

Appendix 1. Baseline Characteristics and Primary and Secondary Outcomes of Patients Included in and Excluded From Final Cohort

Characteristic	Included n=18,162	Excluded* n=10,893
Age (years)	29.7 ± 5.4	29.0 ± 5.6
Pre-pregnancy BMI (kg/m ²)	27.2 ± 6.9	26.5 ± 6.8
Gestational weight gain category†		
Inadequate	3740 (22.1)	2372 (24.0)
Adequate	4870 (28.7)	2467 (24.9)
Excessive	8332 (49.2)	5060 (51.1)
Race		
White	12626 (69.5)	7227 (66.3)
Black or African American	3832 (21.1)	2355 (21.6)
Other/Not Specified	1704 (9.4)	1311 (12.0)
Ethnicity		
Hispanic or Latino	253 (1.4)	268 (2.5)
Not Hispanic or Latino	16393 (90.3)	9028 (82.9)
Declined/Not Specified	1516 (8.3)	1597 (14.7)
Current smoker	1715 (10.0)	1592 (15.5)
Pre-existing diabetes	310 (1.7)	161 (1.5)
First delivery	8029 (46.1)	4937 (46.1)
Outcome		
Preeclampsia	1249 (6.9)	799 (7.3)
Preterm preeclampsia	489 (2.7)	386 (3.5)
Term preeclampsia	760 (4.2)	413 (3.8)
Severe maternal morbidity	588 (3.2)	430 (4.0)
Placental abruption	254 (1.4)	234 (2.2)
Gestational Diabetes	1177 (6.5)	645 (6.0)
Composite neonatal morbidity‡	4420 (24.3)	3728 (34.1)
BMI, body mass index Data are n (%) or mean ± standard deviation *Data for excluded patients includes those with no prenatal record (n=5570) and those with a prenatal record but with <2 recorded blood pressures < 20 weeks' gestation (n=5323). †Gestational weight gain defined according to Institute of Medicine. Weight gain during pregnancy: reexamining the guidelines. Washington, DC: National Academies Press; 2009. Due to missing data, subgroup totals do not add up to column totals. ‡Composite neonatal morbidity includes any of the following: intrauterine fetal demise after 20 weeks' gestation, neonatal death within 28 days of life, 5-minute Apgar < 7, neonatal intensive care unit admission, small-for-gestational-age birthweight, or preterm birth.		

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Appendix 2. Variable Sources

Variable	Variable Source
Age	Calculated using maternal date of birth and delivery date
Pre-pregnancy body mass index (PpBMI)	$(\text{Weight measured at first prenatal visit, kg}) / (\text{Height reported at delivery, m})^2$ *Note: If weight measured at first prenatal visit is missing, use reported pre-gravid weight, reported at delivery
Gestational weight gain (GWG) category	GWG=Weight at admission, kg – Pre-pregnancy weight, kg Calculated, based on Institute of Medicine guidelines (Institute of Medicine. Weight gain during pregnancy: reexamining the guidelines. Washington, DC: National Academies Press; 2009)
Race	Recorded at delivery admission; ‘Other/Not Specified’ includes: Chinese, Other Asian, Filipino, Guam/Chamorro, Indian (Asian), Japanese, Korean, Alaska Native, American Indian, Other Pacific Islander, Hawaiian, Samoan, Vietnamese, Declined, Not Specified, missing
Ethnicity	Recorded at delivery admission; ‘Declined/Not Specified’ includes: Declined, Not Specified, missing
Current smoker	Recorded at delivery admission; ‘No’ includes: ‘Never smoker,’ ‘Yes, former smoker quit more than 12 months ago,’ or ‘Yes, former smoker quit within the past 12 months’ ‘Yes’ includes: ‘Yes, smoke every day,’ ‘Yes, smoke some days,’ or ‘Yes, smoker, current status unknown’
Pre-existing diabetes	Type 1 Diabetes: ICD-9: 250.01; 250.03; 250.11; 250.13; 250.21; 250.23; 250.31; 250.33; 250.41; 250.43; 250.51; 250.53; 250.61; 250.63; 250.71; 250.73; 250.81; 250.83; 250.91; 250.93; ICD-10: O24.011; O24.012; O24.013; O24.02; O24.03 Type 2 Diabetes: ICD-9: 250.00; 250.02; 250.10; 250.12; 250.20; 250.22; 250.30; 250.32; 250.40; 250.42; 250.50; 250.52; 250.60; 250.62; 250.70; 250.72; 250.80; 250.82; 250.90; 250.92; ICD-10: O24.111; O24.112; O24.113; O24.119; O24.12; O24.13 Unspecified Diabetes: ICD-9: 648.00; 648.01; 648.02; 648.03; 648.04; ICD-10: O24.311; O24.312; O24.313; O24.319; O24.32; O24.811; O24.812; O24.813; O24.819; O24.82; O24.83; O24.911; O24.912; O24.913; O24.919; O24.92; O24.93

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Chronic hypertension and chronic hypertension with superimposed preeclampsia diagnosis	ICD-9: 642.00; 642.01; 642.02; 642.03; 642.04; 642.10; 642.11; 642.12; 642.13; 642.14; 642.20; 642.21; 642.22; 642.23; 642.24; 642.50; 642.51; 642.52; 642.53; 642.54; ICD-10: O10.011; O10.012; O10.013; O10.019; O10.02; O10.03; O10.111; O10.112; O10.113; O10.12; O10.13; O10.211; O10.212; O10.213; O10.22; O10.23; O10.311; O10.312; O10.313; O10.32; O10.33; O10.411; O10.412; O10.413; O10.419; O10.42; O10.43; O10.911; O10.912; O10.913; O10.919; O10.92; O10.93; O14.10; O14.12; O14.13; O14.14; O14.15; O14.20; O14.22; O14.23; O14.24; O14.25
First delivery	Recorded at delivery admission
Gestational age at first prenatal visit	Calculated using first prenatal visit date, delivery date, and weeks' gestation at delivery
Systolic blood pressure before 20 weeks gestation	Calculated average systolic blood pressure from all available measurements before 20 weeks
Diastolic blood pressure before 20 weeks gestation	Calculated average diastolic blood pressure from all available measurements before 20 weeks
Gestational hypertension	ICD-9: 642.30; 642.31; 642.32; 642.33; 642.34; ICD-10: O13.1; O13.2; O13.3; O13.4; O13.5; O13.9
Term preeclampsia or eclampsia, ≥37 weeks	Mild Preeclampsia: ICD-9: 642.40; 642.41; 642.42; 642.43; 642.44; ICD-10: O14.00; O14.02; O14.03; O14.04; O14.05 Preeclampsia with Severe Features/HELLP: ICD-9: 642.5; 642.51; 642.52; 642.53; 642.54; ICD-10: O14.10; O14.12; O14.13; O14.14; O14.15; O14.20; O14.22; O14.23; O14.24; O14.25 Eclampsia: ICD-9: 642.60; 642.61; 642.62; 642.63; 642.64; ICD-10: O15.00; O15.02; O15.03; O15.1; O15.2; O15.9
Severe maternal morbidity	Any of the following: 1. At least one of the CDC-defined variables (Appendix 3); 2. Admittance to the ICU, indicated by a charge code; 3. Postpartum length-of-stay (PPLOS) greater than three standard deviations above the mean PPLOS a. PPLOS calculated using discharge date and delivery date b. Average and standard deviation for PPLOS are based on the study years, 2015-Jun 2018, and delivery route; for these calculations, the range of PPLOS is limited to [0, 70]

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Placental abruption	ICD-9: 641.20; 641.21; 641.23; ICD-10: O45.001; O45.002; O45.003; O45.011; O45.012; O45.013; O45.021; O45.022; O45.023; O45.091; O45.092; O45.093; O45.8X1; O45.8X2; O45.8X3; O45.91; O45.92; O45.93
Gestational diabetes	ICD-9: 648.80; 648.81; 648.82; 648.83; 648.84; ICD-10: O24.410; O24.414; O24.415; O24.419; O24.420; O24.424; O24.425; O24.429; O24.430; O24.434; O24.435; O24.439; O99.810; O99.814; O99.815
Intrauterine fetal death after 20 weeks gestation	ICD-9: 656.40; 656.41; 656.43; 768.0; 768.1; V27.1; V27.3; V27.4; V27.6; V27.7; ICD-10: O36.4XX0; O36.4XX1; O36.4XX2; O36.4XX3; O36.4XX4; O36.4XX5; O36.4XX9; Z37.1; Z37.3; Z37.4; Z37.60; Z37.61; Z37.62; Z37.63; Z37.64; Z37.69; Z37.7
Neonatal death within 28 days of life	Using Infant Discharge Codes (below) and time from Delivery Date to Infant Discharge Date: DC Code 10: CTB with autopsy DC Code 12: CTB without autopsy
5-minute Apgar < 7	Recorded at initial newborn exam
NICU admission	Charge code for NICU admission
Small-for-gestational age	Calculated based on newborn birthweight and gestational age at delivery; Using Alexander Growth Curve, <10 th percentile
Spontaneous preterm birth, <37 weeks	Maternal clinical summary and gestational age at delivery
Indicated preterm birth, <37 weeks	Maternal clinical summary and gestational age at delivery

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Appendix 3. Centers for Disease Control Defined Maternal Morbidity Indicators

SMM Indicator	ICD-9/ICD-10 Codes
Amniotic fluid embolism	ICD-9: 673.1x; ICD-10: O88.11x; O88.12; O88.13
Acute myocardial infarction	ICD-9: 410.x; ICD-10: I21.01; I21.02; I21.09; I21.11; I21.19; I21.21; I21.29; I21.3; I21.4; I22.0; I22.1; I22.2; I22.8; I22.9
Severe anesthesia complications	ICD-9: 668.0x; 668.1x; 668.2x; ICD-10: O74.0; O74.1; O74.2; O74.3; O89.01; O89.09; O89.1; O89.2
Aneurysm	ICD-9: 441.x; ICD-10: I71.00-I71.03; I71.1-I71.6; I71.8; I71.9; I79.0
Blood transfusion	ICD-9: 99.0x; ICD-10: 30233J1; 30233K1; 30233N1; 30233V1; 30243J1; 30243R1; 30243W1; 30253R1; 30263M1; 30263N1; 30263Q1; 30263W1; 3E043GC; 30243V1; 30253N1; 30253Q1; 30253V1; 30253W0; 30253W1; 30233H1; 30243H1; 30243N0; 30243N1; 30253J1; 30253K1; 30263H0; 30263H1; 30263L1; 30243K1; 30253H0; 30263K1; 30263P1; 30243H0; 30243L1; 30263N0; 30233H0; 30243P1; 30243W0; 30263T1; 30263W0; 30233P1; 30233R1; 30233T1; 30233W1; 30243M1; 30253H1; 30253L1; 30253N0; 30253P1; 30263J1; 30263R1; 30263V1; 3E053GC; 3E063GC; 30233L1; 30233M1; 30233N0; 30233Q1; 30233W0; 30243Q1; 30243T1; 30253M1; 30253T1; 3E033GC
Cardiac arrest/ventricular fibrillation	ICD-9: 427.41; 427.42; 427.5; ICD-10: I46.2; I46.8; I46.9; I49.01; I49.02
Conversion of cardiac rhythm	ICD-9: 99.6x; ICD-10: 5A2204Z; 5A12012
Puerperal cerebrovascular disorders	ICD-9: 430; 431; 432.x; 433.x; 434.x; 436; 437.x; 671.5x; 674.0x; 997.02; ICD-10: I60.x; I61.x; I62.x; I63.x; I65.x; I66.x; I67.1-I67.9; I68.x; I97.810; I97.811; I97.820; I97.821; O22.50; O22.51; O22.52; O22.53; O87.3
Disseminated intravascular coagulation	ICD-9: 286.6; 286.9; 666.3x; ICD-10: D65; D68.8; D68.9; O72.3
Eclampsia	ICD-9: 642.6x; ICD-10: O15.x
Heart failure during procedure or surgery	ICD-9: 997.1; ICD-10: I97.12x; I97.13x
Hysterectomy	ICD-9: 68.3x-68.9x; ICD-10: OUT90ZZ; OUT94ZZ; OUT97ZZ; OUT98ZZ; OUT9FZZ
Pulmonary edema	ICD-9: 428.0; 428.1; 428.821; 428.823; 428.831; 428.833; 428.841; 428.843; 518.4; ICD-10: I50.1; I50.20; I50.21; I50.23; I50.30; I50.31; I50.33; I50.40; I50.41; I50.43; I50.9; J81.0
Acute renal failure	ICD-9: 584.x; 669.3x;

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SMM Indicator	ICD-9/ICD-10 Codes
	ICD-10: N17.x; O90.4
Adult respiratory distress syndrome	ICD-9: 518.5x; 518.81; 518.82; 518.84; 799.1; ICD-10: J80; J95.1; J95.2; J95.3; J95.82x; J96.0x; J96.2x; R09.2
Sepsis	ICD-9: 038.x; 670.2x; 995.91; 995.92; ICD-10: A32.7; A40.x; A41.x; O85; R65.2x; T80.211A; T81.4XXA
Shock	ICD-9: 669.1x; 785.5x; 995.0; 995.4; 998.0x; ICD-10: O75.1; R57.0; R57.1; R57.8; R57.9; R65.21; T78.2XXA; T81.10XA; T81.11XA; T81.19XA; T88.2XXA; T88.6XXA
Sickle cell anemia with crisis	ICD-9: 282.42; 282.62; 282.64; 282.69; ICD-10: D57.0x; D57.21x; D57.41x; D57.81x
Thrombotic embolism	ICD-9: 415.1x; 673.0x; 673.2x; 673.3x; 673.8x; ICD-10: I26.x; O88.0x; O88.2x; O88.3x; O88.8x
Temporary tracheostomy	ICD-9: 31.1; ICD-10: OB110F4; OB110Z4; OB113F4; OB113Z4; OB114F4; OB114Z4
Ventilation	ICD-9: 93.90; 96.01; 96.02; 96.03; 96.04; 96.05; 967.x; ICD-10: 5A1935Z; 5A1945Z; 5A1955Z

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Appendix 4. Frequency and Average Blood Pressure by AHA/ACC 2017 Systolic and Diastolic Classification Criteria

Classification Criteria		N (%)	Systolic BP	Diastolic BP
Stage 1 HTN (n=988), defined by:	Average systolic BP only	216 (21.9)	132.2 ± 2.2	72.3 ± 5.7
	Average diastolic BP only	671 (67.9)	121.1 ± 5.0	81.6 ± 1.8
	Both average systolic and diastolic BP	101 (10.2)	133.2 ± 2.7	83.1 ± 2.2
Stage 2 HTN (n=1,005), defined by:	Average systolic BP only	94 (9.4)	144.9 ± 5.5	80.6 ± 6.2
	Average diastolic BP only	43 (4.3)	132.1 ± 5.5	92.5 ± 2.2
	Both average systolic and diastolic BP	32 (3.2)	148.2 ± 8.0	94.5 ± 3.8
	Chronic HTN diagnosis, with average BP below stage 2 range	836 (83.2)	125.5 ± 7.9	75.2 ± 7.6
BP, blood pressure; HTN, hypertension Data are n (%) or mean ± standard deviation				

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