

Trends in Maternal and Child Morbidity and Mortality in Hawaii?

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Child Death Review-Maternal Mortality Review Programs Summit
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Infants, Children, and Pregnancies in Hawaii

- ~23,000 pregnancies every year — Vital Statistics
- ~19,000 births every year (Just over 50 per day)— Vital statistics
- Under 5 population of 87,407 (6% of state population)—based on 2010 census data
- Under 18 population of 303,818 (22% of state population)—based on 2010 census data
- Women of Reproductive age (15-44 years) population of 265,368 (19.1% of state population)
- Diverse population

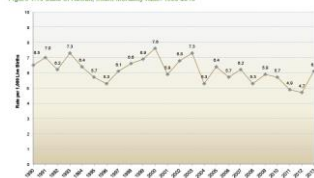


FHSD Profiles 2014

Infant Mortality

The death of an infant is a critical indicator of population health as it often reflects the overall state of maternal and infant health. It also is used as measurement of the quality and accessibility of health care for pregnant women and infants. Some risk factors for an infant death include being born with low birth weight, a short gestation, receipt of care, access to medical care, sleep positioning and exposure to smoking. The national Healthy People 2020 objective is to decrease the rate of infant mortality among all groups to 6 per 1,000 live births. The national infant mortality rate was 6.4 deaths per 1,000 live births in 2010. There was more than a two-fold difference in infant mortality rates by race and ethnicity, from a high of 12.6 per 1,000 live births among non-Hispanic black women to a low of 3.3 among non-Hispanic white women and 3.4 among Hispanic women. These differences may result, in part, to differences in risk factors for infant mortality, such as prenatal and low birth weight delivery, socioeconomic status, access to medical care, etc. However, many of the social and ethnic differences in infant mortality remain unexplained.

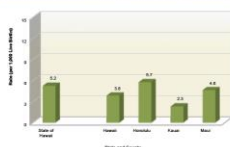
Figure 1.16 State of Hawaii, Infant Mortality Rate - 1999-2013



Source: Hawaii State Department of Health, Office of Health Status Monitoring
Note: Limited to Resident Population and 2013 data is preliminary.
In Hawaii, there was little change in the infant mortality rate from 1999 to 2013, with a low of 5.3 deaths per 1,000 live births in 2004 and a high of 7.0 deaths per 1,000 live births in 2000. However, in 2011 and 2012, Hawaii experienced the lowest infant mortality rates ever documented in the state, but there was an increase in 2013 (preliminary data) back up to levels not seen in 2007. It will be critical to continue to monitor the rate, particularly within population subgroups, and promote activities to return to a downward trend.

On average,
2 infants
die each week
in Hawaii.

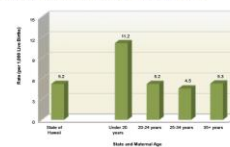
Figure 1.17 State of Hawaii, Infant Mortality Rate by Maternal County of Residence - 2011-2013



Source: Hawaii State Department of Health, Office of Health Status Monitoring
Note: The Office of Health Status Monitoring estimates by mother's county of residence at time of birth was obtained from that reported on the linked birth certificate. Limited to Resident Population and 2013 data is preliminary.

Based on the county of residence of the mother at delivery, infants whose mothers lived in Hawaii, Kauai and Maui counties had lower infant mortality rates than the overall state average from 2011-2013. Infant mortality among mothers living in Honolulu County was above the overall state rate.

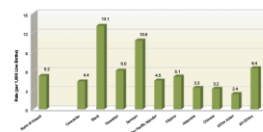
Figure 1.18 State of Hawaii, Infant Mortality Rate by Maternal Age - 2011-2013



Source: Hawaii State Department of Health, Office of Health Status Monitoring
Note: The Office of Health Status Monitoring estimates by mother's age at time of birth was obtained from that reported on the linked birth certificate. Limited to Resident Population and 2013 data is preliminary.

Based on the age of the mother at delivery, infants whose mothers were younger than 20 years of age had the highest infant mortality rate and may well exceed the overall state average from 2011-2013. The infant mortality rate among mothers 25-34 years of age was slightly below the overall state rate. Whereas, infants whose mothers who were 20-24 years old and 35 years of age and older had similar mortality rates to the state estimate.

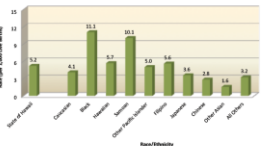
Figure 1.19 State of Hawaii, Infant Mortality Rate by Race/Ethnicity of Mother - 2011-2013



Source: Hawaii State Department of Health, Office of Health Status Monitoring
Note: The Office of Health Status Monitoring estimates by mother's race/ethnicity was obtained from that reported on the linked birth certificate. Limited to Resident Population and 2013 data is preliminary.

Infants born to mothers within the racial/ethnic categories of black, Samoan, Hawaiian, or "all others" had rates of infant mortality higher than the overall state average. Whereas, infants whose mothers reported being Chinese, Japanese, Caucasian, "other Pacific Islander" or "other Asian" had lower rates.

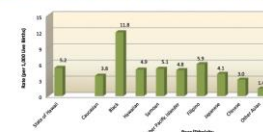
Figure 1.20 State of Hawaii, Infant Mortality Rate by Race/Ethnicity of Child - 2011-2013



Source: Hawaii State Department of Health, Office of Health Status Monitoring
Note: The Office of Health Status Monitoring estimates by child's race/ethnicity was obtained from that reported on the linked birth certificate. Limited to Resident Population and 2013 data is preliminary.

Based on the race/ethnicity of the child, infants who were black or Samoan experienced the highest rates of infant mortality. Infants who were Hawaiian or Filipino also had higher rates than the overall state average. Whereas, infants that were Chinese, Japanese, Caucasian or "other Asian" had lower rates.

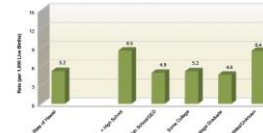
Figure 1.21 State of Hawaii, Infant Mortality Rate by Race/Ethnicity of Father - 2011-2013



Source: Hawaii State Department of Health, Office of Health Status Monitoring
Note: The Office of Health Status Monitoring estimates by father's race/ethnicity was obtained from that reported on the linked birth certificate. Limited to Resident Population and 2013 data is preliminary.

Infants born to fathers within the racial/ethnic categories of black, Samoan, Filipino or "all others" had rates of infant mortality higher than the overall state average. Infants whose fathers reported being "Other Asian" or Chinese had the lowest rates of infant mortality. The "all others" group, which by definition included individuals in which the relationship was missing or treated as "unknown," was much higher among fathers compared to mothers and children. For example, the "all others" paternal group was associated with 17.0% of infant deaths and 11.0% of births in 2013. Compared to much lower estimates within maternal (3.7% and 3.7%, respectively) or child race/ethnicity (1.7% and 2.0%, respectively) groups.

Figure 1.22 State of Hawaii, Infant Mortality Rate by Maternal Education - 2011-2013



Source: Hawaii State Department of Health, Office of Health Status Monitoring
Note: The Office of Health Status Monitoring estimates by mother's education at time of birth was obtained from that reported on the linked birth certificate. Limited to Resident Population and 2013 data is preliminary.

Based on the education of the mother at delivery, infants whose mothers had less than a high school education or did not have a reported education level had the highest rates of infant mortality, which was well above the overall state average. Infants whose mothers only completed high school, had a GED, or had some college education experienced a mortality rate similar to the state average, while college graduates had a lower rate than the state average.

Changes over Time and by Maternal Age, Race, Education

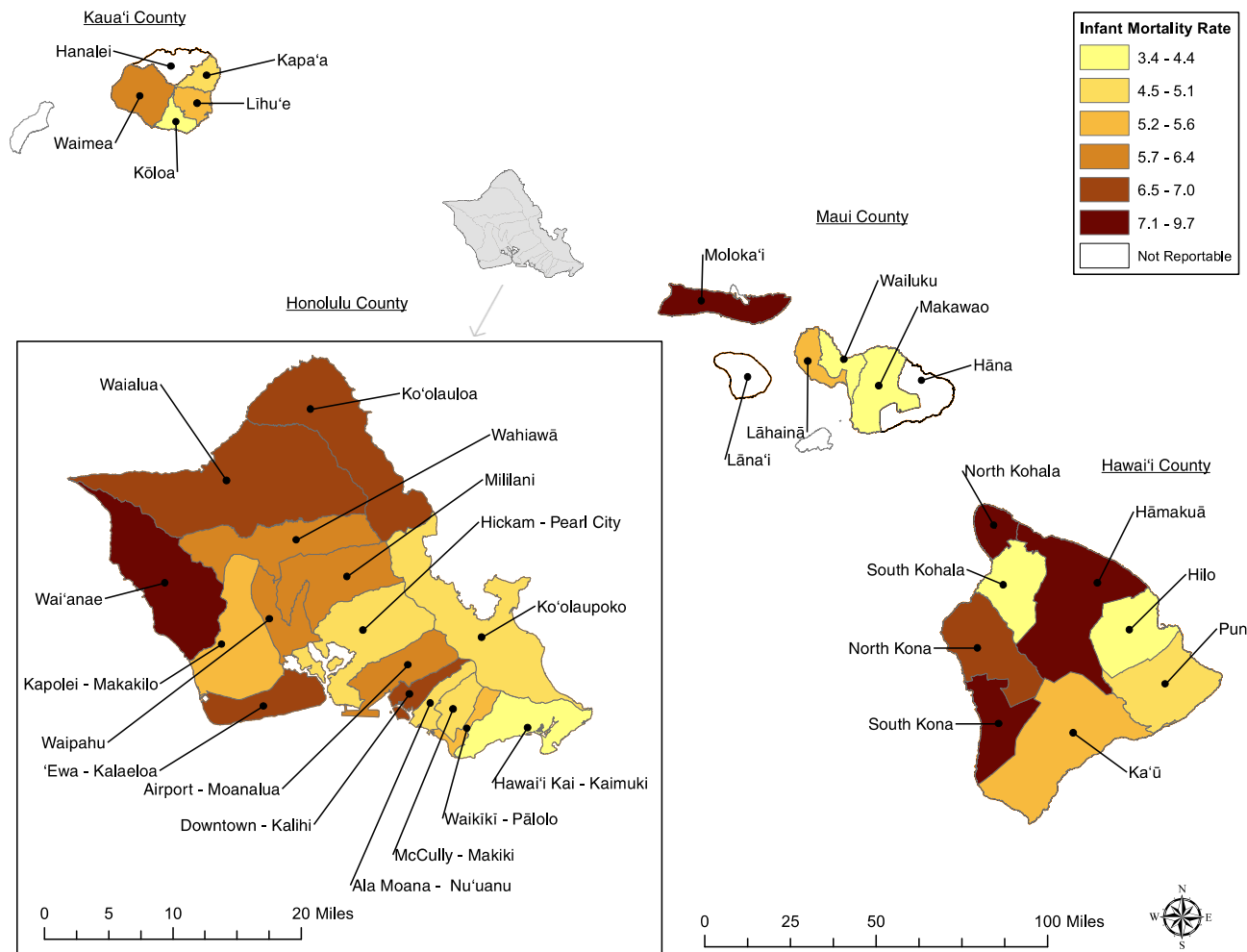
Report highlights information on 32 plus public health issues affecting women, infants, children, and families in Hawaii.

- FHSD programs and their efforts to promote health and improve health outcomes.
- FHSD partnerships and collaborations.

STATE OF HAWAII PRIMARY CARE NEEDS ASSESSMENT DATA BOOK 2016

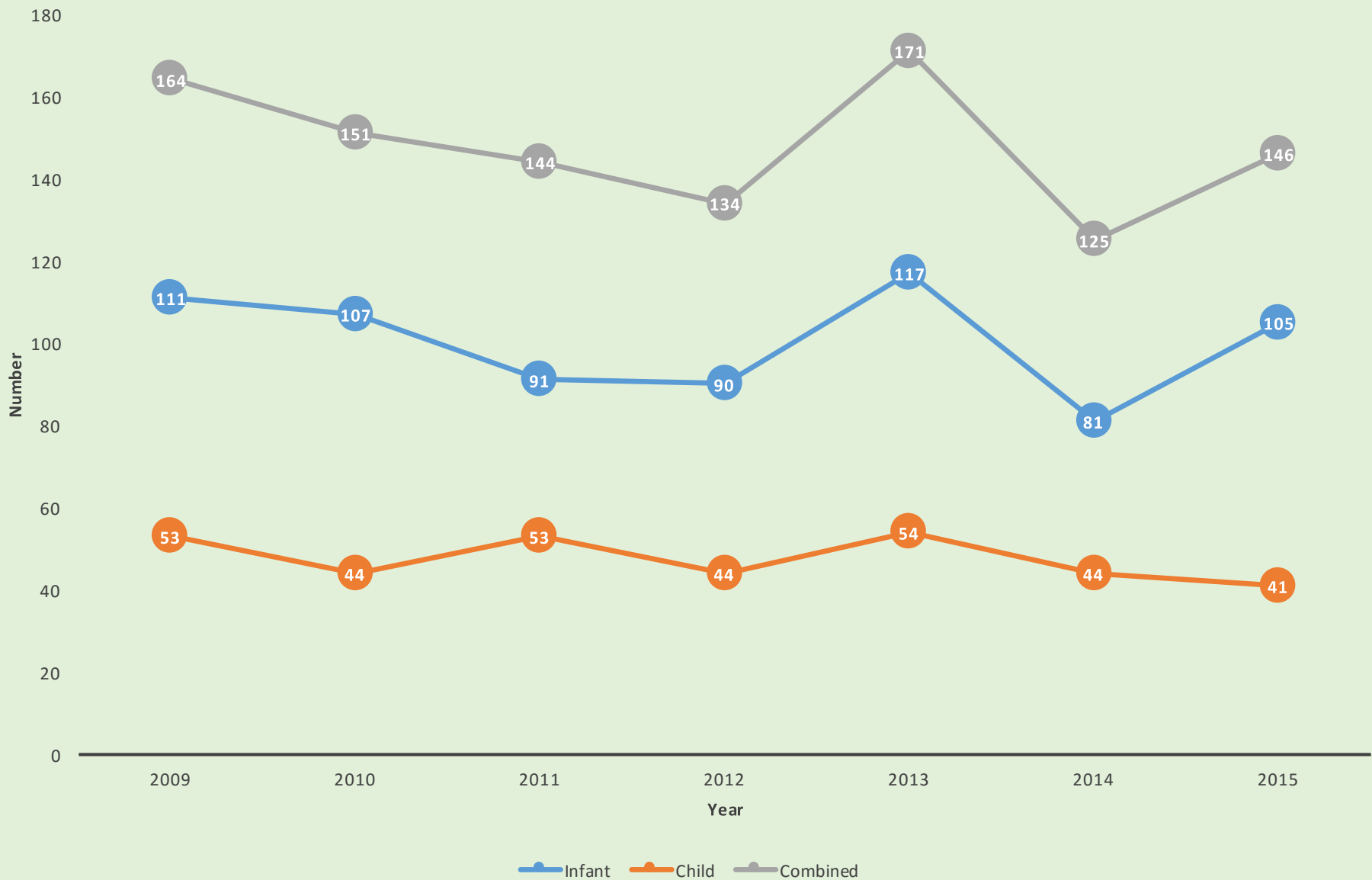


FAMILY HEALTH SERVICES DIVISION
HAWAII DEPARTMENT OF HEALTH
MAY 2016



- Just one way to look at the data
- Variation by Geography
- Helpful in planning/surveillance
- Data reflects 10 year time period due to small numbers (2001-2010)
- Over 40 Health and Socio-economic indicators (multiple data sources)

Trends in Number of Infant and Child Deaths, Hawaii Residents, 2009-2015



Leading Causes of Infant Death in Hawaii, 2009-2015

Cause of Death	Number	Percent of Infant Deaths
Preterm related	235	33.5%
Other perinatal	95	13.5%
Congenital malformations	102	14.5%
SUID	77	11.0%
Maternal Complications	75	10.7%

- Small numbers limit ability to look at trends over time for individual causes
 - Preterm related and other perinatal show slight increase (3 year rolling averages)
 - Congenital malformations show slight decrease (3 year rolling averages)
 - SUID and maternal complications little change (3 year rolling averages)

Note: Limited to Hawaii Residents. Infants defined as < 1 year of age. 2015 Data is provisional. FHSD calculations of Office of Health Status Monitoring Death Certificate Data

Leading Causes of Child Death in Hawaii, 2009-2015

Cause of Death	Number	Percent of Child Deaths
Transport related	55	16.5%
Malignant Neoplasms	46	13.8%
Suicide	36	10.8%
Drowning	31	9.3%
Pulmonary disease	20	6.0%
Congenital malformations	16	4.8%
Cardiovascular disease	15	4.5%
Homicide	11	3.3%

- Small numbers limit ability to look at trends over time for individual causes even with 3 year rolling averages

Note: Limited to Hawaii Residents, Children defined as 1-17 years of age. 2015 Data is provisional. FHSD calculations of Office of Health Status Monitoring Death Certificate Data

Leading Causes of Death in Hawaii, 2008-2012

2015
Hawaii
State Fact Sheet



Unintentional injuries and violence are the leading causes of death, hospitalization, and disability for children ages 1-18. This fact sheet provides a state snapshot of data on the injury-related Maternal and Child Health Block Grant National Performance Measures and Health Status Indicators, with a special focus on disparities based on race, gender, and rural/urban residence. The fact sheet is intended to be a helpful and easy-to-use tool for needs assessments, planning, program development, and presentations.

The Children's Safety Network (CSN) National Injury and Violence Prevention Resource Center, funded by the Maternal and Child Health (MCH) Bureau, works with states to utilize a science-based, public health approach for injury and violence prevention (IVP). CSN is available to provide information and technical assistance on injury surveillance and data; needs assessments; best practices; and the design, implementation, and evaluation of programs to prevent child and adolescent injuries.

Major Causes of Injury Death

Table 1: Leading Causes and Total 5-Year Incidence of Deaths by Age Group, Hawaii, 2008-2012

Rank	Age Groups					
	<1	1 - 4	5 - 9	10 - 14	15-19	20-24
1	Short Gestation 95	Unintentional Injury 26	Malignant Neoplasms 12	Unintentional Injury 11	Unintentional Injury 75	Unintentional Injury 139
2	Congenital Anomalies 89	Malignant Neoplasms ****	Unintentional Injury ****	Congenital Anomalies ****	Suicide 46	Suicide 88
3	Maternal Pregnancy Comp. 54	Homicide ****	Heart Disease ****	Suicide ****	Malignant Neoplasms 25	Malignant Neoplasms 22
4	Placenta Cord Membranes 31	Congenital Anomalies ****	Congenital Anomalies ****	Malignant Neoplasms ****	Heart Disease ****	Heart Disease 20
5	Unintentional Injury 25	Influenza & Pneumonia ****	Homicide ****	Five Tied ****	Homicide ****	Homicide ****

Note. **** = indicates that the cell values range from 1-9 and are suppressed for data confidentiality purposes. For ages 10-14, five mechanisms were tied for the fifth through ninth ranking including Cerebro-vascular, Chronic Lower Respiratory Disease, Homicide, Perinatal Period, and Septicemia. Each of these mechanisms had fewer than 10 deaths.

Infant specific:

- Short Gestation
- Congenital Anomalies
- Sudden Unexpected Infant Death (SUID)

1-4 years of age:

- Unintentional Injury
- Cancer
- Homicide

5-9 years of age:

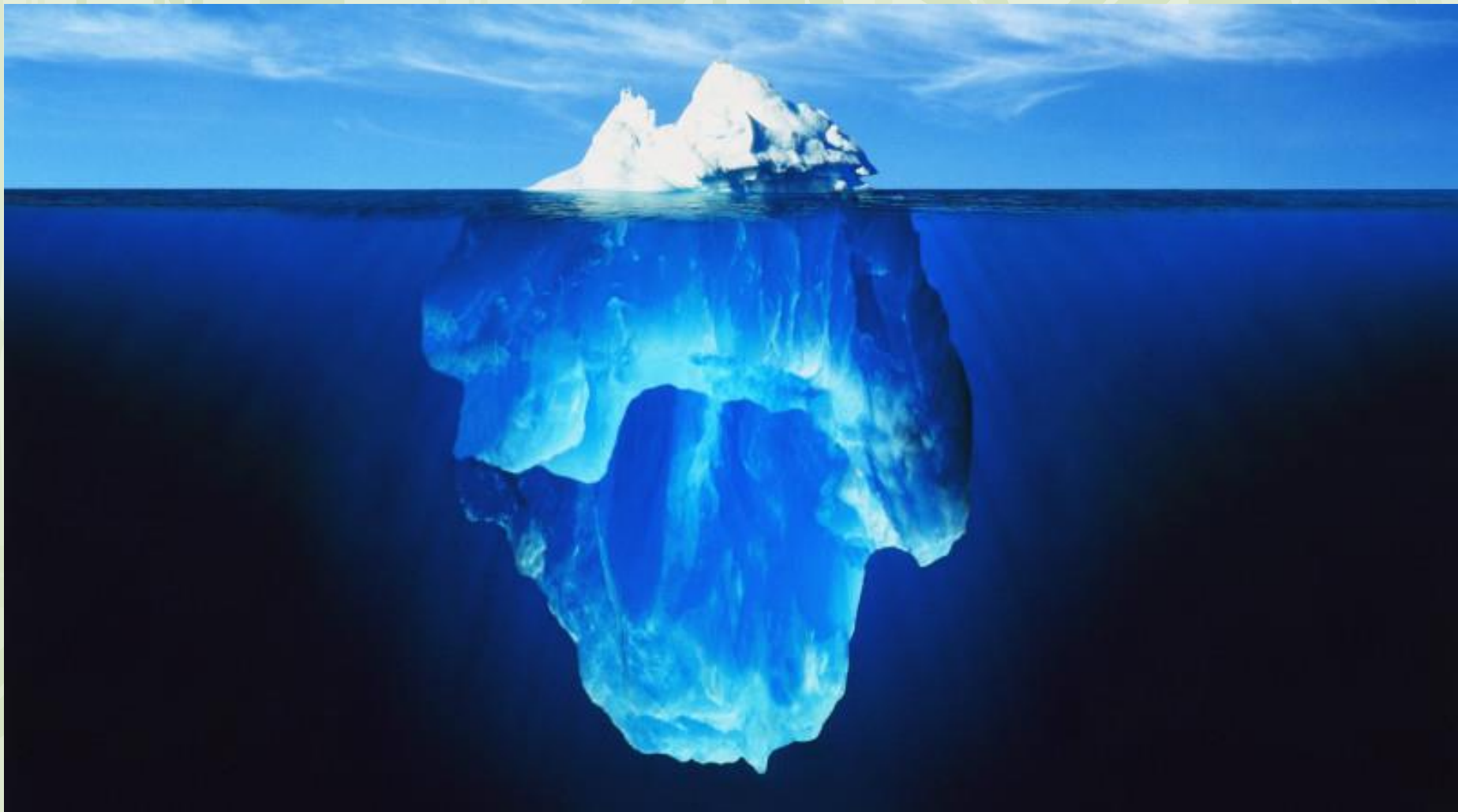
- Cancer
- Unintentional Injury
- Heart Disease

10-14 years of age:

- Unintentional Injury
- Congenital Anomalies
- Suicide

15-19 years of age:

- Unintentional Injury
- Suicide
- Cancer



Tip of the Iceberg

Leading Causes of Injury Mortality and Morbidity among Hawaii Residents Under 18 years of Age, 2010-2014

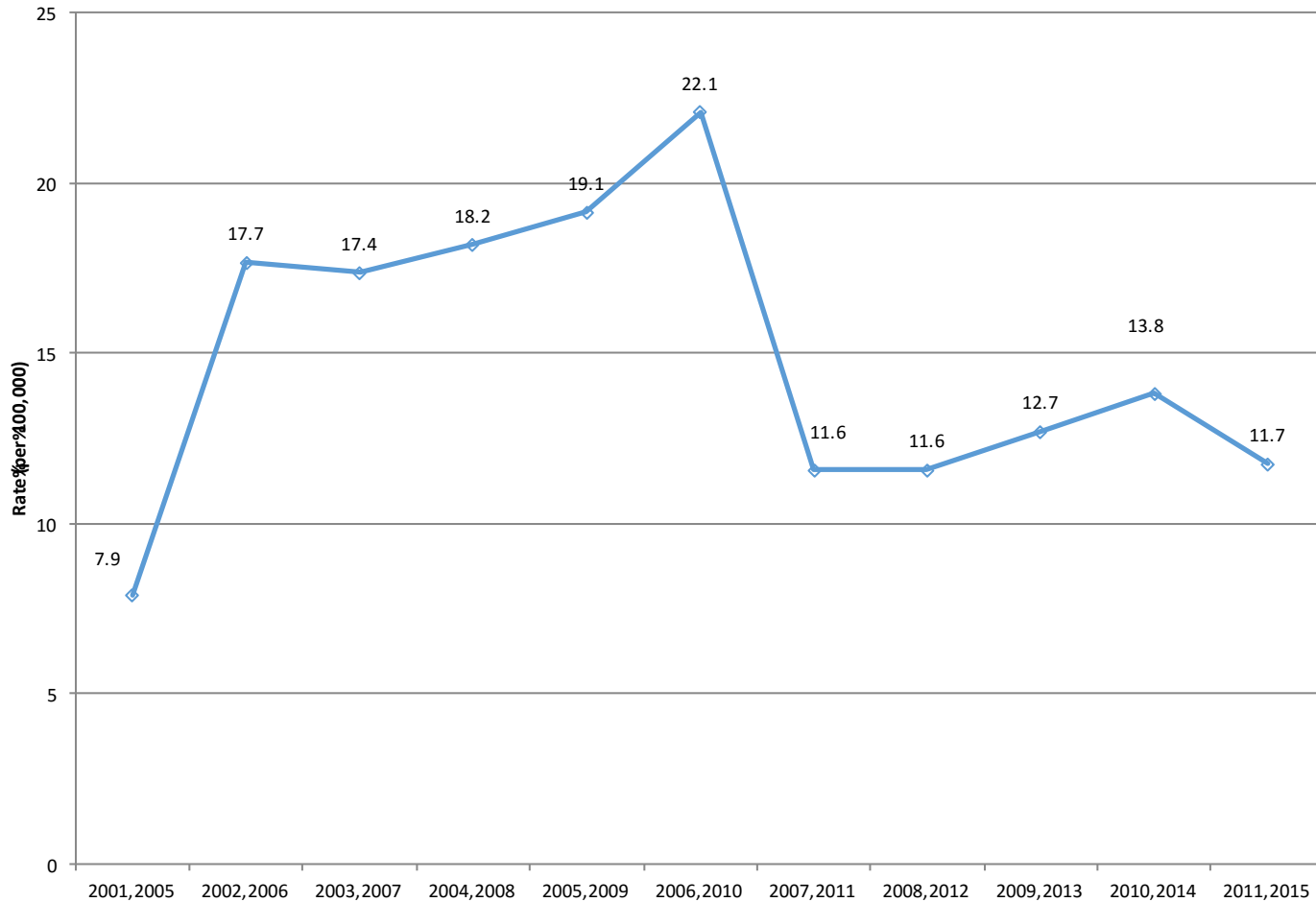
Death Certificates (Fatal)				Hospital Admission Records (non-fatal)			Emergency Department Records (non-Fatal)		
Rank	Cause	Number	Percentage	Cause	Number	Percentage	Cause	Number	Percentage
1	SUID	13	34%	Falls	178	32%	Falls	1,395	34%
2	Drowning	5	14%	Striking	43	8%	Striking	5,535	22%
3	Suicide	5	13%	Suicide	37	7%	all other	4,369	18%
4	Car occupant	<5	11%	Fire/burn	28	5%	Overexertion	1,671	7%
5	Pedestrian	<5	7%	Car occupant	27	5%	Cut/pierce	1,347	5%
6	Assault	<5	6%	Pedestrian	22	4%	Natural/environment	1,270	5%
7	Motorcyclist	<5	3%	Bicyclist	22	4%	Bicyclist	1,057	2%
8	Falls	<5	2%	Poisoning	21	4%	Car occupant	1,071	2%
9	Poisoning	<5	2%	Drowning	19	3%	Assault	1,046	2%
10	Striking	<5	2%	Motorcyclist	16	3%	Fire/burn	1,030	1%
	all other	<5	6%	all other	150	27%	Poisoning	1,016	1%
Average Annual Total		38			563			2,4707	

15 fold → 650 fold

Source: Department of Health EMS and Injury Prevention

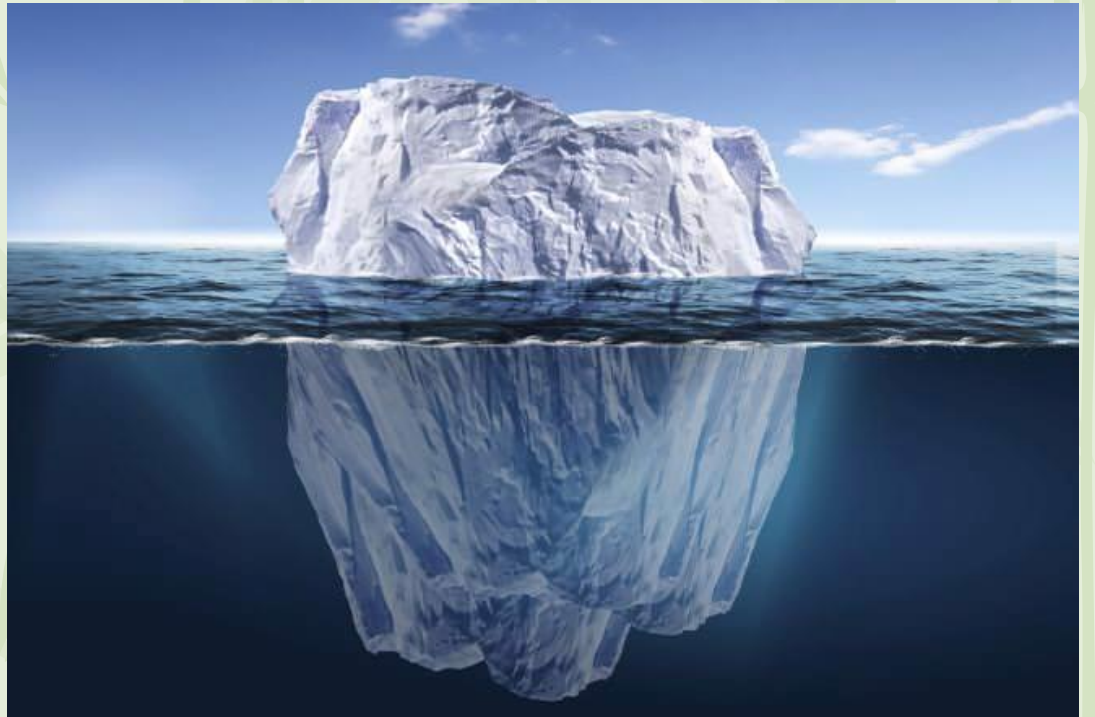
Maternal Mortality

Maternal Mortality Rate, Hawaii, 5 Year Rolling Averages



- Ranged from 0-10 deaths (average of 2.7 since 2009) annually since 2001.

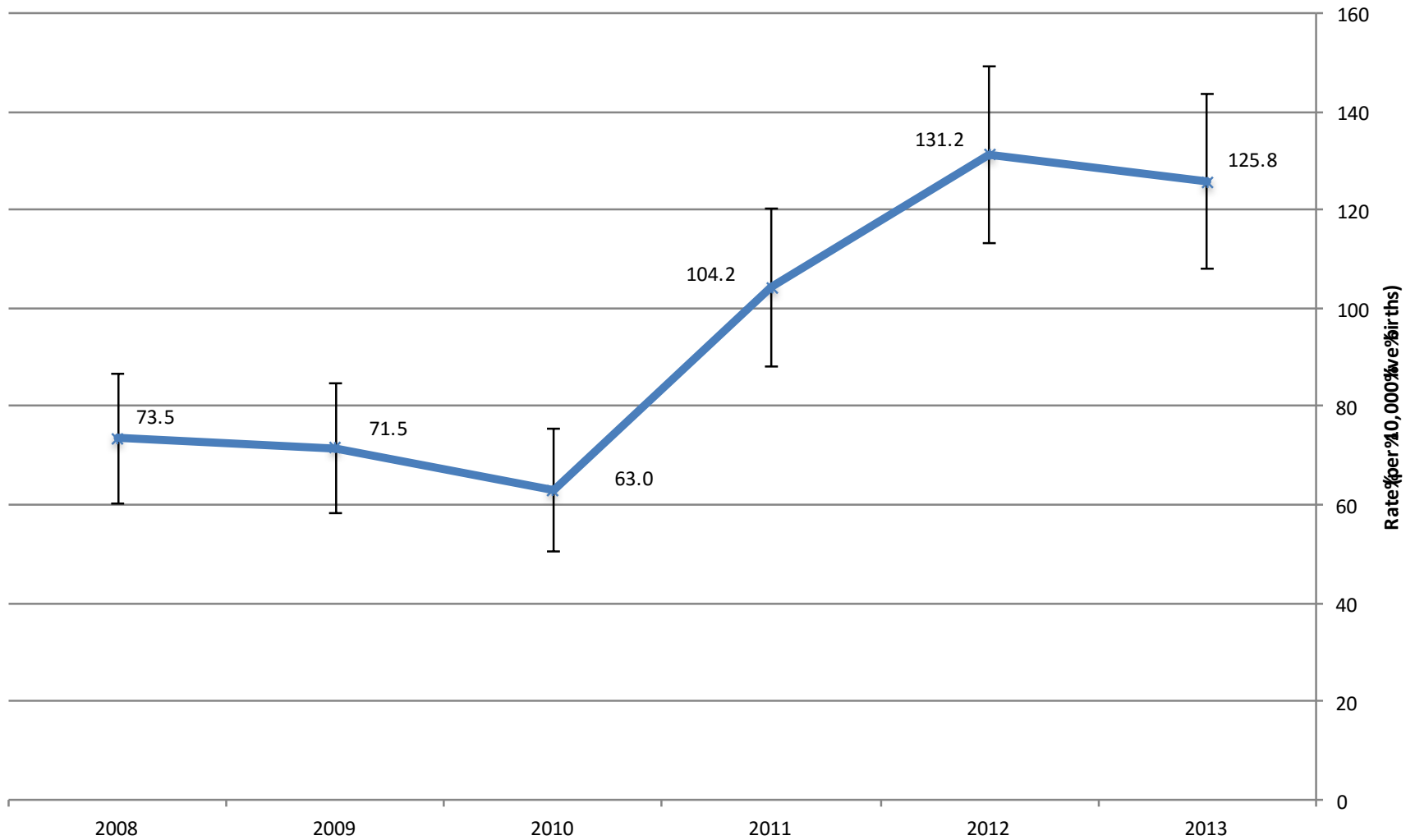
Note: Limited to Hawaii Residents, Maternal Mortality WHO definition A34, O00-O95, O98-O99 for underlying cause of death. 2015 Data is provisional. FHSD calculations of Office of Health Status Monitoring Death Certificate Data



Background

- Examining severe maternal morbidities (SMM) can identify opportunities to prevent maternal complications and death and to improve quality in perinatal care.
- SMM include complications resulting from or exacerbated by pregnancy.
 - Hysterectomy, Transfusions, Cardiac Procedures, ...
 - Disseminated Intravascular Coagulation, Heart Failure, Pulmonary Edema, Adult Respiratory Distress Syndrome, Acute Renal Failure,...
- SMM can be a complement to examining maternal deaths – especially in small states or those where these events are rare.

Trends in Severe Maternal Morbidity, Hawaii, 2008-2013, State Inpatient Data, Title V Federally Available Data



- Ranged from 98-205 (average of 149) hospitalization annually since 2008.

Source: Data from Title V MCHB/HRSA Federally Available Data based on hospital discharges.

Note: Military hospitals are excluded from calculations.

Methods

- *Data source:* Hospital discharge records for Hawaii residents. Agency for Health Care Research and Quality, Care Utilization Project (HCUP) State Inpatient data.
- *Delivery hospitalizations:* Identified with method described by Kuklina, et al. using ICD-9-CM codes
- *SMM:* 25 procedures or conditions present at the time of delivery, as described by Callaghan, et al. (Includes blood transfusion, amniotic fluid embolism, eclampsia, hysterectomy)

Results

- An adjusted* analysis of 2007-2011 HCUP data revealed that SMM was:
 - 420%-580% more likely among cesarean deliveries compared to vaginal
 - 64% more likely in urban vs. rural hospitals
 - 30% more likely in low volume (<1000 deliveries/year) hospitals compared to moderate volume (1,001-2,000 deliveries/year)

*Adjusted for Maternal race, maternal age, mode of delivery, rural residence, hospital volume, and year

Summary

- Maternal and Child Mortality are both relatively rare events
- Childhood Injury data highlights a large number of children at risk
- Severe Maternal Morbidity has increased significantly over time
- Need to raise awareness and develop activities to reduce Maternal and Child Morbidity and Mortality

Acknowledgements

- Hawaii Department of Health
- Centers for Disease Control and Prevention (CDC)
- Hawaii Maternal and Infant Health Collaborative

Comments & Questions



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Child Death Review Historical

- 2001-2006, there were 1,079 child deaths
 - 34% received a full team review (n=372)
 - 22.3% of all infant deaths (156 of 699)
 - 55.8% of 1-4 years of age (67 of 120)
 - 32.1% of 5-9 years of age (17 of 53)
 - 50.6% of 10-14 years of age (44 of 87)
 - 73.3% of 15-17 years of age (88 of 120)



*A Report from Hawaii Child Death Review
2001-2006*

Submitted by the
Hawaii State Department of Health
Family Health Services Division
Maternal and Child Health Branch
December 2011



Primary Cause of Death Table 8 shows the primary cause of child death between 2001 and 2006 resulted from injury or medical causes.

Table 8. Child Deaths by Primary Cause of Death in Hawaii, Comprehensively Reviewed, 2001-2006 (N=368)

Primary Cause of Death		Number of Deaths	Percent of Deaths
Injury (external)	Injury (external)	275	75%
	Motor vehicle and other transport	91	25%
	Asphyxia	58	16%
	Undetermined	51	14%
	Drowning	29	8%
	Weapon (including use of a body part)	19	5%
	Fall or crush	13	4%
	Fire, burn or electrocution	4	1%
	Poisoning, overdose, or acute intoxication	2	1%
	Animal bite or attack	2	1%
	Exposure	1	0%
	Other	2	1%
	Unknown	3	1%
Medical	Medical	79	21%
	Pneumonia	18	5%
	SIDS	12	3%
	Cardiovascular	9	2%
	Congenital anomaly	7	2%
	Other infection	7	2%
	Undetermined medical	5	1%
	Prematurity	2	1%
	Neurological	2	1%
	Other perinatal condition	1	0%
Other medical condition	16	4%	
Undetermined if injury (external) or medical		14	4%
Total		368	100%

Source: National Center for Child Death Review Case Reporting System. Data Note: Number of deaths includes resident and non-resident deaths. For primary cause of death, 1 death was blank and 3 deaths were indicated as unknown. Summation of percentages may not total 100% due to rounding.

Leading Causes of Injury Mortality and Morbidity among Hawai'i residents¹

Death Certificates (fatal)			Hospital Admission Records (non-fatal)			Emergency Department Records (non-fatal)			
Cause	# ²	%	Cause	# ³	%	Cause	# ⁴	%	
1	Suicide	159	24%	Falls	2,705	45%	Falls	20,920	26%
2	Falls	108	16%	Car occupant	414	7%	Striking ⁵	11,572	15%
3	Poisoning	98	15%	Suicide attempt/ self inflicted	361	6%	Cut/pierce	7,563	10%
4	Car occupant	58	9%	Assault	307	5%	Overexertion ⁶	6,618	8%
5	Drowning	35	5%	Motorcyclist	276	5%	Car occupant	4,204	5%
6	Suffocation	30	4%	Poisoning	207	3%	Assault	3,936	5%
7	Motorcyclist	29	4%	Striking ⁵	191	3%	Natural/ environmental ⁷	3,549	4%
8	Pedestrian	26	4%	Pedestrian	137	2%	Bicyclist	1,133	1%
9	Assault	22	3%	Overexertion ⁶	106	2%	Motorcyclist	1,044	1%
10	Fire/burn	4	1%	Bicyclist	105	2%	Fire/burn	988	1%
	<i>all other</i>	102	15%	<i>all other</i>	603	10%	<i>all other</i>	10,892	14%
	Annual total	671		Annual total	5,980		Annual total	79,576	

¹ Non-residents comprised 9% of the victims killed by injuries in the state, 9% of those hospitalized, and 10% of those treated in emergency departments.

² Annual number of deaths, from 2007-2011 death certificates. For underlying cause of death in the ICD-10 code series: V01-Y36, Y85-Y87, Y89, and U01-U03.

³ Annual number of injury-related hospitalizations, from 2004-2008 records. For principle diagnosis in ICD-9CM code series: 800-909.2, 909.4, 909.9, 910-994.9, 995.5-995.59, 995.80-995.85.

⁴ Annual number of injury-related hospitalizations, from 2004-2008 records. For principle diagnosis in ICD-9CM code series: 800-909.2, 909.4, 909.9, 910-994.9, 995.5-995.59, 995.80-995.85.

⁵ Most (92%) of these patients were "struck accidentally by objects or persons"; the rest (9%) were "struck accidentally by falling object". Of the former, the most commonly specified causes were "striking...in sports" (20%), and "striking against...furniture" (4%). For the 30% of 2010 and 2011 records with specific coding, most (79%) of these injuries were sports-related, most commonly "surfing, windsurfing and boogie boarding" (16%), "american tackle football" (15%), basketball (10%), baseball (9%), and soccer (7%).

⁶ Most (95%) of these injuries were related to "Overexertion and strenuous movements", with no further specificity. Subcategories include overexertion from sudden strenuous movements (39%), and trauma from repetitive motion, loads or impacts (17%). For the 30% of 2010 and 2011 records with specific coding, about half (44%) of these injuries were sports-related, including basketball (14%), and baseball, soccer and volleyball (5% each). Another 13% were due to "walking, marching and hiking", and 6% to running.

⁷ Most (98%) of these visits were related to the bites or venom of animals, most specifically dog bites (36%), bee and wasp stings (11%), centipedes (11%) and venomous marine animals (6%).



Hawai'i Injury Prevention Plan 2012-2017

Injury Prevention Advisory Committee
Injury Prevention and Control Section

Hawai'i State Department of Health
Emergency Medical Services and Injury Prevention Systems Branch

- Drowning and Near Drowning
- Suicide and Suicide Attempts
- Traffic Safety and Emergency/Hospitalizations
- Homicide and Assaults

Leading Causes of Injury Deaths in Hawaii, 2008-2012

Table 2: Leading Causes and Total 5-Year Incidence of Injury Deaths by Age Group, Hawaii, 2008-2012

Age Groups									
Rank	<1	1 - 4		5 - 9	10 - 14		15-19	20-24	
1	Suffocation 21	Drowning 12		MVT ****	MVT ****	Suicide ****	MVT 49	Suicide 88	
2	Undetermined Suffocation ****	Homicide ****		Three Tied ****	Drowning ****		Suicide 46	Poisoning 20	
3	Natural/ Environmental ****	MVT ****	Pedestrian, Other ****	Three Tied ****	Four Tied ****		Poisoning 10	Drowning 11	
4	Four Tied ****	Suffo- cation ****	Struck by/ against ****				Drowning ****	Homicide ****	
5		Fall ****	Natural/ Environ- mental ****				Homicide ****	Undeter- mined Poisoning ****	Undeter- mined Fall ****

Note. All mechanisms of suicide and homicide were combined according to intent. Each listed mechanism is unintentional except those otherwise noted. **** = indicates that the cell values range from 1-9 and are suppressed for data confidentiality purposes. *For age <1 four mechanisms were tied for the fourth ranking including Drowning, MVT, Homicide, and Undetermined Unspecified. **For age 5-9 three mechanisms were tied for the second ranking including Drowning, Struck by/against, Homicide. ***For age 5-9 three mechanisms were tied for the third ranking including Cut/pierce, Suffocation, Undetermined Poisoning. ****For age 10-14 four mechanisms were tied for the third ranking including Machinery; Poisoning; Other specified, NEC; and Homicide. Each of these mechanisms had fewer than 10 deaths.

Infant specific:

Suffocation

1-4 years of age:

Drowning

Homicide

Motor Vehicle

Pedestrian

5-9 years of age:

Motor Vehicle

Drowning

Homicide

10-14 years of age:

Suicide

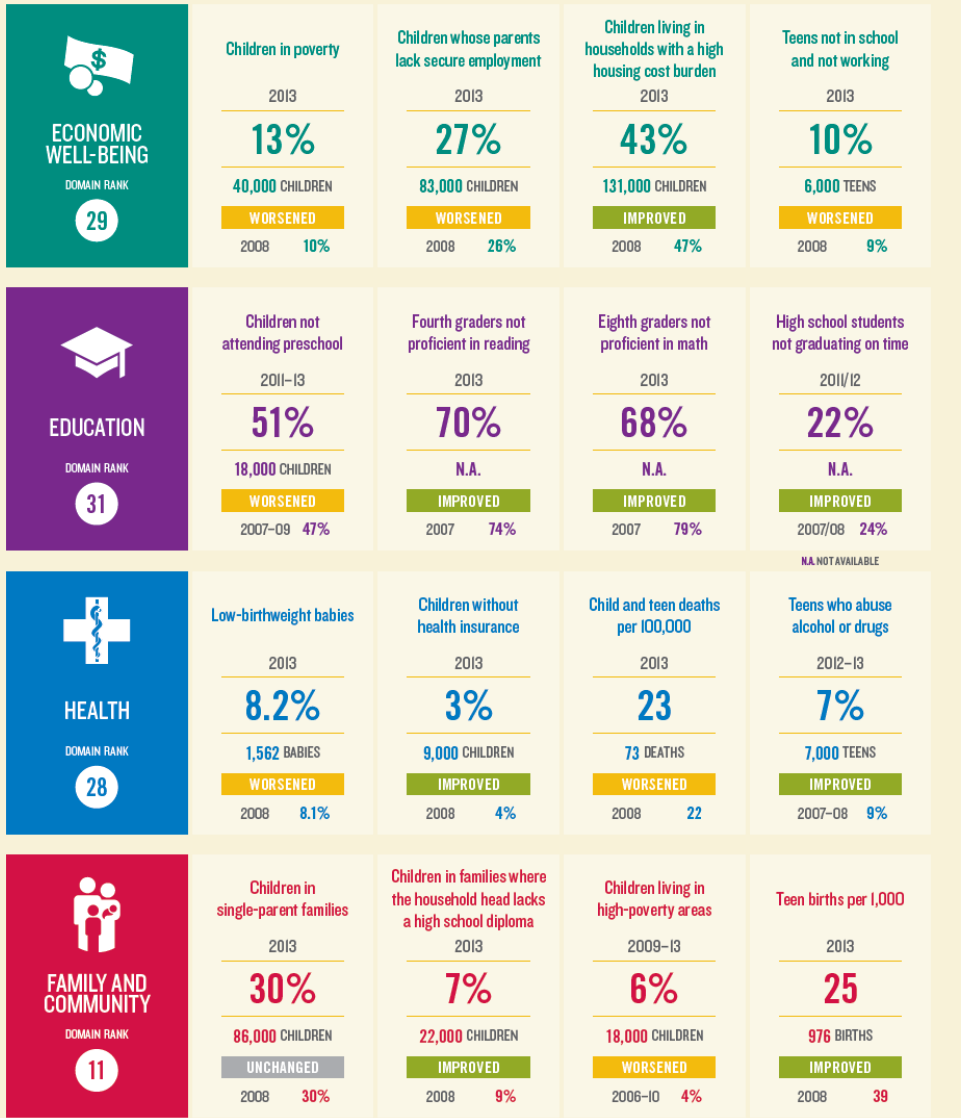
Drowning

15-19 years of age:

Motor Vehicle

Suicide

Poisoning



Kids Count Data

- Annie E. Casey Foundation
- National with State comparison
- Relies on available data sources
- Available online

2015 Report:

- Hawaii ranked 24th overall
- 13% Children living in poverty
- 51% Children not attending preschool
- 3% Children without health insurance
- 30% Children living in single parent families