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# **New York State Perinatal Quality Collaborative**

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# Presentation Objectives

- **Maternal Mortality and Morbidity in New York State (NYS)**
  - Review background and NYS Maternal Mortality Review (MMR) Initiative
  - Discuss MMR results and racial disparities in maternal mortality and morbidity
  - Identify issues for focus
- **New York State Perinatal Quality Collaborative (NYSPQC)**
  - **Overview**
  - **New York State Obstetric Hemorrhage Project**
    - Review project goals, structure, progress to date and racial disparities
    - Provide next steps for ongoing plans to reduce maternal mortality and morbidity in the state

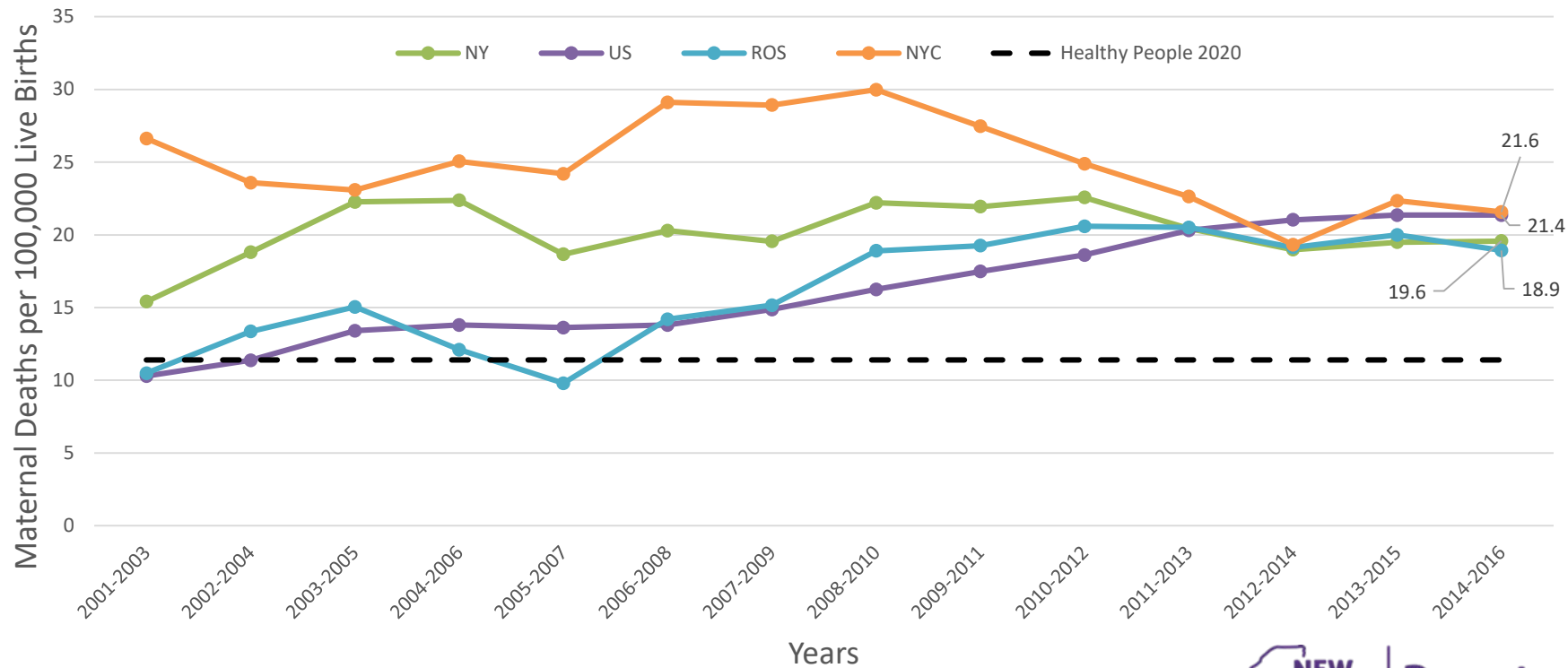


# Maternal Mortality & Morbidity in New York State (NYS)



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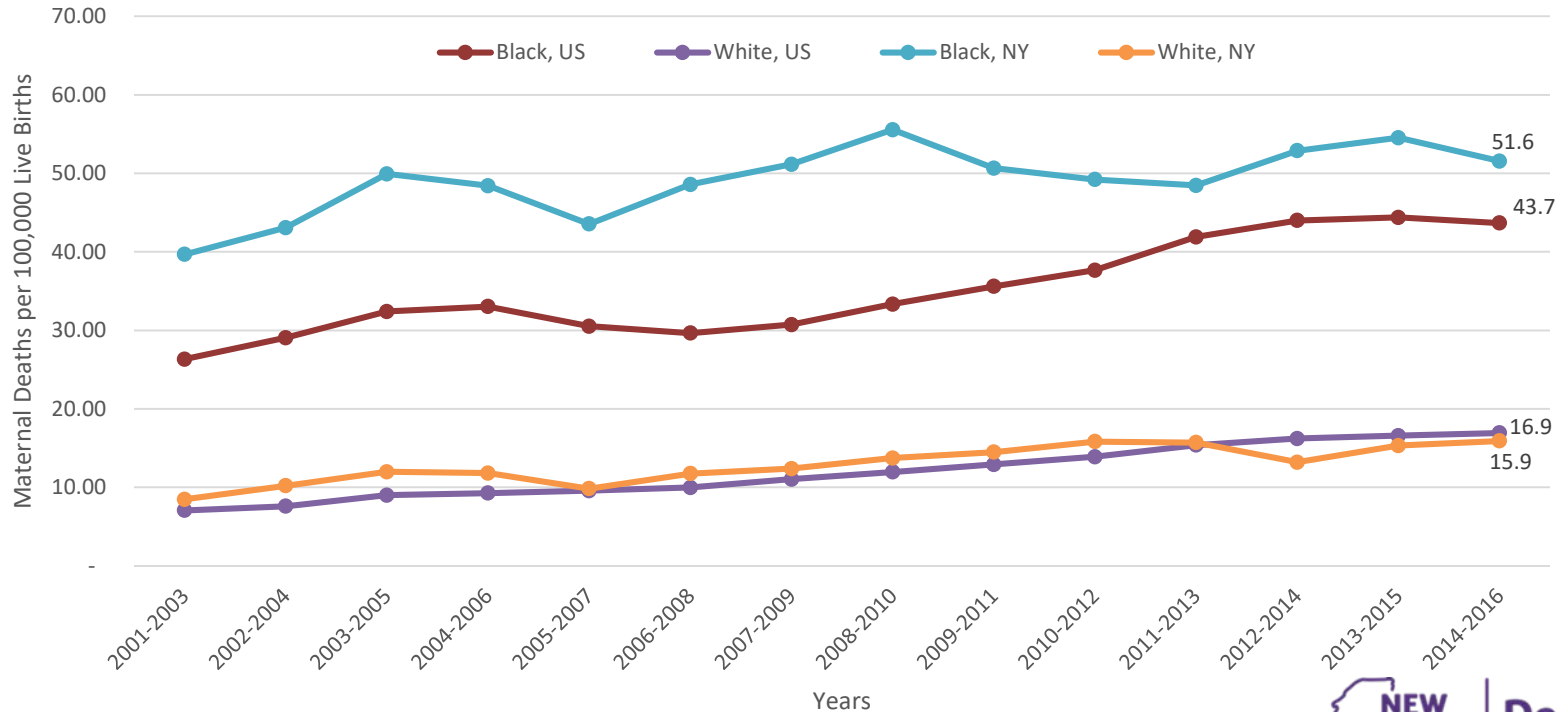
# Trends in Maternal Mortality as Reported in Vital Records\*



\*Causes of death from death records A34, O00-O95, O98-O99.

2000-2014 data from NY Vital Records. 2015 NY and national data from CDC Wonder database.

# Trends in Maternal Mortality by Race as Reported in Vital Records\*



\*Causes of death from death records A34, O00-O95, O98-O99.

National maternal mortality trends derived from CDC Wonder Database available at <https://wonder.cdc.gov/>



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# Maternal Mortality Disparities in NYS

Racial disparities in maternal deaths remain significant:

- The Black to White mortality ratio peaked in 2006 at 6 to 1;
- Decreased to 5 to 1 in 2009;
- Continued to decrease to 3.4 to 1 in 2013;
- Continued to decrease to 2.8 to 1 in 2015; and
- Continued to decrease to 2.4 to 1 in 2016.

Data from NY Vital Records.



# NYS Maternal Mortality Review Initiative (MMR)

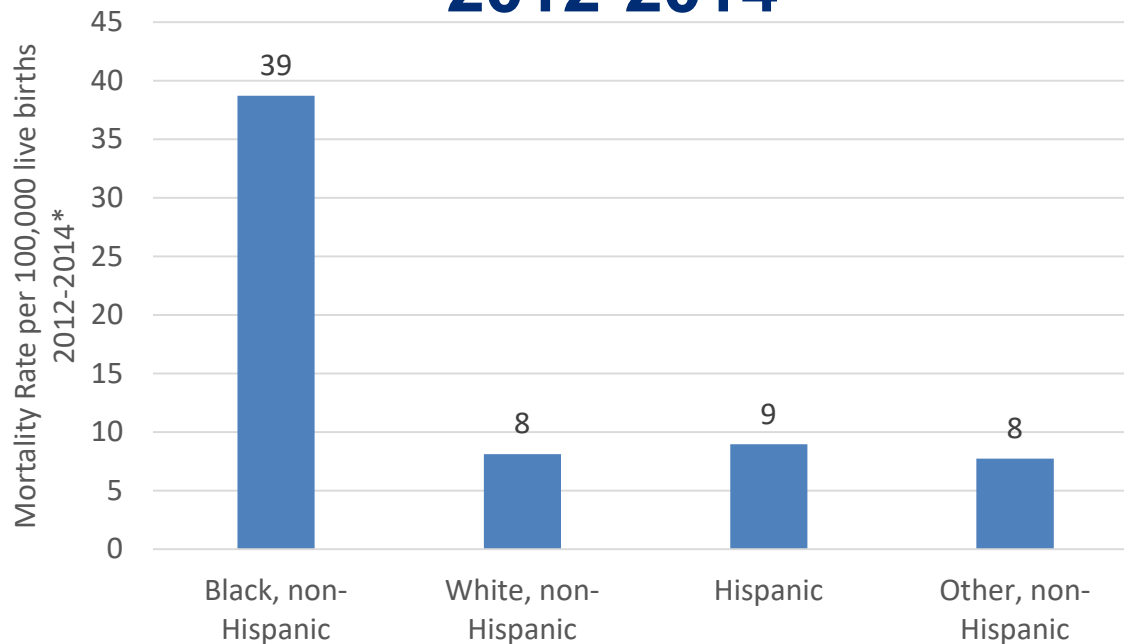
- NYS MMR aims to:
  - Maintain a comprehensive view of factors leading to maternal deaths
  - Inform interventions to reduce the risk of these deaths
- Comprehensive population based examination of maternal mortality:
  - Pregnancy Related Death (directly caused or exacerbated by pregnancy)
  - Pregnancy Associated Death (not a cause of pregnancy or illness exacerbated by pregnancy)

# MMR Results: Pregnancy Related Maternal Mortality in NYS

Pregnancy-related deaths	NYS MMR 2006-2008	NYS MMR 2012-2014*
Race disparities: Deaths per 100,000 live births	48.9 Black; 14.5 Hispanic; 6.9 White	38.7 Black; 9.0 Hispanic; 8.1 White
Pre-pregnancy weight: overweight or obese	15% overweight; 30% obese	9% overweight; 51% obese
Insurance: Medicaid	45%	65%
Method of delivery: C-section	63%	65%
Education:	14% high school graduate 11% some college, no degree	29% high school graduate 13% some college, no degree
Primary Language: English	63%	70%
Marital Status: Single; Married	48% ; 48%	48%; 43%
Parity: First time mothers	30%	29%
One previous live birth	26%	17%
2 or more previous births	33%	37%
Unknown	12%	16%



# Pregnancy-Related Mortality Rate by Race/Ethnicity 2012-2014\*



Data source: NYS Maternal Mortality Review

Mortality Rate is death per 100, 000 live births in 2012-2014

\*2014 not complete



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# Pregnancy-Related Deaths by Pre-Pregnancy Weight Status and Race/Ethnicity, 2012-2014\*

Pre-Pregnancy BMI	Total	White, Non-Hispanic	Black, Non-Hispanic	Hispanic	Other, Non-Hispanic
Thin	1 (1%)	1	0	0	0
Normal	10 (11%)	2	5	3	0
Overweight	6 (7%)	3	0	2	1
Obese	48 (52%)	12	31	5	0
Unknown	27 (29%)	10	6	5	6
<b>Total</b>	<b>92 (100%)</b>	<b>28</b>	<b>42</b>	<b>15</b>	<b>7</b>

Data source: NYS Maternal Mortality Review

\*2014 not complete



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# Cause of Death by Maternal Mortality Review Cohort

Cause of Death	2006-2008 n (%) (N=125)	2012-2014* (n) % (N=92)
Hemorrhage	<b>29(23%)</b>	<b>15(16%)</b>
Hypertensive disorders	<b>29(23%)</b>	6(7%)
Embolism (not cerebral)	<b>21(17%)</b>	<b>22(24%)</b>
Cardiovascular conditions	12(10%)	6(7%)
Other	10(8%)	4(4%)
Intracerebral hemorrhage (not associated with PIH)	5(4%)	4(4%)
Infection	4(3%)	<b>15(16%)</b>
Cardiac arrest/failure	4(3%)	2(2%)
Hematopoietic (sickle cell, thalassemia, ITP)	3(2%)	2(2%)
Pulmonary problems	3(2%)	3(3%)
Neurologic/neurovascular problems	3(2%)	2(2%)
Cardiomyopathy	2(2%)	11(12%)

Data source: NYS Maternal Mortality Review

\*2014 not complete

## Cause of Death by Race/Ethnicity, 2012-2014\*

Cause of Death	Total	White, Non-Hispanic	Black, Non-Hispanic	Hispanic	Other, Non-Hispanic
Embolism	22(24%)	7	10	3	2
Hemorrhage	15 (16%)	4	5	3	3
Infection	15 (16%)	6	5	3	1
Cardiomyopathy	11 (12%)	4	5	2	0
Hypertensive disorders	6 (7%)	2	4	0	0
Cardiovascular problems	6 (7%)	0	3	2	1
Intracerebral Hemorrhage	4 (4%)	3	1	0	0
Pulmonary Problems	3 (3%)	0	3	0	0
Neurological	2 (2%)	1	0	1	0
Cardiac arrest	2( 2%)	0	1	1	0
Hematopoietic	2 (2%)	0	2	0	0
Other	4 (4%)	1	3	0	0
<b>Total</b>	<b>92(100%)</b>	28	42	15	7

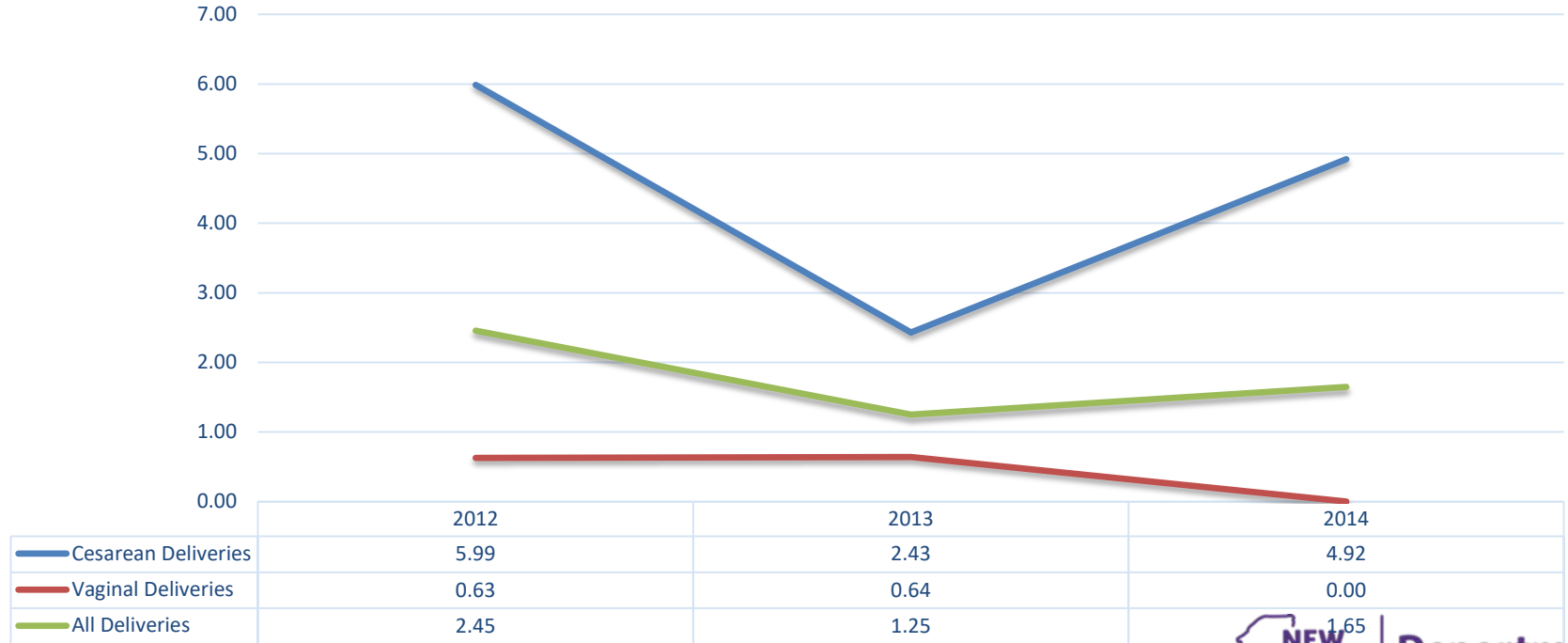
Data source: NYS Maternal Mortality Review

\*2014 not complete



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# MMR Result: Hemorrhage Mortality Rate by Delivery Type



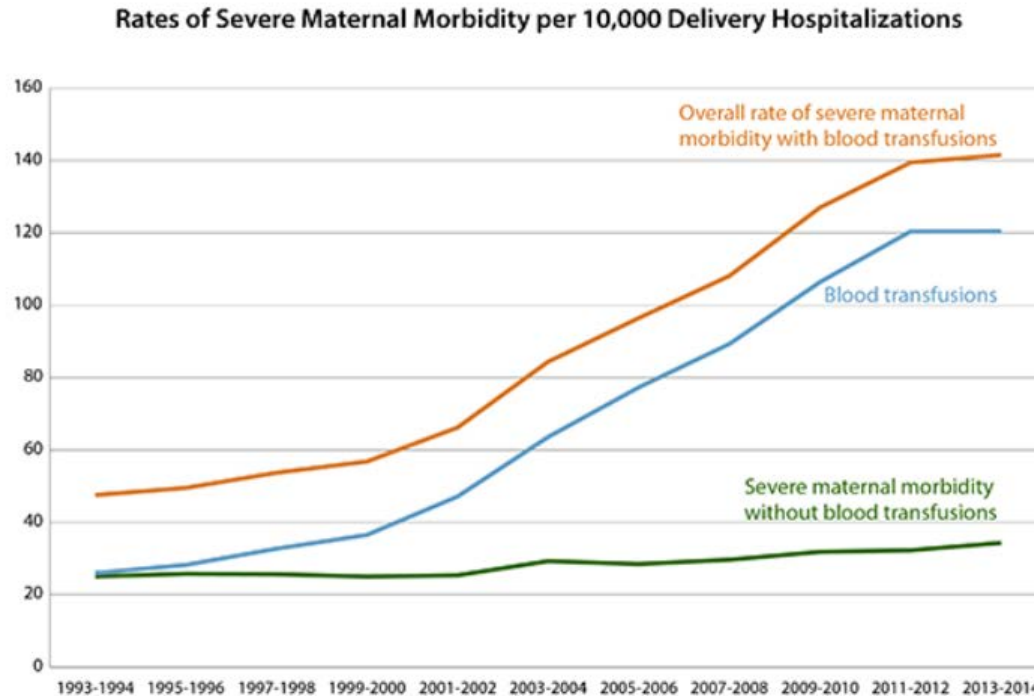
Mortality rate is deaths per 100,000 live births in a given year.



# Severe Maternal Morbidity (SMM)

Severe maternal morbidity can be thought of as unintended outcomes of the process of labor and delivery that result in significant short-term or long-term consequences to a woman's health.

# Background: SMM at National Level\*



<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html>



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# Hospital Discharge Data: Hemorrhage-Related SMM Indicators, 2016

Method of Delivery (n=number of hospital deliveries)	Indicator	Number of Cases	% of Deliveries
Cesarean (n=74,262)	Hysterectomy	253	0.34%
	RBC transfusion	2,614	3.5%
	ICU	889	1.2%
	Abruptio placenta	2,215	3%
	Morbidly adherent placenta	234	0.3%
Vaginal (n=150,773)	Hysterectomy	42	0.03%
	RBC transfusion	1,399	0.93%
	ICU	377	0.3%
	Abruptio placenta	924	0.6%
	Morbidly adherent placenta	45	0.03%

Note: A woman might have multiple hemorrhage-related SMM indicators.



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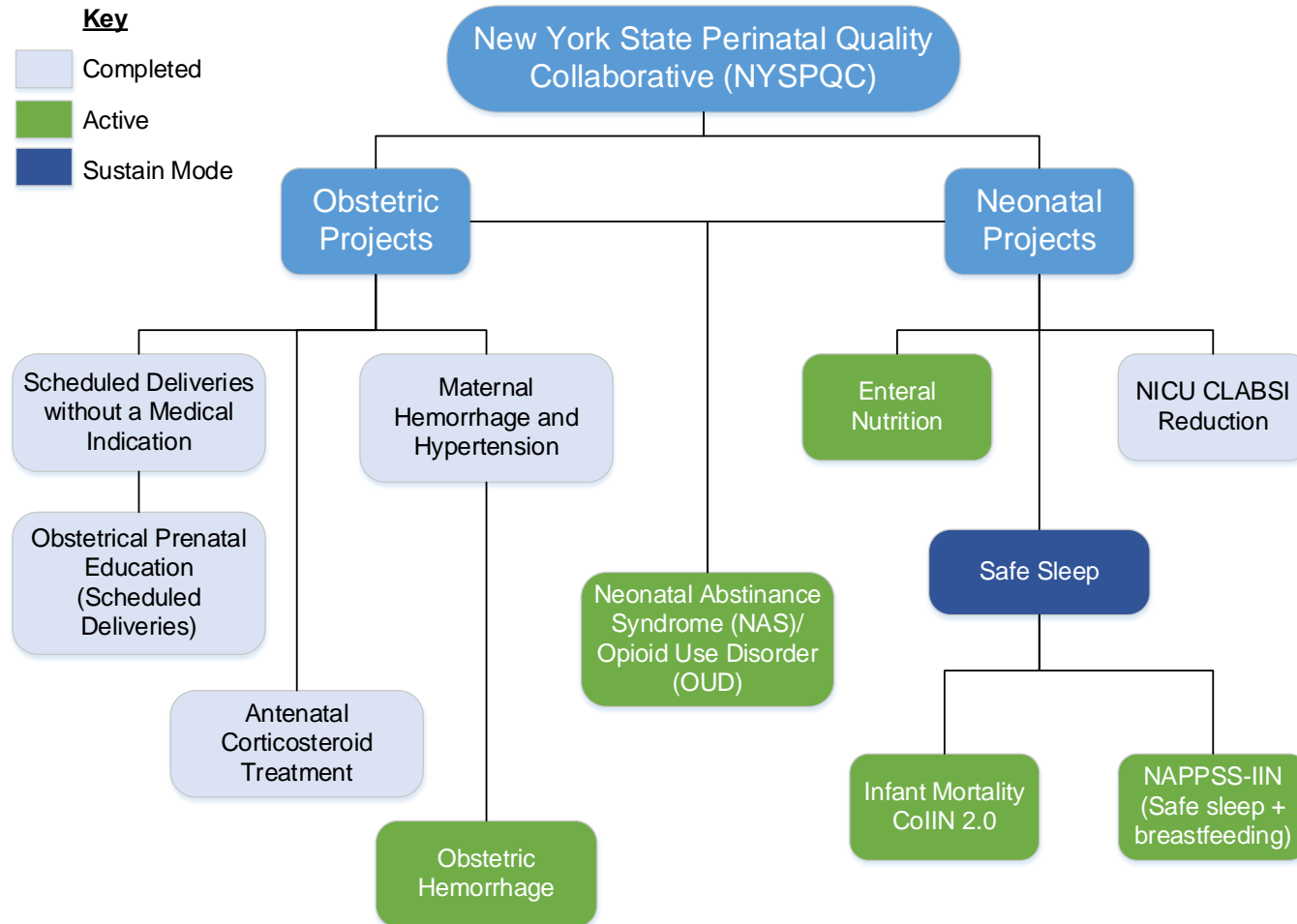
# Summary

- Black mothers had the highest pregnancy related mortality rate (39%) based on 2012-2014\* NYS MMR data, while the other race/ethnicity groups had similar rates (8%-9%).
- An increasing majority of pregnancy-related deaths were covered by Medicaid.
- One of the leading causes of death is obstetric hemorrhage.
- Mortality rate due to obstetric hemorrhage was higher for cesarean deliveries than that for vaginal deliveries.
- Cesarean deliveries had a higher percentage of hemorrhage-related SMM indicators.

# New York State Perinatal Quality Collaborative (NYSPQC)

The NYSPQC aims to provide the best and safest care for women and infants in NYS by collaborating with birthing hospitals, perinatal care providers, professional organizations and other key stakeholders to prevent and minimize harm through the translation of evidence-based guidelines to clinical practice.





# NYS Obstetric Hemorrhage Project

# Project Goal

- To reduce maternal morbidity and mortality statewide by translating evidence-based guidelines into clinical practice to improve the assessment and management of obstetric hemorrhage.
- Specific focus is being given to:
  - Increasing hemorrhage risk assessment on admission to the birth hospitalization, as well as in the postpartum period; and
  - Reducing racial disparities in obstetric hemorrhage related morbidity and mortality.

# Project Leadership



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New York State

nyspQc

Perinatal Quality Collaborative



ACOG

The American College of  
Obstetricians and Gynecologists

District II



Always There for Healthcare



NICHQ National Institute  
for Children's  
Health Quality



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# Project Development Process

- NYSDOH NYSPQC worked with partner organizations to:
  - Develop recruitment materials including:
    - Recruitment and Pre-work Package;
    - Driver Diagrams;
    - Current Practices Survey;
    - Project measures; and
    - Data collection forms
  - Develop educational curriculum schedule and presentations for in-person Learning Sessions and monthly Coaching Call webinars
  - Select and convene Clinical Advisory Work Group members, who provide feedback on all materials



# Clinical Advisory Work Group

- A multi-disciplinary group of providers representing a range of birthing hospitals from across the state
- Provide clinical and quality improvement expertise in program development, measurement strategy, implementation, evaluation and sustainability





# Quality Improvement Methodology

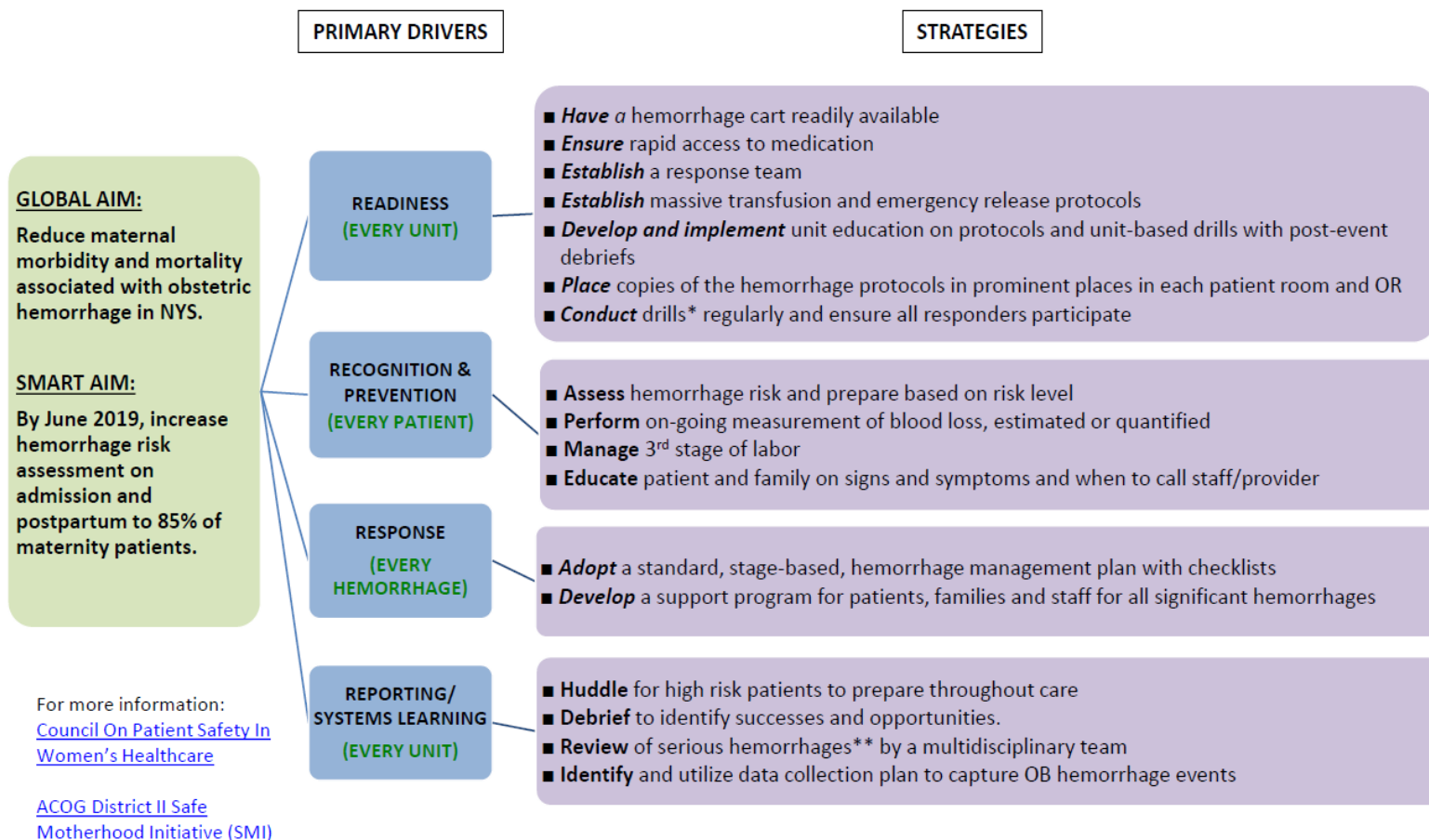
- Adapts the Institute for Healthcare Improvement (IHI) model for Idealized Perinatal Care and Breakthrough Series Methodology as a framework to guide improvement
  - This strategy has been executed with the assistance of a long standing partnership with NICHQ
- Participating birthing hospitals implement evidence-based strategies for the assessment and management of obstetric hemorrhage

# Recruitment

- All 123 NYS birthing hospitals were sent the project's Recruitment and Pre-work Package
  - Outlines the background, clinical significance, project goals, benefits to participation, hospital's responsibilities, measurement strategy
- An Informational Call was held to provide information on the project and allow hospital staff to ask questions



# NEW YORK STATE OBSTETRIC HEMORRHAGE PROJECT – KEY DRIVER DIAGRAM



\* Drills = Right participants, scenarios, demonstration of competency in roles and responsibilities.

\*\*Blood loss greater than  $\geq 500$  ml with a vaginal delivery and  $\geq 1000$  ml with a cesarean section.

# Participation

- 70% (86/123) of NYS birthing hospital are participating:
  - 100% (17/17) RPCs;
  - 74% (25/34) Level III hospitals;
  - 65% (17/26) Level II hospitals; and
  - 54% (25/46) Level I hospitals.



# Major Project Activities

- Monthly Coaching Call webinars;
- In-person Learning Sessions;
- Monthly data collection/submission through web-based portal (NYSDOH HCS);
- Access to expert faculty, both clinical and quality improvement;
- Access to project website ([www.nyspqc.org](http://www.nyspqc.org)); and
- Utilization of project e-mail listserv.

# Monthly Coaching Call Webinars

## Educational Curriculum Topics

### Previous topics

- Structural preparedness
- Hemorrhage drills, huddles and debriefs
- Blood loss quantification methods
- In situ drill simulation
- Team communication tactics

### Upcoming topics

- Engaging patients, families, and the community
- Massive Transfusion Protocol
- Sustainability: hardwiring your practice for the long- & short-term





## Simulation training at the NYS Obstetric Hemorrhage Project Learning Session #2

# Aggregate Data Form

Collects information on:

- Obstetric hemorrhage diagnosis
- Massive transfusion
- Obstetric hemorrhage and:
  - Transfer to higher care
  - Hysterectomy
  - Death
- Risk assessment
  - On admission
  - Postpartum
- Hemorrhage drills

## New York State Obstetric Hemorrhage Project Aggregate Data Collection Tool

Instructions: Each month, complete this form for maternity patients,  $\geq 20$  weeks completed gestation, admitted to labor and delivery for the birth hospitalization. Patients should be included in the month which they were discharged from the birth hospitalization. Please enter the total number of patients for each of the criteria below.

Month: \_\_\_\_\_ Year: \_\_\_\_\_

Obstetric Hemorrhage Diagnosis	
Number of maternity patients admitted to labor and delivery $\geq 20$ weeks completed gestation <u>delivering via vaginal delivery</u>	
Number of maternity patients with a vaginal delivery and obstetric hemorrhage defined as $\geq 500$ ml blood loss	
Number of maternity patients with a vaginal delivery and obstetric hemorrhage defined as $\geq 1,500$ ml blood loss	
Number of maternity patients admitted to labor and delivery $\geq 20$ weeks completed gestation <u>delivering via a cesarean section</u>	
Number of maternity patients with a cesarean section and obstetric hemorrhage defined as $\geq 1,000$ ml blood loss	
Number of maternity patients with a cesarean section and obstetric hemorrhage defined as $\geq 1,500$ ml blood loss	
Risk Assessment <sup>1</sup>	
Number of maternity patients, $\geq 20$ weeks completed gestation, admitted to labor and delivery for the birth hospitalization <sup>1</sup>	
Number of maternity patients with a documented risk assessment for obstetric hemorrhage <u>completed on admission</u> to the hospital <sup>2</sup>	
Number of maternity patients with at least one documented risk assessment for obstetric hemorrhage <u>completed in the post-partum period (between birth and discharge)</u> <sup>1,3</sup>	
Hemorrhage Drills	
Number of drills (In Situ <sup>4</sup> and/or Sim Lab) conducted related to obstetric hemorrhage	
Number of post-drill debriefs conducted related to obstetric hemorrhage	



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# Progress to Date

Project Measure	Baseline – March 2018	Current – July 2018
Vaginal deliveries with $\geq$ 500 ml blood loss	6.5% (602/9,224)	6.4% (495/7,752)
Vaginal deliveries with $\geq$ 1,500 ml blood loss	0.5% (43/9,224)	0.5% (36/7,752)
Cesarean sections with $\geq$ 1,000 ml blood loss	12.8% (569/4,446)	14.8% (539/3,654)
Cesarean sections with $\geq$ 1,500 ml blood loss	2.8% (124/4,446)	3.3% (120/3,654)
Massive Transfusion (4 or more units of packed red cells)	0.3% (45/13,244)	0.4% (38/10,756)
Obstetric hemorrhage and admitted to a higher level of care*	2.1% (23/1,083)	1.7% (21/1,247)
Obstetric hemorrhage and hysterectomy*	1.4% (15/1,083)	0.8% (10/1,247)
Obstetric hemorrhage and death*	0.0% (0/1,083)	0.0% (0/1,247)
Documented risk assessment for obstetric hemorrhage completed on admission	59.8% (5,794/9,694)	74.6% (6,126/8,211)
Documented risk assessment for obstetric hemorrhage completed in the post-partum period	34.0% (3,299/9,694)	51.5% (4,227/8,211)
Number of hospitals conducting obstetric hemorrhage drills	35	36
Number of hospitals conducting post-drill debriefs	25	23

# Patient Specific Form

- Completed for each patient with one or more of the following:
  - Massive transfusion
  - Obstetric hemorrhage\* & transfer to higher care
  - Obstetric hemorrhage\* & hysterectomy
  - Obstetric hemorrhage\* & death
- Total of 215 patient specific forms completed for March 2018 to July 2018
  - 0.3% (215/62,718) of maternity patients,  $\geq 20$  weeks completed gestation, admitted to labor and delivery for the birth hospitalization had a qualifying event

## New York State Obstetric Hemorrhage Project Patient Specific Data Collection Tool

Instructions: Complete one form for each patient with any of the following: massive transfusion (four or more units of PRBCs); obstetric hemorrhage with an admission to higher care; obstetric hemorrhage and a hysterectomy; or obstetric hemorrhage and death. Only include information for maternity patients, admitted to labor and delivery  $\geq 20$  weeks completed gestation for the birth hospitalization, and discharged during the month of data collection.

If an event occurs to a woman who did not deliver at your facility, i.e., transfers after delivery, please contact data staff at [NYSPOHC@health.ny.gov](mailto:NYSPOHC@health.ny.gov), or call 518/473-9883 for instructions on completing this form.

Health Commerce System (HCS) Identifiers	
A. System ID:	<input type="checkbox"/> Generated by HCS, record here.
B. Sequence Number:	<input type="checkbox"/> Please assign each patient a six-digit ID unique to your hospital.
Patient Demographics	
1. Discharge month (1-12) and year:	Month: _____ Year: _____
2. Patient age (years)	Age: _____
3. Patient ethnicity	<input type="checkbox"/> Hispanic <input type="checkbox"/> Not Hispanic <input type="checkbox"/> Unknown or unable to obtain
4. Patient race (check all that apply)	<input type="checkbox"/> White <input type="checkbox"/> Black or African-American <input type="checkbox"/> Asian <input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> Other <input type="checkbox"/> Unknown or unable to obtain
5. Primary Insurer	<input type="checkbox"/> Medicaid <input type="checkbox"/> Uninsured <input type="checkbox"/> Private <input type="checkbox"/> Other
Clinical Data	
6. Method of delivery	<input type="checkbox"/> Vaginal <input type="checkbox"/> Cesarean
7. Received four or more units of packed red blood cells during the hospitalization	<input type="checkbox"/> Yes <input type="checkbox"/> No

\*Obstetric hemorrhage is defined as a blood loss of 500mL or greater for a vaginal delivery and 1,000mL or greater for a cesarean section.



# Patient Specific Forms Submitted by Hospital Level (N=215)

- Between March 2018 and July 2018:
  - 54% (n=116) of forms were submitted by RPCs;
  - 25% (n=54) of forms were submitted by Level III hospitals;
  - 13% (n=27) of forms were submitted by Level II hospitals; and
  - 8% (n=18) of forms were submitted by Level I hospitals.
- This demonstrates that the majority of severe obstetric hemorrhage cases are occurring at higher level birthing hospitals.



# Patient Specific Form Demographics (N=215)

- 33 years old on average
  - Median: 33 years old
  - Range: 16 to 52 years old
- Race/Ethnicity
  - 44% White, non-Hispanic (n=95)
  - 20% Black, non-Hispanic (n=43)
  - 16% Hispanic (n=35)
  - 8% Asian, non-Hispanic (n=18)
  - 7% Unknown (n=14)
  - 5% Other (n=10)



# Patient Specific Form Demographics, cont. (N=215)

- Primary Insurer
  - 51% Medicaid (n=110)
  - 45% Private (n=97)
  - 3% Other (n=6)
  - 1% Uninsured (n=2)
- Delivery type
  - 76% Cesarean section (n=164)
  - 24% Vaginal (n=51)



# Patient Specific Form Obstetric Hemorrhage Morbidity and Mortality (N=215)

- 2,729 mL average blood loss
  - Median: 2,300 mL
  - Range: 600 to 16,300 mL
- Method of calculating blood loss
  - 46% Mixed methods (n=98)
  - 32% Visual estimation (n=70)
  - 22% Formal quantification (n=47)
- 69% of cases had a post-hemorrhage event debrief (n=149)



# Blood Loss by Hospital Level

Hospital Level	# of Patients	Average (mL)	Median (mL)	Range (mL)
RPC	116	2,686	2,285	700 - 16,300
Level III	54	2,792	2,500	800 - 11,000
Level II	27	3,012	2,500	1,000 – 9,100
Level I	18	2,395	2,138	600 - 5,500



# Patient Specific Form Obstetric Hemorrhage-Related\* Co-morbidities and Mortality (N=215)

- Percent of Patient Specific Forms with an indication of:
  - 84% massive transfusion (4 or more units of PRBCs) (n=181)
  - 51% transfer to higher care & hemorrhage (n=110)
  - 30% hysterectomy & hemorrhage (n=65)
  - 1% death & hemorrhage (n=2)

Note: Patients can be included in more than one category

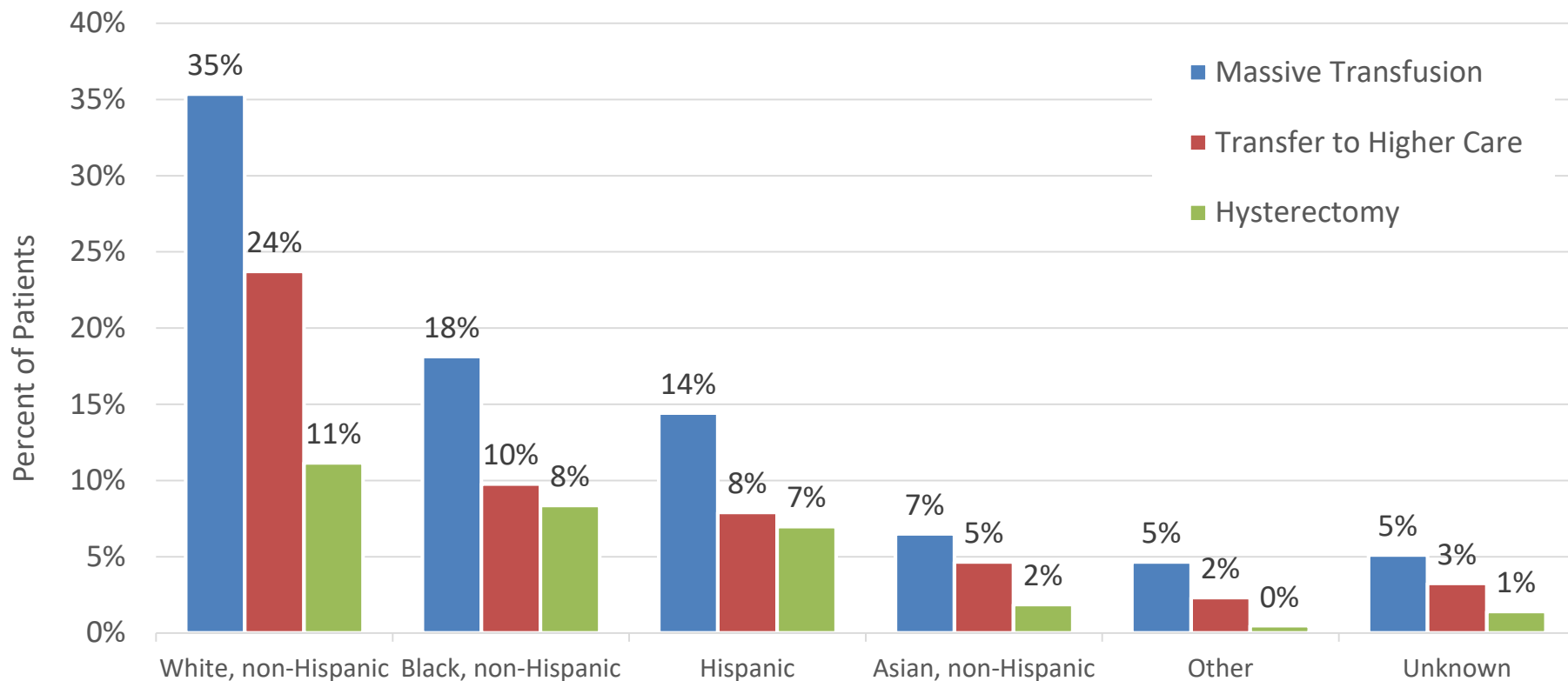
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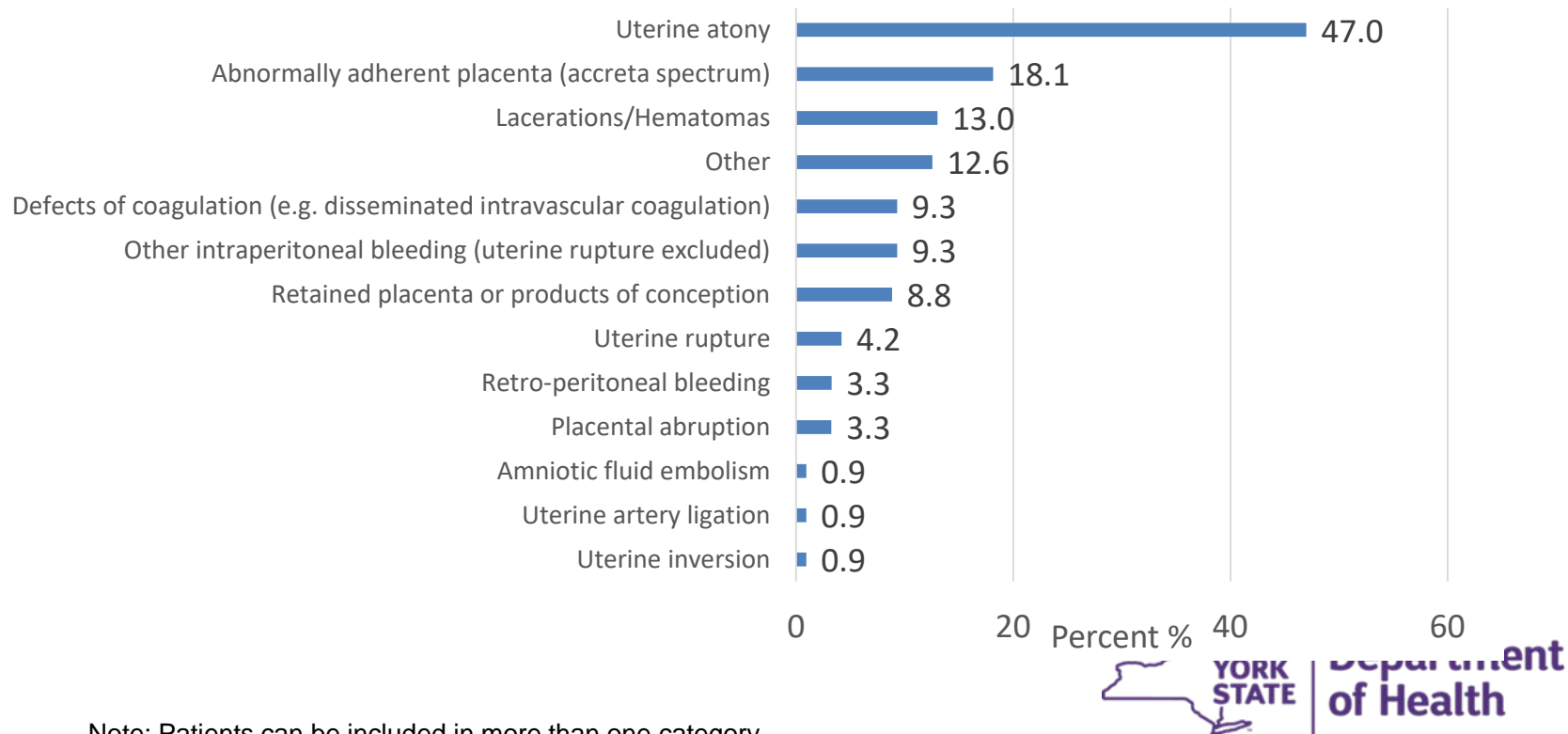
# Patient Specific Form Morbidity by Race/Ethnicity



# Percent of Patient Specific Forms with an Indication of Morbidity by Race/Ethnicity

Race/Ethnicity	Massive Transfusion (4 or more units of PRBCs)	Obstetric Hemorrhage* and Transfer to Higher Care	Obstetric Hemorrhage* and Hysterectomy
White, non-Hispanic	80% (76/95)	54% (51/95)	25% (24/95)
Black, non-Hispanic	91% (39/43)	49% (21/43)	42% (18/43)
Hispanic	89% (31/35)	49% (17/35)	43% (15/35)
Asian, non-Hispanic	78% (14/18)	56% (10/18)	22% (4/18)
Other	100% (10/10)	40% (4/10)	10% (1/10)
Unknown	79% (11/14)	50% (7/14)	21% (3/14)

# Obstetric Hemorrhage Etiology (n=215)



# Patient Specific Form – White, non-Hispanic

- Morbidity
  - 80% (76/95) massive transfusion (4 or more units of PRBCs)
  - 54% (51/95) obstetric hemorrhage\* & transfer to higher care
  - 25% (24/95) obstetric hemorrhage\* & hysterectomy
- Top three etiologies
  - 45.3% (43/95) Uterine atony
  - 15.8% (15/95) Abnormally adherent placenta (accreta spectrum)
  - 12.6% (12/95) Laceration/hematoma

\*Obstetric hemorrhage is defined as a blood loss of 500mL or greater for a vaginal delivery and 1,000mL or greater for a cesarean section.



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# Patient Specific Form – Black, non-Hispanic

- Morbidity
  - 91% (39/43) massive transfusion (4 or more units of PRBCs)
  - 49% (21/43) obstetric hemorrhage\* & transfer to higher care
  - 42% (18/43) obstetric hemorrhage\* & hysterectomy
- Top etiologies
  - 60.5% (26/43) Uterine atony
  - 16.3% (7/43) Abnormally adherent placenta (accreta spectrum)
  - 7.0% (3/43) Defects of coagulation
  - 7.0% (3/43) Other intraperitoneal bleeding (uterine rupture excluded)
  - 7.0% (3/43) Lacerations/hematoma
  - 7.0% (3/43) Uterine rupture

\*Obstetric hemorrhage is defined as a blood loss of 500mL or greater for a vaginal delivery and 1,000mL or greater for a cesarean section.



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# Patient Specific Form – Hispanic

- Morbidity
  - 89% (31/35) massive transfusion (4 or more units of PRBCs)
  - 49% (17/35) obstetric hemorrhage\* & transfer to higher care
  - 43% (15/35) obstetric hemorrhage\* & hysterectomy
- Top three etiologies
  - 42.9% (15/35) Uterine atony
  - 34.3% (12/35) Abnormally adherent placenta (accreta spectrum)
  - 14.3% (5/35) Other intraperitoneal bleeding (uterine rupture excluded)

\*Obstetric hemorrhage is defined as a blood loss of 500mL or greater for a vaginal delivery and 1,000mL or greater for a cesarean section.



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# Next Steps

- Ongoing NYS Obstetric Hemorrhage Project events will focus on:
  - Engaging staff, patients, families and communities
    - Support for patients, family, communities and staff that have experienced an obstetric hemorrhage
    - Addition of patients and/or family members to the QI team

# Next Steps

- Massive transfusion protocols
  - Developing a massive transfusion protocol with emphasis on the 1:1 ratio
  - Working with patients that refuse a blood transfusion
  - Educating support departments (i.e., blood bank, ICU, etc.)
- Sustainability for the short and long term
  - Staff participation and buy-in
  - Planning meaningful skills building interventions (i.e., simulation)
  - Documentation (i.e., risk assessment)
  - Diffusion of innovation





# Contact Information

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