Epi Monthly Report

FLORIDA DEPARTMENT OF HEALTH IN MIAMI-DADE COUNTY

8600 NW 17TH ST. SUITE 200 DORAL, FL 33126

Tel: 305.470.5660

Fax: 305.470.5533

Infant Mortality & Risk Factors: Linked Birth and Infant Death Data Analysis Miami-Dade County, 2005-2014

Guoyan Zhang, MD, MPH and Lakisha Thomas, MPH

Background

According to the Centers for Disease Control and Prevention (CDC), approximately 23,000 infants died in the U.S. in 2014. Infant mortality is defined as the death of a baby before his or her first birthday. The infant mortality rate is an estimate of the number of infant deaths for every 1,000 live births. This rate is often used to measure the health of a nation because factors affecting the health of entire populations can also impact the mortality rate of infants.[1]

Linked birth and infant death data is a valuable tool and resource for monitoring and exploring the complex inter-relationships between infant death and risk factors present at birth. Linked data files include information from the birth certificate such as age, race, and Hispanic origin of the parents, birthweight, period of gestation, plurality, prenatal care usage, maternal education, live birth order, marital status, and maternal smoking, linked to information from the death certificate such as age at death and underlying and multiple cause of death.[2] This report describes infant mortality rate trends and potential risk factors among pregnant women during 2005-2014 live births in Miami-Dade County utilizing linked birth and infant death data.

Methods

Birth certificates between 2005 and 2014 were linked to infant deaths between 2005 and 2015 based on the birth certificate number on infant death certificates. The International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD–10) was used to classify the leading causes of death. SAS 9.4 was employed to perform all data linkage and analysis.

Results

In Miami-Dade County, the infant mortality rate declined from 5.4 in 2005 to 4.5 per 1,000 live births in 2014, which was lower than Florida and U.S. (6.0) levels; although there were some waves in 2006 and 2007 (Figure-1). The three year rolling infant mortality rates decreased gradually among Hispanic and Non-Hispanic black, however, the infant mortality rate for non-Hispanic black were more than two times higher compared to non-Hispanic white and Hispanic babies (Figure-2).

The infant mortality rate was 5.6 in babies born male and higher than 4.3 in females per 1,000 live births during 2005-2014. Among multiple births, the infant mortality rate was 22.4 per 1,000 live births, five times higher compared to 4.4 among singleton births.

On average, 65% of all infant deaths occurred in the neonatal period. However, it was disproportional by mother's race/ ethnicity. The percent of infant deaths in the neonatal period was 71.3%, 60% and 67.9% among non-Hispanic white, non-Hispanic black and Hispanic infants (Figure -3).

Preterm birth is an important issue in public health and is a major cause for infant
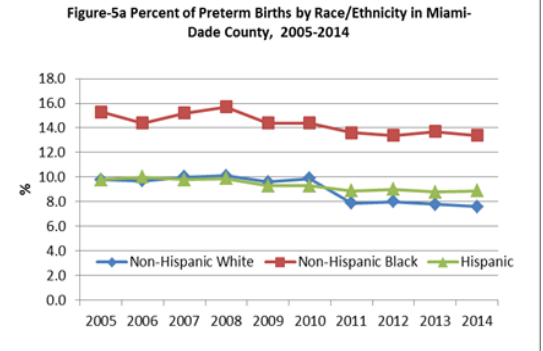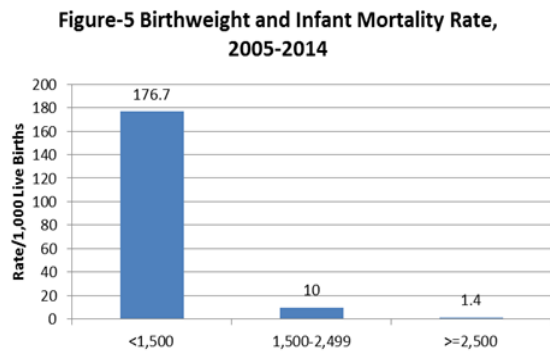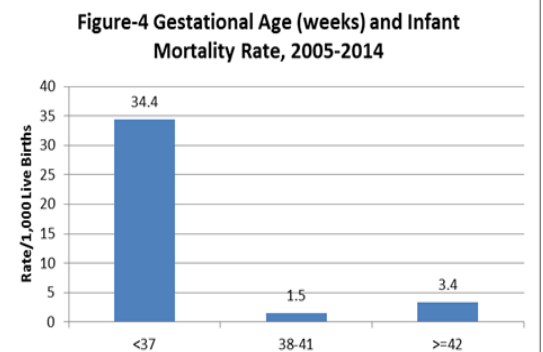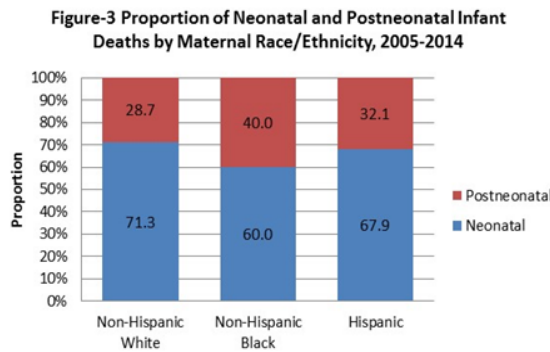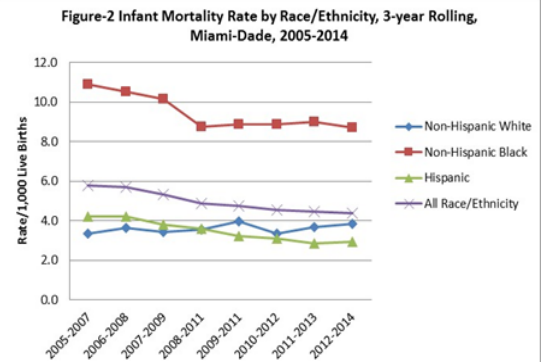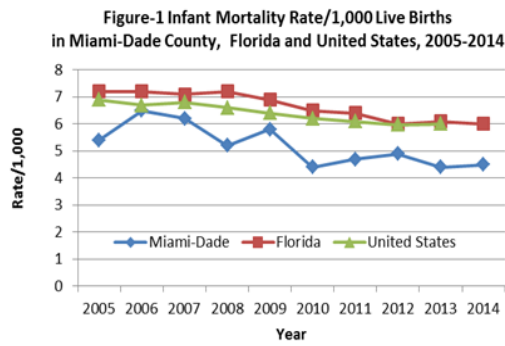
mortality and morbidity. Preterm births and low birthweight, particularly very low birthweight, are the second infant leading cause of death. The infant mortality rate among preterm births was 34.4 per 1,000 live births, 23 and 10 times the rate for those born at 37-41 weeks and born at 42 and over (1.5 and 3.4 per 1,000 live births respectively).

Birthweight is another important predictor of infant health. It is closely associated, but does not exactly correspond with, the period of gestation.[3] During 2005-2014 live births, the infant mortality rates per 1,000 live births were 176.7 for very low birthweight babies (<1,500 grams), 10.0 for low birth-

weight babies (1,500-2,499 grams) and 1.4 for babies with a birthweight 2,500 grams or more (Figures-4 and 5).

In Miami-Dade County the percent of low birthweight has gradually declined from 9.0% in 2005 to 8.8% in 2014, which was higher than 8.7% in Florida and 8.0% nationwide. Non-Hispanic black women were nearly two times more likely to have a preterm and/or low birthweight infant compared to non-Hispanic white and Hispanic women (Figures-5a and 5b).

"Preterm birth is an important issue in public health and is a major cause for infant mortality and morbidity."

Figure-1 Infant Mortality Rate/1,000 Live Births in Miami-Dade County, Florida and United States, 2005-2014

Figure-2 Infant Mortality Rate by Race/Ethnicity, 3-year Rolling, Miami-Dade, 2005-2014

Figure-3 Proportion of Neonatal and Postneonatal Infant Deaths by Maternal Race/Ethnicity, 2005-2014

Figure-4 Gestational Age (weeks) and Infant Mortality Rate, 2005-2014

Figure-5 Birthweight and Infant Mortality Rate, 2005-2014

Figure-5a Percent of Preterm Births by Race/Ethnicity in Miami-Dade County, 2005-2014

Maternal Factors

Infants delivered by women under the age 20 were more likely to die in the first year of life compared with women aged 20-34 and 35 or older (8.3, 4.7 and 4.8 per 1,000 live births respectively) (Figure-6). The teenage birth rate per 1,000 females aged 15-19 years has decreased from 35.6 in 2005 to 16.6 in 2014 which was lower than Florida 21.9 and 24.2 in the U.S. Despite this, the teen birth rate in non-Hispanic black were 3.6 and 2.3 times higher than that in non-Hispanic white and Hispanic (31, 8.5 and 13.7 per 1,000 females aged 15-19 years respectively).

Infants of unmarried mothers had higher rates of mortality compared with married mothers (6.5 vs. 3.6 per 1,000 live births). The percent of live births to unmarried women were 70.7% in non-Hispanic black, 25.9% in non-Hispanic white and 49.5 in Hispanic in 2014 respectively.

Women who used cigarettes before and during pregnancy had higher infant mortality rates compared to non-smoking women (17.4 vs 4.8 per 1,000 live births). Similarly,

Figure-5b Percent of Low Birthweight by Race/Ethnicity in Miami-Dade County, 2005-2014
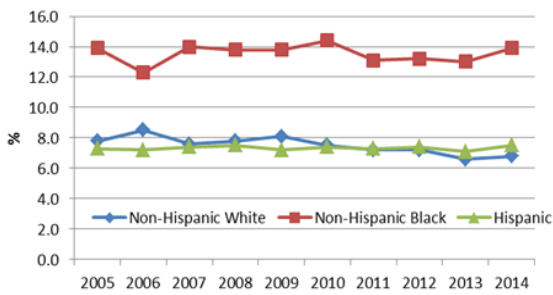
Figure-6 Mother's Age and Infant Mortality Rate, 2005-2014
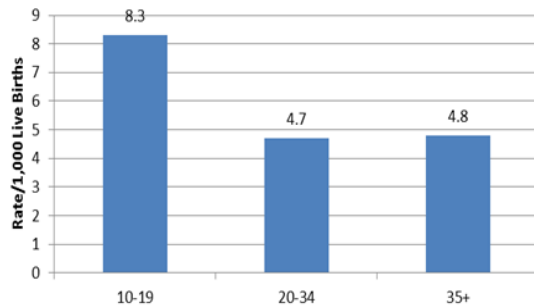
Figure-7 Maternal Tobacco and Alcohol Use Status and Infant Mortality Rate
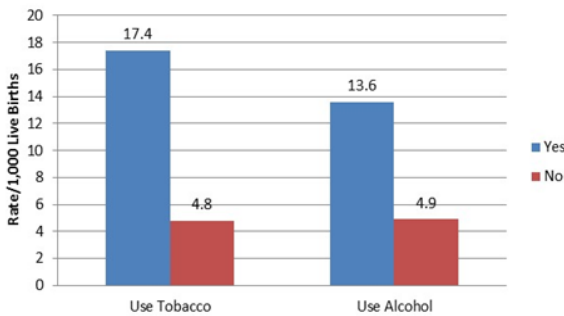
Figure-8 Mother's BMI at Pregnancy and Infant Mortality Rate, Miami-Dade County, 2005-2014
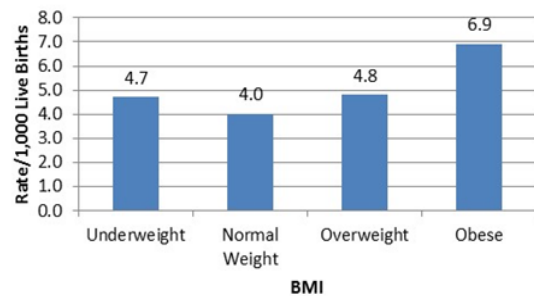
Figure-9 Pregnancy Weight Gain Status and Infant Mortality Rate, 2005-2014

Figure-10 Infant Mortality Rates for Selected Causes of Death by Mother's Race/ethnicity, Miami-Dade County, 2005-2014

women who used alcohol also had higher infant mortality rates compared to non-alcohol users (13.6 vs. 4.9 per 1,000 live births) (Figure-7).

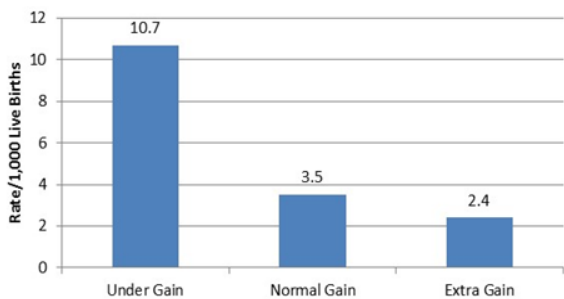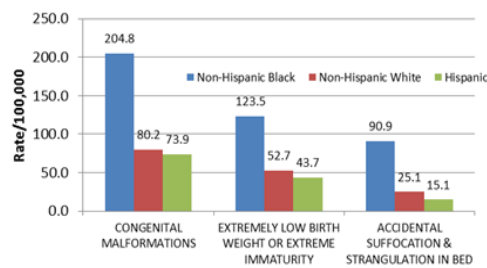Maternal chronic conditions were also associated with higher rates of infant mortality. Although less than half percent of maternal women reported pre-pregnancy diabetes, the infant mortality rate was much higher compared to mothers with no diabetes (11.5 vs. 4.9 per 1,000 live births). Women who had hypertension were more likely to have a baby that died before his or her first birthday compared to women without hypertension (8.6 vs. 4.7 per 1,000 live births). Additionally, women who had previous poor birth outcomes or previous preterm births were more likely to have a baby die before their first birthday compared to women without previous issues (8.6 vs. 4.7 per 1,000 live births).

A number of peer-reviewed studies reiterate that early and regular prenatal care is an accepted strategy to improve health outcomes of pregnancy for mothers and infants.[4] Two of the most significant benefits of early and ongoing prenatal care are improved birth weight and decreased risk of preterm delivery. Although there were less than 3% of pregnant women with access to prenatal care later or no care, the infant mortality rate among these women was 14.1 per 1,000 live births which was 3.5 times higher than that of women who used prenatal care during the first and second trimesters.

Overweight and obesity are risk factors for stillbirth and infant mortality. During 2005-2014, 16.5% and 23.5% of women were obese or overweight at pregnancy. Compared to normal weight mothers, infant mortality per 1,000 live births increased from 4.0 to 4.7 among underweight women,

> *"Maternal chronic conditions were also associated with higher rates of infant mortality."*

4.8 in overweight women and 6.9 in obese mothers respectively (Figure-8)

A pregnant woman should gain 25 to 35 pounds after becoming pregnant. Underweight women should gain 28 to 40 pounds and overweight women may need to gain only 15 to 25 pounds during pregnancy. A woman expecting twins should gain 35 to 45 pounds during pregnancy. Babies delivered by mothers who did not obtain enough weight gain based on their BMI and plurality status of pregnancy, are three times more likely to die during the first year (10.7 vs. 2.9 per 1,000 live births) (Figure-9).

Breast milk promotes sensory and cognitive development, and protects infants against infectious and chronic diseases. Exclusive breastfeeding reduces infant mortality due to common childhood illnesses such as diarrhea or pneumonia, and helps for a quicker recovery during illness.[3] Infants delivered by mothers who did not provide breastfeeding at discharge are more likely to die during the first year of life compared to breastfed infants (22.5 vs. 1.6 per 1,000 live births). In Miami-Dade County, the percent of infants' breastfed at discharge increased among all races/ethnicities and improved from 84.1% in 2005 to 92.7% in 2014. Despite this, rates were disproportional; the rate was 96% in non-Hispanic white, 87% in non-Hispanic black and 93.7% in Hispanic mothers in 2014 respectively.

Leading causes of infant death

The top five leading causes of infant death in Miami-Dade County were congenital malformations, deformations and chromosomal abnormalities (congenital malformations), accounting for 21.1% of all of infant deaths, extremely low birthweight or extreme immaturity, 13.4%, accidental suffocation and strangulation in bed, 6.8%, maternal complications of pregnancy, 4.6%

and sudden infant death syndrome 1.8%. Accidental suffocation and strangulation in bed (ASSB), a subgroup of sudden, unexpected infant deaths, is a potentially preventable injury-related infant death. There were a total 109 cases of ASSB during 2005-2014, Non-Hispanic accounted for 61.5% of all total cases. Figure-10 shows selected leading causes of death by mother's race/ethnicity.
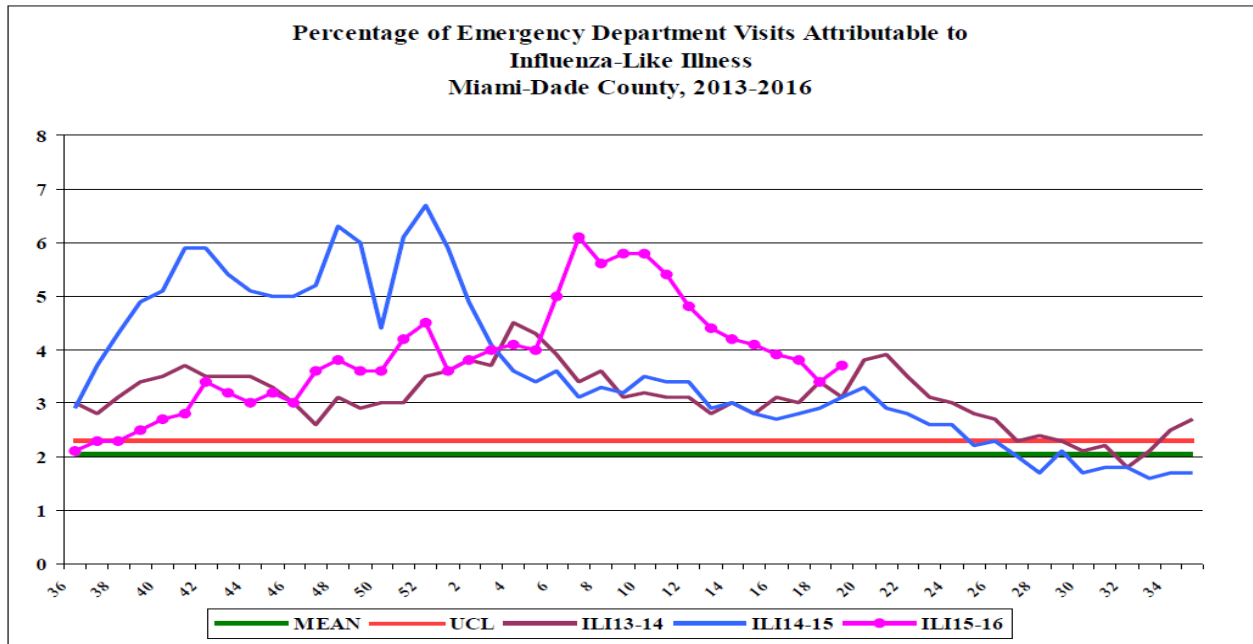
Discussion

Although the overall rate of infant mortality for Miami-Dade County has decreased from 2005 to 2014 and the rate is below both the national and state averages, which is a result of collaborative efforts, racial/ethnic disparities still exist. Non-Hispanic black infants continue to die at nearly twice the rate of non-Hispanic white and Hispanic infants. The further reduction of preventable infant deaths remains a challenge. Infant mortality is a complex issue that is associated with many different factors. For these reasons, it is important that infant deaths be investigated. Linked birth and infant death data analysis may help communities better understand the causes of infant mortality such as social, behavioral and health risk factors, so that steps may be taken to improve the health of infants in our community. Additionally, enhancing education about sleep safety may help parents and caregivers provide safer sleep environments and reduce accidental suffocation and strangulation in bed related infant mortality.

References

1. Center for Disease Control and Prevention. Reproductive Health: Infant mortality. (http://www.cdc.gov/reproductivehealth/maternalinfanthealth/infantmortality.htm, accessed on 2 May 2016).
2. Centers for Disease Control and Prevention. National Center for Health Statistics: Linked birth and infant death data. (http://www.cdc.gov/nchs/linked.htm, accessed on 11 April 2016).
3. Hyattsville, MD: National Center for Health Statistics. 2015. *Kramer M et al Promotion of Breastfeeding Intervention Trial (PROBIT: A randomized trial in the Republic of Belarus. Journal of the American Medical Association, 2001, 285(4): 413-420).*
4. Mathews TJ, MacDorman MF, Thoma ME. Infant mortality statistics from the 2013 period linked birth/infant death data set. National vital statistics reports; vol 64 no 9.

Influenza-Like-Illness, All Age

Percentage of Emergency Department Visits Attributable to
Influenza-Like Illness
Miami-Dade County, 2013-2016

During this period, there were 25,177 ED visits; among them 921 (3.7%) were ILI. At the same week of last year, 3.1% of ED visits were ILI.

PARTICIPATE IN INFLUENZA SENTINEL PROVIDER SURVEILLANCE

Florida Department of Health in Miami-Dade County NEEDS Influenza Sentinel Providers!

Sentinel providers are key to the success of the Florida Department of Health's Influenza Surveillance System. Data reported by sentinel providers gives a picture of the influenza virus and ILI activity in the U.S. and Florida which can be used to guide prevention and control activities, vaccine strain selection, and patient care.

- Providers of any specialty, in any type of practice, are eligible to be sentinel providers.

- Most providers report that it takes **less than 30 minutes a week** to compile and report data on the total number of patients seen and the number of patients seen with influenza-like illness.

- Sentinel providers can submit specimens from a subset of patients to the state laboratory for virus isolation **free of charge**.

For more information, please contact

Lakisha Thomas at 305-470-5660.

TO REPORT ANY DISEASE AND FOR INFORMATION CALL:
Epidemiology, Disease Control & Immunization Services

Childhood Lead Poisoning
 Prevention Program 305-470-6877
 Hepatitis 305-470-5536
 Immunizations or outbreaks 305-470-5660
 HIV/AIDS Program 305-470-6999

STD Program ....……....305-575-5430

Tuberculosis Program 305- 575-5415

 Immunization Service 305-470-5660

 To make an appointment....................786-845-0550

About the Epi Monthly Report

The Epi Monthly Report is a publication of the Florida Department of Health in Miami-Dade County: Epidemiology, Disease Control & Immunization Services. The publication serves a primary audience of physicians, nurses, and public health professionals. Articles published in the Epi Monthly Report may focus on quantitative research and analysis, program updates, field investigations, or provider education. For more information or to submit an article, please contact Emily Moore at (305) 470-6918.

Miami-Dade County Monthly Report
Select Reportable Disease/Conditions
January 2016

Diseases/Conditions	2016 Current Month	2016 Year to Date	2015 Year to Date	2014 Year to Date
HIV/AIDS				
AIDS*	51	209	143	161
HIV	166	581	470	386
STD				
Infectious Syphilis*	41	164	91	108
Chlamydia*	1206	4065	3030	3205
Gonorrhea*	257	884	551	666
TB				
Tuberculosis**	5	26	35	36
Epidemiology, Disease Control & Immunization Services				
Epidemiology				
Campylobacteriosis	22	83	102	104
Chikungunya Fever	0	0	7	0
Ciguatera Poisoning	0	0	4	4
Cryptosporidiosis	1	6	5	7
Cyclosporiasis	0	0	0	0
Dengue Fever	0	7	4	6
Escherichia coli, Shiga Toxin-Producing	1	3	7	6
Encephalitis, West Nile Virus	0	0	0	0
Giardiasis, Acute	31	74	57	69
Influenza Novel Strain	0	0	0	0
Influenza, Pediatric Death	0	0	0	1
Legionellosis	1	2	8	5
Leptospirosis	0	0	1	0
Listeriosis	3	3	0	1
Lyme disease	0	0	0	0
Malaria	1	2	0	1
Meningitis (except aseptic)	1	2	2	6
Meningococcal Disease	0	0	4	3
Salmonella serotype Typhy (Typhoid Fever)	0	0	2	1
Salmonellosis	41	143	138	130
Shigellosis	6	28	40	316
Streptococcus pneumoniae, Drug Resistant	0	1	0	28
Vibriosis	0	0	1	3
West Nile Fever	0	0	0	0
Immunization Preventable Diseases				
Measles	0	0	0	0
Mumps	0	2	1	0
Pertussis	2	9	10	8
Rubella	0	0	0	0
Tetanus	0	0	0	0
Varicella	6	32	15	19
Hepatitis				
Hepatitis A	4	8	8	8
Hepatitis B (Acute)	1	2	5	5
Healthy Homes				
Lead Poisoning	20	44	19	19

*Data is provisional at the county level and is subject to edit checks by state and federal agencies.

** Data on tuberculosis are provisional at the county level.

http://miamidade.floridahealth.gov