

Assessing Maternal and Child Health in Hawai'i using HHIC data

Presented by

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HHIC

Use of HHIC data by FHSD

- Title V Measures
- State Infant Mortality Collaborative
- Mom-Baby data set
- Other
- Future

Title V

The Maternal and Child Health Services Block Grant, Title V of the Social Security Act, is the only federal program devoted to improving the health of all women, children and families. Title V provides funding to state maternal and child health (MCH) programs, which serve 35 million women and children in the U.S. To learn more about Title V, visit www.amchp.org.

- Hawaii receives Title V funds, matched by State funds
- Reporting requirements include surveillance of several MCH indicators

Health System Capacity Indicator 1

- Rate of Hospitalizations for Asthma among Children < 5 years of age:
 - 20.4 per 10,000 in 2007
 - 35.5 per 10,000 in 2003

FORM 17
HEALTH SYSTEMS CAPACITY INDICATORS
FORMS FOR HSCI 01 THROUGH 04, 07 & 08 - MULTI-YEAR DATA
STATE: HI

Form Level Notes for Form 17
None

HEALTH SYSTEMS CAPACITY MEASURE # 01
The rate of children hospitalized for asthma (ICD-9 Codes: 493.0 -493.9) per 10,000 children less than five years of age.

	Annual Indicator Data				
	2003	2004	2005	2006	2007
Annual Indicator	35.8	32.5	27.0	25.4	20.4
Numerator	302	284	209	207	177
Denominator	84,356	87,433	77,324	81,476	86,690

Check this box if you cannot report the numerator because
1. There are fewer than 5 events over the last year, and
2. The average number of events over the last 3 years is fewer than 5 and therefore a 3-year moving average cannot be applied.

(Explain data in a year note. See Guidance, Appendix IX.)

Is the Data Provisional or Final? Final Provisional

Health System Capacity Indicators 5a, 5b

- No difference in LBW between Medicaid and Non-Medicaid (8.0% and 8.0%)
- More infant deaths among Medicaid compared to non-Medicaid (8.0 per 1,000 vs. 5.9 per 1,000)

FORM 18
HEALTH SYSTEMS CAPACITY INDICATOR #05
(MEDICAID AND NON-MEDICAID COMPARISON)
STATE: HI

INDICATOR #05 <i>Comparison of health system capacity indicators for Medicaid, non-Medicaid, and all MCH populations in the State</i>	YEAR	DATA SOURCE	POPULATION		
			MEDICAID	NON-MEDICAID	ALL
a) <i>Percent of low birth weight (< 2,500 grams)</i>	2007	Other	8	8	8
b) <i>Infant deaths per 1,000 live births</i>	2007	Other	8	5.9	6.7
c) <i>Percent of infants born to pregnant women receiving prenatal care beginning in the first trimester</i>	2007	Other	67.9	85.5	80.1
d) <i>Percent of pregnant women with adequate prenatal care (observed to expected prenatal visits is greater than or equal to 80% [Kotelchuck Index])</i>	2007	Other	59.1	69.4	65.9

Health Status Indicators 4b, 4c

- Rate of nonfatal injuries due to motor vehicle crashes among Children < 15 years of age:

- 40.3 per 100,000 in 2007
- 41.7 per 100,000 in 2003

HEALTH STATUS INDICATOR MEASURE # 04B
The rate per 100,000 of nonfatal injuries due to motor vehicle crashes among children aged 14 years and younger.

Annual Indicator	2003	2004	Annual Indicator Data		
			2005	2006	2007
Annual Indicator	41.7	45.9	46.0	42.4	40.3
Numerator	103	114	108	99	95
Denominator	246,956	248,365	234,919	233,415	235,583

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(Explain data in a year note. See Guidance, Appendix IX.)

Is the Data Provisional or Final? Final Provisional

- Rate of nonfatal injuries due to motor vehicle crashes among Children 15-24 years of age:

- 161.9 per 100,000 in 2007
- 213.8 per 100,000 in 2003

HEALTH STATUS INDICATOR MEASURE # 04C
The rate per 100,000 of nonfatal injuries due to motor vehicle crashes among youth aged 15 through 24 years.

Annual Indicator	2003	2004	Annual Indicator Data		
			2005	2006	2007
Annual Indicator	213.8	217.9	219.8	185.5	161.9
Numerator	370	376	383	334	281
Denominator	173,083	172,551	174,278	177,157	173,523

Check this box if you cannot report the numerator because
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(Explain data in a year note. See Guidance, Appendix IX.)

Is the Data Provisional or Final? Final Provisional

State Infant Mortality Collaborative

- Hawaii was selected to participate in a multi-state collaborative to evaluate causes of infant mortality. Project funded through HRSA
- Several components looked at , including using HHIC Data

SIM Analysis

Hypothesis: Infant mortal events are more likely to occur in sick/chronic infants

Data Source: Hawaii Health Information Collaborative, Emergency Room (ER) and Inpatient hospitalization data, 2000-2005 (All readmits up to 1 year of age)

162,407 Total records (42,614 ER and 119,793 Inpatient)

SIM Analysis

- An examination of deaths, excluding newborn admissions, reveals:
 - Majority were related to an emergency type of admission and occurred when the infant was older, compared to both the overall sample and all infant deaths.
 - This may imply acute events, but diagnostic codes were not analyzed in this study.
 - More often occurred in the rural setting and had greater proportion resulting in length of stays of 7 or more days.
 - These infants did have more encounters with the hospital/er system compared to overall sample

Mom-Baby Data Set

- Family Health Services Division requested HHIC to produce a linked data set between infant and mother to increase analytic capability:
 - Conditions/Factors in mothers may impact birth outcomes
 - Ability to evaluate subsequent pregnancies
 - Birth certificate captures information on both mothers and infant

Fact Sheet



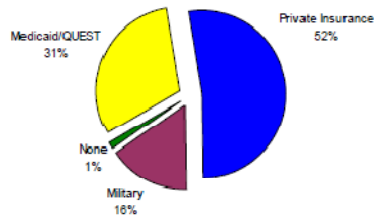
Medicaid/QUEST Birth Outcomes Fact Sheet

Hospital Discharge Data, Hawai'i Health Information Corporation

Medicaid in Hawai'i

Medicaid is a federal program, administered and jointly funded at the state level, to provide health insurance and access to care for low-income individuals. The name of the Medicaid program in Hawai'i is termed QUEST. To monitor the performance of Medicaid in helping to reduce socioeconomic disparities in birth outcomes, the Maternal and Child Health Bureau requires annual reporting of maternal and child health indicators by Medicaid status for the Title V Maternal and Child Health Services Block Grant Program. Due to data linkage difficulties, the State of Hawai'i has never reported these indicators by Medicaid status. Using hospital discharge data, acquired from the Hawai'i Health Information Corporation, various maternal and child health indicators were evaluated by insurance status. The QUEST program accounts for close to one third of all births in Hawai'i.

Insurance at Delivery, Hawai'i 2004-2006



"I would like to say thank you to QUEST for giving me medical care. It sure took a lot of pressure off my shoulders and I was much happier. When you're happy as a mother you take care of yourself better, and therefore have a healthier baby and family too. Mahalo"

"It took QUEST a long time to kick in. When I got QUEST, not many OB/Gyns accepted it."

- Hawai'i PRAMS Participants

For More Information Contact:

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Suggested Citation

Sohempf A, Hayes D, Fuddy L. "Medicaid/QUEST Birth Outcomes Fact Sheet." Honolulu, HI: Hawai'i Department of Health, Family Health Services Division; October 2008.

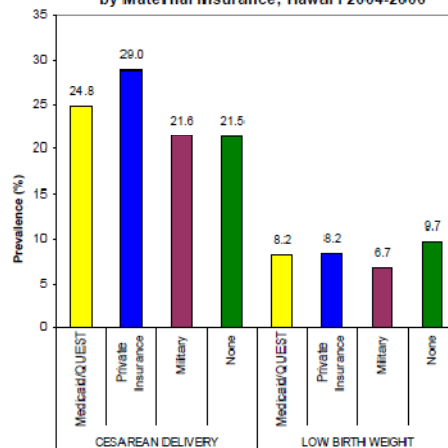
Data Highlights

- Almost 1 in 3 births in Hawai'i were Medicaid/QUEST insured; the remainder were mostly private or military insured; 1% were uninsured
- Cesarean deliveries were highest in those with private insurance and lowest in those with military or were uninsured.
- Those with military insurance had the lowest rates of low birth weight, while those who were uninsured had the highest rate.
- Infant mortality was significantly higher among the Medicaid/QUEST insured compared to those with private or military insurance
- Women with Medicaid/QUEST insured deliveries were more than twice as likely to experience a short birth interval as women who were privately insured

Delivery Outcomes

Cesarean deliveries were highest in those with private insurance, intermediate in those with Medicaid/QUEST, and lowest in those with military insurance or were uninsured. A low birth weight (LBW; <2,500 grams or 5.5 pounds) infant was highest in the uninsured, similar between those on Medicaid/QUEST, and lowest among those with military insurance. There were no meaningful differences in maternal or newborn length of stay (not shown).

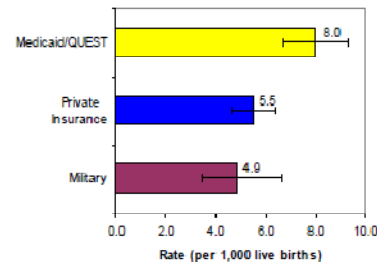
Cesarean Delivery and Low Birth Weight by Maternal Insurance, Hawai'i 2004-2006



Infant Mortality

The infant mortality rate for the Medicaid/QUEST insured was significantly higher, compared to private and military insured births.

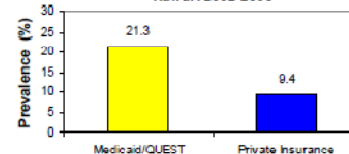
Infant Mortality Rates by Insurance, 2003-2005



Birth Interval

Short birth intervals are associated with adverse perinatal events including preterm birth and growth restriction.¹ In women who had multiple deliveries between 2002-2006, those who were Medicaid/QUEST insured were more than twice as likely to deliver another infant within 15 months of the previous birth compared to those with private insurance.

Birth Interval <15 months by Insurance, Hawai'i 2002-2006



Discussion

There is emerging evidence that health status at birth—a product of maternal health—is linked to morbidity and mortality not only in infancy, but throughout the lifespan. LBW is a strong risk factor for infant death and is also related to many adverse health effects including cognitive deficits and adult cardiovascular disorders.¹ Women of low-income or education levels are more likely to deliver low birth weight infants.² Thus, we would expect that mothers on Medicaid/QUEST should have higher rates of LBW than those with private insurance. Our analysis, revealed little differences in LBW and Length of stay between the Medicaid/QUEST and privately insured mothers, but Medicaid/QUEST mothers were much more likely to have an infant death. This is consistent with the literature that shows smaller socioeconomic gaps in LBW than infant death,² and suggests the need for more effective infant mortality prevention programs serving women in Hawai'i.

While few women in Hawai'i are uninsured, comparisons between Medicaid/QUEST and uninsured suggest that Medicaid/QUEST may be helping to reduce LBW and infant mortality among the otherwise uninsured. An increased effort to identify the circumstances of women who remain uninsured and whether they are ineligible due to residency or other factors would be helpful to see if they are eligible for Medicaid/QUEST or other programs.

Future linkage to the birth/death certificate would help to differentiate the timing and underlying causes of infant death according to Medicaid status in addition to prenatal care utilization, and other factors. This could be accomplished by linking the birth certificate file to either Medicaid data or to hospital discharge files. Additionally, implementing the 2003 National Birth Certificate revision (currently in 25 states) would also improve analysis of these issues. Continued evaluation of Medicaid performance will be vital to improve outcomes for Hawai'i's most vulnerable low-income mothers and their children. Adverse birth outcomes have life-long health, social, and economic repercussions so it is important to ensure equity in health from the beginning of life.

References

1. Goldenberg R, Culhane J. Low birth weight in the United States. *American Journal of Clinical Nutrition*. 2007;85(2):584S-590S.
2. Parker JD, Schoendorf KC, Kiely JL. Associations between measures of socioeconomic status and low birth weight, small for gestational age, and premature delivery in the United States. *Annals of Epidemiology*. 1994;4(4):271-8.
3. Zhu BP, Rolfs RT, Nangle BE, Horan JM. Effect of the interval between pregnancies on perinatal outcomes. *NEJM*. 1999; 340(8):589-94.

About the Data

Hospital discharge data, furnished by the Hawai'i Health Information Corporation, included information from all Hawai'i maternal and newborn medical records at delivery and newborn inpatient and emergency room visits through the first year of life. Cesarean delivery and LBW rates were calculated according to maternal insurance at delivery for the most recent three years (2004-2006).

Infant mortality was determined by dividing recorded infant deaths by births according to newborn insurance status for the period 2003-2005 (97% coverage compared to state vital statistics). Due to small number of births and deaths among those who were uninsured, we did not calculate an infant mortality rate for this group. Birth intervals were calculated for women who had more than one delivery between 2002-2006 with Medicaid/QUEST or Private Insurance only as we couldn't link successive pregnancies in those with military insurance.

The Hawai'i Pregnancy Risk Assessment Monitoring System (PRAMS) is a self-reported survey of recent mothers conducted by mail with telephone follow-up. It is designed to monitor the health and experiences of women before, during, and just after pregnancy. Every year, about 2,000 women who deliver a live infant are randomly selected to participate. Comment data collected in PRAMS was used in the development of this fact sheet.

Fact Sheet

- Almost 1/3 of births covered by QUEST/Medicaid
- Variation in rates of cesarean delivery and low birth weight based on insurance at delivery

Percent Low Birth Weight and Cesarean Delivery by Insurance Status, all births 2004-2006

Insurance at Delivery	Percent Low Birth Weight	Percent Cesarean Delivery
Medicaid/QUEST	8.2 %	24.8 %
Private	8.2 %	29.0 %
Military	6.7 %	21.6 %
Self Pay	9.7 %	21.5 %

Ashley's Paper/Fact Sheet

Evaluation of Birth Outcomes by Medicaid Status in Hawaii: An Analysis of Hospital Discharge Records.

Accepted for publication in the Hawaii Journal of Public Health. Ashley Schempf primary author. Donald Hayes and Loretta Fuddy are co-authors.

Birth Outcomes and Medicaid Status Analysis

Hypothesis: Evaluate perinatal health indicators by Quest/Medicaid status.

Data Source: Hawaii Health Information Collaborative

- 1) Emergency Room (ER) and Inpatient hospitalization data, 2000-2005 (All readmits up to 1 year of age)
- 2) Mom-Baby data set, 2002-2006

Ashley's Paper

Percent Cesarean Delivery, Crude and Age-Standardized by Insurance, Singleton births, 2004-2006

Insurance at Delivery	Percent Cesarean Delivery	Age-standardized Percent Cesarean
Medicaid/QUEST	23.8 %	26.0 %
Non-Medicaid	25.7 %	24.6%
Private	27.5 %	25.7%
Military	20.5 %	--
Self Pay	20.1 %	--

- Those on Medicaid/QUEST actually have a greater percent Cesarean Delivery compared to non-Medicaid when accounting for age differences

Ashley's Paper

Infant, Neonatal, and Post-neonatal Mortality Rates (per 1,000) by Insurance, all births, 2003-2005

Insurance at Delivery	Infant Mortality Rate (<365 days)	Neonatal Mortality Rate (<28 days)	Post-neonatal Mortality Rate (28-365 days)
Medicaid/QUEST	8.0 (6.6-9.3)	5.7 (4.0-7.7)	2.3 (1.7-3.2)
Non-Medicaid	5.8 (5.0-6.6)	4.6 (3.9-5.3)	1.2 (0.9-1.6)
Private	5.5 (4.6-6.4)	4.5 (3.7-5.3)	1.0 (0.7-1.4)
Military	4.9 (3.5-6.6)	3.6 (2.6-5.)	--

- Mothers on QUEST/Medicaid at delivery had greater perinatal mortality rates
- Those with Military insurance had the lowest rates

Ashley's Paper

Birth Spacing by Maternal Insurance at Two Successive Pregnancies, all births, 2002-2006

Insurance at First Delivery	Insurance at 2 nd Delivery	Proportion <15 months
Medicaid/QUEST	Medicaid/QUEST	21.3 %
Medicaid/QUEST	Private	7.1 %
Private	Medicaid/QUEST	14.3 %
Private	Private	9.4 %

- Mothers with consecutive births covered by QUEST had a high proportion of short birth interval
- Those that were on QUEST and converted to Private insurance had a low proportion of short birth interval

Ashley's Paper

- Minor clinical difference in low birth weight, cesarean delivery, and length of stay among mothers with Medicaid/QUEST (compared to private insurance)
- Infant Mortality was 1.44 times higher among mothers with Medicaid/QUEST (compared to private insurance)
- Short Birth Intervals were 2.27 times more common among women insured with Medicaid/QUEST (compared to private insurance)

Ashley's Paper

- Medicaid/QUEST may be reducing some perinatal indicators, but still see significant differences in others such as infant mortality and short birth intervals
- A linkage of HHIC data and the birth certificate would allow a more detail analysis of factors contributing to disparities observed in this study

**Common Conditions Associated with
Pregnancy with a particular focus on
Diabetes and Birth Outcomes:
Hawai'i 2002-2008**

David W. Feigal

UCLA School of Public Health

MPH candidate



HAWAII STATE
DEPARTMENT
OF HEALTH

Data Sources: HHIC, 2002-2008

Hawai'i Health Information Co. (HHIC)

- Private, not-for-profit corporation established in 1994
- Maintains one of Hawaii's largest healthcare databases
- Captures population-level health statistics for the State of Hawai'i
- Provides inpatient, emergency room, hospital discharge information on mothers and babies
- Captures ICD-9 diagnostic codes assigned to both mothers and baby at the time of discharge.
- Other variables of interest: maternal age, birth weight, race*, hospital length of stay, charges, mother's county of residence, insurance type, type of delivery, mother's patient ID
- N= 127,265 births included in the analysis from 2002-2008 for which the mom and newborn delivery records (Mom-Baby dataset).

Co-morbid Conditions

- **Initial analysis:** Evaluate common ICD9 groupings among mothers
- With an average maternal age (28 years HHIC, 2002-2008), increasingly important to monitor both maternal and child birth outcomes with respect to chronic diseases
- **Follow up analysis:** we decided to look at a particular area of chronic disease affecting mothers

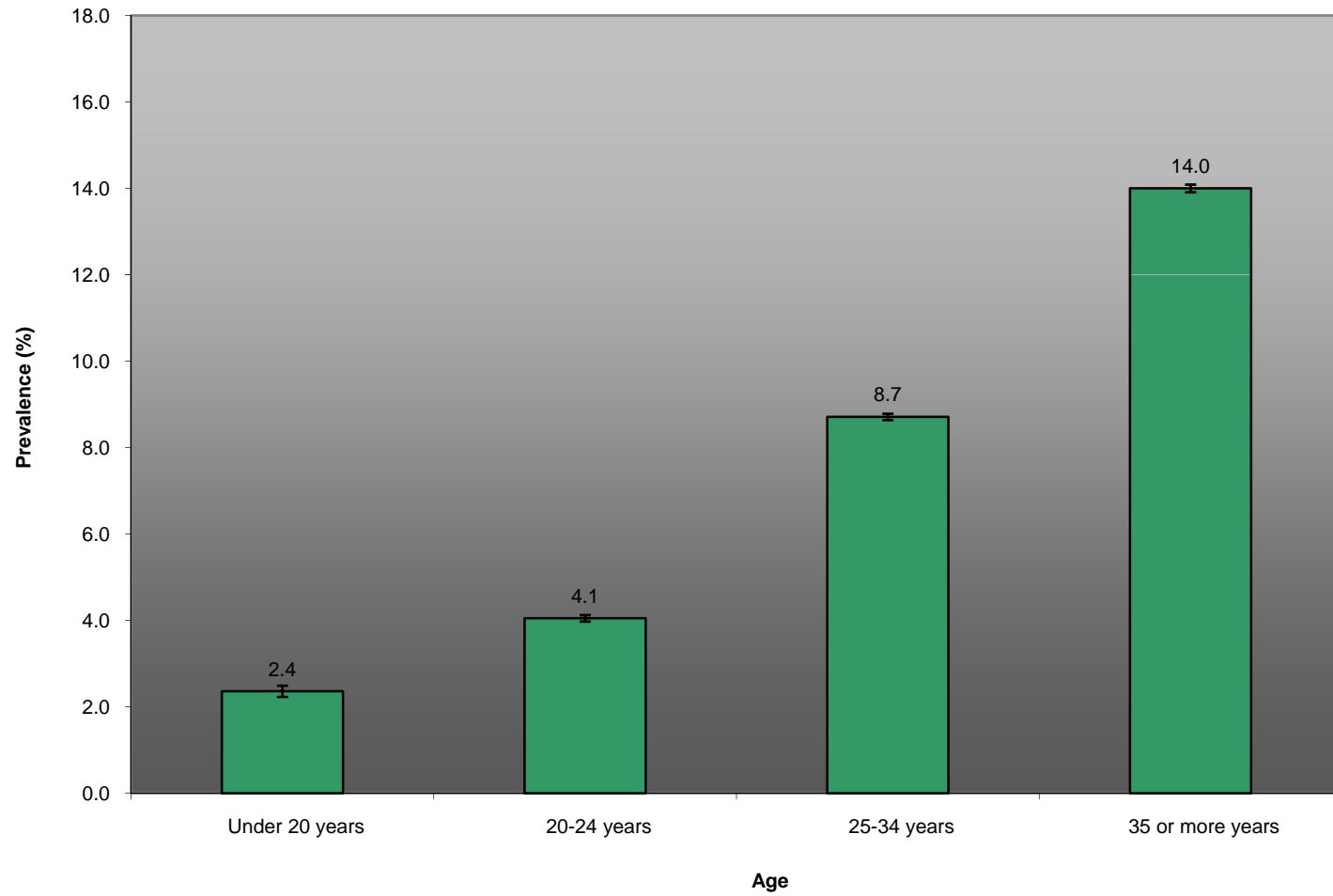
Mothers with Diabetes

- Specifically we went through the mother and infant diagnostic records aggregating associated ICD9 codes that were likely to identify mothers who had diabetes.

Diabetes Associated ICD9 codes

ICD	Diagnoses	Diag Loc	N	% of all birth records
250	Chronic Diabetes	mom_code	832	0.6%
648.0	Diabetes mellitus complicating pregnancy childbirth or the puerperium	mom_code	1087	0.8%
648.8	Abnormal glucose tolerance of mother complicating pregnancy childbirth or the puerperium	mom_code	8864	7.0%
775.0	Infant of Diabetic Mother Syndrome	NB_code	1059	0.8%
		Total	11842	9.3%

Table 2.8b - Maternal Age Comparisons in Diabetic Mothers,
(HHIC) Hawaii 2002-2008



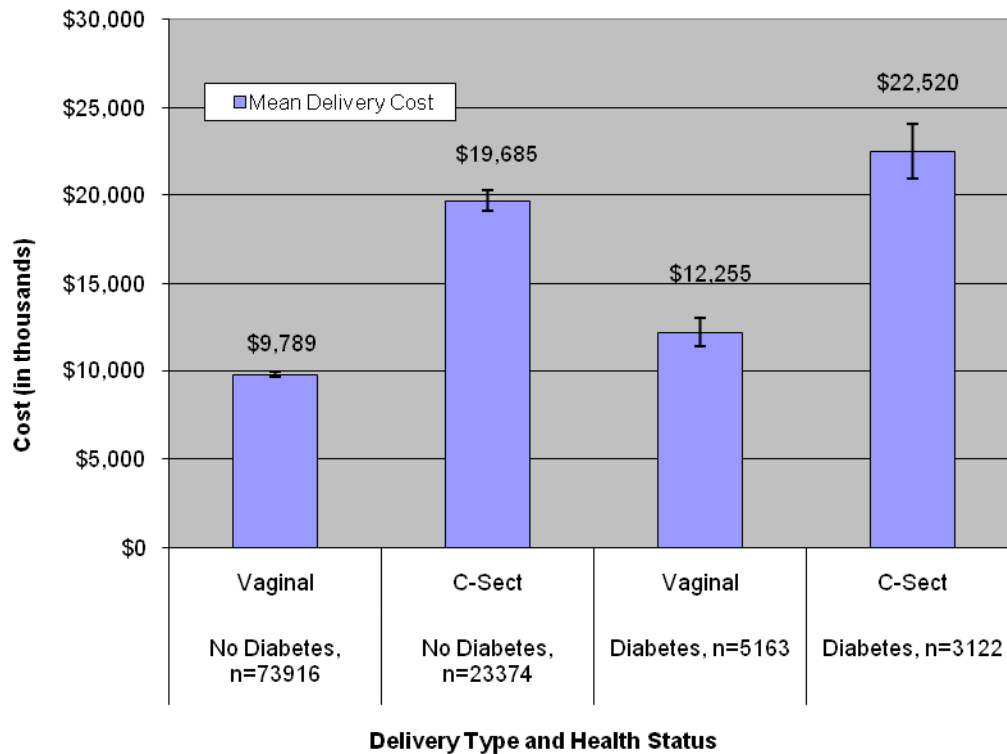
Source: HHIC, 2002-2008

HHIC Mothers with Diabetes – Prelim Results

Hawaii Health Information Corporation



Table 2.4 - Cost Comparisons of Diabetic Mothers by Delivery Type, Hawaii 2002-2008



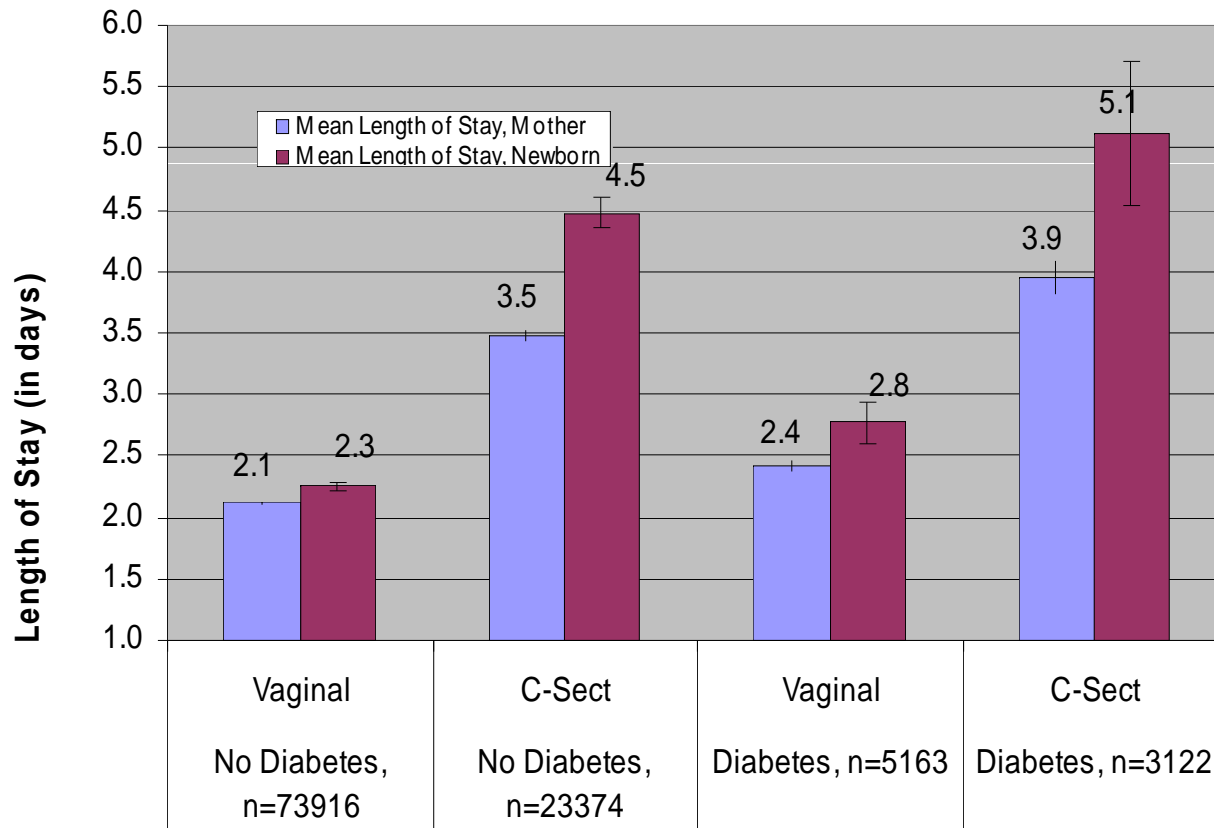
Total charges combined mother and infant charges when available (no information on those born at military hospitals)

HHIC Mothers with Diabetes – Prelim Results

Hawaii Health Information Corporation



Table 2.5 - Length of Stay by Health Status and Delivery Type, Hawaii (HHIC) 2002-2008



Delivery Type and Health Status

Source: HHIC, 2002-2008

Strengths

- Linkable data set for mother and infant records
- Rich data set: captures population-level statistics, with nearly everyone giving birth to a child in the state of Hawaii captured in this data set (~ 18,000 records)
- Useful variables: maternal age, infant weight, separate hospital charges/length of stay for mother and infant, up to 12 useable diagnostic columns for documenting ICD9 codes
- Assigned IDs for both individual records and mothers to account for repeat mothers/multiple gestations in data

Weaknesses

Inherent

- Billable vs. Non-billable ICD codes
- Cross-sectional: lack of temporality; can't tell us much about the course or severity of disease

Room for Improvement

- Race inadequately captured (<60%)
- Gestational age poorly captured (~8%), ICD9 codes are now present for this 765.20-.29 gestational age codes (not billable)

Summary

- Approximately, 9.3% of all births in the State of Hawaii were to mothers who had diabetes based on hospital billing codes reflected on birth admission
- Diabetes increased steadily with age
- Diabetes associated with increased hospital charges
- Diabetes associated with longer hospitalizations for both newborns and mothers

Future Directions

Could look at:

- Hospital Costs
- Repeat Hospitalizations/ER visits Children and Mothers. For example, Are infants born to mothers with diabetes more likely to be readmitted or come to the ER more frequently in first 5 years of life?
- Subsequent pregnancies. For example, Are women who had diabetes in a prior pregnancy more likely to have diabetes in a subsequent one?
- Other conditions (high blood pressure)

Other Uses

- Legislative Report on Shaken Baby Syndrome
- Muscular Dystrophy admissions (MDstarnet)

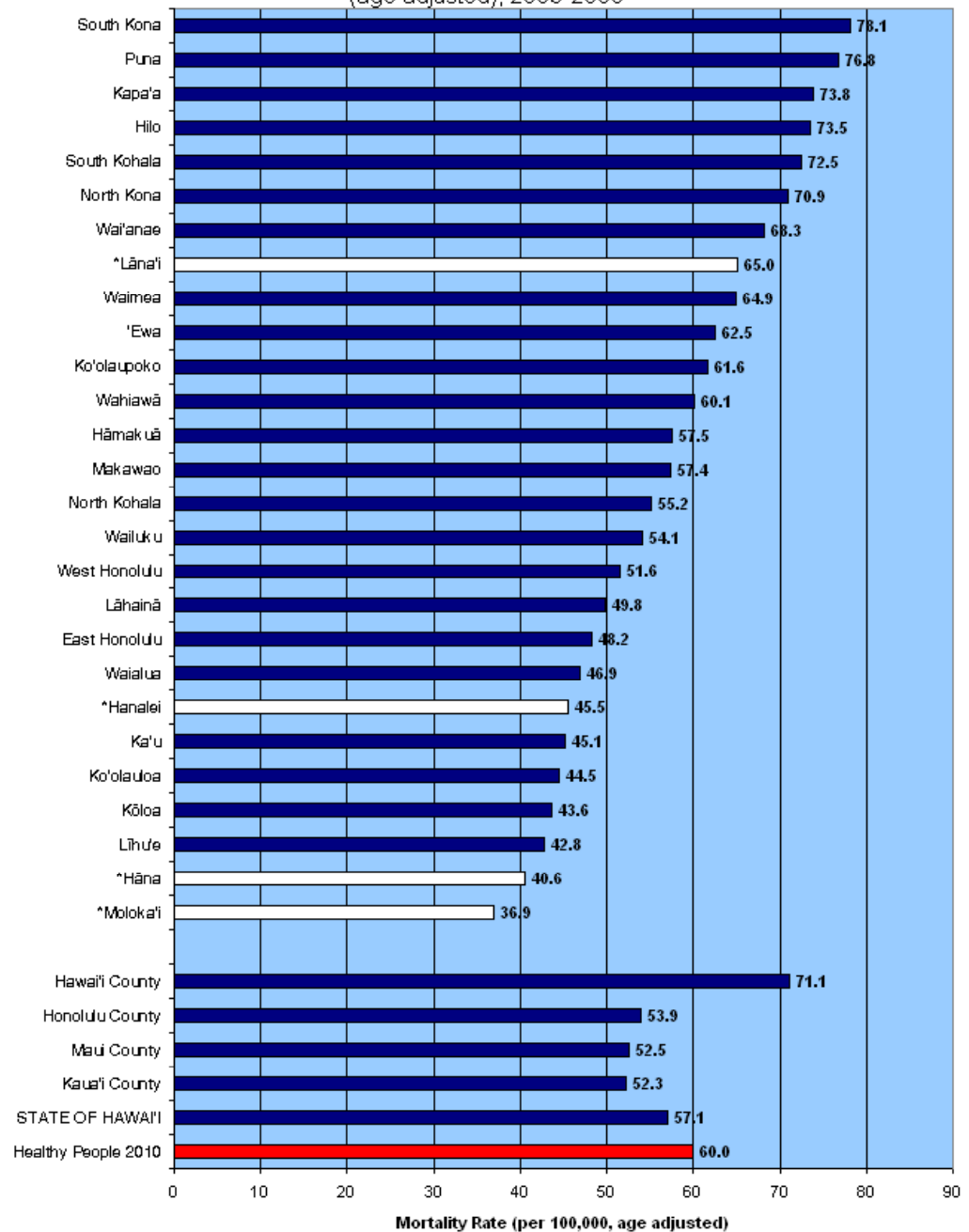
Other Potential Activities

- Intimate Partner Violence
 - Working with Injury Prevention and Control
- Health Care Resolution 215
 - Need linkage to birth certificate in order to assess rates of non-indicated early inductions and cesarean deliveries contributing to prematurity
- Infant Mortality
 - Linkage to birth certificate would help to further characterize infant mortality demographics and ICD coding

■ Primary Care Needs Assessment Data Book

- Need zipcode level information to calculate aggregated rates of various topics (Depression and other Mental Health related diagnoses; Admissions for Stroke, Diseases of the Heart, etc....)

Chart 28: Stroke (Cerebrovascular Disease) Mortality Rate (age adjusted), 2003-2008



Questions, comments?





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