BIRTH DEFECTS AND OTHER ADVERSE PREGNANCY OUTCOMES IN ILLINOIS 2008-2012

A REPORT ON COUNTY-SPECIFIC PREVALENCE

Illinois Department of Public Health
Division of Epidemiologic Studies

June 2019

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:

Jodi Snow, APORS Abstractor Liaison

Latina Iverson-Simmons, APORS Field Abstractor

Lisa Lingleo, APORS Field Abstractor

Angela Butler, APORS Field Abstractor

Julie Rowden, APORS Coder/Editor

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 2008-2012. Epidemiologic Report Series 19:03 Springfield, Ill.: Illinois Department of Public Health, June 2019.

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INTRODUCTION

The Illinois Department of Public Health (IDPH) records adverse pregnancy outcomes in infants with congenital anomalies (birth defects) and other serious neonatal conditions (listed in Table 1). Each year IDPH's Adverse Pregnancy Outcomes Reporting System (APORS), Division of Epidemiologic Studies, obtains information on thousands of such births throughout the state. Information about congenital anomalies and other adverse pregnancy outcomes identified in newborn infants was first collected statewide by APORS in 1989. Table 1 shows the number of cases and rates of different neonatal conditions included in APORS case definition between 2008 and 2012. 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.

Table 1. Frequency of Reported Infants Meeting APORS Case Criteria, 2008-2012

Infants	5-Year Total	Annual Average	Rate[1]	% APORS Cases
Total APORS Cases	62,122	12,424.4	745.7	100.0
Birth Defects	40,798	8,159.6	477.1	65.7
Very Low Birth Weight	16,256	3,251.2	195.1	26.2
Positive for Controlled Substances	9,549	1,909.8	114.6	15.4
Fetal Deaths	4,875	975.0	58.5	7.8
Died During Newborn Hospitalization	3,492	698.4	41.9	5.6
Intrauterine Growth Restriction	4,424	884.8	53.1	7.1
Congenital Infections	3,259	651.8	39.1	5.2
Retinopathy of Prematurity	2,473	494.6	29.7	4.0
Endocrine, Metabolic or Immune Disorder	921	184.2	11.1	1.5
Blood Disorder	652	130.4	7.8	1.0
Infant Exposed to Alcohol	128	25.6	1.5	0.2

[1] Rate per 10,000 live births

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Information about adverse pregnancy outcomes is collected for two major reasons. First, infants with a congenital anomaly or other problem often need special services to help assure that 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.

APORS is the most complete source of data on adverse pregnancy outcomes that exists in Illinois. All Illinois hospitals are mandated to report infants with adverse pregnancy outcomes born to Illinois women. (Perinatal centers in St. Louis also participate.) Prior to 2002, APORS

was considered a passive surveillance system, because it relied primarily on reports sent from hospitals, rather than having abstraction staff going to hospitals to identify cases. Passive systems, while relatively easy to operate, are generally thought to underestimate birth defect rates. Because of this, APORS has taken steps over the years to incorporate elements more characteristic of an active system of surveillance. Active systems utilize abstraction staff to review data from multiple sources on an ongoing basis to identify and verify birth defects (Centers for Disease Control and Prevention, [CDC], 2018). While resource intensive, this practice is generally recognized as improving case identification and quality.

In 2002, APORS began systematic active case verification whereby APORS staff review charts for infants reported with certain conditions that are likely to be associated with one or more birth defects. These conditions include: death before discharge, exposure to alcohol, a diabetic mother, a disturbance in neonatal tooth eruption, or one or more birth defects. As the charts are reviewed, APORS staff correct and add to information reported by hospitals.

Birth certificates (maintained by the IDPH's Division of Vital Records) are an additional data source, allowing APORS to identify infants with very low birth weights or with certain birth defects who were unreported by the hospitals. The Division of Vital Records also provides information about fetal deaths from the death certificates.

APORS staff believes that the prevalence of infants prenatally exposed to controlled substances is subject to testing bias (Fornoff *et al.*) It is important that these infants and their families receive follow-up services, so prenatal drug exposure is still part of APORS case definition. However, since the results are not representative of Illinois newborns, further data is not presented.

This report includes two sections. The first describes the county-specific prevalence rates of six groups of major birth defects. In addition, a listing of the International Classification of Diseases – Ninth Revision Clinical Modification (ICD-9-CM) 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, including most of 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 (Armitage and Berry, page 134) as

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

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

Where there are many birth defect cases, the confidence interval is narrow, indicating that the rate is stable. Where there are few birth defect cases, the confidence interval becomes very wide, indicating that 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 that 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 that 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 2012, birth defects were responsible for 20.9% of infant deaths in the U.S. (Heron M). In Illinois, birth defects were responsible for 15.8% of infant deaths in 2012, ranking as the second leading cause of these deaths (Illinois Department of Public Health [IDPH], 2019).

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 CDC (CDC, 2019) Specific steps she can take include:

- Adopt a healthy active lifestyle
- Avoid harmful substances (alcohol, smoking, marijuana, illicit drugs)
- Get enough folic acid daily
- See a health care provider prior to pregnancy to discuss health conditions, medications, diet, and how to prevent infections
- Begin 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 very specialized care and technology.

Between 2008 and 2012, more than 15,000 major birth defects were identified in Illinois newborns at a rate of 189.9 per 10,000 live births. Heart and circulatory system defects were the most commonly identified major defect in Illinois, accounting for 45.9% of the six major 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 hydrocephalus. 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 which 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 and size of the lesion as well as whether other anomalies are present.

Hydrocephalus is an abnormal buildup of cerebrospinal fluid in the brain causing a widening of the ventricle spaces and creating pressure on the brain. This condition can occur alone or in conjunction with other malformations and may cause a variety of symptoms including a large head, seizures, vomiting, headaches, visual problems, and abnormal reflexes. It is often treated surgically by shunting the fluid out of the brain to be reabsorbed by the body (National Institutes of Health [NIH], 01/29/2019).

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 Newborn Infants, Illinois, 2008-2012

Defect	ICD-9-CM Codes	Number	Rate[1]	95% CI[2]
Anencephalus	740.0-740.1	115	1.4	(1.1, 1.7)
Spina bifida[3]	741.00-741.93	240	2.9	(2.5, 3.3)
Encephalocele	742.0	56	0.7	(0.5, 0.9)
Microcephalus	742.1	440	5.3	(4.8, 5.8)
Hydrocephalus[4]	742.3	597	7.2	(6.6, 7.8)

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

[3] Includes only spina bifida without anencephaly

[4] Includes only hydrocephaly without spina bifida or anencephaly.

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Table 3. Total Number and Prevalence Rates of Major Central Nervous System Defects in Newborn Infants by County of Residence, 2008-2012

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	1,448	17.4	16.5	18.3	Lee	0	0.0	0.0	20.0
Adams	10	24.7	11.9	45.5	Livingston	2	8.5	1.0	30.7
Alexander	1	18.3	0.5	102.2	Logan	4	26.1	7.1	66.9
Bond	0	0.0	0.0	42.1	McDonough	7	47.5	19.1	97.8
Boone	6	19.4	7.1	42.3	McHenry	24	13.7	8.8	20.3
Brown	0	0.0	0.0	133.7	McLean	24	22.5	14.4	33.5
Bureau	7	39.2	15.8	80.8	Macon	15	21.5	12.0	35.4
Calhoun	0	0.0	0.0	139.2	Macoupin	1	4.1	0.1	23.0
Carroll	1	14.3	0.4	79.8	Madison	18	11.1	6.6	17.5
Cass	1	10.9	0.3	60.8	Marion	6	23.7	8.7	51.6
Champaign	23	19.2	12.1	28.7	Marshall	1	16.3	0.4	91.0
Christian	4	21.1	5.7	54.0	Mason	3	41.4	8.5	120.9
Clark	1	10.4	0.3	57.7	Massac	0	0.0	0.0	41.5
Clay	1	11.8	0.3	65.8	Menard	0	0.0	0.0	58.3
Clinton	1	4.8	0.1	27.0	Mercer	2	25.2	3.0	90.9
Coles	3	11.2	2.3	32.8	Monroe	0	0.0	0.0	21.9
Cook	708	19.2	17.9	20.7	Montgomery	5	32.3	10.5	75.3
Crawford	0	0.0	0.0	35.9	Morgan	6	31.9	11.7	69.5
Cumberland	0	0.0	0.0	61.0	Moultrie	3	34.6	7.1	101.0
DeKalb	5	8.0	2.6	18.6	Ogle	4	14.3	3.9	36.6
DeWitt	2	21.3	2.6	76.9	Peoria	48	35.8	26.4	47.4
Douglas	5	37.2	12.1	86.8	Perry	0	0.0	0.0	35.3
DuPage	93	17.2	13.8	21.0	Piatt	3	35.6	7.3	104.1
Edgar	2	20.8	2.5	75.2	Pike	1	11.0	0.3	61.1
Edwards	0	0.0	0.0	103.3	Pope	0	0.0	0.0	238.0
Effingham	1	4.5	0.1	24.8	Pulaski	0	0.0	0.0	112.8
Fayette	2	16.4	2.0	59.1	Putnam	0	0.0	0.0	140.3
Ford	3	40.9	8.4	119.6	Randolph	0	0.0	0.0	20.6
Franklin	2	8.6	1.0	31.0	Richland	1	10.2	0.3	56.9
Fulton	2	10.9	1.3	39.5	Rock Island	17	17.6	10.2	28.1
Gallatin	0	0.0	0.0	129.9	St. Clair	17	9.5	5.5	15.2
Greene	4	52.2	14.2	133.7	Saline	2	12.9	1.6	46.7
Grundy	2	6.0	0.7	21.8	Sangamon	10	8.2	4.0	15.2
Hamilton	0	0.0	0.0	78.2	Schuyler	0	0.0	0.0	100.2
Hancock	1	10.1	0.3	56.5	Scott	2	73.8	8.9	266.6
Hardin	1	48.5	1.2	270.5	Shelby	1	8.8	0.2	48.9
Henderson	0	0.0	0.0	123.4	Stark	1	35.1	0.9	195.5
Henry	6	21.8	8.0	47.6	Stephenson	4	15.8	4.3	40.4
Iroquois	0	0.0	0.0	23.7	Tazewell	22	26.8	16.8	40.6
Jackson	2	5.9	0.7	21.3	Union	0	0.0	0.0	39.0
Jasper	0	0.0	0.0	65.3	Vermillion	12	22.1	11.4	38.7
Jefferson	4	16.6	4.5	42.4	Wabash	0	0.0	0.0	49.8
Jersey	2	17.5	2.1	63.4	Warren	2	19.6	2.4	70.7
Jo Daviess	1	10.0	0.3	55.5	Washington	1	13.8	0.3	76.6
Johnson	1	17.0	0.4	94.9	Wayne	2	19.5	2.4	70.3
Kane	69	18.7	14.5	23.6	White	0	0.0	0.0	42.5
Kankakee	10	13.9	6.7	25.6	Whiteside	2	6.0	0.7	21.6
Kendall	15	16.6	9.3	27.4	Will	68	15.7	12.2	19.9
Knox	10	37.4	17.9	68.7	Williamson	2	5.2	0.6	18.9
Lake	48	11.2	8.2	14.8	Winnebago	29	15.2	10.2	21.8
LaSalle	11	17.6	8.8	31.5	Woodford	6	26.4	9.7	57.5
Lawrence	0	0.0	0.0	43.7					

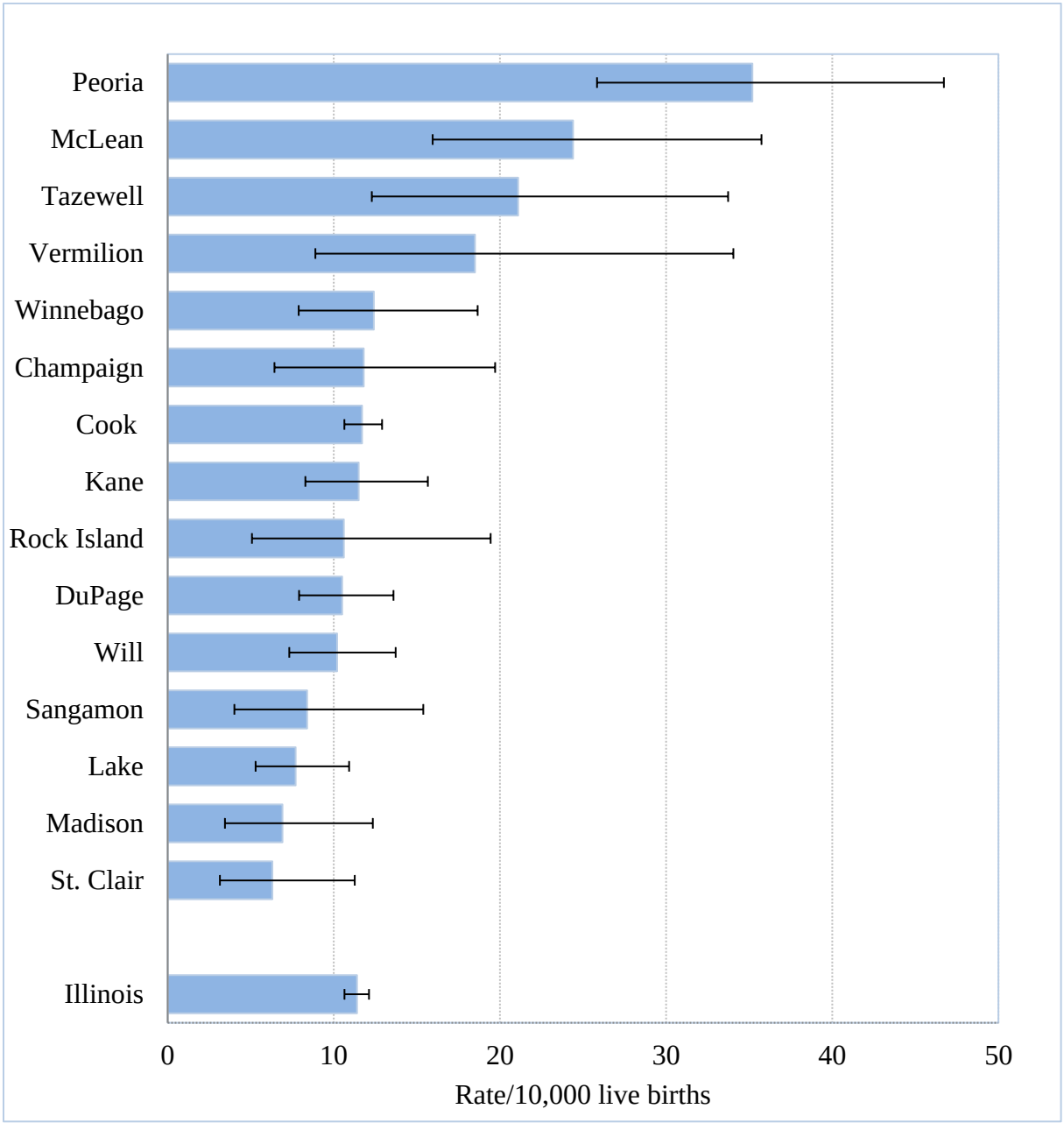
[1] Per 10,000 live births

[2] 95 % confidence interval for rate

The number for Illinois includes one case for which county of residence is missing

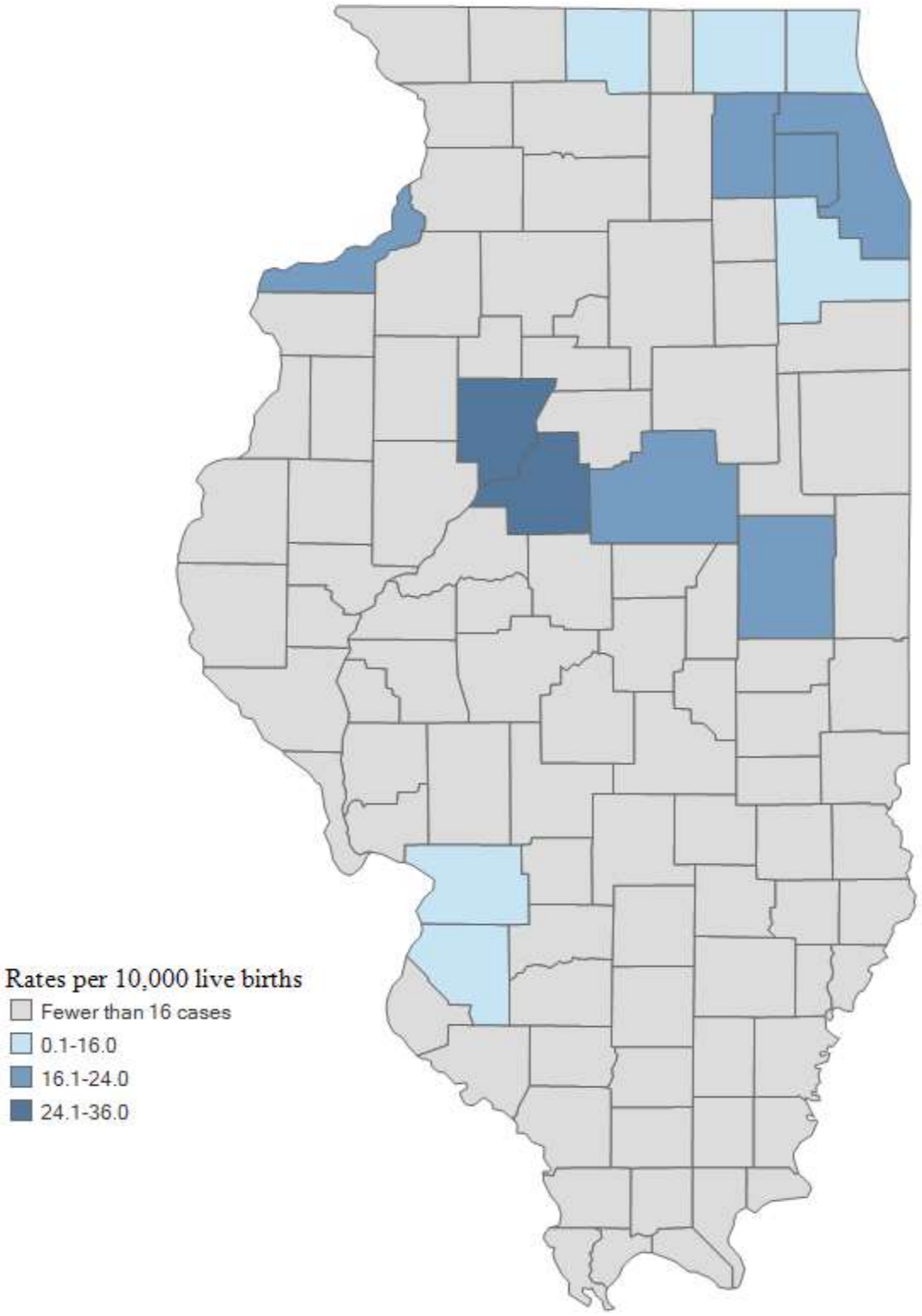
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 1. Prevalence Rates[1] and 95% Confidence Intervals for Major Central Nervous System Defects in Newborn Infants by Selected Counties of Residence,[2] 2008-2012



[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, January 2019

Figure 2. Map of Prevalence Rates for Major Central Nervous System Defects in Newborn Infants by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

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 87.2 identified cases per 10,000 live births in Illinois during the period of 2008-2012.

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 that 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 people 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.

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.

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.

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

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.

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.

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.

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

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

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

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. This condition is usually fatal in the first month of life if not treated.

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.

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

Table 4. Total Number and Prevalence Rates of Major Cardiovascular System Defects in Newborn Infants, Illinois, 2008 – 2012

Defect	ICD-9-CM Codes	Cases	Rate[1]	95% CI[2]
Common truncus	745.0	47	0.6	(0.4, 0.8)
Transposition of great arteries	745.1x	197	2.4	(2.0, 2.7)
Tetralogy of Fallot	745.2	264	3.2	(2.8, 3.6)
Ventricular septal defect	745.4	3,359	40.3	(39.0, 41.7)
Atrial septal defect	745.5	2,056	24.7	(23.6, 25.8)
Endocardial cushion defect	745.6x	405	4.9	(4.4, 5.4)
Pulmonary valve atresia/stenosis	746.01, 746.02	226	2.7	(2.4, 3.1)
Tricuspid valve atresia/stenosis	746.0	70	0.8	(0.7, 1.1)
Ebstein anomaly	746.2	46	0.6	(0.4, 0.7)
Aortic valve stenosis	746.3	100	1.2	(1.0, 1.5)
Hypoplastic left heart syndrome	746.7	167	2.0	(1.7, 2.3)
Coarctation of aorta	747.10	264	3.2	(2.8, 3.6)
Total anomalous pulmonary venous return (TAPVR)	747.41	60	0.7	(0.5, 0.9)

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

Table 5. Total Number and Prevalence Rates of Major Cardiovascular System Defects in Newborn Infants by County of Residence, 2008-2012

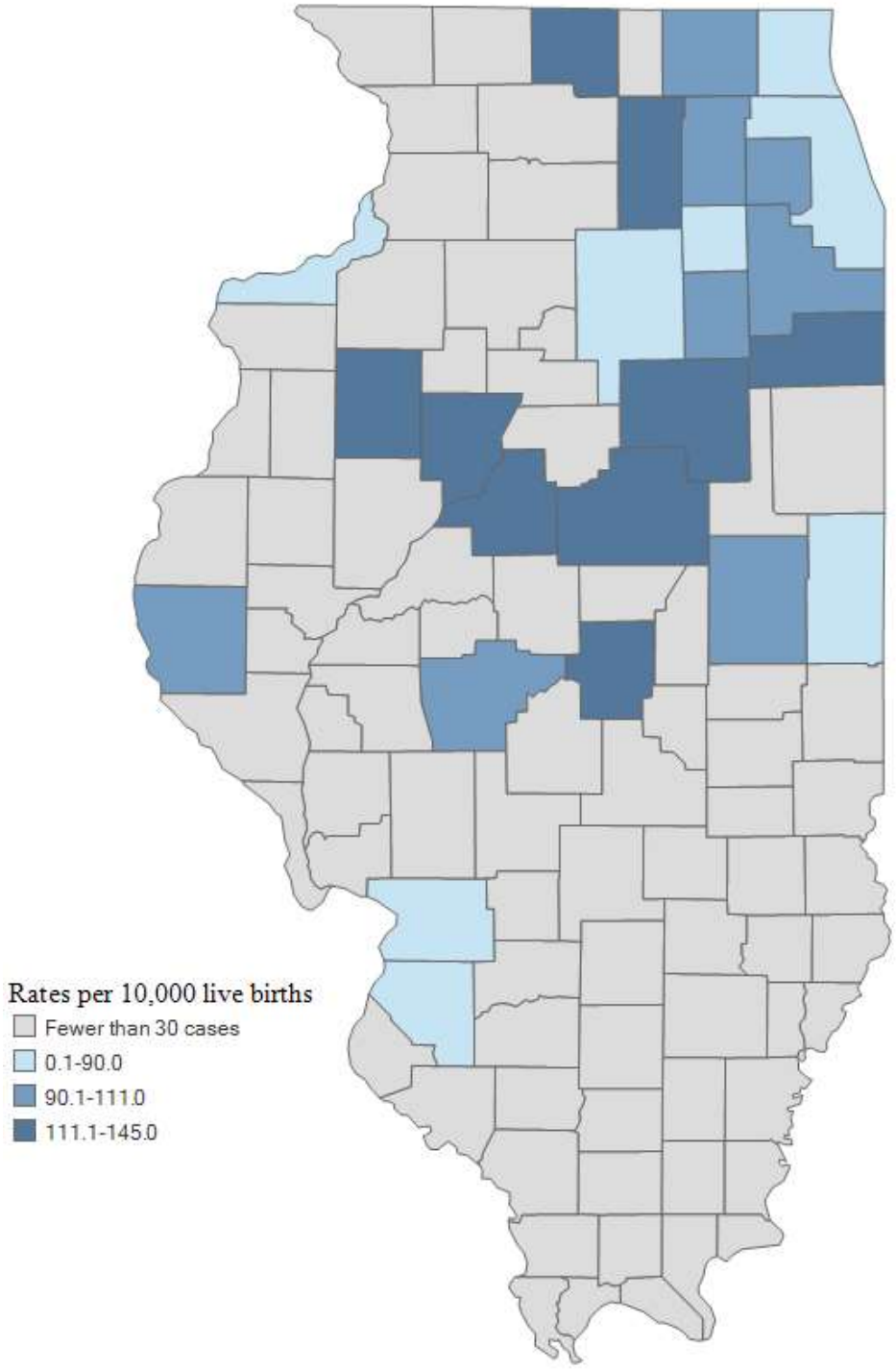
			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	7,261	87.2	85.2	89.2	Lee	7	37.9	15.2	78.0
Adams	38	94.0	66.5	129.0	Livingston	34	144.5	100.1	201.9
Alexander	2	36.7	4.4	132.6	Logan	11	71.8	35.9	128.6
Bond	4	45.7	12.4	116.9	McDonough	25	169.5	109.7	250.2
Boone	29	94.0	63.0	135.0	McHenry	164	93.3	79.6	108.8
Brown	1	36.2	0.9	201.9	McLean	127	119.0	99.2	141.6
Bureau	18	100.8	59.8	159.4	Macon	85	121.8	97.3	150.6
Calhoun	0	0.0	0.0	139.2	Macoupin	15	61.9	34.6	102.1
Carroll	7	100.3	40.3	206.6	Madison	43	26.4	19.1	35.6
Cass	8	87.3	37.7	172.1	Marion	27	106.8	70.4	155.3
Champaign	129	107.4	89.7	127.6	Marshall	9	147.1	67.2	279.2
Christian	25	131.9	85.3	194.6	Mason	4	55.2	15.0	141.3
Clark	0	0.0	0.0	38.2	Massac	0	0.0	0.0	41.5
Clay	3	35.4	7.3	103.5	Menard	6	94.8	34.8	206.3
Clinton	7	33.9	13.6	69.8	Mercer	3	37.7	7.8	110.3
Coles	17	63.6	37.0	101.8	Monroe	1	5.9	0.2	33.1
Cook	3271	88.9	85.9	92.0	Montgomery	12	77.5	40.0	135.3
Crawford	4	38.9	10.6	99.7	Morgan	15	79.9	44.7	131.7
Cumberland	1	16.5	0.4	92.1	Moultrie	4	46.1	12.6	118.0
DeKalb	70	111.3	86.8	140.7	Ogle	29	103.6	69.4	148.9
DeWitt	9	95.7	43.8	181.8	Peoria	184	137.2	118.1	158.5
Douglas	8	59.5	25.7	117.3	Perry	2	19.1	2.3	69.1
DuPage	537	99.0	90.8	107.8	Piatt	9	106.9	48.9	202.9
Edgar	2	20.8	2.5	75.2	Pike	6	65.8	24.1	143.2
Edwards	0	0.0	0.0	103.3	Pope	0	0.0	0.0	238.0
Effingham	14	62.3	34.1	104.6	Pulaski	0	0.0	0.0	112.8
Fayette	9	73.6	33.6	139.7	Putnam	4	152.1	41.4	389.4
Ford	6	81.9	30.0	178.2	Randolph	4	22.4	6.1	57.3
Franklin	3	12.9	2.7	37.6	Richland	0	0.0	0.0	37.6
Fulton	14	76.6	41.9	128.5	Rock Island	53	54.8	41.0	71.6
Gallatin	2	70.4	8.5	254.4	St. Clair	60	33.4	25.5	43.0
Greene	5	65.3	21.2	152.3	Saline	5	32.3	10.5	75.4
Grundy	36	108.6	76.0	150.3	Sangamon	119	98.2	81.3	117.5
Hamilton	3	63.6	13.1	185.7	Schuyler	2	54.3	6.6	196.3
Hancock	10	101.3	48.6	186.3	Scott	4	147.6	40.2	377.9
Hardin	0	0.0	0.0	179.1	Shelby	7	61.4	24.7	126.5
Henderson	3	100.3	20.7	293.2	Stark	7	245.6	98.7	506.1
Henry	11	40.1	20.0	71.7	Stephenson	14	55.2	30.2	92.6
Iroquois	9	57.8	26.4	109.7	Tazewell	111	135.2	111.2	162.8
Jackson	9	26.5	12.1	50.4	Union	1	10.6	0.3	58.8
Jasper	3	53.1	10.9	155.2	Vermillion	44	81.1	59.0	108.9
Jefferson	11	45.6	22.8	81.6	Wabash	1	13.5	0.3	75.2
Jersey	6	52.6	19.3	114.6	Warren	13	127.2	67.7	217.5
Jo Daviess	4	39.9	10.9	102.1	Washington	2	27.5	3.3	99.4
Johnson	2	34.1	4.1	123.1	Wayne	5	48.7	15.8	113.6
Kane	374	101.2	91.2	112.0	White	1	11.5	0.3	64.3
Kankakee	85	118.5	94.6	146.5	Whiteside	27	80.7	53.2	117.4
Kendall	59	65.4	49.8	84.4	Will	420	97.0	87.9	106.7
Knox	35	130.8	91.1	181.9	Williamson	7	18.3	7.4	37.7
Lake	343	79.8	71.6	88.7	Winnebago	213	111.4	96.9	127.4
LaSalle	47	75.2	55.2	100.0	Woodford	21	92.4	57.2	141.2
Lawrence	1	11.8	0.3	65.9					

[1] Per 10,000 live births

[2] 95 % confidence interval for rate

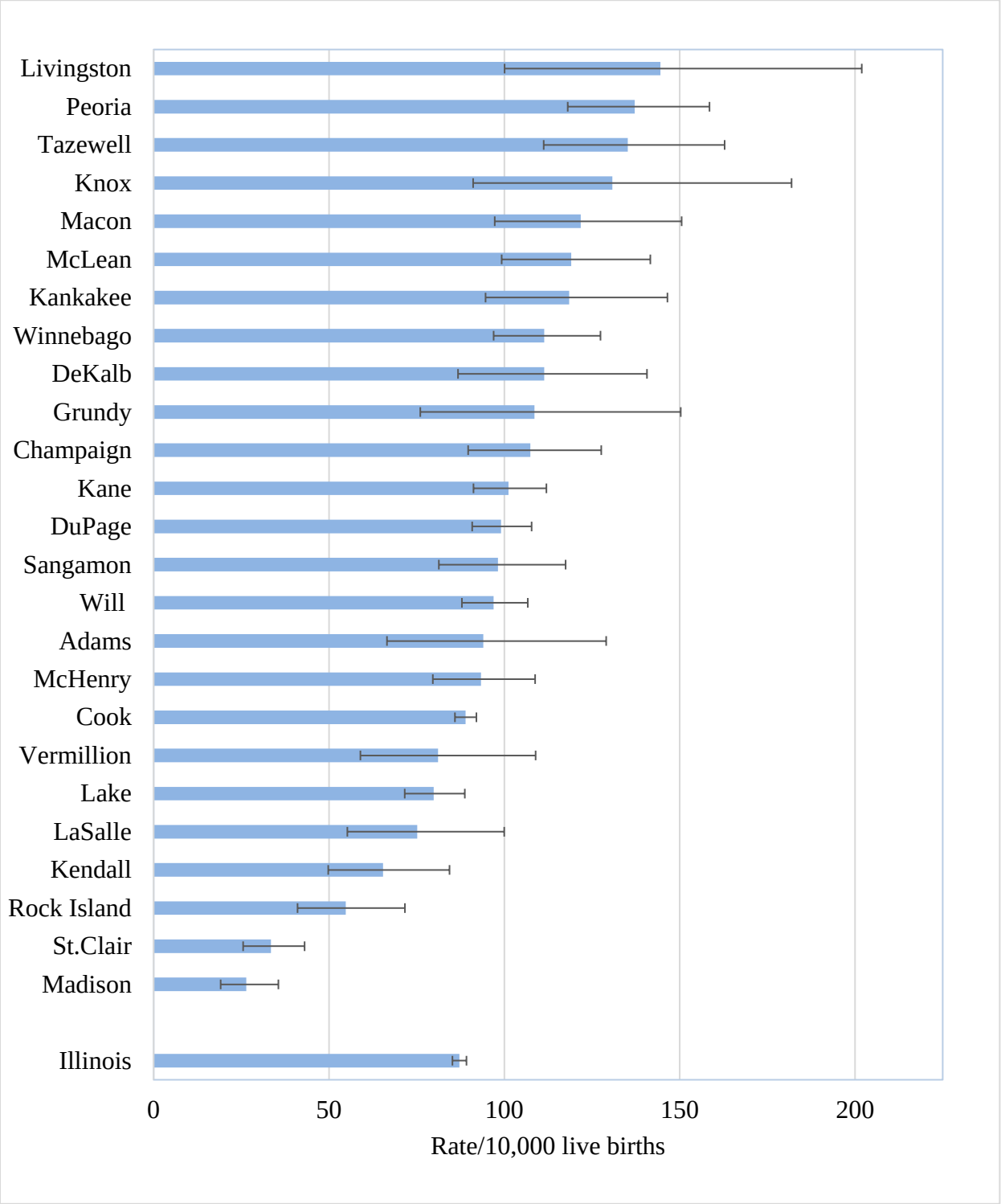
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 3. Map of Prevalence Rates for Major Cardiovascular System Defects in Newborn Infants by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 4.
Prevalence Rates[1] and 95% Confidence Intervals for Major Cardiovascular System Defects in Newborn Infants by Selected Counties of Residence,[2] 2008-2012



[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, January 2019

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.

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.

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.

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

Esophageal atresia is a defect of the esophagus in which there are two separate sections that do not connect. It often occurs with a *tracheosophageal 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.

Pyloric Stenosis is a narrowing of the opening (pylorus) between the stomach and small intestine.

Hirschsprung disease is the absence of nerves in the large intestine (bowel).

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

Table 6. Total Number and Prevalence Rates of Major Alimentary Tract Defects in Newborn Infants, Illinois, 2008-2012

Defect	ICD-9-CM Codes	Cases	Rate[1]	95% CI[2]
Cleft palate alone	749.0x	417	5.0	(4.5, 5.5)
Cleft lip (with or without cleft palate)	749.10-749.25	656	7.9	(7.3, 8.5)
Choanal atresia	748.0	85	1.0	(0.8, 1.3)
Esophageal atresia/ tracheosophageal fistula	750.3	183	2.2	(1.9, 2.5)
Rectal, anal, large intestinal atresia/stenosis	751.2	291	3.5	(3.1, 3.9)
Pyloric stenosis	750.5	51	0.6	(0.5, 0.8)
Hirschsprung disease	751.3	68	0.8	(0.6,1.0)
Biliary atresia	751.61	12	0.1	(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, January 2019

Table 7. Total Number and Prevalence Rates of Major Alimentary Tract Defects in Newborn Infants by County of Residence, 2008-2012

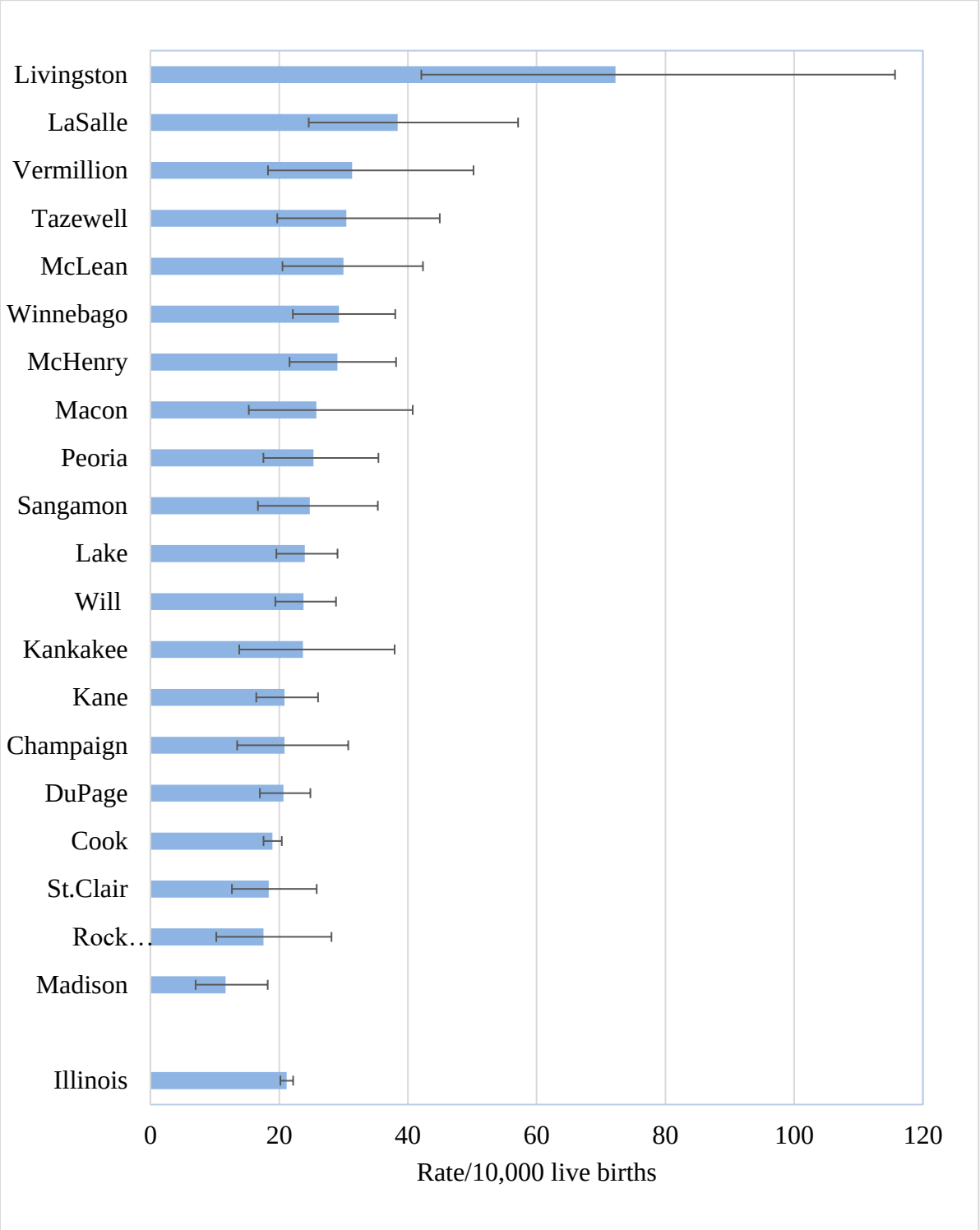
			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	1,763	21.2	20.2	22.2	Lee	7	37.9	15.2	78.0
Adams	8	19.8	8.5	39.0	Livingston	17	72.2	42.1	115.7
Alexander	1	18.3	0.5	102.2	Logan	7	45.7	18.4	94.2
Bond	1	11.4	0.3	63.6	McDonough	4	27.1	7.4	69.4
Boone	13	42.1	22.4	72.1	McHenry	51	29.0	21.6	38.2
Brown	2	72.5	8.8	261.8	McLean	32	30.0	20.5	42.3
Bureau	3	16.8	3.5	49.1	Macon	18	25.8	15.3	40.8
Calhoun	1	37.7	1.0	210.3	Macoupin	5	20.6	6.7	48.1
Carroll	5	71.6	23.3	167.2	Madison	19	11.7	7.0	18.2
Cass	2	21.8	2.6	78.9	Marion	4	15.8	4.3	40.5
Champaign	25	20.8	13.5	30.7	Marshall	2	32.7	4.0	118.1
Christian	6	31.6	11.6	68.9	Mason	1	13.8	0.3	76.9
Clark	1	10.4	0.3	57.7	Massac	3	33.8	7.0	98.7
Clay	2	23.6	2.9	85.3	Menard	0	0.0	0.0	58.3
Clinton	2	9.7	1.2	35.0	Mercer	3	37.7	7.8	110.3
Coles	7	26.2	10.5	53.9	Monroe	0	0.0	0.0	21.9
Cook	697	19.0	17.6	20.4	Montgomery	2	12.9	1.6	46.6
Crawford	1	9.7	0.2	54.3	Morgan	2	10.6	1.3	38.5
Cumberland	0	0.0	0.0	61.0	Moultrie	4	46.1	12.6	118.0
DeKalb	12	19.1	9.9	33.3	Ogle	8	28.6	12.3	56.3
DeWitt	0	0.0	0.0	39.2	Peoria	34	25.3	17.6	35.4
Douglas	4	29.8	8.1	76.2	Perry	3	28.7	5.9	83.8
DuPage	112	20.7	17.0	24.9	Piatt	2	23.8	2.9	85.8
Edgar	0	0.0	0.0	38.4	Pike	2	21.9	2.7	79.2
Edwards	0	0.0	0.0	103.3	Pope	1	64.5	1.6	359.5
Effingham	5	22.3	7.2	52.0	Pulaski	0	0.0	0.0	112.8
Fayette	4	32.7	8.9	83.7	Putnam	1	38.0	1.0	211.8
Ford	2	27.3	3.3	98.6	Randolph	2	11.2	1.4	40.4
Franklin	3	12.9	2.7	37.6	Richland	4	40.8	11.1	104.5
Fulton	5	27.4	8.9	63.8	Rock Island	17	17.6	10.2	28.1
Gallatin	0	0.0	0.0	129.9	St. Clair	33	18.4	12.7	25.8
Greene	1	13.1	0.3	72.7	Saline	4	25.8	7.0	66.2
Grundy	9	27.1	12.4	51.5	Sangamon	30	24.7	16.7	35.3
Hamilton	0	0.0	0.0	78.2	Schuyler	0	0.0	0.0	100.2
Hancock	3	30.4	6.3	88.8	Scott	0	0.0	0.0	136.1
Hardin	0	0.0	0.0	179.1	Shelby	1	8.8	0.2	48.9
Henderson	1	33.4	0.8	186.3	Stark	2	70.2	8.5	253.5
Henry	8	29.1	12.6	57.4	Stephenson	4	15.8	4.3	40.4
Iroquois	5	32.1	10.4	74.9	Tazewell	25	30.5	19.7	45.0
Jackson	3	8.8	1.8	25.8	Union	2	21.1	2.6	76.3
Jasper	1	17.7	0.4	98.6	Vermillion	17	31.3	18.3	50.2
Jefferson	3	12.4	2.6	36.3	Wabash	0	0.0	0.0	49.8
Jersey	1	8.8	0.2	48.9	Warren	0	0.0	0.0	36.1
Jo Daviess	0	0.0	0.0	36.8	Washington	3	41.3	8.5	120.6
Johnson	0	0.0	0.0	62.8	Wayne	2	19.5	2.4	70.3
Kane	77	20.8	16.4	26.0	White	0	0.0	0.0	42.5
Kankakee	17	23.7	13.8	37.9	Whiteside	11	32.9	16.4	58.8
Kendall	14	15.5	8.5	26.0	Will	103	23.8	19.4	28.8
Knox	4	14.9	4.1	38.3	Williamson	4	10.4	2.8	26.7
Lake	103	24.0	19.6	29.1	Winnebago	56	29.3	22.1	38.0
LaSalle	24	38.4	24.6	57.1	Woodford	8	35.2	15.2	69.3
Lawrence	3	35.5	7.3	103.8					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

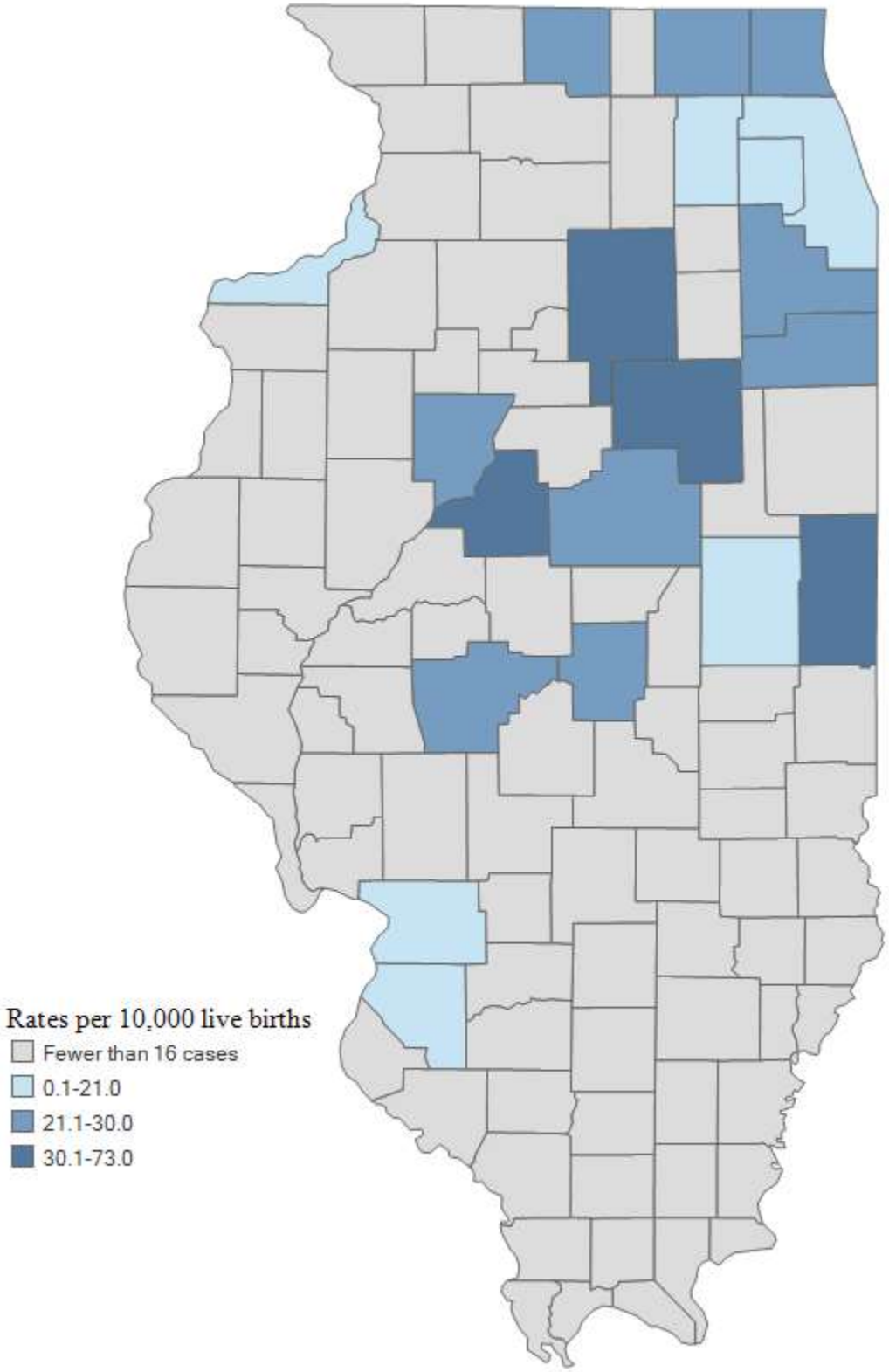
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 5. Prevalence Rates[1] and 95% Confidence Intervals for Major Alimentary Tract Defects in Newborn Infants by Selected Counties of Residence,[2] 2008-2012



[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, January 2019

Figure 6. Map of Prevalence Rates for Major Alimentary Tract Defects in Newborn Infants by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

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 and formats, respectively.

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.

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.

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.

Epispadias is a rare congenital defect in which the urethra opens on the top surface of the penis. Surgical correction is aimed at correcting incontinence and permitting sexual function.

Table 8. Total Number and Prevalence Rates of Major Genitourinary System Defects in Newborn Infants, Illinois, 2008-2012

Defect	ICD-9-CM Codes	Cases	Rate[1]	95% CI[2]
Renal agenesis/hypoplasia	753.0	411	4.9	(4.5, 5.4)
Bladder exstrophy	753.5	21	0.3	(0.2, 0.4)
Hypospadias	752.61	2,214	26.6	(25.5, 27.7)
Epispadias	752.62	92	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, January 2019

Table 9. Total Number and Prevalence Rates of Major Genitourinary System Defects in Newborn Infants by County of Residence, 2008-2012

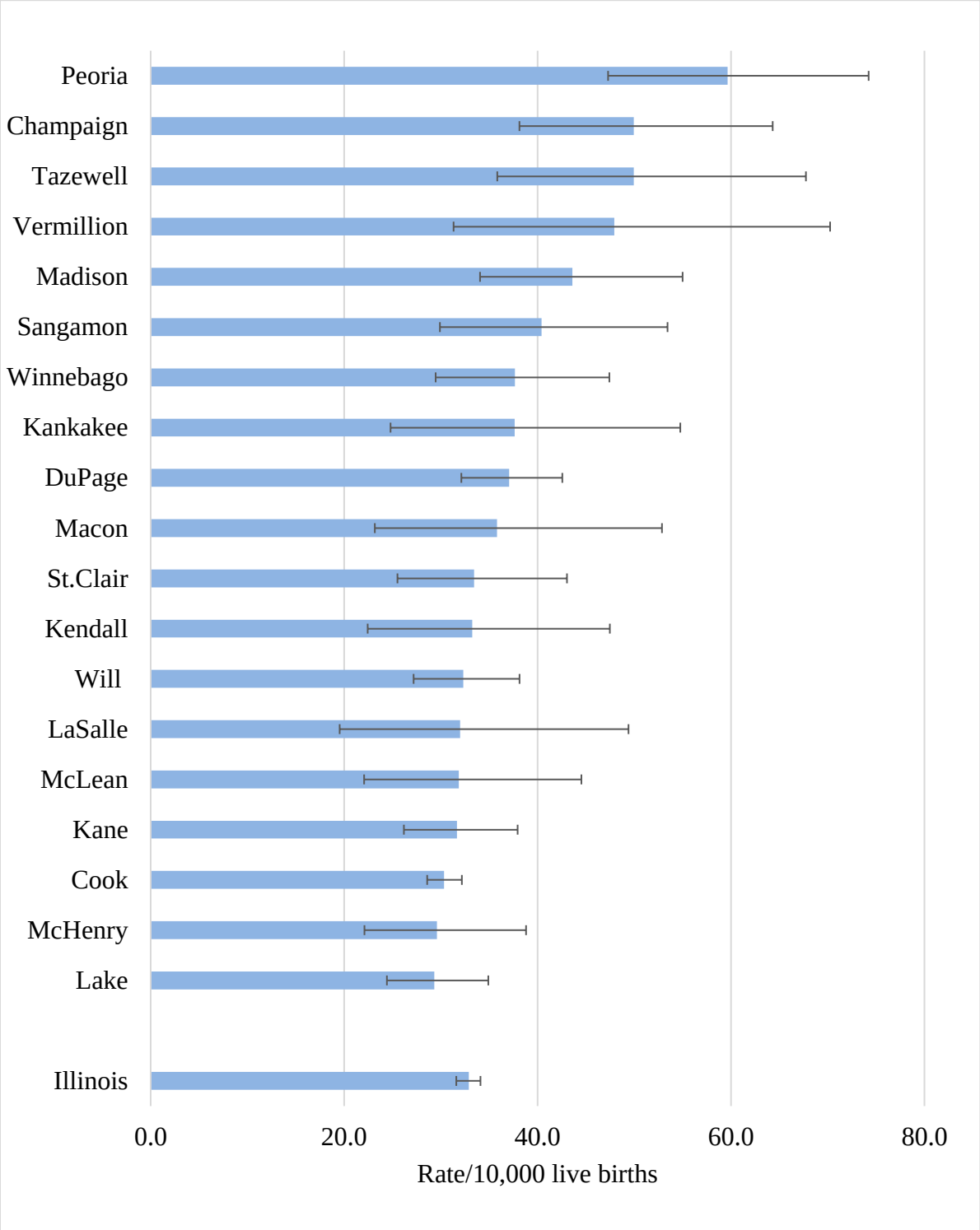
			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	2,738	32.9	31.6	34.1	Lee	7	37.9	15.2	78.0
Adams	10	24.7	11.9	45.5	Livingston	6	25.5	9.4	55.5
Alexander	1	18.3	0.5	102.2	Logan	10	65.3	31.3	120.1
Bond	1	11.4	0.3	63.6	McDonough	10	67.8	32.5	124.7
Boone	9	29.2	13.3	55.4	McHenry	52	29.6	22.1	38.8
Brown	0	0.0	0.0	133.7	McLean	34	31.9	22.1	44.5
Bureau	13	72.8	38.8	124.5	Macon	25	35.8	23.2	52.9
Calhoun	1	37.7	1.0	210.3	Macoupin	12	49.5	25.6	86.5
Carroll	1	14.3	0.4	79.8	Madison	71	43.6	34.1	55.0
Cass	1	10.9	0.3	60.8	Marion	9	35.6	16.3	67.6
Champaign	60	50.0	38.1	64.3	Marshall	1	16.3	0.4	91.0
Christian	7	36.9	14.8	76.1	Mason	4	55.2	15.0	141.3
Clark	1	10.4	0.3	57.7	Massac	2	22.5	2.7	81.4
Clay	3	35.4	7.3	103.5	Menard	1	15.8	0.4	88.0
Clinton	9	43.6	19.9	82.7	Mercer	1	12.6	0.3	70.1
Coles	7	26.2	10.5	53.9	Monroe	3	17.8	3.7	52.1
Cook	1,116	30.3	28.6	32.2	Montgomery	6	38.7	14.2	84.3
Crawford	1	9.7	0.2	54.3	Morgan	3	16.0	3.3	46.7
Cumberland	3	49.6	10.2	144.9	Moultrie	2	23.0	2.8	83.2
DeKalb	19	30.2	18.2	47.2	Ogle	15	53.6	30.0	88.4
DeWitt	2	21.3	2.6	76.9	Peoria	80	59.6	47.3	74.2
Douglas	6	44.6	16.4	97.2	Perry	4	38.2	10.4	97.9
DuPage	201	37.1	32.1	42.6	Piatt	2	23.8	2.9	85.8
Edgar	3	31.2	6.4	91.2	Pike	1	11.0	0.3	61.1
Edwards	1	28.0	0.7	156.1	Pope	0	0.0	0.0	238.0
Effingham	12	53.4	27.6	93.3	Pulaski	1	30.6	0.8	170.4
Fayette	8	65.4	28.2	128.9	Putnam	2	76.0	9.2	274.7
Ford	2	27.3	3.3	98.6	Randolph	7	39.1	15.7	80.7
Franklin	6	25.7	9.4	56.0	Richland	0	0.0	0.0	37.6
Fulton	10	54.7	26.2	100.6	Rock Island	14	14.5	7.9	24.3
Gallatin	0	0.0	0.0	129.9	St. Clair	60	33.4	25.5	43.0
Greene	6	78.3	28.7	170.5	Saline	3	19.4	4.0	56.6
Grundy	16	48.3	27.6	78.4	Sangamon	49	40.4	29.9	53.4
Hamilton	1	21.2	0.5	118.0	Schuyler	5	135.9	44.1	317.1
Hancock	5	50.7	16.4	118.2	Scott	1	36.9	0.9	205.6
Hardin	0	0.0	0.0	179.1	Shelby	8	70.2	30.3	138.3
Henderson	0	0.0	0.0	123.4	Stark	1	35.1	0.9	195.5
Henry	10	36.4	17.5	67.0	Stephenson	9	35.5	16.2	67.3
Iroquois	6	38.5	14.1	83.9	Tazewell	41	49.9	35.8	67.7
Jackson	4	11.8	3.2	30.2	Union	2	21.1	2.6	76.3
Jasper	0	0.0	0.0	65.3	Vermillion	26	47.9	31.3	70.2
Jefferson	0	0.0	0.0	15.3	Wabash	0	0.0	0.0	49.8
Jersey	1	8.8	0.2	48.9	Warren	3	29.4	6.1	85.8
Jo Daviess	0	0.0	0.0	36.8	Washington	6	82.5	30.3	179.6
Johnson	1	17.0	0.4	94.9	Wayne	0	0.0	0.0	35.9
Kane	117	31.7	26.2	37.9	White	0	0.0	0.0	42.5
Kankakee	27	37.6	24.8	54.8	Whiteside	12	35.9	18.5	62.6
Kendall	30	33.3	22.4	47.5	Will	140	32.3	27.2	38.1
Knox	12	44.8	23.2	78.3	Williamson	10	26.1	12.5	48.0
Lake	126	29.3	24.4	34.9	Winnebago	72	37.7	29.5	47.4
LaSalle	20	32.0	19.5	49.4	Woodford	8	35.2	15.2	69.3
Lawrence	1	11.8	0.3	65.9					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

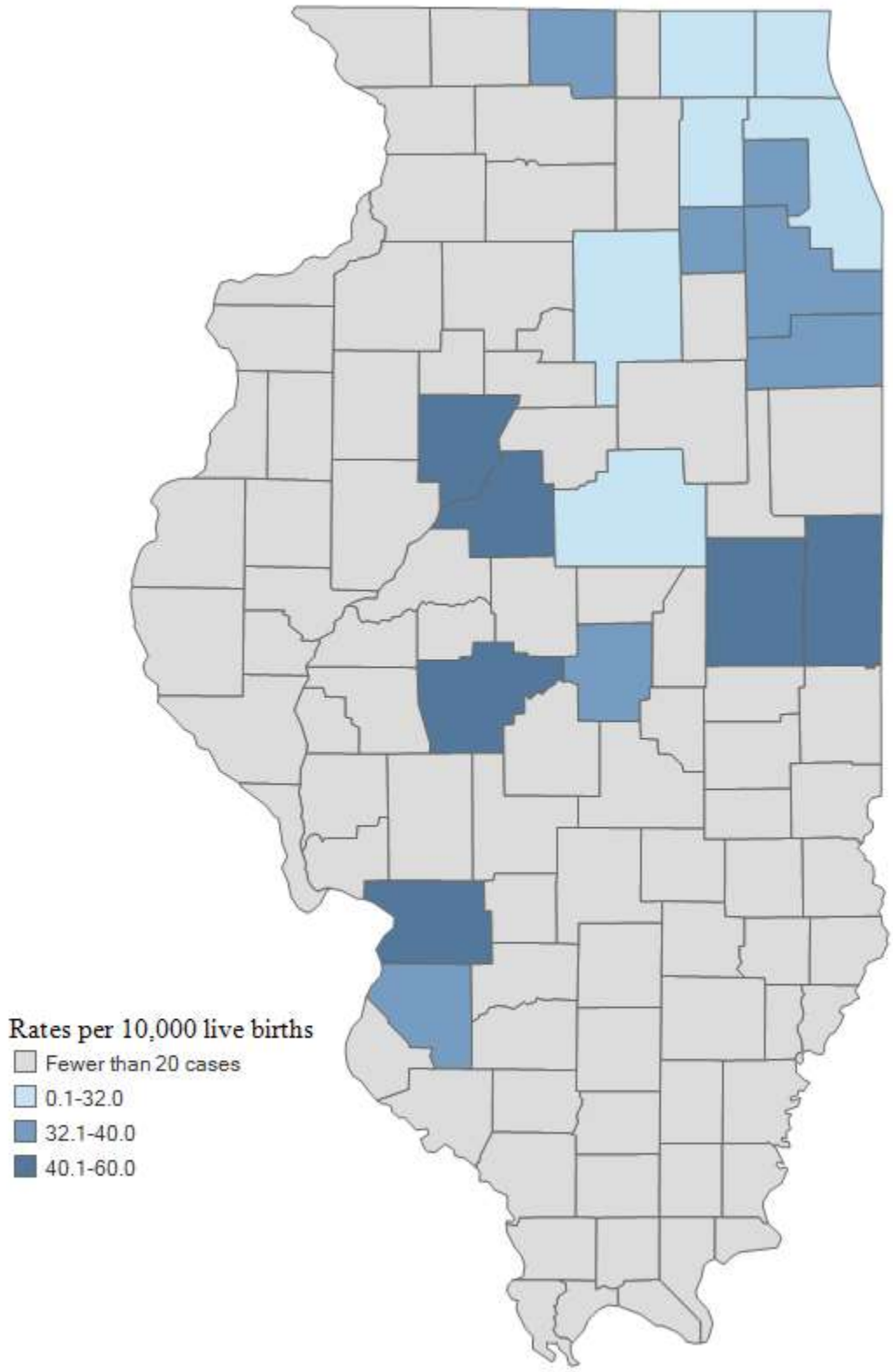
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 7. Prevalence Rates[1] and 95% Confidence Intervals for Major Genitourinary Defects in Newborn Infants by Selected Counties of Residence,[2] 2008-2012



[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, January 2019

Figure 8. Map of Prevalence Rates for Major Genitourinary Defects in Newborn Infants by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

MUSCULOSKELETAL DEFECTS

These malformations make up a diverse group of defects that includes developmental dysplasia of the hip—a relatively common disorder—and several more rare and serious conditions. 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.

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

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.

Developmental dysplasia of the hip is an abnormal development of the hip joint, in which a neonate's hips easily become dislocated.

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.

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.

Table 10. Total Number and Prevalence Rates of Major Musculoskeletal Defects in Newborn Infants, Illinois, 2008-2012

Defect	ICD-9-CM Codes	Cases	Rate[1]	95% CI[2]
Limb reduction deformity	755.2 – 755.4	385	4.6	(4.2, 5.1)
Gastroschisis	756.73	315	3.8	(3.4, 4.2)
Omphalocele	756.72	155	1.9	(1.6, 2.2)
Developmental dysplasia of the hip	754.30,754.31,754.35	242	2.9	(2.6, 3.3)
Diaphragmatic hernia	756.6	201	2.4	(2.1, 2.8)

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

Table 11. Total Number and Prevalence Rates of Major Musculoskeletal Defects in Newborn Infants by County of Residence, 2008-2012

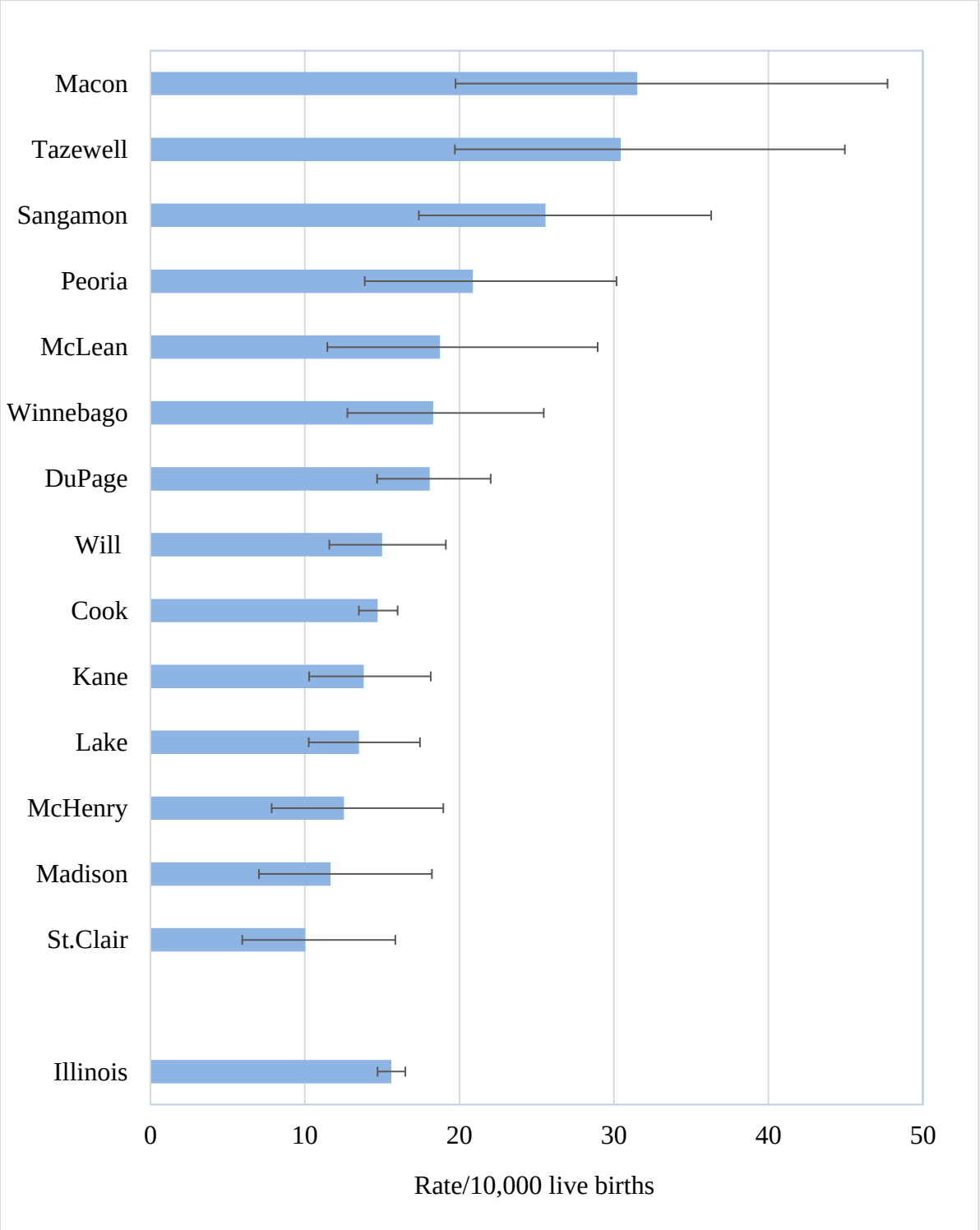
			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	1,298	15.6	14.7	16.5	Lee	4	21.6	5.9	55.4
Adams	7	17.3	7.0	35.7	Livingston	9	38.2	17.5	72.6
Alexander	1	18.3	0.5	102.2	Logan	6	39.2	14.4	85.3
Bond	5	57.1	18.5	133.2	McDonough	2	13.6	1.6	49.0
Boone	8	25.9	11.2	51.1	McHenry	22	12.5	7.8	19.0
Brown	1	36.2	0.9	201.9	McLean	20	18.7	11.5	29.0
Bureau	5	28.0	9.1	65.4	Macon	22	31.5	19.7	47.7
Calhoun	1	37.7	1.0	210.3	Macoupin	5	20.6	6.7	48.1
Carroll	1	14.3	0.4	79.8	Madison	19	11.7	7.0	18.2
Cass	2	21.8	2.6	78.9	Marion	3	11.9	2.4	34.7
Champaign	14	11.7	6.4	19.6	Marshall	2	32.7	4.0	118.1
Christian	3	15.8	3.3	46.2	Mason	1	13.8	0.3	76.9
Clark	0	0.0	0.0	38.2	Massac	0	0.0	0.0	41.5
Clay	1	11.8	0.3	65.8	Menard	0	0.0	0.0	58.3
Clinton	1	4.8	0.1	27.0	Mercer	1	12.6	0.3	70.1
Coles	4	15.0	4.1	38.3	Monroe	0	0.0	0.0	21.9
Cook	541	14.7	13.5	16.0	Montgomery	2	12.9	1.6	46.6
Crawford	1	9.7	0.2	54.3	Morgan	8	42.6	18.4	83.9
Cumberland	0	0.0	0.0	61.0	Moultrie	5	57.6	18.7	134.4
DeKalb	6	9.5	3.5	20.8	Ogle	2	7.1	0.9	25.8
DeWitt	5	53.2	17.3	124.1	Peoria	28	20.9	13.9	30.2
Douglas	1	7.4	0.2	41.5	Perry	1	9.6	0.2	53.3
DuPage	98	18.1	14.7	22.0	Piatt	1	11.9	0.3	66.2
Edgar	0	0.0	0.0	38.4	Pike	4	43.9	12.0	112.3
Edwards	0	0.0	0.0	103.3	Pope	0	0.0	0.0	238.0
Effingham	3	13.4	2.8	39.0	Pulaski	0	0.0	0.0	112.8
Fayette	2	16.4	2.0	59.1	Putnam	0	0.0	0.0	140.3
Ford	2	27.3	3.3	98.6	Randolph	0	0.0	0.0	20.6
Franklin	4	17.1	4.7	43.9	Richland	2	20.4	2.5	73.7
Fulton	6	32.8	12.0	71.4	Rock Island	10	10.3	5.0	19.0
Gallatin	1	35.2	0.9	196.2	St. Clair	18	10.0	5.9	15.9
Greene	0	0.0	0.0	48.2	Saline	1	6.5	0.2	36.0
Grundy	2	6.0	0.7	21.8	Sangamon	31	25.6	17.4	36.3
Hamilton	1	21.2	0.5	118.0	Schuyler	1	27.2	0.7	151.4
Hancock	3	30.4	6.3	88.8	Scott	2	73.8	8.9	266.6
Hardin	0	0.0	0.0	179.1	Shelby	3	26.3	5.4	76.9
Henderson	0	0.0	0.0	123.4	Stark	0	0.0	0.0	129.4
Henry	4	14.6	4.0	37.3	Stephenson	4	15.8	4.3	40.4
Iroquois	3	19.3	4.0	56.3	Tazewell	25	30.5	19.7	45.0
Jackson	4	11.8	3.2	30.2	Union	1	10.6	0.3	58.8
Jasper	2	35.4	4.3	127.9	Vermillion	14	25.8	14.1	43.3
Jefferson	4	16.6	4.5	42.4	Wabash	0	0.0	0.0	49.8
Jersey	2	17.5	2.1	63.4	Warren	1	9.8	0.2	54.5
Jo Daviess	1	10.0	0.3	55.5	Washington	0	0.0	0.0	50.7
Johnson	0	0.0	0.0	62.8	Wayne	1	9.7	0.2	54.3
Kane	51	13.8	10.3	18.1	White	0	0.0	0.0	42.5
Kankakee	15	20.9	11.7	34.5	Whiteside	4	12.0	3.3	30.6
Kendall	7	7.8	3.1	16.0	Will	65	15.0	11.6	19.1
Knox	3	11.2	2.3	32.8	Williamson	4	10.4	2.8	26.7
Lake	58	13.5	10.2	17.4	Winnebago	35	18.3	12.8	25.5
LaSalle	15	24.0	13.4	39.6	Woodford	11	48.4	24.2	86.6
Lawrence	0	0.0	0.0	43.7					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

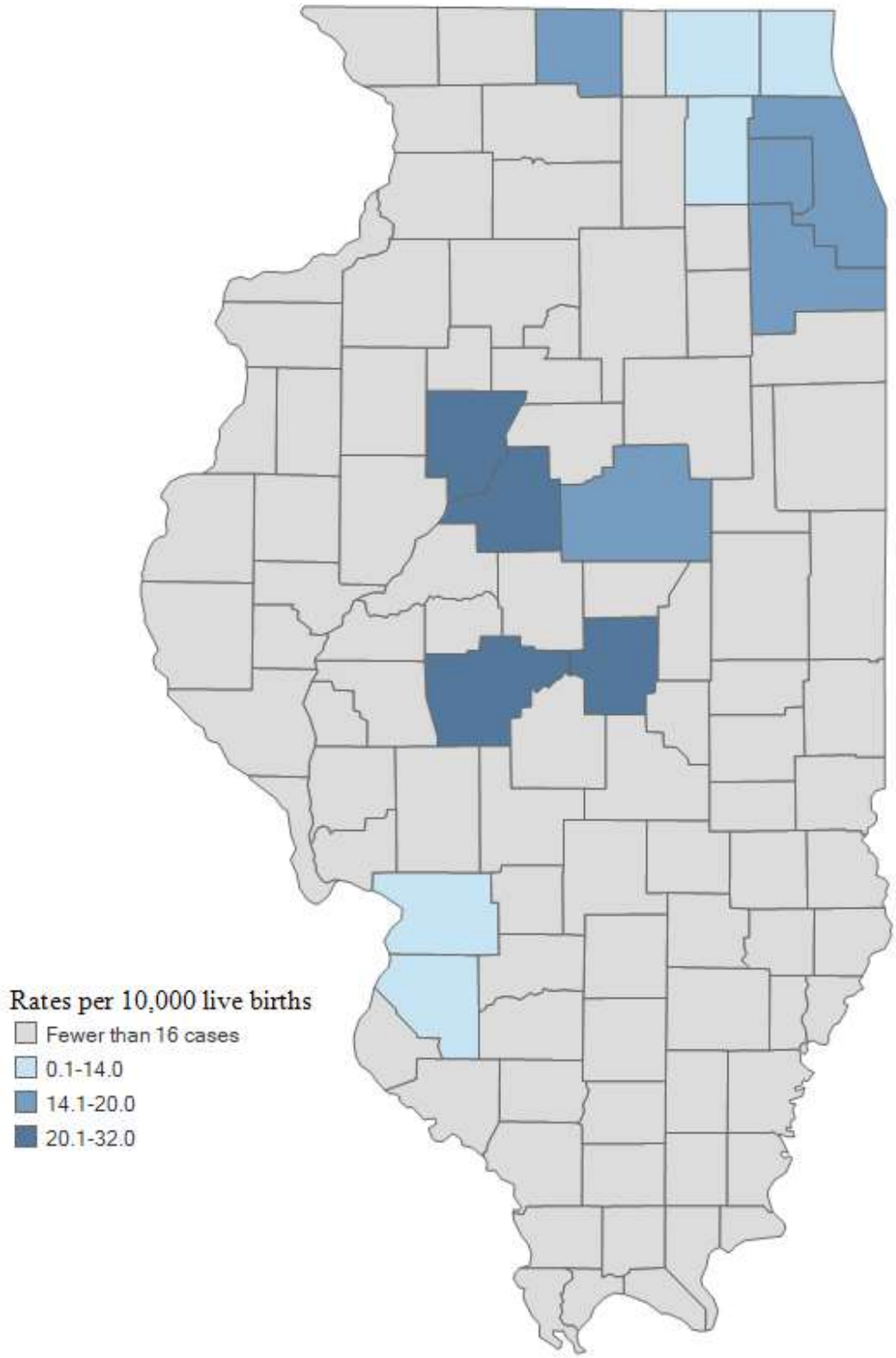
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 9. Prevalence Rates[1] and 95% Confidence Intervals for Major Musculoskeletal Defects in Newborn Infants by Selected Counties of Residence,[2] 2008-2012



[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, January 2019

Figure 10. Map of Prevalence Rates for Major Musculoskeletal Defects in Newborn Infants by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

CHROMOSOMAL CONDITIONS

Chromosomal conditions 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 very common among these infants and are a major cause of death. 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.

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 life-threatening medical problems.

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 everyone will attain his or her 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.

Table 12. Total Number and Prevalence Rates of Major Chromosomal Defects in Newborn Infants, Illinois, 2008 – 2012

Defect	ICD-9-CM Codes	Cases	Rate[1]	95% CI[2]
Patau syndrome (trisomy 13)	758.1	105	1.3	(1.0, 1.5)
Down syndrome (trisomy 21)	758.0	1,028	12.3	(11.6, 13.1)
Edward syndrome (trisomy 18)	758.2	185	2.2	(1.9, 2.6)

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

Table 13. Total Number and Prevalence Rates of Major Chromosomal Defects in Newborn Infants by County of Residence, 2008-2012

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	1,318	15.8	15.0	16.7	Lee	2	10.8	1.3	39.1
Adams	15	37.1	20.8	61.2	Livingston	3	12.7	2.6	37.3
Alexander	0	0.0	0.0	67.7	Logan	3	19.6	4.0	57.3
Bond	2	22.8	2.8	82.5	McDonough	3	20.3	4.2	59.4
Boone	10	32.4	15.5	59.6	McHenry	31	17.6	12.0	25.0
Brown	0	0.0	0.0	133.7	McLean	15	14.1	7.9	23.2
Bureau	3	16.8	3.5	49.1	Macon	7	10.0	4.0	20.7
Calhoun	0	0.0	0.0	139.2	Macoupin	2	8.3	1.0	29.8
Carroll	1	14.3	0.4	79.8	Madison	19	11.7	7.0	18.2
Cass	1	10.9	0.3	60.8	Marion	6	23.7	8.7	51.6
Champaign	17	14.2	8.2	22.7	Marshall	0	0.0	0.0	60.3
Christian	0	0.0	0.0	19.5	Mason	0	0.0	0.0	50.9
Clark	0	0.0	0.0	38.2	Massac	0	0.0	0.0	41.5
Clay	2	23.6	2.9	85.3	Menard	2	31.6	3.8	114.1
Clinton	2	9.7	1.2	35.0	Mercer	1	12.6	0.3	70.1
Coles	3	11.2	2.3	32.8	Monroe	0	0.0	0.0	21.9
Cook	597	16.2	15.0	17.6	Montgomery	1	6.5	0.2	36.0
Crawford	0	0.0	0.0	35.9	Morgan	3	16.0	3.3	46.7
Cumberland	0	0.0	0.0	61.0	Moultrie	0	0.0	0.0	42.5
DeKalb	10	15.9	7.6	29.3	Ogle	4	14.3	3.9	36.6
DeWitt	2	21.3	2.6	76.9	Peoria	23	17.1	10.9	25.7
Douglas	3	22.3	4.6	65.2	Perry	1	9.6	0.2	53.3
DuPage	107	19.7	16.2	23.8	Piatt	1	11.9	0.3	66.2
Edgar	0	0.0	0.0	38.4	Pike	2	21.9	2.7	79.2
Edwards	0	0.0	0.0	103.3	Pope	0	0.0	0.0	238.0
Effingham	2	8.9	1.1	32.2	Pulaski	0	0.0	0.0	112.8
Fayette	1	8.2	0.2	45.6	Putnam	0	0.0	0.0	140.3
Ford	2	27.3	3.3	98.6	Randolph	4	22.4	6.1	57.3
Franklin	1	4.3	0.1	23.9	Richland	0	0.0	0.0	37.6
Fulton	0	0.0	0.0	20.2	Rock Island	10	10.3	5.0	19.0
Gallatin	1	35.2	0.9	196.2	St. Clair	13	7.2	3.9	12.4
Greene	0	0.0	0.0	48.2	Saline	2	12.9	1.6	46.7
Grundy	2	6.0	0.7	21.8	Sangamon	23	19.0	12.0	28.5
Hamilton	1	21.2	0.5	118.0	Schuyler	0	0.0	0.0	100.2
Hancock	1	10.1	0.3	56.5	Scott	2	73.8	8.9	266.6
Hardin	0	0.0	0.0	179.1	Shelby	2	17.5	2.1	63.4
Henderson	0	0.0	0.0	123.4	Stark	1	35.1	0.9	195.5
Henry	3	10.9	2.3	31.9	Stephenson	3	11.8	2.4	34.6
Iroquois	3	19.3	4.0	56.3	Tazewell	13	15.8	8.4	27.1
Jackson	6	17.7	6.5	38.5	Union	1	10.6	0.3	58.8
Jasper	3	53.1	10.9	155.2	Vermillion	6	11.1	4.1	24.1
Jefferson	5	20.7	6.7	48.4	Wabash	0	0.0	0.0	49.8
Jersey	1	8.8	0.2	48.9	Warren	1	9.8	0.2	54.5
Jo Daviess	0	0.0	0.0	36.8	Washington	1	13.8	0.3	76.6
Johnson	1	17.0	0.4	94.9	Wayne	0	0.0	0.0	35.9
Kane	66	17.9	13.8	22.7	White	0	0.0	0.0	42.5
Kankakee	8	11.2	4.8	22.0	Whiteside	5	14.9	4.9	34.9
Kendall	21	23.3	14.4	35.6	Will	70	16.2	12.6	20.4
Knox	3	11.2	2.3	32.8	Williamson	2	5.2	0.6	18.9
Lake	77	17.9	14.1	22.4	Winnebago	41	21.4	15.4	29.1
LaSalle	6	9.6	3.5	20.9	Woodford	3	13.2	2.7	38.6
Lawrence	0	0.0	0.0	43.7					

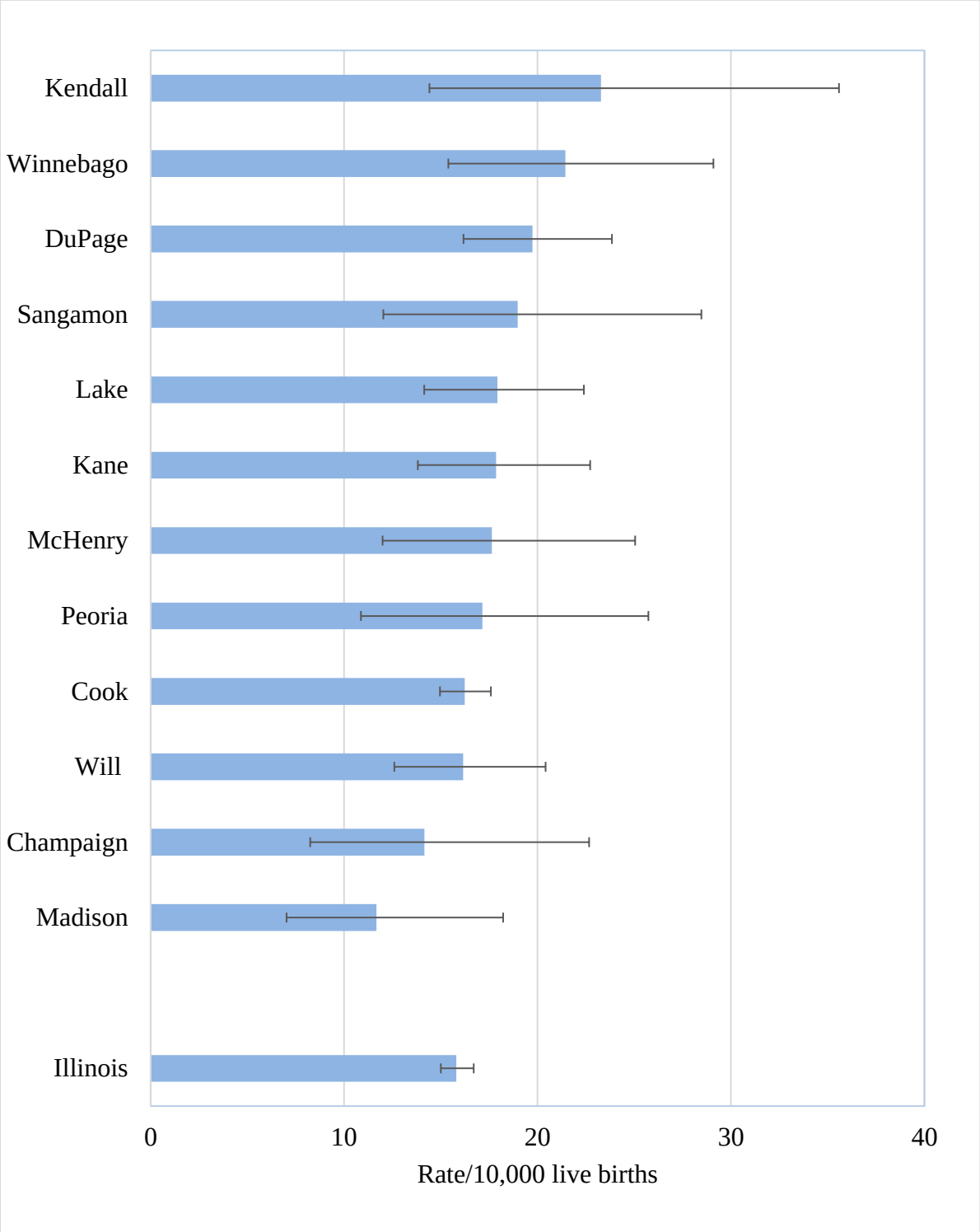
[1] Per 10,000 live births

[2] 95% confidence intervals for rate

The number for Illinois includes one case for which county of residence is missing.

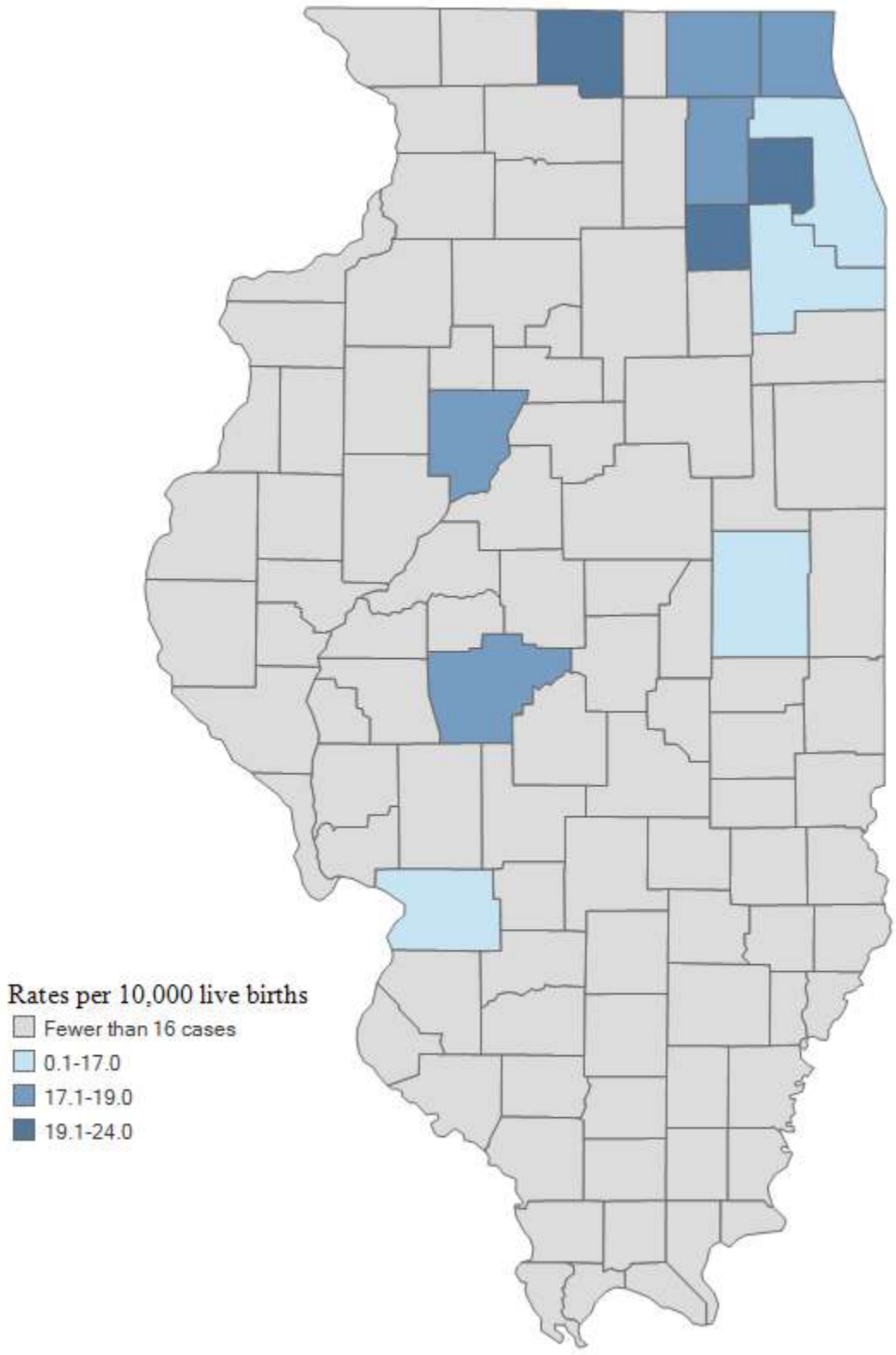
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 11. Prevalence Rates[1] and 95% Confidence Intervals for Major Chromosomal Defects in Newborn Infants by Selected Counties of Residence,[2] 2008-2012



[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, January 2019

Figure 12. Map of Prevalence Rates for Major Chromosomal Defects in Newborn Infants by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

SECTION II

OTHER ADVERSE PREGNANCY OUTCOMES

VERY LOW BIRTH WEIGHT

Children born weighing less than 1,500 grams (about 3 pounds 5 ounces) are considered to have very low birth weights. In 2012, 1.4% of Illinois infants had very low birth weights (IDPH, 2015), mirroring that of the U.S. (Martin, et al.) While medical advances over the years have increased the survival of these 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 (17.8 and 26.3% respectively) (Heron M, and IDPH, 2019).

There are several risk factors that can lead to premature births, and thus very low birth weight infants. 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 and American Indian/Alaska Native races
- 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 (NIH, March 2019)

While some risk factors listed are modifiable, others are not, and research is ongoing to identify additional causes. Regardless of the causes, very low birth weight infants who survive have more chronic conditions (blindness, deafness, intellectual disabilities, and cerebral palsy), more limitations in daily activities, and poorer overall health in their first few years of life than newborns with normal birth weights. Also, very low birth weight has been associated with poorer receptive language skills (Singer *et al.*) and with poor behavioral and educational outcomes (Saigal).

Table 14 provides five-year prevalence rates for infants with very low birth weights 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 Very Low Birth Weights (<1,500 g) by County of Residence, 2008-2012

			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	16,256	195.1	192.1	198.2	Lee	34	184.0	127.4	257.1
Adams	58	143.5	109.0	185.5	Livingston	36	153.0	107.2	211.8
Alexander	6	110.1	40.4	239.6	Logan	30	196.0	132.2	279.7
Bond	24	274.0	175.5	407.6	McDonough	34	230.5	159.6	322.1
Boone	66	213.9	165.5	272.2	McHenry	256	145.7	128.4	164.7
Brown	4	144.9	39.5	371.1	McLean	181	169.7	145.8	196.2
Bureau	16	89.6	51.2	145.6	Macon	157	224.9	191.1	263.0
Calhoun	5	188.7	61.3	440.3	Macoupin	29	119.6	80.1	171.8
Carroll	11	157.6	78.7	282.0	Madison	249	152.9	134.5	173.1
Cass	17	185.6	108.1	297.1	Marion	39	154.2	109.7	210.8
Champaign	228	189.9	166.0	216.2	Marshall	5	81.7	26.5	190.7
Christian	43	226.8	164.1	305.5	Mason	22	303.4	190.2	459.4
Clark	10	103.5	49.6	190.4	Massac	5	56.3	18.3	131.4
Clay	7	82.6	33.2	170.3	Menard	12	189.6	98.0	331.1
Clinton	24	116.2	74.5	172.9	Mercer	7	88.1	35.4	181.4
Coles	42	157.1	113.2	212.3	Monroe	14	83.1	45.5	139.5
Cook	8,303	225.7	220.9	230.7	Montgomery	22	142.0	89.0	215.0
Crawford	17	165.5	96.4	265.0	Morgan	39	207.7	147.7	283.9
Cumberland	9	148.8	68.0	282.4	Moultrie	16	184.3	105.4	299.3
DeKalb	96	152.7	123.7	186.5	Ogle	56	200.1	151.2	259.9
DeWitt	23	244.7	155.1	367.1	Peoria	286	213.2	189.2	239.4
Douglas	16	119.0	68.0	193.3	Perry	17	162.5	94.7	260.2
DuPage	926	170.8	159.9	182.1	Piatt	11	130.6	65.2	233.8
Edgar	12	124.9	64.5	218.1	Pike	14	153.5	83.9	257.6
Edwards	0	0.0	0.0	103.3	Pope	2	129.0	15.6	466.1
Effingham	23	102.4	64.9	153.7	Pulaski	5	152.9	49.6	356.8
Fayette	13	106.3	56.6	181.8	Putnam	1	38.0	1.0	211.8
Ford	11	150.1	74.9	268.5	Randolph	21	117.4	72.7	179.5
Franklin	39	167.1	118.8	228.4	Richland	10	102.0	48.9	187.7
Fulton	31	169.6	115.2	240.7	Rock Island	129	133.3	111.3	158.4
Gallatin	5	176.1	57.2	410.9	St. Clair	327	182.2	163.0	203.1
Greene	24	313.3	200.7	466.2	Saline	30	193.8	130.8	276.7
Grundy	49	147.8	109.3	195.4	Sangamon	245	202.1	177.6	229.1
Hamilton	3	63.6	13.1	185.7	Schuyler	4	108.7	29.6	278.3
Hancock	11	111.4	55.6	199.4	Scott	2	73.8	8.9	266.6
Hardin	1	48.5	1.2	270.5	Shelby	18	157.9	93.6	249.5
Henderson	4	133.8	36.5	342.5	Stark	4	140.4	38.2	359.4
Henry	25	91.0	58.9	134.4	Stephenson	40	157.7	112.6	214.7
Iroquois	25	160.6	103.9	237.0	Tazewell	141	171.7	144.6	202.5
Jackson	57	168.0	127.2	217.7	Union	14	147.8	80.8	248.0
Jasper	11	194.7	97.2	348.4	Vermillion	112	206.5	170.1	248.5
Jefferson	43	178.2	129.0	240.0	Wabash	9	121.5	55.5	230.6
Jersey	10	87.7	42.1	161.3	Warren	8	78.3	33.8	154.2
Jo Daviess	8	79.8	34.4	157.2	Washington	8	110.0	47.5	216.8
Johnson	8	136.3	58.8	268.5	Wayne	7	68.2	27.4	140.4
Kane	626	169.4	156.4	183.2	White	8	92.3	39.8	181.8
Kankakee	147	204.9	173.1	240.8	Whiteside	40	119.5	85.4	162.8
Kendall	138	153.0	128.5	180.7	Will	820	189.3	176.5	202.7
Knox	66	246.6	190.7	313.8	Williamson	55	143.6	108.2	187.0
Lake	717	166.8	154.9	179.5	Winnebago	381	199.3	179.8	220.3
LaSalle	96	153.6	124.4	187.5	Woodford	30	132.0	89.0	188.4
Lawrence	10	118.3	56.8	217.6					

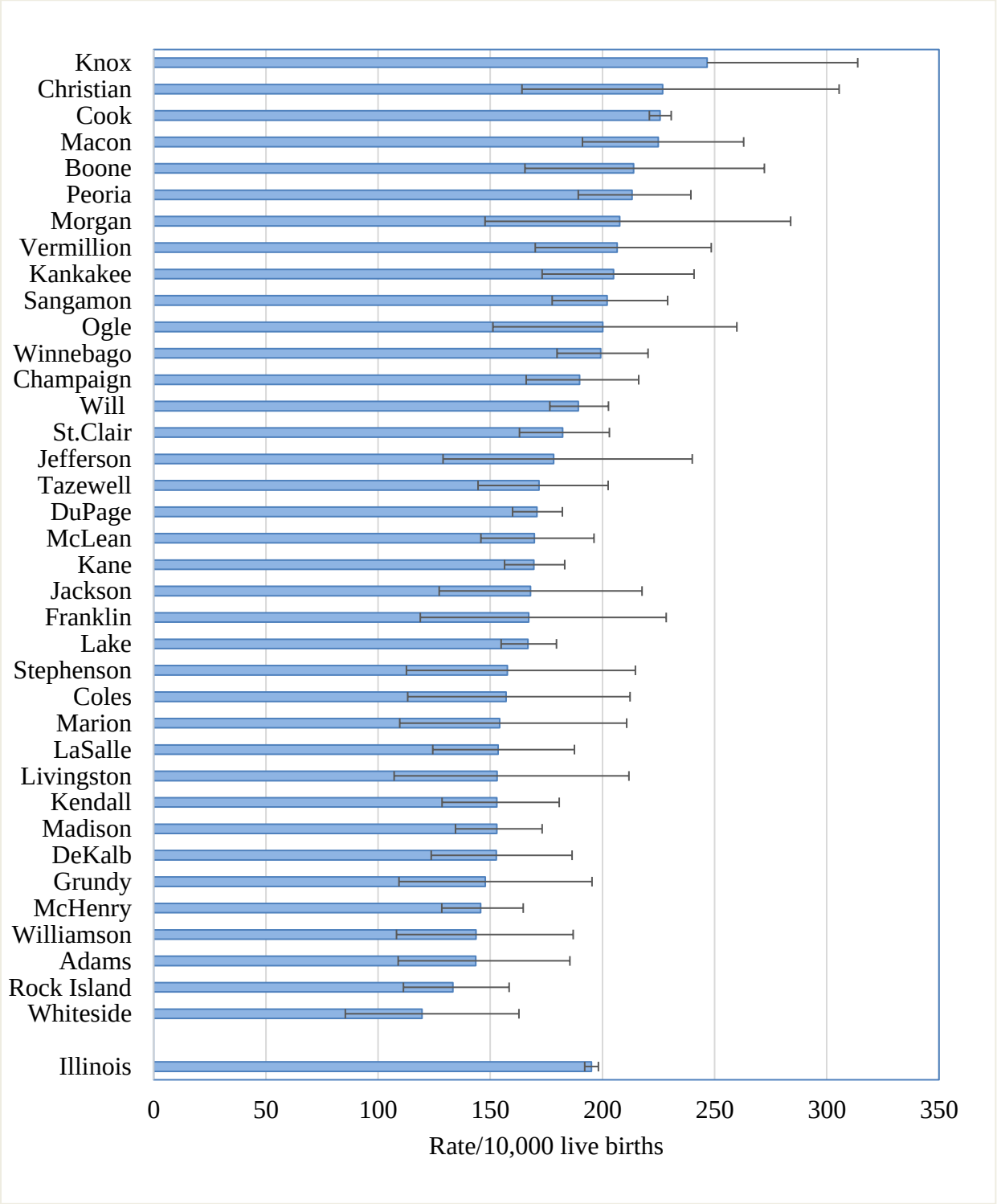
[1] Per 10,000 live births

[2] 95% confidence intervals for rate

The number for Illinois includes 50 cases for which county of residence is missing.

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 13. Prevalence Rates[1] and 95% Confidence Intervals for Very Low Birth Weight Infants by Selected Counties of Residence,[2] 2008-2012

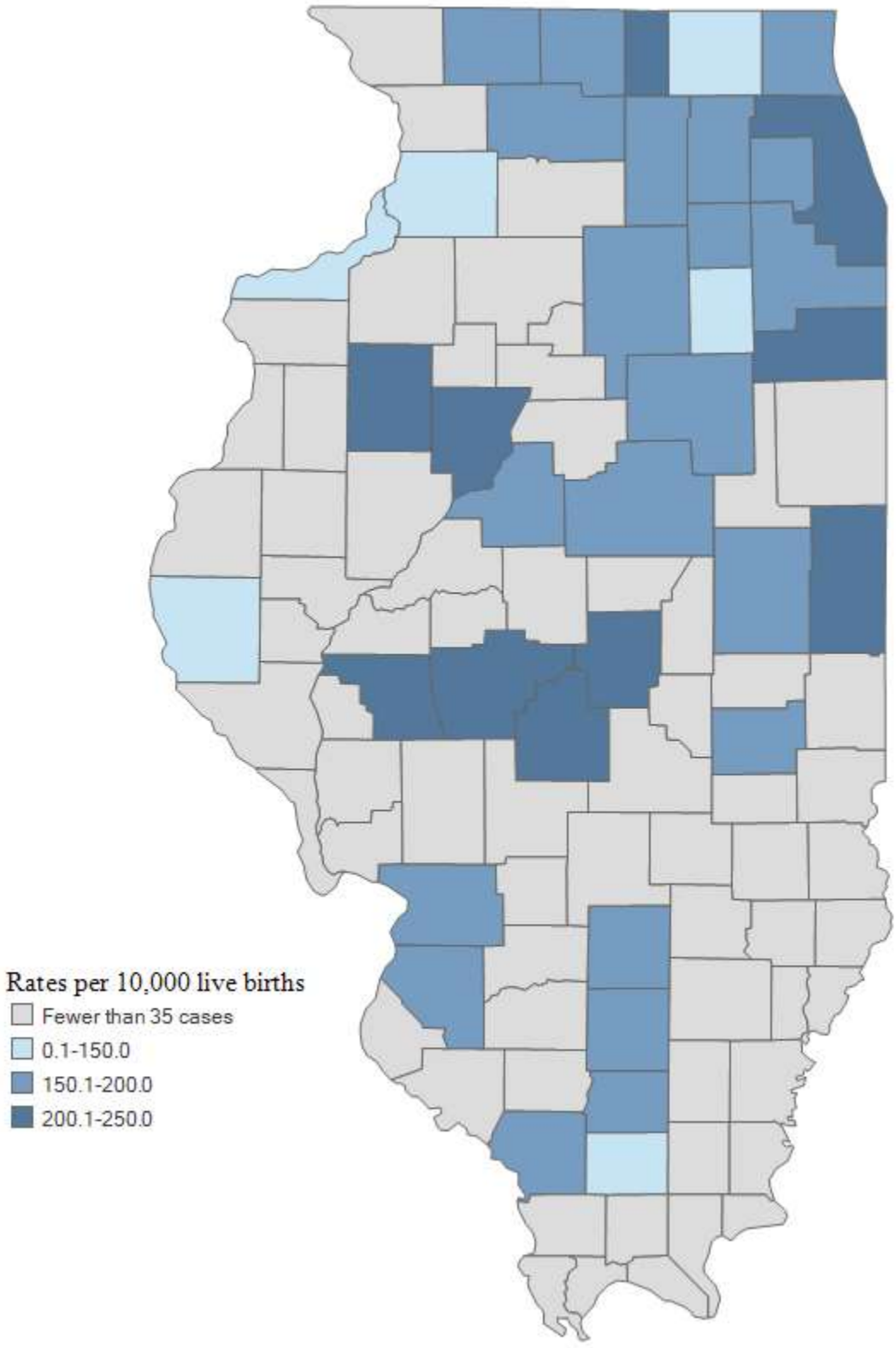


[1] Rates per 10,000 live births

[2] Only counties with 35 or more cases are presented.

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 14. Map of Prevalence Rates for Infants with Very Low Birth Weights (1,500g), by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

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 that 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, 2008-2012

Defect	ICD-9-CM Codes	Cases	Rate[1]	95% CI[2]	
				Lower	Upper
Chlamydial infections	079.88, 079.98	4	0.0	0.0	0.1
Cytomegalovirus	771.1	115	1.4	1.1	1.7
Gonococcal infections	098.0 - 098.89	3	0.0	0.0	0.1
Group B streptococcus	041.02	245	2.9	2.6	3.3
Hepatitis B	774.4	11	0.1	0.1	0.2
Prenatal exposure to hepatitis B	V01.7B	958	11.5	10.8	12.3
Herpes and other infections	771.2	75	0.9	0.7	1.1
Listeriosis	027.0	1	0.0	0.0	0.1
Rubella	771.0	1	0.0	0.0	0.1
Sepsis (confirmed septicemia)	771.8	1,657	19.9	18.9	20.9
Syphilis	090.0 - 090.9	189	2.3	2.0	2.6
Tetanus neonatorum	771.3	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, January 2019

Table16. Total Number and Prevalence Rates of Serious Congenital Infections in Newborn Infants by County of Residence, 2008-2012

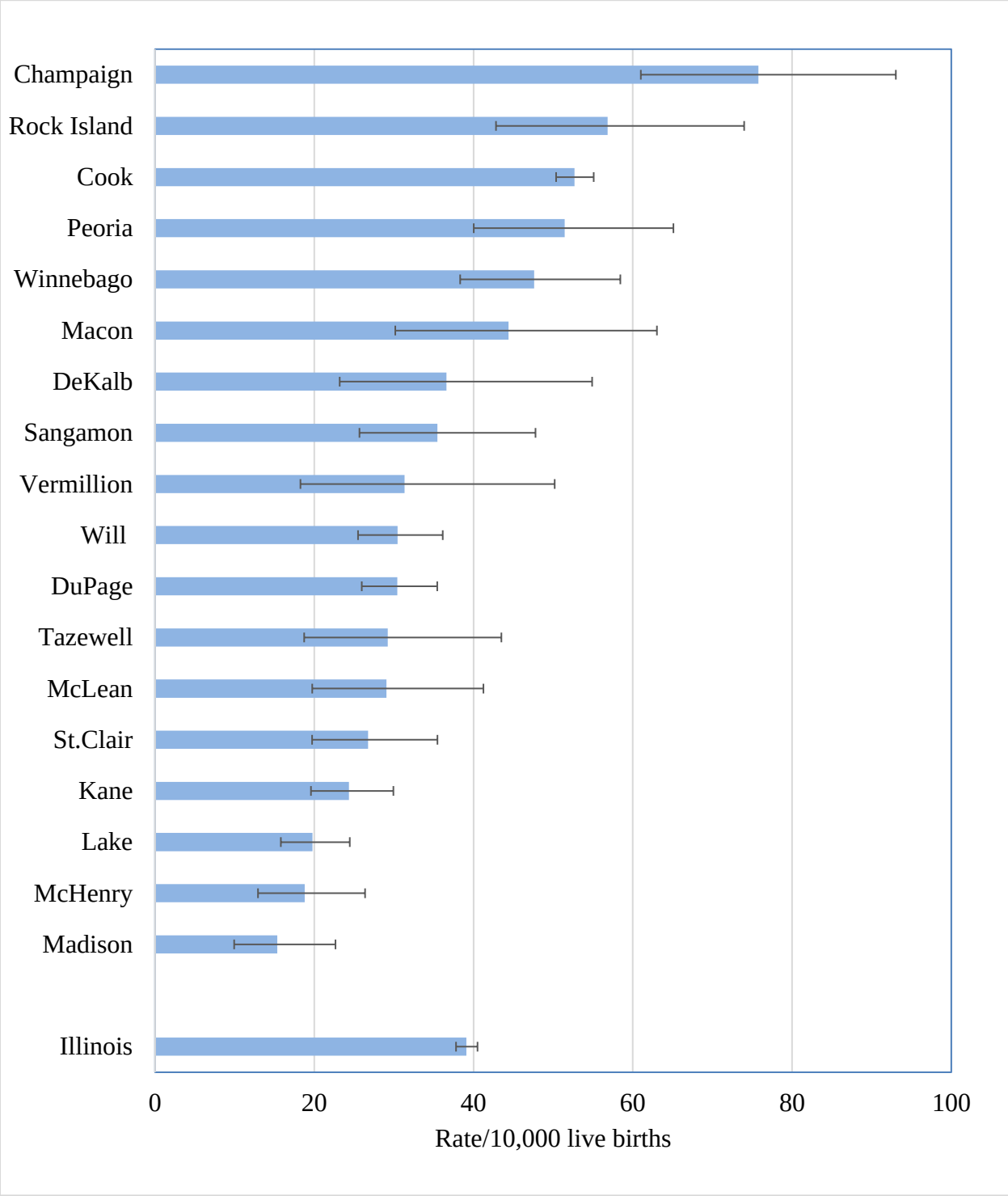
			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	3,259	39.1	37.8	40.5	Lee	0	0.0	0.0	20.0
Adams	8	19.8	8.5	39.0	Livingston	4	17.0	4.6	43.5
Alexander	0	0.0	0.0	67.7	Logan	6	39.2	14.4	85.3
Bond	3	34.2	7.1	100.1	McDonough	3	20.3	4.2	59.4
Boone	14	45.4	24.8	76.1	McHenry	33	18.8	12.9	26.4
Brown	1	36.2	0.9	201.9	McLean	31	29.1	19.7	41.2
Bureau	7	39.2	15.8	80.8	Macon	31	44.4	30.2	63.0
Calhoun	0	0.0	0.0	139.2	Macoupin	6	24.8	9.1	53.9
Carroll	1	14.3	0.4	79.8	Madison	25	15.4	9.9	22.7
Cass	2	21.8	2.6	78.9	Marion	7	27.7	11.1	57.0
Champaign	91	75.8	61.0	93.0	Marshall	1	16.3	0.4	91.0
Christian	7	36.9	14.8	76.1	Mason	5	69.0	22.4	160.9
Clark	2	20.7	2.5	74.8	Massac	0	0.0	0.0	41.5
Clay	0	0.0	0.0	43.6	Menard	1	15.8	0.4	88.0
Clinton	2	9.7	1.2	35.0	Mercer	3	37.7	7.8	110.3
Coles	8	29.9	12.9	58.9	Monroe	0	0.0	0.0	21.9
Cook	1,938	52.7	50.4	55.1	Montgomery	6	38.7	14.2	84.3
Crawford	2	19.5	2.4	70.3	Morgan	4	21.3	5.8	54.5
Cumberland	1	16.5	0.4	92.1	Moultrie	1	11.5	0.3	64.2
DeKalb	23	36.6	23.2	54.9	Ogle	9	32.2	14.7	61.1
DeWitt	3	31.9	6.6	93.3	Peoria	69	51.4	40.0	65.1
Douglas	3	22.3	4.6	65.2	Perry	1	9.6	0.2	53.3
DuPage	165	30.4	26.0	35.4	Piatt	2	23.8	2.9	85.8
Edgar	3	31.2	6.4	91.2	Pike	4	43.9	12.0	112.3
Edwards	1	28.0	0.7	156.1	Pope	0	0.0	0.0	238.0
Effingham	5	22.3	7.2	52.0	Pulaski	1	30.6	0.8	170.4
Fayette	3	24.5	5.1	71.7	Putnam	1	38.0	1.0	211.8
Ford	4	54.6	14.9	139.7	Randolph	2	11.2	1.4	40.4
Franklin	2	8.6	1.0	31.0	Richland	1	10.2	0.3	56.9
Fulton	1	5.5	0.1	30.5	Rock Island	55	56.8	42.8	74.0
Gallatin	0	0.0	0.0	129.9	St. Clair	48	26.8	19.7	35.5
Greene	0	0.0	0.0	48.2	Saline	0	0.0	0.0	23.8
Grundy	4	12.1	3.3	30.9	Sangamon	43	35.5	25.7	47.8
Hamilton	1	21.2	0.5	118.0	Schuyler	0	0.0	0.0	100.2
Hancock	5	50.7	16.4	118.2	Scott	0	0.0	0.0	136.1
Hardin	1	48.5	1.2	270.5	Shelby	3	26.3	5.4	76.9
Henderson	0	0.0	0.0	123.4	Stark	1	35.1	0.9	195.5
Henry	6	21.8	8.0	47.6	Stephenson	5	19.7	6.4	46.0
Iroquois	4	25.7	7.0	65.8	Tazewell	24	29.2	18.7	43.5
Jackson	6	17.7	6.5	38.5	Union	1	10.6	0.3	58.8
Jasper	4	70.8	19.3	181.3	Vermillion	17	31.3	18.3	50.2
Jefferson	6	24.9	9.1	54.1	Wabash	0	0.0	0.0	49.8
Jersey	0	0.0	0.0	32.4	Warren	0	0.0	0.0	36.1
Jo Daviess	2	19.9	2.4	72.0	Washington	0	0.0	0.0	50.7
Johnson	0	0.0	0.0	62.8	Wayne	2	19.5	2.4	70.3
Kane	90	24.4	19.6	29.9	White	0	0.0	0.0	42.5
Kankakee	13	18.1	9.6	31.0	Whiteside	10	29.9	14.3	55.0
Kendall	12	13.3	6.9	23.2	Will	132	30.5	25.5	36.1
Knox	8	29.9	12.9	58.9	Williamson	2	5.2	0.6	18.9
Lake	85	19.8	15.8	24.5	Winnebago	91	47.6	38.3	58.4
LaSalle	13	20.8	11.1	35.6	Woodford	8	35.2	15.2	69.3
Lawrence	0	0.0	0.0	43.7					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

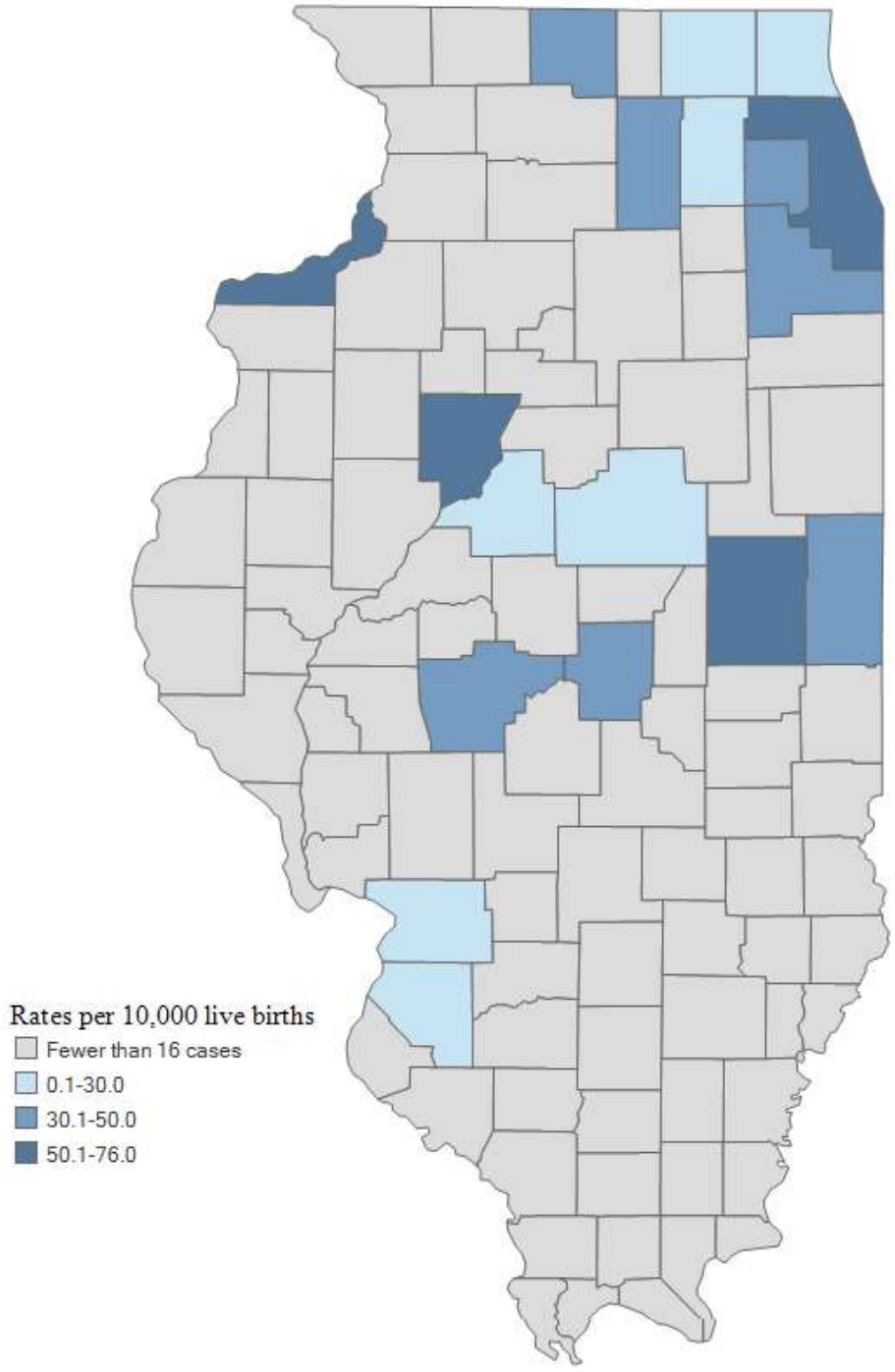
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 15. Prevalence Rates[1] and 95% Confidence Intervals for Serious Congenital Infections in Newborn Infants for Selected Counties of Residence,[2] 2008-2012



[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, January 2019

Figure 16. Map of Prevalence Rates for Serious Congenital Infections in Newborn Infants by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

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, 2008 – 2012

Defect	Cases	Rate[1]	95% CI[2]	
			Lower	Upper
Fetal deaths	4,875	58.5	56.9	60.2
Deaths during newborn stay	3,492	41.9	40.5	43.3

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

Table18. Total Number and Prevalence Rates of Perinatal Deaths by County of Residence, 2008-2012

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	8,367	100.4	98.3	102.6	Lee	16	86.6	49.5	140.6
Adams	31	76.7	52.1	108.9	Livingston	29	123.2	82.5	177.0
Alexander	2	36.7	4.4	132.6	Logan	14	91.4	50.0	153.4
Bond	9	102.7	47.0	195.0	McDonough	21	142.4	88.1	217.6
Boone	26	84.3	55.1	123.5	McHenry	129	73.4	61.3	87.2
Brown	5	181.2	58.8	422.8	McLean	107	100.3	82.2	121.2
Bureau	14	78.4	42.9	131.6	Macon	87	124.6	99.8	153.7
Calhoun	4	150.9	41.1	386.5	Macoupin	29	119.6	80.1	171.8
Carroll	4	57.3	15.6	146.7	Madison	135	82.9	69.5	98.1
Cass	9	98.3	44.9	186.5	Marion	23	90.9	57.7	136.5
Champaign	113	94.1	77.5	113.1	Marshall	0	0.0	0.0	60.3
Christian	19	100.2	60.3	156.5	Mason	11	151.7	75.7	271.5
Clark	0	0.0	0.0	38.2	Massac	4	45.0	12.3	115.3
Clay	5	59.0	19.2	137.8	Menard	2	31.6	3.8	114.1
Clinton	12	58.1	30.0	101.5	Mercer	5	62.9	20.4	146.8
Coles	25	93.5	60.5	138.0	Monroe	8	47.5	20.5	93.6
Cook	4,212	114.5	111.1	118.0	Montgomery	13	83.9	44.7	143.5
Crawford	8	77.9	33.6	153.5	Morgan	16	85.2	48.7	138.4
Cumberland	6	99.2	36.4	215.9	Moultrie	10	115.2	55.2	211.9
DeKalb	51	81.1	60.4	106.7	Ogle	29	103.6	69.4	148.9
DeWitt	15	159.6	89.3	263.2	Peoria	162	120.8	102.9	140.9
Douglas	11	81.8	40.9	146.4	Perry	8	76.5	33.0	150.7
DuPage	511	94.2	86.2	102.8	Piatt	7	83.1	33.4	171.3
Edgar	2	20.8	2.5	75.2	Pike	8	87.7	37.9	172.8
Edwards	0	0.0	0.0	103.3	Pope	1	64.5	1.6	359.5
Effingham	11	49.0	24.4	87.6	Pulaski	1	30.6	0.8	170.4
Fayette	9	73.6	33.6	139.7	Putnam	2	76.0	9.2	274.7
Ford	2	27.3	3.3	98.6	Randolph	11	61.5	30.7	110.1
Franklin	20	85.7	52.3	132.3	Richland	5	51.0	16.6	119.1
Fulton	19	103.9	62.6	162.3	Rock Island	73	75.4	59.1	94.9
Gallatin	1	35.2	0.9	196.2	St. Clair	134	74.7	62.6	88.4
Greene	10	130.5	62.6	240.1	Saline	17	109.8	64.0	175.8
Grundy	16	48.3	27.6	78.4	Sangamon	124	102.3	85.1	122.0
Hamilton	3	63.6	13.1	185.7	Schuyler	0	0.0	0.0	100.2
Hancock	5	50.7	16.4	118.2	Scott	1	36.9	0.9	205.6
Hardin	1	48.5	1.2	270.5	Shelby	6	52.6	19.3	114.6
Henderson	1	33.4	0.8	186.3	Stark	1	35.1	0.9	195.5
Henry	15	54.6	30.6	90.1	Stephenson	18	70.9	42.0	112.1
Iroquois	12	77.1	39.8	134.6	Tazewell	71	86.5	67.5	109.1
Jackson	24	70.7	45.3	105.2	Union	5	52.8	17.1	123.2
Jasper	1	17.7	0.4	98.6	Vermillion	68	125.4	97.4	159.0
Jefferson	15	62.2	34.8	102.5	Wabash	1	13.5	0.3	75.2
Jersey	5	43.9	14.2	102.4	Warren	3	29.4	6.1	85.8
Jo Daviess	3	29.9	6.2	87.4	Washington	4	55.0	15.0	140.9
Johnson	4	68.1	18.6	174.5	Wayne	5	48.7	15.8	113.6
Kane	332	89.8	80.4	100.0	White	5	57.7	18.7	134.6
Kankakee	68	94.8	73.6	120.2	Whiteside	25	74.7	48.4	110.3
Kendall	82	90.9	72.3	112.8	Will	429	99.0	89.9	108.9
Knox	41	153.2	109.9	207.9	Williamson	33	86.2	59.3	121.0
Lake	374	87.0	78.4	96.3	Winnebago	197	103.0	89.2	118.5
LaSalle	56	89.6	67.7	116.3	Woodford	23	101.2	64.1	151.8
Lawrence	2	23.7	2.9	85.5					

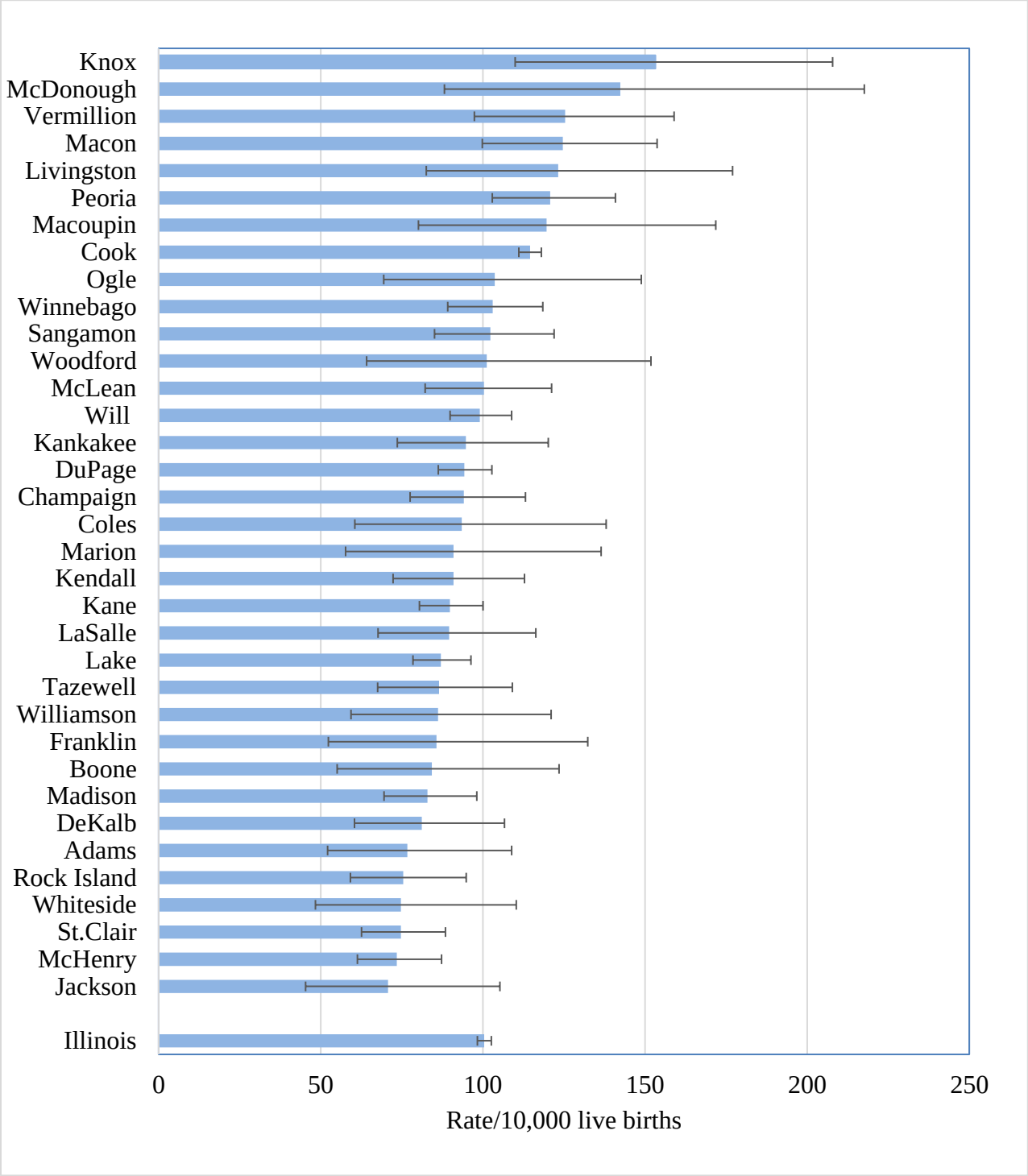
[1] Per 10,000 live births

[2] 95% confidence intervals for rate

The number for Illinois includes five cases for which county of residence is missing

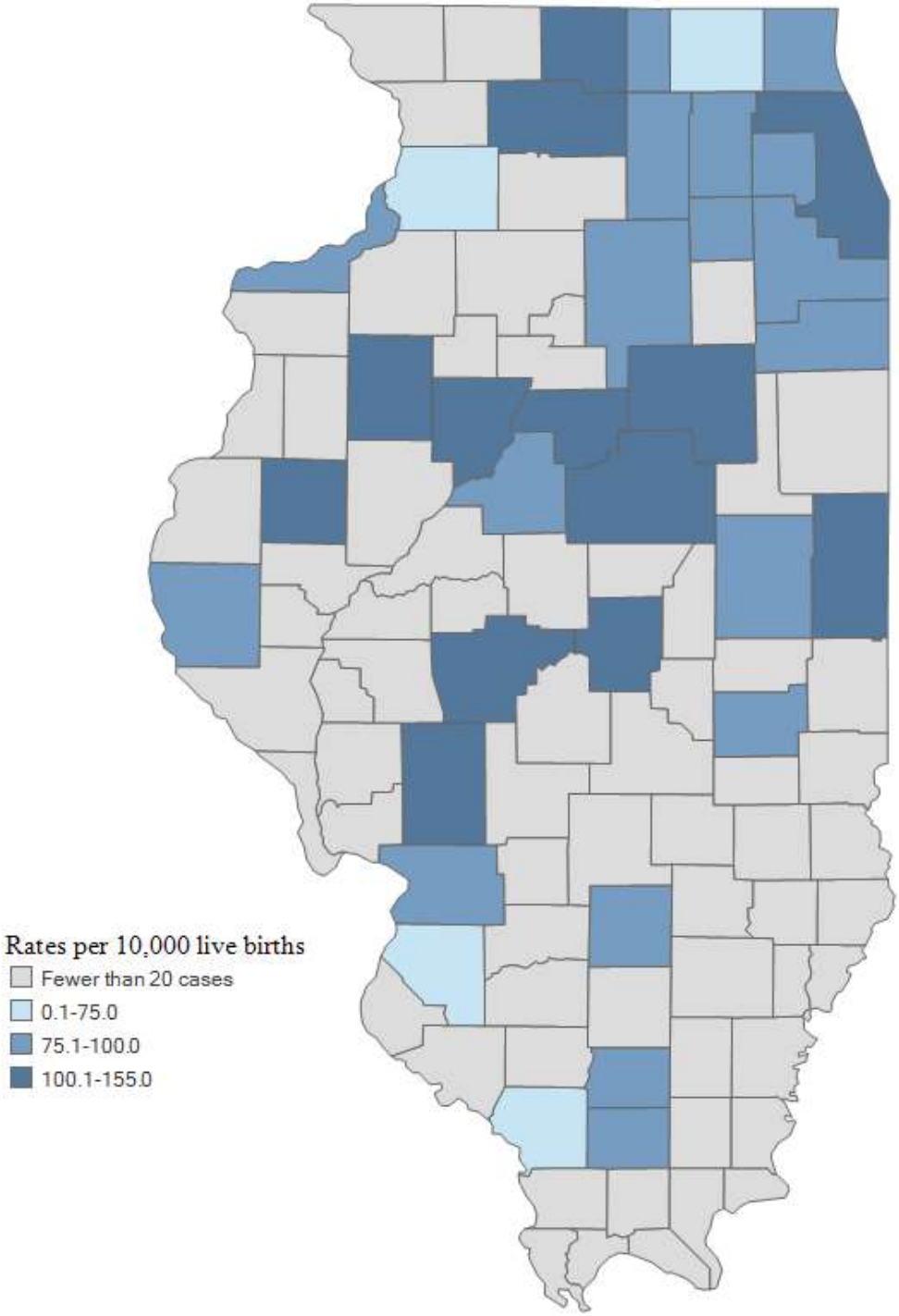
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting Systems, January 2019

Figure 17. Prevalence Rates[1] and 95% Confidence Intervals for Perinatal Deaths for Selected Counties of Residence,[2] 2008-2012



[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, January 2019

Figure 18. Map of Prevalence Rates for Perinatal Deaths by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

ENDOCRINE, METABOLIC, OR IMMUNE DISORDERS

APORS works closely with the Newborn Metabolic Screening program at IDPH 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 two to three 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, 2008 – 2012

Defect	ICD-9-CM Codes	Cases	Rate[1]	95% CI[2]	
				Lower	Upper
Adrenogenital syndrome	255.2	52	0.6	0.5	0.8
Cystic fibrosis	277.00, 277.01	176	2.1	1.8	2.4
Hypothyroidism	243	465	5.6	5.1	6.1
Immune deficiency disease	279.2	3	0.0	0.0	0.1
Inborn errors of metabolism	270.0 - 273.9	225	2.7	2.4	3.1

[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 20. Total Number and Prevalence Rates of Endocrine, Metabolic, or Immune Disorders in Newborn Infants by County of Residence, 2008-2012

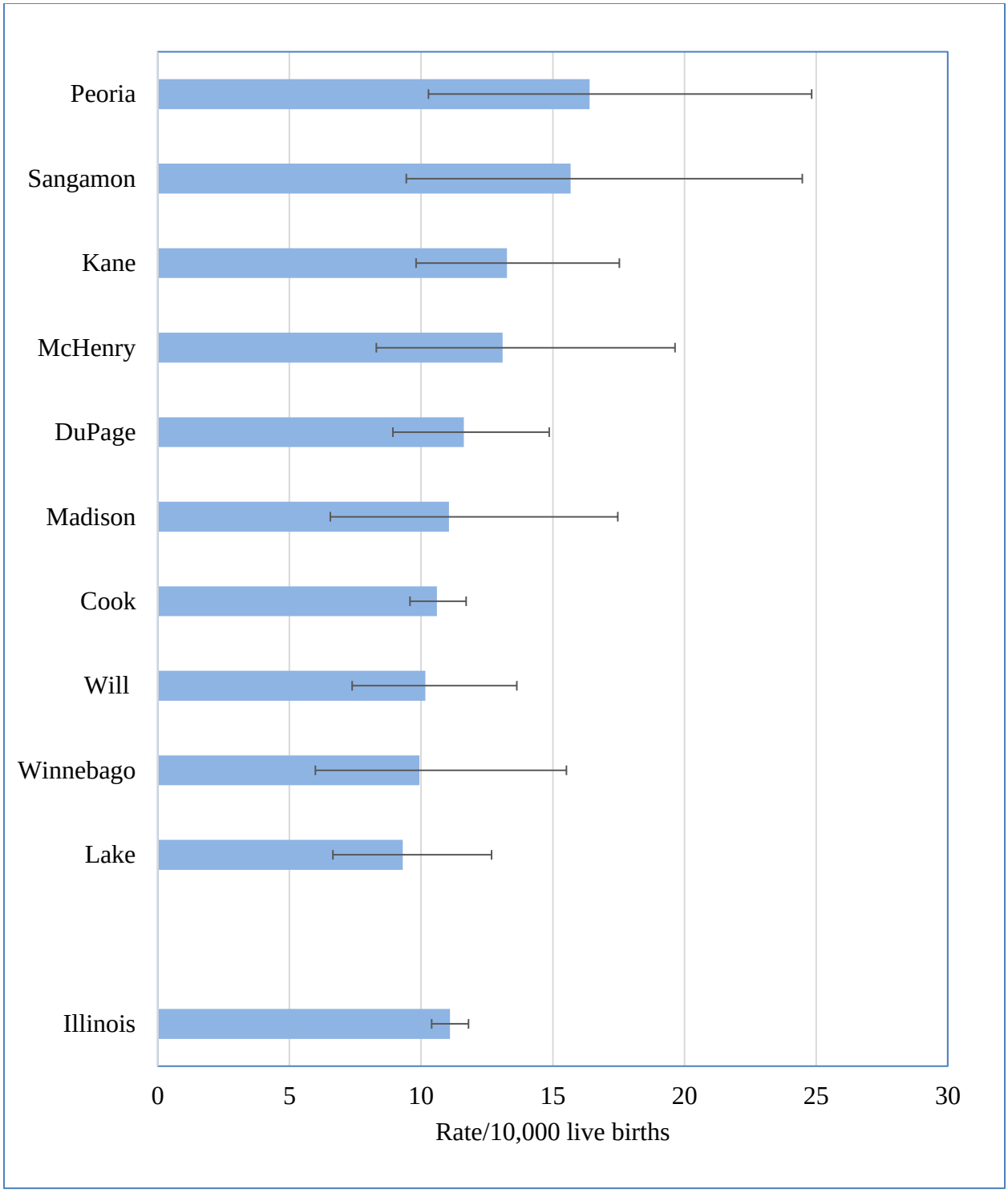
			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	921	11.1	10.4	11.8	Lee	0	0.0	0.0	20.0
Adams	5	12.4	4.0	28.9	Livingston	4	17.0	4.6	43.5
Alexander	0	0.0	0.0	67.7	Logan	1	6.5	0.2	36.4
Bond	2	22.8	2.8	82.5	McDonough	2	13.6	1.6	49.0
Boone	3	9.7	2.0	28.4	McHenry	23	13.1	8.3	19.6
Brown	2	72.5	8.8	261.8	McLean	9	8.4	3.9	16.0
Bureau	0	0.0	0.0	20.7	Macon	11	15.8	7.9	28.2
Calhoun	1	37.7	1.0	210.3	Macoupin	4	16.5	4.5	42.3
Carroll	0	0.0	0.0	52.8	Madison	18	11.1	6.6	17.5
Cass	1	10.9	0.3	60.8	Marion	6	23.7	8.7	51.6
Champaign	14	11.7	6.4	19.6	Marshall	0	0.0	0.0	60.3
Christian	0	0.0	0.0	19.5	Mason	0	0.0	0.0	50.9
Clark	0	0.0	0.0	38.2	Massac	1	11.3	0.3	62.7
Clay	0	0.0	0.0	43.6	Menard	1	15.8	0.4	88.0
Clinton	3	14.5	3.0	42.5	Mercer	0	0.0	0.0	46.4
Coles	5	18.7	6.1	43.6	Monroe	0	0.0	0.0	21.9
Cook	390	10.6	9.6	11.7	Montgomery	5	32.3	10.5	75.3
Crawford	0	0.0	0.0	35.9	Morgan	7	37.3	15.0	76.8
Cumberland	0	0.0	0.0	61.0	Moultrie	2	23.0	2.8	83.2
DeKalb	7	11.1	4.5	22.9	Ogle	4	14.3	3.9	36.6
DeWitt	0	0.0	0.0	39.2	Peoria	22	16.4	10.3	24.8
Douglas	5	37.2	12.1	86.8	Perry	2	19.1	2.3	69.1
DuPage	63	11.6	8.9	14.9	Piatt	0	0.0	0.0	43.8
Edgar	0	0.0	0.0	38.4	Pike	2	21.9	2.7	79.2
Edwards	1	28.0	0.7	156.1	Pope	0	0.0	0.0	238.0
Effingham	5	22.3	7.2	52.0	Pulaski	0	0.0	0.0	112.8
Fayette	3	24.5	5.1	71.7	Putnam	1	38.0	1.0	211.8
Ford	1	13.6	0.3	76.0	Randolph	5	28.0	9.1	65.3
Franklin	1	4.3	0.1	23.9	Richland	1	10.2	0.3	56.9
Fulton	4	21.9	6.0	56.0	Rock Island	10	10.3	5.0	19.0
Gallatin	0	0.0	0.0	129.9	St. Clair	13	7.2	3.9	12.4
Greene	0	0.0	0.0	48.2	Saline	1	6.5	0.2	36.0
Grundy	2	6.0	0.7	21.8	Sangamon	19	15.7	9.4	24.5
Hamilton	0	0.0	0.0	78.2	Schuyler	3	81.5	16.8	238.2
Hancock	1	10.1	0.3	56.5	Scott	0	0.0	0.0	136.1
Hardin	0	0.0	0.0	179.1	Shelby	1	8.8	0.2	48.9
Henderson	0	0.0	0.0	123.4	Stark	0	0.0	0.0	129.4
Henry	2	7.3	0.9	26.3	Stephenson	1	3.9	0.1	22.0
Iroquois	1	6.4	0.2	35.8	Tazewell	14	17.1	9.3	28.6
Jackson	2	5.9	0.7	21.3	Union	1	10.6	0.3	58.8
Jasper	1	17.7	0.4	98.6	Vermillion	11	20.3	10.1	36.3
Jefferson	2	8.3	1.0	29.9	Wabash	0	0.0	0.0	49.8
Jersey	4	35.1	9.6	89.8	Warren	0	0.0	0.0	36.1
Jo Daviess	1	10.0	0.3	55.5	Washington	0	0.0	0.0	50.7
Johnson	0	0.0	0.0	62.8	Wayne	1	9.7	0.2	54.3
Kane	49	13.3	9.8	17.5	White	0	0.0	0.0	42.5
Kankakee	8	11.2	4.8	22.0	Whiteside	3	9.0	1.8	26.2
Kendall	8	8.9	3.8	17.5	Will	44	10.2	7.4	13.6
Knox	6	22.4	8.2	48.8	Williamson	1	2.6	0.1	14.6
Lake	40	9.3	6.6	12.7	Winnebago	19	9.9	6.0	15.5
LaSalle	3	4.8	1.0	14.0	Woodford	2	8.8	1.1	31.8
Lawrence	0	0.0	0.0	43.7					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

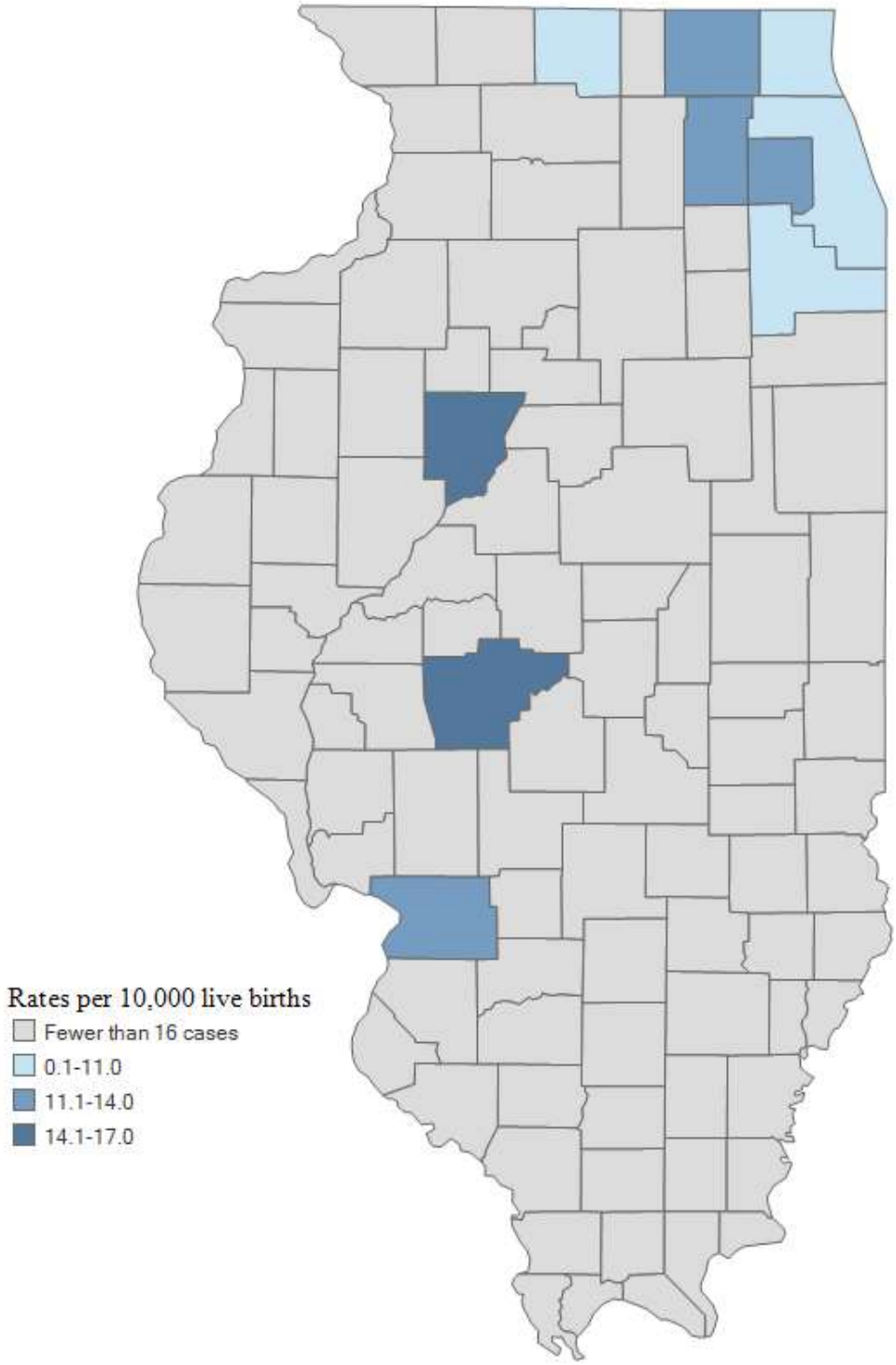
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 19. Prevalence Rates[1] and 95% Confidence Intervals For Endocrine, Metabolic, or Immune Disorders in Newborn Infants by Selected Counties of Residence,[2] 2008-2012



[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, January 2019

Figure 20. Map of Prevalence Rates for Endocrine, Metabolic, or Immune Disorders in Newborn Infants by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

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.

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.

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.

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.

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.

Table 21. Total Number and Prevalence Rates of Blood Disorders in Newborn Infants, Illinois, 2008-2012

Defect	ICD-9-CM Codes	Cases	Rate[1]	95% CI[2]	
				Lower	Upper
Coagulation defects	286.x	60	0.7	0.5	0.9
Constitutional aplastic anemia	284.x	3	0.0	0.0	0.1
Hereditary hemolytic anemia	282.x	584	7.0	6.5	7.6
Leukemia	204.00 - 208.91	5	0.1	0.0	0.1

[1] Rate per 10,000 live births

[2] 95% confidence interval for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Table 22. Total Number and Prevalence Rates of Blood Disorders in Newborn Infants by County of Residence, 2008-2012

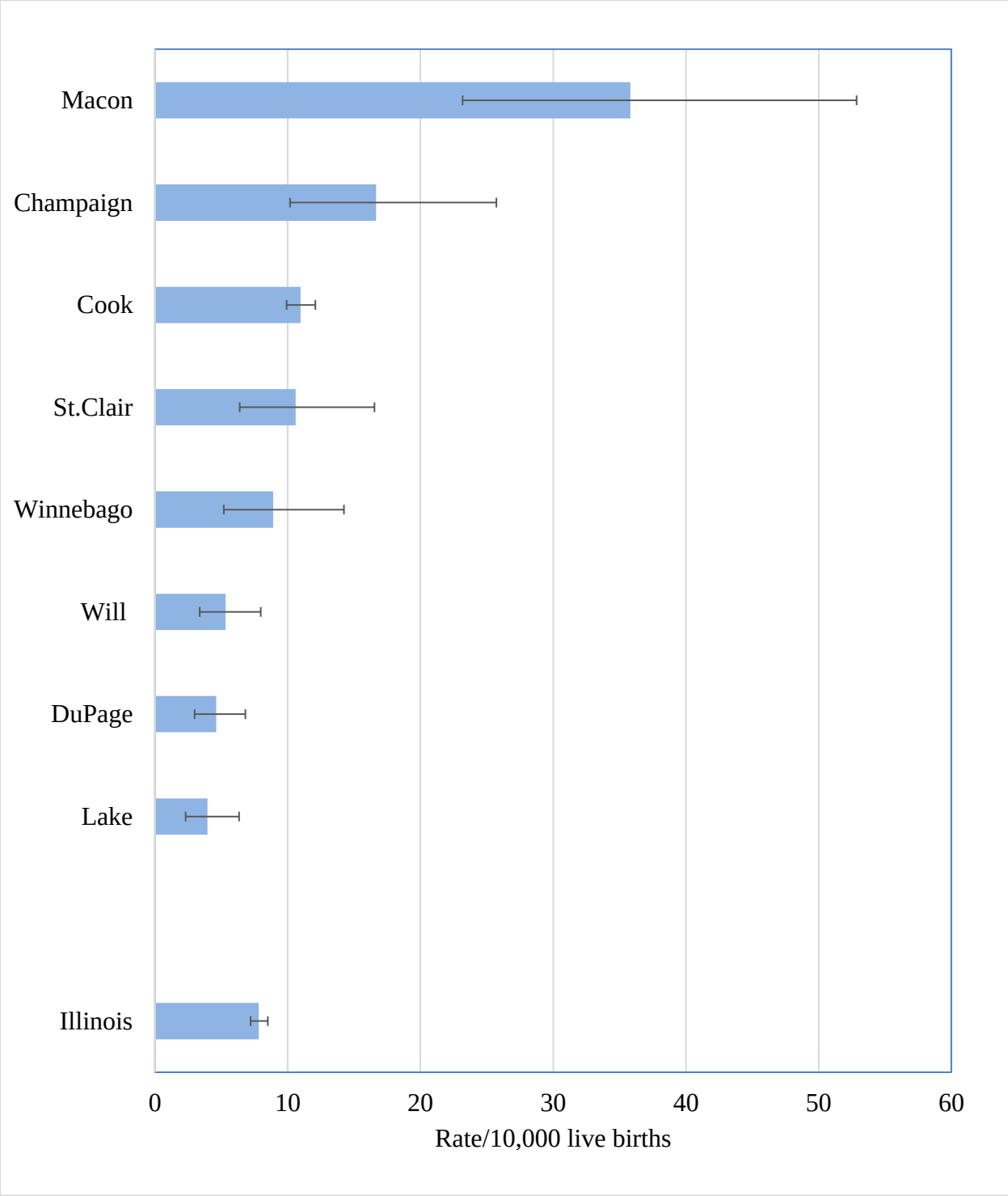
			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	652	7.8	7.2	8.5	Lee	0	0.0	0.0	20.0
Adams	1	2.5	0.1	13.8	Livingston	0	0.0	0.0	15.7
Alexander	0	0.0	0.0	67.7	Logan	0	0.0	0.0	24.1
Bond	0	0.0	0.0	42.1	McDonough	2	13.6	1.6	49.0
Boone	0	0.0	0.0	12.0	McHenry	7	4.0	1.6	8.2
Brown	0	0.0	0.0	133.7	McLean	5	4.7	1.5	10.9
Bureau	1	5.6	0.1	31.2	Macon	25	35.8	23.2	52.9
Calhoun	0	0.0	0.0	139.2	Macoupin	0	0.0	0.0	15.2
Carroll	0	0.0	0.0	52.8	Madison	5	3.1	1.0	7.2
Cass	0	0.0	0.0	40.3	Marion	0	0.0	0.0	14.6
Champaign	20	16.7	10.2	25.7	Marshall	0	0.0	0.0	60.3
Christian	3	15.8	3.3	46.2	Mason	0	0.0	0.0	50.9
Clark	0	0.0	0.0	38.2	Massac	0	0.0	0.0	41.5
Clay	0	0.0	0.0	43.6	Menard	0	0.0	0.0	58.3
Clinton	0	0.0	0.0	17.9	Mercer	0	0.0	0.0	46.4
Coles	3	11.2	2.3	32.8	Monroe	0	0.0	0.0	21.9
Cook	403	11.0	9.9	12.1	Montgomery	0	0.0	0.0	23.8
Crawford	0	0.0	0.0	35.9	Morgan	1	5.3	0.1	29.7
Cumberland	0	0.0	0.0	61.0	Moultrie	0	0.0	0.0	42.5
DeKalb	2	3.2	0.4	11.5	Ogle	0	0.0	0.0	13.2
DeWitt	0	0.0	0.0	39.2	Peoria	8	6.0	2.6	11.8
Douglas	2	14.9	1.8	53.8	Perry	0	0.0	0.0	35.3
DuPage	25	4.6	3.0	6.8	Piatt	0	0.0	0.0	43.8
Edgar	0	0.0	0.0	38.4	Pike	0	0.0	0.0	40.4
Edwards	0	0.0	0.0	103.3	Pope	0	0.0	0.0	238.0
Effingham	0	0.0	0.0	16.4	Pulaski	2	61.2	7.4	220.9
Fayette	1	8.2	0.2	45.6	Putnam	0	0.0	0.0	140.3
Ford	1	13.6	0.3	76.0	Randolph	0	0.0	0.0	20.6
Franklin	0	0.0	0.0	15.8	Richland	0	0.0	0.0	37.6
Fulton	0	0.0	0.0	20.2	Rock Island	9	9.3	4.3	17.7
Gallatin	0	0.0	0.0	129.9	St. Clair	19	10.6	6.4	16.5
Greene	0	0.0	0.0	48.2	Saline	0	0.0	0.0	23.8
Grundy	1	3.0	0.1	16.8	Sangamon	14	11.5	6.3	19.4
Hamilton	0	0.0	0.0	78.2	Schuyler	0	0.0	0.0	100.2
Hancock	0	0.0	0.0	37.4	Scott	0	0.0	0.0	136.1
Hardin	0	0.0	0.0	179.1	Shelby	1	8.8	0.2	48.9
Henderson	0	0.0	0.0	123.4	Stark	0	0.0	0.0	129.4
Henry	0	0.0	0.0	13.4	Stephenson	0	0.0	0.0	14.5
Iroquois	0	0.0	0.0	23.7	Tazewell	1	1.2	0.0	6.8
Jackson	3	8.8	1.8	25.8	Union	0	0.0	0.0	39.0
Jasper	0	0.0	0.0	65.3	Vermillion	4	7.4	2.0	18.9
Jefferson	0	0.0	0.0	15.3	Wabash	0	0.0	0.0	49.8
Jersey	0	0.0	0.0	32.4	Warren	0	0.0	0.0	36.1
Jo Daviess	0	0.0	0.0	36.8	Washington	0	0.0	0.0	50.7
Johnson	0	0.0	0.0	62.8	Wayne	0	0.0	0.0	35.9
Kane	15	4.1	2.3	6.7	White	0	0.0	0.0	42.5
Kankakee	2	2.8	0.3	10.1	Whiteside	0	0.0	0.0	11.0
Kendall	4	4.4	1.2	11.4	Will	23	5.3	3.4	8.0
Knox	1	3.7	0.1	20.8	Williamson	0	0.0	0.0	9.6
Lake	17	4.0	2.3	6.3	Winnebago	17	8.9	5.2	14.2
LaSalle	4	6.4	1.7	16.4	Woodford	0	0.0	0.0	16.2
Lawrence	0	0.0	0.0	43.7					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

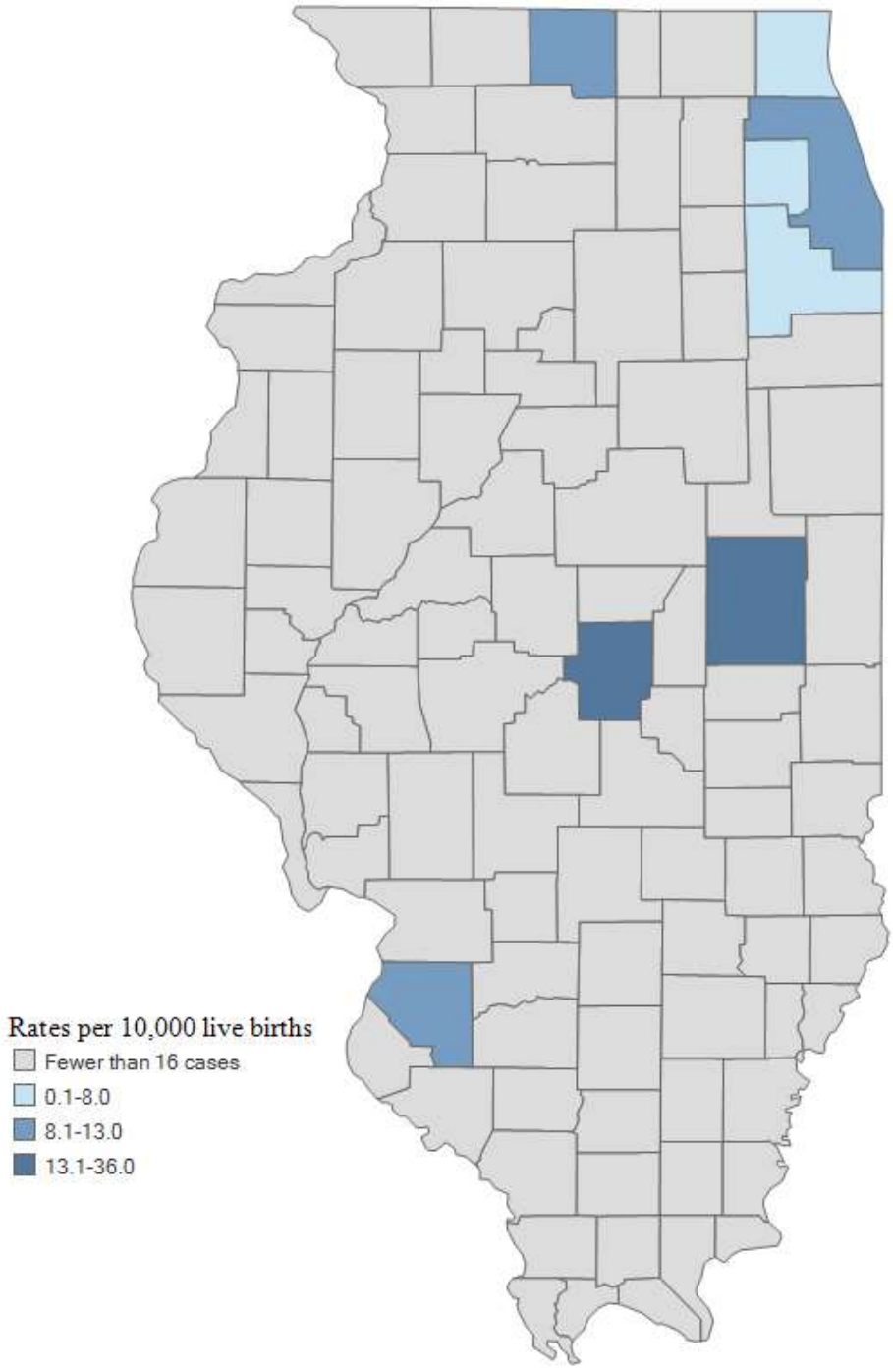
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 21. Prevalence Rates[1] and 95% Confidence Intervals For Blood Disorders in Newborn Infants by Selected Counties of Residence,[2] 2008-2012



[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, January 2019

Figure 22. Map of Prevalence Rates for Blood Disorders in Newborn Infants by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

FETAL ALCOHOL EXPOSURE

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.

Multiple birth defects associated with "classical" fetal alcohol syndrome consist of the following: 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.

Fetal alcohol syndrome is rarely diagnosed in newborn infants. The data collected by APORS includes babies diagnosed with fetal alcohol spectrum disorders as well as those affected by or significantly exposed to alcohol as reported by Illinois hospitals. Table 23 gives five-year prevalence rates for significantly alcohol exposed infants by county.

There is no figure illustrating the data since only Cook and Winnebago counties had more than 16 cases.

Table 23. Total Number and Prevalence Rates of Newborn Infants with Fetal Alcohol Exposure by County of Residence, 2008-2012

			95% CI[2]					95% CI[2]	
County	**Cases**	**Rate[1]**	**Lower**	**Upper**	**County**	**Cases**	**Rate[1]**	**Lower**	**Upper**
ILLINOIS	128	1.5	1.3	1.8	Lee	0	0.0	0.0	20.0
Adams	0	0.0	0.0	9.1	Livingston	0	0.0	0.0	15.7
Alexander	0	0.0	0.0	67.7	Logan	1	6.5	0.2	36.4
Bond	1	11.4	0.3	63.6	McDonough	0	0.0	0.0	25.0
Boone	2	6.5	0.8	23.4	McHenry	0	0.0	0.0	2.1
Brown	0	0.0	0.0	133.7	McLean	3	2.8	0.6	8.2
Bureau	1	5.6	0.1	31.2	Macon	3	4.3	0.9	12.6
Calhoun	0	0.0	0.0	139.2	Macoupin	0	0.0	0.0	15.2
Carroll	0	0.0	0.0	52.8	Madison	2	1.2	0.1	4.4
Cass	0	0.0	0.0	40.3	Marion	0	0.0	0.0	14.6
Champaign	4	3.3	0.9	8.5	Marshall	0	0.0	0.0	60.3
Christian	0	0.0	0.0	19.5	Mason	0	0.0	0.0	50.9
Clark	1	10.4	0.3	57.7	Massac	0	0.0	0.0	41.5
Clay	0	0.0	0.0	43.6	Menard	0	0.0	0.0	58.3
Clinton	0	0.0	0.0	17.9	Mercer	0	0.0	0.0	46.4
Coles	2	7.5	0.9	27.0	Monroe	0	0.0	0.0	21.9
Cook	30	0.8	0.6	1.2	Montgomery	0	0.0	0.0	23.8
Crawford	0	0.0	0.0	35.9	Morgan	0	0.0	0.0	19.6
Cumberland	1	16.5	0.4	92.1	Moultrie	0	0.0	0.0	42.5
DeKalb	0	0.0	0.0	5.9	Ogle	1	3.6	0.1	19.9
DeWitt	0	0.0	0.0	39.2	Peoria	0	0.0	0.0	2.8
Douglas	0	0.0	0.0	27.4	Perry	0	0.0	0.0	35.3
DuPage	1	0.2	0.0	1.0	Piatt	0	0.0	0.0	43.8
Edgar	0	0.0	0.0	38.4	Pike	0	0.0	0.0	40.4
Edwards	0	0.0	0.0	103.3	Pope	0	0.0	0.0	238.0
Effingham	2	8.9	1.1	32.2	Pulaski	0	0.0	0.0	112.8
Fayette	1	8.2	0.2	45.6	Putnam	0	0.0	0.0	140.3
Ford	0	0.0	0.0	50.3	Randolph	0	0.0	0.0	20.6
Franklin	0	0.0	0.0	15.8	Richland	0	0.0	0.0	37.6
Fulton	0	0.0	0.0	20.2	Rock Island	0	0.0	0.0	3.8
Gallatin	0	0.0	0.0	129.9	St. Clair	2	1.1	0.1	4.0
Greene	0	0.0	0.0	48.2	Saline	0	0.0	0.0	23.8
Grundy	0	0.0	0.0	11.1	Sangamon	1	0.8	0.0	4.6
Hamilton	0	0.0	0.0	78.2	Schuyler	0	0.0	0.0	100.2
Hancock	0	0.0	0.0	37.4	Scott	0	0.0	0.0	136.1
Hardin	0	0.0	0.0	179.1	Shelby	0	0.0	0.0	32.4
Henderson	0	0.0	0.0	123.4	Stark	0	0.0	0.0	129.4
Henry	0	0.0	0.0	13.4	Stephenson	1	3.9	0.1	22.0
Iroquois	0	0.0	0.0	23.7	Tazewell	2	2.4	0.3	8.8
Jackson	0	0.0	0.0	10.9	Union	0	0.0	0.0	39.0
Jasper	0	0.0	0.0	65.3	Vermillion	5	9.2	3.0	21.5
Jefferson	0	0.0	0.0	15.3	Wabash	0	0.0	0.0	49.8
Jersey	0	0.0	0.0	32.4	Warren	0	0.0	0.0	36.1
Jo Daviess	0	0.0	0.0	36.8	Washington	0	0.0	0.0	50.7
Johnson	0	0.0	0.0	62.8	Wayne	0	0.0	0.0	35.9
Kane	2	0.5	0.1	2.0	White	0	0.0	0.0	42.5
Kankakee	0	0.0	0.0	5.1	Whiteside	4	12.0	3.3	30.6
Kendall	0	0.0	0.0	4.1	Will	3	0.7	0.1	2.0
Knox	0	0.0	0.0	13.8	Williamson	1	2.6	0.1	14.6
Lake	11	2.6	1.3	4.6	Winnebago	40	20.9	14.9	28.5
LaSalle	0	0.0	0.0	5.9	Woodford	0	0.0	0.0	16.2
Lawrence	0	0.0	0.0	43.7					

[1] Per 10,000 live births

[2] 95% confidence intervals for rate

Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

OTHER ADVERSE PREGNANCY OUTCOMES

APORS collects information on a variety of other adverse outcomes in newborns. Descriptions of these conditions follow, together with Table 24, which gives the five-year prevalence rates for each condition for the state. Table 25 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.

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.

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.

Chorioretinitis is an inflammation of the uveal tract, which lines the inside of the eye behind the cornea. It almost always affects the retina, usually following an active microbial invasion of the tissues. Toxoplasmosis and cytomegalovirus are the most common causes. Onset is insidious: vision gradually becomes blurred, pain is minimal, mild photophobia is present, and the pupil is often constricted and/or irregular in shape. The disease can last months to years, sometimes with remissions and exacerbations, and may cause permanent damage with marked visual loss.

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.

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.

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.

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.

Table 24. Total Number and Prevalence Rates of Other Adverse Pregnancy Outcomes in Newborn Infants, Illinois, 2008-2012

Defect	ICD-9-CM Codes	Cases	Rate[1]	95% CI[2]	
				Lower	Upper
Cerebral lipidoses	330.1	0	0	0.0	0.1
Chorioretinitis	363.20-363.22	3	0.0	0.0	0.1
Endocardial fibroelastosis	425.3	8	0.1	0.0	0.2
Intrauterine growth restriction	764.90-764.99	4,424	53.1	51.5	54.7
Neurofibromatosis	237.70-237.72	3	0.0	0.0	0.1
Occlusion of cerebral arteries	434.00-434.91	170	2.0	1.7	2.4
Retinopathy of prematurity	362.20-362.27	2,473	29.7	28.5	30.9
Strabismus	378.00-378.9	15	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, January 2019

Table 25. Total Number and Prevalence Rates of Other Adverse Pregnancy Outcomes in Newborn Infants by County of Residence, 2008-2012

			95% CI[2]					95% CI[2]	
County	Cases	Rate[1]	Lower	Upper	County	Cases	Rate[1]	Lower	Upper
ILLINOIS	7,096	85.2	83.2	87.2	Lee	14	75.8	41.4	127.1
Adams	42	103.9	74.9	140.5	Livingston	16	68.0	38.9	110.4
Alexander	2	36.7	4.4	132.6	Logan	14	91.4	50.0	153.4
Bond	7	79.9	32.1	164.6	McDonough	23	155.9	98.8	234.0
Boone	37	119.9	84.4	165.3	McHenry	101	57.5	46.8	69.9
Brown	5	181.2	58.8	422.8	McLean	96	90.0	72.9	109.9
Bureau	11	61.6	30.8	110.3	Macon	61	87.4	66.8	112.2
Calhoun	1	37.7	1.0	210.3	Macoupin	19	78.4	47.2	122.4
Carroll	8	114.6	49.5	225.8	Madison	91	55.9	45.0	68.6
Cass	6	65.5	24.0	142.6	Marion	28	110.7	73.6	160.0
Champaign	203	169.0	146.6	194.0	Marshall	4	65.4	17.8	167.3
Christian	28	147.7	98.1	213.4	Mason	11	151.7	75.7	271.5
Clark	3	31.1	6.4	90.8	Massac	0	0.0	0.0	41.5
Clay	10	118.1	56.6	217.1	Menard	6	94.8	34.8	206.3
Clinton	12	58.1	30.0	101.5	Mercer	2	25.2	3.0	90.9
Coles	12	44.9	23.2	78.4	Monroe	7	41.6	16.7	85.6
Cook	3,424	93.1	90.0	96.3	Montgomery	16	103.3	59.0	167.7
Crawford	10	97.4	46.7	179.1	Morgan	11	58.6	29.2	104.8
Cumberland	6	99.2	36.4	215.9	Moultrie	8	92.2	39.8	181.6
DeKalb	30	47.7	32.2	68.1	Ogle	22	78.6	49.3	119.0
DeWitt	11	117.0	58.4	209.4	Peoria	167	124.5	106.3	144.9
Douglas	11	81.8	40.9	146.4	Perry	5	47.8	15.5	111.6
DuPage	491	90.6	82.7	98.9	Piatt	5	59.4	19.3	138.6
Edgar	8	83.2	35.9	164.0	Pike	11	120.6	60.2	215.8
Edwards	0	0.0	0.0	103.3	Pope	1	64.5	1.6	359.5
Effingham	35	155.8	108.5	216.7	Pulaski	2	61.2	7.4	220.9
Fayette	14	114.5	62.6	192.1	Putnam	1	38.0	1.0	211.8
Ford	9	122.8	56.1	233.1	Randolph	5	28.0	9.1	65.3
Franklin	16	68.6	39.2	111.3	Richland	6	61.2	22.5	133.3
Fulton	12	65.6	33.9	114.7	Rock Island	38	39.3	27.8	53.9
Gallatin	1	35.2	0.9	196.2	St. Clair	120	66.9	55.4	80.0
Greene	12	156.7	80.9	273.6	Saline	7	45.2	18.2	93.2
Grundy	28	84.4	56.1	122.0	Sangamon	142	117.1	98.7	138.1
Hamilton	1	21.2	0.5	118.0	Schuyler	2	54.3	6.6	196.3
Hancock	10	101.3	48.6	186.3	Scott	4	147.6	40.2	377.9
Hardin	0	0.0	0.0	179.1	Shelby	10	87.7	42.1	161.3
Henderson	4	133.8	36.5	342.5	Stark	3	105.3	21.7	307.6
Henry	21	76.5	47.3	116.9	Stephenson	41	161.6	116.0	219.2
Iroquois	10	64.2	30.8	118.1	Tazewell	83	101.1	80.5	125.3
Jackson	29	85.5	57.2	122.7	Union	7	73.9	29.7	152.3
Jasper	7	123.9	49.8	255.3	Vermillion	47	86.7	63.7	115.2
Jefferson	14	58.0	31.7	97.3	Wabash	0	0.0	0.0	49.8
Jersey	2	17.5	2.1	63.4	Warren	5	48.9	15.9	114.2
Jo Daviess	7	69.8	28.1	143.8	Washington	2	27.5	3.3	99.4
Johnson	1	17.0	0.4	94.9	Wayne	3	29.2	6.0	85.4
Kane	213	57.6	50.2	65.9	White	2	23.1	2.8	83.3
Kankakee	28	39.0	25.9	56.4	Whiteside	10	29.9	14.3	55.0
Kendall	53	58.8	44.0	76.8	Will	353	81.5	73.2	90.4
Knox	28	104.6	69.5	151.2	Williamson	16	41.8	23.9	67.9
Lake	288	67.0	59.5	75.2	Winnebago	163	85.3	72.7	99.4
LaSalle	48	76.8	56.6	101.8	Woodford	14	61.6	33.7	103.3
Lawrence	0	0.0	0.0	43.7					

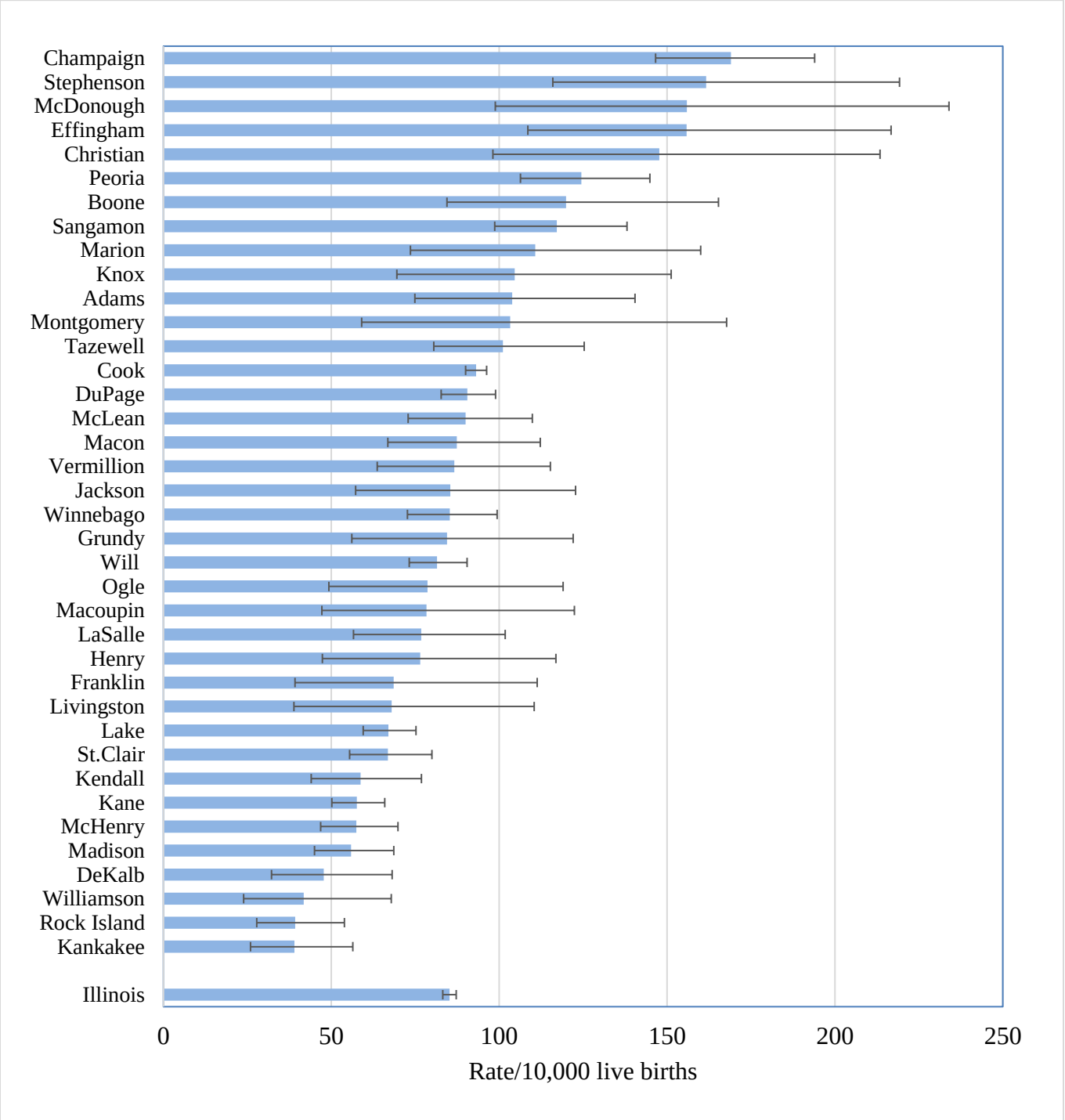
[1] Per 10,000 live births

[2] 95% confidence interval for rate

The number for Illinois two cases for which county of residence is missing.

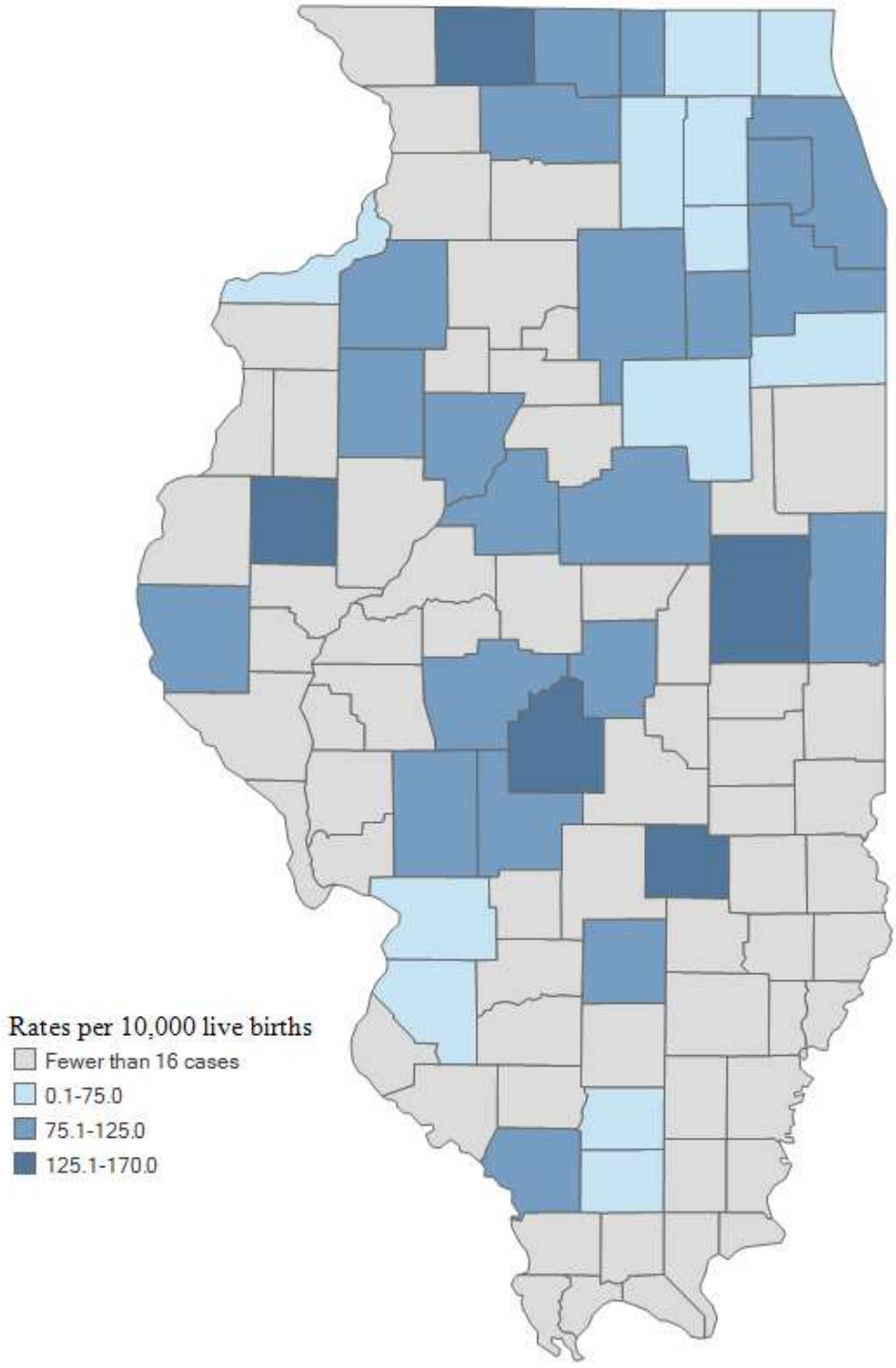
Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

Figure 23. Prevalence Rates[1] and 95% Confidence Intervals for Other Adverse Pregnancy Outcomes in Newborn Infants by Selected Counties of Residence,[2] 2008-2012



[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, January 2019

Figure 24. Map of Prevalence Rates for Newborn Infants with Other Adverse Pregnancy Outcomes, by Selected Counties of Residence, 2008-2012



Source: Illinois Department of Public Health, Adverse Pregnancy Outcomes Reporting System, January 2019

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