Delaware CDRC
REVIEW & PREVENTION OF CHILD DEATHS

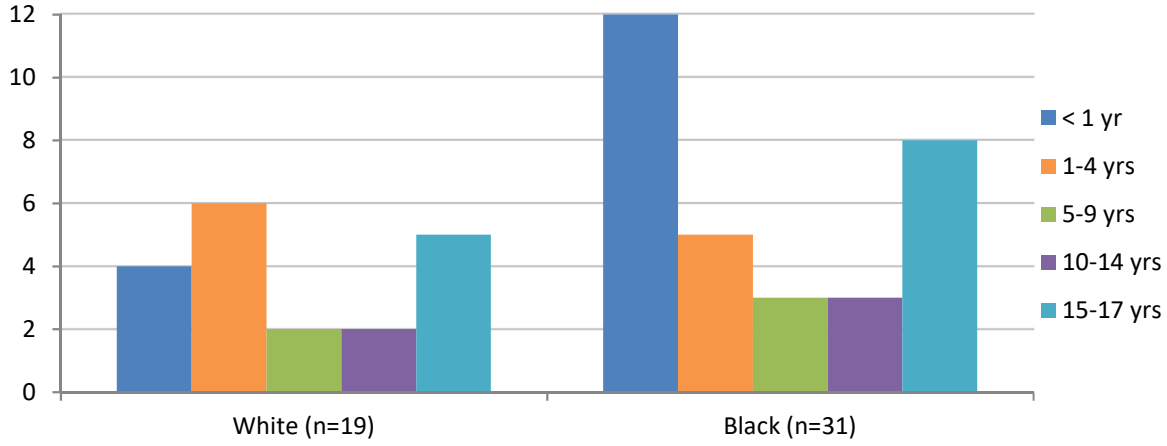
Child Death Review Commission: Data Addendum for Annual Report 2018

Child Death Review (CDR)/Sudden Death in the Young (SDY)

Quick Statistics:

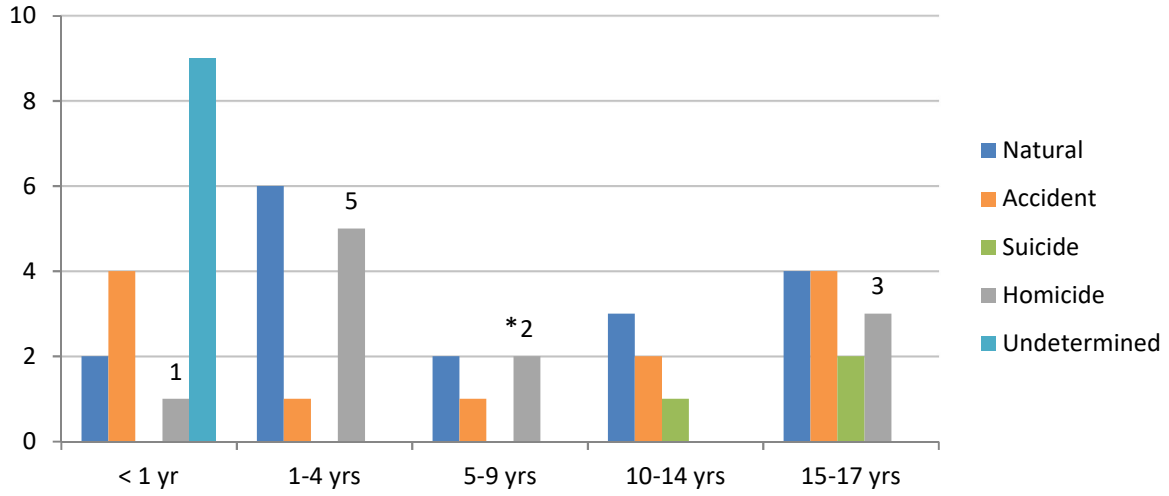
- 52 cases reviewed – 26 by CDR and 26 by SDY panels
- 16 infant cases reviewed
- 12 unsafe sleep deaths reviewed
- 14 cases were reviewed jointly with the Child Abuse and Neglect (CAN) panel
- New Castle residents made up 71%, Kent 12% and Sussex 15% of cases
- Two-thirds of the cases were males (65%) and one-third (35%) were females

CDR/SDY Cases: Age and Race



- **Black children had a three-fold higher relative risk of death compared to White children up to the age of 18 years.** Black children made up 25% of the population of 0-19 years old in Delaware in 2017, but made up 59% of the CDR/SDY and FIMR infant cases.

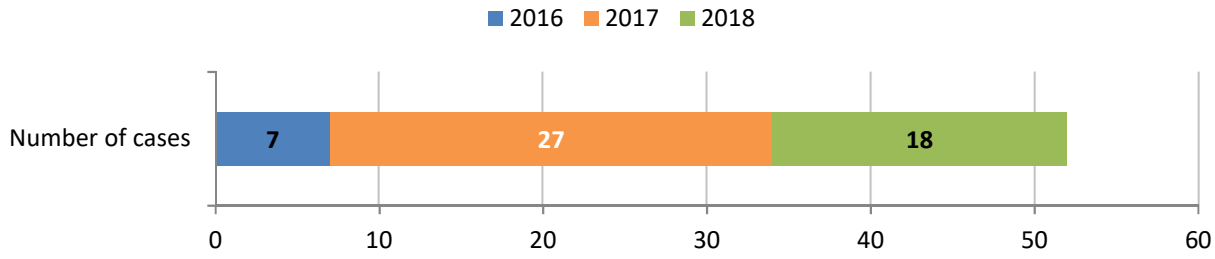
Age and Manner of Death in CDR/SDY Cases



*Numbers indicate homicides deaths in each age group

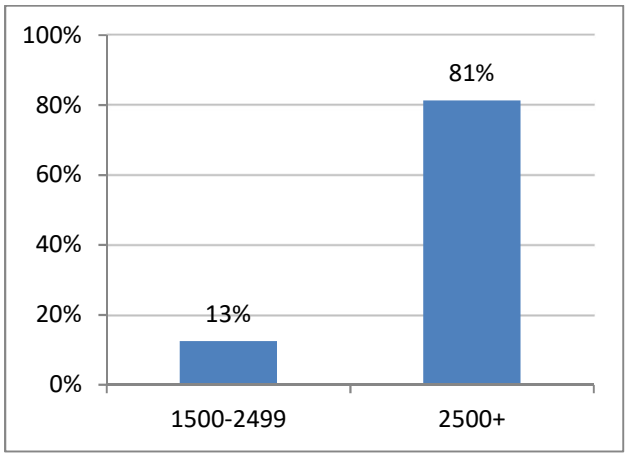
- The majority of infant deaths, 9 out of 16, were classified as undetermined.
- Homicide was the second leading manner of death in 1-9 year olds (n=7 cases). Inter-family violence accounted for all of these deaths.
- Twelve children were identified as having chronic health conditions, and 92% of them (n=11) succumbed to natural causes.
- Preventability: overall, 44% of cases were determined to be probably preventable. Most of these cases were accidents, suicides and undetermined by manner of death.

Year of Death

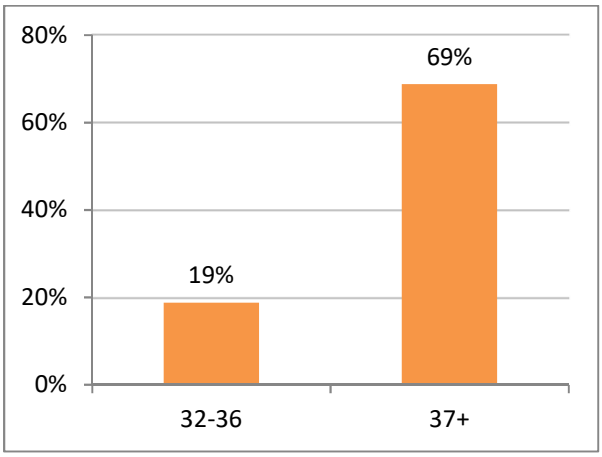


CDR/SDY Infant Deaths

Birthweight & Gestational Age: 2018 Cases



Birthweight in grams (n=16)



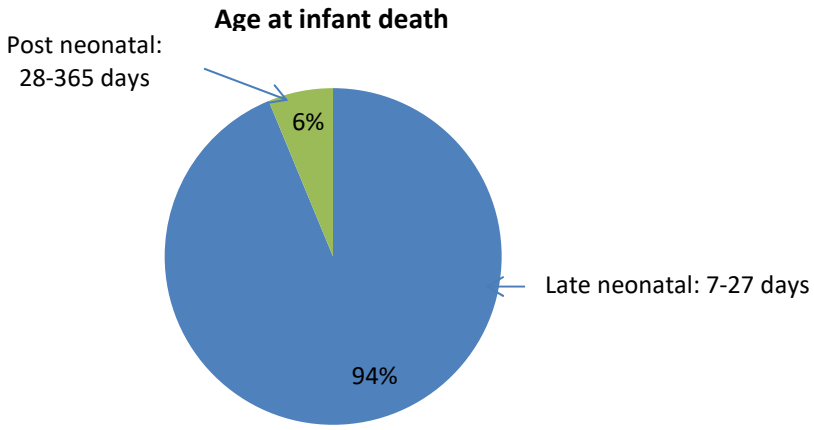
Gestational age in weeks (n=16)

Infant Cases: Tracking Issues by Year of Review

	2018 (n=16)	2017 (n=16)	2016 (n=31)
Intrauterine tobacco exposure	31%	29%	52%
Intrauterine alcohol exposure	6%	6%	3%
Intrauterine drug exposure	38%	19%	13%
Late or no prenatal care	25%	12%	23%
Insurance coverage for infant			
Medicaid	63%	69%	86%
Private	19%	18%	10%
None	6%	0%	5%
No ABC education documented	44%	50%	13%
No infant safe sleep education documented	6%	38%	6%
No drug screen done on mother	13%	6%	6%
Baby tested positive for drugs	19%	6%	19%
NAS scoring	13%	0%	22%
DFS notification for SEI	25%	6%	13%
Home visiting referral made	50%	25%	19%
Home visiting enrollment	19%	0%	10%

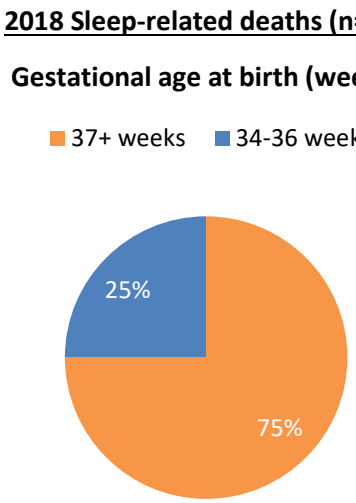
- All SEI had a DFS referral as well as a home visiting referral

	2018 (n=16)	2017 (n=16)	2016 (n=31)
Caregiver at time of death			
Parent	87%	81%	97%
Other	13%	19%	3%
Substance use at time of death	31%	19%	3%



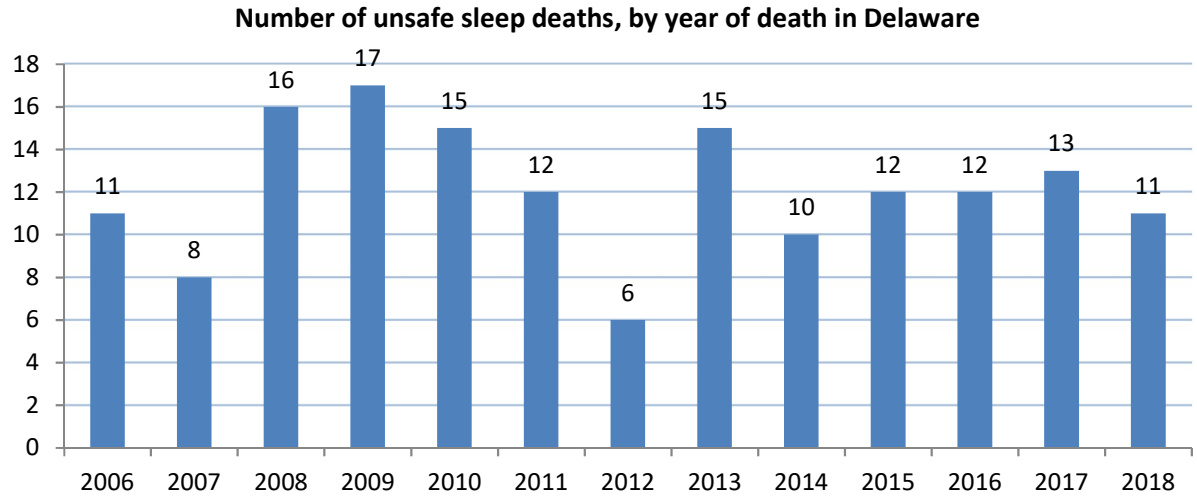
- Most common determination of cause of infant deaths: 12 sleep-related deaths

CDR/SDY Specific Causes of Death

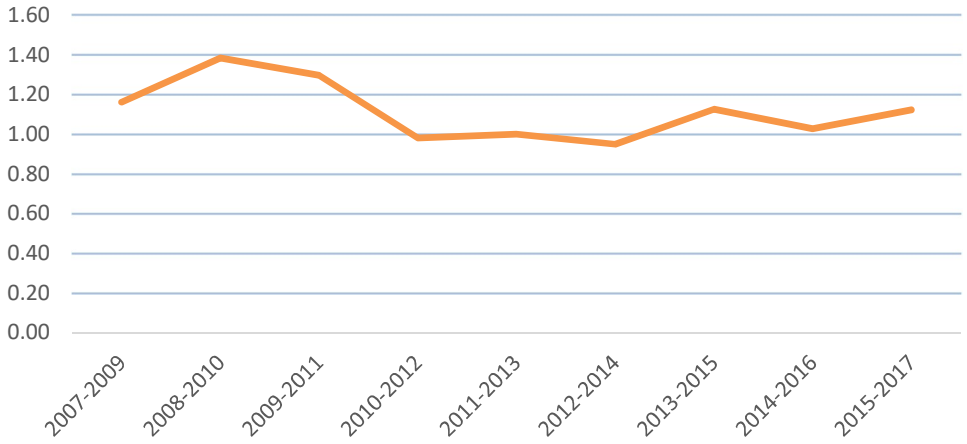


Age and race of 2018 unsafe sleep deaths:

- 4 White infants, 8 Black infants
- 6 infants < 1 month old
- 6 infants 2-7 months old



Unsafe sleep deaths: 3-year averaged rate per 1,000 live births



Sleep-related deaths, associated factors, by year of review

	2018 (n=12)	2017 (n=12)	2016 (n=23)	PRAMS 2012-2015[1]
Not in a crib, bassinette, side sleeper or baby box	100%	100%	82%	--
Not sleeping on back	75%	60%	50%	21%
Unsafe bedding or toys near infant	100%	90%	83%	--
Sleeping with other people	67%	83%	65%	16%[2]
Intrauterine drug exposure	33%	10%	*	--
Infant born drug-exposed	27%	10%	*	--
Tobacco use: mother	58%	40%	57%	24%[3]
Adult was alcohol or drug impaired	25%	25%	26%	--
Infant ever breastfed	50%	60%	48%	83%
Infant exclusively breastfed	8%	0%	0%	--
Mother fell asleep while breastfeeding	8%	0%	9%	--

[1]PRAMS=Pregnancy Risk Assessment Monitoring System. Hussaini SK. PRAMS Consolidated Report 2012-2015. Delaware Department of Health and Social Services, Division of Public Health. July 2018.

[2]Always of often

[3]Three months before pregnancy

*More than 50% of values unknown

Firearm deaths: associated factors

	Multiyear analysis 2008-2018 (n=28)
Type of gun	
Handgun	77%
Hunting rifle	10%
Parent owned firearm	23%
Storage	
Not stored	23%
Locked cabinet	13%
Unlocked cabinet	3%
Loaded	10%
Event at time of incident	
Intimate partner violence	10%
Gang-related activity	29%
Drive by shooting	19%
Playing with the firearm	6%
Child as bystander	10%

From the multiyear analysis 2008-2018:

- 9 out of 28 deaths determined to be potentially preventable

CDR/SDY Tracking Issues

Adverse Family Experiences, by year of review[1]

	2018 (n=52)	2017 (n=44)	2016 (n=105)
DFS notified of death[2]	100%	100%	100%
DFS rejected MDT response that should have been accepted, 0-3 year olds	6%	27%	50%
Active with DFS at time of death	8%	18%	10%
Active with DFS within 12 months of death	13%	32%	17%
DFS history: parents as adults	50%	64%	60%
DFS history: parents as children	35%	36%	
Single/divorced/separated parents	41%	27%	42%
Maternal substance abuse	45%	33%	*
Paternal substance abuse	50%	25%	*
Maternal criminal history	19%	21%	*
Paternal criminal history	43%	42%	*
Maternal mental health issue	32%	25%	*
Paternal mental health issue	19%	15%	*
Maternal intimate partner violence	31%	24%	*
Paternal intimate partner violence	36%	52%	*
Maternal history of abuse	19%	22%	*
Paternal history of abuse	6%	3%	*
Maternal history of neglect	21%	32%	*
Paternal history of neglect	17%	25%	*

[1]Denominator is applicable cases with known information

[2]Denominator is cases specified by statute: Title 16, Chapter 9, Subsection 906(e)(3) for DFS investigation

*More than 50% of values unknown so not reported here

Other Tracking Issues, by year of review

	2018 (n=52)	2017 (n=44)	2016 (n=105)
Hospice involved	17%	30%	NR
Teen parent	4%	5%	NR
No SUIDI reporting form[1]	0%	0%	17%
No scene investigation[1]	0%	0%	0%
No scene photos[1]	0%	0%	0%
No toxicology screen of perpetrator[1]	23%	42%	13%
No doll re-enactment[1]	38%	50%	52%

[1]denominator is infant deaths due to unsafe sleeping or undetermined manner

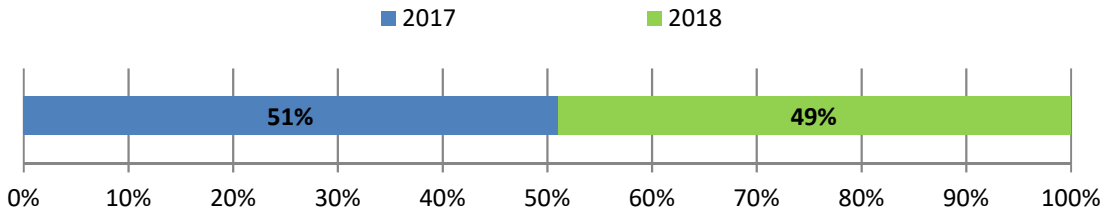
NR=not recorded

Fetal and Infant Mortality Review (FIMR)

Quick statistics:

- 45 cases reviewed in 2018, including 23 (51%) infant deaths and 22 (49%) fetal deaths
- 43 mothers, including 4 mothers (9%) with a previous infant or fetal loss
- 5 twins
- 1 maternal death

Year of death



23 (51%) in 2017
22 (49%) in 2018

Process & Workflow

Number of FIMR referrals to CDRC in 2018: 103

- Fifty-three cases accepted for FIMR based on randomization process
  - Six cases out of state→44 triage cases accepted for FIMR

Maternal interview completion rate: 4% (2), down from 19% (CY2017) and 34% (CY2016)
Average time between referral and CRT review: 4 months, down from 8 months in CY2017

Race/ethnicity

Race/Ethnicity	FIMR Total (n=45)	FIMR Infant (n=23)	FIMR Fetal (n=22)	DE live births 2017 (n=10,835)[1]	DE infant deaths 2016 (n=87)[2]	DE fetal deaths 2016 (n=48)[2]
White	40% (18)	30% (7)	50% (11)	49%	41%	35%
Black	49% (22)	48% (11)	50% (11)	27%	46%	56%
Hispanic	11% (5)	22% (5)	0%	16%	NR	6%

County & Zip Zones

	FIMR cases (n=45)	DE live births 2017 (n=10,835)[1]	DE infant deaths 2016 (n=87)[2]	DE fetal deaths 2016 (n=48)[2]
New Castle	67%	59%	71%	54%
Wilmington		9%	21%	--
Kent	33%	20%	16%	25%
Sussex		21%	13%	21%

FIMR cases with a high-risk zip zone: 53% (n=24)

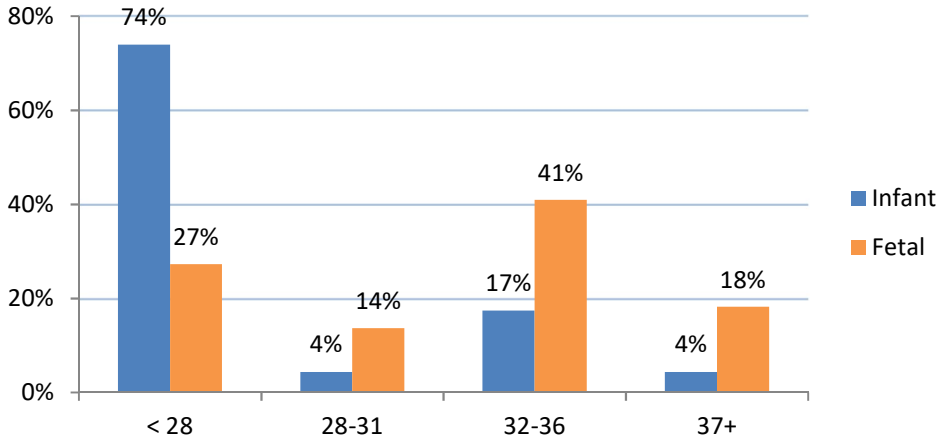
[1]Delaware Health and Social Services (DHSS), Division of Public Health (DPH). Delaware vital statistics annual report 2017. Available at: https://dhss.delaware.gov/DHSS/DPH/hp/annrepvs.html.
[2]DHSS, DPH. Delaware vital statistics annual report 2016. Available at: https://dhss.delaware.gov/DHSS/DPH/hp/annrepvs.html.

Birth Hospital & Infant Care

Level 3 birth hospital: 56% (25)
Level 2 birth hospital: 36% (16)
Level 1 birth hospital: 7%
Mode of delivery: C-section 22% (n=10) (compared to 32% of DE live births by C-section in 2017)

Gestational age

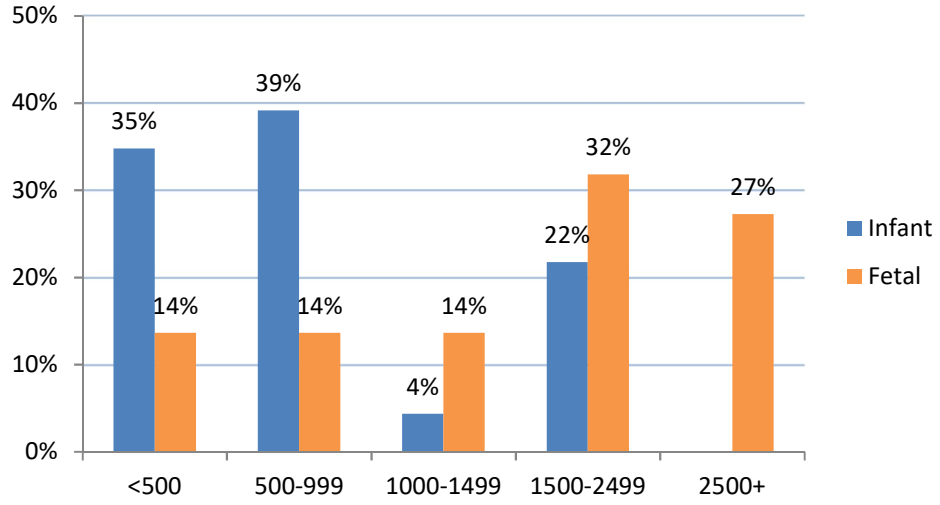
Gestational age in weeks, by type of death



Average infant gestational age: 25.5 weeks
Average fetal gestational age: 31.6 weeks

Birthweight

Birthweight in grams, by type of death



Average infant birthweight: 826 grams (1.8 lbs)
Average fetal birthweight: 1770 grams (3.9 lbs)

Perinatal Periods of Risk (PPOR)

Maternal Health/Prematurity: 60% (n=27)

- Preconception health, health behaviors, perinatal care
- Causes of death:
  - Prematurity (n=12)
  - Fetal death (n=9)
  - Also sepsis (n=3), necrotizing enterocolitis (n=3), congenital anomalies (n=1)

Maternal Care: 29% (n=13)

- Prenatal care, high-risk referral, obstetric care
- Cause of death: Fetal death

Newborn Care: 2% (n=1)

- Perinatal management, neonatal care, pediatric surgery
- Cause of death: Congenital anomaly

Infant Health: 9% (n=4)

- No infant was discharged home, so home factors not relevant
- Cause of death: Congenital anomalies

<table>
<tr><th>Birthweight</th><th>Fetal</th><th>Early neonatal</th><th>Late neonatal</th><th>Post neonatal</th></tr>
<tr><td>500-999</td><td colspan="4" rowspan="2">Maternal Health/Prematurity (60%)
Extreme prematurity & Fetal deaths</td></tr>
<tr><td>1000-1499</td></tr>
<tr><td>1500-2499</td><td rowspan="2">Maternal Care (29%)
Fetal deaths</td><td colspan="2" rowspan="2">Newborn Care (2%)
Congenital anomaly</td><td rowspan="2">Infant Health (9%)
Congenital anomalies</td></tr>
<tr><td>2500+</td></tr>
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Fetal deaths - Underlying factors from medical history:

- Pre-eclampsia (27%)
- Cord problem (14%)
- Placental abruption (14%)
- Mother's pre-existing hypertension (9%)

- **Key finding:** Maternal health, maternal care & prematurity are the PPOR categories encompassing 90% of FIMR cases. So FIMR provides insights into potential action steps relating to the care of women, their health risks and risks for premature delivery. FIMR findings together with quantitative analysis of mortality rates—and excess mortality in certain subpopulations--by PPOR category can help establish priorities for community action planning.
- The other group of FIMR deaths pertains to congenital anomalies but is much less frequent (11% total).

FIMR Issues Summary

Pre/Inter/Post-Conception Care Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)
Preconception care	13%	11%	--
Postpartum visit kept	60%	61%	71%

Medical Issues: Mother, by year of review

Either as present or contributing factor

	2018 (n=45)	2017 (n=81)	2016 (n=84)	DE live births 2017 (n=10,835)	DE PRAMS 2012-2015[1]
Pre-existing diabetes	2%	4%	13%		
Gestational diabetes	4%	6%	10%		
Mother overweight or obese	40%	62%	43%		28%[2]
Pre-existing hypertension	7%	5%	8%		
Pre-eclampsia	13%	7%	NR		15%[3]
Eclampsia	2%		NR		
Short inter-pregnancy interval < 18 months	20%	19%	19%		
Previous fetal loss	2%	3%	6%		
Previous infant loss	4%	4%	11%		
Previous low birthweight delivery	2%	12%	7%		
Previous preterm delivery	16%	24%	19%		
Associated reproductive technology	7%	7%	4%		
Teen pregnancy <20 years old	9%	5%	2%	5%	
Pregnancy > 35 years old	18%	16%	15%	16%	
First pregnancy < 18 years old	24%	12%	13%		

[1]Hussaini SK. PRAMS Consolidated Report 2012-2015. DHSS, DPH. July 2018.

[2]Obesity

[3]Hypertension, pregnancy-induced hypertension, pre-eclampsia or toxemia

Prenatal Care/Delivery Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)
No prenatal care	11%	11%	6%
Late entry into prenatal care	11%	13%	13%
Missed appointments	24%	17%	17%
Multiple provider sites	33%	12%	8%
Inappropriate use of ER	4%	3%	1%

Medical Care Issues: Fetal/Infant, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)
Non-viable fetus	42%	9%	24%
Low birthweight (<2500 grams)	11%	6%	6%
Very low birthweight (<1500 grams)	4%	11%	7%
Extremely low birthweight (<750 grams)	33%	35%	45%
Congenital anomaly	22%	17%	15%
Prematurity	44%	45%	38%
Infection/sepsis	16%	13%	5%

Family Planning Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)	DE PRAMS 2012-2015[1]
Intended pregnancy	14%	26%	14%	49%
Unintended pregnancy	11%	33%	31%	51%
Counseled on birth spacing > 18 months	7%	6%	4%	
Counseled on family planning postpartum	71%	64%	58%	
Accepted family planning postpartum	51%	46%	48%	
Accepted LARC postpartum	9%	12%	5%	
Expressed interest in LARC no documented receipt	13%	--	--	

[1]Hussaini SK. PRAMS Consolidated Report 2012-2015. DHSS, DPH. July 2018.

Substance Use Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)	DE PRAMS 2012-2015[1]
Positive drug test: mother	22%	18%	14%	
No drug test: mother	13%	20%	31%	
Tobacco use (current)	18%	22%	16%	24%
Illicit drug use (current)	24%	11%	10%	
Illicit drug use (history)	13%	15%	11%	
In utero drug exposure	7%	2%	0%	
Neonatal abstinence syndrome diagnosis	0%	0%	0%	

[1]Hussaini SK. PRAMS Consolidated Report 2012-2015. DHSS, DPH. July 2018.

Of the positive drug tests in 2018 (n=10), in order of decreasing frequency:

- Marijuana
- Cocaine
- Illicit opioids
- Prescription opioids
- Polysubstance

➢ **Key finding**: One out of five mothers had a positive urine drug test. NAS clinical scoring is based on an assessment validated in term infants. The diagnosis in extremely premature infants is challenging.

Social Support & Family Transitions Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)	DE live births 2017 (n=10,835)[1]
Lack of family support	18%	9%	5%	--
Lack of partner support	16%	9%	18%	--
Single parent	58%	45%	31%	48%
<12th grade education	16%	11%	14%	15%
Homeless	7%		0%	
Concern regarding citizenship	4%		2%	

[1]DHSS, DPH. Delaware vital statistics annual report 2016. Available at: https://dhss.delaware.gov/DHSS/DPH/hp/annrepvs.html.

Mental Health/Stress Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)	DE PRAMS 2012-2015[1]
History of mental illness: mother	40%	24%	29%	
Depression screening documented	71%	69%	56%	70%
Depression/mental illness during pregnancy	9%	12%	10%	
Depression/mental illness in postpartum	22%	25%	27%	13%
Multiple stressors	49%	45%	51%	
Social chaos	11%	19%	20%	
Concern about money	24%	9%	25%	
Problems with family/relatives	13%	11%	8%	

[1]Hussaini SK. PRAMS Consolidated Report 2012-2015. DHSS, DPH. July 2018.

Family Adverse Experiences Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)	DE PRAMS 2012-2015[1]
History of abuse: mother	36%	12%	11%*	
Current abuse: mother	2%			
History of neglect: mother	22%	7%	14%*	
History of abuse: father	7%	10%		
History of neglect: father	4%	5%		
DFS history	33%	36%	38%	
Active with DFS	2%	4%	2%	
Police reports	24%	25%	3%	
Criminal history: mother	22%	23%	26%*	
Criminal history: father	18%	21%		
Intimate partner violence screening documented	71%	81%	68%	58%
Intimate partner violence	7%	7%	4%	3%

[1]Hussaini SK. PRAMS Consolidated Report 2012-2015. DHSS, DPH. July 2018.
*history in either parent

Cultural Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)
Language barrier	13%	13%	11%
Beliefs regarding pregnancy/health	9%		4%

Payment for Care Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)	DE live births 2017 (n=10,835)[1]
Private	44%	33%	38%	50%
Medicaid	49%	48%	51%	45%
Self-pay/medically indigent	7%	3%	4%	2%
Other	11%	13%	11%	3%

[1]DHSS, DPH. Delaware vital statistics annual report 2016. Available at: https://dhss.delaware.gov/DHSS/DPH/hp/annrepvs.html.

Services Provided/Access Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)	DE PRAMS 2012-2015[1]
Lack of home visiting referral (eligible)	58%	--	--	
Client dissatisfaction	4%	5% (prenatal)	12% (hospital)	
Inadequate/unreliable transportation	7%		5%	14%

[1]Hussaini SK. PRAMS Consolidated Report 2012-2015. DHSS, DPH. July 2018.

Other FIMR Tracking Issues, by year of review

	2018 (n=45)	2017 (n=81)	2016 (n=84)	DE PRAMS 2012-2015[1]
Antenatal steroids used when appropriate	64% (out of 14)	33%		
17-Progesterone offered when appropriate	33% (out of 9)	20%		
Fetal kick counts education when appropriate	69% (out of 29)	31%	45%	89%
Home visiting referral made	7%	11%	8%	18%*

[1]Hussaini SK. PRAMS Consolidated Report 2012-2015. DHSS, DPH. July 2018.

*Home visit received postpartum

Maternal Mortality Review (MMR)

Quick statistics:

- 5 cases were reviewed in two MMR panel meetings
  - 2 cases picked up by pregnancy check box
  - 3 cases picked up by vital statistics linkage
- 2 additional cases picked up by pregnancy check box were false positives: in 1 case the mother was not pregnant, and in the other case the mother died over 1 year postpartum
- 1 case identified by vital statistics linkage was not reviewed by the MMR panel because it was beyond two years after the death

Maternal Age & Race

- 3 mothers were White, 2 were Black
- Mother's ages ranged between 29 and 42 years old

Timing of Death

- Postpartum < 42 days: 1/5
- Postpartum 43-365 days: 4/5 (for 1 case, the interval is not exactly known)

Pregnancy-relation

- 1/5 deaths was pregnancy-related
- 4/5 deaths were pregnancy-associated, including two deaths due to acute drug intoxication

Psychosocial risk factors identified, by year of review

	2018 (n=5)	2017 (n=5)	2016 (n=6)
DFS active within 12 months	40%	0%	17%
DFS history	60%	40%	33%
Current drug use	60%[1]	60%	33%
Delivery of substance exposed infant	60%	0%	17%
Mental health issue	80%	20%	17%
No prenatal care	40%	0%[2]	0%
Home visiting referral	0%	20%	0%
Criminal history	80%	20%	17%
History of abuse/neglect	20%	40%	17%
Intimate partner violence	0%	40%	17%

[1]Substance use disorder: 2 cases involving cocaine, 3 cases with opioids

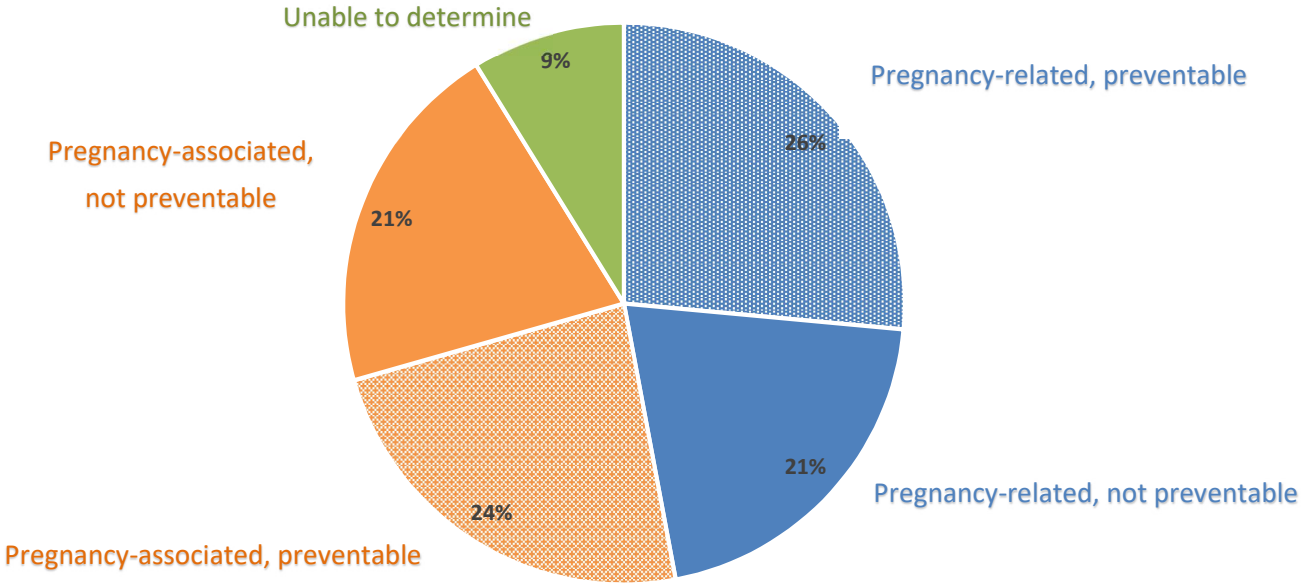
[2]In three cases mother was just a few weeks pregnant and had not entered care.

Delaware MMR Data: Summary 2011-2018

Quick statistics

34 cases reviewed since MMR program inception in 2011:

- Represent maternal deaths, irrespective of cause, during pregnancy and up to 1 year postpartum
- 9 cases picked up by vital statistics linkage were not reviewed because the death occurred > 2 years' prior
- 2 cases were internally reviewed due to pending legislation in homicide cases
- 47% of cases reviewed were pregnancy-related
- 44% were pregnancy-associated
- Just over half of all cases, 53%, were considered preventable.



- The pregnancy-related mortality ratio in Delaware is 18 per 100,000 live births for 2009-2016 and is on par with the national ratio as reported by the CDC.[1]

[1]This includes a review of the death certificate information for the 9 cases not fully reviewed by the MMR, one of which had a likely pregnancy-related cause of death.

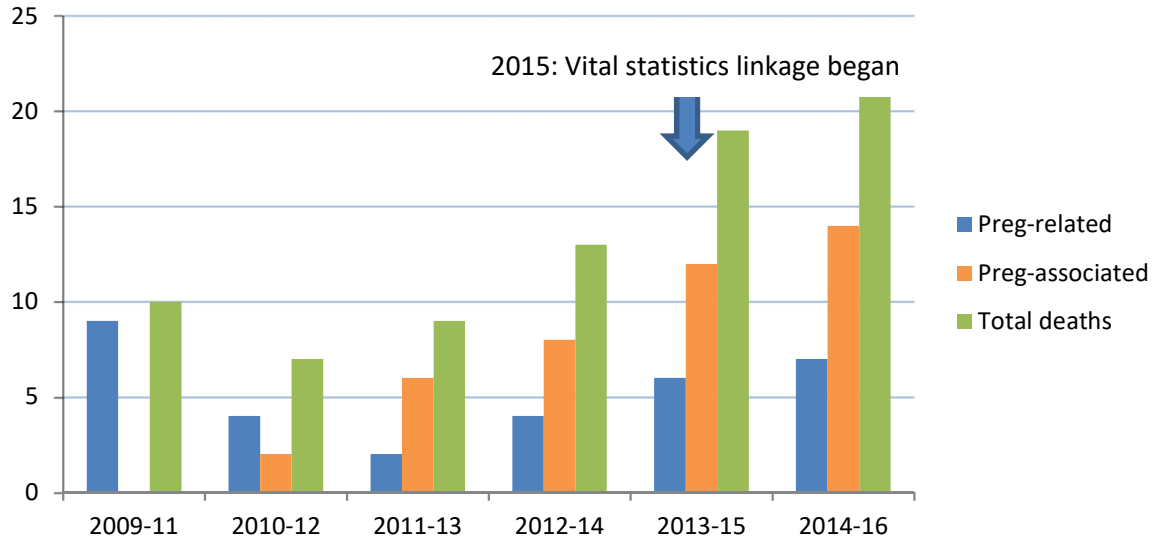
Maternal race

	All maternal deaths (n=34)	Pregnancy-related deaths (n=16)
White	50%	44%
Black	38%	50%
Other	12%	6%

- A higher proportion of pregnancy-related deaths involved Black mothers.

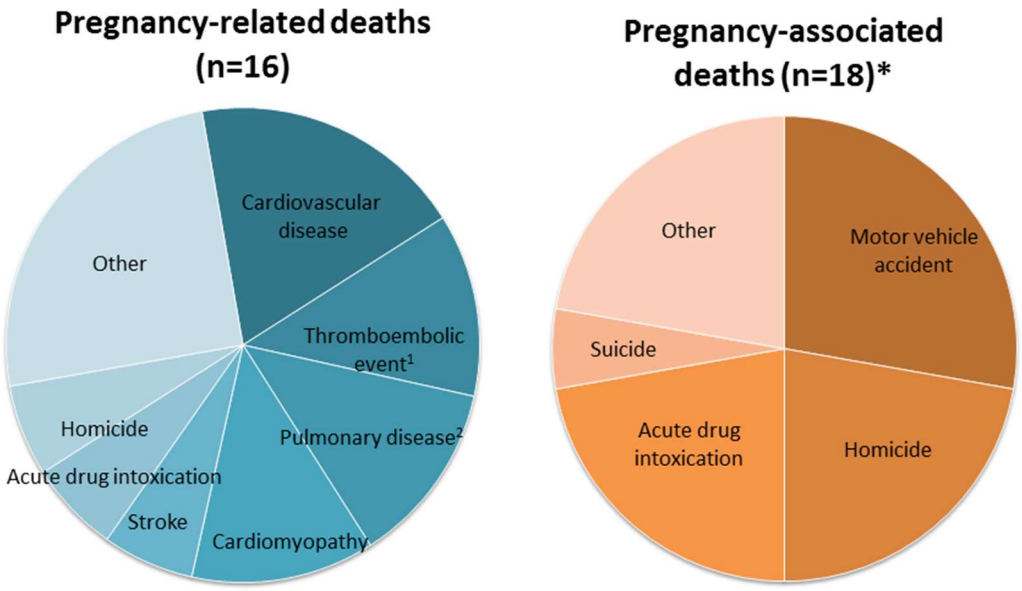
Pregnancy-relation

Number of pregnancy-related and –associated deaths by year of death (3-year averages)



- There have been an increasing number of pregnancy-associated deaths picked up over time.

Underlying Cause of Death, MMR cases reviewed 2011-2018



*Includes 3 deaths that where pregnancy association could not be determined
[1]Includes one deep venous thrombosis and one pulmonary embolism
[2]Includes one pneumonia and one Adult Respiratory Distress Syndrome

- Other causes of pregnancy-related deaths include: diabetes, sepsis, lupus, cardiopulmonary arrest during an emergent C-section of unclear etiology
- Other causes of pregnancy-associated deaths include: sepsis, pulmonary embolism, cancer and intracranial hemorrhage

Key issues identified:

- 18% of cases (6 out of 34) involved IPV.
  - Of the 5 homicides, three were a result of IPV.
- Mental health issues were identified in 32% (11 out of 34 cases).
- Substance use disorder was identified in 32% (11 out of 34 cases).