 that 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.

Table 14 provides five-year prevalence rates for infants born before 37 completed weeks of gestation reported to APORS by county, and Figures 13 and 14 present prevalence rates for selected counties in Illinois.

Table14. Total Number and Prevalence Rates of Infants with Prematurity (<31 Completed Weeks Gestation), by County of Residence, 2013-2017

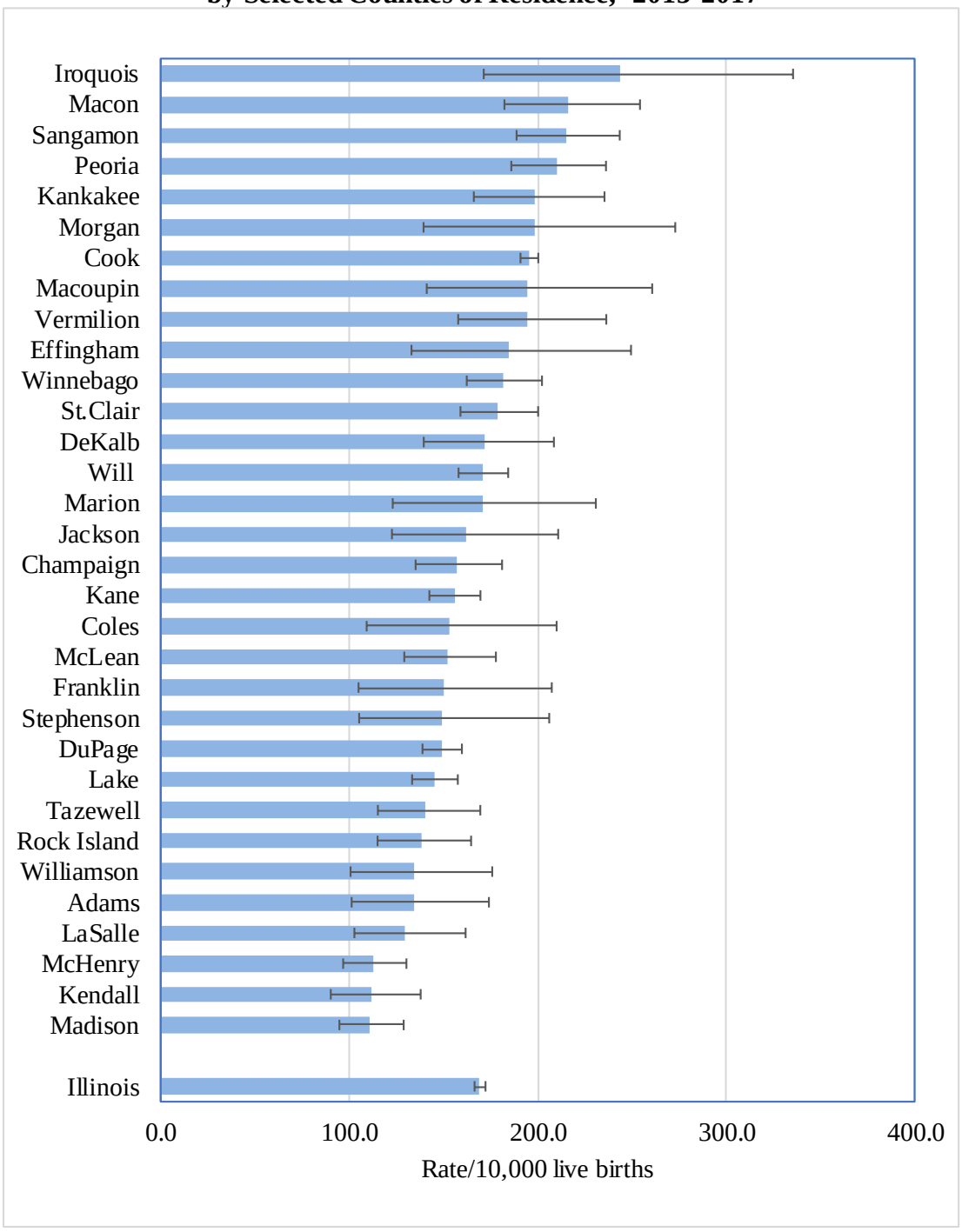
County	Cases	Rate[1]	95% CI[2] Lower	95% CI[2] Upper	County	Cases	Rate[1]	95% CI[2] Lower	95% CI[2] Upper
ILLINOIS	13,170	169.4	166.5	172.3	Lee	20	114.5	70.0	176.9
Adams	56	134.1	101.3	174.1	Livingston	31	155.8	105.8	221.1
Alexander	3	67.0	13.8	195.7	Logan	28	183.2	121.8	264.8
Bond	5	65.2	21.2	152.1	McDonough	26	185.2	121.0	271.3
Boone	33	112.2	77.3	157.6	McHenry	180	112.7	96.8	130.4
Brown	2	67.8	8.2	244.9	McLean	157	152.1	129.2	177.8
Bureau	18	103.2	61.1	163.0	Macon	145	216.1	182.4	254.3
Calhoun	2	82.0	9.9	296.1	Macoupin	44	194.3	141.1	260.8
Carroll	4	56.1	15.3	143.6	Madison	169	110.9	94.8	128.9
Cass	14	164.7	90.0	276.3	Marion	42	170.8	123.1	230.9
Champaign	187	156.9	135.3	181.1	Marshall	7	110.4	44.4	227.5
Christian	23	136.3	86.4	204.5	Mason	10	147.9	70.9	272.0
Clark	5	55.2	17.9	128.8	Massac	6	75.4	27.7	164.1
Clay	9	116.9	53.4	221.9	Menard	7	114.9	46.2	236.8
Clinton	26	122.8	80.2	180.0	Mercer	7	95.4	38.3	196.5
Coles	39	153.7	109.3	210.1	Monroe	6	35.1	12.9	76.5
Cook	6,617	195.6	190.9	200.3	Montgomery	17	113.6	66.2	181.9
Crawford	13	123.0	65.5	210.3	Morgan	37	198.1	139.5	273.0
Cumberland	10	152.9	73.3	281.2	Moultrie	8	83.3	36.0	164.2
DeKalb	100	171.5	139.6	208.6	Ogle	31	117.3	79.7	166.5
DeWitt	11	128.2	64.0	229.4	Peoria	277	210.0	186.0	236.3
Douglas	17	128.9	75.1	206.4	Perry	10	92.9	44.6	170.9
DuPage	796	149.1	138.9	159.8	Piatt	12	133.5	69.0	233.2
Edgar	14	154.2	84.3	258.7	Pike	6	64.7	23.7	140.7
Edwards	0	0.0	0.0	96.6	Pope	2	144.9	17.6	523.5
Effingham	42	184.6	133.1	249.5	Pulaski	4	117.3	32.0	300.3
Fayette	12	96.5	49.8	168.5	Putnam	4	156.9	42.7	401.6
Ford	5	66.9	21.7	156.2	Randolph	12	70.5	36.4	123.1
Franklin	36	149.9	105.0	207.5	Richland	10	102.4	49.1	188.2
Fulton	23	133.9	84.9	200.9	Rock Island	125	138.2	115.1	164.7
Gallatin	0	0.0	0.0	129.4	St. Clair	298	178.8	159.0	200.3
Greene	6	90.8	33.3	197.6	Saline	15	93.4	52.3	154.0
Grundy	34	112.4	77.8	157.1	Sangamon	245	214.9	188.8	243.6
Hamilton	2	46.6	5.6	168.4	Schuyler	4	138.4	37.7	354.4
Hancock	5	51.9	16.8	121.0	Scott	4	166.0	45.2	425.0
Hardin	0	0.0	0.0	239.5	Shelby	11	88.7	44.3	158.7
Henderson	2	59.0	7.1	213.1	Stark	3	92.9	19.2	271.4
Henry	28	104.7	69.6	151.3	Stephenson	37	149.6	105.3	206.1
Iroquois	37	243.4	171.4	335.5	Tazewell	108	140.5	115.2	169.6
Jackson	56	162.4	122.7	210.9	Union	2	21.4	2.6	77.4
Jasper	9	160.1	73.2	304.0	Vermilion	99	194.2	157.8	236.4
Jefferson	28	112.3	74.6	162.3	Wabash	3	43.1	8.9	126.0
Jersey	12	113.6	58.7	198.5	Warren	14	128.2	70.1	215.1
JoDaviess	4	45.2	12.3	115.9	Washington	8	98.9	42.7	194.8
Johnson	5	93.8	30.5	218.9	Wayne	13	127.1	67.7	217.3
Kane	519	155.7	142.6	169.7	White	4	49.7	13.5	127.2
Kankakee	132	198.6	166.1	235.5	Whiteside	25	78.9	51.1	116.5
Kendall	90	112.2	90.2	137.9	Will	660	170.8	158.0	184.4
Knox	33	115.8	79.7	162.6	Williamson	53	134.5	100.7	175.9
Lake	562	145.1	133.4	157.6	Winnebago	327	181.5	162.4	202.3
LaSalle	79	129.8	102.8	161.8	Woodford	24	110.3	70.7	164.2
Lawrence	8	97.1	41.9	191.3					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

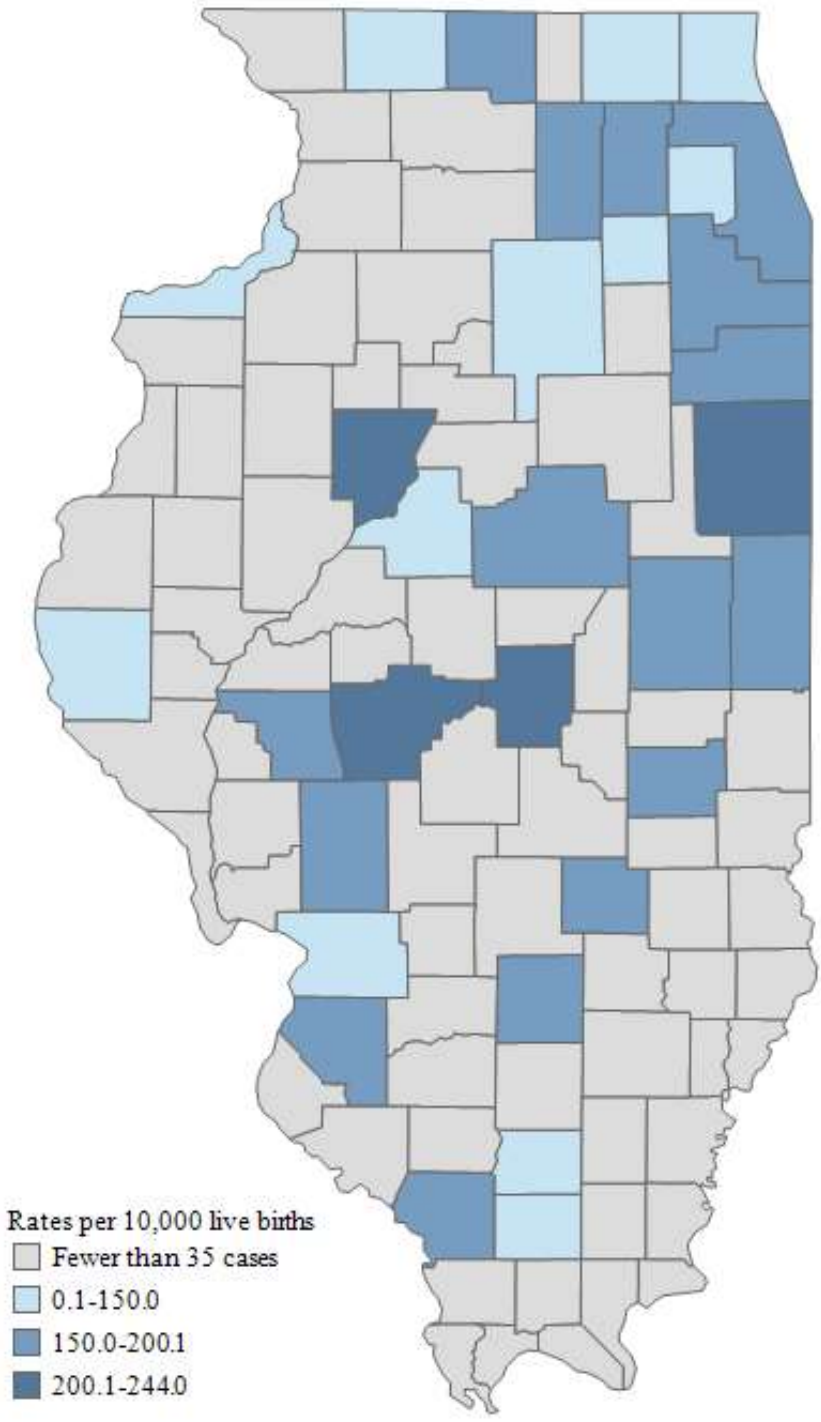
Source: Illinois Department Of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

Figure 13. Prevalence Rates[1] and 95% Confidence Intervals for Infants with Prematurity (<31 Completed Weeks Gestation) by Selected Counties of Residence,[2] 2013-2017



[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, March 2020

Figure 14. Map of Prevalence Rates for Infants with Prematurity (<31 Completed Weeks Gestation), by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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 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 (CDC).

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, 2013-2017

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Chlamydial infections	A7489, A749, P231	8	0.1	(0.0, 0.2)
Cytomegalovirus	P35.1	133	1.7	(1.4, 2.0)
Gonococcal infections	A5431	1	0.0	(0.0, 0.1)
Group B streptococcus	B95.1, J15.3, P36.0	196	2.5	(2.2, 2.9)
Hepatitis B	P35.3	3	0.0	(0.0, 0.1)
Prenatal exposure to hepatitis B	Z205_B	1,405	18.1	(17.1, 19.0)
Herpes and other infections	P35.2	71	0.9	(0.7, 1.2)
Listeriosis	P37.2	1	0.0	(0.0, 0.1)
Rubella	P35.0	0	0.0	(0.0, 0.0)
Sepsis (confirmed septicemia)	P36.9_C, P3639, P364, P365, P368, B377, P3610, P3619, P362, P3630	1,136	14.6	(13.8, 15.5)
Syphilis (disease or prenatal exposure to active disease)	A50.01-A53.9	387	5.0	(4.5, 5.5)
Tetanus neonatorum	A33	0	0.0	(0.0, 0.0)

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020.

Table16. Total Number and Prevalence Rates of Serious Congenital Infections in Newborn Infants by County of Residence, 2013-2017

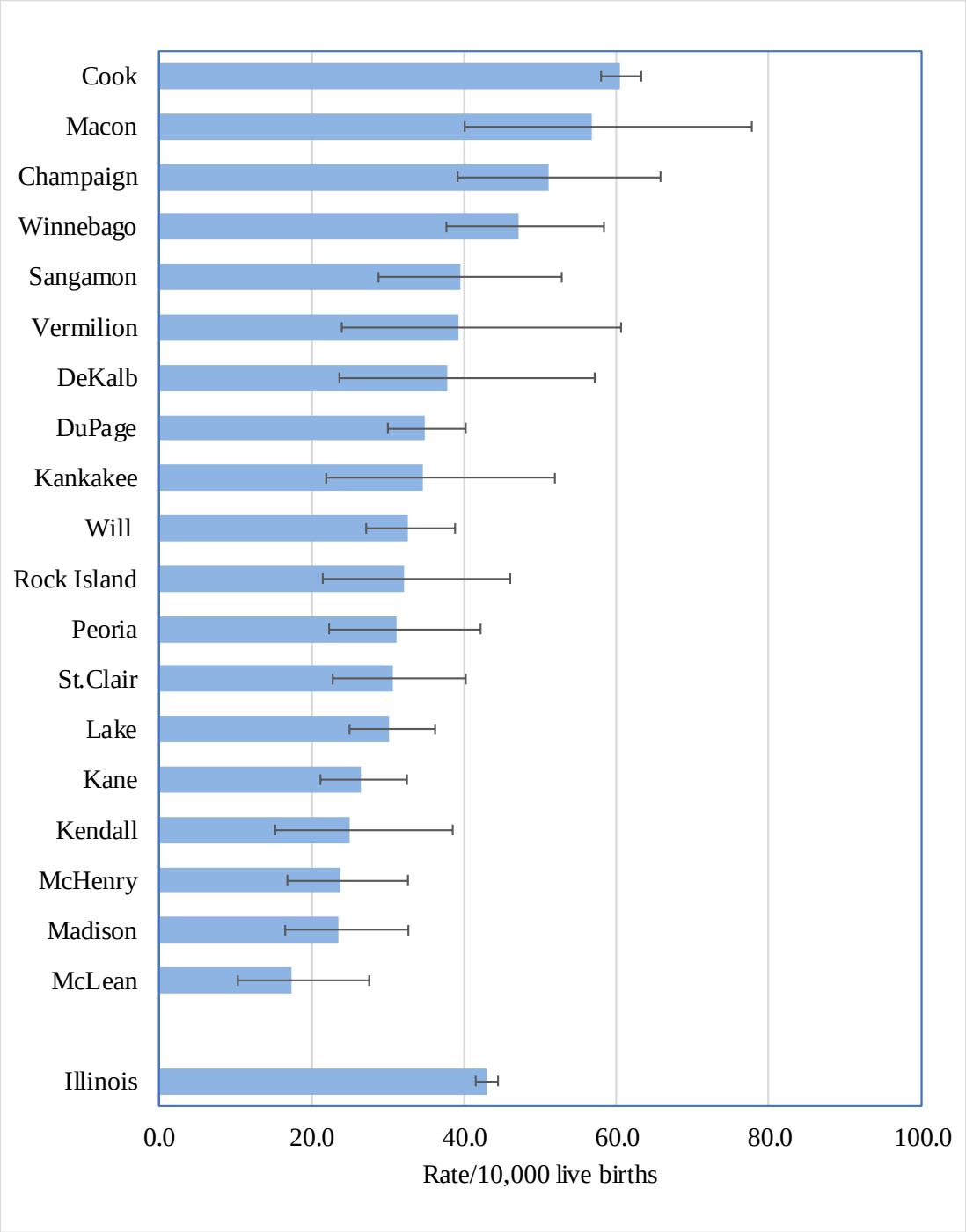
			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	3,341	43.0	41.5	44.5	Lee	4	22.9	6.2	58.7
Adams	9	21.6	9.9	40.9	Livingston	4	20.1	5.5	51.5
Alexander	0	0.0	0.0	82.3	Logan	7	45.8	18.4	94.4
Bond	0	0.0	0.0	48.1	McDonough	2	14.2	1.7	51.5
Boone	6	20.4	7.5	44.4	McHenry	38	23.8	16.8	32.6
Brown	0	0.0	0.0	125.0	McLean	18	17.4	10.3	27.6
Bureau	6	34.4	12.6	74.8	Macon	38	56.6	40.1	77.7
Calhoun	1	41.0	1.0	228.3	Macoupin	7	30.9	12.4	63.7
Carroll	3	42.1	8.7	123.0	Madison	36	23.6	16.5	32.7
Cass	6	70.6	25.9	153.6	Marion	2	8.1	1.0	29.4
Champaign	61	51.2	39.2	65.8	Marshall	0	0.0	0.0	58.2
Christian	2	11.8	1.4	42.8	Mason	0	0.0	0.0	54.6
Clark	2	22.1	2.7	79.7	Massac	0	0.0	0.0	46.3
Clay	0	0.0	0.0	47.9	Menard	1	16.4	0.4	91.5
Clinton	4	18.9	5.1	48.4	Mercer	0	0.0	0.0	50.3
Coles	9	35.5	16.2	67.3	Monroe	0	0.0	0.0	21.6
Cook	2,049	60.6	58.0	63.2	Montgomery	2	13.4	1.6	48.3
Crawford	1	9.5	0.2	52.7	Morgan	8	42.8	18.5	84.4
Cumberland	0	0.0	0.0	56.4	Moultrie	1	10.4	0.3	58.0
DeKalb	22	37.7	23.6	57.1	Ogle	12	45.4	23.5	79.3
DeWitt	1	11.7	0.3	64.9	Peoria	41	31.1	22.3	42.2
Douglas	3	22.7	4.7	66.5	Perry	5	46.5	15.1	108.4
DuPage	186	34.8	30.0	40.2	Piatt	0	0.0	0.0	41.0
Edgar	2	22.0	2.7	79.6	Pike	1	10.8	0.3	60.0
Edwards	0	0.0	0.0	96.6	Pope	0	0.0	0.0	267.3
Effingham	3	13.2	2.7	38.5	Pulaski	0	0.0	0.0	108.2
Fayette	1	8.0	0.2	44.8	Putnam	1	39.2	1.0	218.5
Ford	2	26.8	3.2	96.7	Randolph	1	5.9	0.1	32.7
Franklin	8	33.3	14.4	65.6	Richland	0	0.0	0.0	37.8
Fulton	2	11.6	1.4	42.1	Rock Island	29	32.1	21.5	46.1
Gallatin	0	0.0	0.0	129.4	St. Clair	51	30.6	22.8	40.2
Greene	3	45.4	9.4	132.6	Saline	1	6.2	0.2	34.7
Grundy	6	19.8	7.3	43.2	Sangamon	45	39.5	28.8	52.8
Hamilton	0	0.0	0.0	86.0	Schuyler	1	34.6	0.9	192.8
Hancock	2	20.7	2.5	74.9	Scott	1	41.5	1.1	231.2
Hardin	0	0.0	0.0	239.5	Shelby	6	48.4	17.8	105.3
Henderson	1	29.5	0.7	164.4	Stark	0	0.0	0.0	114.2
Henry	2	7.5	0.9	27.0	Stephenson	12	48.5	25.1	84.7
Iroquois	3	19.7	4.1	57.7	Tazewell	9	11.7	5.4	22.2
Jackson	14	40.6	22.2	68.1	Union	0	0.0	0.0	39.5
Jasper	2	35.6	4.3	128.6	Vermilion	20	39.2	24.0	60.6
Jefferson	4	16.0	4.4	41.1	Wabash	0	0.0	0.0	53.0
Jersey	1	9.5	0.2	52.8	Warren	7	64.1	25.8	132.1
JoDaviess	0	0.0	0.0	41.7	Washington	1	12.4	0.3	68.9
Johnson	0	0.0	0.0	69.2	Wayne	2	19.6	2.4	70.6
Kane	88	26.4	21.2	32.5	White	0	0.0	0.0	45.8
Kankakee	23	34.6	21.9	51.9	Whiteside	6	18.9	7.0	41.2
Kendall	20	24.9	15.2	38.5	Will	126	32.6	27.2	38.8
Knox	7	24.6	9.9	50.6	Williamson	11	27.9	13.9	49.9
Lake	117	30.2	25.0	36.2	Winnebago	85	47.2	37.7	58.3
LaSalle	13	21.4	11.4	36.5	Woodford	3	13.8	2.8	40.3
Lawrence	0	0.0	0.0	44.8					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

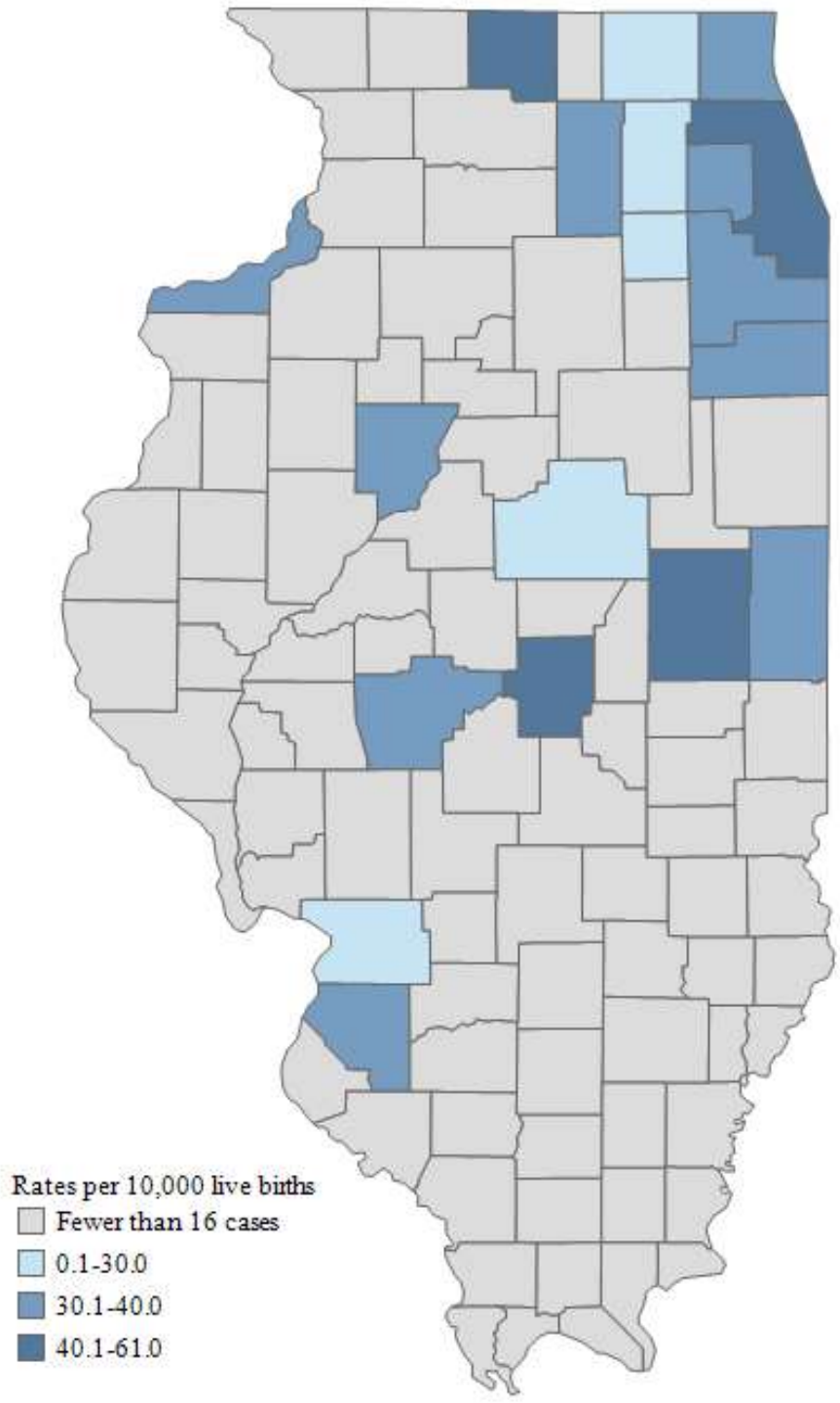
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

Figure 15. Prevalence Rates[1] and 95% Confidence Intervals for Serious Congenital Infections in Newborn Infants for Selected Counties of Residence,[2] 2013-2017



[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, March 2020

Figure 16. Map of Prevalence Rates for Serious Congenital Infections in Newborn Infants by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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, 2013-2017

Defect	Cases	Rate[1]	95% CI[2]
Fetal deaths	4,442	57.1	(55.5, 58.8)
Deaths during newborn stay	3,596	46.3	(44.8, 47.8)

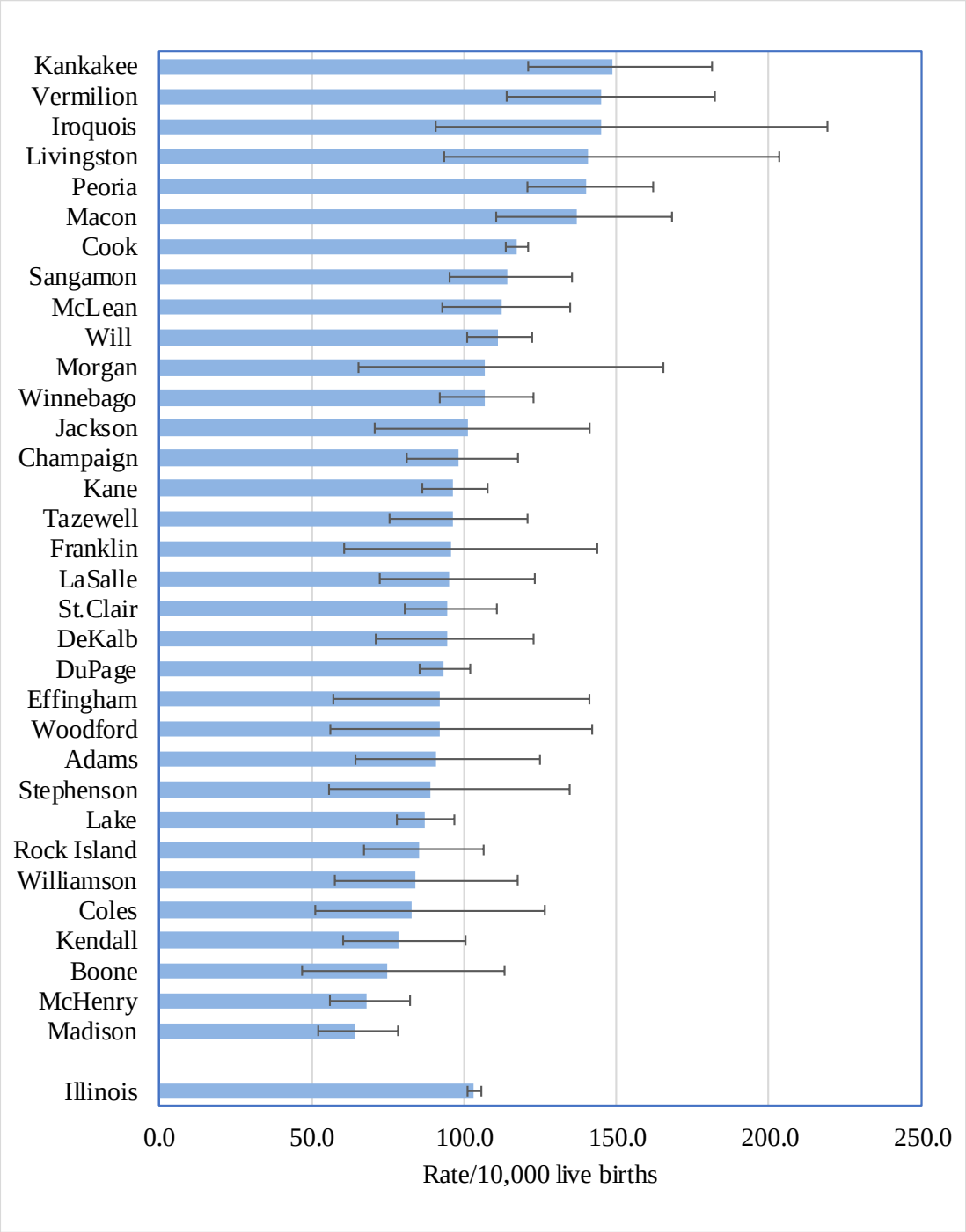
[1] Rate per 10,000 live births
[2] 95% confidence interval for rate
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020.

Table18. Total Number and Prevalence Rates of Perinatal Deaths, by County of Residence, 2013-2017

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	8,038	103.4	101.1	105.7	Lee	15	85.9	48.1	141.7
Adams	38	91.0	64.4	124.9	Livingston	28	140.7	93.5	203.4
Alexander	3	67.0	13.8	195.7	Logan	14	91.6	50.1	153.7
Bond	2	26.1	3.2	94.2	McDonough	18	128.2	76.0	202.6
Boone	22	74.8	46.9	113.3	McHenry	109	68.2	56.0	82.3
Brown	3	101.7	21.0	297.2	McLean	116	112.4	92.9	134.8
Bureau	11	63.0	31.5	112.8	Macon	92	137.1	110.5	168.2
Calhoun	1	41.0	1.0	228.3	Macoupin	19	83.9	50.5	131.0
Carroll	1	14.0	0.4	78.1	Madison	98	64.3	52.2	78.4
Cass	7	82.4	33.1	169.7	Marion	13	52.9	28.1	90.4
Champaign	117	98.2	81.2	117.7	Marshall	6	94.6	34.7	206.0
Christian	18	106.6	63.2	168.5	Mason	10	147.9	70.9	272.0
Clark	1	11.0	0.3	61.5	Massac	1	12.6	0.3	70.0
Clay	5	64.9	21.1	151.5	Menard	7	114.9	46.2	236.8
Clinton	13	61.4	32.7	105.0	Mercer	4	54.5	14.8	139.5
Coles	21	82.7	51.2	126.5	Monroe	2	11.7	1.4	42.3
Cook	3,969	117.3	113.7	121.0	Montgomery	9	60.2	27.5	114.2
Crawford	9	85.1	38.9	161.6	Morgan	20	107.1	65.4	165.4
Cumberland	6	91.7	33.7	199.7	Moultrie	4	41.7	11.4	106.7
DeKalb	55	94.3	71.1	122.8	Ogle	15	56.8	31.8	93.6
DeWitt	8	93.2	40.3	183.7	Peoria	185	140.3	120.8	162.0
Douglas	14	106.1	58.0	178.1	Perry	4	37.2	10.1	95.2
DuPage	499	93.5	85.4	102.0	Piatt	12	133.5	69.0	233.2
Edgar	5	55.1	17.9	128.5	Pike	7	75.4	30.3	155.4
Edwards	1	26.2	0.7	145.9	Pope	0	0.0	0.0	267.3
Effingham	21	92.3	57.1	141.1	Pulaski	3	88.0	18.1	257.1
Fayette	7	56.3	22.6	115.9	Putnam	1	39.2	1.0	218.5
Ford	3	40.2	8.3	117.4	Randolph	8	47.0	20.3	92.6
Franklin	23	95.8	60.7	143.7	Richland	8	81.9	35.4	161.3
Fulton	18	104.8	62.1	165.6	Rock Island	77	85.1	67.2	106.4
Gallatin	2	70.2	8.5	253.5	St. Clair	158	94.8	80.6	110.8
Greene	6	90.8	33.3	197.6	Saline	8	49.8	21.5	98.2
Grundy	18	59.5	35.3	94.0	Sangamon	130	114.0	95.3	135.4
Hamilton	4	93.2	25.4	238.7	Schuyler	1	34.6	0.9	192.8
Hancock	2	20.7	2.5	74.9	Scott	0	0.0	0.0	153.1
Hardin	1	64.9	1.6	361.8	Shelby	11	88.7	44.3	158.7
Henderson	0	0.0	0.0	108.8	Stark	3	92.9	19.2	271.4
Henry	17	63.6	37.0	101.8	Stephenson	22	88.9	55.7	134.6
Iroquois	22	144.7	90.7	219.1	Tazewell	74	96.2	75.6	120.8
Jackson	35	101.5	70.7	141.2	Union	3	32.1	6.6	93.9
Jasper	8	142.3	61.5	280.5	Vermilion	74	145.2	114.0	182.2
Jefferson	13	52.1	27.8	89.2	Wabash	1	14.4	0.4	80.1
Jersey	9	85.2	39.0	161.8	Warren	7	64.1	25.8	132.1
JoDaviess	4	45.2	12.3	115.9	Washington	6	74.2	27.2	161.4
Johnson	3	56.3	11.6	164.5	Wayne	7	68.4	27.5	141.0
Kane	322	96.6	86.3	107.7	White	3	37.3	7.7	108.9
Kankakee	99	148.9	121.0	181.3	Whiteside	8	25.3	10.9	49.8
Kendall	63	78.6	60.4	100.5	Will	430	111.3	101.0	122.3
Knox	13	45.6	24.3	78.0	Williamson	33	83.7	57.6	117.6
Lake	337	87.0	78.0	96.8	Winnebago	192	106.6	92.0	122.8
LaSalle	58	95.3	72.4	123.2	Woodford	20	92.0	56.2	142.0
Lawrence	2	24.3	2.9	87.7					

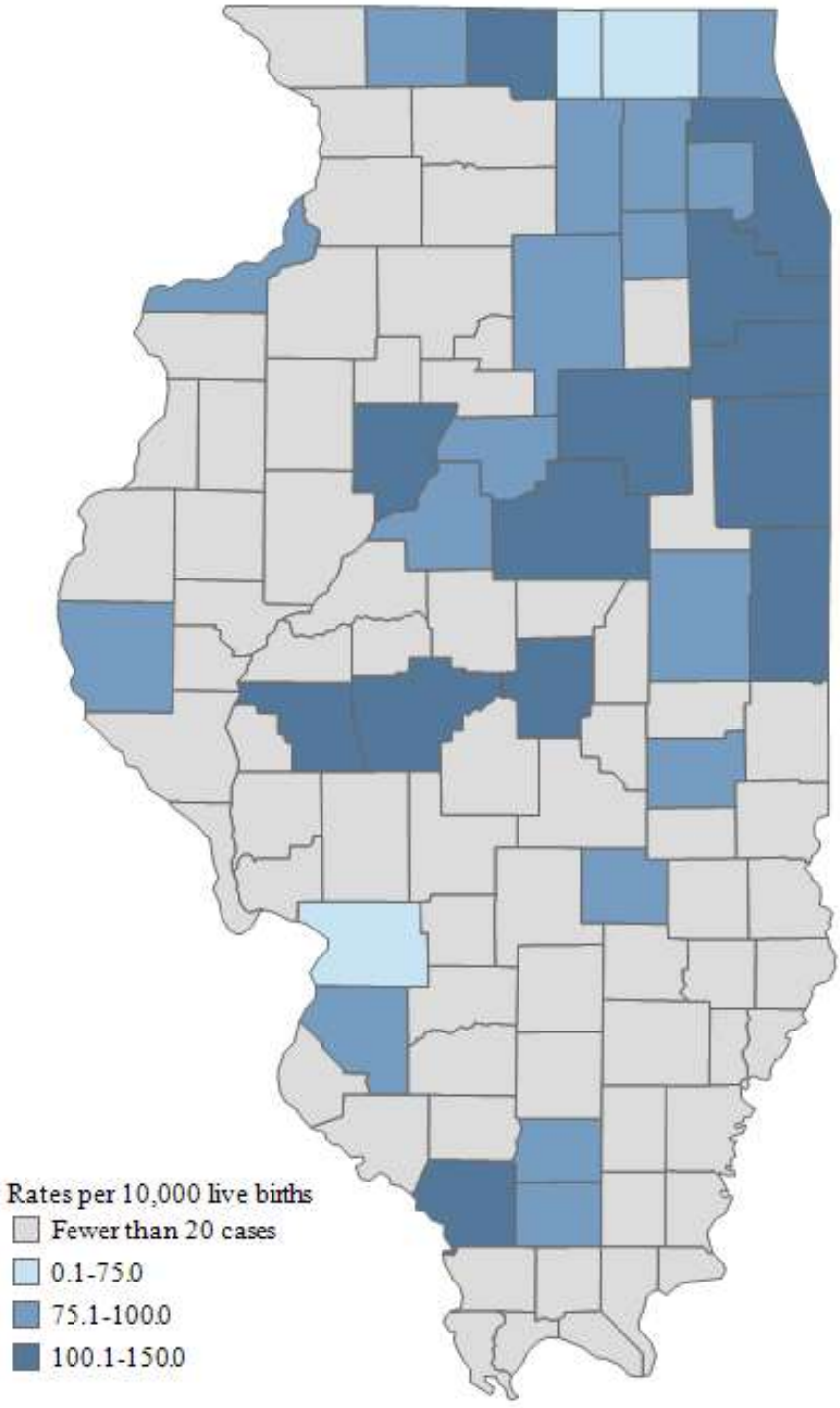
[1] Per 10,000 live births
[2] 95% confidence intervals for rate
The number for Illinois includes three cases for which county of residence is missing
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting Systems, March2020

Figure 17. Prevalence Rates[1] and 95% Confidence Intervals for Perinatal Deaths for Selected Counties of Residence,[2] 2013-2017



[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, March 2020

Figure 18. Map of Prevalence Rates for Perinatal Deaths by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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, 2013-2017

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Adrenogenital syndrome	E25.0-E25.9	40	0.5	(0.4, 0.7)
Cystic fibrosis	E84.0-E84.9	188	2.4	(2.1, 2.8)
Hypothyroidism	E03.0, E03.1	467	6.0	(5.5, 6.6)
Immune deficiency disease	D81.0, D81.9	67	0.9	(0.7, 1.1)
Inborn errors of metabolism	E70-E79	483	6.2	(5.7, 6.8)

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020.

Table20. Total Number and Prevalence Rates of Endocrine, Metabolic, or Immune Disorders in Newborn Infants, by County of Residence, 2013-2017

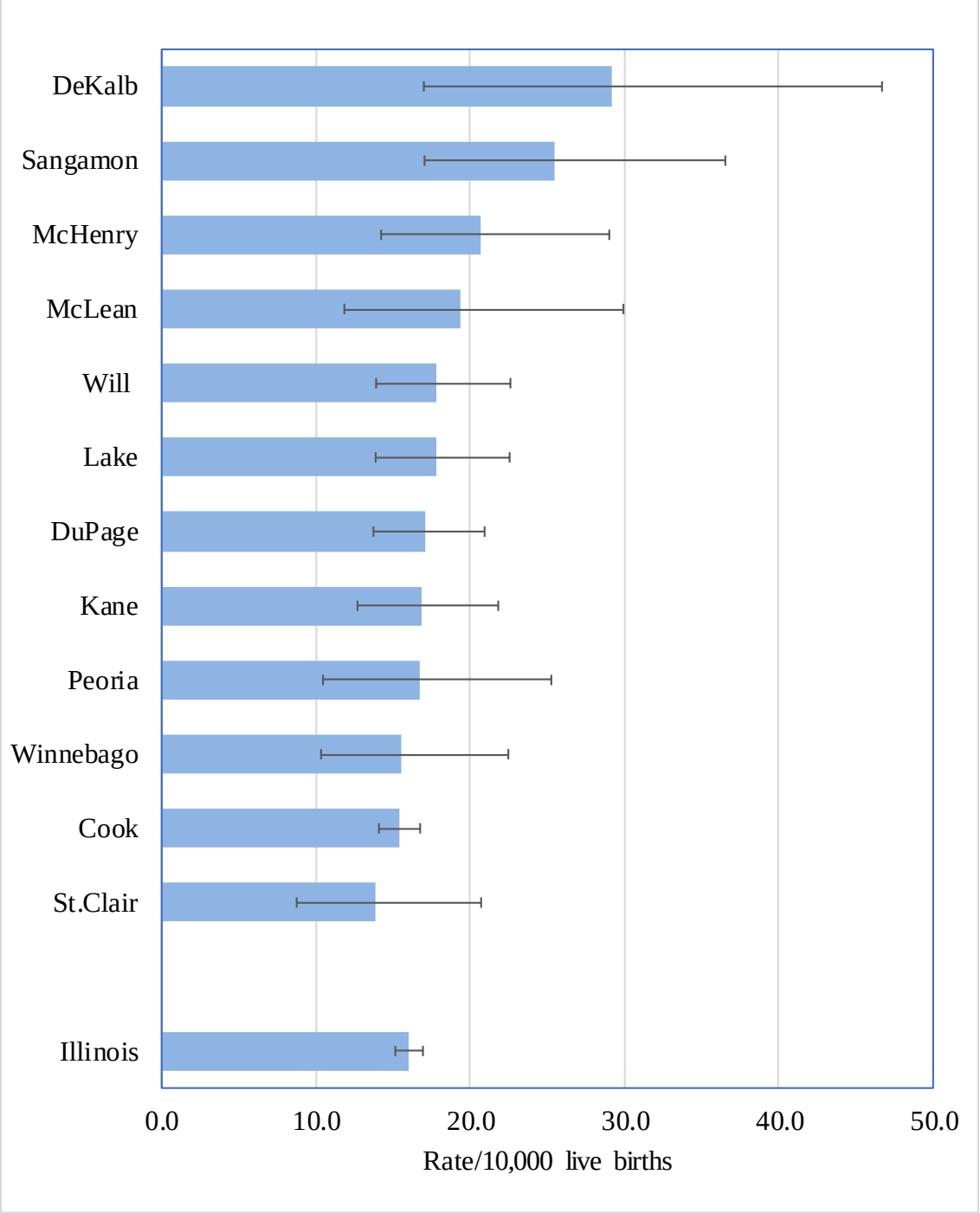
			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	1,245	16.0	15.1	16.9	Lee	2	11.5	1.4	41.4
Adams	4	9.6	2.6	24.5	Livingston	2	10.1	1.2	36.3
Alexander	0	0.0	0.0	82.3	Logan	2	13.1	1.6	47.3
Bond	0	0.0	0.0	48.1	McDonough	1	7.1	0.2	39.7
Boone	4	13.6	3.7	34.8	McHenry	33	20.7	14.2	29.0
Brown	2	67.8	8.2	244.9	McLean	20	19.4	11.8	29.9
Bureau	3	17.2	3.5	50.2	Macon	11	16.4	8.2	29.3
Calhoun	1	41.0	1.0	228.3	Macoupin	2	8.8	1.1	31.9
Carroll	0	0.0	0.0	51.7	Madison	15	9.8	5.5	16.2
Cass	1	11.8	0.3	65.5	Marion	4	16.3	4.4	41.6
Champaign	13	10.9	5.8	18.7	Marshall	1	15.8	0.4	87.9
Christian	3	17.8	3.7	51.9	Mason	0	0.0	0.0	54.6
Clark	0	0.0	0.0	40.7	Massac	1	12.6	0.3	70.0
Clay	7	90.9	36.6	187.3	Menard	3	49.3	10.2	144.0
Clinton	5	23.6	7.7	55.1	Mercer	2	27.2	3.3	98.4
Coles	8	31.5	13.6	62.1	Monroe	0	0.0	0.0	21.6
Cook	520	15.4	14.1	16.7	Montgomery	5	33.4	10.9	78.0
Crawford	0	0.0	0.0	34.9	Morgan	4	21.4	5.8	54.8
Cumberland	0	0.0	0.0	56.4	Moultrie	3	31.3	6.4	91.3
DeKalb	17	29.2	17.0	46.7	Ogle	3	11.4	2.3	33.2
DeWitt	2	23.3	2.8	84.2	Peoria	22	16.7	10.5	25.3
Douglas	3	22.7	4.7	66.5	Perry	2	18.6	2.3	67.1
DuPage	91	17.0	13.7	20.9	Piatt	2	22.2	2.7	80.4
Edgar	2	22.0	2.7	79.6	Pike	0	0.0	0.0	39.8
Edwards	0	0.0	0.0	96.6	Pope	0	0.0	0.0	267.3
Effingham	6	26.4	9.7	57.4	Pulaski	0	0.0	0.0	108.2
Fayette	1	8.0	0.2	44.8	Putnam	0	0.0	0.0	144.7
Ford	0	0.0	0.0	49.4	Randolph	3	17.6	3.6	51.5
Franklin	4	16.7	4.5	42.6	Richland	0	0.0	0.0	37.8
Fulton	1	5.8	0.1	32.4	Rock Island	6	6.6	2.4	14.4
Gallatin	0	0.0	0.0	129.4	St. Clair	23	13.8	8.7	20.7
Greene	2	30.3	3.7	109.3	Saline	0	0.0	0.0	23.0
Grundy	4	13.2	3.6	33.9	Sangamon	29	25.4	17.0	36.5
Hamilton	0	0.0	0.0	86.0	Schuyler	0	0.0	0.0	127.6
Hancock	1	10.4	0.3	57.8	Scott	0	0.0	0.0	153.1
Hardin	0	0.0	0.0	239.5	Shelby	2	16.1	2.0	58.3
Henderson	1	29.5	0.7	164.4	Stark	0	0.0	0.0	114.2
Henry	7	26.2	10.5	53.9	Stephenson	2	8.1	1.0	29.2
Iroquois	3	19.7	4.1	57.7	Tazewell	13	16.9	9.0	28.9
Jackson	11	31.9	15.9	57.1	Union	3	32.1	6.6	93.9
Jasper	0	0.0	0.0	65.6	Vermilion	7	13.7	5.5	28.3
Jefferson	1	4.0	0.1	22.3	Wabash	0	0.0	0.0	53.0
Jersey	5	47.3	15.4	110.5	Warren	2	18.3	2.2	66.2
JoDaviess	0	0.0	0.0	41.7	Washington	1	12.4	0.3	68.9
Johnson	2	37.5	4.5	135.5	Wayne	2	19.6	2.4	70.6
Kane	56	16.8	12.7	21.8	White	1	12.4	0.3	69.2
Kankakee	14	21.1	11.5	35.3	Whiteside	2	6.3	0.8	22.8
Kendall	14	17.5	9.5	29.3	Will	69	17.9	13.9	22.6
Knox	4	14.0	3.8	35.9	Williamson	7	17.8	7.1	36.6
Lake	69	17.8	13.9	22.6	Winnebago	28	15.5	10.3	22.5
LaSalle	10	16.4	7.9	30.2	Woodford	3	13.8	2.8	40.3
Lawrence	0	0.0	0.0	44.8					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

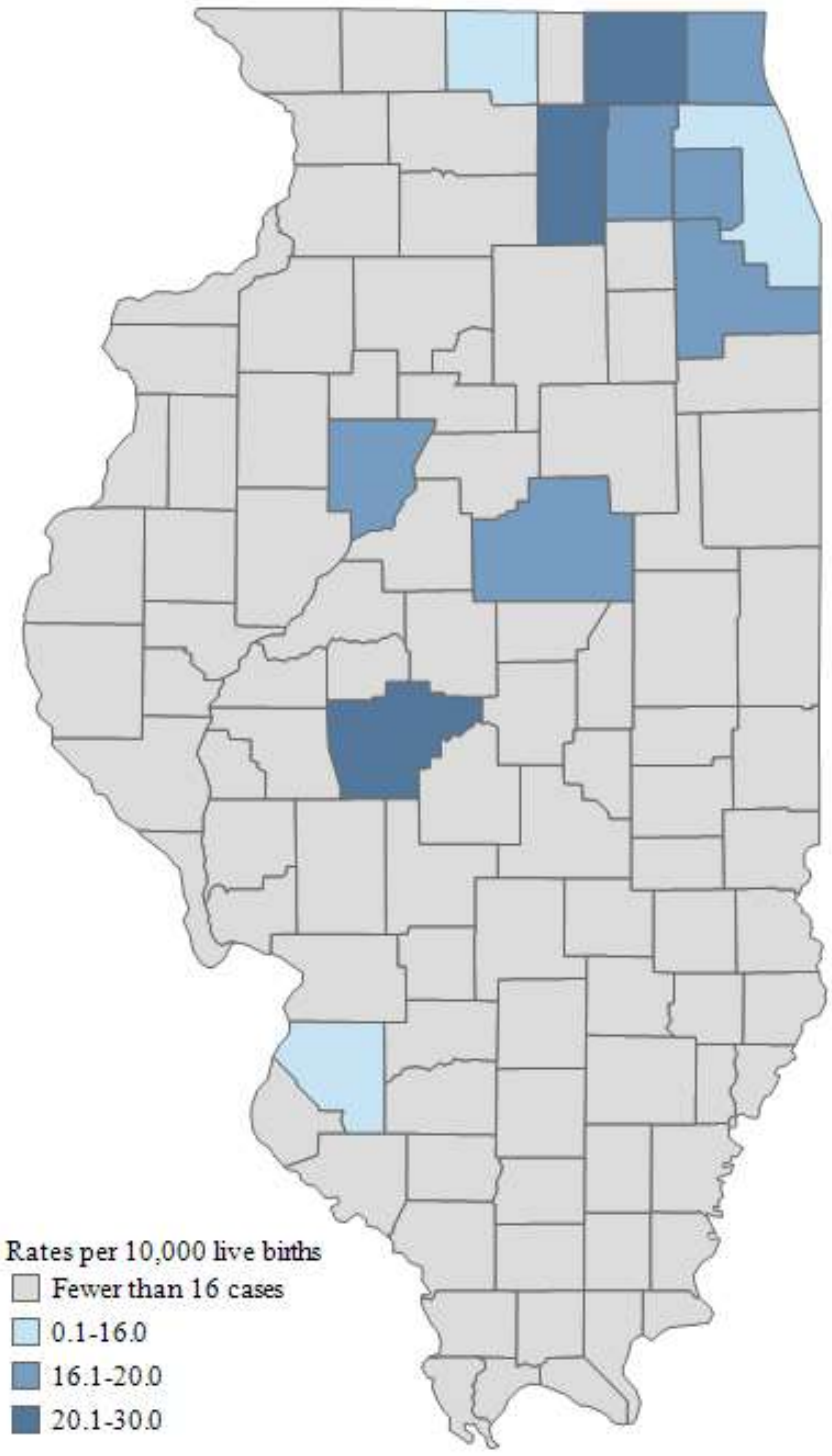
Source: Illinois Department Of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

Figure 19. Prevalence Rates[1] and 95% Confidence Intervals For Endocrine, Metabolic, or Immune Disorders in Newborn Infants by Selected Counties of Residence,[2] 2013-2017



[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, March 2020

Figure 20. Map of Prevalence Rates for Endocrine, Metabolic, or Immune Disorders in Newborn Infants by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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, 2013-2017

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Coagulation defects	D65-D68.9	52	0.7	(0.5, 0.9)
Constitutional aplastic anemia	D61.0-D61.9	7	0.1	(0.0, 0.2)
Hereditary hemolytic anemia	D58.0-D58.9, D550, D551, D559, D560-D563, D565, D568, D571, D5720, D5740, D5780	564	7.3	(6.7, 7.9)
Leukemia	C91-C95.92	5	0.1	(0.0, 0.2)

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

Table22. Total Number and Prevalence Rates of Blood Disorders in Newborn Infants by County of Residence, 2013-2017

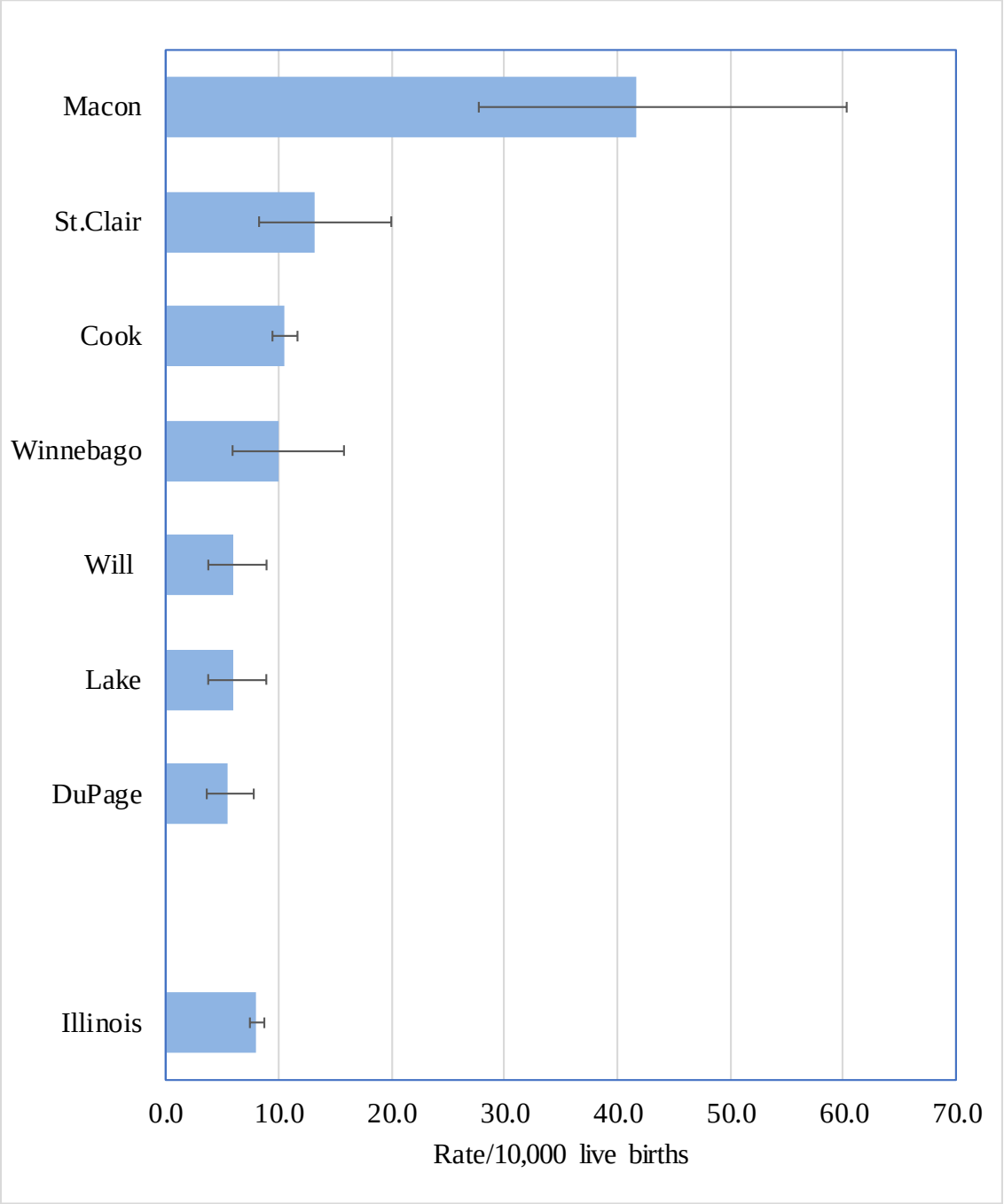
			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	628	8.1	7.5	8.7	Lee	2	11.5	1.4	41.4
Adams	1	2.4	0.1	13.3	Livingston	1	5.0	0.1	28.0
Alexander	0	0.0	0.0	82.3	Logan	0	0.0	0.0	24.1
Bond	0	0.0	0.0	48.1	McDonough	0	0.0	0.0	26.3
Boone	1	3.4	0.1	19.0	McHenry	3	1.9	0.4	5.5
Brown	0	0.0	0.0	125.0	McLean	6	5.8	2.1	12.7
Bureau	0	0.0	0.0	21.1	Macon	28	41.7	27.7	60.3
Calhoun	0	0.0	0.0	151.2	Macoupin	0	0.0	0.0	16.3
Carroll	0	0.0	0.0	51.7	Madison	5	3.3	1.1	7.7
Cass	3	35.3	7.3	103.1	Marion	1	4.1	0.1	22.7
Champaign	12	10.1	5.2	17.6	Marshall	0	0.0	0.0	58.2
Christian	0	0.0	0.0	21.9	Mason	0	0.0	0.0	54.6
Clark	0	0.0	0.0	40.7	Massac	1	12.6	0.3	70.0
Clay	0	0.0	0.0	47.9	Menard	0	0.0	0.0	60.6
Clinton	0	0.0	0.0	17.4	Mercer	0	0.0	0.0	50.3
Coles	0	0.0	0.0	14.5	Monroe	0	0.0	0.0	21.6
Cook	356	10.5	9.5	11.7	Montgomery	2	13.4	1.6	48.3
Crawford	1	9.5	0.2	52.7	Morgan	1	5.4	0.1	29.8
Cumberland	0	0.0	0.0	56.4	Moultrie	2	20.8	2.5	75.3
DeKalb	1	1.7	0.0	9.6	Ogle	0	0.0	0.0	14.0
DeWitt	3	35.0	7.2	102.2	Peoria	13	9.9	5.2	16.9
Douglas	0	0.0	0.0	28.0	Perry	0	0.0	0.0	34.3
DuPage	29	5.4	3.6	7.8	Piatt	1	11.1	0.3	62.0
Edgar	0	0.0	0.0	40.6	Pike	0	0.0	0.0	39.8
Edwards	0	0.0	0.0	96.6	Pope	0	0.0	0.0	267.3
Effingham	0	0.0	0.0	16.2	Pulaski	1	29.3	0.7	163.4
Fayette	0	0.0	0.0	29.7	Putnam	0	0.0	0.0	144.7
Ford	0	0.0	0.0	49.4	Randolph	0	0.0	0.0	21.7
Franklin	0	0.0	0.0	15.4	Richland	0	0.0	0.0	37.8
Fulton	1	5.8	0.1	32.4	Rock Island	12	13.3	6.9	23.2
Gallatin	0	0.0	0.0	129.4	St. Clair	22	13.2	8.3	20.0
Greene	0	0.0	0.0	55.8	Saline	1	6.2	0.2	34.7
Grundy	0	0.0	0.0	12.2	Sangamon	12	10.5	5.4	18.4
Hamilton	0	0.0	0.0	86.0	Schuyler	0	0.0	0.0	127.6
Hancock	1	10.4	0.3	57.8	Scott	0	0.0	0.0	153.1
Hardin	0	0.0	0.0	239.5	Shelby	0	0.0	0.0	29.7
Henderson	0	0.0	0.0	108.8	Stark	0	0.0	0.0	114.2
Henry	3	11.2	2.3	32.8	Stephenson	1	4.0	0.1	22.5
Iroquois	0	0.0	0.0	24.3	Tazewell	4	5.2	1.4	13.3
Jackson	4	11.6	3.2	29.7	Union	0	0.0	0.0	39.5
Jasper	0	0.0	0.0	65.6	Vermilion	7	13.7	5.5	28.3
Jefferson	0	0.0	0.0	14.8	Wabash	0	0.0	0.0	53.0
Jersey	0	0.0	0.0	34.9	Warren	0	0.0	0.0	33.8
JoDaviess	0	0.0	0.0	41.7	Washington	0	0.0	0.0	45.6
Johnson	0	0.0	0.0	69.2	Wayne	1	9.8	0.2	54.5
Kane	8	2.4	1.0	4.7	White	0	0.0	0.0	45.8
Kankakee	8	12.0	5.2	23.7	Whiteside	0	0.0	0.0	11.6
Kendall	1	1.2	0.0	6.9	Will	23	6.0	3.8	8.9
Knox	1	3.5	0.1	19.5	Williamson	1	2.5	0.1	14.1
Lake	23	5.9	3.8	8.9	Winnebago	18	10.0	5.9	15.8
LaSalle	2	3.3	0.4	11.9	Woodford	0	0.0	0.0	17.0
Lawrence	0	0.0	0.0	44.8					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

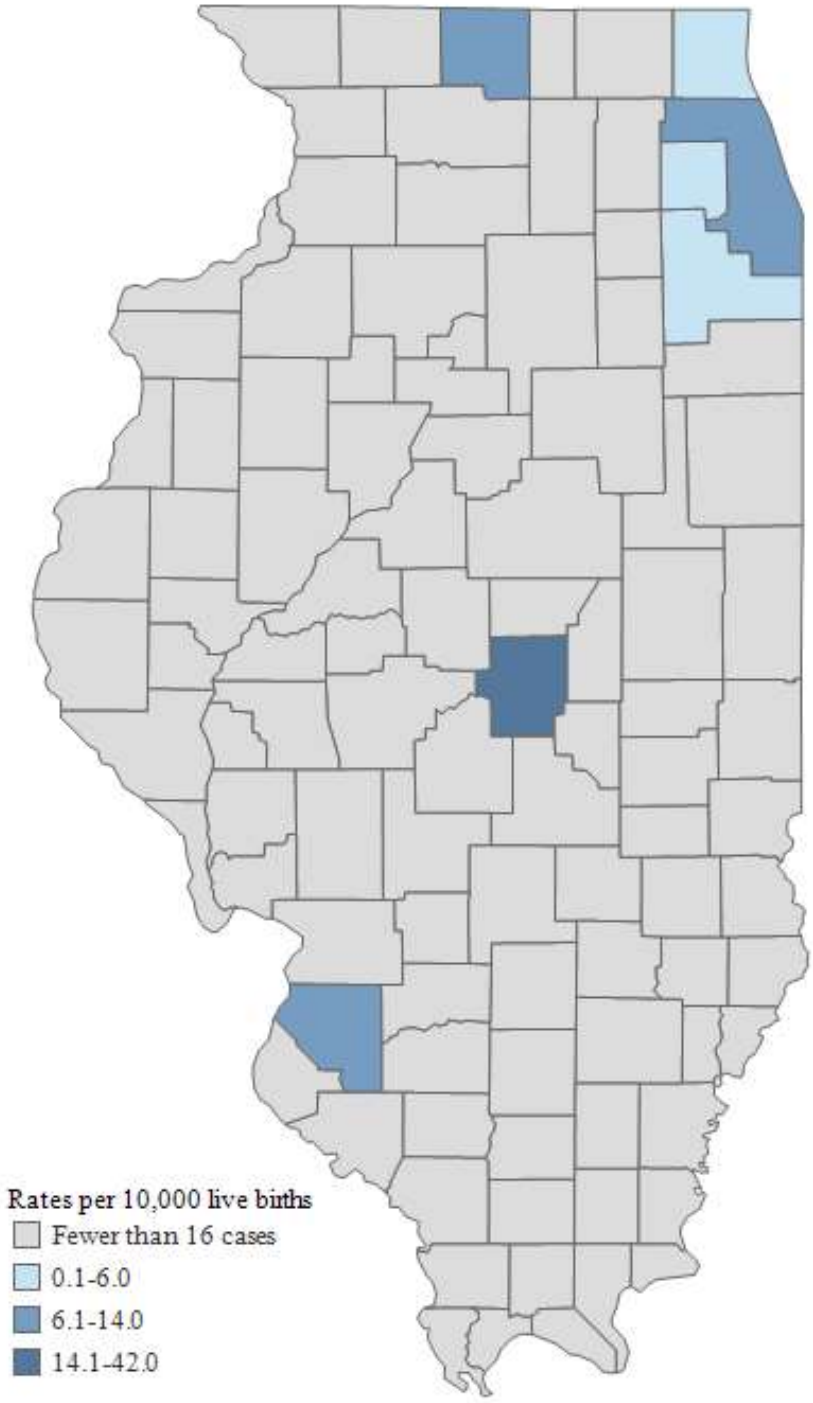
Source: Illinois Department Of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

Figure 21. Prevalence Rates[1] and 95% Confidence Intervals For Blood Disorders in Newborn Infants by Selected Counties of Residence,[2] 2013-2017



[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, March 2020

Figure 22. Map of Prevalence Rates for Blood Disorders in Newborn Infants by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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 is ingested by a pregnant woman, it easily passes across the placenta to the fetus and can adversely affect 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 one 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 depends 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 three or four 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, 2013-2017

Defect	ICD-10-CM Codes	Cases	Rate[1]	95% CI[2]
Bronchopulmonary dysplasia	P27.1	2,143	27.6	(26.4, 28.8)
Cerebral lipidoses	E75.4	0	0.0	(0.0, 0.0)
Endocardial fibroelastosis	I42.4	32	0.4	(0.3, 0.6)
Fetal alcohol syndrome	Q860	14	0.2	(0.1, 0.3)
Intrauterine growth restriction (IUGR)	P059	6,243	80.3	(78.3, 82.3)
Intraventricular hemorrhage (Grade III or IV)	P522.1-P52.22	690	8.9	(8.2, 9.6)
Neurofibromatosis	Q85.0-Q85.09	7	0.1	(0.0, 0.2)
Occlusion of cerebral arteries	I63.30-I63.9, I66.0-I66.9	186	2.4	(2.1, 2.8)
Retinopathy of prematurity	H35.1-H35.179	3,225	41.5	(40.1, 42.9)
Seizures	P90	1,212	15.6	(14.7, 16.5)
Strabismus	H50.0-H50.9	16	0.2	(0.1, 0.3)

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

Table 24. Total Number and Prevalence Rates of Other Adverse Pregnancy Outcomes in Newborn Infants by County of Residence, 2013-2017

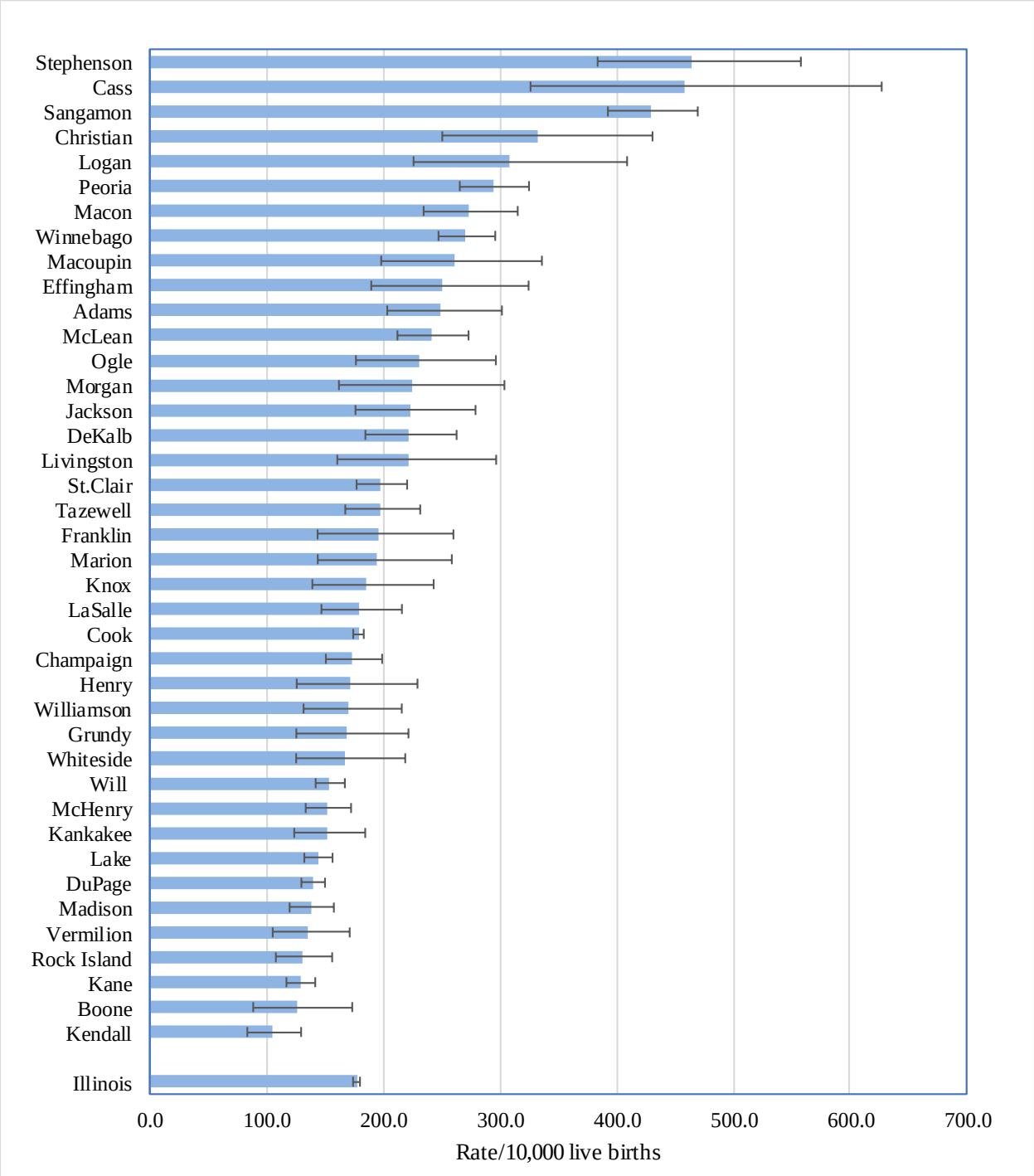
			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	13,768	177.1	174.2	180.1	Lee	28	160.4	106.6	231.8
Adams	104	249.0	203.5	301.8	Livingston	44	221.1	160.7	296.8
Alexander	0	0.0	0.0	82.3	Logan	47	307.6	226.0	409.0
Bond	12	156.5	80.8	273.3	McDonough	34	242.2	167.7	338.4
Boone	37	125.9	88.6	173.5	McHenry	243	152.1	133.6	172.5
Brown	4	135.6	36.9	347.2	McLean	249	241.2	212.2	273.1
Bureau	27	154.7	102.0	225.1	Macon	183	272.8	234.7	315.3
Calhoun	3	123.0	25.4	359.3	Macoupin	59	260.5	198.3	336.0
Carroll	18	252.5	149.6	399.0	Madison	210	137.8	119.8	157.7
Cass	39	458.8	326.3	627.2	Marion	48	195.2	143.9	258.8
Champaign	207	173.7	150.9	199.1	Marshall	11	173.5	86.6	310.4
Christian	56	331.8	250.6	430.8	Mason	15	221.9	124.2	366.0
Clark	4	44.2	12.0	113.0	Massac	5	62.8	20.4	146.6
Clay	10	129.9	62.3	238.8	Menard	20	328.4	200.6	507.2
Clinton	29	137.0	91.7	196.7	Mercer	7	95.4	38.3	196.5
Coles	24	94.6	60.6	140.7	Monroe	8	46.9	20.2	92.3
Cook	6,049	178.8	174.3	183.4	Montgomery	25	167.1	108.1	246.7
Crawford	3	28.4	5.9	82.9	Morgan	42	224.8	162.0	303.9
Cumberland	5	76.5	24.8	178.4	Moultrie	11	114.6	57.2	205.0
DeKalb	129	221.3	184.7	262.9	Ogle	61	230.9	176.6	296.6
DeWitt	13	151.5	80.7	259.1	Peoria	388	294.2	265.6	325.0
Douglas	13	98.6	52.5	168.5	Perry	19	176.6	106.3	275.8
DuPage	746	139.7	129.9	150.1	Piatt	9	100.1	45.8	190.0
Edgar	13	143.2	76.2	244.8	Pike	16	172.4	98.5	280.0
Edwards	0	0.0	0.0	96.6	Pope	2	144.9	17.6	523.5
Effingham	57	250.5	189.8	324.6	Pulaski	6	176.0	64.6	383.0
Fayette	18	144.7	85.8	228.7	Putnam	4	156.9	42.7	401.6
Ford	9	120.5	55.1	228.7	Randolph	17	99.8	58.2	159.8
Franklin	47	195.7	143.8	260.2	Richland	5	51.2	16.6	119.4
Fulton	31	180.4	122.6	256.1	Rock Island	118	130.5	108.0	156.3
Gallatin	1	35.1	0.9	195.5	St. Clair	330	198.0	177.2	220.5
Greene	8	121.0	52.3	238.5	Saline	21	130.8	80.9	199.9
Grundy	51	168.6	125.5	221.7	Sangamon	490	429.8	392.6	469.6
Hamilton	4	93.2	25.4	238.7	Schuyler	9	311.4	142.4	591.2
Hancock	10	103.7	49.7	190.8	Scott	7	290.5	116.8	598.5
Hardin	2	129.9	15.7	469.1	Shelby	13	104.8	55.8	179.3
Henderson	5	147.5	47.9	344.2	Stark	4	123.8	33.7	317.1
Henry	46	172.0	125.9	229.4	Stephenson	115	464.8	383.8	558.0
Iroquois	30	197.4	133.2	281.8	Tazewell	152	197.7	167.5	231.7
Jackson	77	223.3	176.2	279.1	Union	11	117.8	58.8	210.7
Jasper	6	106.8	39.2	232.4	Vermilion	69	135.3	105.3	171.3
Jefferson	30	120.3	81.2	171.8	Wabash	0	0.0	0.0	53.0
Jersey	14	132.6	72.5	222.4	Warren	17	155.7	90.7	249.3
JoDaviess	12	135.7	70.1	237.1	Washington	8	98.9	42.7	194.8
Johnson	5	93.8	30.5	218.9	Wayne	5	48.9	15.9	114.1
Kane	430	129.0	117.1	141.8	White	5	62.1	20.2	144.9
Kankakee	101	151.9	123.7	184.6	Whiteside	53	167.4	125.4	218.9
Kendall	84	104.7	83.5	129.7	Will	596	154.3	142.1	167.2
Knox	53	186.0	139.3	243.2	Williamson	67	170.0	131.8	215.9
Lake	558	144.1	132.4	156.6	Winnebago	488	270.9	247.4	296.0
LaSalle	109	179.1	147.1	216.0	Woodford	26	119.5	78.1	175.2
Lawrence	5	60.7	19.7	141.6					

[1] Per 10,000 live births

[2] 95% confidence interval for rate

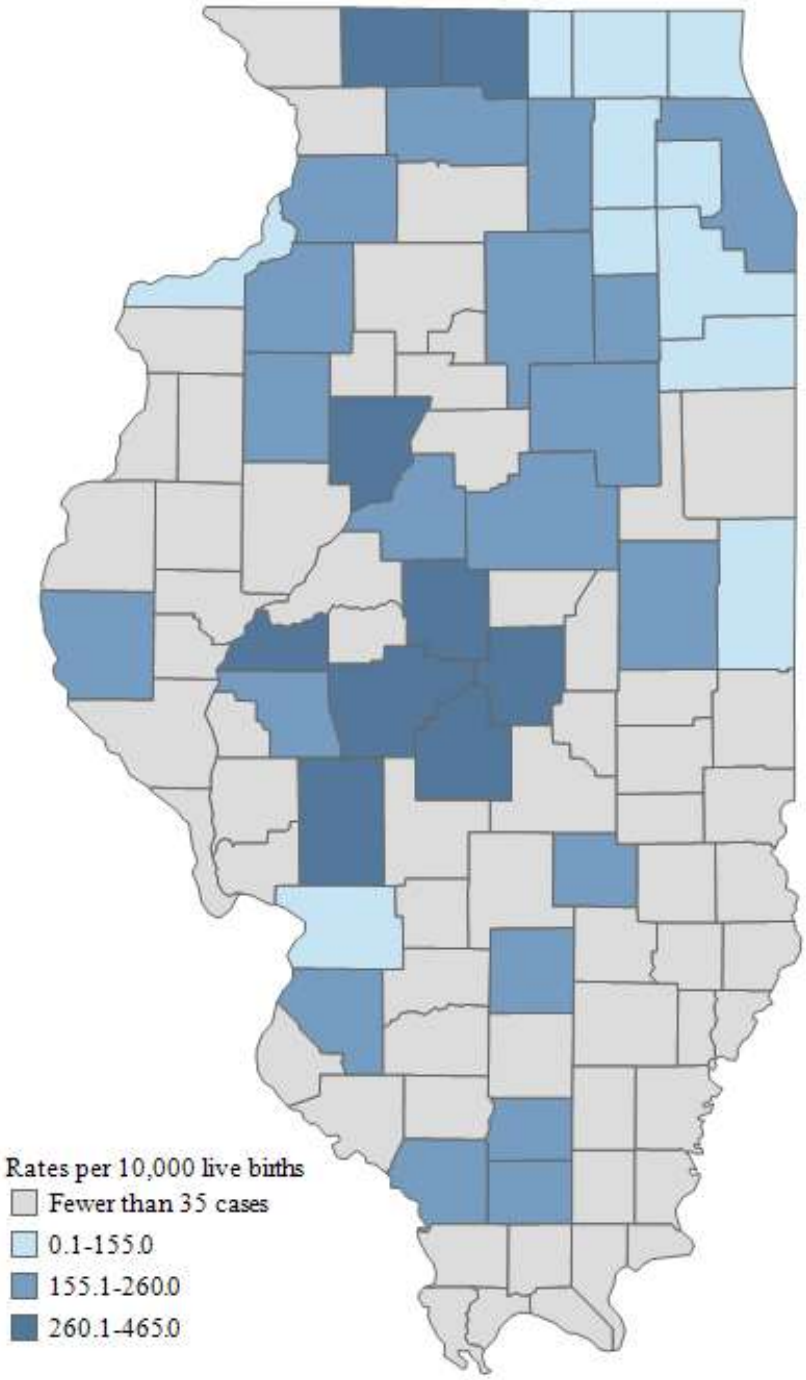
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

Figure 23. Prevalence Rates[1] and 95% Confidence Intervals for Other Adverse Pregnancy Outcomes in Newborn Infants by Selected Counties of Residence,[2] 2013-2017



[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, March 2020

Figure 24. Map of Prevalence Rates for Newborn Infants with Other Adverse Pregnancy Outcomes, by Selected Counties of Residence, 2013-2017



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, March 2020

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