



---

## **RATES OF HOSPITAL REPORTING OF ADVERSE PREGNANCY OUTCOMES IN 2018**

**February 2020**

**Theresa Sandidge, M.A.**  
**Adverse Pregnancy Outcomes Reporting System**

### **PURPOSE**

The Illinois Department of Public Health's (IDPH) regulations require hospitals to report adverse pregnancy outcomes identified in Illinois residents during the newborn hospital stay. In 2018, these included infants with birth defects, prematurity (less than 31 weeks), serious congenital infections, intrauterine growth restriction, retinopathy of prematurity, those who had other serious conditions and those who died during the newborn stay (Appendix 1). Rates of adverse pregnancy outcome reporting are calculated by the Adverse Pregnancy Outcomes Reporting System (APORS) to compare the number of adverse pregnancy outcomes each hospital reported to the number of live births at that hospital. The results are used to provide hospital-specific feedback to improve the completeness of case reporting.

### **METHODS**

Several hospitals are not included in this study for various reasons. Three out-of-state hospitals that are part of the Illinois Perinatal Network are not included because the number of births to

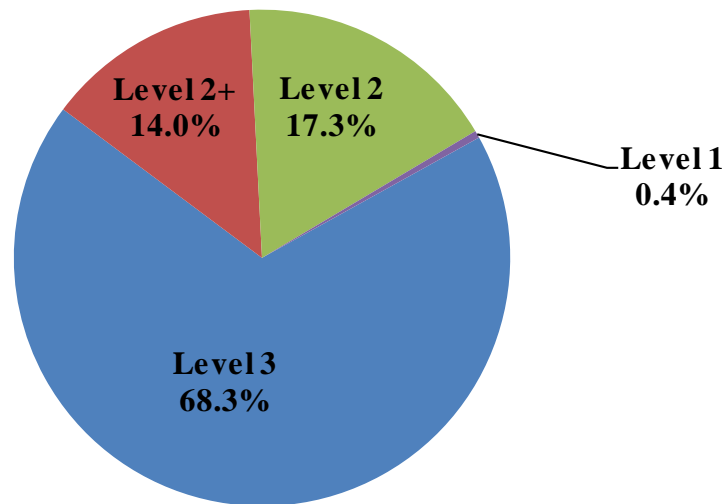
Illinois residents at those facilities is not available for this study period. Two additional hospitals are excluded because no births take place there; they provide services to newborns transferred from delivery hospitals. Data for 2018 shows that 138,534 births took place at the 115 included Illinois Perinatal Network hospitals. The number of births is based on the number of 2018 birth certificates filed by Illinois hospitals with IDPH's Division of Vital Records. These 115 hospitals reported 9,516 cases to APORS either electronically or on paper forms provided by the program. Each hospital's case reporting rate was calculated as the percentage of reported cases among the total number of births at that hospital. The reporting rate for a hospital level was calculated as the number of cases reported by hospitals at that level divided by the total number of births at hospitals at that level.

## **RESULTS**

*Overall Case Reporting Rates.* For 2018, case reporting rates among all hospitals ranged from 0.4% to 18.8% with the average being 6.9%, nearly the same as the 2017 average of 6.8%. In Illinois, hospitals are certified at one of four levels, depending on the services they offer. The Level 3 facilities care for patients requiring the most complex care and operate a neonatal intensive care unit (NICU). The Level 2+ hospitals provide care to newborns at moderate risk and operate a Special Care Nursery (SCN) but not a NICU. Level 2 hospitals provide care to newborns at moderate risk, and have intermediate care nurseries, but do not operate a NICU or a SCN. Level 1 hospitals provide care to low-risk newborns and have only general care nurseries. Most APORS cases are reported by Level 3 facilities, with very few being born at Level 1 hospitals (Figure 1). Since mothers whose babies have known or suspected adverse outcomes are expected to deliver at Level 3 or 2+ hospitals, to assure their babies receive the appropriate

care, the analyses of case completeness rates were reported separately for each care level. If a baby is transferred between hospitals, the highest level facility is responsible for reporting the case.

**Figure 1. Percentage of APORS Cases Reported by Hospital Level, 2018**



*Hospital Case Reporting Rates.* When examining combined reporting rates by level of care, the 23 Level 3 hospitals had the highest reporting rate at 9.7% (Table 1). This is expected given these hospitals care for the most complex cases and report the majority of cases to APORS. The combined reporting rates for Level 2+ and Level 2 facilities were 4.2%. (Tables 2 and 3). The eight Level 1 hospitals reported 3.4% of their births (Table 4).

For each level of care, there were varied ranges of reporting rates among hospitals. Among Level 3 hospitals the reporting rates by hospital ranged from 3.3% to 18.8%. Among level 2+ hospitals rates ranged from 1.7% to 7.4%, while among level 2 facilities the range was 0.4% to 12.9%. Among the level 1 hospitals rates ranged from 1.1% to 4.8%.

**Table 1. Case Reporting Rates in 2018 for Level 3 Hospitals**

<b>Hospital</b>	<b>Cases</b>	<b>Rate</b>	<b>Hospital</b>	<b>Cases</b>	<b>Rate</b>
<b>3-1</b>	35	3.3	<b>3-13</b>	1,139	9.6
<b>3-2</b>	94	3.8	<b>3-14</b>	211	9.8
<b>3-3</b>	167	5.5	<b>3-15</b>	278	10.1
<b>3-4</b>	103	5.9	<b>3-16</b>	98	10.4
<b>3-5</b>	230	5.9	<b>3-17</b>	149	11.3
<b>3-6</b>	178	6.3	<b>3-18</b>	258	14.8
<b>3-7</b>	216	6.8	<b>3-19</b>	396	14.9
<b>3-8</b>	188	7.2	<b>3-20</b>	377	16.5
<b>3-9</b>	247	7.3	<b>3-21</b>	398	17.7
<b>3-10</b>	269	7.8	<b>3-22</b>	516	17.8
<b>3-11</b>	155	8.2	<b>3-23</b>	390	18.8
<b>3-12</b>	404	9.4	<i><b>Combined</b></i>	<b>6,496</b>	<b>9.7</b>

**Table 2. Case Reporting Rates in 2018 for Level 2+ Hospitals**

<b>Hospital</b>	<b>Cases</b>	<b>Rate</b>	<b>Hospital</b>	<b>Cases</b>	<b>Rate</b>
<b>2+-1</b>	17	1.7	<b>2+-14</b>	35	4.3
<b>2+-2</b>	23	2.1	<b>2+-15</b>	73	4.6
<b>2+-3</b>	37	2.3	<b>2+-16</b>	87	4.9
<b>2+-4</b>	36	3.0	<b>2+-17</b>	48	5.0
<b>2+-5</b>	50	3.2	<b>2+-18</b>	60	5.1
<b>2+-6</b>	45	3.2	<b>2+-19</b>	98	5.2
<b>2+-7</b>	79	3.3	<b>2+-20</b>	91	5.5
<b>2+-8</b>	19	3.6	<b>2+-21</b>	65	5.8
<b>2+-9</b>	20	3.8	<b>2+-23</b>	136	5.8
<b>2+-10</b>	11	3.8	<b>2+-23</b>	74	7.1
<b>2+-11</b>	43	3.8	<b>2+-24</b>	37	7.4
<b>2+-12</b>	103	3.8	<i><b>Combined</b></i>	<b>1,331</b>	<b>4.2</b>
<b>2+-13</b>	44	4.0			

**Table 3. Case Reporting Rates in 2018 for Level 2 Hospitals**

Hospital	Cases	Rate	Hospital	Cases	Rate	Hospital	Cases	Rate
2-1	6	0.4	2-22	10	2.8	2-43	16	6.0
2-2	4	0.8	2-23	21	2.9	2-44	8	6.2
2-3	3	0.9	2-24	7	3.0	2-45	46	6.2
2-4	12	1.0	2-25	6	3.1	2-46	45	6.3
2-5	2	1.2	2-26	23	3.1	2-47	8	6.5
2-6	7	1.3	2-27	12	3.2	2-48	32	6.7
2-7	5	1.3	2-28	48	3.6	2-49	21	7.1
2-8	11	1.4	2-29	49	4.0	2-50	11	8.1
2-9	18	1.6	2-30	17	4.1	2-51	26	8.2
2-10	10	1.7	2-31	24	4.2	2-52	23	8.2
2-11	12	1.8	2-32	62	4.2	2-53	60	8.9
2-12	11	1.9	2-33	10	4.3	2-54	50	8.9
2-13	15	2.0	2-34	38	4.4	2-55	66	8.9
2-14	16	2.1	2-35	15	4.6	2-56	97	9.1
2-15	20	2.2	2-36	22	4.9	2-57	89	9.5
2-16	25	2.4	2-37	12	5.1	2-58	39	9.6
2-17	9	2.5	2-38	74	5.1	2-59	36	10.3
2-18	57	2.5	2-39	74	5.1	2-60	65	11.9
2-19	10	2.6	2-40	7	5.1	2-61	4	12.9
2-20	14	2.6	2-41	14	5.4	<i>Combined</i>	<i>1,644</i>	<i>4.2</i>
2-21	9	2.8	2-42	81	5.8			

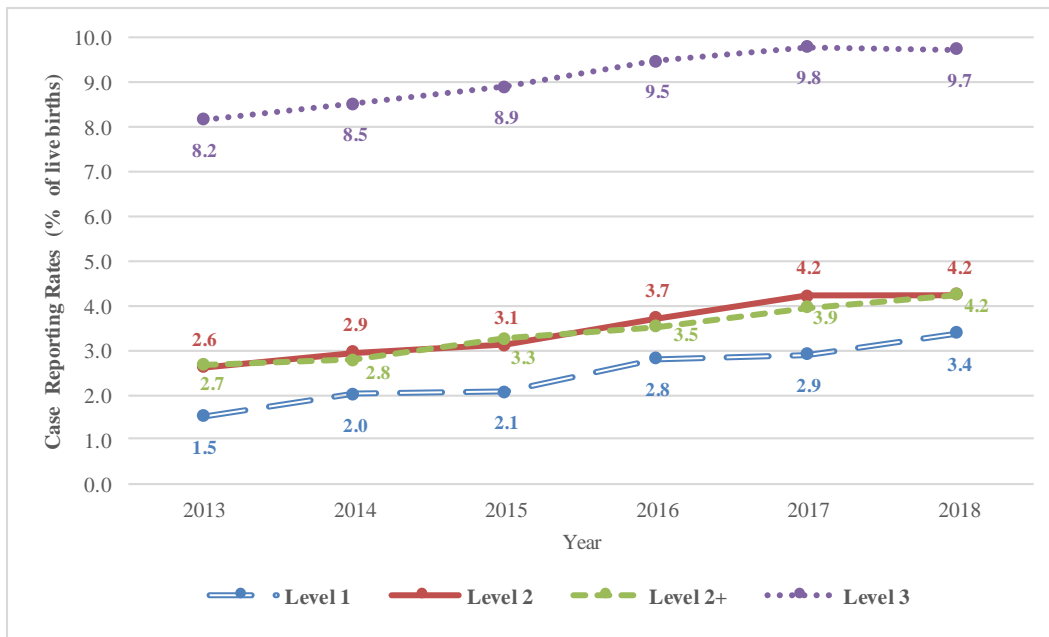
**Table 4. Case Reporting Rates in 2018 for Level 1 Hospitals**

Hospital	Cases	Rate	Hospital	Cases	Rate
1-1	1	1.1	1-5	8	3.6
1-2	2	1.1	1-6	9	4.8
1-3	6	2.9	1-7	11	4.8
1-4	8	3.6	<i>Combined</i>	<i>45</i>	<i>3.4</i>

## DISCUSSION

Since the introduction of a revised APORS case definition<sup>1</sup> and electronic reporting in 2013, combined hospital reporting rates for each perinatal designation level have steadily increased, plateauing in 2018 for Levels 2 and 3 hospitals (see Figure 2 below). The increase in case reporting over this time period can be attributed to a number of factors including the systematic flagging of certain reportable conditions on the birth certificate through the electronic reporting system, increased case identification by hospital staffs as they have adjusted to the revised reporting definition, and improvements in technology utilized to identify reportable conditions. Additionally, during 2016 and 2017 in conjunction with the Centers for Disease Control and

**Figure 2. Case Reporting Rates by Hospital Level, Illinois, 2013-2018**

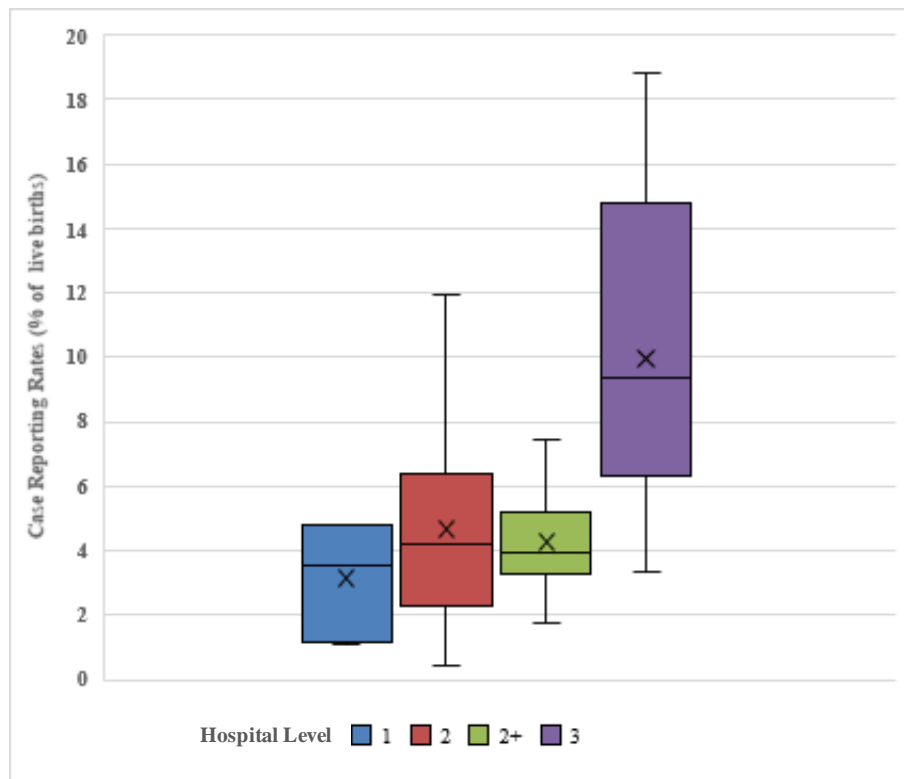


<sup>1</sup> Major changes to the case definition consisted of dropping very low birth weight (VLBW), marijuana exposure, patent foramen ovale (PFO), and patent ductus arteriosus (PDA). Conditions introduced included <31 weeks gestational age, triplet births, extracorporeal membrane oxygen (ECMO), hypoxic ischemic encephalopathy (HIE), Erb's Palsy, and maternal admission of illicit drug during pregnancy.

Prevention (CDC), APORS engaged in rapid case identification of conditions potentially related to the Zika virus, raising hospital awareness of the need for prompt reporting of brain and eye anomalies, neural tube defects, and arthrogyposis.

Although rates have increased over time, as discussed in previous reports, case reporting continues to vary widely among hospitals providing the same level of care. Distributions of the reporting rates by hospital level are illustrated in Figure 3 below using box and whisker plots<sup>2</sup>.

**Figure 3. Distribution of Case Reporting Rates in 2018 by Hospital Level**



<sup>2</sup> For each hospital level, the shaded box represents the middle 50% of rates for that level. The whiskers extending upwards or downwards represent the upper and lower 25% of rates respectively. Within the shaded box, the X represents the mean (average) while the line that divides the box into two parts is the median (middle) point. Half of the rates are greater than or equal to the median, while half are less.

The box plot for Level 3 hospital reporting is tall with long whiskers, suggesting quite different reporting rates among the Level 3 hospitals. While Levels 2 and 2+ hospitals have similar combined reporting rates, the box plot for Level 2 hospitals is longer with whiskers extending further out, indicating a greater level of variance in rates overall. The box plot for the seven Level 1 hospitals exhibits unevenness in the shaded area around the median point, indicating some variance in rates.

Variation in reporting is expected among hospitals providing the same level of care due to differences in populations served, transfer protocols between hospitals, and types of specialty care offered. However, there is also the possibility that underreporting is occurring in some facilities. Underreporting happens when hospital staffs do not identify and report every case to APORS. Hospitals may be particularly prone to underreporting when staffs change.

APORS continually works to maximize case identification by providing training, education and support to hospitals. Hospital specific training is provided on an ongoing basis for new hospital reporters, and statewide webinars are held several times per year to provide up-to-date reporting information on selected topics and to allow an open question-and-answer forum between hospital reporting staff and APORS staff. Hospitals have access to a dedicated SharePoint site online where they can access manuals, training videos, webinar recordings and other materials. APORS also provides prompt follow-up to hospital inquiries through the use of a dedicated email address hospitals utilize to communicate with the APORS team. Finally, quality control reports are provided periodically to hospitals throughout the year to assist with assessment of timely and complete reporting. APORS will maintain these supports and develop new approaches as needed



to further assist with case identification so that babies and families are provided the assistance needed after leaving the hospital.

**Appendix 1**  
**Conditions for APORS Hospital Nursery Reporting**

<b>Gestational age less than 31 completed weeks (based on physician's assessment)</b>			
<b>Multiple birth, triplets or higher order</b>			
<b>Infant death (before discharge from the newborn stay)</b> Expiration after showing signs of life including breathing; heart beat; pulsation of the umbilical cord; or definite movement of voluntary muscles. May have a zero APGAR score. A birth certificate should be issued.			
<b>Prenatal drug exposure</b>			
Diagnosis of a positive toxicology for any drug (except marijuana or drugs administered during labor and delivery)			
Signs of drug toxicity or withdrawal (in the infant)			
Children of mothers who admit to illicit drug use during pregnancy (except marijuana)			
<b>Birth defect or congenital anomaly (except as listed below)</b>			
<i>Congenital pigment anomalies (stork bites, Mongolian spots etc.)</i>	<i>Peripheral pulmonic stenosis (PPS)</i>	<i>Skin tag</i>	
<i>Dacrostenosis</i>	<i>Persistent fetal circulation</i>	<i>Syndactyly</i>	
<i>Incomplete or redundant penile foreskin</i>	<i>Polydactyly</i>	<i>Tongue tie</i>	
<i>Isolated choroid plexus cyst</i>	<i>Preauricular sinus</i>	<i>Two-vessel cord</i>	
<i>Isolated simian crease</i>	<i>Prenatal diagnosis of hydronephrosis, caliectasis or pelviectasis</i>	<i>Umbilical hernia</i>	
<i>Patent ductus arteriosus (PDA)</i>	<i>Sacral dimple with visualized base or post-natal imaging ruling out problem</i>	<i>Undescended testes</i>	
<i>Patent foramen ovale (PFO)</i>		<i>Vascular hamatomas (small or insignificant birth marks, port wine stains, strawberry nevi etc.)</i>	
<b>Serious congenital infections (Excludes: Hepatitis C or HIV exposure, neonatal candidiasis (thrush), conjunctivitis, dacrocystitis, infective mastitis and omphalitis, and HIV)</b>			
Chlamydia	Hepatitis B (disease or prenatal exposure)	Rubella	
Confirmed septicemia (sepsis)	Herpes	Syphilis (disease or exposure to active disease)	
Cytomegalovirus	Listeriosis	Tetanus neonatorum	
Gonococcal conjunctivitis neonatorum	Meningitis		
Group B streptococcus	Necrotizing enterocolitis leading to surgery		
<b>Endocrine, metabolic or immune disorders</b>			
Combined immunity deficiency	Hypothyroidism		
<b>Blood disorder</b>			
Coagulation defects	Constitutional aplastic anemia	Hereditary hemolytic anemia	Leukemia
<b>Other conditions</b>			
Bronchopulmonary dysplasia	Endocardial fibroelastosis	IVH grade III or IV	
Cerebral lipidoses	Erb's palsy	Neurofibromatosis	
Chorioretinitis	Fetal alcohol syndrome	Occlusion of cerebral arteries	
Conditions leading to ECMO	HIE leading to cooling treatment	Retinopathy of prematurity	
Conditions leading to >72 hours on a ventilator	Intra uterine growth restriction leading to SGA	Strabismus	
		Seizures	