



Alaska Maternal-Infant Mortality Review

2014 Annual Report

Reviews of infant deaths in Alaska from 2008-2012

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Background

Alaska MIMR-CDR

The Alaska MIMR was established by the Commissioner of the Department of Health and Social Services in 1989. After an initial pilot period, the program started comprehensive reviews of all infant deaths during 1992. The program expanded to include reviews of maternal deaths in 1999 and deaths of children ages 1 to 18 years (the Child Death Review) in 2004. MIMR-CDR is modeled on national evidence-based programs. Additional information on the history and objectives, as well as the review process and sources of information can be found on the [MCH-Epidemiology Website](#).

The MIMR-CDR Committee is a multidisciplinary group of professionals and child advocates who possess knowledge and experience relating to infant and child health and welfare. Members have expertise in a variety of areas relevant to infant and child health including neonatology and perinatology, family practice, obstetrics/gynecology, pediatrics, pathology and social work. While State of Alaska employees may assist with case reviews and provide relevant information on services provided by the State, formal recommendations are developed by non-State employees. See *Appendix A* for a list of committee members.

The MIMR-CDR committee generally completes retrospective reviews of deaths 2-3 years after they occurred. Starting with deaths in 2006, the program decided to halt reviews of cases where the infant did not leave the hospital prior to death. This was done to increase the timeliness of reviews of deaths that were more likely to have been prevented through public health education, action or interventions. This change primarily affected reviews of neonatal deaths. See *Appendix B* for a table comparing numbers of all cases reviewed as of December 2014 with the numbers reported by the Alaska Bureau of Vital Statistics, by year. See *Appendix D* for the current review form used.

Infant Mortality

Infant deaths are those that occur between birth and one year of age. We sub-classified infant mortality by those that occurred during the first 28 days of life (neonatal), and during 28 days to one year (postneonatal). Risk factors, causes, and preventability of neonatal and postneonatal deaths often differ. Many neonatal deaths are influenced by events that occurred antenatally or during delivery (such as prenatal health of the mother or perinatal conditions), while postneonatal deaths are often associated with injuries from external events (such as unintentional suffocation in a sleep environment).

Infant Mortality Rates and Statistical Comparisons

- Infant mortality rates (IMR) are calculated as the number of infant deaths per 1,000 live births in a given year.
- Incidence rate ratios (IRR) are used to compare the IMRs among different populations and are calculated as the IMR of the comparison population divided by the IMR of the referent population.
- Negative binomial models were used to test linear IMR trends over time.
- Chi-square tests were used to test IMRs between populations for association.

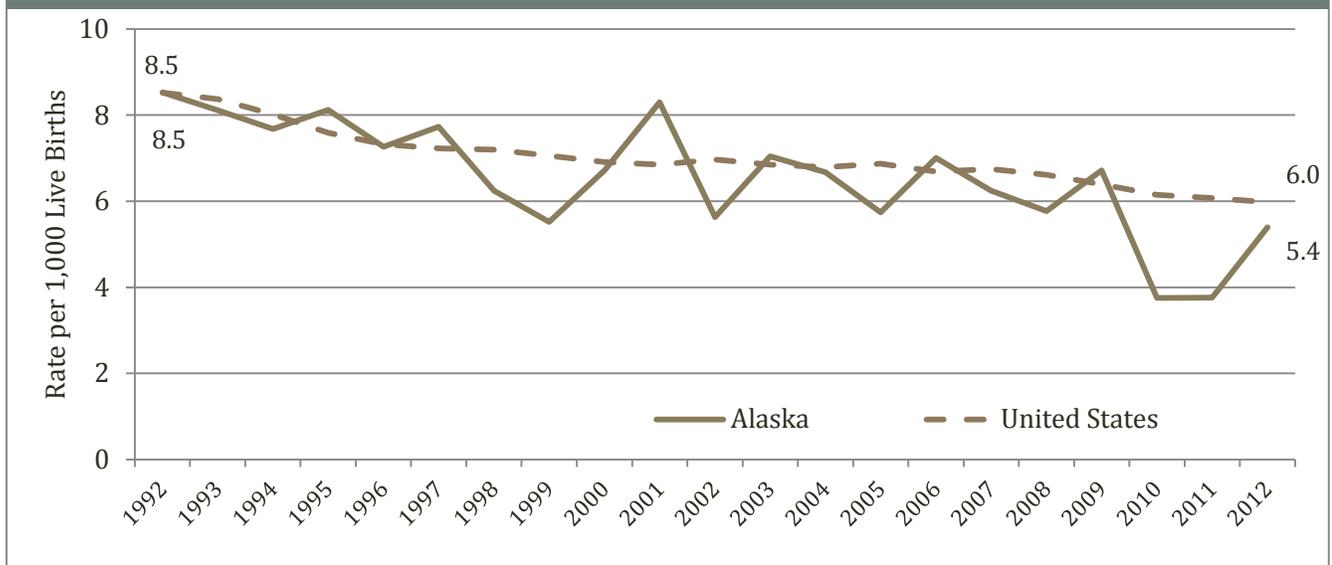
Vital Statistics Trends and Demographics

Alaska and the United States: Annual Trends

The Alaska IMR has more year-to-year variation than the United States IMR, due to a relatively small number of deaths each year (**Figure 1**). From 1992 through 2012 both the United States IMR and Alaska IMR decreased by more than a third. The Alaska IMR per 1,000 live births decreased from 8.5 in 1992 to 5.4 in 2012 ($p < 0.001$).

Figure 1: Trends in Infant Mortality Rates, Alaska and the US, 1992-2012

Data Sources: Alaska Bureau of Vital Statistics and National Center for Health Statistics



Alaska and the United States: Infant Age Trends

Neonatal and postneonatal trends for Alaska are presented using 3-year moving averages to smooth out the annual variability induced by small numbers. During the evaluation period the trend in Alaska neonatal IMR per 1,000 live births decreased from 3.9 in 1992-1994 to 2.4 in 2010-2012 ($p < 0.001$), a decrease of 42% (**Figure 2**). The Alaska postneonatal IMR per 1,000 live births decreased from 4.2 in 1992-1994 to 2.0 in 2010-2012 ($p < 0.001$), a decrease of 52% (**Figure 3**).

Figure 2: Neonatal Rates, Alaska (3 Year Average) and the US (Annual), 1992-2012

Data Sources: Alaska Bureau of Vital Statistics and National Center for Health Statistics

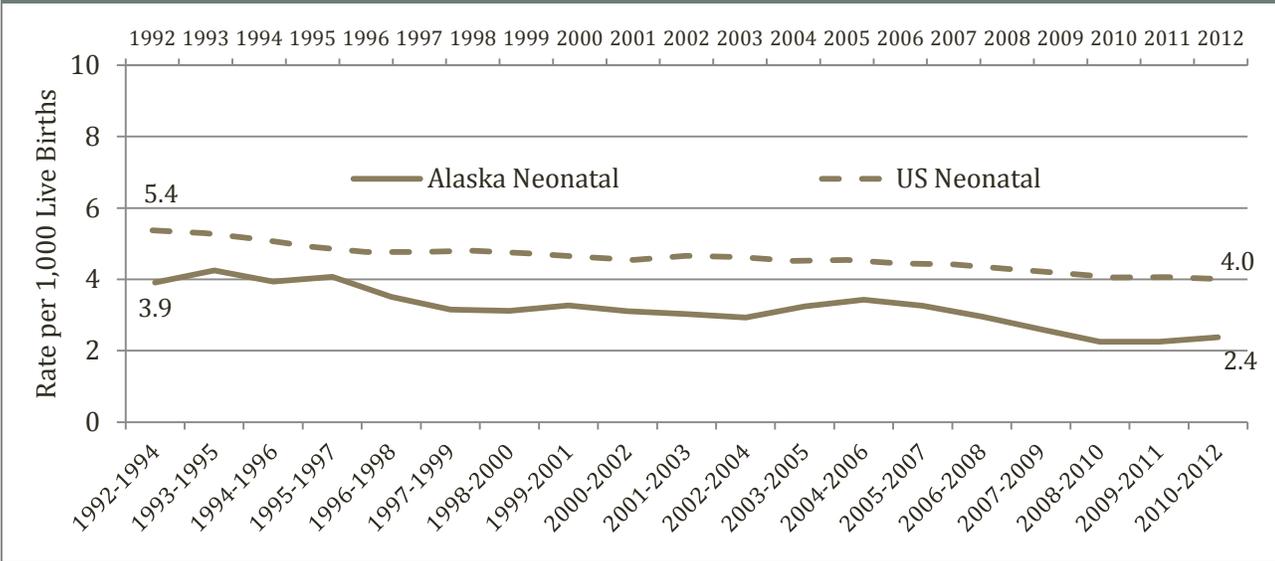


Figure 3: Postneonatal Rates, Alaska (3 Year Average) and the US (Annual), 1992-2012

Data Sources: Alaska Bureau of Vital Statistics and National Center for Health Statistics



Alaska Demographics

During 2008-2012, neonatal IMRs were higher among infants who were born to non-White mothers and higher among infants who did not have a father listed on their birth certificate.

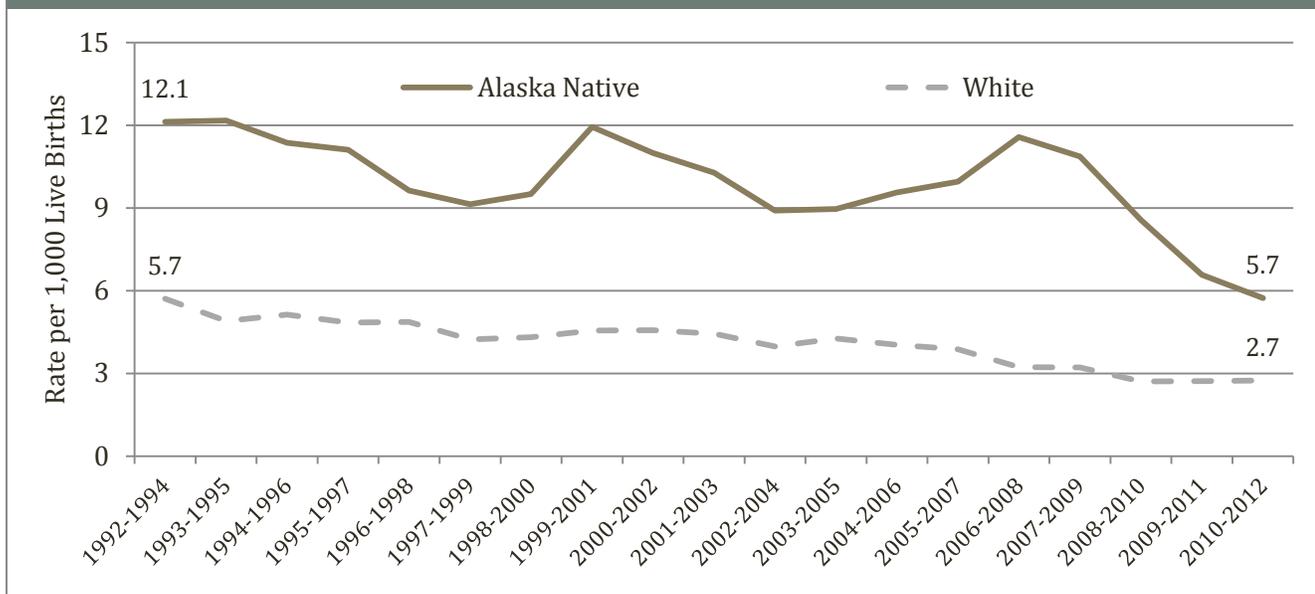
Higher postneonatal IMRs were observed among infants who were born to non-White mothers, mothers with less than 12 years of education, infants whose delivery was paid for by Medicaid, or infants who did not have a father listed on their birth certificate.

Very low birthweight (< 1,500 grams at delivery) and moderately low birthweight (1,500-2,500 grams) infants also had much higher neonatal and postneonatal IMRs, compared to normal birthweight infants. Full demographic information for infant deaths during 2008-2012 is available in **Appendix C**.

The IMR per 1,000 live births for infants born to Alaska Native mothers decreased from 12.1 in 1992-1994 to 5.7 in 2010-2012 ($p < 0.01$), a decrease of 53% (**Figure 4**). The IMR per 1,000 live births for infants born to White mothers decreased from 5.7 in 1992-1994 to 2.7 in 2010-2012 ($p < 0.001$), a decrease of 52%. Rates for other races are suppressed due to small numbers (average fewer than 5 deaths per year). Over the entire evaluation period the Alaska Native IMR has remained approximately 2.0 times that of the White IMR.

Figure 4: Infant Mortality Rates by Race, Alaska and the US, 1992-2012

Data Sources: Alaska Bureau of Vital Statistics and National Center for Health Statistics



Alaska by Region

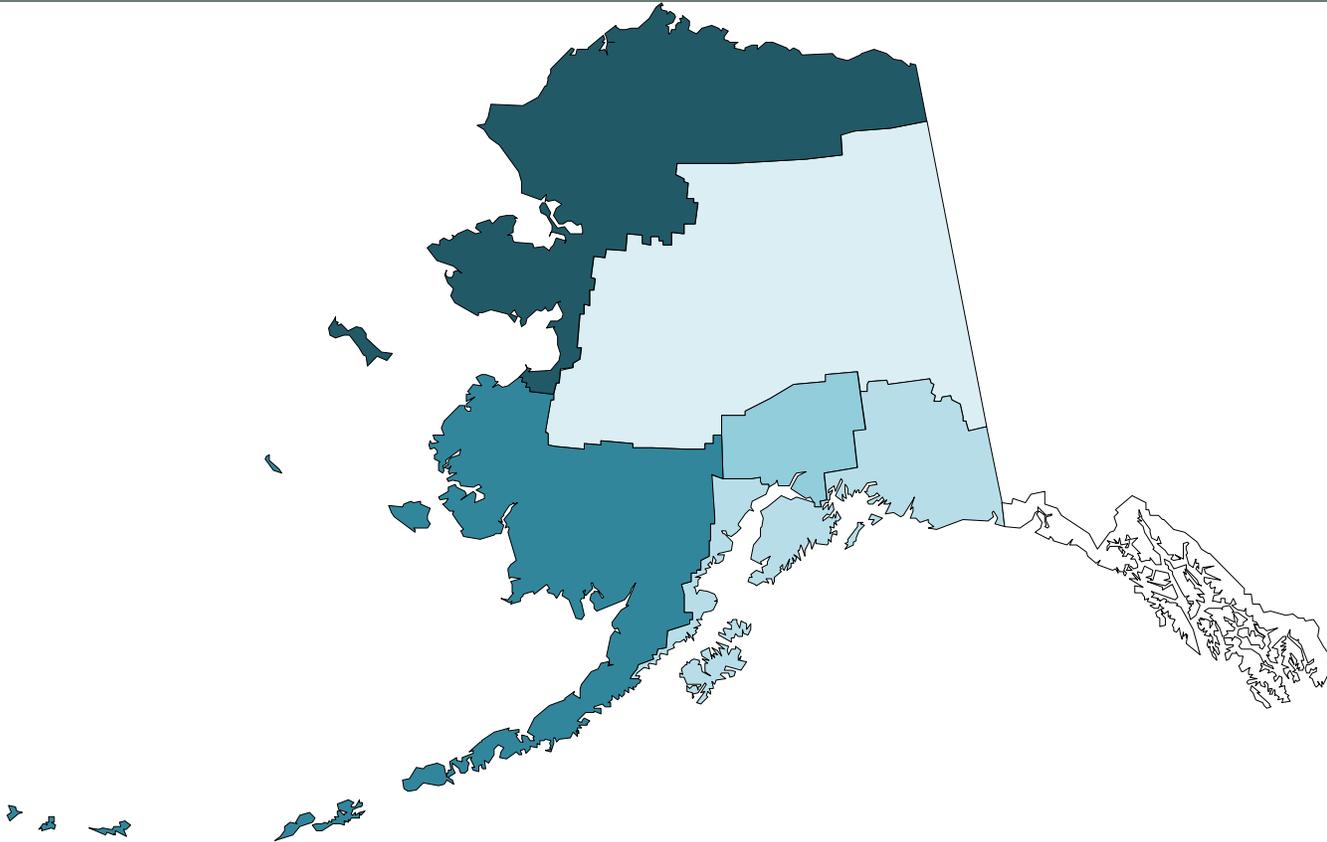
The IMR trended downward in all regions during the evaluation period but only reached statistical significance in the Anchorage/Mat-Su and Interior regions. The IMR for infants born in Anchorage/Mat-Su decreased from 7.9 per 1,000 births in 1992-94 to 3.7 per 1,000 births in 2010-12 ($p < 0.01$). The IMR for infants born in the Interior decreased from 5.0 per 1,000 births to 3.4 per 1,000 in the same time periods ($p < 0.01$).

Vital Statistics Trends and Demographics

During 2008-2012 the lowest overall IMR was in the Southeast region (2.8 per 1,000 live births), while the highest was in the Northern region (10.1 per 1,000 live births) (**Figure 5**). Compared to the Anchorage/Mat-Su region, the Northern and Southwest regions had significantly higher postneonatal and neonatal IMRs ($p < 0.001$). A full comparison of the IMR by region can be found in **Appendix C**.

Figure 5: Infant Mortality Rates by Region, Alaska, 2008-2012

Data Source: Alaska Bureau of Vital Statistics



Scale	Region	# Deaths (254)*	Avg. IMR	IRR	95% CI (LL, UL)
	Southeast	12	2.77 [†]	0.67 [†]	(0.37 , 1.22) [†]
	Interior	32	3.38	0.82	(0.56 , 1.21)
	Gulf Coast	18	3.46 [†]	0.84 [†]	(0.51 , 1.38) [†]
	Anchorage / Mat-Su	122	4.11	1 (Ref)	
	Southwest	39	9.07	2.21**	(1.54 , 3.16)
	Northern	31	10.10	2.46**	(1.66 , 3.64)

IMR = Infant Mortality Rate; IRR = Incidence Rate Ratios; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit

*Regional demographic information available for 254/288 infant deaths from 2008-2012.

[†]Rates based on fewer than 20 deaths in the numerator should be interpreted with caution.

** $p < 0.001$

Committee Consensus Determinations

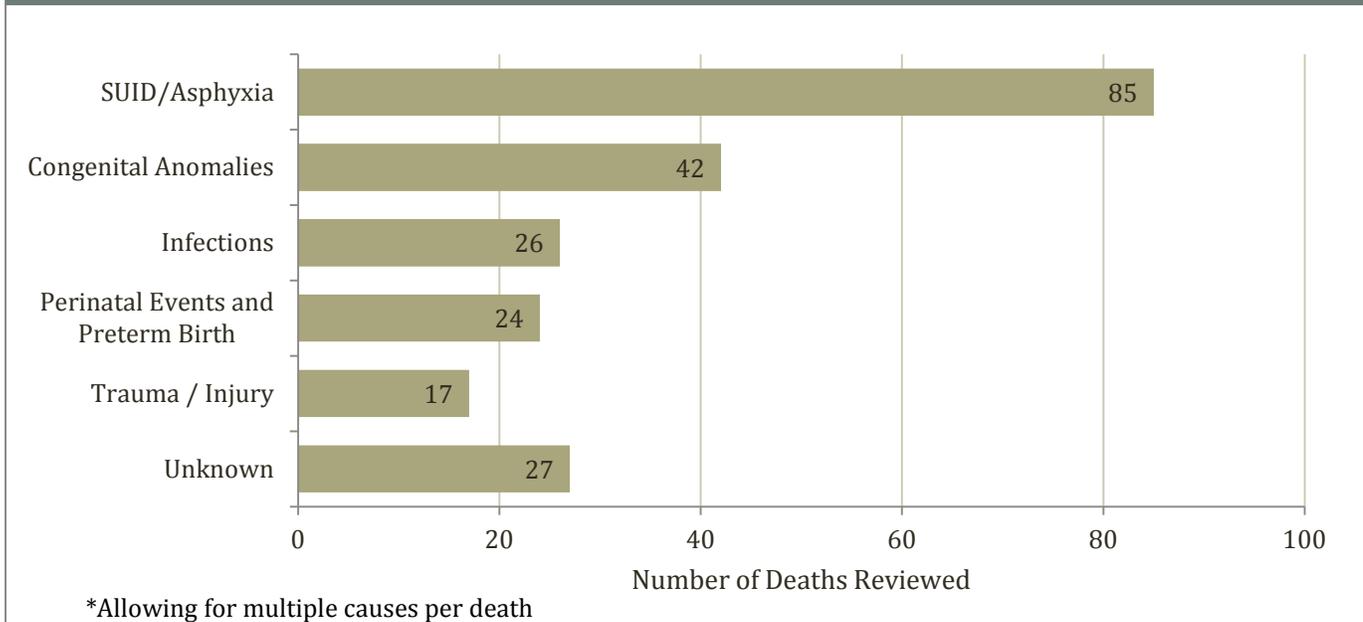
Cause of Death

During case reviews, the MIMR-CDR committee assigns contributing causes to each death, identifying multiple causes per death as appropriate (**Figure 6**). The Case Review Form that was implemented for all deaths starting in 2005 can be found in *Appendix C*. Summary causes of death are selected by the committee from a checklist found in question 6 on the form. Prior to 2005 deaths, the committee wrote in responses to open-ended questions regarding the primary and underlying causes. Their responses were re-coded into summary categories by the MIMR-CDR epidemiologist.

This review focuses on deaths that occurred during 2008-2012; for information on deaths that occurred prior to 2008 refer to previous reports, available on the MIMR-CDR website. As of December 2014, the MIMR-CDR committee had reviewed 186 out of 261 infant deaths which occurred in Alaska during 2008-2012; 51 were neonatal and 135 were postneonatal. These represent 71% of all infant deaths in the time period; 40% of the neonatal and 100% of the postneonatal. The neonatal deaths that were not reviewed were predominately due to congenital anomalies or factors related to preterm birth. Deaths that occurred out of state were not reviewed.

Figure 6: Number of Infant Deaths Reviewed by Cause*, Alaska, 2008-2012

Data Source: Alaska MIMR-CDR



The MIMR-CDR review process allows for a determination of multiple causes for each death. Among the deaths reviewed, the most common causes identified by the committee were Sudden Unexpected Infant death (SUID)/asphyxia, congenital anomalies, and infections. These were also the most common causes identified in the [2011 Annual Report](#). The SUID/asphyxia category included all deaths which occurred in a sleep environment, whether or not there was a known mechanism for asphyxia. The trauma/injury category included deaths that were associated with unintentional and intentional exposure, poisoning, drowning, motor vehicle accidents, falls, fire, and weapons (including body parts).

Completeness of Death Certificate

The MIMR-CDR review process includes a nuanced examination of the causes contributing to each infant death; this allows the committee to identify additional contributing causes beyond those listed on the death certificate. During 2008-2012 the committee identified alternate or additional contributing causes for 68 deaths (37%). Examples of additional contributing causes identified by the committee include an unsafe sleep environment, substance use by caretakers, extreme prematurity, inadequate caretaker supervision, child maltreatment, and prenatal substance exposure.

Contributing Factors

The committee is interested in factors that may contribute to deaths, such as access to care, substance use, and child maltreatment. A consensus decision of *contributed* is reached only when the committee feels there is sufficient evidence to make the determination. A consensus decision of *probably contributed* is reached if there is not enough evidence to make a definitive assessment, but the evidence is strong. A consensus decision of *possibly contributed* is reached if there is any indication that the factor in question may have been related.

Access to Care

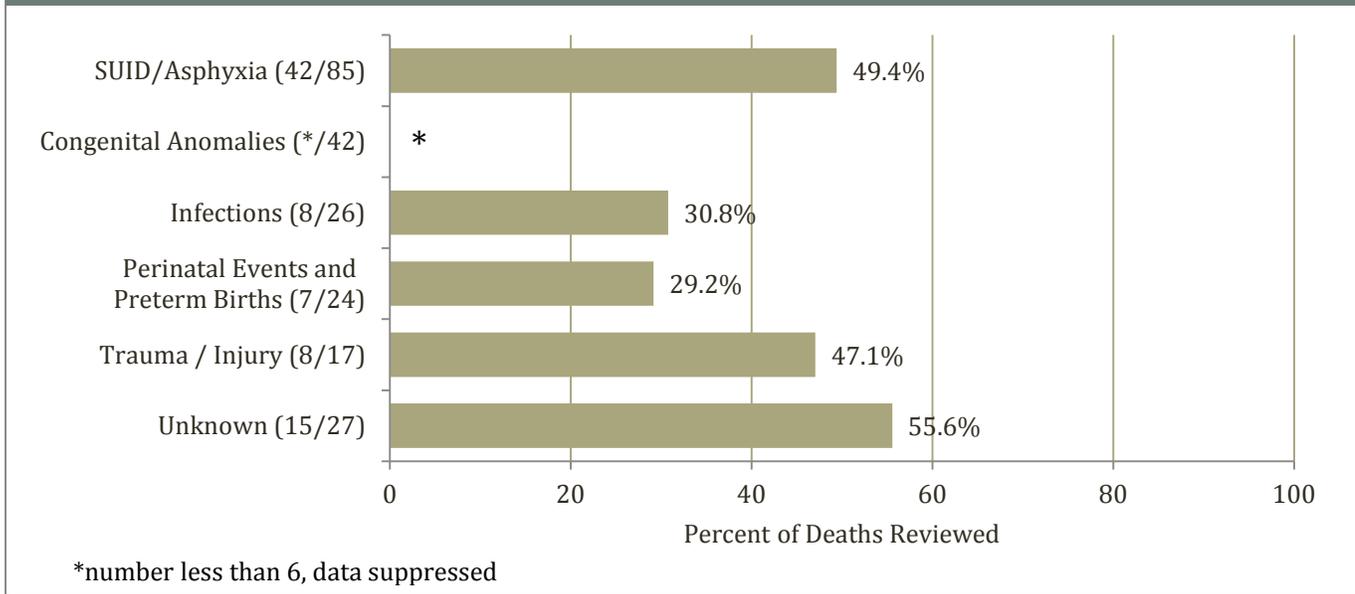
Lack of access to care or inadequate access to care contributed, probably contributed, or possibly contributed to 19 deaths reviewed (10%) during 2008-2012, including 7 neonatal deaths and 12 postneonatal deaths. These include cases in which the mother had received insufficient or no prenatal care or education, cases where appropriate care was unavailable in a timely manner due to distance, and cases where misdiagnoses may have contributed to delays in proper care.

Substance Use

The committee assesses whether substance use contributed to each death based on evidence of impairment in the time immediately preceding the death. During 2008-2012 the committee determined that substance use contributed, probably contributed, or possibly contributed to 67 deaths reviewed (36%). Of the known causes of death, substance use was most likely to contribute to deaths with a cause of SUID/asphyxia (**Figure 7**). The committee identified alcohol as contributing to 37 deaths, tobacco to 34, marijuana to 19, and heroin, methadone or other opioids as contributing to 12.

Figure 8: Infant Deaths Reviewed with Any Substance Use Indicated, by Cause, Alaska, 2008-2012

Data Source: Alaska MIMR-CDR



Child Maltreatment

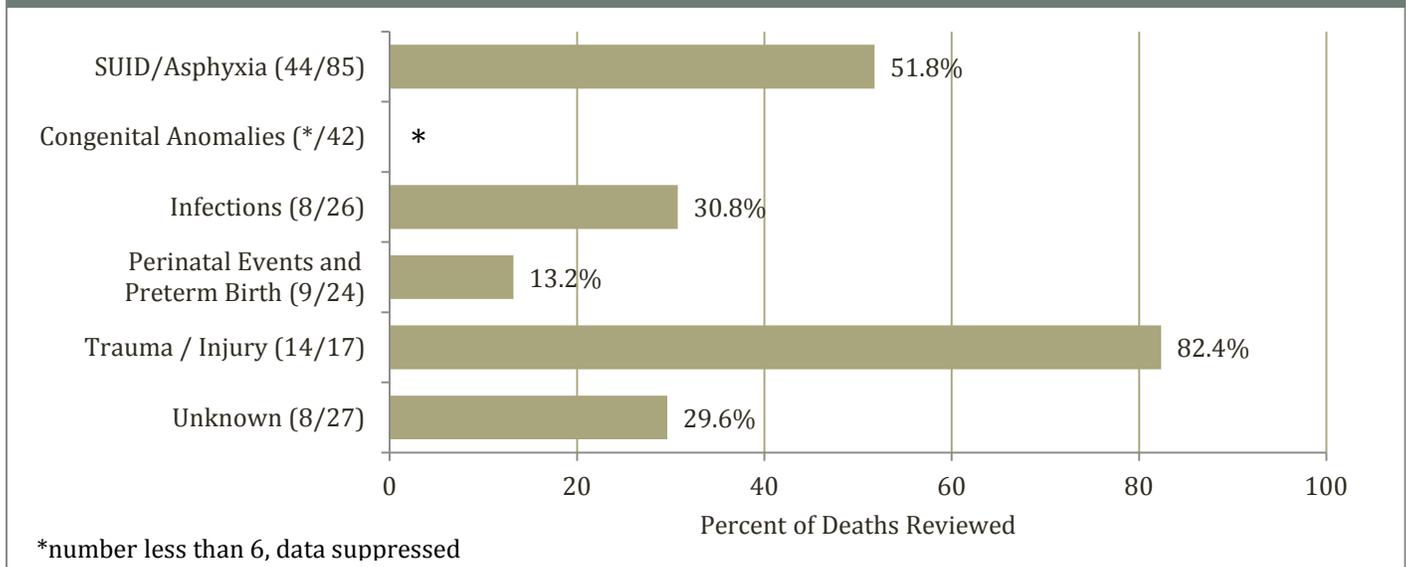
Abuse consists of deliberate words or overt actions on the part of a caregiver that cause harm, potential harm, or threat of harm to a child. This includes physical, sexual, and psychological abuse. *Neglect* includes the failure to provide for a child’s basic physical, emotional, or educational needs or to protect a child from harm or potential harm. *Gross Negligence* is the failure to exercise reasonable care at the level that would be expected of most people in a similar situation. While harm to the child may not have been intended, maltreatment refers to the consequences.

The committee assesses whether maltreatment contributed or probably contributed to each death. A determination of probably contributed is made if there is not enough evidence to make a definitive assessment of maltreatment, but there are unusual, questionable, and/or suspicious factors present that strongly suggest maltreatment contributed to the infant’s death. The determinations made by the committee members are not required to be based on sufficient evidence to withstand legal scrutiny; therefore MIMR-CDR is able to have a more sensitive definition of child maltreatment than the death certificate. This sensitive definition increases the probability that maltreatment-related deaths and associated risk factors are identified.

Among the 184 deaths reviewed, the committee found that 64 (35%) were associated or probably associated with at least one type of maltreatment. Of these, 23 had more than one type of maltreatment. Abuse contributed or probably contributed to 17 deaths, neglect to 28, and negligence to 50.

Figure 8: Infant Deaths Reviewed with Any Maltreatment Indicated, by Cause, Alaska, 2008-2012

Data Source: Alaska MIMR-CDR



The proportion of reviewed deaths associated with maltreatment varied within cause of death categories (Figure 8), ranging from 13% of deaths due to congenital anomalies and preterm births to 82% of deaths due to injury. Among the most common cause of death category, SUID/asphyxia, 52% of deaths were associated or probably associated with maltreatment. Half of the maltreatment-associated deaths were among deaths attributed to SUID/Asphyxia.

The committee believed that only one of the maltreatment-related deaths was not preventable. This infant had a fatal congenital anomaly, but the committee believed that possible maltreatment in the form of neglect and negligence contributed to the death.

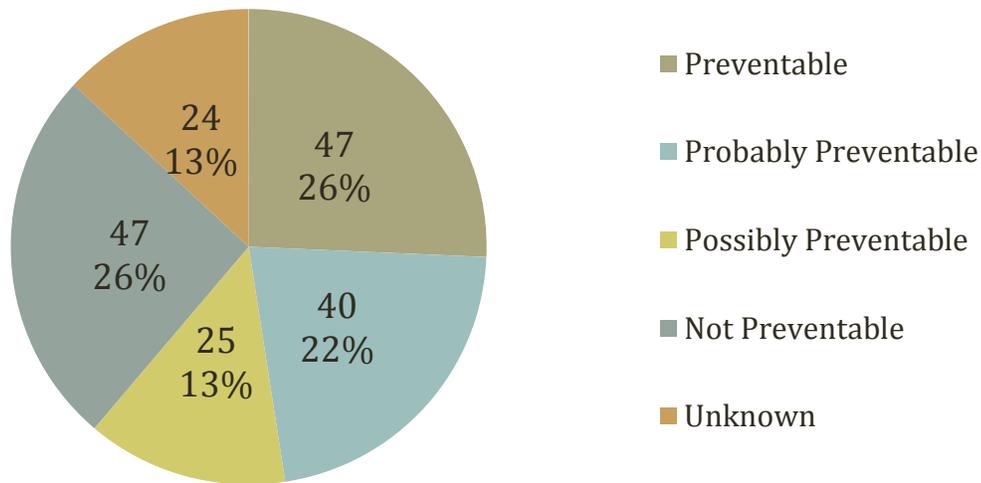
Preventability

The MIMR committee thoroughly reviews the events preceding each death to assess whether and how a death could have been prevented. They use this understanding to recommend changes that they believe should occur in order to prevent other similar deaths and to keep children safe, healthy, and protected.

Deaths are classified as preventable, probably preventable (meaning the causal chain/mechanism between prevention and outcome is clear), possibly preventable (meaning the causal chain/mechanism between prevention and outcome is unclear), not preventable, or unknown. During 2008-2012 the committee determined that 112 (61%) of the deaths reviewed were preventable or possibly/probably preventable (Figure 9). This included 90 (67%) postneonatal deaths and 22 (44%) neonatal.

Figure 9: Preventability of Infant Deaths Reviewed, Alaska, 2008-2012

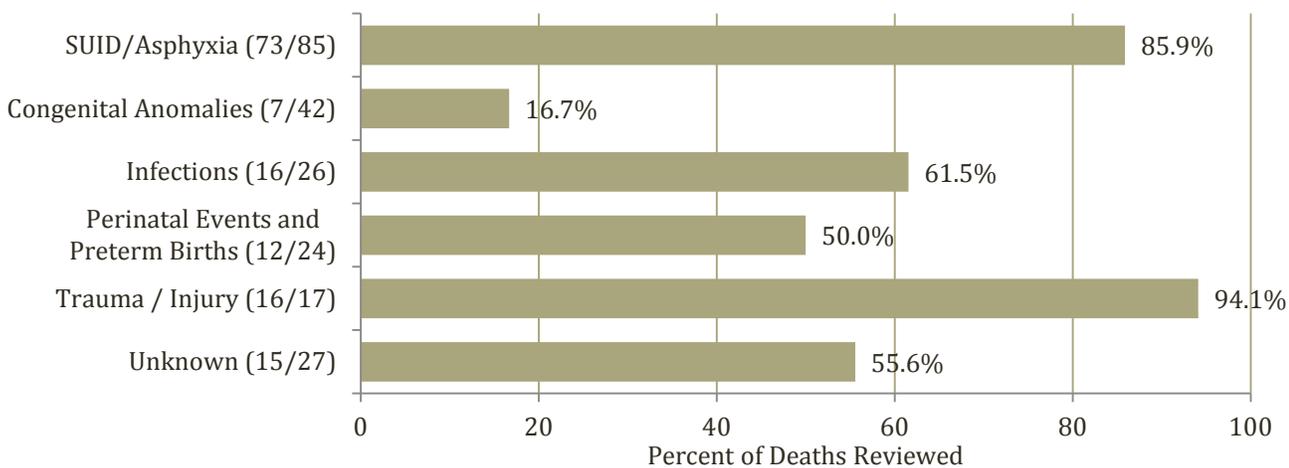
Data Source: Alaska MIMR-CDR



The proportion of reviewed deaths with any level of preventability varied within cause of death categories (Figure 10), ranging from 17% of deaths due to congenital anomalies to 94% of deaths due to injury. Among the most common cause of death category, SUID/asphyxia, 87% of deaths were preventable, probably preventable, or possibly preventable.

Figure 10: Infant Deaths Reviewed with Any Level of Preventability, by Cause, Alaska, 2008-2012

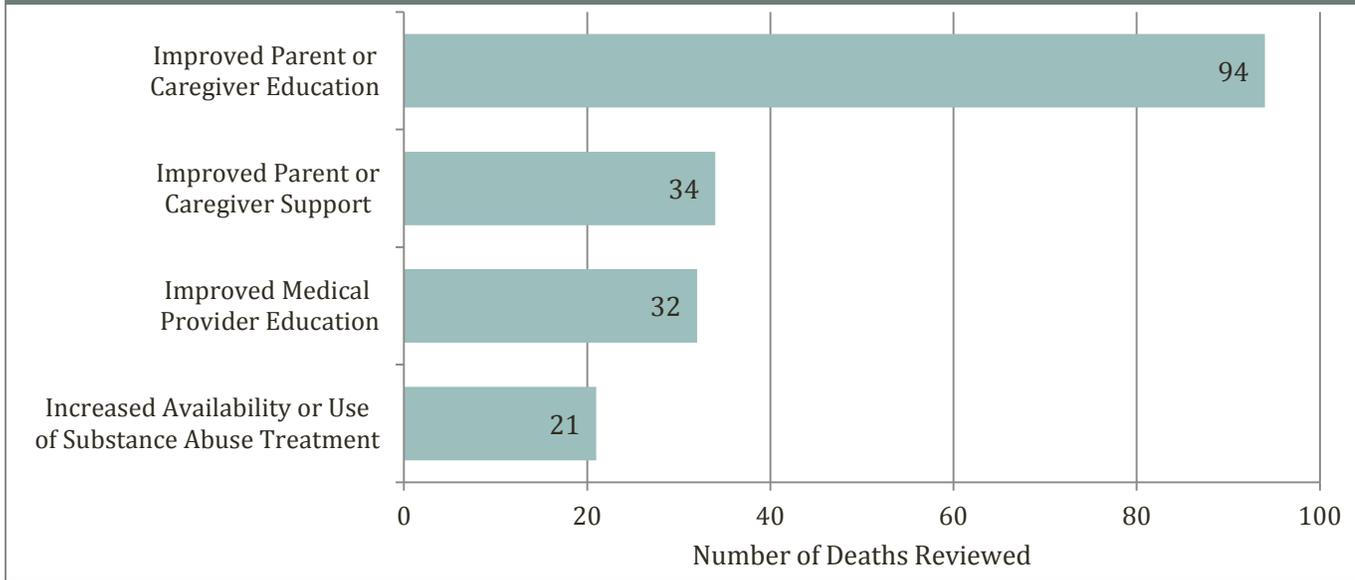
Data Source: Alaska MIMR-CDR



For each death, the committee recommended specific changes that they believe should occur in order to prevent other similar deaths. The most common recommendation was improved parent or caregiver education (Figure 11), followed by improved parent or caregiver support, improved medical provider information, and the increased availability and use of alcohol and drug abuse treatment programs.

Figure 11: Infant Deaths Reviewed by Preventability Recommendation, Alaska, 2008-2012

Data Source: Alaska MIMR-CDR



Parent or caregiver education included recommendations such as additional education on safe sleep environments, the dangers of bottle propping, appropriate age specific supervision, and the importance of prenatal and postnatal medical care. Parent or caregiver support included recommendations such as expanding home visiting programs and to provide skills and support for parents with psychiatric issues. Medical provider education included working with health aides, first responders, midwives, and doctors to improve documentation, increase testing and follow-up or referrals to specialists when necessary, and increase parental education efforts.

Other suggestions frequently made by the committee included expanding mandatory reporting laws and increasing Office of Children’s Services (OCS) authority in order to keep at-risk infants safe.

Acknowledgements and Contact Information

Prepared by: Abigail Newby-Kew

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Cheryl Prince, editorial review
Michael Valiquette, MIMR-CDR Coordinator
Leanne Kim, MIMR-CDR Health Program Associate
Margaret Young, Unit Manager

Special thanks to all of the MIMR-CDR Review Committee members for contributing their time and expertise to the case reviews.

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Appendix A: MIMR Committee

Name	Specialty/Organization
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*Cathy Baldwin-Johnson, MD	Family Physician and Medical Director, Alaska CARES
*BJ Coopes, MD	Medical Director, PICU and Inpatient Pediatric Services, Children's Hospital at Providence
Jessica Craig, MPH	Epidemiologist, Alaska Native Tribal Health Consortium, Alaska Native Epidemiology Center
*Karla Ebert, RN, LCDR, USPHS	Improvement Advisor, Southcentral Foundation
Martin Grasmeyer, MD	Pediatrics and Medical Director, SouthEast Alaska Regional Health Consortium
*Georgia Heiberger, EdD, PNP	Assistant Professor of Nursing, University of Alaska Anchorage
*Matt Hirschfeld, MD, PhD	Medical Director, Pediatrics, Alaska Native Medical Center
Melissa Kemberling, PhD, MPH	Senior Epidemiologist, Alaska Native Tribal Health Consortium, Alaska Native Epidemiology Center
*Carol Klamser, FNP, DNP	Kachemak Bay Medical Clinic and Associate Professor, UAA School of Nursing
*Susan Lemagie, MD	Obstetrics-Gynecology, Valley Women's Health Care
*Kelly Murphy, RN, LCDR, USPHS	Southcentral Foundation
*Neil Murphy, MD	Obstetrics-Gynecology, Alaska Native Medical Center
*Kimber Olsen, LCSW, BCD	Clinical Director, Changing Tides Child & Family Enrichment Center
*Kathryn Ostrom, MD, FACOG	Alaska Women's Health, PC
Diane Payne	Children's Justice Specialist and Alaska Native community liaison
Marilyn Pierce-Bulger, FNP, CNM	Nurse Midwife, Southcentral Foundation; Owner, Pioneer Consulting
Ellen Provost, DO, MPH	Director, Alaska Native Tribal Health Consortium, Alaska Native Epidemiology Center
Sherrie Richey, MD	Maternal-Fetal Medicine, Alaska Perinatology Associates
*Christine Tan Cadogan, MD	Pediatric Hospital, Southcentral Foundation, Department of Pediatric Hospital Medicine
*Nigel Wappett, MD	Obstetrics-Gynecology, Tanana Chiefs Conference
*Paul Zimmer, MD	Staff Physician, Providence Kodiak Island Medical Center

*Current MIMR Committee Members as of December, 2014

Appendix B: Case Comparison

Table A1: Infant Mortality by Year and MIMR-CDR Committee Review

Year	Infant Deaths that Occurred in Alaska, Reported by Bureau of Vital Statistics			Infant Deaths Reviewed by MIMR-CDR Committee as of December 2014*		
	Infant Deaths	Neonatal	Postneonatal	Infant Deaths	Neonatal	Postneonatal
1992	94	43	51	100	46	54
1993	79	41	38	90	50	40
1994	75	32	43	83	36	47
1995	74	47	27	83	51	32
1996	70	33	37	74	36	38
1997	63	29	34	78	36	42
1998	57	29	28	61	32	29
1999	48	22	26	57	27	30
2000	64	33	31	66	34	32
2001	79	35	44	83	38	45
2002	50	18	32	54	19	35
2003	61	26	35	62	27	35
2004	62	29	33	60	27	33
2005	59	30	29	58	28	30
2006	71	39	32	35	2	33
2007	65	29	36	48	12	36
2008	59	23	36	46	10	36
2009	67	28	39	57	18	39
2010	38	18	20	27	7	20
2011	40	22	18	28	10	18
2012	57	35	22	28	6	22

*In 2007 the MIMR-CDR committee stopped reviewing deaths that occurred out of state.

Appendix C: Demographic Tables

Overall Infant Mortality 2008-2012

Table A2: Infant Mortality Rates by Demographic Characteristics (n = 256)*

		# Deaths*	Avg. IMR	IRR	95% CI
		2008-2012	2008-2012	2008-2012	(LL, UL)
Sex	Female	106	3.89	1 (Ref)	
	Male	150	5.17	1.33	(1.0, 1.7)
Maternal Race	White	98	2.87	1 (Ref)	
	Alaska Native	108	7.68	2.68	(2.0, 3.5)
	Black	21	9.29	3.24	(2.0, 5.12)
	Asian/Pacific Islander	23	4.54	1.58	(1.0, 2.5)
Maternal Age	Less than 20 years	24	5.08	1.23	(0.8, 2.0)
	20-24 years	91	5.77	1.39	(1.0, 1.9)
	25-29 years	70	4.13	1 (Ref)	
	30-34 years	40	3.37	0.82	(0.6, 1.2)
	35 years or older	28	4.02	0.97	(0.6, 1.5)
Maternal Education	Less than 12 years	53	7.92	2.01	(1.5, 2.7)
	12 or more years	186	3.95	1 (Ref)	
Medicaid	Delivery paid by Medicaid	176	5.98	1 (Ref)	
	Delivery not paid by Medicaid	77	2.88	0.48	(0.4, 0.6)
Birth weight	Very Low (< 1,500 g)	66	129.67	47.29	(35.8, 62.4)
	Moderately Low (1,500-2,499 g)	38	14.15	5.16	(3.6, 7.4)
	Normal(2,500+ g)	145	2.74	1 (Ref)	
Prenatal Care	Less than Adequate Care**	94	4.57	1.15	(0.9, 1.5)
	Adequate or Better Care	118	3.96	1 (Ref)	
Father on Birth Certificate	Father's name not on BC	73	21.40	6.17	(4.7, 8.1)
	Father's name on BC	183	3.47	1 (Ref)	
Region	Anchorage / Mat-Su	122	4.11	1 (Ref)	
	Gulf Coast	18 [†]	3.46 [†]	0.84 [†]	(0.5, 1.4) [†]
	Interior	32	3.38	0.82	(0.6, 1.2)
	Northern	31	10.10	2.46	(1.7, 3.6)
	Southeast	12 [†]	2.77 [†]	0.67 [†]	(0.4, 1.2) [†]
	Southwest	39	9.07	2.21	(1.6, 3.2)

IMR = Infant Mortality Rate; IRR = Incidence Rate Ratio; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit

*Demographics available for 256/288 infant deaths during 2008-2012.

**Less than adequate means the Adequacy of Prenatal Care Utilization (APNCU) index, calculated from the number and timing of prenatal visits recorded on the birth certificate was 0 (none), 1 (inadequate), or 2 (intermediate). Adequate or better means the APNCU index was 3 (adequate) or 4 (adequate+).

[†]Rates based on fewer than 20 deaths in the numerator should be interpreted with caution.

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Overall Infant Mortality 2008-2012

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Appendix C: Demographic Tables

Neonatal Infant Mortality 2008-2012

Table 3: Neonatal Infant Mortality Rates by Demographic Characteristics (n=126)*

		# Deaths* 2008-2012	Avg. IMR 2008-2012	IRR 2008-2012	95% CI (LL, UL)
Sex	Female	56	2.06	1 (Ref)	
	Male	70	2.38	1.17	(0.8 , 1.7)
Maternal Race	White	55	1.61	1 (Ref)	
	Alaska Native	38	2.70	1.68	(1.2 , 2.4)
	Black	14†	6.19	3.85	(2.2 , 6.7)
	Asian/Pacific Islander	15†	2.96	1.84	(1.1 , 3.2)
Maternal Age	Less than 20 years	10†	2.12	1.16	(0.6 , 2.2)
	20-24 years	41	2.60	1.42	(1.0 , 2.1)
	25-29 years	31	1.83	1 (Ref)	
	30-34 years	24	2.02	1.10	(0.7 , 1.8)
	35 years or older	20	2.87	1.57	(1.0 , 2.6)
Maternal Education	Less than 12 years	14†	2.09	0.93	(0.5 , 1.6)
	12 or more years	106	2.25	1 (Ref)	
Medicaid	Delivery paid by Medicaid	76	2.58	1 (Ref)	
	Delivery not paid by Medicaid	49	1.83	0.71	(0.5 , 1.0)
Birth weight	Very Low (< 1,500 g)	61	119.84	158.44	(119.0 , 210.9)
	Moderately Low (1,500-2,499 g)	21	7.82	10.34	(6.6 , 16.3)
	Not Low (2,500+ g)	40	0.76	1 (Ref)	
Prenatal Care	Less than Adequate Care**	32	1.56	0.69	(0.5 , 1.1)
	Adequate or Better Care	67	2.25	1 (Ref)	
Father on Birth Certificate	Father's name not on BC	35	10.26	5.95	(4.2 , 8.5)
	Father's name on BC	91	1.73	1 (Ref)	
Region	Anchorage / Mat-Su	59	1.99	1 (Ref)	
	Gulf Coast	9	1.73†	0.87†	(0.4 , 1.7) †
	Interior	18	1.90†	0.96†	(0.6 , 1.6) †
	Northern	12	3.91†	1.97†	(1.1 , 3.6) †
	Southeast	7	1.62†	0.81†	(0.4 , 1.7) †
	Southwest	19	4.42†	2.22†	(1.4 , 3.6) †

IMR = Infant Mortality Rate; IRR = Incidence Rate Ratio; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit

*Demographics available for 126/136 neonatal infant deaths during 2008-2012.

**Less than adequate means the Adequacy of Prenatal Care Utilization (APNCU) index, calculated from the number and timing of prenatal visits recorded on the birth certificate was 0 (none), 1 (inadequate), or 2 (intermediate). Adequate or better means the APNCU index was 3 (adequate) or 4 (adequate+).

†Rates based on fewer than 20 deaths in the numerator should be interpreted with caution.

Postneonatal Infant Mortality 2008-2012

Table 3: Postneonatal Infant Mortality Rates by Demographic Characteristics (n=130)*

		# Deaths* 2008-2012	Avg. IMR 2008-2012	IRR 2008-2012	95% CI (LL, UL)
Sex	Female	52	1.91	1 (Ref)	
	Male	78	2.69	1.41	(1.0, 2.0)
Maternal Race	White	43	1.26	1 (Ref)	
	Alaska Native	70	4.98	3.96	(2.9, 5.4)
	Black	7	3.10 [†]	2.46 [†]	(1.1, 5.3) [†]
	Asian/Pacific Islander	8	1.58 [†]	1.25 [†]	(0.6, 2.6) [†]
Maternal Age	Less than 20 years	14	2.96 [†]	1.25 [†]	(0.7, 2.2) [†]
	20-24 years	50	3.17	1.34	(0.9, 1.9)
	25-29 years	40	2.36	1 (Ref)	
	30-34 years	16	1.35 [†]	0.57 [†]	(0.3, 1.0) [†]
	35 years or older	8	1.15 [†]	0.49 [†]	(0.2, 1.0) [†]
Maternal Education	Less than 12 years	36	5.38	2.81	(1.9, 4.1)
	12 or more years	90	1.91	1 (Ref)	
Medicaid	Delivery paid by Medicaid	100	3.40	1 (Ref)	
	Delivery not paid by Medicaid	28	1.05	0.31	(0.2, 0.5)
Birth weight	Very Low (< 1,500 g)	<6 [‡]			
	Low (1,500-2,500 g)	17	6.33 [†]	3.19 [†]	(1.9, 5.3) [†]
	Not Low (2,500+ g)	105	1.99	1 (Ref)	
Prenatal Care	Less than Adequate Care**	62	3.02	1.76	(1.2, 2.6)
	Adequate or Better Care	51	1.71	1 (Ref)	
Father on Birth Certificate	Father's name not on BC	38	11.14	6.39	(4.5, 9.0)
	Father's name on BC	92	1.74	1 (Ref)	
Region	Anchorage / Mat-Su	63	2.12	1 (Ref)	
	Gulf Coast	9	1.73 [†]	0.82 [†]	(0.4, 1.6) [†]
	Interior	14	1.48 [†]	0.70 [†]	(0.4, 1.2) [†]
	Northern	19	6.19 [†]	2.91 [†]	(1.8, 4.7) [†]
	Southeast	<6 [‡]			
	Southwest	20	4.65 [†]	2.19 [†]	(1.4, 3.5) [†]

IMR = Infant Mortality Rate; IRR = Incidence Rate Ratio; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit

*Demographics available for 130/152 postneonatal infant deaths during 2008-2012.

**Less than adequate means the Adequacy of Prenatal Care Utilization (APNCU) index, calculated from the number and timing of prenatal visits recorded on the birth certificate was 0 (none), 1 (inadequate), or 2 (intermediate). Adequate or better means the APNCU index was 3 (adequate) or 4 (adequate+).

[†]Rates based on fewer than 20 deaths in the numerator should be interpreted with caution.

[‡] Number less than 6, data and rates are suppressed.

Appendix D: MIMR Review Form

Appendix D: MIMR Review Form

Case Number: _____

Date of Review: ___/___/___

MIMR-CDR Committee Consensus Form

Case Presenter: _____

Other Case Reviewers: 1. _____

Scribe: _____

2. _____

What type of death is this? Natural Accidental Suicide Assault/Neglect Unknown

1) Autopsy Performed: Yes No

If No, Committee recommended autopsy: Yes No

Why: _____

2) What do you believe was the **most probable** cause of death for this child? _____

3) What do you believe were **other contributing cause(s)** that led to this death, or the incident resulting in death?

A) _____

B) _____

C) _____

D) _____

E) _____

4) Does the death certificate completely capture the above causes and contributors of death? Yes

Does not accurately reflect most probable cause of death ***Explain why not:** _____

Does not accurately reflect contributing cause(s) of death

5) Was the information available for review adequate for the committee to determine the cause(s) of death?

Yes No Presumptive death

What missing information would have helped to better understand this case? (*check all that apply*)

Post-mortem cultures Post-mortem drug screen Post-mortem x-rays School records

Social Service records Home interview Police report

Other medical records: (psychiatry/psychology)

Standardized death scene investigation form

Toxicology Testing: _____

Other: _____

*** If No**, what **improvements of the available records** would have helped? _____

Did **lack of access or inadequate access to care** contribute to this death? (due to geographical or other reasons)

Yes Yes probably Yes, possibly No Unknown

If any "Yes", explain: _____

Appendix D: MIMR Review Form

6) Summary Cause of Death: Which of the following causes of death do you believe were part of the causal chain?
(i.e. if prevented may have prevented the death, even if no known prevention exists). **Check all that apply.**

- | | | | | |
|--|--|--|---|--|
| <input type="checkbox"/> Unknown | <input type="checkbox"/> Infection | <input type="checkbox"/> Perinatal event | <input type="checkbox"/> Use of weapon(s), including body parts | <input type="checkbox"/> Exposure |
| <input type="checkbox"/> MVI | <input type="checkbox"/> Poisoning | <input type="checkbox"/> Animal bite or attack | <input type="checkbox"/> Fire, burn or electrocution | <input type="checkbox"/> SUID/SIDS |
| <input type="checkbox"/> Drowning | | <input type="checkbox"/> Congenital anomaly | <input type="checkbox"/> Asphyxiation, suffocation, strangulation | <input type="checkbox"/> Fall or crush |
| <input type="checkbox"/> Spontaneous preterm birth | <input type="checkbox"/> Mental health disease | <input type="checkbox"/> Drug, alcohol, or tobacco use | <input type="checkbox"/> Medical condition | |
| <input type="checkbox"/> Medically indicated preterm birth | | <input type="checkbox"/> Other _____ | | |

9) Did any of the following cause or contribute to the child's death? (See definitions handout.)

9a) Abuse by caregiver/other Adult(s)? Yes Yes, probably No
 Unknown, committee suspicious Unknown, but unlikely

*If Yes, was the Abuse: Primary cause of death Relate cause of death Unknown

*If Yes, relationship(s) of suspected/confirmed perpetrator(s)? _____

9b) Intentional neglect by a caregiver(s)? Yes Yes, probably No
 Unknown, committee suspicious Unknown, but unlikely

*If Yes, was the neglect: Primary cause of death Relate cause of death Unknown

*If Yes, relationship(s) of suspected/confirmed perpetrator(s)? _____

9c) Gross negligence by caregiver(s)? Yes Yes, probably No
 Unknown, committee suspicious Unknown, but unlikely

*If Yes, was the negligence: Primary cause of death Relate cause of death Unknown

*If Yes, relationship(s) of suspected/confirmed perpetrator(s)? _____

10) Did substance use by the child cause or contribute to the death?

Yes Yes probably Yes, possibly No Unknown

*If Yes, what type of substance? Cocaine ETOH Methadone Tobacco

Semi-synthetic opiates OTC Marijuana Other: _____

Victim's prescribed meds Other's prescribed meds

10b) How did the substance use cause or contribute to the death? _____

11) Did substance use by someone else contribute to the child's death?

Yes Yes probably Yes, possibly No Unknown

*If Yes, what type of substance? Cocaine ETOH Methadone Tobacco

Semi-synthetic opiates OTC Marijuana Other: _____

*If Yes, How did the substance use cause or contribute to the death? _____

*If Yes, what was their relationship to the child? Unknown Mother Father Friend
 Stranger Family member Other: _____

*If Yes, was the person the supervisor of the child? Yes No Unknown

Appendix D: MIMR Review Form

Specific Causes or Contributing Factors to Death

Please also refer to and correct the data extraction sheet on the left side of the file

Motor Vehicle N/A (Circle N/A and skip to next section if not applicable)

12) Was the child properly restrained or was the child wearing proper protective gear (i.e. seatbelt, child safety seat, ATV rider protection)? Yes No Unknown N/A

*If No, please list what was *not* or *incorrectly* used. _____

The above listed was: Not Used Incorrectly used Unknown

13) Please describe any factors not previously mentioned that you believe may have contributed to motor vehicle incident resulting in the death of the child: _____

Drowning N/A (Circle N/A and skip to next section if not applicable)

14) What was the primary reason child was in the water?

Unknown Rescuing another Swimming Bathing Accidental fall (i.e. fell in toilet, fell off boat)
 Other: _____

15) Contributing factor(s) to death (check all that apply):

Weather Current Drop-off Inappropriate supervision House not child safe
 No personal flotation device Water temp Child's inability to swim Other: _____

16) Please describe any factors not previously mentioned that you believe may have contributed to the drowning of the child:

Assault N/A (Circle N/A and skip to next section if not applicable)

17) Child-related factors that may have contributed to the assault (*check all that had supporting evidence*)

Current sexual abuse Past sexual abuse Dangerous online activities
 Prostitution Drug use/abuse History of delinquency
 Other: _____

18) Perpetrator-related factors that may have contributed to the assault (*check all that had supporting evidence*)

Inexperienced caregiver Stress/frustration Drug use/abuse
 Mental health issues Previous victim of DV/abuse Previously committed DV/abuse
 Religious beliefs Discrimination Other: _____

19) Event-related factors that may have contributed to the assault (*check all that had supporting evidence*)

Domestic dispute Gangs Other: _____

Appendix D: MIMR Review Form

Accident/Risky Behavior N/A (Circle N/A and skip to next section if not applicable)

20) Behavior that led to accident (describe behavior): _____

***Did risky behavior lead to the accident?** (See definition of risky behavior on the definitions sheet.)

Yes Yes, probably Yes, possibly No Unknown N/A

21) The behavior described in #20 was (check all that apply): N/A behavior of someone else
 Unknown behavior of child

22) Behavior by self or other(s) was: Unknown Direct cause of death Contributing cause of death

23) If by child, was this behavior typical for the child's age?

Yes Yes, probably Yes, possibly No Unknown N/A

***If No, why not?** _____

24) If BEHAVIOR of child, does evidence support this was typical behavior for this individual? N/A (reckless behavior by others)

Yes Yes, probably Yes, possibly No Unknown

***If No, why not?** _____

25) If BEHAVIOR of other(s), what is the relationship to the child? N/A (reckless behavior by child)

Unknown Parent Other primary caregiver Friend Family member

Stranger Sibling Other: _____

26) What was the primary reason for this behavior? _____

Medical Condition N/A (Circle N/A and skip to next section if not applicable)

27) Was/were the medical condition(s) that led to the death (check all that apply):

Congenital Chronic Acute

28) Was death expected as a result of any of the medical condition(s)? Yes Possibly No

***If yes, typical remaining life expectancy with condition(s):** _____

29) Were any of the medical condition(s) the result of a previous event (e.g. accident, suicide attempt, etc.)?

Yes No Unknown N/A

***If yes, what?** _____

30) Did any of the medical condition(s) complicate or lead to the event that was the direct cause of the child's death?

Yes No Unknown

Medical condition continued on next page:

Appendix D: MIMR Review Form

Medical Condition continued:

31) Was the child receiving adequate health care for the medical condition(s)? Yes No Unknown

* If no, was the inadequate care while the child was in utero, or after birth? in utero after birth

32) Was the child or primary caregiver compliant with prescribed care plans?

Yes No Presumed Unknown N/A

*If No, check non-compliance issues: Appointments Medications Medical equipment use
 Therapies Other: _____

33) Did the primary care facility provide adequate care based on available knowledge and technology?

Yes No Unknown N/A

*If no, please explain: _____

Sudden Unexpected Infant Deaths N/A (Circle N/A and skip to next section if not applicable)

(Include all child asphyxiation/suffocation sleep related deaths)

34) Was child sleeping with an impaired person?

Yes Yes, Probably Yes, Possibly No Unknown Not bed sharing

*If YES, how was the person impaired: ETOH Tobacco Extreme exhaustion
 Sleep apnea Other _____

35) Did overlying contribute to the death?

Yes Yes, Probably Yes, Possibly No Insufficient information Not bed sharing

36) Did inappropriate bedding contribute to the death?

Yes Yes, Probably Yes, Possibly No Unknown

37) Did any object that is not sleep related contribute to the death (i.e. plastic bag in crib)?

Yes Yes, Probably Yes, Possibly No Unknown

38) Please circle how close this case fits the definition of a true SIDS death (see definitions handout).

Definitely SIDS Probably SIDS Possibly SIDS Unlikely SIDS NOT SIDS

Appendix D: MIMR Review Form

Preventability

39) Was this death preventable? (see definitions handout) Unknown No. Why not? _____

Yes, possibly (causal chain/mechanism between prevention and outcome is unclear)

Yes, probably (causal chain/mechanism between prevention and outcome is clear)

Yes

40) If yes, during the sequence of events prior to the death, what reasonable things, if they **had not** occurred or **had** occurred, might have prevented the death? (Please rank in order, with 1 being most likely to have prevented death.)

Rank

41) What specific change(s) do you believe should occur to **prevent other similar deaths** and to keep children safe, healthy and protected? (Check all that apply and describe.)

Improved patient education _____

Improved parent education _____

Improved other caretaker education _____

Improved education of medical care providers; Who? _____

More widely offered school education programs _____

Increased availability and use of alcohol/drug/tobacco abuse treatment programs _____

New or expanded social support programs or services _____

New or revised procedures _____

New law or ordinance _____

Improved enforcement of existing law/ordinance; What? _____

Modify or recall consumer product; What product? _____

Improved access to medical care Primary Intensive Specialty Mental Health _____

Changes in public health nursing: _____

Other: _____

42) Other comments (Anything else important about this death that has not already been captured):

