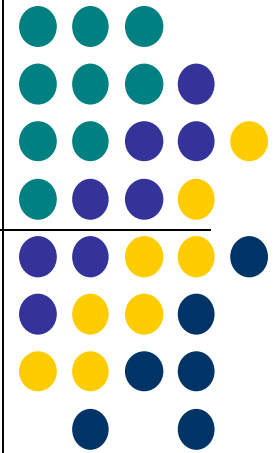


Assessing Prenatal Risk Screening and Severe Maternal Morbidity in Florida 2010-2014



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



Presentation Outline



- Background
- Study Questions
- Data Source and Methods
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- Limitations
- Conclusions
- Public Health Implications
- References

Background



- Severe maternal morbidity (SMM) is associated with a high rate of preventability, similar to that of maternal mortality.¹ It also can be considered a near miss for maternal mortality.¹
- SMM affected more than 65,000 women in the United States in 2016.²
- SMM includes unexpected outcomes of labor and delivery that result in significant short-or long-term consequences to a woman's health.³

Background Continued



- To identify delivery hospitalizations with SMM, CDC uses administrative hospital discharge data and International Classification of Diseases (ICD) diagnosis and procedure codes.³
- Between 2010 and 2013, the rate of SMM in Florida was 162.4 per 10,000 delivery hospitalizations, and the US rate for 2010 and 2011 was 162.7⁴


Background Continued




- Florida's Prenatal Risk Screening Instrument is a questionnaire used to identify women at risk for preterm or low birth weight, or other high risk conditions.
- Florida law mandates that all women be offered the Prenatal Risk Screen at their first prenatal visit.
- A score on the screen of 6 or more indicates that the pregnant woman is at risk for a poor birth outcome, and is automatically referred to Care Coordination.

Background Continued





Help your baby have a healthy start in life!



Please answer the following questions to find out if anything in your life could affect your health or your baby's health. Your answers are **confidential**. You may qualify for free services from the Healthy Start Program or the Healthy Families Program, no matter what your income level is! (Please complete in ink.)*

Today's Date: _____

<ol style="list-style-type: none"> 1. Have you graduated from high school or received a GED? <input type="checkbox"/> YES <input type="checkbox"/> NO 2. Are you married now? <input type="checkbox"/> YES <input type="checkbox"/> NO 3. Are there any children at home younger than 5 years old? <input type="checkbox"/> YES <input type="checkbox"/> NO 4. Are there any children at home with medical or special needs? <input type="checkbox"/> YES <input type="checkbox"/> NO 5. Is this a good time for you to be pregnant? <input type="checkbox"/> YES <input type="checkbox"/> NO 6. In the last month, have you felt down, depressed or hopeless? <input type="checkbox"/> YES <input type="checkbox"/> NO 7. In the last month, have you felt alone when facing problems? <input type="checkbox"/> YES <input type="checkbox"/> NO 8. Have you ever received mental health services or counseling? <input type="checkbox"/> YES <input type="checkbox"/> NO 9. In the last year, has someone you know tried to hurt you or threaten you? <input type="checkbox"/> YES <input type="checkbox"/> NO 10. Do you have trouble paying your bills? <input type="checkbox"/> YES <input type="checkbox"/> NO 	<ol style="list-style-type: none"> 11. What race are you? Check one or more. <input type="checkbox"/> White <input type="checkbox"/> Black <input type="checkbox"/> Other _____ 12. In the last month, how many alcoholic drinks did you have per week? _____ drinks, <input type="checkbox"/> did not drink 13. In the last month, how many cigarettes did you smoke a day? (a pack has 20 cigarettes) _____ cigarettes, <input type="checkbox"/> did not smoke 14. Thinking back to just before you got pregnant, did you want to be.....? <input type="checkbox"/> pregnant now <input type="checkbox"/> pregnant later <input type="checkbox"/> not pregnant 15. Is this your first pregnancy? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, give date your last pregnancy ended: Date: (month/year) _____ 16. Please mark any of the following that have happened. <input type="checkbox"/> Had a baby that was not born alive <input type="checkbox"/> Had a baby born 3 weeks or more before due date <input type="checkbox"/> Had a baby that weighed less than 5 pounds, 8 ounces <input type="checkbox"/> None of the above
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PATIENT INFORMATION	Name: First _____ Last _____ M.I. _____ Social Security Number: _____ Date of Birth (mo/day/yr): _____ 17. Age: <input type="checkbox"/> <18
	Street address (apartment complex name/number): _____ County: _____ City: _____ State: _____ Zip Code: _____
	Prenatal Care covered by: <input type="checkbox"/> Medicaid <input type="checkbox"/> Private Insurance _____ <input type="checkbox"/> No Insurance <input type="checkbox"/> Other _____ Best time to contact me: _____ Phone #1 _____ Phone #2 _____

I authorize the exchange of my health information between the Healthy Start Program, Healthy Start Providers, Healthy Start Coalitions, Healthy Families Florida, WIC, Florida Department of Health, and my health care providers for the purposes of providing services, paying for services, improving quality of services or program eligibility. This authorization remains in effect until revoked in writing by me.

Patient Signature: _____ Date: _____

Please initial: _____ Yes _____ No I also authorize specific health information to be exchanged as described above, which includes any of my mental health, TB, alcohol/drug abuse, STD, or HIV/AIDS information.

* If you do not want to participate in the screening process, please complete the patient information section only and sign below:
Signature: _____ Date: _____

PROVIDER ONLY	LMP (mo/day/yr): _____ EDD (mo/day/yr): _____ 18. Pre-Pregnancy: Wt: _____ lbs. Height: _____ ft. _____ in. BMI: _____ <input type="checkbox"/> < 18.5 <input type="checkbox"/> > 35.0
	Provider's Name: _____ Provider's ID: _____ 19. Pregnancy Interval Less Than 18 Months? <input type="checkbox"/> N/A <input type="checkbox"/> No <input type="checkbox"/> Yes
	Provider's Phone Number: _____ Provider's County: _____ 20. Trimester at 1st Prenatal Visit? _____ <input type="checkbox"/> 1st <input type="checkbox"/> 2nd
	21. Does patient have an illness that requires ongoing medical care? Specify illness: _____ <input type="checkbox"/> No <input type="checkbox"/> Yes
	Healthy Start Screening Score: _____ Check One: <input type="checkbox"/> Referred to Healthy Start. If score <6, specify: _____ <input type="checkbox"/> Not Referred to Healthy Start.

Provider's/Interviewer's Signature and Title _____ Date (mo/day/yr) _____

DH 3134, 04/08, stock number 5744-100-3134-7 Distribution of copies: WHITE & YELLOW—County Health Department in county where screening occurred
PINK—Retained in patient's record GREEN—Patient's Copy



Study Questions



- What is the association between the prenatal risk screening score and SMM in women residing in Florida who had a singleton live birth during 2010-2014?
- What other risk factors are associated with SMM in Florida for the period 2010-2014?

Data Source and Methods



Predictor Measure: **Prenatal Risk Screening Score** from Florida Department of Health (Maternal and Child Health Section).

- A score on the screen of 6 or more indicates that the pregnant woman is at risk for a poor birth outcome.
- Other Risk Factors: Variables From Birth Certificate data, Florida Department of Health.

Data Source and Methods



Outcome measure: **Severe Maternal Morbidity**

- Delivery hospitalizations: Hospital discharge data from the Agency for Health Care Administration (Florida's Medicaid Agency) were linked to birth certificate data and prenatal screening data.
- Delivery hospitalizations with ≥ 1 SMM identified using 25 ICD-9-CM code-based categories and 24 ICD-9-CM code-based categories.
- A cross-sectional study design was used.
- Stata/SE 14.2 was used for the analysis.

Data Source and Methods



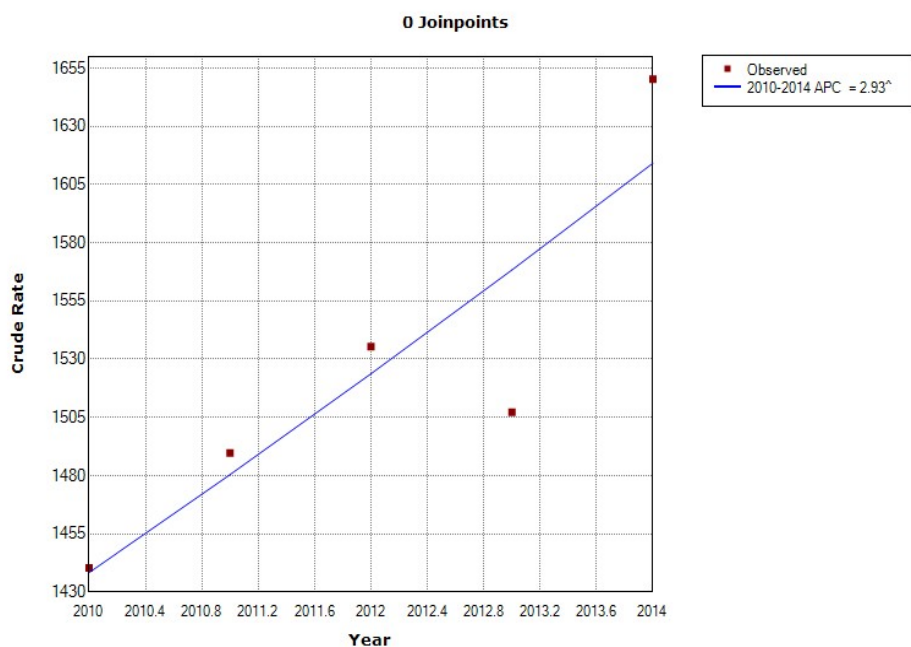
Florida hospital discharge data (2010-2014)	N = 982,167 (100.0%)
Florida residents: hospital discharge data linked to births records	N = 979,669 (99.7%)
Delivery hospitalizations identified	N = 972,128 (99.0%)
Florida residents: hospital discharge, births records, and prenatal screening linkage	N = 746,846 (76.0%)
Florida residents: hospital discharge, births records, and prenatal screening linkage for singletons	N = 722,912 (74.0%)

Results



Maternal Morbidity Trend Analysis 25 Conditions, FL 2010-2014

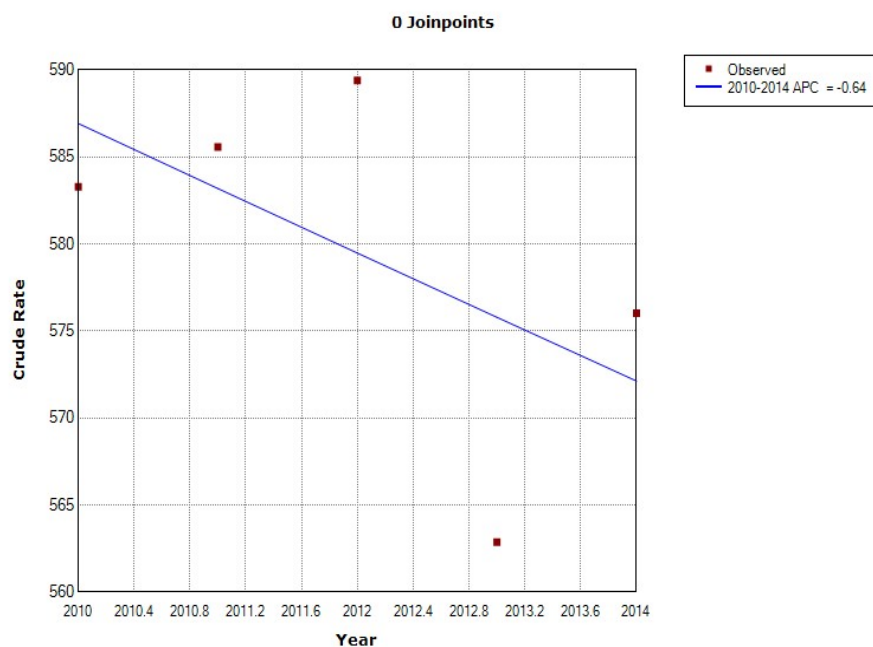
Maternal Morbidity Trend Analysis 24 Conditions, FL 2010-2014



SMM 25 conditions

2010=144.0
2011=149.0
2012=153.5
2013=150.7
2014=165.0

Overall Rate=152.4



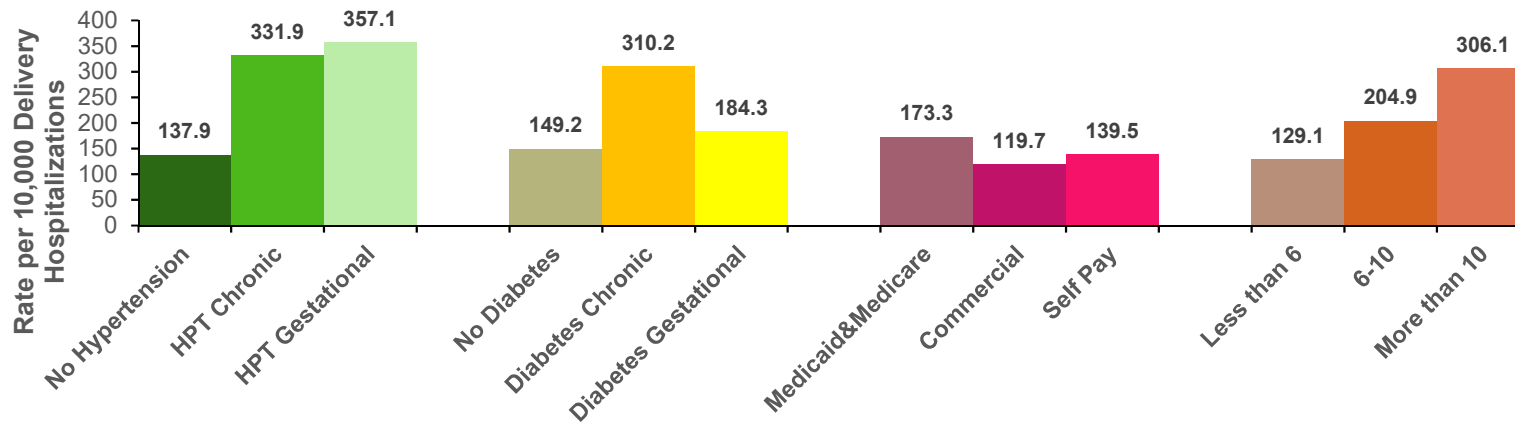
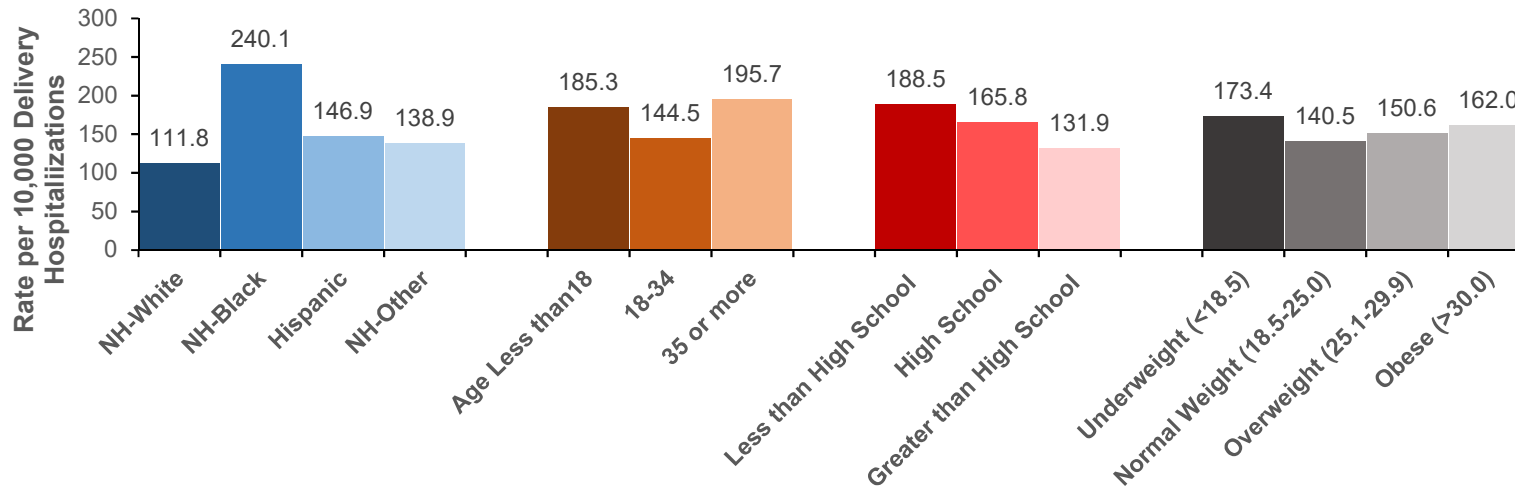
SMM 24 conditions

2010=58.3
2011=58.6
2012=58.9
2013=56.3
2014=57.6

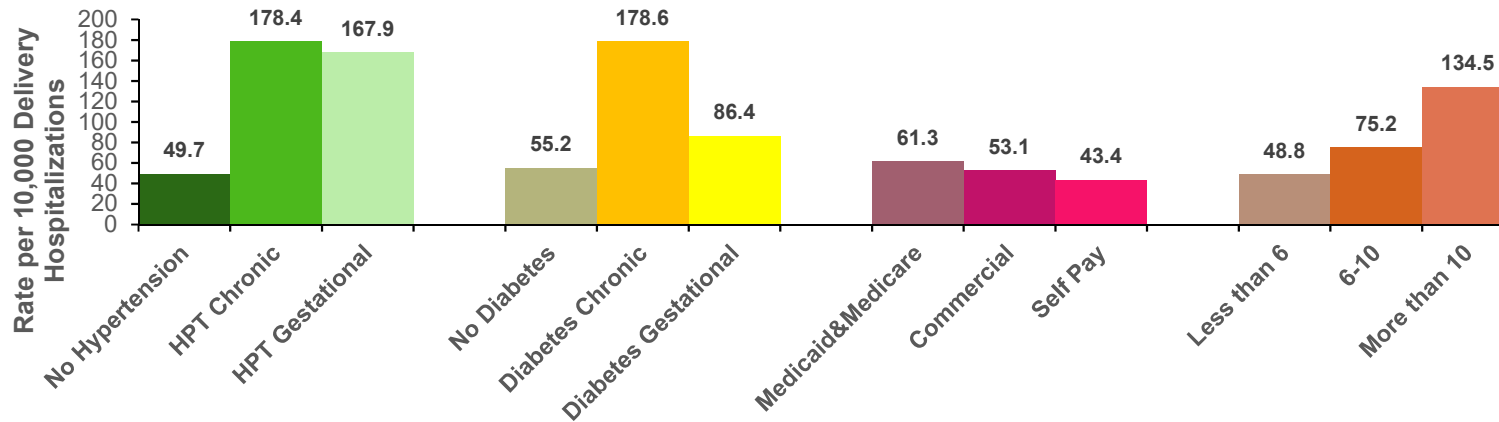
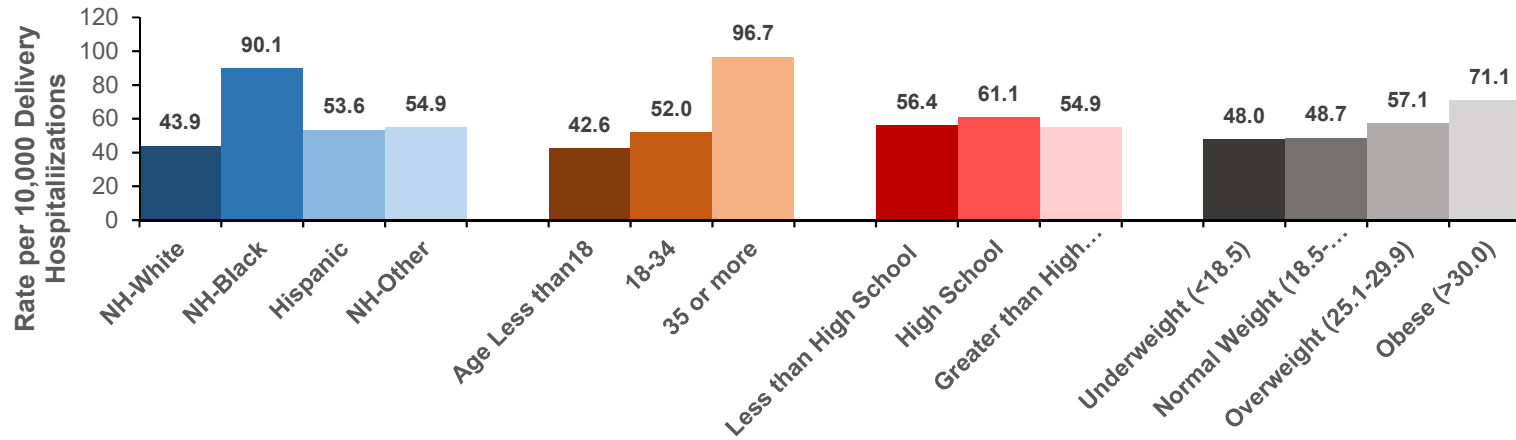
Overall Rate=57.9



Results: Severe Maternal Morbidity Rates By Demographic and Maternal Characteristics, FL 2010-2014 (25 Conditions)



Results: Severe Maternal Morbidity Rate By Demographic and Maternal Characteristics, FL 2010-2014 (24 Conditions)



Results



Frequency and Rates of Five Most Common SMM Indicators, FL 2010-2014

Name (#) 25 Conditions	Rate per 10,000 Delivery Hosp.	Name (#) 24 Conditions	Rate per 10,000 Delivery Hosp.
Blood transfusion (7,248)	100.26	Heart failure during procedure/surgery (662)	9.16
Heart failure during procedure/surgery (662)	9.16	Operation on heart and pericardium (562)	7.77
Operation on heart and pericardium (562)	7.77	Disseminate intravascular coagulation (537)	7.43
Disseminate intravascular coagulation (537)	7.43	Hysterectomy (530)	7.33
Hysterectomy (530)	7.33	Ventilation	5.59



Results



Severe Maternal Morbidity (25 Conditions)¹

	Crude Risk Ratio (CRR) (95% CI)	Adjusted Risk Ratio (ARR) (95% CI)
Risk Screening Score (6-9)	1.6 (1.5-1.7)*	1.2 (1.1-1.2)*
Risk Screening Score (10 or more)	2.4 (2.2-2.5)*	1.5 (1.4-1.6)*

¹/ Model 1 25 conditions, adjusted by race/ethnicity, maternal age, maternal education, smoke during pregnancy, body mass index, hypertension, diabetes, payer. * P<0.05



Results



Severe Maternal Morbidity (24 Conditions)²

	Crude Risk Ratio (CRR) (95% CI)	Adjusted Risk Ratio (CRR) (95% CI)
Risk Screening Score (6-9)	1.5 (1.4-1.7)*	1.3 (1.2-1.4)*
Risk Screening Score (10 or More)	2.8 (2.5-3.1)*	1.9 (1.7-2.2)*

²/ Model 2 24 conditions, adjusted by race/ethnicity, maternal age, marital status, smoke during pregnancy, parity, hypertension, diabetes, payer. * P <0.05



Results



Other Factors and Severe Maternal Morbidity

Demographics	CPR (95% CI) 25 Conditions	APR (95% CI) 25 Conditions	CPR (95% CI) 24 Conditions	APR (95% CI) 24 Conditions
NH Black /Ref: NH White	2.1 (2.1-2.3)*	1.7 (1.6-1.8)*	2.0 (1.9-2.2)*	1.6 (1.5-1.8)*
Hispanic /Ref: NH White	1.3 (1.2-1.4)*	1.2 (1.2-1.3)*	1.2 (1.1-1.3)*	1.2 (1.1-1.3)*
NH Other /Ref: NH White	1.3 (1.2-1.4)*	1.2 (1.1-1.3)*	1.3 (1.1-1.5)*	1.2 (1.0-1.4)*
Less than 18 Years /Ref: 18-34	1.3 (1.1-1.4)*	0.9 (0.8-1.0)	0.8 (0.6-1.0)	0.7 (0.6-0.9)*
35 Years or Older /Ref:18-34	1.4 (1.3-1.4)*	1.4 (1.3-1.5)*	1.9 (1.7-2.0)*	1.7 (1.6-1.9)*
Less than High School /Ref: HS	1.1 (1.1-1.2)*	1.1 (1.0-1.1)*	0.9 (0.8-1.0)	-
More than High School /Ref: HS	0.8 (0.8-0.8)*	0.9 (0.9-1.0)*	0.9 (0.8-1.0)*	-
Single /Ref: Married	1.3 (1.3-1.4)*	-	1.0 (1.0-1.1)	0.9 (0.8-1.0)*



Results



Other Factors and Severe Maternal Morbidity

Health and Social	CRR (95% CI) 25 Conditions	ARR (95% CI) 25 Conditions	CRR (95% CI) 24 Conditions	ARR (95% CI) 24 Conditions
Underweight /Ref: Normal Weight	1.2 (1.1-1.3)*	1.2 (1.1-1.3)*	-	-
Overweight /Ref: Normal Weight	1.1 (1.0-1.1)*	-	1.2 (1.1-1.3)*	-
Obese /Ref: Normal Weight	1.2 (1.1-1.2)*	0.9 (0.8-0.9)*	1.5 (1.4-1.6)*	-
Smoke Yes /Ref: No	0.8 (0.8-0.9)*	0.8 (0.8-0.9)*	0.9(0.8-0.9)*	0.9 (0.8-1.0)*
Previous Live Birth /Ref: First LB	1.1 (1.0-1.1)*	-	1.2 (1.1-1.3)*	1.1 (1.0-1.2)*
Medicaid-Medicare /Ref: Private	1.4 (1.4-1.5)*	1.2 (1.2-1.3)*	1.2 (1.1-1.2)*	1.1 (1.0-1.2)*
Self Pay /Ref: Private	1.2 (1.0-1.3)*	-	-	0.8 (0.6-1.0)*
Other Insurance/Ref: Private	1.3 (1.2-1.5)*	1.3 (1.1-1.4)*	-	1.2 (1.0-1.5)*



Results



Other Factors and Severe Maternal Morbidity

Health	CRR (95% CI) 25 Conditions	ARR ¹ (95% CI) 25 Conditions	CRR (95% CI) 24 Conditions	ARR ² (95% CI) 24 Conditions
Chronic Hypertension /Ref: No HPT	2.4 (2.2-2.7)*	1.9 (1.7-2.1)*	3.6 (3.1-4.1)*	2.4 (2.1-2.8)*
Gestational Hypertension /Ref: No HPT	2.6 (2.4-2.7)*	2.5 (2.3-2.6)*	3.4 (3.1-3.7)*	3.1 (2.8-3.4)*
Chronic Diabetes /Ref: No Diabetes	2.1 (1.8-2.4)*	1.5 (1.3-1.8)*	3.2 (2.7-3.9)*	1.9 (1.6-2.3)*
Gestational Diabetes /Ref: No Diabetes	1.2 (1.1-1.3)*	1.1 (1.0-1.2)*	1.6 (1.4-1.7)*	1.2 (1.1-1.3)*

1. Model 1 25 conditions, adjusted by race/ethnicity, maternal age, maternal education, smoke during pregnancy, body mass index, hypertension, diabetes, payer. 2. Model 2 24 conditions, adjusted by race/ethnicity, maternal age, marital status, smoke during pregnancy, parity, hypertension, diabetes, payer. *P<0.05

Conclusions



- For 25 conditions, a statistically significant increased trend in severe maternal morbidity was observed for the period 2010-2014.
- When excluding blood transfusions (24 conditions), a non-significant trend was observed for the period 2010-2014.
- Women with a screening score of 6 or more were more likely to have a severe maternal morbidity (24 or 25 conditions). The relationship was stronger in women with a screening score of 10 or more.

Conclusions



- Being non-Hispanic Black, 35 years or more, or having chronic or gestational hypertension, chronic or gestational diabetes were associated with a high probability of severe maternal morbidity (24 or 25 conditions).

Limitations



- The ICD-9-CM could be subject to underestimating the prevalence of SMM.
- Hospital discharge records that could not be linked to birth records.
- Hospital and birth records that could not be linked to prenatal screening records.
- These findings may not be generalizable to all women.

Public Health Implications



- All providers should explain to their pregnant patients the benefits of the prenatal risk screen as a predictor for low birth weight and preterm births and the relationship with maternal morbidity prevention.
- Increase education and public awareness about the risk factors associated with health conditions that women can face during the reproductive years, especially for women 35 years of age or greater.

References



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Thank You!

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