

Frequently Asked Questions (FAQs) on the Maternal Health Indicators (MHI) ^{Beta} Software, v2024

Prepared for: Agency for Healthcare Research and Quality U.S. Department of Health and Human Services 5600 Fishers Lane Rockville, MD 20857 https://qualityindicators.ahrq.gov/

Contract No. 75Q80119C00008

September 2024

Table of Contents

Maternal Health Indicators (MHI) Beta Software v2024 Product Information	1
Methodology	7
Using MHI Beta Software	8

Maternal Health Indicators (MHI) ^{Beta} Software v2024 Product Information

1. What is the purpose of Maternal Health Indicators module (MHI)?

The Maternal Health Indicators module aims to broadly address healthcare quality in the domain of maternal health and identify opportunities to improve complications during the antepartum, intrapartum, and postpartum periods. The intent of the module is to allow users to leverage claims data to generate area-level measures of maternal health. The v2024 release of measures addresses severe maternal morbidity (SMM) and death identified during the delivery hospitalization. Future measures in the module may address antepartum, postpartum, and other intrapartum maternal health indicators.

The beta software of the MHI module includes three measures related to SMM (two of which include in-hospital death) identified via delivery discharge claims data that can be used for population health analysis, surveillance, quality assurance, and research purposes. The MHI module is not intended to be used for accountability purposes or for comparison between hospitals.

2. What indicators are included in the MHI software?

The v2024 MHI measures are geographic area-level rates of SMM and mortality that could potentially be prevented by high quality health care during the inpatient hospital stay for delivery.

i. MHI 01 Severe Maternal Morbidity Rate (20 Indicators)

• This measure replicates the 20 SMM indicators used by the <u>Centers for Disease</u> <u>Control and Prevention (CDC)</u>, <u>AHRQ Fast Stats</u>, the <u>Health Resources and</u> <u>Services Administration (HRSA) Title V MCH Block Grant Program</u>, and the <u>Alliance for Innovation on Maternal Health (AIM)</u> (excluding blood transfusions¹).²

ii. MHI 02 Severe Maternal Morbidity (20 Indicators) Plus In-Hospital Mortality Rate

- This measure includes the 20 SMM indicators used by the CDC and HRSA (excluding blood transfusions) and adds in-hospital death.
- The inclusion of in-hospital death in MHI 02 aligns more closely with the approach in the Center for Medicare & Medicaid Services (CMS)'s Severe Obstetric Complications (SOC) measure (PC-07, CMS1028v2). However, since

¹ Blood transfusion is excluded because ICD coding of blood transfusion varies widely across facilities and regions and over time. There is general clinical consensus that transfusion of 1 unit of blood products does not in itself constitute SMM. However, current ICD coding cannot distinguish how many units of blood products were transfused. Blood transfusions account for the greatest proportion of patients identified as having an obstetric complication, but patients for whom this is the only identified numerator event represent a less severe outcome experience.

² The MHI measures are calculated using fiscal year 2025 ICD-10-CM/PCS coding.

MHI 02 is based on administrative claims data exclusively, it cannot include risk adjustment for laboratory or clinical values in the way the CMS SOC measure does.³

- iii. MHI 03 Refined Severe Maternal Morbidity (20 indicators) Plus In-Hospital Mortality Rate, Beta
 - This measure starts from the 20 SMM indicators used by CDC and HRSA (excluding blood transfusions), adds in-hospital death, and *adds refinements to*:
 - Acute Renal Failure: Requires dialysis;
 - Coagulopathy (including disseminated intravascular coagulation [DIC]): Removes non-specific codes from code set.
 - Please see the document entitled "<u>Scientific Rationale and Empirical Testing:</u> <u>Refinements to the Severe Maternal Morbidity Measure</u>" for more information.

The three MHIs include the following maternal health conditions that are identified by International Classification of Diseases, Tenth Revision, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) diagnosis and procedure codes and administrative discharge disposition data:

- Acute myocardial infarction
- Aneurysm
- Acute renal failure (with and without refinement)
- Acute respiratory distress syndrome
- Amniotic fluid embolism
- Cardiac arrest/Ventricular fibrillation
- Conversion of cardiac rhythm
- Coagulopathy (including disseminated intravascular coagulation) (with and without refinement)
- Eclampsia
- Heart failure/Arrest during surgery or procedure
- Puerperal cerebrovascular disorders
- Pulmonary edema/Acute heart failure
- Severe anesthesia complications
- Sepsis
- Shock
- Sickle cell disease with crisis
- Air and thrombotic embolism
- Hysterectomy
- Temporary tracheostomy
- Ventilation
- In-hospital mortality (MHI 02 and MHI 03 only)

³ Severe Obstetrics Complications Electronic Clinical Quality Measure (eCQM) Methodology Report, October 2021: <u>https://www.cms.gov/files/document/measure-methodology-report.pdf.</u>

3. Are any of the MHIs the same as the SMM measure used by CDC and HRSA?

MHI 01 is defined to replicate the SMM measure used by the CDC, HRSA and AIM (excluding blood transfusion). Note that MHI 01 (as well as MHI 02 and MHI 03) does not include the use of MS-DRGs in the denominator logic and utilizes only ICD-10-CM/PCS codes (*DX_Delivery* and *PR_Delivery*) for denominator identification, in contrast to the CDC/HRSA/AIM SMM measure that utilizes MS-DRGs to define its denominator.⁴ The removal of MS-DRGs is inconsequential and allows some users who do not have MS-DRGs in their data to calculate the measure.

4. Are any of the MHIs the same as the CMS Severe Obstetrics Complications measure?

MHI 02 is intended to align more closely with the CMS SOC measure, which includes inhospital mortality. However, MHI 02 does not allow for risk adjustment using laboratory or other clinical data the way that the CMS SOC does, since MHI 02 is constructed exclusively with claims data. By constructing MHI 02 with claims data, users without access to non-claims data sources can still leverage their data to generate area-level SMM rates. In addition, the CMS SOC measure excludes patients with a COVID diagnosis and either a COVID-related condition or procedure, while MHI 02 does not. Lastly, the CMS SOC measure limits deliveries to greater than or equal to 20 weeks gestation, while the MHI 02 measure does not have this restriction. <u>Table 1</u> summarizes the differences between these measures.

⁴ CDC measure information is here: <u>https://www.cdc.gov/maternal-infant-health/php/severe-maternal-morbidity/icd.html</u>. The full measure specification and logic is available from the Federally Available Data Resources, here:

https://mchb.tvisdata.hrsa.gov/Admin/FileUpload/DownloadContent?filename=FadResourceDocument.pdf&isForD ownload=true&year=2023

Measure	CDC/HRSA/AIM SMM Measure	MHI 01	MHI 02	MHL03	CMS Severe Obstetrics
component					Complications (SOC)
Numerator: 20 indicators	 Includes: Acute myocardial infarction Aneurysm Acute renal failure Acute respiratory distress syndrome Amniotic fluid embolism Cardiac arrest or ventricular fibrillation Conversion of cardiac rhythm Coagulopathy (including disseminated intravascular coagulation) Eclampsia Heart failure or arrest during surgery or procedure Puerperal cerebrovascular disorders Pulmonary edema or acute heart failure Severe anesthesia complications Sepsis Shock Sickle cell disease with crisis Air and thrombotic embolism Hysterectomy Temporary tracheostomy Ventilation 	(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
Numerator: includes in-	No	No	Yes	Yes	Yes
hospital mortality					

Table 1. 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 (SOC)
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
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

Measure component	CDC/HRSA/AIM SMM Measure	MHI 01	MHI 02	MHI 03	CMS Severe Obstetrics Complications (SOC)
Risk	No	Yes, by	Yes, by	Yes, by	Yes, by race and
stratification		race/ethnicity,	race/ethnicity,	race/ethnicity,	ethnicity
		poverty	poverty	poverty category	
		category	category	based on zip code,	
		based on zip	based on zip	state, year, payer,	
		code, state,	code, state,	and custom stratum	
		year, payer,	year, payer,		
		and custom	and custom		
		stratum	stratum		

*MHI=Maternal Health Indicators; CMS=Centers for Medicare & Medicaid Services; SOC=Severe Obstetric Complications; CDC=Centers for Disease Control and Prevention; HRSA=Health Resources and Services Administration; AIM=Alliance for Innovation on Maternal Health (AIM); SMM=Severe Maternal Morbidity.

5. Are these measures intended to be used for accountability?

No, these measures are designed for population health analysis, surveillance, quality assurance, and research purposes. The measures are developed at the area-level and can generate observed rates overall and by several strata, including race/ethnicity, payer, state, poverty category based on zip code, year, and a custom user-specified stratum. Users should consider known coding variation across states and regions when using the MHI software for surveillance.⁵ For users seeking an accountability measure, the CMS Severe Obstetric Complications measure was developed and designed for hospital-level accountability and comparison purposes. Please see the specifications for more details, here: https://ecqi.healthit.gov/ecqm/eh/2023/cms1028v1?qt-tabs_measure=measure-information.

6. What year of data do the SAS QI and CloudQI v2024 MHI Software support?

The v2024 software supports Fiscal Year (FY) 2024 (October 2023 to September 2024) data. The software is backward compatible, meaning that it supports visits classified under International Classification of Diseases, 10th Revision, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) retroactively through October 2015. Backward compatibility ensures users can analyze trend data/multiple years of data from 2015 forward, with a single version of the software.

Methodology

7. What inputs are needed to use the MHI software?

The data required for measuring the MHIs come from hospital discharge abstracts or billing claims (administrative data), which are readily available from many state data organizations and state hospital associations. Input data for the MHI software should contain delivery discharge abstracts.

8. How are the MHI denominators defined?

The denominators for the three MHIs are delivery discharges for patients between the ages of 12 and 55 delivering stillborn or live birth defined using ICD-10-CM/PCS diagnosis and procedure codes.

9. What levels of stratification are included in the software and what is the custom stratum option?

The MHI software generates observed rates overall and by race/ethnicity, payer, state, year, poverty category based on zip code, and a custom stratum.⁶ The custom stratum allows users to specify an additional identifier for the software to generate stratified observed rates; for

⁵ 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

⁶ The MHI software outputs rates by state of hospitalization. However, users have the option to specify patient state as the custom stratum.

example, users can specify a particular regional variable or sociodemographic factor to produce stratified rates for research and surveillance.

10. Is the AHRQ MHI software v2024 risk adjusted?

No, the MHI software is not risk adjusted at this time.

11. Do the MHIs incorporate post-delivery discharge events?

At this time, the MHIs are designed to measure only diagnoses and procedures identified during delivery discharges.

12. Why is blood transfusion not one of the MHI components?

ICD coding of blood transfusion varies widely across facilities and regions and over time. There is general clinical consensus that transfusion of 1 unit of blood products does not in itself constitute SMM. However, current ICD coding cannot distinguish how many units of blood products were transfused. Blood transfusions account for the greatest proportion of patients identified as having an obstetric complication, but patients for whom this is the only identified numerator event represent a less severe outcome experience.

13. Does the MHI beta module consider social determinants of health?

As with all AHRQ QIs, the software modules allow for those interested in examining differences by race/ethnicity, payer, state, year, and poverty category based on zip code to calculate measures stratified by these characteristics. In addition, the MHI ^{beta} software module allows users to stratify by a user-defined variable, which could be a health-system or region-specific variable. Allowing for stratifications by these important characteristics can aid states and health systems in designing programs targeting reductions in disparities in these health measures.

Using MHI Beta Software

14. Where can I download the AHRQ MHI Beta v2024 software?

The Windows version of the MHI ^{Beta} software can be downloaded from the AHRQ QI website by visiting the <u>CloudQI page</u>.

The SAS version can be downloaded from the SAS QI page.

15. Can I install the Windows version of MHI ^{Beta} Software on my desktop that also has WinQI installed?

Yes, the Windows version of the MHI ^{Beta} software can be installed alongside the WinQI software. If you have a previous version of CloudQI (v2023 or v2024) installed, you will receive a notification to upgrade to the latest version, v2024.0.1, when you launch the application. The installation guide for the software can be found on the <u>AHRQ QI website</u>.

16. Do I need any additional software to run the Windows version of the MHI ^{Beta} Software?

The only additional software needed is an internet browser, such as Google Chrome, Firefox, or Edge. Google Chrome is recommended, but any modern browser can be used.

17. What data do I need to import to compute MHIs in CloudQI?

To compute the MHIs in CloudQI, you may import the same inpatient discharge data file used for calculating the Patient Safety Indicators (PSIs). The only difference is that the "Hospital State" field is recommended on the input file for MHIs to stratify area-level reports. While this field is not required, if your inpatient discharge file contains it, rates can still be computed without any issues. In other words, if you import the inpatient discharge file once with/without the "Hospital State" field included, you can use that same file to compute rates for both PSIs and MHIs.

18. Since MHIs and PSIs use the same inpatient discharge file, can I generate combined rates for both in CloudQI?

No, currently, CloudQI allows you to generate rates for only one module at a time. Combined reports for MHIs and PSIs are not available at this time.

19. What types of reports are generated for MHIs in CloudQI?

CloudQI provides Area-level and Patient-level reports for MHIs.

20. Does the software generate observed rates for the individual indicators that comprise the MHIs?

The v2024 beta software only calculates observed rates for the MHIs. Users can analyze the individual indicators by reviewing the output of the MHI_MEASURE.sas program for SAS QI or the data export report in Cloud QI. Note, CloudQI users must enable "Temporary Flags" to output the individual indicators.

21. Is technical assistance available for users of the AHRQ MHI ^{Beta} Software v2024?

Yes, users may submit questions or feedback to <u>QISupport@ahrq.hhs.gov</u>.