Scientific Rationale and Empirical Testing: Refining the Severe Maternal Morbidity Measure

The Agency for Healthcare Research and Quality (AHRQ) pursues the goal of bringing excellence to health care decision making, quality improvement, and research. One of the avenues through which AHRQ achieves this goal is by developing and managing a set of standardized, evidence-based quality indicators (QIs) that can be used for population health analysis, surveillance, quality assurance, and research purposes. AHRQ continuously evaluates and refines the QIs to incorporate changes in the field of quality measurement. As part of this effort, AHRQ evaluates the need for new QIs. Beginning in v2024, AHRQ is pleased to provide a set of Maternal Health Indicators (MHI) in a new beta module. The module includes:

- MHI 01 Severe Maternal Morbidity Rate (20 Indicators)
- MHI 02 Severe Maternal Morbidity (20 Indicators) Plus In-Hospital Mortality Rate
- MHI 03 Refined Severe Maternal Morbidity (20 Indicators) Plus In-Hospital Mortality Rate, Beta

These indicators are based on the Severe Maternal Morbidity (SMM) measure used by the Centers for Disease Control and Prevention (CDC), AHRQ Fast Stats, the Health Resources and Services Administration (HRSA) Title V MCH Block Grant Program, and the Alliance for Innovation on Maternal Health (AIM) (excluding blood transfusions). MHI 02 expands on MHI 01 by incorporating in-hospital death (see rationale below). MHI 03 expands on MHI 01 by incorporating in-hospital death and refining two indicators (Acute Renal Failure and Disseminated Intravascular Coagulation [DIC], labeled as Coagulopathy) to address coding issues and variation in severity. This memo details the scientific rationale and empirical testing related to these coding refinements.

Rationale for Updating the SMM Measure

The CDC uses an ICD-10 version of the SMM measure with 21 indicators[1]:

Table 1. CDC SMM indicators

CDC SMM Indicators	
• Acute myocardial infarction • Aneurysm • Acute renal failure • Acute respiratory distress syndrome • Amniotic fluid embolism	• Heart failure/Arrest during surgery or procedure • Puerperal cerebrovascular disorders • Pulmonary edema/Acute heart failure • Severe anesthesia complications

[1] https://www.cdc.gov/maternal-infant-health/php/severe-maternal-morbidity/index.html

CDC SMM Indicators	
• Cardiac arrest/Ventricular fibrillation • Conversion of cardiac rhythm • Disseminated intravascular coagulation • Blood transfusion • Eclampsia	• Sepsis • Shock • Sickle cell disease with crisis • Air and thrombotic embolism • Hysterectomy • Temporary tracheostomy • Ventilation

Blood transfusion was subsequently made an optional SMM indicator after research indicated high rates of blood transfusion where true SMM did not occur and with acknowledgement that current ICD-10-CM/PCS coding does not distinguish volume or severity of blood transfusion episodes.[2]

Further research identified validity concerns for the ARF and DIC code sets, particularly for state- and hospital-level analyses.[3,4,5] Specifically, the N17.x ARF codes lack acuity and may therefore erroneously flag a patient as having SMM where only transient oliguria and/or elevated serum creatinine has occurred. In 2022, Rodriguez et al. found that, of preeclamptic patients with acute kidney injury (AKI), 80% had stage I disease and noted that stage I did not manifest in substantial clinical differences compared to preeclamptic patients without AKI.[6] Similarly, it was identified that the DIC codes O72.3, D68.8, and D68.9 may flag a patient as having SMM where only mild thrombocytopenia has occurred.[3,7]

Given these concerns, AHRQ conducted a request for information from clinical experts on SMM measure coding, solicited potential revisions, and completed validity analyses of the ARF and DIC indicators. AHRQ assessed the morbidity severity of various code set variations against

[2] Main EK, Abreo A, McNulty J, et al. Measuring severe maternal morbidity: validation of potential measures. *Am J Obstet Gynecol*. 2016;214(5):643.e1-643.e10. doi:10.1016/j.ajog.2015.11.004

[3] Hirai AH, Owens PL, Reid LD, Vladutiu CJ, Main EK. Associations Between State-Level Severe Maternal Morbidity and Other Perinatal Indicators. *JAMA Netw Open*. 2022;5(7):e2224621. doi:10.1001/jamanetworkopen.2022.24621

[4] Hirai AH, Owens PL, Reid LD, Vladutiu CJ, Main EK. Trends in Severe Maternal Morbidity in the US Across the Transition to *ICD-10-CM/PCS* From 2012-2019. *JAMA Netw Open*. 2022;5(7):e2222966. doi:10.1001/jamanetworkopen.2022.22966

[5] Boulet SL, Stanhope KK, Valdez-Sinon AN, Vuncannon D, Preslar J, Bergbower H, Gray B, Gathoo A, Hansen N, Andre K, Bensouda S, Braun C, Platner M. Validation of ICD-10 Codes for Severe Maternal Morbidity at Delivery in a Public Hospital. Epidemiology. 2024 Jul 1;35(4):506-511. doi: 10.1097/EDE.0000000000001743. Epub 2024 Mar 29. PMID: 38567907.

[6] Rodriguez AN, Nelson DB, Spong CY, McIntire DD, Reddy MT, Cunningham FG. Acute Kidney Injury in Pregnancies Complicated by Late-Onset Preeclampsia with Severe Features. *Am J Perinatol*. 2024;41(S 01):e6-e13. doi:10.1055/s-0042-1749632

[7] Declercq ER, Cabral HJ, Cui X, et al. Using Longitudinally Linked Data to Measure Severe Maternal Morbidity. *Obstet Gynecol*. 2022;139(2):165-171. doi:10.1097/AOG.0000000000004641

other measures of severity, including intensive care unit (ICU) admission[8], cesarean delivery[9], length of stay (LOS), and in-hospital death using the Healthcare Cost & Utilization Project (HCUP) Statewide Inpatient Databases (SID) 2019-2021 reference population used for version 2024 of the QI software. AHRQ also assessed the appropriateness of including the in-hospital death indicator in the SMM measure. Note that in-hospital death is a rare event, thus our validation analyses drew inferences from multiple indicators of severity when assessing coding changes.

SMM Indicator Coding Refinement Testing Results

Acute renal failure

AHRQ validated variations of the ARF indicator codes against the CDC/HRSA/AIM ARF indicator codes, other measures of SMM, including ICU admission, cesarean delivery, LOS, and against in-hospital death. Table 2 Illustrates the CDC/HRSA/AIM ARF code list, the tested ARF code list version 1, in which the N17.9 code is dropped,[10] and the tested ARF code list version 2, in which the N17.x codes are retained and a dialysis requirement is added. See Appendix A Table A1 for the description of codes included in the ARF indicator used by CDC/HRSA/AIM.

Table 2. ICD-10-CM codes included in each test version of the ARF indicator

	CDC/HRSA/AIM ARF	ARF test version 1 – Without N17.9	ARF test version 2 – At least one ARF code AND one dialysis code present[11]
ARF codes	N17.0, N17.1, N17.2, N17.8, N17.9, O90.4x	N17.0, N17.1, N17.2, N17.8, O90.4x	**ARF codes:** N17.0, N17.1, N17.2, N17.8, N17.9, O90.4 **Dialysis codes:** 3E1M39Z, 5A1D00Z, 5A1D60Z, 5A1D70Z, 5A1D80Z, 5A1D90Z

[8] ICU stays are identified using the following revenue center codes: 200, 201, 202, 203, 204, 207, 208, 209, 210, 211, 212, 213, and 219. See HCUP's Description of Data Elements for more details: https://hcup-us.ahrq.gov/db/vars/siddistnote.jsp?var=revcdn

[9] Cesarean deliveries are identified by any listed ICD-10-PCS procedure code for Cesarean delivery (PRCSECP*) and without any listed ICD-10-PCS procedure code for hysterotomy (PRCSE2P*). See AHRQ Inpatient Quality Indicator 21 Cesarean Delivery Rate Uncomplicated for complete list of procedure codes: https://qualityindicators.ahrq.gov/Downloads/Modules/IQI/V2024/TechSpecs/IQI_21_Cesarean_Delivery_Rate_Uncomplicated.pdf

[10] The N17.9 code was identified for potential exclusion by clinical experts in consultation with AHRQ. These codes represent the vast majority of instances of the use of the N17.x codes in delivery discharges.

[11] Version used in MHI 03 Refined Severe Maternal Morbidity Plus In-Hospital Mortality Rate, Beta

Table 3 shows the rates of ICU admission, cesarean delivery, LOS, and in-hospital death using the CDC/HRSA/AIM ARF definition (N17.x, O90.4), the tested ARF code list version 1 that removes the N17.9 code (N17.0, N17.1, N17.2, N17.8, O90.4), and the tested ARF code list version 2 that retains the ARF diagnosis codes but requires dialysis (at least one ARF code from N17.0, N17.1, N17.2, N17.8, N17.9, O90.4 and at least one dialysis code from 3E1M39Z, 5A1D00Z, 5A1D60Z, 5A1D70Z, [12] 5A1D80Z, 5A1D90Z). Removal of N17.9 improves the identification of severe cases of ARF only slightly; for example, the rate of ICU stays increases from 19.1% to 21.3% and the rate of in-hospital death increases from 1.6% to 2.5%. While adding a requirement of dialysis to the CDC/HRSA/AIM code set (including N17.9) isolates the most severe cases of ARF and increases the rate of ICU stays from 19.1% in the CDC/HRSA/AIM ARF definition to 57.7%. The rate of in-hospital death also increases from 1.6% in the CDC/HRSA/AIM ARF definition to 11.5% when requiring dialysis. Requiring dialysis leads to significantly lower rates of ARF, from 0.2% in the CDC/HRSA/AIM ARF definition to 0.006% in the ARF version requiring dialysis.

Table 3. Impact of ARF coding changes on indicators of severity

	CDC/HRSA/AIM ARF		ARF test version 1 - Without N17.9		ARF test version 2 – At least one ARF code AND one dialysis code present	
	Yes (0.2%)	No (99.8%)	Yes (0.07%)	No (99.3%)	Yes (0.006%)	No (99.9%)
ICU Admission	19.1%	0.3%	21.3%	0.4%	57.7%	0.4%
Cesarean delivery	73.3%	32.0%	75.9%	32.0%	74.2%	32.0%
In-hospital death	1.6%	0.006%	2.5%	0.007%	11.5%	0.008%
LOS	7.6 (9.3)	2.6 (2.2)	8.3 (10.7)	2.6 (2.2)	19.1 (16.8)	2.6 (2.3)

Source: HCUP Statewide Inpatient Databases (SID) from 2019-2021.

Coagulopathy, including DIC

AHRQ validated variations of the coagulopathy (including DIC) indicator codes against the CDC/HRSA/AIM DIC indicator codes, other measures of SMM, including ICU admission, cesarean delivery, LOS, and against in-hospital death. Table 4. Illustrates the CDC/HRSA/AIM Coagulopathy (including DIC)[13] code list and the tested coagulopathy code list version 1, in

[12] Note that 5A1D00Z (Performance of Urinary Filtration, Single) and 5A1D60Z (Performance of Urinary Filtration, Multiple) were deleted from the ICD-10-PCS code set effective October 1, 2017. They are included in the MHI software so that the MHI beta module can be backwards compatible to the start of the ICD-10 transition.

[13] Indicator title changed to 'Coagulopathy (including DIC)' to better reflect the clinical concepts captured by the codes in the 'DIC' indicator. No additional coagulopathy codes were added to the CDC/HRSA/AIM ARF code list.

which O72.3 is dropped, and the tested coagulopathy code list version 2, in which O72.3, D68.8, and D68.9 are dropped. See Appendix A Table A2 for the description codes included in the Coagulopathy (including DIC) indicator used by CDC/HRSA/AIM.

Table 4. ICD-10-CM codes included in each test version of the coagulopathy indicator

	CDC/HRSA/AIM Coagulopathy (including DIC)	Coagulopathy (including DIC) test version 1 – Without O72.3	Coagulopathy (including DIC) test version 2 – Without O72.3, D68.8, and D68.9[14]
Coagulopathy (including DIC) codes	D65, D68.8, D68.9, O45.002, O45.003, O45.009, O45.012, O45.013, O45.019, O45.022, O45.023, O45.029, O45.092, O45.093, O45.099, O46.002, O46.003, O46.009, O46.012, O46.013, O46.019, O46.022, O46.023, O46.029, O46.092, O46.093, O46.099, O67.0, O72.3	(Removes O72.3)	(Removes O72.3, D68.8, and D68.9)

Table 5 shows the rates of ICU admission, cesarean delivery, LOS, and in-hospital death with the CDC/HRSA/AIM Coagulopathy (including DIC) definition, the tested coagulopathy code list version 1 that removes the O72.3 code, and the tested coagulopathy code list version 2 that removes O72.3, D68.8, and D68.9. Removal of O72.3 slightly improves identification of severe cases of coagulopathy, for example an increase in ICU admissions from 15.5% to 21.4% and an increase in the rates of in-hospital death during delivery from 1.2% to 2.0%. Removal of O72.3, D68.8, and D68.9 further improves the identification of severe cases of coagulopathy with an increase in the ICU admission rates from 15.5% in the CDC/HRSA/AIM definition to 28.7% and an increase in the rates of in-hospital death from 1.2% in the CDC/HRSA/AIM definition to 2.8%.

Table 5. Impact of coagulopathy (DIC) coding changes on indicators of severity

	CDC/HRSA/AIM Coagulopathy (including DIC)	Coagulopathy (including DIC) test version 1 - Without O72.3	Coagulopathy (including DIC) test version 2 - Without O72.3, D68.8, and D68.9

[14] Version used in MHI 03 Refined Severe Maternal Morbidity (20 Indicators) Plus In-Hospital Mortality Rate, Beta

	Yes (0.2%)	No (99.8%)	Yes (0.11%)	No (99.9%)	Yes (0.07%)	No (99.3%)
ICU Admission	15.5%	0.3%	21.4%	0.4%	28.7%	0.4%
Cesarean delivery	56.5%	32.0%	60.8%	32.0%	67.6%	32.0%
In-hospital death	1.2%	0.006%	2.0%	0.006%	2.8%	0.007%
LOS	4.7 (6.3)	2.6 (2.2)	5.5 (8.2)	2.6 (2.2)	5.8 (7.8)	2.6 (2.3)

Source: HCUP Statewide Inpatient Databases (SID) from 2019-2021.

In-hospital death as an additional indicator

In-hospital death, though, relatively rare, is an important metric of maternal health and is useful for care improvement and population health initiatives. We identified an additional 32 cases of in-hospital death during delivery that were not captured by the 20 indicators in MHI 03, representing about 4% of all in-hospital deaths during delivery. In order to capture these cases and to align more closely with the approach in the CMS Severe Obstetric Complications Measure, we included in-hospital death as an additional indicator in MHI 03.[15] It should be noted that the additional in-hospital deaths included in MHI 02 or MHI 03 were not necessarily complications related to the delivery.

Identification of delivery

We reviewed the existing SMM measure denominator logic and identified possible redundancies in the use of Medicare-Severity Diagnosis Related Group (MS-DRG) codes to identify deliveries. Input from our team's coding experts indicated that the inclusion of MS-DRG codes in the CDC/HRSA SMM measure denominator logic is unnecessary, given that all vaginal and cesarean delivery DRGs require an ICD-10-CM diagnosis code (see setname DX_DELIVERY) or an ICD-10-PCS procedure code (see setname PR_DELIVERY), respectively. Given that the inclusion of MS-DRGs will not capture any additional deliveries, we removed the MS-DRGs from the denominator logic. This will allow users that do not have MS-DRG information in their data to still calculate the MHI indicators.

[15] The MHI 02 measure is intended to align more closely, but not completely, with the Severe Obstetrics Complications measure, which is used for hospital-level accountability and includes risk adjustment based on both diagnoses and laboratory values. For more information on similarities and differences, see Table 6. The technical specifications for the SOC measure can be found here: https://ecqi.healthit.gov/ecqm/eh/2023/cms1028v1?qt-tabs_measure=measure-information.

Comparison of Maternal Health Indicators, CMS Severe Obstetric Complications, and the CDC/HRSA/AIM Severe Maternal Morbidity measure

Table 6 provides a comparison of the Maternal Health Indicators with the CMS Severe Obstetric Complications and the CDC/HRSA/AIM Severe Maternal Morbidity measure.

Table 6. Differences between the MHIs and the CMS SOC measure, in reference to the CDC/HRSA/AIM SMM measure

Measure component	CDC/HRSA/AIM SMM Measure	MHI 01	MHI 02	MHI 03	CMS Severe Obstetrics Complications
Numerator: 20 indicators	Includes: 1. Acute myocardial infarction 2. Aneurysm 3. Acute renal failure 4. Acute respiratory distress syndrome 5. Amniotic fluid embolism 6. Cardiac arrest or ventricular fibrillation 7. Conversion of cardiac rhythm 8. Coagulopathy (including disseminated intravascular coagulation) 9. Eclampsia 10. Heart failure or arrest during surgery or procedure 11. Puerperal cerebrovascular disorders 12. Pulmonary edema or acute heart failure 13. Severe anesthesia complications	(Same as CDC/HRSA/ AIM)	(Same as CDC/HRSA/ AIM)	• Refines acute renal failure to require dialysis • Removes codes from coagulopathy • Fiscal year updates to codes	• Removes codes from coagulopathy • Adds codes to puerperal cerebrovascular disorders

Measure component	CDC/HRSA/AIM SMM Measure	MHI 01	MHI 02	MHI 03	CMS Severe Obstetrics Complications
	14. Sepsis 15. Shock 16. Sickle cell disease with crisis 17. Air and thrombotic embolism 18. Hysterectomy 19. Temporary tracheostomy 20. Ventilation				
Numerator: includes in-hospital mortality	No	No	Yes	Yes	Yes
Numerator: includes transfusion	Optional incorporation of transfusion	Does not incorporate transfusion	Does not incorporate transfusion	Does not incorporate transfusion	Stratifies numerator by transfusion
Denominator	Inpatient hospitalizations for patients between 12 and 55 delivering stillborn or livebirth	(Same as CDC/HRSA/ AIM)	(Same as CDC/HRSA/ AIM)	(Same as CDC/HRSA/AIM)	Inpatient hospitalizations for patients between 8 and 65 delivering stillborn or live birth with >= 20 weeks, 0 days gestation completed
Denominator exclusions	Ectopic pregnancy, hydatidiform mole, other abnormal products of conception, spontaneous abortion, complications following induced termination of pregnancy, complications following ectopic and molar pregnancy	Spontaneous or elective abortions	Spontaneous or elective abortions	Spontaneous or elective abortions	Confirmed diagnosis of COVID with COVID-related respiratory condition or COVID-related respiratory procedure

Measure component	CDC/HRSA/AIM SMM Measure	MHI 01	MHI 02	MHI 03	CMS Severe Obstetrics Complications
MS-DRG included in denominator criteria	Yes	No	No	No	No
Measurement level	Area	Area	Area	Area	Hospital
Risk adjustment	No	No	No	No	Yes
Risk stratification	No	Yes, by race/ethnicity, poverty category based on zip code, state, year, payer, and custom stratum	Yes, by race/ethnicity, poverty category based on zip code, state, year, payer, and custom stratum	Yes, by race/ethnicity, poverty category based on zip code, state, year, payer, and custom stratum	Yes, by race and ethnicity

*MHI 01 Severe Maternal Morbidity Rate aligns with the SMM measure used by the CDC/HRSA and informed by work from AIM based on 20 indicators (excluding blood transfusion). Neither measure is risk adjusted. The CDC/HRSA measures excludes cases of ectopic pregnancy, hydatidiform mole, abnormal products of conception, spontaneous abortion, complications following induced termination of pregnancy, failed attempted termination of pregnancy, complications following ectopic or molar pregnancy, and abortion of products of conception. MHI 01 excludes all abortions.

Conclusion

Given the findings of the SMM validation study, AHRQ has included the following refinements to the SMM measure used by CDC/HRSA/AIM into the MHI 03 Refined Severe Maternal Morbidity (20 Indicators) Plus In-Hospital Mortality Rate, Beta measure.

MHI 03 refinements:

- Retains the existing ARF indicator codes (ICD-10-CM codes: N17.x, O90.4) and adds a dialysis requirement (ICD-10-PCS codes: 3E1M39Z, 5A1D00Z, 5A1D60Z, 5A1D70Z, 5A1D80Z, 5A1D90Z)
- Removes O72.3, D68.8, and D68.9 from the Coagulopathy (DIC) indicator (ICD-10-CM codes: D65, O45.002, O45.003, O45.009, O45.012, O45.013, O45.019, O45.022, O45.023, O45.029, O45.092, O45.093, O45.099, O46.002, O46.003, O46.009, O46.012, O46.013, O46.019, O46.022, O46.023, O46.029, O46.092, O46.093, O46.099, O67.0)
- Adds in-hospital death as an additional indicator
- Removes the MS-DRGs from the denominator logic

Table 7 summarizes the impact of the coding refinements to the ARF and coagulopathy indicators on the rates of ICU stays, cesarean delivery, in-hospital death and LOS, as well as the SMM rate overall. Note: the indicator of in-hospital mortality is not included in the definition of SMM in Table 7 in order to show the impact of coding changes on the measure's severity. The refinements increased the ICU admission rate from 17.0% to 22.4%, the rate of in-hospital death from 0.9% to 1.3%, and the mean LOS from 6.1 to 6.7 days. The coding refinements also lowered the SMM rate from 89.9 per 10,000 deliveries to 63.9 per 10,000 delivery, among deliveries in HCUP SID data from 2019 – 2021. Users should consider known coding variation across states and regions when using the MHI software for surveillance.[5]

Table 7. Impact of coding refinements to the ARF and coagulopathy indicators only on SMM measure severity

	Identified by CDC/HRSA/AIM SMM measure		Identified by refined SMM measure	
	Yes	**No**	**Yes**	**No**
ICU Admission	17.0%	0.2%	22.4%	0.3%
Cesarean delivery	66.3%	31.8%	68.9%	31.8%
In-hospital death	N=827 (0.9%)	N=30 (<0.01%)	N=825 (1.3%)	N=32 (<0.01%)
LOS	6.1 (7.9)	2.6 (2.1)	6.7 (8.9)	2.6 (2.1)

	Identified by CDC/HRSA/AIM SMM measure		Identified by refined SMM measure	
	Yes	No	Yes	No
SMM per 10,000	89.9	-	63.9	-

Source: HCUP Statewide Inpatient Databases 2019-2021.

Appendix A: List of Codes in the CDC/HRSA ARF and DIC Indicators

Table A1. ICD-10-CM Codes in the CDC/HRSA Acute Renal Failure (ARF) indicator definition

ICD-10 Code	Description
N170	Acute kidney failure with tubular necrosis
N171	Acute kidney failure with acute cortical necrosis
N172	Acute kidney failure with medullary necrosis
N178	Other acute kidney failure
N179	Acute kidney failure, unspecified
O904	Postpartum acute kidney failure

Table A2. ICD-10-CM Codes in the CDC/HRSA disseminated intravascular coagulation (DIC) indicator definition

ICD-10 Code	Description
D65	Disseminated intravascular coagulation [defibrination syndrome]
D688	Other specified coagulation defects
D689	Coagulation defect, unspecified
O45002	Premature separation of placenta with coagulation defect, unspecified, second trimester
O45003	Premature separation of placenta with coagulation defect, unspecified, third trimester
O45009	Premature separation of placenta with coagulation defect, unspecified, unspecified trimester
O45012	Premature separation of placenta with afibrinogenemia, second trimester

ICD-10 Code	Description
O45013	Premature separation of placenta with afibrinogenemia, third trimester
O45019	Premature separation of placenta with afibrinogenemia, unspecified trimester
O45022	Premature separation of placenta with disseminated intravascular coagulation, second trimester
O45023	Premature separation of placenta with disseminated intravascular coagulation, third trimester
O45029	Premature separation of placenta with disseminated intravascular coagulation, unspecified trimester
O45092	Premature separation of placenta with other coagulation defect, second trimester
O45093	Premature separation of placenta with other coagulation defect, third trimester
O45099	Premature separation of placenta with other coagulation defect, unspecified trimester
O46002	Antepartum hemorrhage with coagulation defect, unspecified, second trimester
O46003	Antepartum hemorrhage with coagulation defect, unspecified, third trimester
O46009	Antepartum hemorrhage with coagulation defect, unspecified, unspecified trimester
O46012	Antepartum hemorrhage with afibrinogenemia, second trimester
O46013	Antepartum hemorrhage with afibrinogenemia, third trimester
O46019	Antepartum hemorrhage with afibrinogenemia, unspecified trimester
O46022	Antepartum hemorrhage with disseminated intravascular coagulation, second trimester
O46023	Antepartum hemorrhage with disseminated intravascular coagulation, third trimester
O46029	Antepartum hemorrhage with disseminated intravascular coagulation, unspecified trimester
O46092	Antepartum hemorrhage with other coagulation defect, second trimester
O46093	Antepartum hemorrhage with other coagulation defect, third trimester

ICD-10 Code	Description
O46099	Antepartum hemorrhage with other coagulation defect, unspecified trimester
O670	Intrapartum hemorrhage with coagulation defect
O723	Postpartum coagulation defects