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To protect, promote & improve the health of all people in Florida through integrated state, county & community efforts.

**Rick Scott**

Governor

**John H. Armstrong, MD, FACS**

State Surgeon General &amp; Secretary

**Vision:** To be the Healthiest State in the Nation

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# Executive Summary

## Perinatal Periods of Risk (PPOR) Analysis

Orange County, Florida

2009-2013

In collaboration with  
CityMatCH

PPOR Project Co-Leads:  
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## **Background**

In 2013, the Florida Department of Health in Orange County (DOH-Orange) partnered with CityMatCH's ([www.citymatch.org](http://www.citymatch.org)) Institute for Equity in Birth Outcomes (Equity Institute) to participate in a two year collaborative project focused on initiatives to improve birth outcomes in Orange County, Florida. As part of the Equity Institute initiative, DOH-Orange Epidemiology Program used the Perinatal Periods of Risk (PPOR) methodology to empirically evaluate and communicate opportunities to reduce infant mortality in Orange County. Communication of the results of the PPOR analysis is the intended purpose of this report.

## **Methods**

Linked birth and death records were obtained for Florida residents from 2009-2013. A PPOR Phase 1 and Phase 2 analysis was conducted using CityMatCH methodologies and guidance (<http://www.citymatch.org/projects/perinatal-periods-risk-ppor>).

The PPOR Phase 1 analysis compared Orange County birth outcomes to those in a comparison group to assess what period of risk had the most excess infant mortality in Orange County. The perinatal periods of risk are based on birth weight and age of death (Table 1). Causes of death tend to be similar within each period of risk making the analysis useful in focusing community efforts to combat infant mortality.

To optimize the analysis for the Orange County population, a second Maternal Health and Prematurity (Category #2) period of risk was added to the standard PPOR Phase 1 analysis due to the number of infant deaths meeting this classification. A fetal death was defined as a spontaneous intrauterine death of a fetus. Fetal deaths with a gestation period less than 20 weeks were excluded from the analysis as the cause of death is difficult to determine. A neonatal death was defined as the death of a baby within 28 days from birth. A post neonatal death was defined as a death of a baby between day 29 after birth to 1 year after birth. The comparison group for the PPOR Phase 1 analysis was mothers aged 20 to 35 years who had attained a high school or equivalent degree, were Florida residents but not an Orange County resident, and identifies race as white and ethnicity as non-Hispanic. Low socioeconomic status (SES) was defined as maternal education less than a high school degree or equivalent.



The PPOR Phase 1 analysis was conducted for two groups: 1. All of Orange County, stratified by race/ethnicity; and, 2. Orange County Low SES Only, stratified by race/ethnicity status. The PPOR Phase 1 analysis was not completed on a geographical area smaller than the entire county due to statistical concerns (e.g., low counts) which would make results unreliable.

Table 1. Perinatal Periods of Risk (PPOR) Phase 1 analysis with groupings of causes of death.

Birth Weight	Fetal Death	Neonatal Death	Post-Neonatal Death
<500 gm	Maternal Health / Prematurity Category #2*		
500-1499 gm	Maternal Health / Prematurity Category #1		
≥1500 gm	Maternal Care	Newborn Care	Infant Health

\*Not a standard CityMatCH period of risk

The purpose of the PPOR Phase 2 analysis was to assess the impact of risk factors for the period of risk with the most excess death identified in the PPOR Phase 1 analysis. The PPOR Phase 2 analysis uses the population attributable risk (PAR) percent calculation which takes into consideration the degree to which each risk factor impacts the birth outcome, but also how many mothers in the population are exposed to the risk factor. In general, the higher the PAR percent, the more importance the risk factor assessed is to the health of the community. As findings of the PPOR Phase 2 analysis were intended to assist community discussions on specific infant mortality interventions, the analysis was completed for two groups: 1. All Orange County, and 2. Orange County Low SES Population.

Very preterm birth was defined as less than 32 weeks gestation and roughly corresponds to less than 1500 grams birth weight, or the Maternal Health and Prematurity period of risk. Risk factors for very preterm birth assessed in the PPOR Phase 2 analysis included inadequate prenatal care (based on Kotelchuck index), any tobacco use prior to or during pregnancy, interpregnancy interval less than 18 months (i.e., from birth to next conception), marital status, maternal age less than 20 years, maternal age greater than 40 years, maternal education greater or equal to 12 years, previous preterm birth (less than 37 weeks gestation), pre pregnancy body mass



index greater than or equal to 25 (kg/m<sup>2</sup>), maternal weight gain during pregnancy based on pre pregnancy weight, presence of chronic or pregnancy related diabetes, presence of chronic or pregnancy related hypertension, infertility treatment, maternal diagnosis of hepatitis C, maternal diagnosis of hepatitis B, and maternal diagnosis of chlamydia, gonorrhea, or syphilis. As part of the CityMatCH partnership, a focused Phase 2 analysis on the Pine Hills community (Zip Codes: 32808 & 32818) was undertaken (Appendix A).

### Results: Population Demographics

From 2009 to 2013, there were 76,952 birth records with 546 linked death records for Orange County residents (Table 2). The Orange County mothers were primarily between the ages of 20 and 40 years (90.2 percent), identified as white, non-Hispanic (35.4 percent), and were considered of high socioeconomic status based on years of education obtained (85.0 percent).

Table 2. Birth Record Maternal Demographics, Orange County, Florida, 2009-2013.

	Frequency	Percent
<b>Total</b>	76,952	100
<b>Age Group, years</b>		
<20	6,036	7.8
20 to 40	69,371	90.2
>40	1,540	2.0
Missing	5	<0.1
<b>Race/Ethnicity</b>		
Hispanic	18,582	24.2
Black, Non-Hispanic	16,413	21.3
White, Non-Hispanic	27,199	35.4
Other, Non-Hispanic	14,758	19.2
<b>Socioeconomic Status</b>		
Low (<12 Years Education)	11,176	14.5
High (≥ 12 Years Education)	65,405	85.0
Missing	371	0.5

### Results: PPOR Phase 1 Analysis

In Orange County from 2009 to 2013, the Maternal Health and Prematurity (blue) period of risk was responsible for the majority of excess infant deaths (Table 3a). Stratification by SES and race/ethnicity status identified that excess infant mortality in the Maternal Health and Prematurity period of risk is an issue in all Orange County populations (Tables 3b-j). The excess



infant death observed in the Infant Health (green) period of risk was higher among the Orange County low SES population compared to the entire county (Tables 3b, 3d, 3f, and 3h). Following the PPOR Phase 1 analysis review, the Maternal Health and Prematurity category #1 period of risk was chosen for further analysis in PPOR Phase 2 as the number of excess deaths was higher than the other periods of risk and was experienced by all assessed Orange County populations.

Tables 3a-j. Perinatal Periods of Risk (PPOR) Phase 1 Analysis: Excess Infant Deaths Observed Compared to the Reference Group, by Race/Ethnicity and Socioeconomic Status (SES), in Orange County, Florida, 2009-2013.

	All Orange County			Orange County Low SES Only		
Total	a)	134.8		b)	73.7	
		65.4			30.5	
	NA	4.0	7.4	NA	7.5	29.2
Non-Hispanic Black Only	c)	69.1		d)	35.2	
		21.1			9.3	
	NA	3.5	18.5	NA	2.5	19.3
Non-Hispanic White Only	e)	11.0		f)	7.7	
		4.7			6.4	
	NA	2.9	NA	0.4	3.8	8.8
Hispanic Only	g)	29.3		h)	15.4	
		18.6			5.4	
	NA	NA	0.5	NA	NA	3.1
Other	i)	25.5		j)	15.4	
		21.0			9.4	
	NA	2.6	NA	0.7	3.4	NA

Blue risk period has causes of risk linked to maternal health and prematurity; Pink risk period has causes of risk linked to maternal care; Yellow risk period has causes of risk linked newborn care; Green risk period has causes linked to infant health; NA = not applicable as negative excess death.



## **Results: PPOR Phase 2 Analysis**

To assess the risk factors for the Maternal Health and Prematurity category #1 period of risk identified in the PPOR Phase 1 analysis, the birth outcome of very preterm birth (i.e., less than 32 weeks gestation) was used in the PPOR Phase 2 PAR percent analysis. In Table 4, the risk factors for very preterm birth assessed in the PPOR Phase 2 PAR percent analysis are presented for all Orange County and among the low SES population in Orange County from 2009-2013. The statistically significant risk factors for prematurity are briefly discussed (sub-county level prematurity risk factor analysis is provided in Appendix B and C).

In Orange County from 2009-2013, 23.6 (95 percent confidence interval (95% CI): 19.2-28.1) percent of the very preterm births can be attributed to mothers not gaining enough weight during pregnancy based on their pre pregnancy weight. There are many possible reasons for mothers not gaining enough weight during pregnancy (e.g., co-morbidities, pregnancy complications, genetic, access to healthy food, personal behaviors including drug use). As these specific data indicators are not captured in birth and death records, further delineation of the underlying issues was not possible in this analysis. In Orange County from 2009-2013, 16.9 (95% CI: 12.8-21.0) percent of the very preterm births can be attributed to mothers not having economic, emotional, or social support. For this risk factor, marital status was used as a surrogate variable. As surrogate variables are inherently imperfect, more specific measures should be used in any intervention evaluation to address this risk factor. In Orange County from 2009-2013, 16.5 (95% CI: 14.5-18.5) percent of the very preterm births can be attributed to mothers having chronic or pregnancy related hypertension and 15.0 (95% CI: 11.1-18.8) percent of the very preterm births can be attributed to mothers having a pre pregnancy body mass index (BMI) of greater or equal to 25 (kg/m<sup>2</sup>). In Orange County from 2009-2013, 11.1 (95% CI: 9.8-12.6) percent of the very preterm births can be attributed to mothers having inadequate prenatal care. The Kotelchuck index captured in the birth record was used as the indicator for this risk factor analysis.



Table 4. Results of Perinatal Periods of Risk (PPOR) Phase 2 Crude Population Attributable Risk (PAR) Percent by Low Socioeconomic Status (SES) in Orange County, Florida 2009-2013.

Risk Factor for Very Preterm Birth	All Orange County		Orange County Low SES Population	
	PAR %	95%CI	PAR %	95%CI
Maternal Health				
<b>Inadequate Weight Gain</b> ...if improve so that mothers that did not gain enough weight during pregnancy based on their pre pregnancy BMI had the same risk as mothers that gained an appropriate amount of weight during pregnancy based on their pre pregnancy BMI of delivering at <32 weeks gestation.	23.6	19.2 - 28.1	25.3	18.3 - 32.2
<b>Hypertension</b> ...if improve so mothers with chronic or pregnancy related hypertension had the same risk as mothers that did not have chronic or pregnancy related hypertension of delivering at <32 weeks gestation.	16.5	14.5 - 18.5	14.0	11.1 - 16.9
<b>Pre Pregnancy BMI</b> ...if improve so mothers with a pre pregnancy weight greater or equal to 25 BMI had the same risk as mothers that had a pre pregnancy weight of less than a 25 BMI of delivering at <32 weeks gestation.	15.0	11.1 - 18.8	9.2	3.4 - 15.1
<b>Previous Preterm Birth</b> ...if improve so mothers that have had a previous preterm birth had the same risk as mothers that have not had a previous preterm birth of delivering at <32 weeks gestation.	4.3	3.2 - 5.3	5.3	3.6 - 7.0
<b>Diabetes</b> ...if improve so mothers with chronic or pregnancy related diabetes had the same risk as mothers that did not have chronic or pregnancy related diabetes of delivering at <32 weeks gestation.	2.5	1.2 - 3.8	Not Statistically Significant	
<b>Advanced Maternal Age</b> ...if improve so mothers older than 40 years of age had the same risk as mothers aged 40 years or younger of delivering at <32 weeks gestation.	1.9	1.0 - 2.8	Not Statistically Significant	
<b>Infertility Treatment</b> ...if improve so mothers that have undergone infertility treatment had the same risk as mothers that have not undergone infertility treatment of delivering at <32 weeks gestation.	Not Statistically Significant		Not Statistically Significant	
<b>Hepatitis C</b> ...if improve so mothers diagnosed with a Hepatitis C infection had the same risk as mothers that did not have a Hepatitis C infection of delivering at <32 weeks gestation.	Not Statistically Significant		Not Statistically Significant	
<b>Hepatitis B</b> ...if improve so mothers diagnosed with a Hepatitis B infection had the same risk as mothers that did not have a Hepatitis B infection of delivering at <32 weeks gestation.	Not Statistically Significant		Not Statistically Significant	
<b>Sexually Transmitted Infections</b> ...if improve so mothers diagnosed with a gonorrhea, syphilis, or chlamydia infection had the same risk as mothers that did not have a gonorrhea, syphilis, or chlamydia infection of delivering at <32 weeks gestation.	Not Statistically Significant		Not Statistically Significant	
Maternal Economic, Emotional, and Social (EES) Support				
<b>Marital Status</b> ...if improve so unmarried mothers had the same risk as married mothers of delivering at <32 weeks gestation.	16.9	12.8 - 21.0	15.2	6.2 - 24.2
<b>Maternal Education</b> ...if improve so mothers with less than 12 years of education had the same risk as mothers with greater than or equal to 12 years of education of delivering at <32 weeks gestation.	3.6	1.6 - 5.5	Not Statistically Significant	
Maternal Prenatal Care				
<b>Adequate Prenatal Care</b> ...if improve so mothers receiving inadequate prenatal care (Kotelchuck) had the same risk as mothers that received adequate prenatal care of delivering at <32 weeks gestation.	11.1	9.8 - 12.6	13.1	10.6 - 15.7
Maternal Health Behaviors				
<b>Tobacco Use</b> ...if improve so mothers that used tobacco prior to or during pregnancy had the same risk as mothers that did not use tobacco prior to or during pregnancy of delivering at <32 weeks gestation.	Not Statistically Significant		Not Statistically Significant	



### **Analysis Limitations**

The primary limitation in the analysis is that only those risk factors that have data captured by birth and death records could be analyzed for their impact on infant mortality in Orange County. Other risk factors that do not have data indicators captured by birth and death records may contribute to infant mortality in Orange County (e.g., physical environment). The second limitation is that the available data indicators may not perfectly represent the risk factor (e.g., marital status used as a surrogate indicator for social, economic and emotional support). The third limitation is that critical variables (e.g., birth weight) were incomplete on a few of the birth records in the dataset and therefore could not be included in the study.

### **Analysis Strengths**

The analysis suggests a few characteristics (e.g., inadequate weight gain during pregnancy, elevated pre pregnancy weight, poor maternal support system, inadequate prenatal care) appear to be contributing measurably to preventable prematurity and infant death in Orange County. Interventions that decrease the risk of women with these characteristics may improve birth outcomes. Since the vital records data analyzed are collected on an ongoing and consistent basis, potential impacts of interventions can be measured over time.

### **Conclusions**

The PPOR Phase 1 analysis identified the Maternal Health and Prematurity period of risk to have the highest excess infant death in Orange County from 2009-2013. Targeted PPOR Phase 2 analysis on the Maternal Health and Prematurity period of risk found that risk factors including inadequate maternal weight gain during pregnancy, inadequate support among unmarried mothers, and maternal chronic and pregnancy-related hypertension contribute to prematurity in Orange County from 2009-2013. In addition, socioeconomic status disparities in the degree to which different risk factors (e.g., maternal pre pregnancy weight, prenatal care, maternal weight gain during pregnancy) are associated with prematurity are evident in Orange County. Efforts to improve maternal health and prematurity, and as a result infant mortality, continue to be needed and enhanced in Orange County. Community health interventions that are currently addressing the opportunities to improve and combat causes of infant mortality in Orange County have been identified (Tables 5a-c).





Table 5a. Florida Department of Health in Orange County and Community Partner Programs Addressing the Identified Opportunity of Improving Maternal Health and Health Behaviors to Decrease Infant Mortality in Orange County, Florida.

Organization	Program / Project Name
Florida Department of Health in Orange County	Healthy Start Program <ul style="list-style-type: none"> <li>Care Coordination</li> <li>Bellies, Babies and Beyond Project</li> <li>Nurse Family Partnership</li> <li>MomCare</li> </ul> TOPWA Women, Infants and Children (WIC) Reproductive Health Program <ul style="list-style-type: none"> <li>Family Planning Program</li> </ul>
Amerigroup	
Evans Wellness Cottage	
Federally Qualified Health Centers	True Health
Florida Department of Children and Families	Family Planning Medical Waiver
Hebni Nutrition Consultant	Fresh Start
Molina	
Orange County High Risk Obstetricians	
Orlando Health	Healthy Families Program
Parramore Kidz Zone	ROCK Baby Institute
Pine Hills Wellness Group	
Prestige	
Sunshine	
United Health and Staywell	



Table 5b. Florida Department of Health in Orange County and Community Partner Programs Addressing the Identified Opportunity of Improving Maternal Economic, Emotional, and Social Support to Decrease Infant Mortality in Orange County, Florida.

Organization	Program / Project Name
Florida Department of Health in Orange County	Healthy Start Program <ul style="list-style-type: none"> <li>• Bellies, Babies and Beyond Project</li> <li>• Nurse Family Partnership</li> <li>• Care Coordination</li> </ul> Reproductive Health Program <ul style="list-style-type: none"> <li>• Family Planning Program</li> </ul> Prospertus Leadership Academy (via DOH-Orange contract)           Women, Infants and Children (WIC)
ASPIRE	Therapeutic Intervention Program (via Healthy Start Coalition and DOH-Orange contract)
Beta	Parents as Partners Program
Children Home Society	Perinatal Programs
Covenant House	
Early Head Start	
Goodwill	
Harbor House of Central Florida	
Healthy Start Coalition	
Orange County Public Schools	
Orlando Health	Healthy Families Orange <ul style="list-style-type: none"> <li>• MIECHV</li> <li>• Healthy Families Program</li> </ul>
Parramore Kidz Zone	Cradle-to-College Program
RESCARE	
United Way	
University of Central Florida	Marriage & Family Research Institute <ul style="list-style-type: none"> <li>• Project TOGETHER</li> </ul>
Urban League	
Wraparound Orange	



Table 5c. Florida Department of Health in Orange County and Community Partner Programs Addressing the Identified Opportunity of Improving Prenatal Care to Decrease Infant Mortality in Orange County, Florida.

Organization	Program / Project Name
Florida Department of Health in Orange County	Healthy Start Program
	<ul style="list-style-type: none"> <li>• Bellies, Babies and Beyond Project</li> <li>• Care Coordination</li> <li>• Nurse Family Partnership</li> <li>• MomCare</li> </ul>
	Reproductive Health Program
	TOPWA
Amerigroup	
Federally Qualified Health Centers	True Health
Molina	
Orlando Health	Healthy Families Program
Prestige	
Sunshine	
United Health and Staywell	



## Appendix A

Table A1. Birth Record Maternal Demographics, Pine Hills Community (Zip Codes: 32808 & 32818), Orange County, Florida 2009-2013.

	Frequency	Percent
<b>Total</b>	7,892	100
<b>Age Group, years</b>		
<20	1,000	12.7
20 to 40	6,725	85.2
>40	167	2.0
<b>Race/Ethnicity</b>		
Hispanic	802	10.2
Black, Non-Hispanic	4,528	57.4
White, Non-Hispanic	760	9.6
Other, Non-Hispanic	1,802	22.8
<b>Socioeconomic Status</b>		
Low (<12 Years Education)	1,823	23.1
High (≥ 12 Years Education)	6,018	76.3
Missing	51	0.7



Table A2. Results of Perinatal Periods of Risk (PPOR) Phase 2 Crude Population Attributable Risk (PAR) Percent among the Pine Hills Community (Zip Codes: 32808 & 32818), Orange County, 2009-2013.

Risk Factor for Very Preterm Birth	Pine Hills Community	
	PAR%	95%CI
Maternal Health		
<b>Inadequate Weight Gain</b> ...if improve so that mothers that did not gain enough weight during pregnancy based on their pre pregnancy BMI had the same risk as mothers that gained an appropriate amount of weight during pregnancy based on their pre pregnancy BMI of delivering at <32 weeks gestation.	20.8	9.1 - 32.5
<b>Hypertension</b> ...if improve so mothers with chronic or pregnancy related hypertension had the same risk as mothers that did not have chronic or pregnancy related hypertension of delivering at <32 weeks gestation.	17.7	12.1 - 23.3
<b>Pre Pregnancy BMI</b> ...if improve so mothers with a pre pregnancy weight greater or equal to 25 BMI had the same risk as mothers that had a pre pregnancy weight of less than a 25 BMI of delivering at <32 weeks gestation.	16.3	4.9 - 27.6
<b>Previous Preterm Birth</b> ...if improve so mothers that have had a previous preterm birth had the same risk as mothers that have not had a previous preterm birth of delivering at <32 weeks gestation.	5.6	2.3 - 8.8
<b>Diabetes</b> ...if improve so mothers with chronic or pregnancy related diabetes had the same risk as mothers that did not have chronic or pregnancy related diabetes of delivering at <32 weeks gestation.	Not Statistically Significant	
<b>Advanced Maternal Age</b> ...if improve so mothers older than 40 years of age had the same risk as mothers aged 40 years or younger of delivering at <32 weeks gestation.	Not Statistically Significant	
<b>Infertility Treatment</b> ...if improve so mothers that have undergone infertility treatment had the same risk as mothers that have not undergone infertility treatment of delivering at <32 weeks gestation.	Not Statistically Significant	
<b>Hepatitis C</b> ...if improve so mothers diagnosed with a Hepatitis C infection had the same risk as mothers that did not have a Hepatitis C infection of delivering at <32 weeks gestation.	Not Statistically Significant	
<b>Hepatitis B</b> ...if improve so mothers diagnosed with a Hepatitis B infection had the same risk as mothers that did not have a Hepatitis B infection of delivering at <32 weeks gestation.	Not Statistically Significant	
<b>Sexually Transmitted Infections</b> ...if improve so mothers diagnosed with a gonorrhea, syphilis, or chlamydia infection had the same risk as mothers that did not have a gonorrhea, syphilis, or chlamydia infection of delivering at <32 weeks gestation.	Not Statistically Significant	
Maternal Economic, Emotional, and Social (EES) Support		
<b>Marital Status</b> ...if improve so unmarried mothers had the same risk as married mothers of delivering at <32 weeks gestation.	Not Statistically Significant	
<b>Maternal Education</b> ...if improve so mothers with less than 12 years of education had the same risk as mothers with greater than or equal to 12 years of education of delivering at <32 weeks gestation.	Not Statistically Significant	
Maternal Prenatal Care		
<b>Adequate Prenatal Care</b> ...if improve so mothers receiving inadequate prenatal care (Kotelchuck) had the same risk as mothers that received adequate prenatal care of delivering at <32 weeks gestation.	Not Statistically Significant	
Maternal Health Behaviors		
<b>Tobacco Use</b> ...if improve so mothers that used tobacco prior to or during pregnancy had the same risk as mothers that did not use tobacco prior to or during pregnancy of delivering at <32 weeks gestation.	Not Statistically Significant	



## Appendix B – Prematurity Risk Factor Analysis among All Births in Orange County, Florida 2009-2013

Table B1. Risk factors for prematurity among all births by Zip Code (min. 20 total births), Orange County, Florida 2009-2013.

Zip Code	Mortality Rate per 1,000 Births	Total Births (N)	Very Preterm Birth (< 32 Weeks) (%)	Inadequate Maternal Weight Gain during Pregnancy (%)	Chronic or Pregnancy-related Hypertension (%)	Maternal Pre Pregnancy Body mass Index $\geq 25$ (%)	Previous Preterm Birth (%)	Chronic or Pregnancy-related Diabetes (%)	Maternal Age > 40 Years (%)	Unmarried Maternal Status (%)	Maternal Education < 12 Years (%)	Inadequate Prenatal Care (Kotelchuck) (%)
32805	11.45	2008	4.88	24.70	11.55	49.8	2.84	4.83	1.29	82.6	34.6	18.3
32811	11.00	3454	4.02	21.31	10.39	48.4	2.55	5.33	1.36	69.5	19.2	13.6
32808	10.94	4388	4.10	21.33	10.48	50.1	3.12	5.20	1.80	73.8	26.2	17.0
32810	10.70	2336	3.13	17.89	9.12	46.1	3.47	4.79	1.33	60.5	17.1	12.5
32809	10.10	2277	2.37	24.15	8.12	48.4	2.85	6.19	1.84	59.6	28.8	11.7
32807	9.19	2286	1.88	16.54	7.70	48.2	1.92	5.42	1.27	62.3	19.2	10.3
34761	8.98	2562	3.24	18.97	8.59	44.5	2.50	6.09	2.22	38.7	20.9	8.7
32822	8.94	3916	1.97	17.29	7.79	47.8	1.86	5.69	0.94	58.0	12.4	9.6
32703	8.84	2942	2.38	18.63	7.04	46.1	2.96	5.64	1.46	53.9	28.0	11.8
32839	8.84	4975	3.22	23.12	9.25	49.8	2.15	5.87	2.09	62.9	24.8	11.5
32709	8.77	114	0.00	16.67	7.89	41.2	0.88	6.14	1.75	49.1	17.5	13.2
32818	8.56	3504	3.34	20.41	10.33	50.6	2.88	6.82	2.51	59.4	19.3	12.2
32825	8.24	3398	1.91	16.48	6.71	45.4	1.50	5.59	1.85	40.7	9.0	7.7
32824	7.98	2507	2.39	18.59	6.66	45.6	1.28	6.42	1.72	41.4	7.8	6.8
32812	7.97	1881	2.07	16.43	8.56	43.2	1.65	6.86	1.97	46.6	11.4	7.2
32833	7.75	516	2.71	17.05	9.11	44.2	2.52	4.65	1.94	42.3	11.6	9.3
32806	7.69	1300	2.69	14.15	7.62	36.2	1.31	5.00	2.15	37.2	6.5	5.9
32798	7.52	133	2.26	12.78	8.27	48.9	3.01	6.02	1.50	66.9	39.9	17.3
32820	7.23	553	2.71	14.10	8.32	42.5	1.08	6.51	1.63	24.2	10.0	5.4
32751	7.20	694	2.88	19.45	5.48	34.7	2.59	5.19	3.60	33.3	5.9	7.6
32817	6.61	1512	2.12	15.61	7.14	42.3	1.59	5.42	1.65	41.3	8.1	7.9
34787	6.06	3303	2.27	16.86	7.63	40.1	2.06	6.02	2.15	31.6	13.5	7.8
32835	5.97	2680	2.84	17.13	8.10	42.2	1.38	5.49	1.79	44.1	8.8	8.0

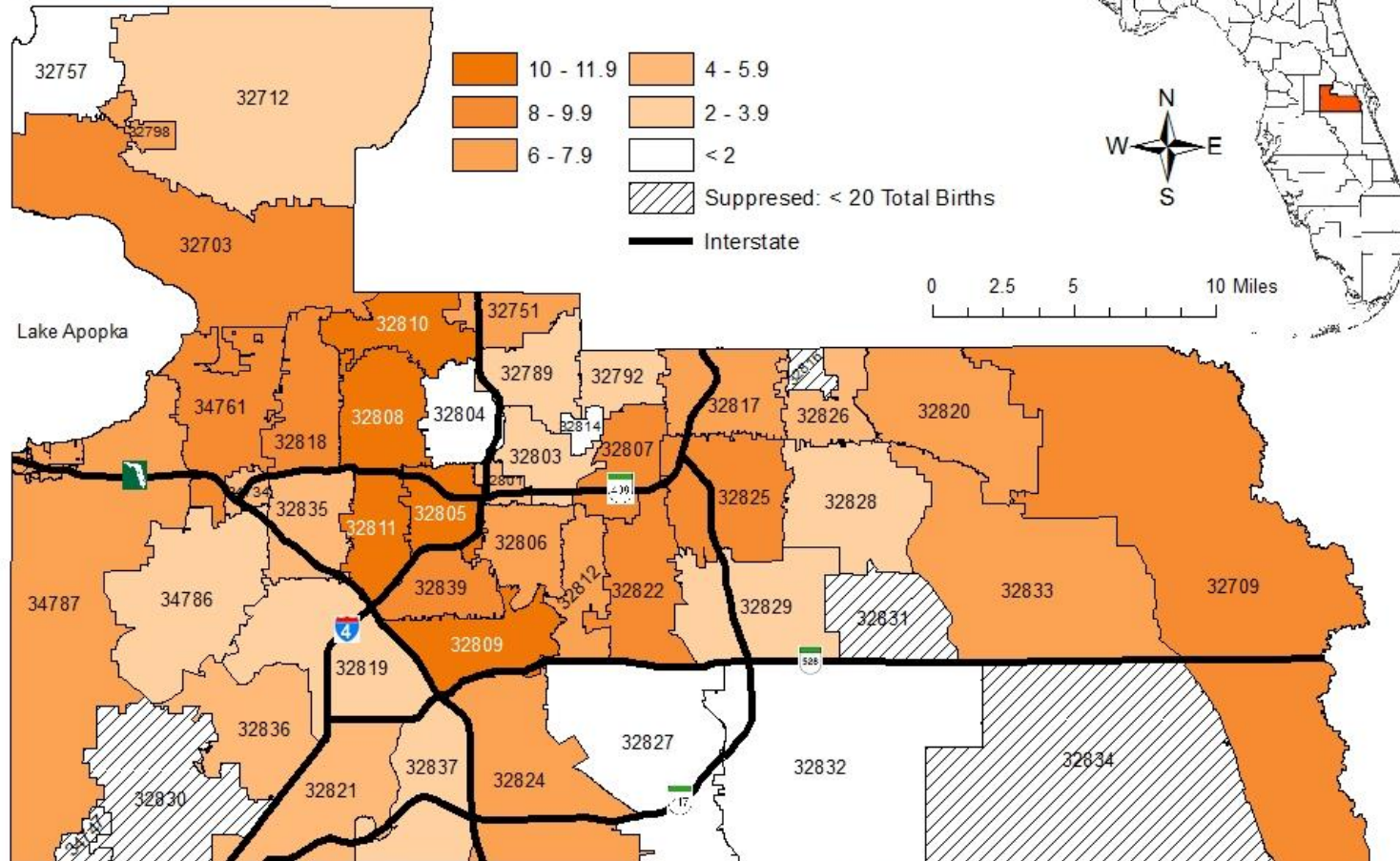


Table B1 (continued). Risk factors for prematurity among all births by Zip Code (min. 20 total births), Orange County, Florida 2009-2013.

Zip Code	Mortality Rate per 1,000 Births	Total Births (N)	Very Preterm Birth (< 32 Weeks) (%)	Inadequate Maternal Weight Gain during Pregnancy (%)	Chronic or Pregnancy-related Hypertension (%)	Maternal Pre Pregnancy Body mass Index $\geq 25$ (%)	Previous Preterm Birth (%)	Chronic or Pregnancy-related Diabetes (%)	Maternal Age > 40 Years (%)	Unmarried Maternal Status (%)	Maternal Education < 12 Years (%)	Inadequate Prenatal Care (Kotelchuck) (%)
32821	5.72	874	1.03	17.05	5.38	40.5	1.49	6.64	2.17	31.9	4.6	9.5
34734	5.15	194	2.58	17.53	7.73	35.6	2.06	4.12	3.09	28.9	6.7	8.8
32836	4.37	916	1.09	16.70	6.55	34.1	1.64	6.99	3.17	16.4	4.3	5.9
32826	4.29	1166	1.97	14.75	6.35	47.0	1.89	5.83	1.54	40.2	8.7	7.6
32801	4.19	477	1.05	16.98	7.34	32.5	1.68	5.45	3.35	42.6	13.0	13.2
32803	3.97	1007	1.79	15.09	6.85	28.6	1.39	4.27	2.98	28.0	4.1	5.5
32789	3.88	1030	2.14	15.05	5.05	28.0	1.46	3.88	3.59	25.3	7.0	6.2
32828	3.49	3723	1.77	14.83	7.92	39.6	1.50	5.51	2.10	24.7	3.8	4.3
32819	3.40	1176	2.64	18.11	6.97	37.8	1.53	4.68	2.47	34.6	7.1	8.3
32837	3.28	2743	2.15	17.57	7.44	43.3	1.57	6.71	2.44	37.3	6.7	7.5
32792	3.27	1528	2.42	14.86	6.61	41.2	2.16	6.02	2.29	47.7	7.2	8.4
32829	2.93	1366	1.98	14.06	8.27	42.7	1.61	6.37	1.90	26.7	4.2	4.3
34786	2.54	1577	1.90	16.17	6.09	28.9	2.03	6.09	4.38	11.2	1.5	3.9
32712	2.36	2543	2.24	17.85	6.92	43.0	2.75	5.58	2.12	35.5	19.9	9.5
32814	1.78	562	0.89	14.77	3.20	18.3	1.78	2.85	2.85	8.2	0.5	1.8
32832	1.76	1139	1.58	17.56	5.88	35.4	2.02	6.50	1.67	16.4	2.0	4.8
32804	0.97	1030	0.87	15.63	4.95	28.3	1.65	3.79	3.88	20.8	3.7	6.0
32768	0.00	25	0.00	24.00	4.00	44.0	8.00	4.00	0.00	88.0	40.0	24.0
34760	0.00	42	2.38	16.67	9.52	45.2	0.00	2.38	0.00	52.4	9.5	23.8
32777	0.00	22	0.00	13.64	4.55	54.5	9.09	9.09	0.00	63.6	27.3	13.6
32757	0.00	115	3.48	22.61	6.96	40.9	2.61	5.22	1.74	19.1	7.0	7.0
32827	0.00	492	2.44	16.87	5.69	35.0	1.63	5.49	1.22	16.3	1.8	4.1



# **Infant Mortality Rate per 1,000 Births by Zip Code, Orange County, Florida 2009-2013**



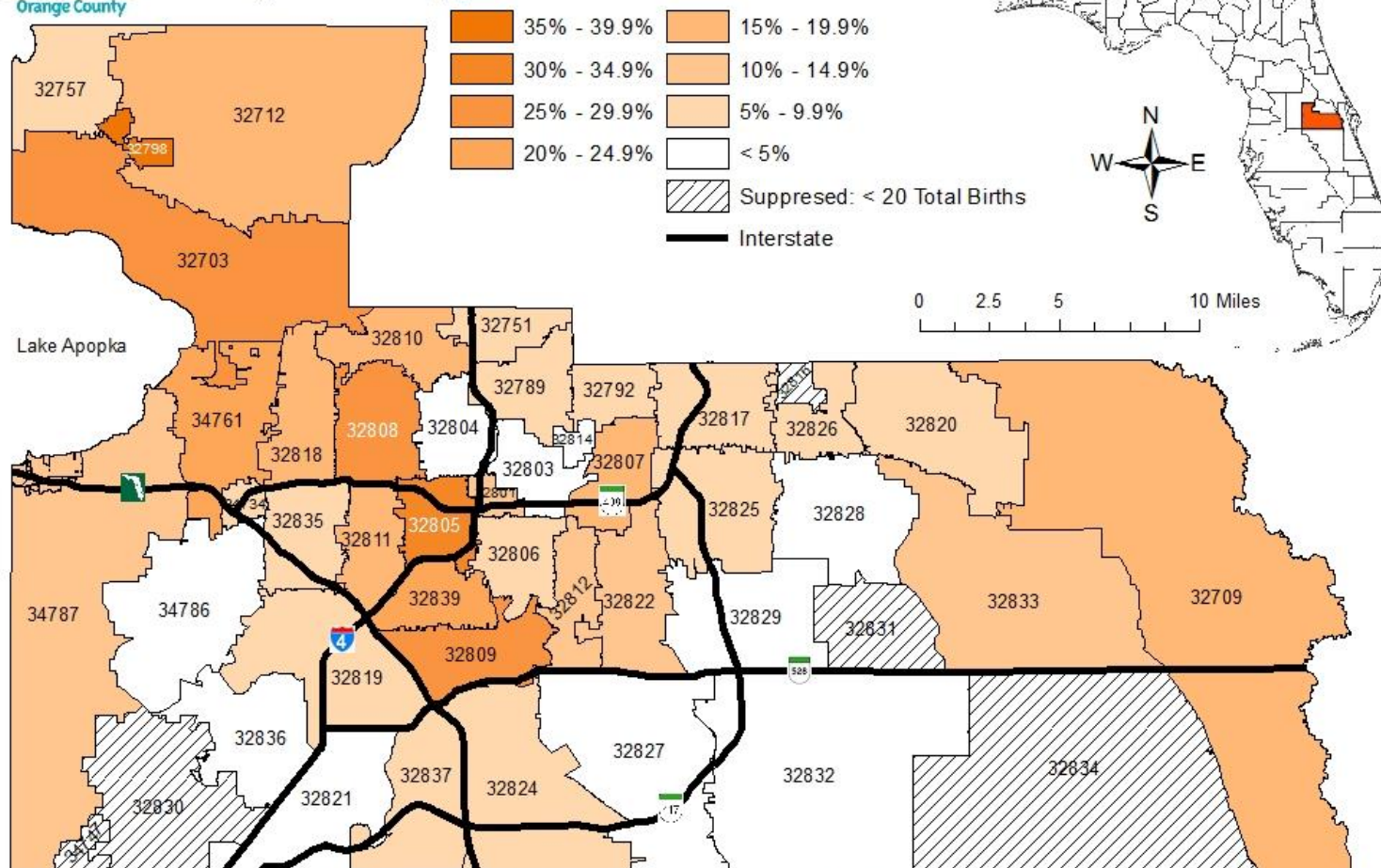
Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 12/02/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis





# Percent Births to Mothers with Less than 12 Years of Education among All Births by Zip Code, Orange County, Florida 2009-2013

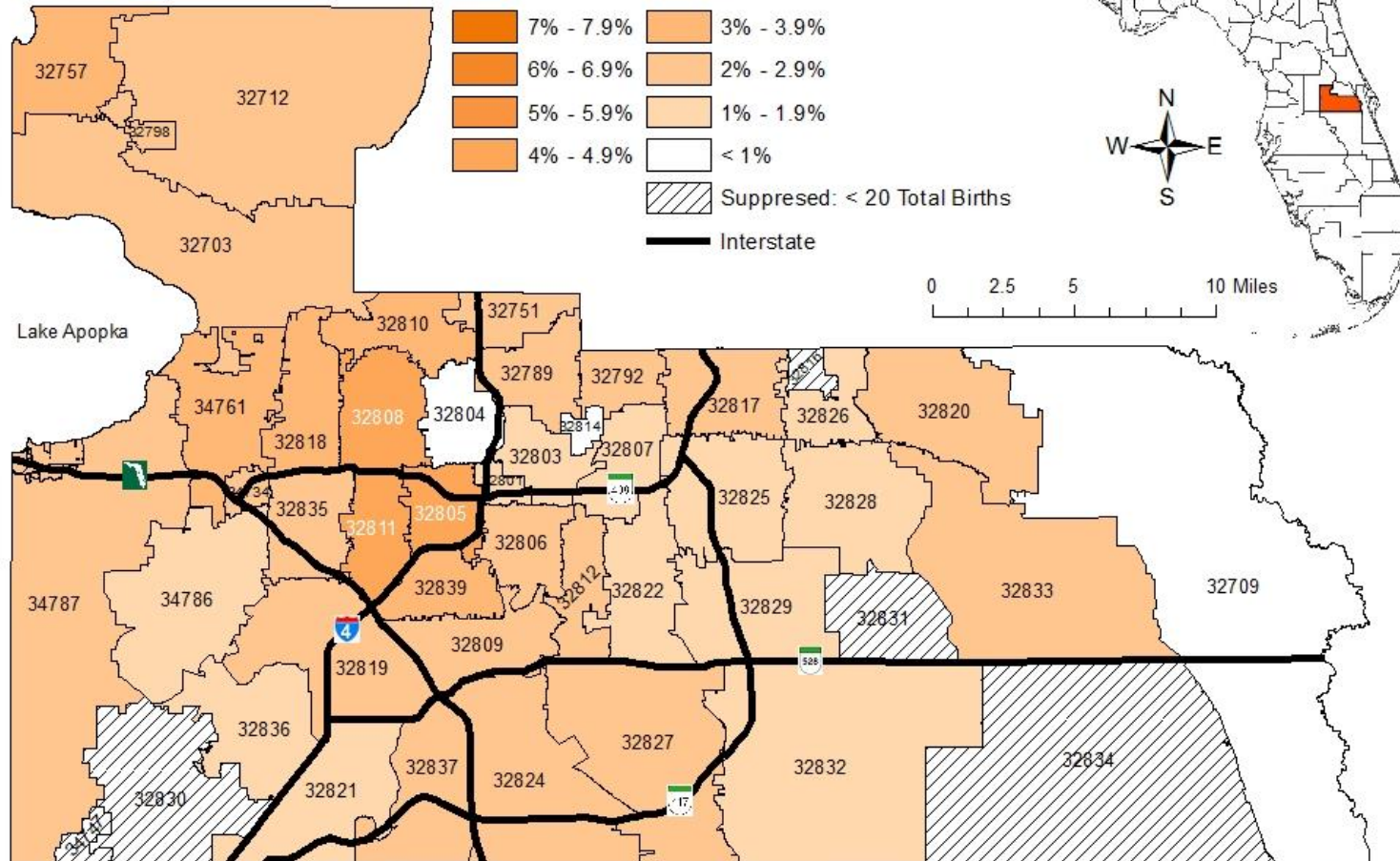


Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis



# Percent Very Preterm Births (<32 Weeks Gestation) among All Births by Zip Code, Orange County, Florida 2009-2013



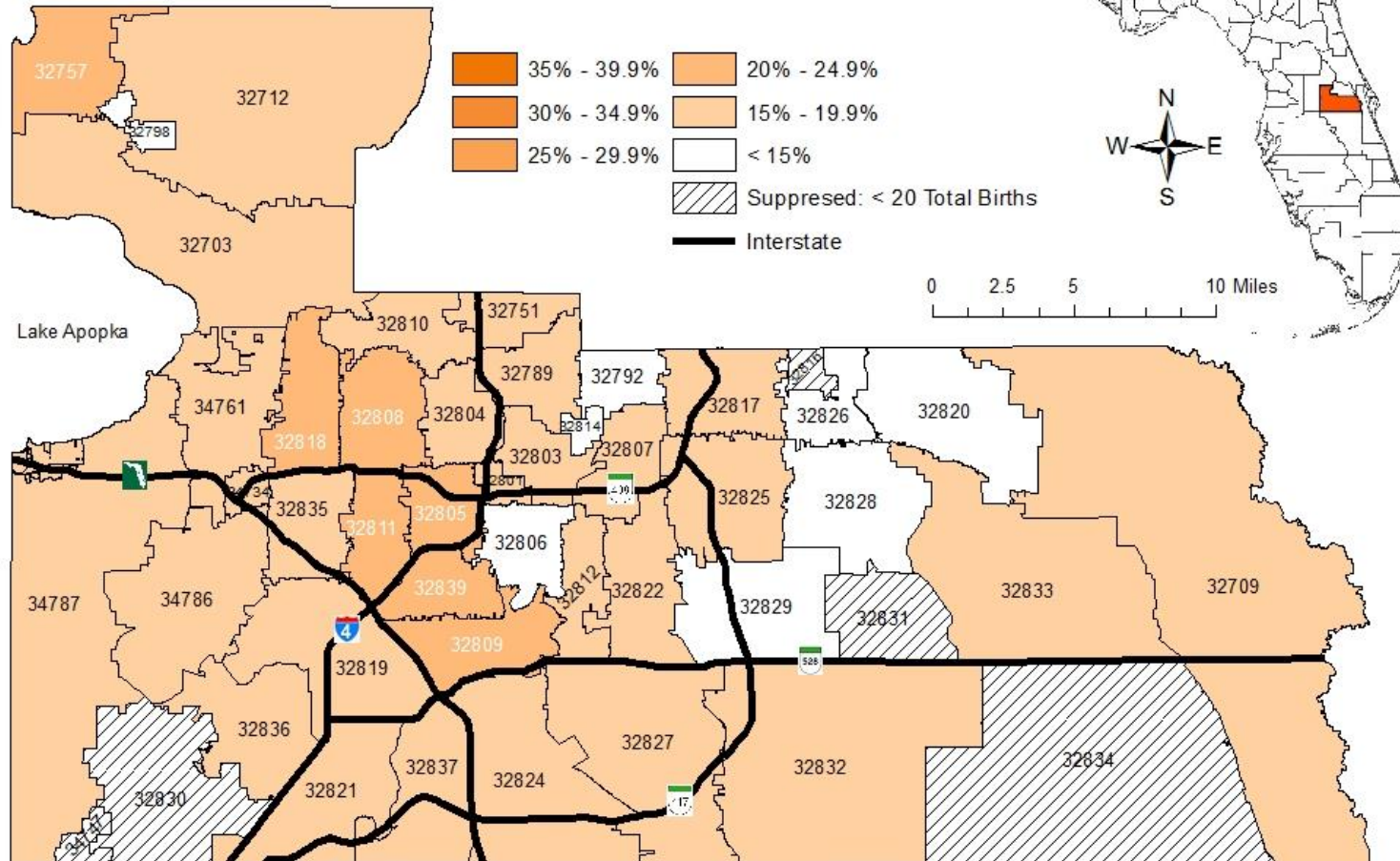
Data Source: Florida Department of Health, Bureau of Vital Statistics  
Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis





# Percent Births to Mothers with Inadequate Weight Gain during Pregnancy among All Births by Zip Code, Orange County, Florida 2009-2013

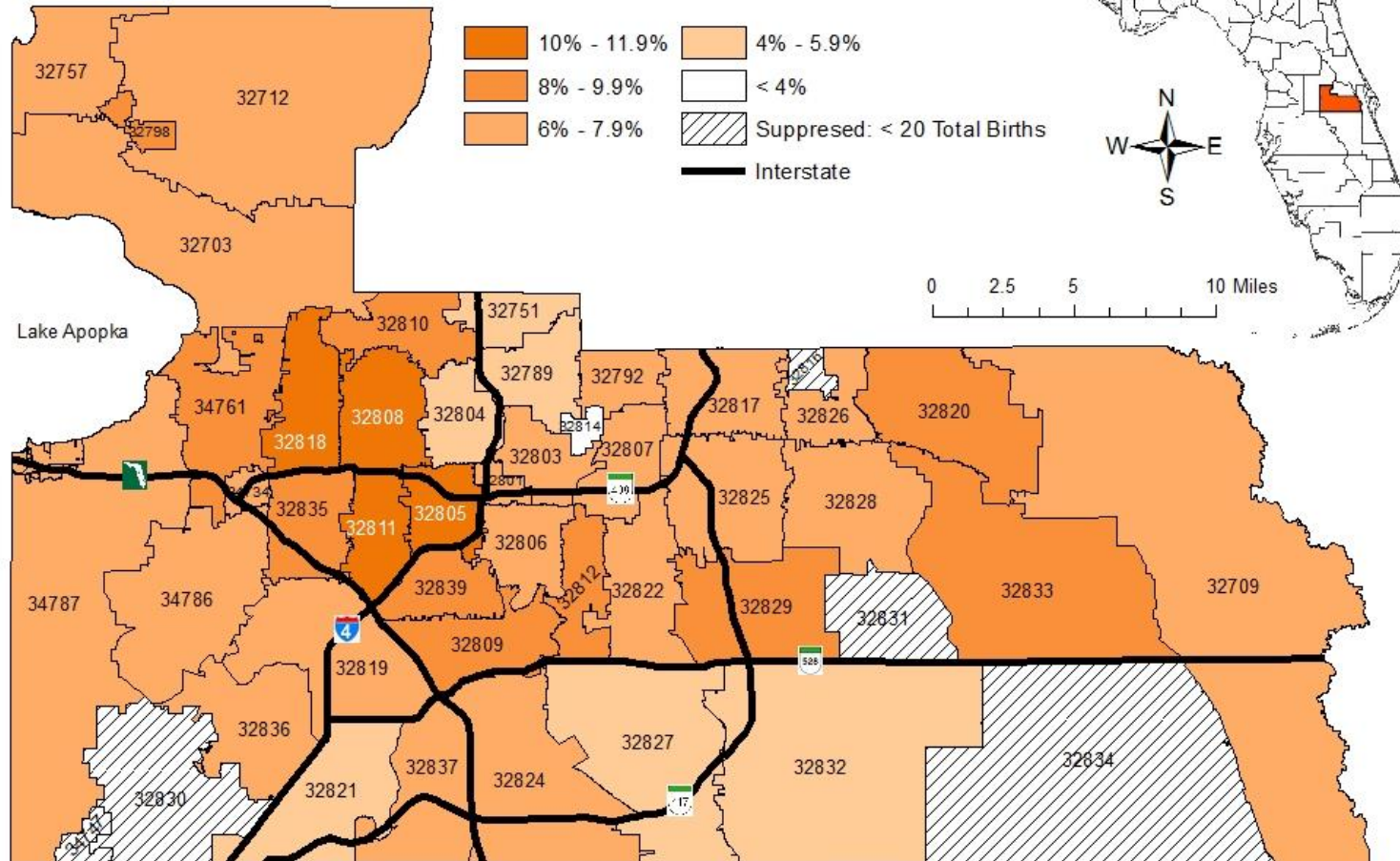


Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis



# Percent Births to Mothers with Chronic or Pregnancy-related Hypertension among All Births by Zip Code, Orange County, Florida 2009-2013



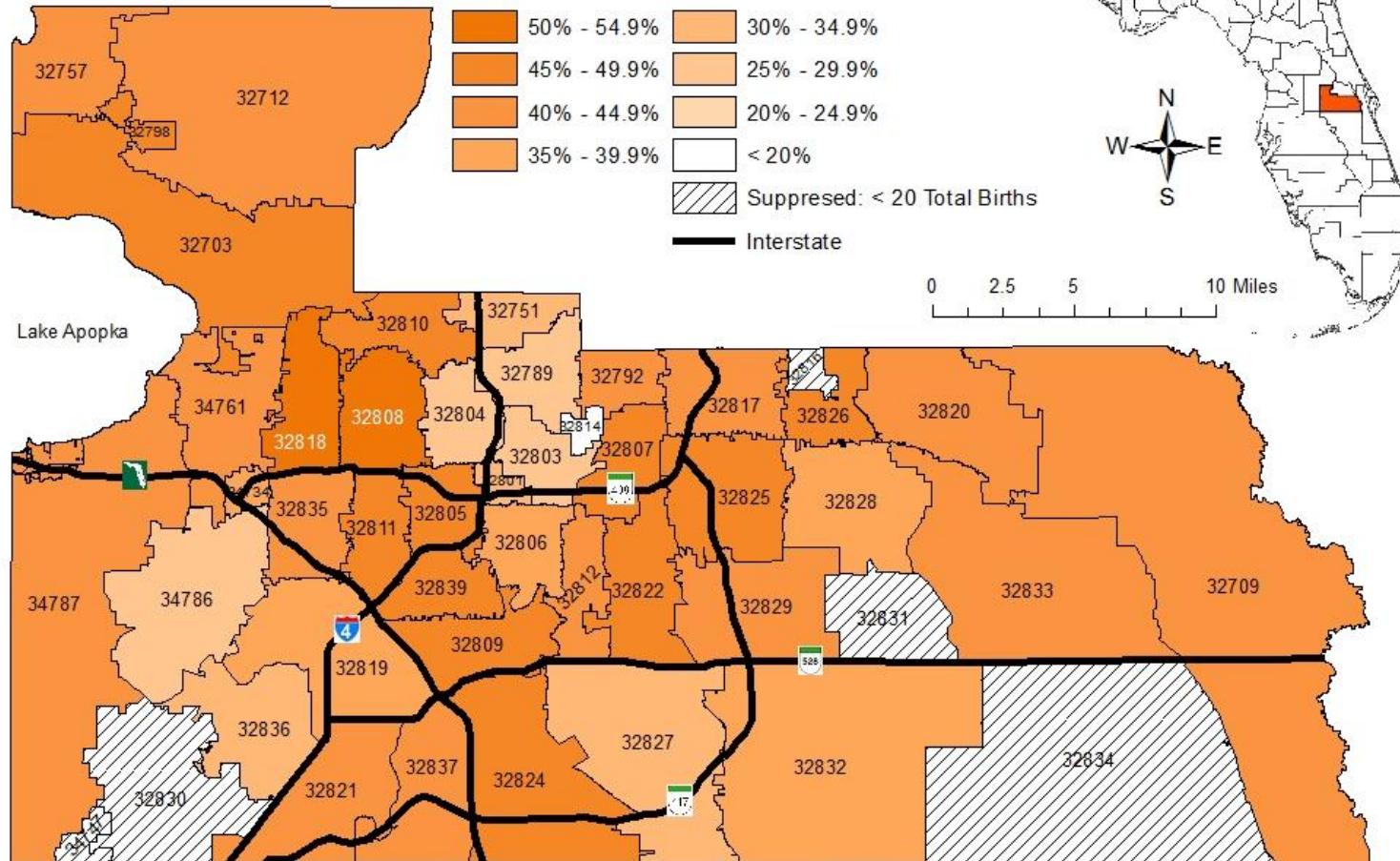
Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis





# Percent Births to Mothers with Pre Pregnancy Body Mass Index Greater or Equal to 25 among All Births by Zip Code, Orange County, Florida 2009-2013

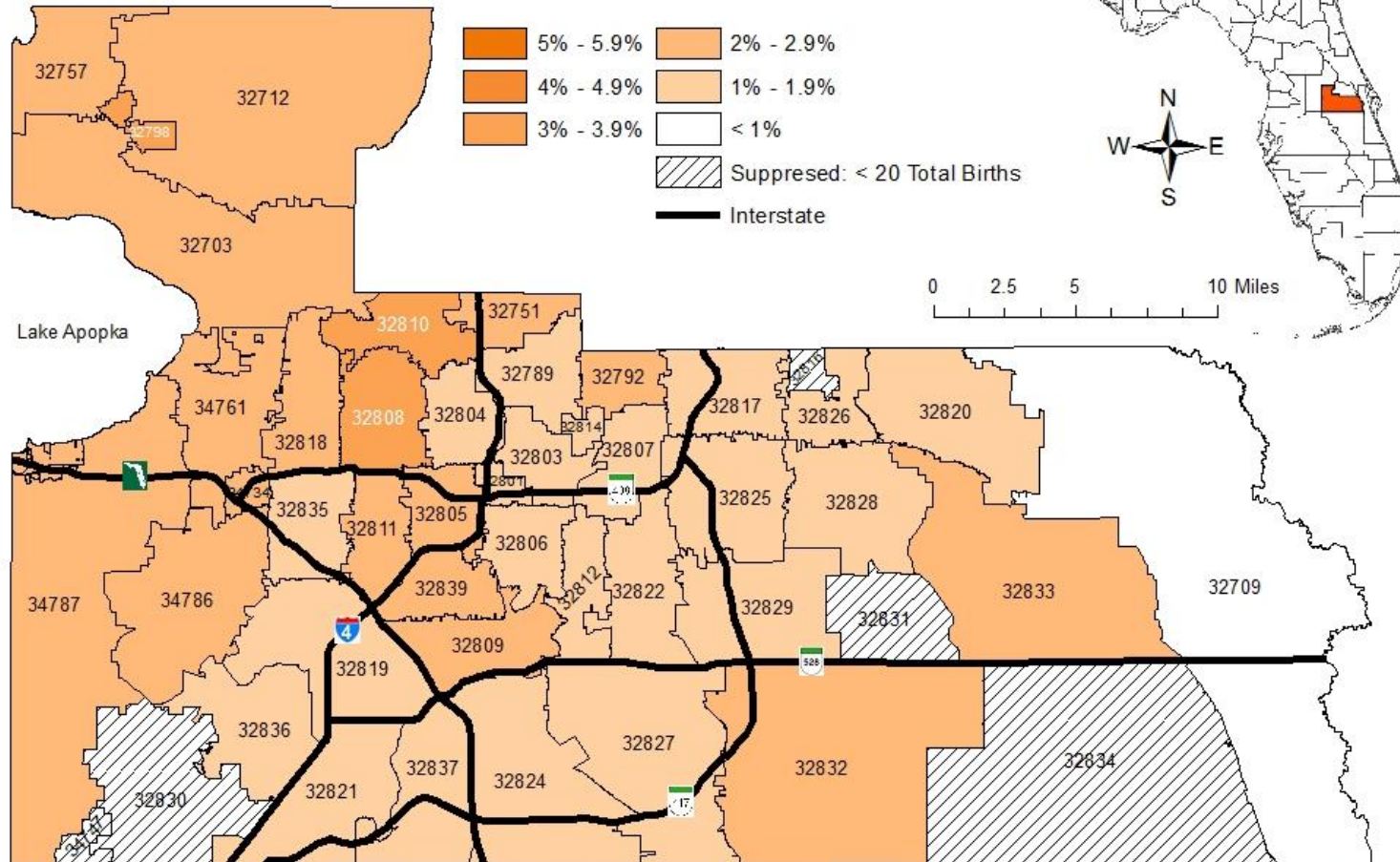


Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 12/02/2015

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## Percent Births to Mothers with a Previous Preterm Birth among All Births by Zip Code, Orange County, Florida 2009-2013



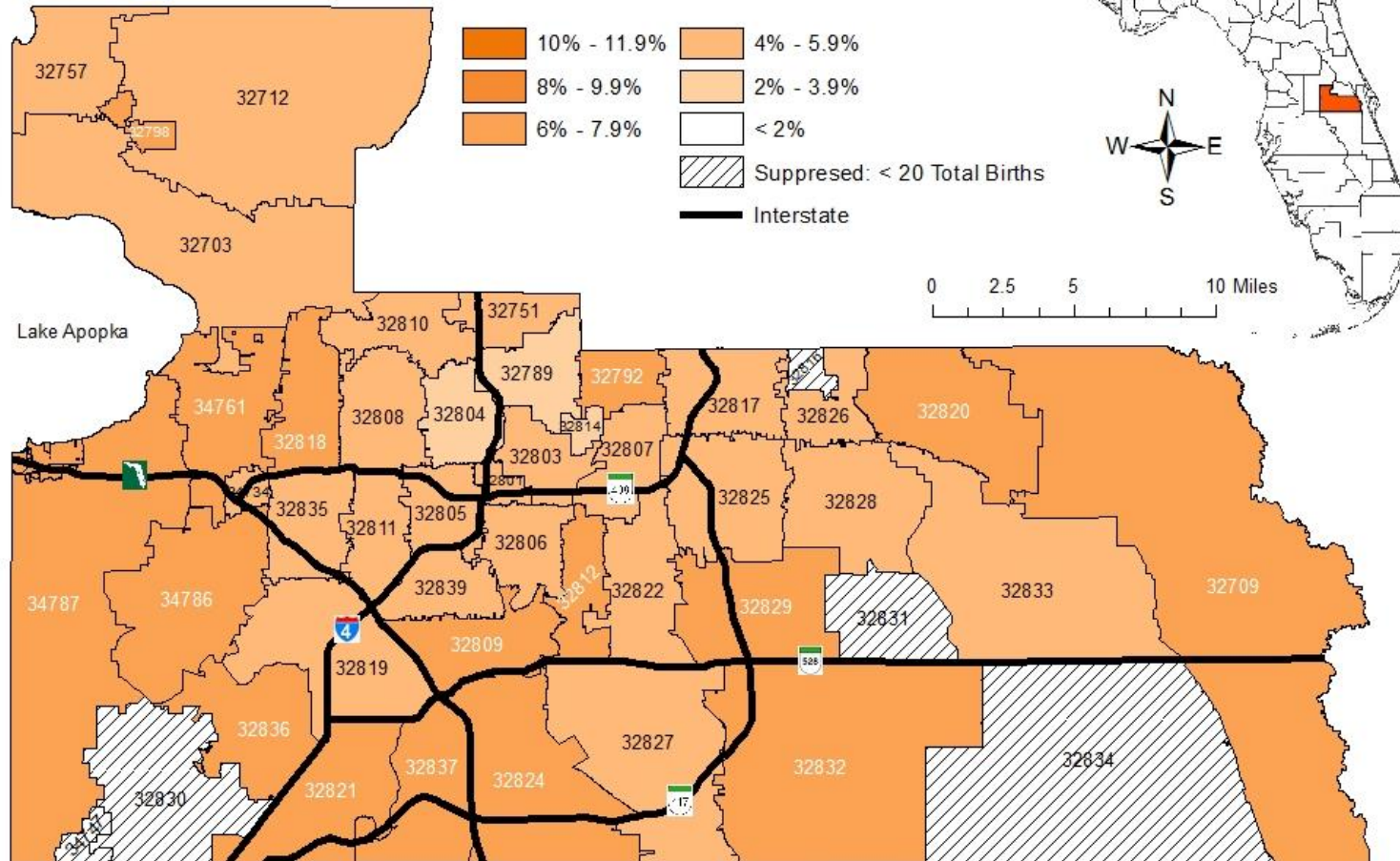
Data Source: Florida Department of Health, Bureau of Vital Statistics  
Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis





# Percent Births to Mothers with Chronic or Pregnancy-related Diabetes among All Births by Zip Code, Orange County, Florida 2009-2013

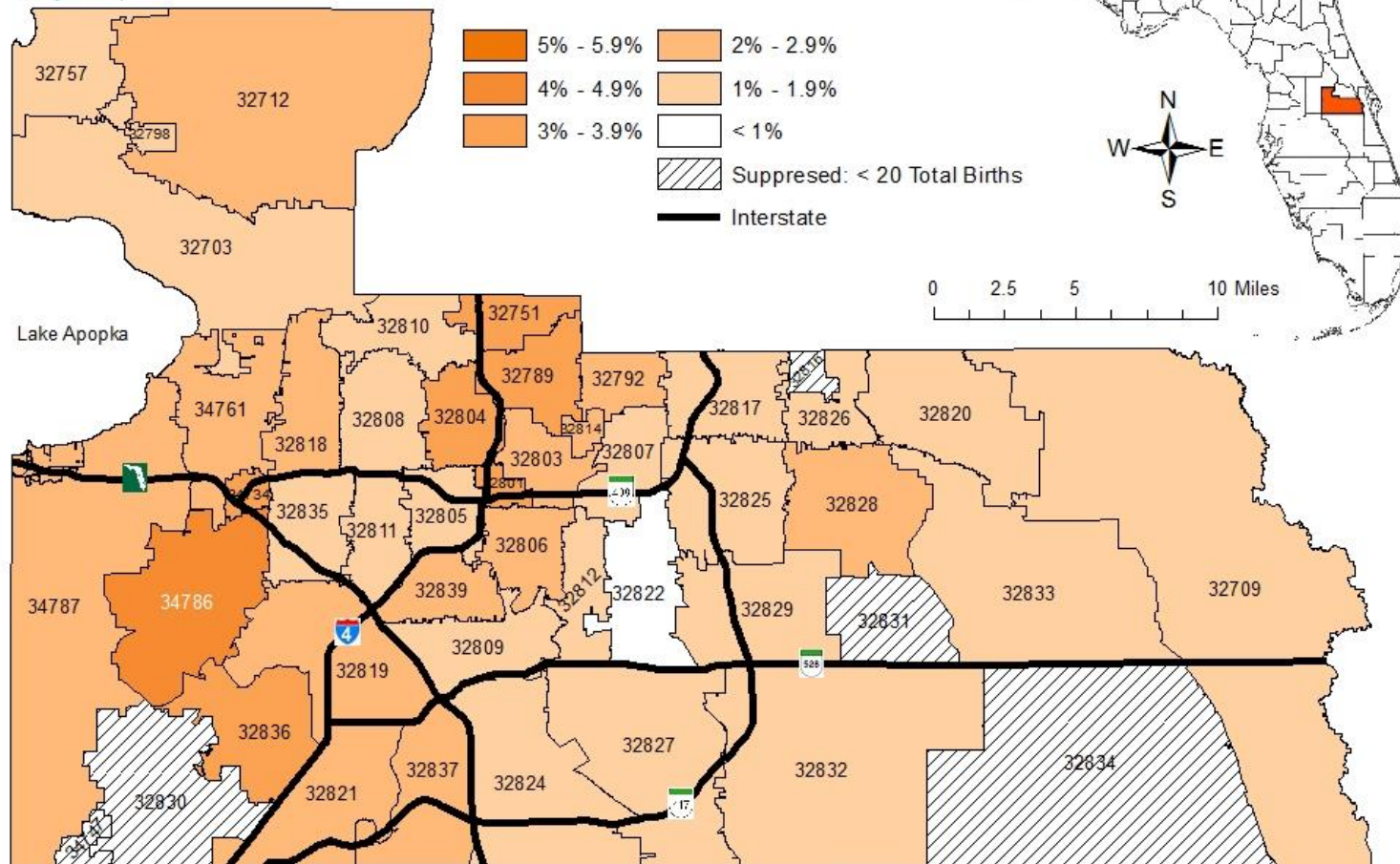


Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis



# Percent Births to Mothers with Age Greater than 40 Years among All Births by Zip Code, Orange County, Florida 2009-2013



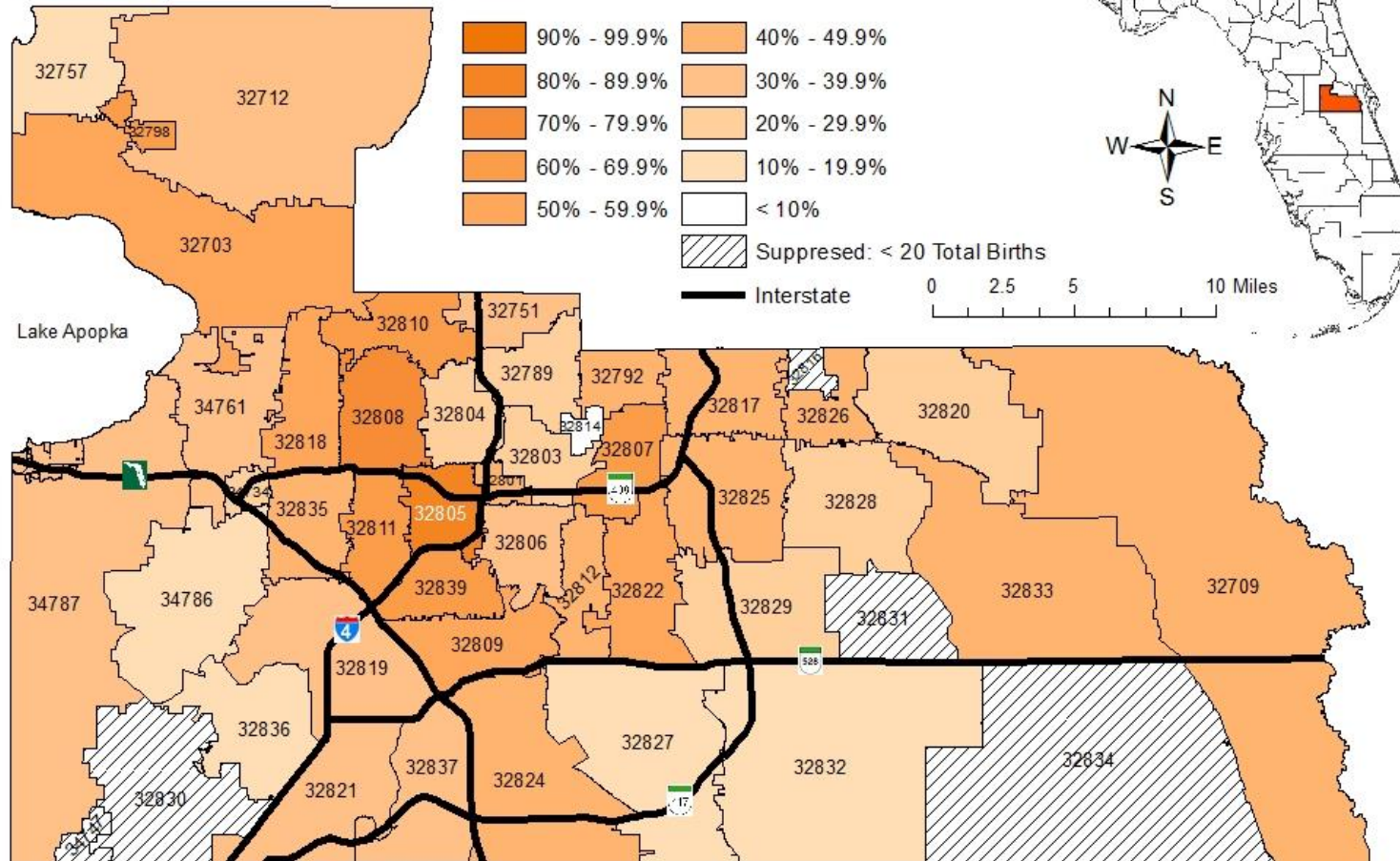
Data Source: Florida Department of Health, Bureau of Vital Statistics  
Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis





# Percent Births to Unmarried Mothers among All Births by Zip Code, Orange County, Florida 2009-2013

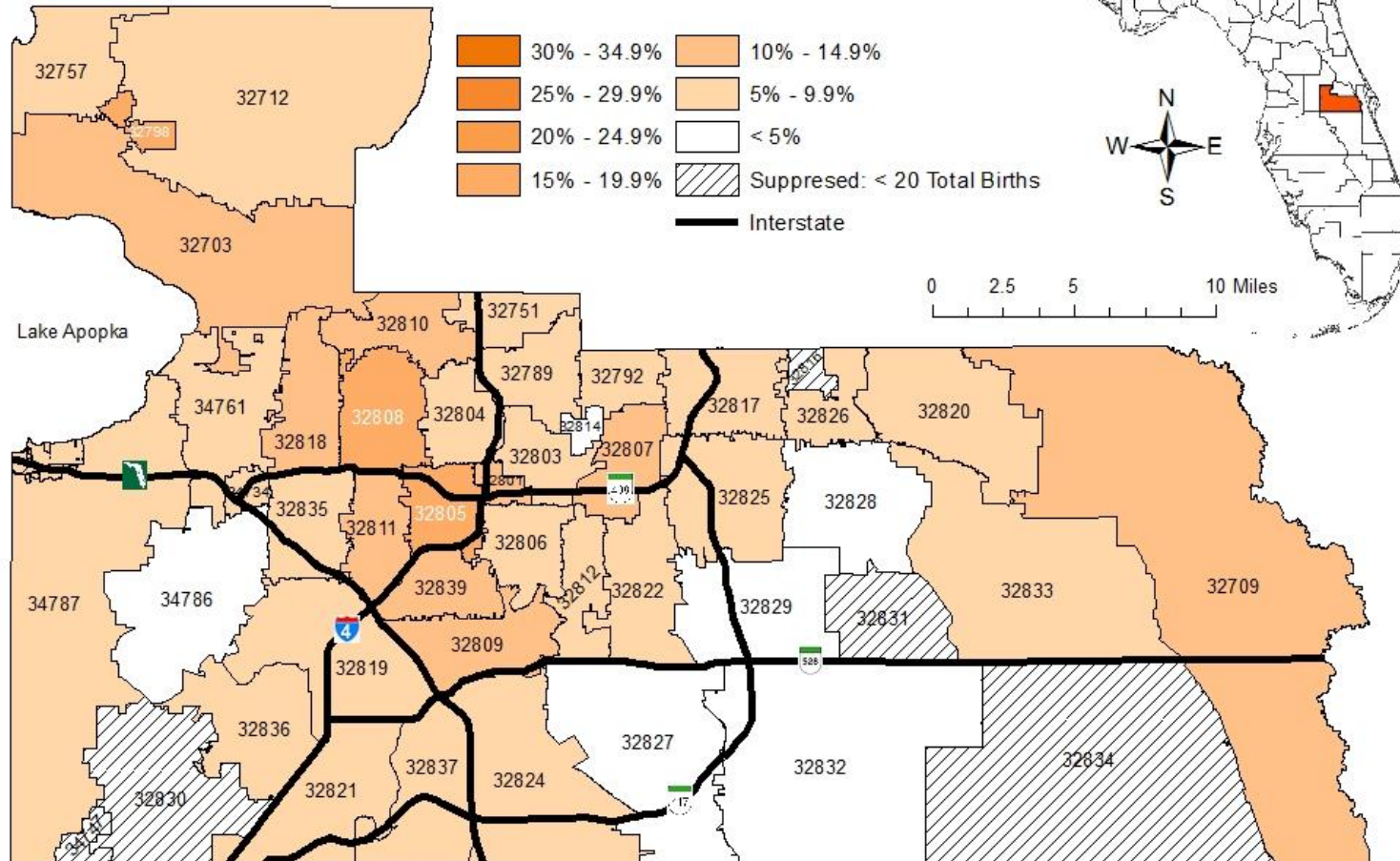


Data Source: Florida Department of Health, Bureau of Vital Statistics  
Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis



# Percent Births to Mothers that Received Inadequate Prenatal Care (Kotelchuck) among All Births by Zip Code, Orange County, Florida 2009-2013



Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

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## Appendix C – Prematurity Risk Factor Analysis among Births to Mothers of Low Socioeconomic Status (<12 Years Education) in Orange County, Florida 2009-2013

Table C1. Risk factors for prematurity among births to mothers of low socioeconomic status by Zip Code (min. 20 total births), Orange County, Florida 2009-2013.

Zip Code	Mortality Rate per 1,000 Births	Total Births (N)	Very Preterm Birth (< 32 Weeks) (%)	Inadequate Maternal Weight Gain during Pregnancy (%)	Chronic or Pregnancy-related Hypertension (%)	Maternal Pre Pregnancy Body Mass Index $\geq 25$ (%)	Previous Preterm Birth (%)	Chronic or Pregnancy-related Diabetes (%)	Maternal Age $> 40$ Years (%)	Unmarried Maternal Status (%)	Inadequate Prenatal Care (Kotelchuck) (%)
32833	33.33	60	3.33	21.67	5.00	36.7	1.67	5.00	0.00	75.0	33.3
32801	32.26	62	3.23	32.26	11.29	48.4	0.00	4.84	0.00	82.3	32.3
32806	23.53	85	4.71	21.18	5.88	41.2	1.18	3.53	0.00	85.9	16.5
32826	19.61	102	1.96	14.71	1.96	43.1	1.96	1.96	0.00	83.3	16.7
32812	18.60	215	3.72	20.00	6.05	43.3	0.93	6.51	0.93	82.3	14.0
32807	18.22	439	3.42	20.50	7.06	41.7	1.37	4.78	0.91	79.5	17.8
32835	16.88	237	2.95	20.25	7.17	38.0	2.11	4.64	0.84	77.6	17.7
32809	16.77	656	2.90	30.03	7.16	44.1	2.90	5.18	1.83	71.8	15.6
32817	16.26	123	0.81	14.63	5.69	31.7	0.81	0.81	1.63	79.7	15.5
34787	13.42	447	4.70	21.92	7.38	43.2	2.68	2.46	1.34	75.6	20.6
32825	13.11	305	3.28	21.97	6.23	40.3	0.98	4.26	0.66	80.7	19.3
32805	12.95	695	5.47	27.77	11.22	45.8	3.02	3.60	1.29	88.9	25.3
32811	12.05	664	3.46	25.00	9.64	41.0	3.01	3.46	2.26	81.2	22.6
32819	11.90	84	3.57	20.24	4.76	36.9	1.19	7.14	2.38	67.9	19.0
32703	10.91	825	1.94	24.48	6.06	42.1	3.03	4.73	1.21	74.4	21.3
32839	10.52	1236	3.96	27.99	9.30	51.7	1.78	6.39	2.91	72.9	15.1
32808	10.45	1148	2.70	25.70	8.01	41.4	2.70	3.31	1.83	82.9	25.0
32822	10.29	486	2.88	18.11	5.35	40.7	2.26	5.76	0.82	77.6	18.9
32824	10.26	195	2.05	24.10	5.13	41.0	0.51	6.67	1.03	73.3	11.3

Note: Caution should be used in interpretation of analysis due to lower number of births as compared to Table B1.

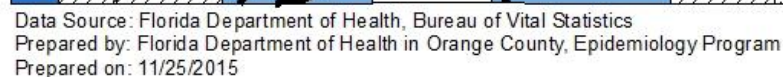
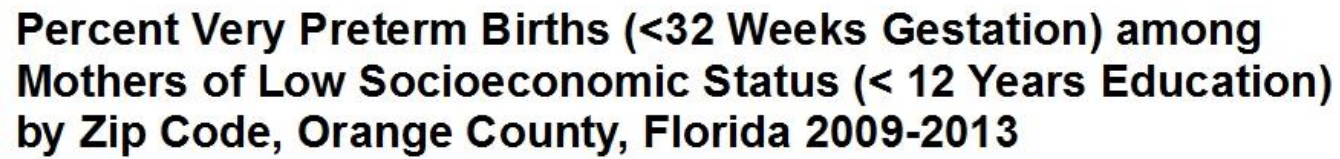


Table C1 (continued). Risk factors for prematurity among births to mothers of low socioeconomic status by Zip Code (min. 20 total births), Orange County, Florida 2009-2013.

Zip Code	Mortality Rate per 1,000 Births	Total Births (N)	Very Preterm Birth ( $< 32$ Weeks) (%)	Inadequate Maternal Weight Gain during Pregnancy (%)	Chronic or Pregnancy-related Hypertension (%)	Maternal Pre Pregnancy Body Mass Index $\geq 25$ (%)	Previous Preterm Birth (%)	Chronic or Pregnancy-related Diabetes (%)	Maternal Age $> 40$ Years (%)	Unmarried Maternal Status (%)	Inadequate Prenatal Care (Kotelchuck) (%)
32810	10.00	400	2.25	21.50	6.75	39.5	3.00	3.25	0.75	82.5	20.8
32828	7.14	140	0.71	20.00	7.14	38.6	0.00	5.71	0.71	72.1	17.9
32818	5.93	675	3.41	24.59	7.41	42.8	1.93	4.59	2.37	72.0	21.5
34761	5.60	536	1.87	26.31	6.16	45.7	2.61	5.78	0.75	64.6	18.5
32712	1.98	506	2.17	22.53	5.14	40.9	2.17	5.53	0.99	68.0	21.2
32832	0.00	23	0.00	26.09	0.00	21.7	0.00	0.00	0.00	65.2	30.4
32709	0.00	20	0.00	20.00	10.00	35.0	0.00	0.00	0.00	85.0	30.0
32803	0.00	41	7.32	21.95	7.32	41.5	0.00	2.44	0.00	65.9	29.3
32821	0.00	40	2.50	27.50	7.50	27.5	0.00	5.00	2.50	57.5	27.5
32804	0.00	38	2.63	31.58	7.89	23.7	5.26	10.53	2.63	63.2	26.3
32798	0.00	53	3.77	11.32	5.66	47.2	3.77	7.55	3.77	75.5	20.8
32836	0.00	39	0.00	35.90	7.69	41.0	0.00	5.13	5.13	41.0	20.5
32820	0.00	55	1.82	12.73	9.09	30.9	1.82	1.82	0.00	65.5	20.0
32789	0.00	72	2.78	20.83	4.17	38.9	4.17	1.39	2.78	75.0	19.4
34786	0.00	23	0.00	8.70	8.70	30.4	0.00	4.35	4.35	56.5	17.4
32751	0.00	41	2.44	39.02	7.32	41.5	2.44	7.32	0.00	92.7	17.1
32837	0.00	184	0.54	28.80	10.33	40.2	1.63	8.15	2.17	61.4	14.7
32792	0.00	110	5.45	20.00	10.00	40.9	1.82	1.82	0.00	74.5	13.6
32829	0.00	58	3.45	24.14	8.62	41.4	1.72	1.72	1.72	56.9	12.1

Note: Caution should be used in interpretation of analysis due to lower number of births as compared to Table B1.

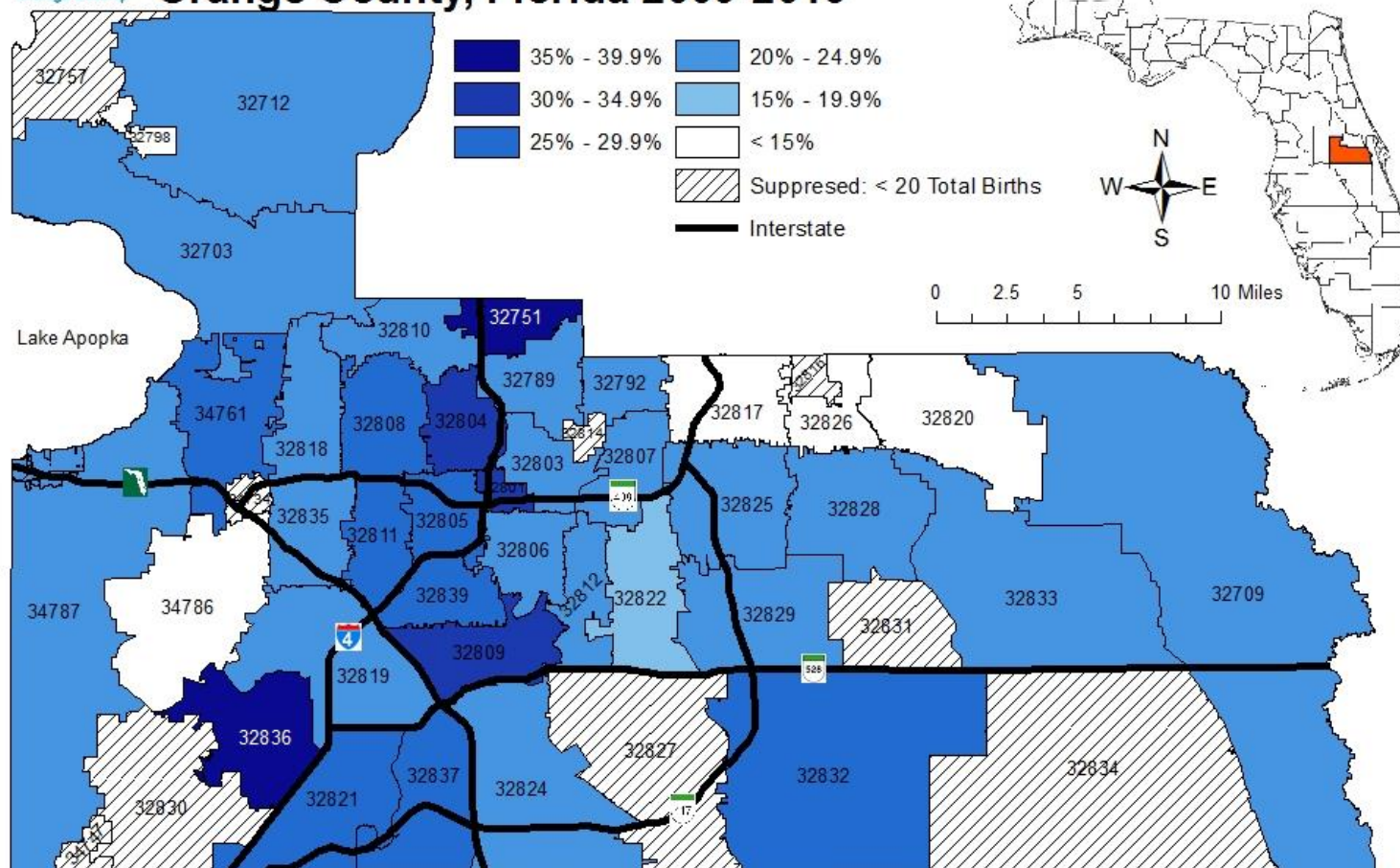




Produced as part of the 2015 Perinatal Periods of Risk Analysis



# **Percent Births to Mothers with Inadequate Weight Gain during Pregnancy among Mothers of Low Socioeconomic Status (< 12 Years Education) by Zip Code, Orange County, Florida 2009-2013**



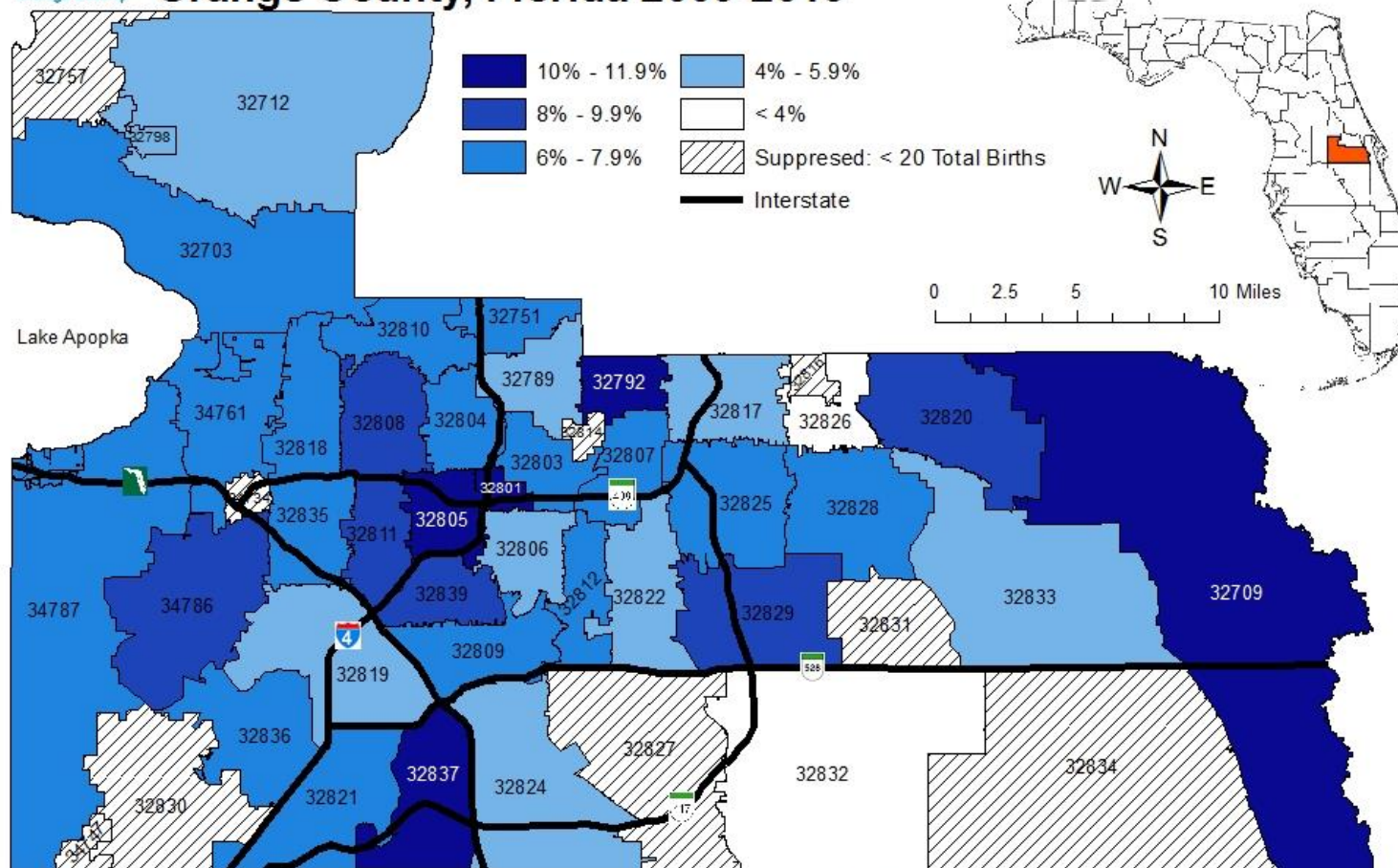
Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis





# Percent Births to Mothers with Chronic or Pregnancy-related Hypertension among Mothers of Low Socioeconomic Status (< 12 Years Education) by Zip Code, Orange County, Florida 2009-2013

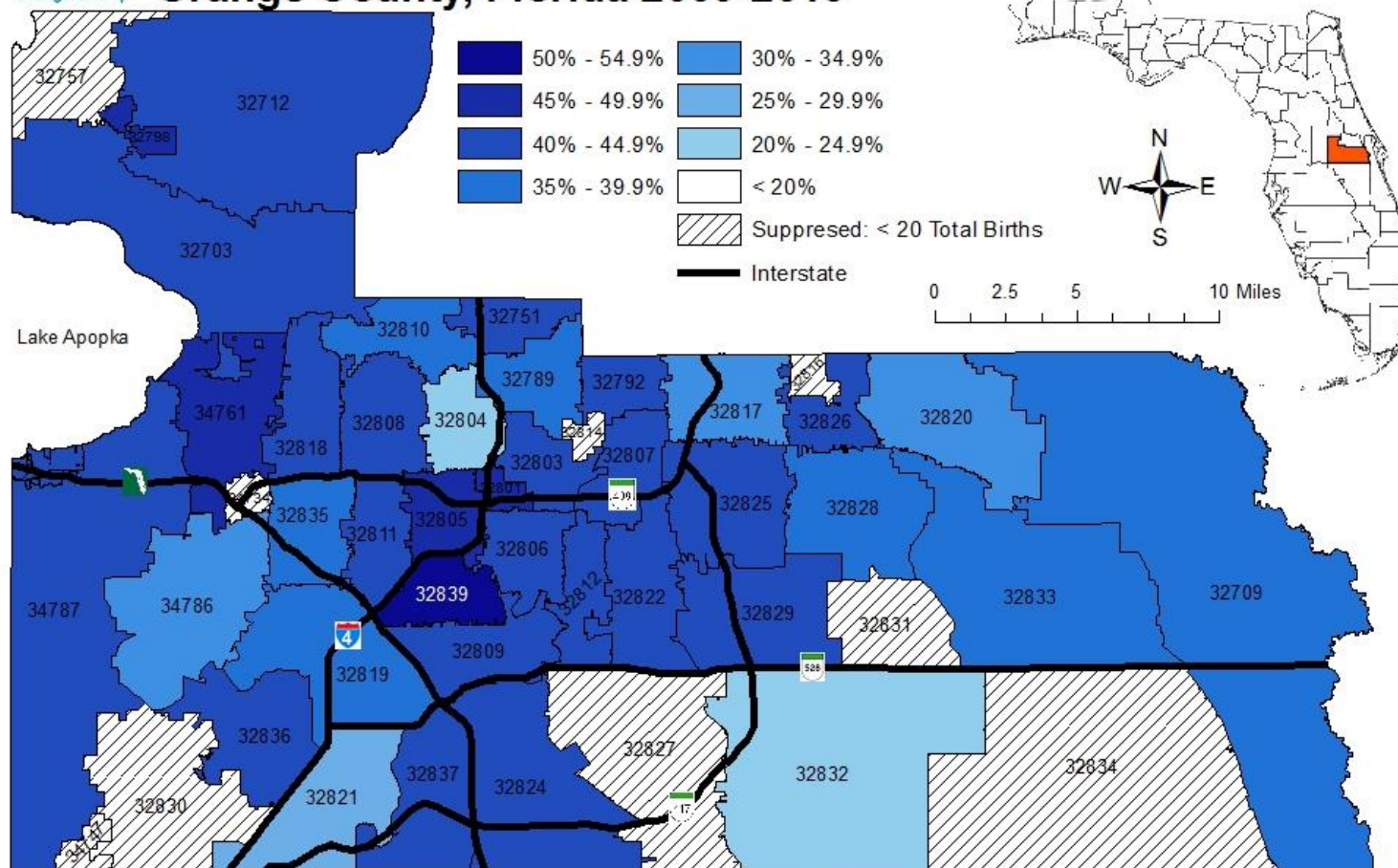


Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis



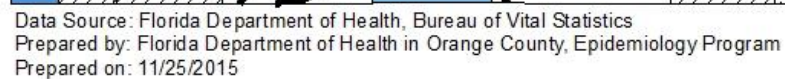
# Percent Births to Mothers with Pre Pregnancy Body Mass Index Greater or Equal to 25 among Mothers of Low Socioeconomic Status (< 12 Years Education) by Zip Code, Orange County, Florida 2009-2013



Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis

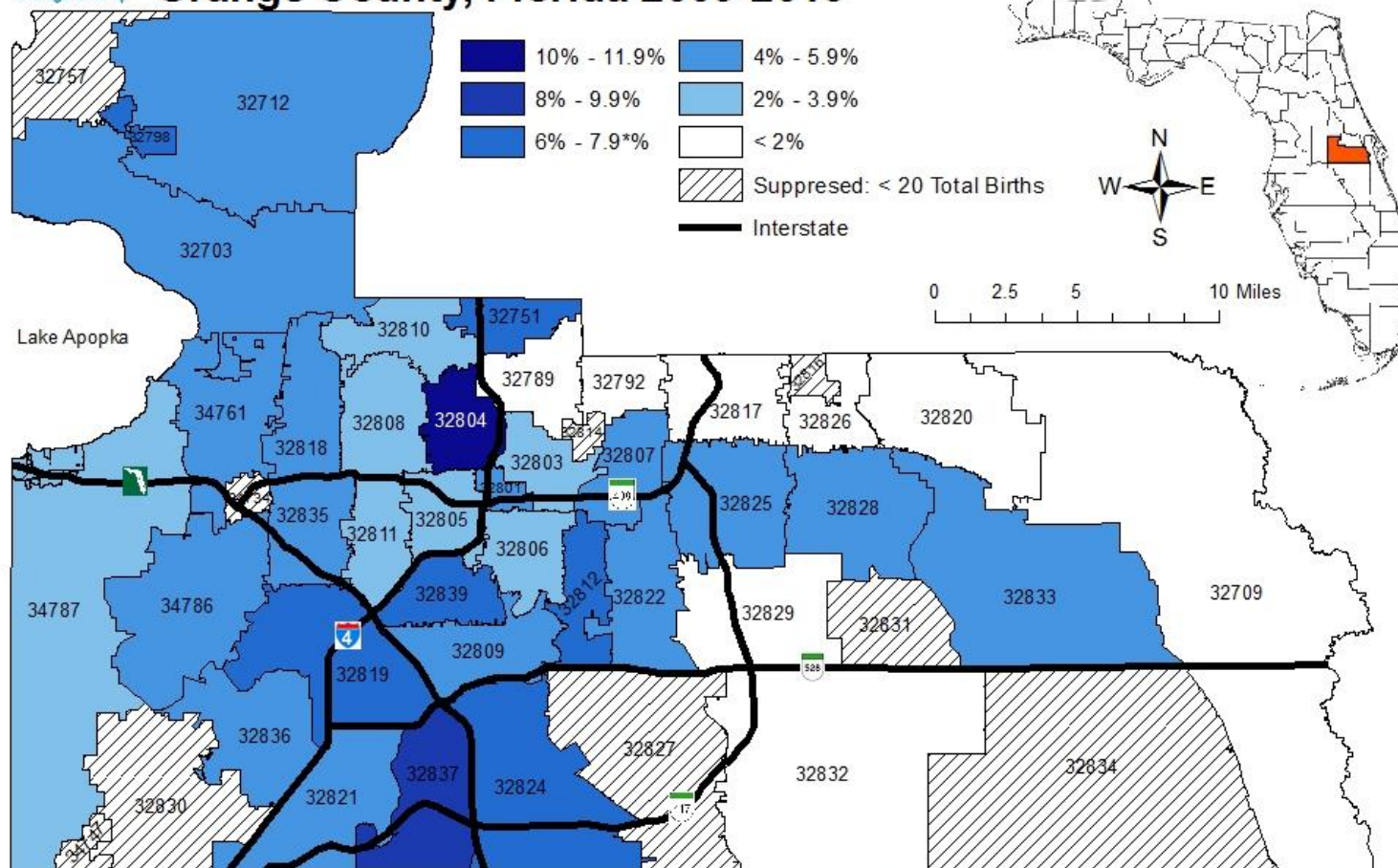




Produced as part of the 2015 Perinatal Periods of Risk Analysis



# Percent Births to Mothers with Chronic or Pregnancy-related Diabetes among Mothers of Low Socioeconomic Status (< 12 Years Education) by Zip Code, Orange County, Florida 2009-2013



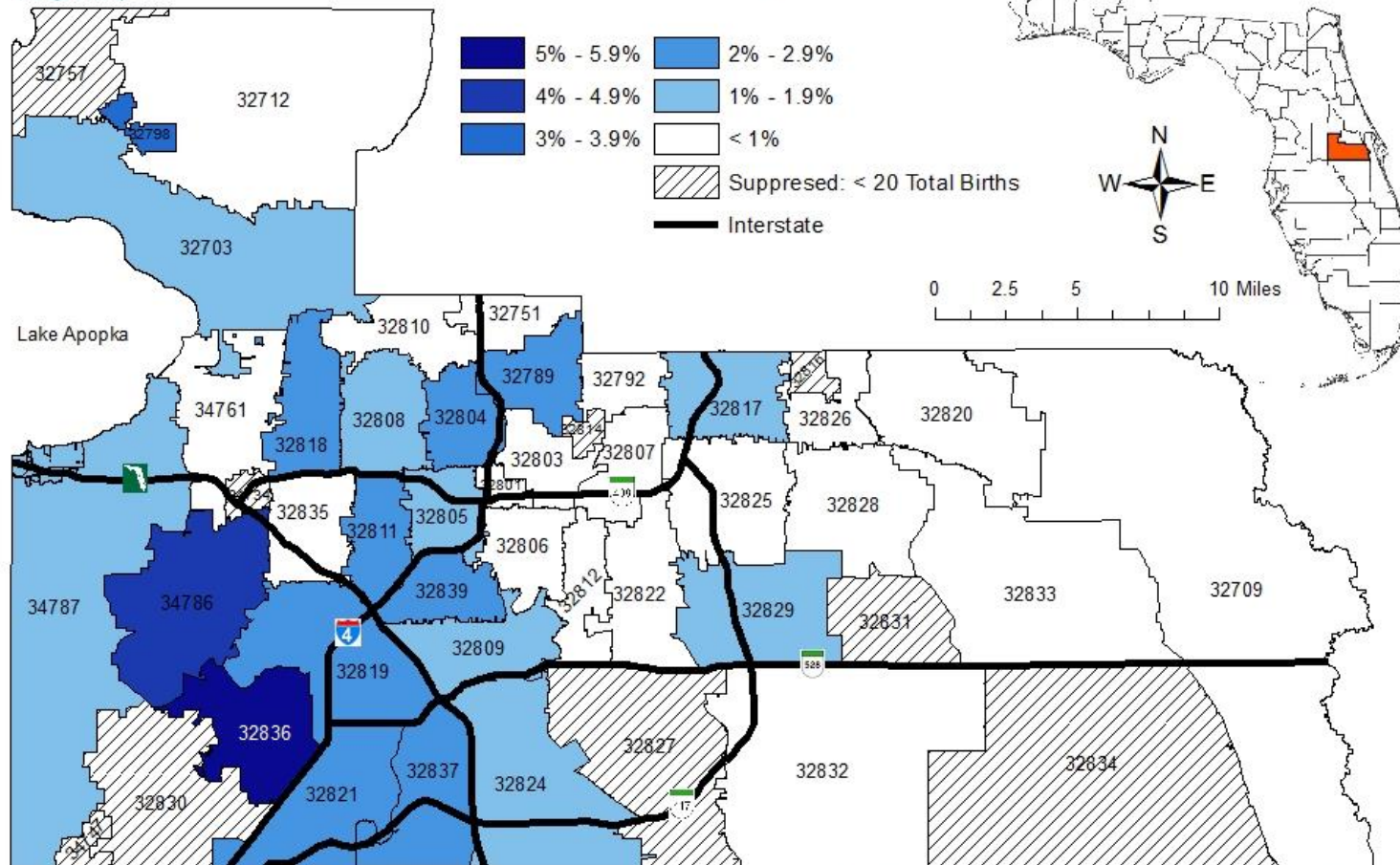
Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis





# **Percent Births to Mothers with Age Greater than 40 years among Mothers of Low Socioeconomic Status (< 12 Years Education) by Zip Code, Orange County, Florida 2009-2013**

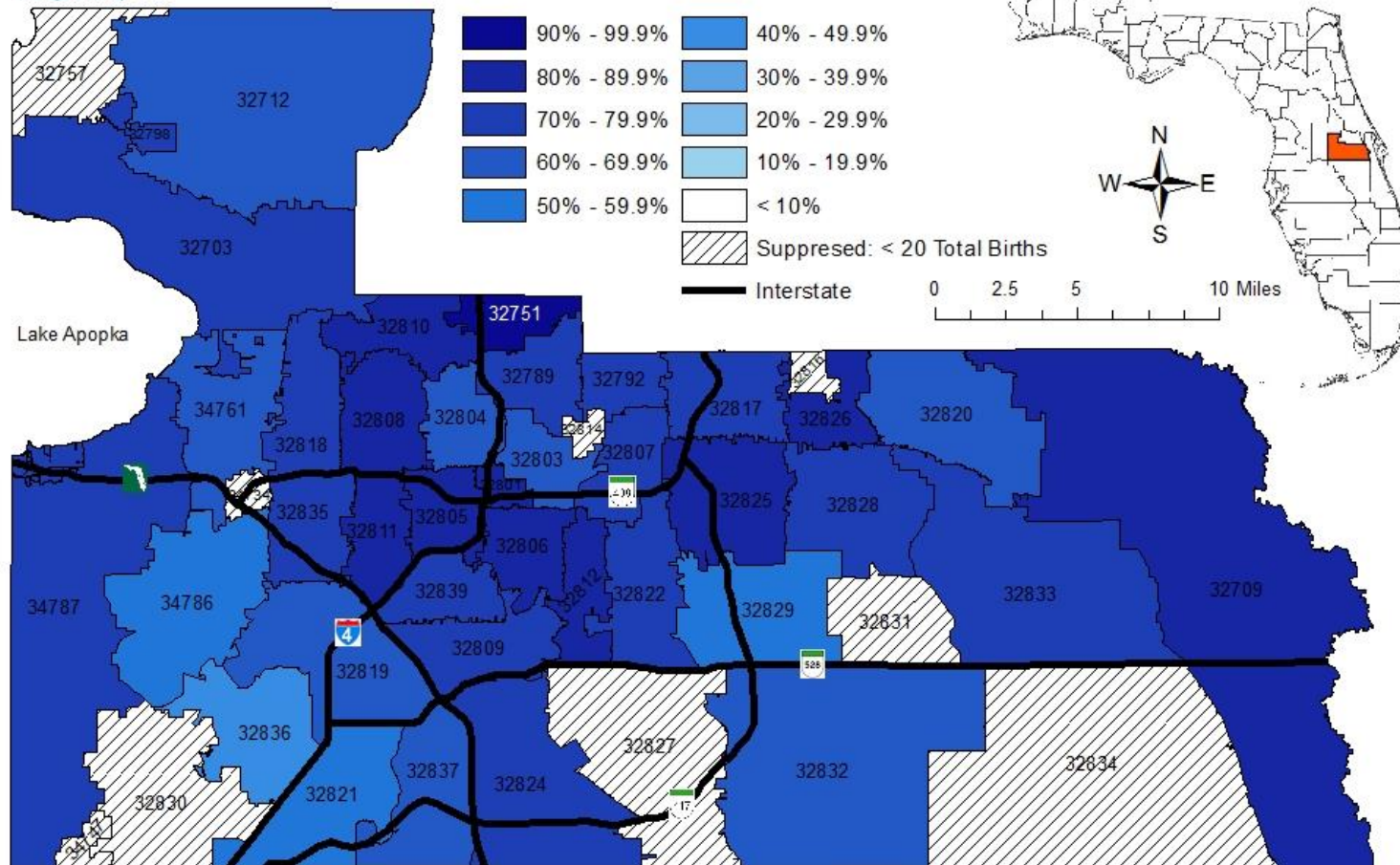


Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

Produced as part of the 2015 Perinatal Periods of Risk Analysis



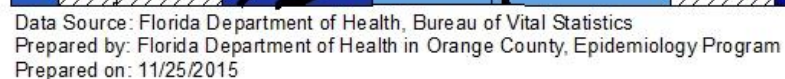
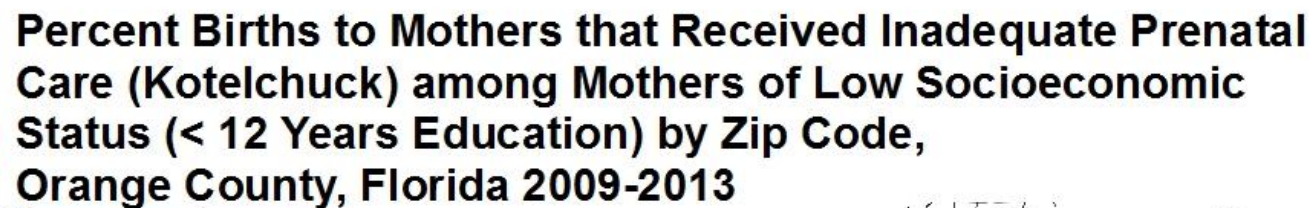
## Percent Births to Unmarried Mothers among Mothers of Low Socioeconomic Status (< 12 Years Education) by Zip Code, Orange County, Florida 2009-2013



Data Source: Florida Department of Health, Bureau of Vital Statistics  
 Prepared by: Florida Department of Health in Orange County, Epidemiology Program  
 Prepared on: 11/25/2015

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