## CBE ID

4715

## Title

CVD Risk Assessment Measure- Proportion of Pregnant/postpartum patients who receive CVD Risk Assessment with a standardized tool

## Project

Initial Recognition and Management

## Endorsement Status

Endorsed with Conditions

## E&M Committee Rationale/Justification

When the measure returns in 3 years for maintenance endorsement, the developer would have:

- Explored the impact of including patient refusal as an exclusion.
- Conducted further outreach and research with smaller or rural entities to explore potential burden associated with implementation and cost.

## Is Under Review

No

## Next Maintenance Cycle

Spring 2028

## Previous Endorsement Cycle

Spring 2025

## Initial Endorsement

Tue, 08/26/2025 - 07:40

## Steward

University of California, Irvine

## 1.0 New or Maintenance

New

## 1.1 Measure Structure

Single Measure

## 1.3 Electronic Clinical Quality Measure (eCQM)

No

## 1.6 Measure Description

The CVD Risk Assessment Measure represents the proportion of pregnant and postpartum individuals assessed for CVD risk using a standardized tool at the clinic and facility levels of health care service delivery. The CVD risk assessment identifies pregnant and postpartum individuals without an existing CVD diagnosis who may have cardiovascular disease (CVD) or are at an increased risk of developing CVD, thus necessitating further evaluation.

All pregnant and postpartum patients presenting for a prenatal or postpartum visit at a health care facility or hospital network office, including pregnant and postpartum minors, should be assessed for CVD risk. Clinicians who care for pregnant and postpartum individuals should conduct a CVD risk assessment with a standardized tool at least once during the patient's pregnancy. If necessary, the CVD risk assessment should be repeated when new symptoms arise during pregnancy or the postpartum period. The CVD risk assessment measure considers the percentage of pregnant and postpartum patients who have undergone CVD risk assessment, with the objective of obtaining a risk score for all (100%) eligible pregnant and postpartum patients. The measure can be used to calculate the percentage of patients assessed for CVD risk on a monthly, quarterly, or annual basis, depending on patient volume, thereby enabling the evaluation of clinic or facility performance.

As of April 2025, the CVD Risk Assessment, developed by the California Maternal Quality Care Collaborative (CMQCC), is the only validated tool available for universal assessment of CVD risk for pregnant and postpartum individuals. The assessment can be conducted manually using a paper format, or the algorithm can be integrated into electronic medical record (EMR) systems. The CVD risk assessment combines 18 parameters, including patient-reported symptoms, vital signs, and risk factors, with physical examination findings, to calculate a comprehensive risk score. Individuals are assigned one of two categories: at risk for CVD or not at risk for CVD. For individuals categorized as at risk for CVD, we recommend that the clinician order follow-up cardiac diagnostic testing. If the results are normal, we recommend that the clinician offer reassurance and maintain routine follow-up. If results are abnormal, we recommend the clinician order a consultation or referral to Maternal Fetal Medicine, Cardiology, or Internal Medicine. Individuals who receive a risk score of ≤3 are categorized as not at risk for CVD and thus do not require follow-up. The clinician may still decide to order follow-up testing at their discretion.

### 1.7 Composite Measure

No

### 1.7 Measure Type

Process

### 1.8 Level of Analysis

Clinician: Group/Practice, Facility

### 1.9 Care Setting

Ambulatory Care: Clinic, Ambulatory Care: Clinician Office, Birthing Center, Clinician

Office/Clinic, Hospital: Outpatient

## 1.10 Measure Rationale

Why measured entities should report this measure

According to the CDC, a staggering 80% of maternal deaths are preventable, indicating systemic failures in health care delivery[1]. In the United States (US), cardiovascular disease (CVD) related maternal deaths are primarily due to delays in recognition and diagnosis contributing to the rising trends in severe maternal morbidity (SMM) which result in short- and long-term health consequences for mothers and their children[2,3].

There is an urgent need to enhance the detection and management of CVD risk for pregnant, birthing, and postpartum individuals who engage with the health care system using a standardized and reliable approach[4]. Appropriate risk stratification, allocation of resources to develop Cardio-Obstetrics teams, and referral of high-risk cases to appropriate levels of care are crucial steps to improve healthcare delivery, mitigating complications due to undiagnosed or delayed diagnosis of CVD ultimately reducing healthcare costs[5]. Currently, the identification of CVD risk varies by the clinician's expertise and clinical judgment, and therefore, there is a need to implement a standardized risk assessment used by every clinician seeing a pregnant or postpartum patient in all clinical care settings.

According to the March of Dimes' most recent report for 2024, 1 in every 25 obstetric units in the U.S. has closed its doors in the past two years. Over one-third of US counties lack a single obstetric clinician, and in many regions, obstetrician-gynecologists (OBGYNs) and family physicians who deliver babies are exiting the workforce [6]. It is within this setting that the quality of patient care suffers most. The collection and reporting of data pertaining to the proposed measure facilitate a robust framework for data-driven quality improvement. By assessing the proportion of pregnant and postpartum patients who receive CVD risk assessment and their related health outcomes, clinicians and hospital networks can gain valuable insights on drivers of CVD-related maternal mortality and morbidity[5]. Recognizing that quality measures are a dynamic process it is expected that through a focus on process improvements involving several components of clinical care will lead to improvements in health outcomes.

How the measure will improve quality of care for patients

Pregnancy is a cardiovascular stress test that often leads to signs and symptoms similar to that of CVD that poses a real challenge for the time constrained healthcare provider to distinguish normal pregnancy from potential CVD. Pregnant individuals may be unaware of their underlying undiagnosed CVD that may lead to symptoms or abnormal physical examination findings arising for the first time during pregnancy or after delivery[5]. In this relatively young and healthy patient population, CVD is not always suspected. The CVD risk assessment measure aims for all (100%)

healthcare providers to perform CVD risk assessment in all (100%) pregnant/postpartum individuals. The measure will improve the quality of care for patients as it facilitates the recognition and early detection of previously undiagnosed or a new onset CVD, i.e., pregnancy associated cardiomyopathy. Timely diagnosis and treatment is imperative to ensure that pregnant/postpartum individuals receive the appropriate level of care and guideline-directed therapy that has shown to improve patient health outcomes, improve patient experience and clinical decision making[2,5].

How the measure will reduce associated health care costs

While research on the economic impact of maternal mortality and morbidity remains limited, one study estimates that the costs associated with maternal morbidity stemming from hypertensive disorders, cardiac arrest, and venous thromboembolism—exceed $7.5 billion[7]. This figure encompasses both medical and non-medical expenses incurred from conception until the child's fifth birthday and the authors caution that this is likely underrepresents the true economic burden. Another analysis that evaluated the long-term physical and psychological effects of each premature maternal death on society found that between 2018 and 2020, the economic burden of maternal mortality was estimated to account for a total of 113,953 years of potential life lost (YPLL) and $27.4 billion in value of statistical life (VSL)[8]. These figures highlight the substantial societal costs associated with the loss of mothers and revealed significant racial and ethnic disparities in the economic implications of maternal mortality. The urgency for action is clear, as these statistics reflect not only financial implications but also the lives and futures impacted.

Implementation and universal adoption of the CVD Risk Assessment measure in all care settings has the potential to reduce both short- and long-term healthcare costs associated with maternal mortality and morbidity among pregnant and postpartum individuals[2]. Targeted cardiac diagnostic testing guided by the standardized CVD risk assessment demonstrates a higher yield of abnormal findings on cardiac testing when compared to patients who completed follow-up testing based on clinician judgment alone[9]. This finding emphasizes the role of CVD risk assessment in allocating resources to those individuals who need that diagnostic test the most and is of particular value in low-resource settings.

Timely identification of CVD in pregnant and postpartum individuals, especially those with previously undiagnosed or newly recognized CVD-related conditions, is critical for facilitating early intervention. This proactive strategy seeks to mitigate the risk of severe morbidity or complications during labor and the postpartum period, ultimately leading to a reduction in healthcare costs and burdens. Individuals with CVD, particularly those with cardiomyopathy, face heightened risks of obstetric and neonatal complications, including major adverse cardiac events (MACE). One study found that CVD correlates with an adjusted increase of $2,598 per hospitalization, and increased length of hospital stay among pregnant people with CVD[10]. This underscores the necessity of early cardiac optimization and care management by a multidisciplinary team throughout pregnancy to prevent complications during childbirth and

realize cost savings through averted adverse outcomes.

CVD risk assessment provides a unique opportunity for improving patient quality of care by empowering clinicians to engage patients in meaningful conversations about their cardiovascular health and encouraging proactive adjustments to modifiable risk factors impacting long-term health outcomes and a decrease in future healthcare expenditures associated with CVD[10]. Embracing this preventive approach is essential for fostering healthier futures for mothers and families, ultimately benefiting our entire healthcare system.

What are the benefits or improvement in quality envisioned by use of this measure

The CVD Risk Assessment measure holds significant potential in enhancing the quality of maternal care and reducing maternal mortality and morbidity. The measure addresses the lack of Healthcare Effectiveness Data and Information Set (HEDIS) measures evaluating clinic and facility performance across essential dimensions of obstetric care, namely assessment of CVD risk. It is crucial for clinicians to prioritize heart health during pregnancy, even among this relatively young patient population, as this can make a significant impact on both maternal and infant health outcomes.

References:

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## 1.11 Measure Webpage

https://sites.uci.edu/cvdriskassessmentmeasures/quality-measures/

## 1.13 Data Dictionary

Attached

## 1.13a Attach Data Dictionary

CVD Risk Assessment Measure Codebook 6.12.2025 Final.pdf

## 1.14 Numerator

Number of pregnant and postpartum individuals who were assessed for CVD risk using a standardized tool

## 1.14a Numerator Details

The numerator includes the total number of pregnant and postpartum individuals who have undergone CVD risk assessment using a standardized tool as part of standard care during prenatal, Labor and Delivery (L&D), and/or postpartum visits at a designated clinic or health care facility over a specific time frame.

Pregnant and postpartum individuals of all ages, including minors, at any gestational age, or prior prenatal care at another clinic or health care facility, are included in the numerator.

Each pregnant and postpartum individual who receives a risk score is counted only once in the numerator. Although individuals attend multiple prenatal and postpartum visits throughout their pregnancy and the postpartum period, they are required to be assessed for CVD risk only once; therefore, multiple visits are treated as duplicates.

Prenatal, L&D, and postpartum visits are identified by CPT visit codes outlined in the CPT-ICD Codebook Data Dictionary attachment.

The measure can be calculated monthly, quarterly, biannually, yearly, etc., to assess clinic or health care facility performance.

Numerator Exclusions: Pregnant and postpartum individuals with a known pre-existing CVD diagnosis are excluded from the numerator. Individuals with existing heart problems are identified by ICD-10 codes as listed in Group C of the CPT-ICD Codebook (Data Dictionary attachment). Patients who have another reason for visiting the clinic [not prenatal or postpartum care] and have a positive pregnancy test but have not established the clinic as an OB provider (e.g., plan to terminate the pregnancy or seek prenatal services elsewhere) are excluded.

## 1.15 Denominator

Number of pregnant and postpartum individuals receiving prenatal and postpartum care from a specific clinic or health care facility.

## 1.15a Denominator Details

The denominator includes the total number of pregnant and postpartum individuals who present for a prenatal, L&D, and/or postpartum care visit at a designated clinic or health care facility over a specified time frame corresponding with the numerator.

Pregnant and postpartum individuals of all ages, including minors, at any gestational age, or prior prenatal care at another clinic or health care facility, are included in the numerator.

Individuals attend multiple prenatal and postpartum visits throughout their pregnancy and the postpartum period; multiple visits are treated as duplicates.

Prenatal, L&D, and postpartum visits are identified by CPT visit codes outlined in the CPT-ICD Codebook Data Dictionary attachment.

The measure can be calculated monthly, quarterly, biannually, yearly, etc., to assess clinic or health care facility performance.

## 1.15b Denominator Exclusions

The denominator excludes pregnant and postpartum individuals with a known pre-existing CVD diagnosis and clinic and health care facility visits that are not pregnancy-related.

### 1.15c Denominator Exclusions Details

Individuals with existing CVD or heart-related problems at the time of pregnancy are excluded from the denominator. Known pre-existing CVD is identified by ICD-10 codes as listed in Group C of the CPT-ICD Codebook Data Dictionary attachment.

Only prenatal, L&D, and postpartum clinic or health care facility visits, as listed in Group B of the CPT-ICD Codebook, are included in the denominator. Other types of clinic or health care facility visits not listed in the CPT-ICD Codebook are excluded, regardless of pregnancy status at the time of the visit. Patients who have another reason for visiting the clinic [not prenatal or postpartum care] and have a positive pregnancy test but have not established the clinic as an OB provider (e.g., plan to terminate the pregnancy or seek prenatal services elsewhere) are excluded.

### 1.15d Age Group

Other

### 1.15e Age Range in Years

8-55

### 1.16 Type of Score

Rate/proportion

### 1.17 Measure Score Interpretation

Better performance = Higher score

### 1.18 Calculation of Measure Score

1. Calculate the numerator by compiling the total number of pregnant and postpartum individuals who have undergone CVD risk assessment using a standardized tool as part of standard care during prenatal, Labor and Delivery (L&D), and/or postpartum visits at a designated clinic or health care facility

2. Specify the time frame: month, quarter, or year

3. Calculate the denominator by compiling the total number of pregnant and postpartum individuals who presented for a prenatal, L&D, and/or postpartum care visit at a designated clinic or health care facility

4. Specify the time frame corresponding to the numerator.

5. Divide the numerator value by the denominator value

6. Multiply the result by 100 to determine the percentage of pregnant or postpartum patients at a clinic or health care facility who were assessed for CVD risk with a standardized tool.

CVD Risk Assessment Quality Measure = (Pregnant + Postpartum patients who had a CVD risk assessment)/ (All Pregnant + Postpartum patients seen at a facility without prior history of known cardiac disease)

The aim is to perform a CVD risk assessment using a standardized tool on all (100 %) eligible pregnant/postpartum patients. Every single patient should be assessed for CVD risk at least once during their pregnancy and, if needed, additional times when new symptoms present during the pregnancy and/or postpartum period.

## 1.19 Measure Stratification Details

The measure is not stratified.

## 1.20 Types of Data Sources

Electronic Health Records, Paper Patient Medical Records

## 1.25 Data Source Details

As of May 2025, the cardiovascular disease (CVD) risk assessment tool developed by the California Maternal Quality Care Collective (CMQCC) *Cardiovascular Disease in Pregnancy and Postpartum Task Force* stands as the sole validated instrument for stratifying CVD risk in pregnant and postpartum individuals. This assessment encompasses a thorough evaluation of patient-reported symptoms, vital signs, risk factors, and auscultatory findings of the heart and lungs.

The tool is designed for integration with electronic health record (EHR) systems such as Epic and Cerner, facilitating direct retrieval of data from a patient's electronic health record. Additionally, a manual calculation is also possible using a paper version of the assessment. Patient monitoring can be efficiently conducted using an Excel spreadsheet, where scores obtained from the hardcopy assessment can be inputted for ongoing evaluation and tracking.

## 1.26 Minimum Sample Size

No minimum sample size required to calculate the measure.

## 2.1 Attach Logic Model

PQM-Logic-Model-CVD risk assessment 4.15.2025.docx

## 2.2 Evidence of Measure Importance

Improving the quality of prenatal, intrapartum, and postpartum care is a critical priority in the United States (U.S.) and globally[1]. Maternal Mortality Review Committees (MMRCs) across the U.S. have found that over 75% of pregnancy-related deaths attributable to CVD were preventable, indicating significant failures in healthcare delivery[2]. Delays in the recognition and diagnosis of CVD are significant contributors to this crisis and severe maternal morbidity (SMM), underscoring the urgent need for quality measures aimed at evaluating drivers of CVD-related mortality and morbidity throughout pregnancy and the postpartum period[3,4].

Evidence of the importance of CVD risk assessment is demonstrated through unequivocal endorsements by multiple national organizations advocating for comprehensive CVD screening during pregnancy and the postpartum period up to one year following childbirth. The Society for Maternal-Fetal Medicine (SMFM) emphasizes that pregnancy and the postpartum provides a window of opportunity to identify risk factors and improve women's long-term cardiovascular health[5]. In 2019, the American College of Obstetricians and Gynecologists (ACOG), published Practice Bulletin #212 on Pregnancy and Heart Disease, stating that “all women should be assessed for cardiovascular disease in the antepartum and postpartum periods.”[6] ACOG Practice Bulletins serve as evidence-based documents that summarize current information on techniques and clinical management issues for the practice of obstetrics and gynecology. Through multiple Scientific Statements and Advisories, the American Heart Association (AHA) has emphasized that a “comprehensive and standardized approach to screening and risk identification is key” among women and recommends that this essential evaluation take place at the first prenatal visit and continue throughout the postpartum period[7]. Furthermore, AHA highlights significant opportunities to bridge cardiology and obstetrics and gynecology through standardized protocols and enhanced cardiac screening for women[8].

Evidence of the proposed measure’s importance is also noted in the publication of and dissemination of toolkits and consensus patient safety bundles that compile collections of evidence-based practices intended to be uniformly applied to the care of every patient, in all appropriate care settings, in every episode of relevant care. The Improving Health Care Response to Cardiovascular Disease in Pregnancy and Postpartum Toolkit published by the California Quality Care Collaborative (CMQCC) provides an overview of clinical assessment and management strategies for CVD based on risk factors and presenting signs and symptoms for all health care providers who interact with women during the prenatal, intrapartum and postpartum periods[9]. Notably, the toolkit describes a first-of-its-kind algorithm to guide stratification and initial evaluation to assist providers in distinguishing between signs and symptoms of cardiac disease and those of normal pregnancy. The algorithm is intended to guide clinicians in the triage of further cardiac evaluation, appropriate referrals and follow-up of pregnant and postpartum women who may have CVD. The Cardiac Conditions in Obstetrical Care bundle, one of 8 core patient safety bundles published by the Alliance for Innovation on Maternal Health (AIM),

incorporates multidisciplinary care training, cardiac screening, patient education, and systems learning recommendations[10]. For this patient safety bundle, cardiac conditions refer to disorders of the cardiovascular system that may affect maternal health. As a part of the domain of recognition and prevention, the bundle emphasizes utilizing standardized cardiac risk assessment tools to identify and stratify risk. The Cardiac Conditions in Obstetric Care patient safety bundle does not introduce new guidance or evidence but summarizes existing recommendations to effectively implement best practices in all maternity care settings.

Multiple studies have also demonstrated the feasibility of introducing a CVD risk assessment tool into clinical practice[11]. Notably, clinician feedback has demonstrated the appropriate improvements in clinical care as evidenced by 67.9% of clinicians agreeing that using a standardized CVD risk assessment has a positive impact on their patients[12]. Accurate diagnosis of CVD in pregnant and postpartum women is of high importance as it relates to the allocation of healthcare resources. Recently published in the *American Journal of Obstetrics and Gynecology Maternal Fetal Medicine Journal*, "Results of Cardiovascular Testing among Pregnant and Postpartum Persons Undergoing Standardized Cardiovascular Risk Assessment," revealed that a standardized CVD risk assessment yielded more abnormal composite test results than clinician judgment alone (6.9% vs. 4.2%; $p < 0.0001$). Patients assessed for CVD had 1.69 times the odds of having an abnormal test than those tested based on clinician judgment alone ($p < 0.0001$)[13]. This publication supports the measure's potential in empowering healthcare providers to order targeted cardiac diagnostic testing specifically for those identified as at increased risk of developing CVD, thereby allowing efficient use of resources, and improving the likelihood of obtaining meaningful cardiac testing results.

Universal cardiovascular risk assessment during pregnancy and the postpartum period is also recommended as a strategy to advance maternal health equity through the identification of preexisting but previously unknown CVD, as well as diagnosis of new onset cardiomyopathy in a timely manner during the period of pregnancy and postpartum among individuals who may not otherwise interact with the health care system[14]. The proposed quality measure, CVD Risk Assessment Measure–Proportion of Pregnant/Postpartum Patients that Receive CVD Risk Assessment with a Standardized Instrument, has already been endorsed in the annual CMS Merit-based Incentive Payment Value Pathways since 2023, which requires physicians or clinical practices that bill a threshold volume of Medicare services to report clinical quality measures as part of the Merit-Based Incentive Payment System (MIPS)[15].

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## 2.3 Anticipated Impact

As outlined in the Logic Model, the implementation of the CVD risk assessment measure will increase clinician awareness of the role of cardiovascular health (CVH) during pregnancy and postpartum through clinician training on how to use the measure and through regular use of the measure as part of standard care. The overlap in symptoms women may experience during normal pregnancies and those associated with cardiac disease presents a diagnostic challenge. It is crucial for clinicians to be well-acquainted with risk factors, warning signs, and physical indicators that may suggest underlying cardiac conditions requiring further evaluation. Increased clinician awareness of CVH during pregnancy and the postpartum period similarly translates to increased patient awareness of CVD risk during pregnancy and postpartum as clinicians communicate with their patients for shared clinical decision making[1,2]. For example, the CVD risk assessment measure includes a heart and lung auscultation to complete the physical examination portion, presenting an opportunity for clinicians to communicate with their patients while conducting the auscultations why they are doing so.

Enhancing clinician awareness of CVD risk during pregnancy and the postpartum period is essential for closing the significant gap that CVD risk assessment aims to address, concerning delayed or undiagnosed CVD and instances of misdiagnosis. Accurate diagnosis of CVD-related disorders is crucial, as it directly influences guideline-adherent clinical care. For instance, a patient misdiagnosed with asthma rather than heart disease will have a different course of treatment, which at best may be ineffective and at worst may exacerbate the underlying cardiac disease, resulting in severe consequences, potentially jeopardizing the patient's life. Improved guideline-adherent clinical care results in improved quality of care, reducing the likelihood of Adverse Pregnancy Outcomes (APOs), CVD-related pregnancy and childbirth complications, and preventable CVD-related pregnancy-related deaths. Furthermore, evidence has shown that improved maternal health outcomes directly affect infant health outcomes[3].

Enhancing patient awareness of the risks of CVD during pregnancy and postpartum is crucial. This heightened awareness can inspire significant lifestyle modifications that not only enhance immediate well-being but also mitigate long-term risks for heart disease. Embracing habits such as a nutritious diet, regular physical activity, and the cessation of smoking can lead to a myriad of health benefits. Research has consistently shown that adopting these healthy behaviors during pregnancy yields substantial positive outcomes for both mothers and their developing children[4,5]. Fostering a proactive approach to CVH during this critical time can pave the way for healthier futures. A recent study published in the *Journal of Patient Experience* highlights a critical gap in patient understanding of CVD risk during pregnancy. The findings emphasize the importance of integrating CVD risk assessments into routine obstetrical care as an opportunity for enhancing individual and community health literacy, empowering patients to take control of their health and engage in proactive, sustainable behavior changes[6]. In this way, the proposed measure can bridge this knowledge gap during obstetrical encounters through empathetic, patient-centered communication with clinicians.

Information obtained from the CVD risk assessment measure not only contributes to individual cardiovascular health evaluations but also holds significant promise for shaping wider healthcare policies. Most notably, the measure could encourage and promote the importance of prevention and enhanced care management for pregnant and postpartum patients with CVD-related conditions. National organizations such as the American Heart Association (AHA) and the American College of Obstetrics and Gynecology (ACOG) further endorse the assessment of CVD risk before, during, and after pregnancy[7,8]. Additionally, data gathered using the measure can play a pivotal role in enhancing medical and nursing educational curricula, ensuring that future healthcare professionals understand how pregnancy acts as a physiological stress test and the appropriate identification of risk factors to prompt further evaluation.

Early detection and treatment of CVD during pregnancy and the postpartum period also present opportunities for health care cost-saving. For example, reducing preventable hospital readmissions or unanticipated complications during childbirth reduces overall costs to the health system as it relates to resource utilization[9-11]. CVD risk assessment is a solution to overexuberant health costs related to missed or delayed CVD-related diagnoses. While there is limited research on the economic burden of maternal mortality and morbidity, quantitative estimates are staggering, suggesting significant costs could be avoided. In one study of maternal morbidity conditions linked to childbirth, the estimated medical and non-medical costs associated with three cardiovascular-related conditions exceeded $7.5 billion ($7.5 billion hypertensive disorders; $10.9 million cardiac arrest; $6.4 million venous thromboembolism)[12]. Researchers emphasize that the economic impact of these conditions is likely significantly underestimated, affecting not only the health system but also burdening employers, public social service programs, and sectors beyond healthcare. Acknowledging that CVD-related deaths during pregnancy, childbirth, and postpartum is one of the leading causes of death, another analysis quantifying the impact of maternal mortality through years of potential life lost (YPLL) and value of statistical life (VSL) revealed a 30% increase in both metrics from 2018 to 2020, correlating with rising maternal mortality rates. Cumulatively, during the period from 2018 to 2020, the economic burden associated with maternal mortality was approximated at 113,953 YPLL and a VSL of $27.4 billion[13]. These numbers further demonstrate the urgent need for and importance of universal CVD risk assessment for all pregnant and postpartum women.

References

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## 2.4 Performance Gap

The performance gap analysis represents clinic-level performance scores for 57 OB/GYN, Maternal Fetal Medicine, and Family Medicine clinics located across four hospital networks: UCI Health, UCSD Health, Montefiore Medical Center, University of Tennessee/St. Thomas Health and Saint Luke's Health System[1]. Due to the limited patient volume at 12 clinics, those clinics with a performance denominator below 15 were deemed statistically unstable and subsequently excluded from this analysis. Performance scores for the 55 clinics were aggregated over four one-year periods from September 2020 through August 2024.

*Characteristics of entities included in this analysis*

- At UCI Health, located in Orange County, CA, 10 OB/GYN, Maternal Fetal Medicine, and Family Medicine clinics were included in this analysis.
- At UC San Diego Health, located in the San Diego region, CA, 15 OB/GYN and Family Medicine clinics were included in this analysis.
- At Montefiore Medical Center, located in the Bronx, New York City, NY, 20 OB/GYN, Maternal Fetal Medicine, and Family Medicine clinics were included in this analysis.
- At University of Tennessee/St. Thomas Health, located in the Nashville, TN region, 3 OB/GYN clinics were included in the analysis.
- At Saint Luke's Health System, located in the Kansas City, Missouri region, 10 OB/GYN and Family Medicine clinics were included in this analysis.

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## Table 1. Performance Scores by Decile

Performance Gap

| | Overall | Minimum | Decile_1 | Decile_2 | Decile_3 | Decile_4 | Decile_5 | Decile_6 | Decile_7 | Decile_8 | Decile_9 | Decile_10 | Maximum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean Performance Score | 0.30 | 0.00 | 0.00 | 0.02 | 0.07 | 0.13 | 0.18 | 0.26 | 0.42 | 0.48 | 0.59 | 0.90 | 1.00 |
| N of Entities | 70 | 11 | 11 | 3 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 3 |
| N of Persons / Encounters / Episodes | 123,895 | 75 | 75 | 2096 | 4918 | 4342 | 4747 | 5678 | 7434 | 7311 | 9607 | 77,687 | 69,581 |

## 2.4a Attach Performance Gap Results

PQM_Performance Gap_5.9.2025.xlsx

## 2.5 Health Care Quality Landscape

Individuals with undiagnosed or previously unrecognized cardiovascular disease (CVD) and those who develop new-onset CVD during pregnancy often present similarly, exhibiting overlapping symptoms and abnormal vital signs. However, timely diagnosis may be hindered, preventing these patients from receiving guideline-recommended management. Clinicians may overlook CVD in pregnant and postpartum patients whose presenting symptoms could indicate an underlying cardiovascular condition.

To address this issue, a standardized CVD risk assessment tool has been developed and validated

by the CMQCC CVD in Pregnancy and Postpartum Task Force. Establishing a quality measure is essential for ensuring clinicians effectively triage pregnant and postpartum patients, facilitating standardized follow-up protocols for further evaluation. The CVD risk assessment framework provides a systematic approach for assessing clinic- and facility-level performance regarding the integration of CVD risk assessments into obstetric clinical practice, thereby improving detection and management of CVD in this population.

The current landscape of cardiovascular risk assessment in pregnant and postpartum populations reveals a significant gap in robust clinical evaluation tools that effectively monitor both hospital and clinician performance. Additionally, there is a noted absence of HEDIS (Healthcare Effectiveness Data and Information Set) indicators specifically designed for pregnant and postpartum individuals that mandate CVD detection and risk assessment protocols utilizing validated assessment tools. While there are a multitude of risk assessment tools available for obstetric patients, these tools are limited to specific outcomes such as gestational hypertension and preeclampsia[1,2]. Other CVD general predictive models including the Framingham Risk Score (FRS) and QRISK assess 10-year risk prediction of CVD but are not specific to pregnancy and the postpartum period and therefore cannot be generalized to this population[3]. The proposed CVD risk assessment measure addresses this existing gap in evaluating maternal health care service delivery related to comprehensive CVD risk screening. The measure aim is to perform a CVD risk assessment using a standardized tool on all (100 %) eligible pregnant/postpartum patients. Every single patient should be assessed for CVD risk at least once during their pregnancy and, if needed, additional times when new symptoms present during the pregnancy and/or postpartum period.

Collaboratives across the United States are working to enhance maternal health outcomes through the implementation of toolkits and patient safety bundles such as the Cardiac Conditions in Obstetrical Care bundle, published by the Alliance for Innovation on Maternal Health (AIM), which has been discussed in earlier sections. Groups such as the Georgia Perinatal Quality Collaborative (GaPQC) and the Tennessee Initiative for Perinatal Quality Care (TIPQC) are spearheading quality improvement initiatives and adoption of the CVD risk assessment tool developed by CMQCC. However, the assessment of clinic and facility-level performance to complement this tool has not been widely adopted. We contend that while the tool itself is valuable for identifying pregnant and postpartum patients without a CVD diagnosis or new-onset cardiomyopathy, the equitable administration of this tool should be mandated as a quality improvement process measure.

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## 2.6 Meaningfulness to Target Population

To support the development of the CVD risk assessment measure, UCI formed a 14-member Technical Expert Panel (TEP) representing diverse stakeholders, including measure developers, cardiology, obstetrics, and maternal fetal medicine specialist clinicians, clinical informaticists, and patient advocates. TEP members convened virtually on a quarterly basis and provided input and feedback on the development, feasibility, and acceptability of the measure in clinical settings among clinicians and patients. Patient advocates on our TEP shared compelling insights, underscoring the fact that a greater number of healthy women exist compared to those exhibiting risk factors for heart disease. This reality highlights the urgent need for mothers to enhance their understanding of their bodies, enabling them to identify critical signs and risk factors with greater ease. Elevating awareness is not just vital for prevention; it serves as a powerful catalyst for ongoing advocacy. Comprehensive CVD risk assessments is essential in fostering informed shared decision-making and empowering women to take charge of their health.

Through a clinician survey conducted among the dedicated physicians and nursing staff at UCI and MMC, patient reactions emerged regarding the administration of the CVD risk assessment as a component of standard care (*unpublished data*). The majority of clinician respondents conveyed a positive perception of the influence that the CVD screening algorithm had on the health outcomes of their patients. Clinicians noted that patients who were found to be risk-positive exhibited concern, anxiety, and worried about their health. One clinician shared a poignant insight, describing a patient who felt overwhelmed by the implications of a positive screening, which necessitated follow-up appointments and additional evaluations. Despite the initial distress, respondents emphasized that their patients expressed satisfaction as their symptoms were acknowledged and taken seriously following the positive screening results. This underscores the importance of addressing patient concerns with empathy and support during the CVD risk assessment process. By doing so, patients feel acknowledged, and it offers an opportunity to communicate vital information regarding CVD risk and pregnancy to enhance patient understanding and engagement.

We solicited feedback through a qualitative study to gather additional insights from patients following CVD risk assessment using a standardized tool. Patients identified as having an elevated risk for CVD were recruited from Montefiore Medical Center in New York, and from general obstetrics/gynecology, family medicine, and high-risk obstetrics clinics at UCI, representing a diverse range of demographics and comorbidities. The findings from these interviews, published in the *Journal of Patient Experience* under the title “Patient Experiences and Behavioral Changes Following Cardiovascular Risk Assessment During Pregnancy and Postpartum,” highlighted an

increased awareness among patients regarding the risks of CVD during and postpartum. One participant illustrated this point, stating, “I didn’t know CVD was something that pregnant women would be at risk of” (Participant 2). Although the primary objective of the study was to evaluate behavioral intent related to CVD risk, many participants reported already having implemented lifestyle modifications by the time of the interview. This suggests that the CVD risk assessment may empower patients to leverage health information effectively for health promotion and disease prevention. Furthermore, we found that patients largely accepted the CVD risk assessment process and considered it an effective catalyst for fostering communication between providers and patients about mitigating modifiable CVD risk factors.

Clinicians have overwhelmingly expressed their support and consistently acknowledge that the process of conducting the CVD risk assessment with their pregnant and postpartum patients does not place a significant burden on their clinical workflows.

## 3.1 Contributions Towards Closing Care Gaps

Evidence of Known Disparities:

Maternal and infant health disparities are closely tied to social determinants, which encompass the conditions in which individuals are born, grow, live, work, and age, as well as their access to power, financial resources, and essential services. These factors significantly influence maternal health outcomes. The domains affecting these disparities can be broadly categorized into economic, educational, physical environment, social and community context, health behaviors, and healthcare access. Within these categories, there are specific subdomains and corresponding indicators as outlined by the World Health Organization.[1].

Of particular relevance to the proposed measure are disparities related to race/ethnicity, insurance status, insurance type, and access related to urban versus rural geographic location.

*Evidence of Racial/Ethnic Disparities*

Racial and ethnic disparities in maternal mortality and morbidity persist with Black, Native Hawaiian/Pacific Islander, and American Indian/Alaska Native patients consistently representing significantly higher rates compared to their White counterparts[2,3]. Maternal health status and associated clinical comorbidities are a result of deeply rooted inequities in the provision of health care at the system level, the provider level, and the patient level[4]. Clinical care during pregnancy, childbirth, and the postpartum period is an important determinant of maternal outcomes with earlier recognition of a previously unknown CVD or a timely diagnosis of pregnancy-associated cardiomyopathy representing a significant gap in care that drives the CVD contribution to maternal mortality[5]. Communication failures and differential treatment may be manifestations of

implicit bias in health care, resulting in inequities in maternal mortality and morbidity. For example, minority and/or low-income patients may feel that clinicians do not have time to listen to their concerns and may either not report their symptoms or the symptoms may be ignored[10]. Studies show that African-American patients are less likely to receive cardiovascular therapies of proven benefit, and have worse outcomes after such procedures and more frequently receive medical and surgical care from lower quality health care providers and facilities and experience higher mortality[4,5,6]. Furthermore, research suggests inequitable guideline directed medical therapy[8]. Studies also show that American Indian/Alaska Native birthing people have a significantly higher likelihood of developing infections, postpartum hemorrhage, and gestational diabetes compared to White birthing people. Higher burden of chronic diseases among American Indian/Alaska Native individuals including mental health conditions, violence, and substance use further exacerbate these disparities[9].

*Evidence of Health Insurance Disparities*

Recent data published by the National Center for Health Statistics, indicate that in 2023, 51% of births were covered by private health insurance, 41.5% by Medicaid, 4.4% were self-pay which can be considered uninsured population, and 3.2% were covered by other insurance including Indian Health Service, TRICARE, and other governmental insurance or charities[11]. As it relates to the proposed measure, health insurance status and insurance type are important considerations when estimating potential costs associated with follow-up cardiac diagnostic testing as clinicians are directed to order for patients determined to be at increased risk of developing CVD.

*Evidence of Urban versus Rural Disparities*

Urban-rural health disparities are well documented in the literature and of particular concern as it relates to accessing care during pregnancy and the postpartum period. Studies has shown that rural residents have higher rates of severe maternal morbidity (SMM) and mortality compared to urban residents[12,13]. Pregnant and postpartum patients in rural regions of the U.S. face significant barriers to quality maternity care and often must travel hundreds of miles for routine prenatal and postpartum visits. Time is valuable in rural clinical settings and assessment of CVD risk should be among priorities for this vulnerable population.

Methodology:

The CVD risk assessment measure seeks to create equity through universal CVD risk assessment during pregnancy and the postpartum period. This measure produces or sustains equity by serving as a clinic or health care facility policy to improve the quality of patient care through 100% of clinicians conducting a standardized CVD risk assessment for 100% of eligible pregnant and postpartum patients seen at a specified clinic during a specified time frame. The accountable entities that are reported in this submission represent a large, geographically and ethnically diverse patient population.

*Demographically Diverse Patient Population*

Demographic characteristics including the racial and ethnic identities, health insurance status and type, and age, of nearly all patients included in our sample were reported by the entity pulled directly from what was recorded in the patient's medical record.

*Geographic Distribution*

The measure was tested at 5 hospital networks located across the U.S.: University of California, Irvine and University of California, San Diego, both located in Southern California on the West coast of the U.S.; Saint Luke's Health System and University of Tennessee/St. Thomas Health located in the Midwest and Southern U.S.; and Montefiore Medical Center located in the Bronx, New York City. These clinic sites represent dense urban populations as well as low-resource settings, FQHCs, and community health systems. Although part of an academic health center, several facilities associated with the University of Tennessee, can be considered non-academic.

In addition to the accountable entities listed in the submission, we also received data from the Northeast Georgia Health System (NGHS), a not-for-profit community health system consisting of five hospital campuses serving 19 counties in northeast Georgia and the Atlanta area. As part of their efforts to improve maternal health outcome in the region, NGHS has successfully implemented the paper-based CVD risk assessment developed by CMQCC in the hospital inpatient setting. This assessment is completed during the morning evaluation following delivery and is uploaded to the patient's chart. Additionally, postpartum doulas in the region have undergone specialized training to effectively conduct a modified paper version of the CVD risk assessment—without physical examination—during their home visits with clients enrolled in a home-visiting program. By meeting women and their infants in the comfort of their own homes, postpartum doulas facilitate this crucial assessment, ensuring a personalized and supportive experience. When clients are determined to be at risk, doulas proactively encourage them to seek essential clinical care.

Results/Interpretation:

While the proposed measure does not mandate stratification, the collection of patient demographics—such as race, ethnicity, insurance coverage, age, and zip code—presents valuable opportunities for accountable entities to perform a more nuanced evaluation of clinic and facility performance at their discretion leading to targeted quality improvement initiatives to address these disparities.

Results from NGHS represent significant promise in supporting CVD risk assessment among pregnant and postpartum patients located in rural regions through manual paper versions. The CVD risk assessment has significantly increased provider awareness of CVD during pregnancy and postpartum and has led to an additional 56 ambulatory referrals (Data as of 12/5/2023 shared by HOPE for Georgia Moms). As of October 2024, within just three months of initial implementation, postpartum doulas have already identified two clients who were at risk and subsequently

diagnosed with cardiomyopathy. This highlights the impactful role doulas play in early detection and intervention. Our team is in contact with HOPE for Georgia Moms and the Georgia Perinatal Quality Collaborative (GaPQC) for continued updates on integrating doula-partnered care to improve maternal and infant health outcomes.

Anticipated Impact:

Acknowledging persistent disparities, it is essential to prioritize the implementation of this measure for clinicians serving groups at heightened risk for CVD-related morbidity and mortality.

We envision that the enhanced integration of both an Electronic Health Record (EHR) embedded and a paper version of the CVD risk assessment will drive widespread adoption across diverse clinical settings, with high, medium, or low resource levels. We anticipate that more clinicians in rural areas will find it helpful to utilize tools that help determine which patients should be referred for further CVD testing in more specialized clinics. While this approach has shown promising results within the U.S. healthcare system, we anticipate that the CVD risk assessment can be successfully implemented in international contexts, ultimately benefiting mothers and their families worldwide.

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## 4.1a Data Structure and Availability

Data elements required to calculate the CVD risk assessment measure include:

1. Clinic- or facility-level prenatal and postpartum OB or Family Medicine visit data within a specified time frame (e.g., monthly, quarterly, bi-annually)
2. Risk scores of all eligible pregnant and postpartum patients who attended prenatal or postpartum visits at designated OB or Family Medicine clinics within a defined time frame. The numerator includes those patients classified with a risk score (either "Not at Risk" or "At Risk") recorded in the electronic health record (EHR) or maintained in Excel formats. Conversely, the denominator encompasses all pregnant and postpartum patients attending these visits, irrespective of their risk score status.

To note, patient information required to calculate the risk score of the CVD risk assessment may vary.

## 4.1b Implementation Costs and Burden

Patient Burden - Costs Associated with Follow-Up Cardiac Diagnostic Testing:

A positive risk assessment will trigger follow-up tests and potentially additional visits to maternal-fetal medicine (MFM) or cardiology specialists. Utilizing BNP (B-type natriuretic peptide), EKG (electrocardiogram), and echocardiography during pregnancy provides crucial diagnostic information without placing a significant burden on healthcare resources. However, if insurance plans require a co-payment for echocardiograms, this **can create a financial strain for patients**. During the implementation of the cardiovascular disease (CVD) algorithm, there were

instances where insurance companies refused to pay for transthoracic echocardiograms without prior authorization. To mitigate this burden, the CVD risk assessment algorithm recommends that all patients with a positive risk assessment should first undergo evaluation with a BNP test and an EKG, followed by an echocardiogram when there is an abnormal BNP or EKG result, or if there is a clinical suspicion of heart failure or valvular disease, as transthoracic echocardiograms are more resource-intensive. While echocardiography has historically been considered the gold standard for diagnosing conditions during pregnancy, recent trends support the use of less resource-intensive tests like BNP and EKG for the detection of CVD in pregnant patients. BNP levels remain stable throughout pregnancy but can increase acutely in cases of heart failure or hypertensive disorders of pregnancy[1,2]. A meta-analysis on the use of BNP in pregnancy reported that a normal BNP result has a negative predictive value exceeding 90% for cardiac complications[3]. Similarly, studies show that a normal EKG has over a 90% negative predictive value in evaluating patients with heart failure. Smaller prospective studies confirm that up to 65% of pregnant patients identified as at risk of developing CVD exhibit abnormalities on their EKG [4,5].

Co-pays, deductibles, out-of-pocket maximums, and coinsurance rates vary significantly based on each patient's health insurance. The costs associated with echocardiograms differ dramatically depending on these factors, all of which are contingent upon an individual's health insurance plan. In the U.S., prices fluctuate significantly, with one study revealing substantial disparities not only between different hospitals but also among patients within the same facility[6]. Generally, patients with Medicaid insurance tend to pay less compared to those with private insurance. A notable exception is Kaiser Health Insurance, which covers 100% of the cost of a "stress test" if the patient has reached their annual out-of-pocket maximum[7]. To help avoid the financial burden of follow-up tests, it is recommended that pre-authorization is requested at the time of referral, ensuring that it is in place when the echocardiogram is scheduled. Some hospital networks classify echocardiograms as radiology procedures, thus avoiding co-pays. However, subsequent referrals to cardiology may still incur co-pays. By understanding and navigating these strategies, the financial burden associated with follow-up assessments can be minimized.

Burden to IT department - Need to dedicate resources for the integration of the risk assessment tool into the EHR:

The integration of the CVD risk assessment tool into EHR systems will require resource allocation from their respective IT departments. Various non-academic and community-based healthcare settings may lack the robust IT support needed for a seamless integration process. However, as part of our network, IT programmers are committed to sharing their scripts and implementation procedures with new facilities, as well as providing troubleshooting support. Furthermore, the UCI Cardio-Obstetrics team has collaborated with clinicians, researchers, and implementers to overcome barriers to tool approval and clinician training. At UCI, we have successfully facilitated the implementation of this tool in EHR systems such as EPIC and Cerner, with detailed implementation guidelines accessible on the UCI website (https://sites.uci.edu/cvdriskassessmentmeasures/). It's important to note that variations exist in the platforms utilized by different EPIC and Cerner instances, meaning that some facilities will need to modify the provided scripts during integration. As adoption expands among networks and clinics, we will continue to document our experiences and pair new networks with those who have

effectively implemented the tool. Our strategy involves not only chronicling these experiences but also establishing workgroups aimed at exploring potential integration methods for the risk assessment tool within EHR software frameworks. In light of the challenges faced by non-academic and community-based settings—where IT support for EHR integration might be limited—some facilities may opt for a manual administration of the risk assessment tool instead. This will likely necessitate additional staff resources for the entry and maintenance of results in an Excel spreadsheet to ensure consistent monitoring and follow-up.

Burden to Clinicians – Administrative Approvals: The main implementation burden for clinicians is to secure the necessary approvals from hospital or clinic management to integrate the tool into the EHR system. Once the tool is integrated into the EHR, clinicians can spend less than 30 seconds administering it and obtaining a CVD risk score.

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## 4.1c Confidentiality

The Health Insurance Portability and Accountability Act of 1996 (HIPAA) and the guidelines set forth by the Institutional Review Board (IRB) provide frameworks that ensure that all accountable entities, including hospitals and medical centers, adhere to stringent protocols designed to protect the privacy and security of personally identifiable information while permitting the use of

aggregated data for quality improvement measures. For clinics with small patient volume, we recommend using longer periods (quarterly instead of monthly reporting, or annual instead of quarterly reporting) to obtain more stable and meaningful estimates.

### 4.3 Feasibility Informed Final Measure

Once the CVD risk assessment tool is implemented in the EHR, data can either be integrated for risk score calculations or documented on paper and later tracked in Excel for manual calculations. The UCI team has worked on automating the quality measure so that performance reports can be sent to clinic sites. However, it is important to note that clinics with low obstetric patient volumes may produce highly variable monthly reports.

In collaboration with UCI IT, an automated EHR report was developed that compiles all prenatal and postpartum clinic visits. This report extracts protected health information (PHI) from the EHR, and the data is filtered and sorted to represent the number of prenatal and postpartum appointments. The reports are stored in a secure drive accessible only to authorized personnel. The report is based on the risk score generated after the patient is assessed for CVD risk using the assessment tool. Once the clinician completes the assessment, the EHR updates the patient's status to "screened." As a result, when the report is generated for a specified time period, it includes data on patients marked as either 'screened' or 'not screened.' The data is sorted by clinic sites, and a percentage is generated for each site's performance. The performance measure helps to identify which sites may need additional support to ensure that more patients are screened in a timely manner. The overall goal is for all clinicians to conduct a CVD risk assessment for all eligible pregnant and postpartum patients.

### 4.4 Proprietary Information

Proprietary measure or components (e.g., risk model, codes), without fees

### 4.4a Fees, Licensing, or Other Requirements

NCQA disclaims all liability for the use or accuracy of any third-party codes contained in the specifications.

THE CVD RISK ASSESSMENT MEASURE AND SPECIFICATIONS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND.

### 5.1.1 Data Used for Testing

EHR and manual data of all pregnant and postpartum patients from five large hospital networks from September 2020 through August 2024.

### 5.1.1a Dates of Testing Data

Field not required Spring 2025.

### 5.1.2 Differences in Data

None.

### 5.1.3 Characteristics of Measured Entities

For the data analysis presented in this submission, several hospital networks extracted and transferred data of all pregnant and postpartum patients from September 2020 to August 2024, resulting in a dataset of over 80,000 patient records. These partners represent geographically and ethnically diverse hospital networks across the U.S. They include regional Level 3 birthing centers with the full scope of inpatient and outpatient hospital services and affiliated community and private medical clinics. All hospitals have OB/GYN residency programs, a high volume of Medicaid patients, and a diverse racial and ethnic demographic mixture.

1. University of California, Irvine/ UC Irvine Health (UCI Health), Orange, CA - 1,500 births annually
2. University of California, San Diego/ UC San Diego Health (UCSD Health), San Diego, CA - 3,000 births annually
3. University of Tennessee/St. Thomas Health (UTenn) Nashville, TN - 11,000 births annually
4. Albert Einstein College/Montefiore Medical Center (MMC) Bronx, New York City, NY - 5,000 births annually
5. Saint Luke’s Health System (SL), Kansas City, Missouri  - 5,000 births annually

### 5.1.4 Characteristics of Units of the Eligible Population

We included all pregnant and postpartum patients at the health care facilities. The only exclusion criteria were obstetric patients with previously known CVD.

Age and Race/Ethnicity of Pregnant and Postpartum Patients Assessed for CVD Risk at Five Hospital Networks:

- <35 years: 79.6%
- 35+: 20.4%
- Non-Hispanic White: 47.7%
- Non-Hispanic Black: 13.1%
- Hispanic: 25.9%
- Asian/Pacific Islander: 5.3%
- Other: 3.7%
- Unknown: 4.3%

### 5.2.1 Level(s) of Reliability Testing Conducted

Person or encounter level (i.e., data element) (e.g., inter–abstractor reliability), Accountable entity level (i.e., measure score) (e.g., signal-to-noise analysis)

### 5.2.2 Method(s) of Reliability Testing

Data element testing is supported by literature describing the reliability of EHR data at the **clinician-level.** Clinician-level data was obtained via the EHR. The clinician who administered the CVD risk assessment is associated with each patient's completed risk score. In the EHR this is indicated by VISIT_PROV

- For each clinician, the total number of pregnant and postpartum patients seen during a specified time period was calculated
- For each clinician, the number of pregnant and postpartum patients who they assessed for CVD risk using the CVD risk assessment embedded in the EHR
- Clinician-level performance was calculated by dividing the number of pregnant and postpartum patients who they assessed for CVD risk using the CVD risk assessment embedded in the EHR by the total number of pregnant and postpartum patients seen during a specified time period

Evidence from literature demonstrates the reliability of using EHR data elements by assessing dimensions of data quality, including completeness, correctness, concordance, plausibility, and currency.

- Weiskopf NG, Weng C. Methods and dimensions of electronic health record data quality assessment: enabling reuse for clinical research. J Am Med Inform Assoc. 2013 Jan 1;20(1):144-51. doi: 10.1136/amiajnl-2011-000681. Epub 2012 Jun 25. PMID: 22733976; PMCID: PMC3555312.
- Chan KS, Fowles JB, Weiner JP. Review: Electronic Health Records and the Reliability and Validity of Quality Measures: A Review of the Literature. Medical Care Research and Review. 2010 Oct;67(5):503–27

Signal-to-Noise reliability ratios were calculated to test the reliability of the measure at the **accountable entity level.**

Clinics with a performance denominator below 10 were deemed statistically unstable and subsequently excluded from this analysis (n=10 excluded). We also eliminated clinics with a relatively large sample size (denominator or n) that could have a disproportionate influence (n=3 excluded).

- Exclude if n>75$^{th}$ percentile +1.5* (interquartile range)
- Calculate the 25$^{th}$ and 75$^{th}$ percentiles of n across 55 clinics
- Use empirical Bayes shrinkage with $n^2$ weighting to estimate the signal and noise variances.

  $A\hat{} = \sigma^2_{(provider\text{-}to\text{-}provider)}$

  $Si^2 = \sigma^2_{error}$

- Calculated using Reliability=$(\sigma^2_{(provider\text{-}to\text{-}provider)}) / (\sigma^2_{(provider\text{-}to\text{-}provider)} + \sigma^2_{error})$ for each clinic

### 5.2.3 Reliability Testing Results

Clinician-level Results: In the attached analysis, clinician performance is characterized by obstetric patient volume.

Provider N: 655

Mean: 28.6%

SD: 28.4%

Median: 21.4%

Lower Quartile: 0.0%

Upper Quartile: 50.0%

Accountable entity level Results:

k: 56

A (Signal Variance): 0.0609

SD: 0.2468

b-hat (mean): 0.473

V-bar: 0.000064

Median Reliability: 0.992

Min SNR: 0.688

Max SNR: 1.00

### 5.2.3a Attach Additional Reliability Testing Results

Reliability Testing Results 5.13.2025.xlsx

### 5.2.4 Interpretation of Reliability Results

Among 655 clinicians, the average performance score was 28.6%, indicating that clinicians assessed just over a quarter of their eligible pregnant and postpartum patients for CVD risk. As shown in the attached results, clinicians with a higher volume of patients performed better than the average, with a 46.7% average performance score among these clinicians, indicating nearly half of their patients were assessed for CVD risk. Overall, these results indicate room for improvement as the goal is for 100% of clinicians to assess CVD risk for 100% of their eligible pregnant and postpartum patients.

The signal in this case is the proportion of the variability in measured performance that can be explained by real differences in performance. A reliability of zero implies that all the variability in a measure is attributable to measurement error. A reliability of one implies that all variability is attributable to real differences in performance. The median reliability is equal to 0.992, meaning the variability is mostly attributable to real differences in performance, not error (noise). Our results demonstrate consistent and dependable results across clinics, supporting the quality measure's reliability.

### 5.3.1 Level(s) of Validity Testing Conducted

Person or encounter level (i.e., data element) (e.g., sensitivity and specificity), Accountable entity level (i.e., measure score) (e.g., criterion validity)

### 5.3.2 Type of Accountable Entity Level Validity Testing Conducted

Empirical validity testing at the accountable entity-level (e.g., criterion validity, construct validity, known groups analysis), Systematic assessment of face validity of the measure's performance score as an indicator of quality or resource use

### 5.3.3 Method(s) of Validity Testing

Face Validity: We reviewed the measure specifications with our Technical Expert Panel (TEP). Our TEP comprises 12 members representing Measure Developers, Patients, Clinicians, Electronic Health Record (EHR) Information Technology Experts, Faculty Representatives/ other Stakeholder Groups with expertise in Cardiology, Obstetrics and Gynecology, Statistics, Healthcare, Administration, Measure Development, and Patient Care. Multiple TEP meetings were dedicated to orienting TEP members to the entire PQM and the Endorsement & Maintenance Process, review and feedback on each submission sections, feedback obtained following each cycle where

we submitted, and feedback on how to address concerns raised in previous unsuccessful submissions. Of the 12 TEP members, at least 8 attended each TEP meeting. At each TEP meeting, decisions were made based on 100% consensus from TEP members.

- Specific questions posed to the TEP included the validation of ICD-10 codes for confirmed CVD diagnosis. The codes listed in CVD Risk Assessment Codebook (Data Dictionary attachment). ICD-10 codes were revisited on an annual basis and if additional codes were identified by co-investigators during chart review of patients with confirmed CVD diagnosis, these codes were presented to the TEP for approval. 100% consensus was achieved through an emailed poll. All 12 members approved of the inclusion of additional CVD codes, after which the UCI team amended the IRB to include these additional codes. Once approved by the UCI IRB, the Codebook was updated. Previous evidence has demonstrated the reliability of ICD-10 data elements, including the numerator, denominator, and exclusions, using acceptable methodologies.
    - Stausberg, J., Lehmann, N., Kaczmarek, D., & Stein, M. (2008). Reliability of diagnoses coding with ICD-10. International Journal of Medical Informatics, 77(1), 50-57. doi:10.1016/j.ijmedinf.2006.11.005

Empirical Validity Testing: Pearson Correlation Coefficient (r) was calculated to assess the empirical validity of the measure. For each site, the rate for the measure and the rate for previously unknown CVD diagnosis at the clinic level were compared. We expect the CVD diagnosis rate to be positively correlated with Measure 1 (screening rate) at the entity level. Entities serving patients at higher risk for CVD are likely to have higher screening rates.

### 5.3.4 Validity Testing Results

Face Validity: 100%

The TEP agreed that the Z- and R-codes do not represent CVD diagnosis but that the other identified ICD-10 codes should be added to the Codebook. These codes included: I34.0: Nonrheumatic mitral (valve) insufficiency; I07.1: Rheumatic tricuspid insufficiency; I71.00: Dissection of unspecified site of aorta; I50.31: Acute diastolic (congestive) heart failure; I47.11: Inappropriate sinus tachycardia, so stated; I47.10: Supraventricular tachycardia, unspecified; Q21.11: Secundum atrial septal defect; I42.9: Cardiomyopathy, unspecified; I27.29: Other secondary pulmonary hypertension; I45.6: Pre-excitation syndrome; O99.413: Diseases of the circulatory system complicating pregnancy, third trimester; Q24.9: Congenital malformation of heart, unspecified

Pearson Correlation Coefficient =0.0719

p-value=0.554

### 5.3.5 Interpretation of Validity Results

The TEP unanimously agreed to the inclusion of additional ICD-10 codes to capture confirmed

CVD diagnoses. This iterative process of validating current and new ICD codes among clinicians, patients, and clinical informaticists is important as ICD-10 codes and billing processes evolve over time. Their input has proved critical in understanding the use of ICD-10 codes for confirming CVD, as well as those that are not used in practice.

The coefficient shows a moderate positive correlation of 0.0719 ($p$ =0.554 ), meaning that the CVD risk assessment measure and CVD diagnosis rate are positively correlated at the clinic level.

### 5.4.1 Methods Used to Address Risk Factors

No risk adjustment or stratification

### 6.1.1 Current Status

In use

### 6.1.2 Current or Planned Use(s)

Quality Improvement with Benchmarking (external benchmarking to multiple organizations)

### 6.1.2a Other Current or Planned Use

The Cardiovascular Disease (CVD) Risk Assessment Measure - Proportion of Pregnant/Postpartum Patients that Receive CVD Risk Assessment with a Standardized Instrument) was included in the 2024 CMS Merit-based Incentive Payment (MIPS) Value Pathways (MVPs).

### 6.1.3 Program Details

Name of the program and sponsor
Cardio-Obstetric Program, University of California, Irvine, School of Medicine, Department of Obstetrics and Gynecology
URL of the program
https://sites.uci.edu/cvdriskassessmentmeasures/
Purpose of the program
The purpose of the UCI Cardio-Obstetric Program is to promote universal CVD screening of pregnant and postpartum women and to develop and test tools that predict CVD risk among this specific patient population..
Geographic area and percentage of accountable entities and patients included
Orange County; (n=3734 patients, ~4% of total number of pregnant and postpartum patients assessed for CVD risk using the measure from September 2020-August 2024).
Applicable level of analysis and care setting

1,500 births annually

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Name of the program and sponsor
University of California, San Diego, School of Medicine, Department of Obstetrics, Gynecology, and Reproductive Sciences
URL of the program
https://health.ucsd.edu/care/pregnancy-birth/prenatal-care/maternal-fetal-medic…

Purpose of the program
Our team of board-certified perinatologists, neonatologists, radiologists, anesthesiologists and pediatric surgeons is committed to providing personalized, family-centered care.
Geographic area and percentage of accountable entities and patients included
San Diego County; (n=13,459 patients, ~14% of total number of pregnant and postpartum patients assessed for CVD risk using the measure from September 2020-August 2024).
Applicable level of analysis and care setting

3,000 births annually

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Name of the program and sponsor
University of Tennessee/St. Thomas Health (UTenn)
URL of the program
https://www.tnmfm.com/default.aspx
Purpose of the program
The specialists at Tennessee Maternal Fetal Medicine want to assure you that we are prepared to care for your pregnancy concerns, ranging from routine prenatal testing to expertise in complications during pregnancy.
Geographic area and percentage of accountable entities and patients included
Middle Tennessee; (n=69,581 patients, ~75% of total number of pregnant and postpartum patients assessed for CVD risk using the measure from September 2020-August 2024).
Applicable level of analysis and care setting

11,000 births annually

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Name of the program and sponsor
Albert Einstein College of Medicine/Montefiore Medical Center (MMC)
URL of the program
https://montefioreeinstein.org/heart/services/programs-centers/cardiology/cardi…
Purpose of the program
MFM-Cardiology Joint Program at Montefiore—a multidisciplinary program to reduce morbidity and prevent mortality in expecting mothers with cardiovascular disease by optimizing the care of high-risk pregnant patients.
Geographic area and percentage of accountable entities and patients included
New York metropolitan area; (n=2,744 patients, ~3% of total number of pregnant and postpartum patients assessed for CVD risk using the measure from September 2020-August 2024).
Applicable level of analysis and care setting

5,000 births annually

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Name of the program and sponsor
University of Missouri, Kansas City/Saint Luke’s Health System (SL)
URL of the program
https://www.saintlukeskc.org/saint-lukes-muriel-i-kauffman-womens-heart-center
Purpose of the program

The Women's Heart Center provides health education, offers screenings, and leads national research on women's heart health and disease prevention.
Geographic area and percentage of accountable entities and patients included
Kansas City area; (n=1,513 patients, ~2% of total number of pregnant and postpartum patients assessed for CVD risk using the measure from September 2020-August 2024).
Applicable level of analysis and care setting

5,000 births annually

### 6.2.1 Actions of Measured Entities to Improve Performance

Hospital networks have the opportunity to leverage the CVD risk assessment measure to identify clinics or facilities that have low performance. This is characterized by low rates of eligible pregnant and postpartum patients receiving thorough CVD assessments through a standardized evaluation tool.

To elevate their performance, these healthcare entities should place a strong emphasis on providing comprehensive training for clinicians, ensuring they are well-equipped to address this vital aspect of patient care. Additionally, fostering proactive involvement and support from leadership is essential, as it creates an environment conducive to continuous improvement and ensures that CVD assessment becomes an integral part of the care provided to these vulnerable populations. In addition to identifying clinics with low performance, hospital networks and clinics can review whether certain patient groups are less likely to be assessed and monitored for CVD risk (racialized, marginalized pregnant or postpartum patients), in which case corrective action steps could involve unconscious bias training and changes in clinic workflows.

### 6.2.2 Feedback on Measure Performance

We solicited feedback from clinicians at UCI and MMC on their experience with CVD risk assessment via a clinician survey. Findings from this survey include: 89.5% strongly agree that it is important to screen pregnant women for cardiovascular risk and 10.5% agree with this statement. These responses indicate a clear consensus among the participants regarding the significance of cardiovascular risk screening during pregnancy. 84.2% either strongly agree or agree that the CVD risk assessment tool is valuable for pregnant and postpartum assessment. 73.7% either disagreed or strongly disagreed that the tool takes too much time to complete and 78.9% reported that there is nothing burdensome about the CVD algorithm to their workflow (*unpublished data*)

### 6.2.3 Consideration of Measure Feedback

After the first year of implementation, we conducted individual interviews with clinicians about their experience. Clinicians provided valuable insights that enhanced our implementation strategies. As a result of this feedback, we developed a concise one-page informational handout for clinicians and one-page workflow guide for providers. These resources are now available on

the UCI Cardio-Obstetrics website (https://sites.uci.edu/cvdriskassessmentmeasures/).

### 6.2.4 Progress on Improvement

Comprehensive clinician training for new hires, particularly residents, is undergoing enhancements to improve efficiency and effectiveness. An analysis of clinic performance revealed a decline in the monthly percentage of patients assessed for CVD risk at the UCI FQHC OBGYN and Family Medicine clinics over the summer months. This drop was linked to the start of incoming residents who had received orientation on the CVD risk assessment tool. In response, proactive measures are being implemented to ensure that comprehensive training on the assessment tool and associated quality measure is integrated into the orientation process for all new residents and chief residents. Typically, resident programs commence during the bustling summer period, and our objective is to streamline training so that it aligns seamlessly with the onboarding of both OBGYN and Family Medicine residents.

In addition, a more in-depth analysis is essential to evaluate the different approaches clinics have adopted for integrating CVD risk assessments into their clinical workflows. For instance, at the University of Tennessee, three primary clinics have successfully achieved a 100% screening rate for eligible pregnant and postpartum patients. This accomplishment can be directly attributed to a strategic feature within their EHR system—a hard stop that prevents clinicians from concluding the clinic visit without first completing the CVD risk assessment and generating an accompanying risk score. However, anecdotal evidence suggests that clinicians may ignore the risk score and not provide appropriate follow-up. Our team is reviewing the impact of this mandatory component on clinical practices.

### 6.2.5 Unexpected Findings

The successful integration of CVD risk assessments conducted by postpartum doulas in Georgia was a positive and unexpected finding. This breakthrough highlights both the feasibility and acceptability of integrating CVD risk assessment into non-clinical care support systems for expectant and new mothers seeking culturally responsive care. By harnessing the trusted role of community-based doulas, we can foster deeper connections, elevate awareness, and promote proactive management of cardiovascular health within these communities. Ultimately, these findings demonstrate a promising avenue for engaging through doula-partnered care beyond out initial expectations of standardized CVD risk assessment for pregnant and postpartum patients.

### 6.2.5a Potential Unintended Consequences

Other than highly variable costs related to follow-up cardiac diagnostic testing discussed in previous sections, we do not anticipate additional unintended consequences at this time.

### Developer POC email

hthiel@hs.uci.edu

## Measure Developer POC

Heike Thiel de Bocanegra
University of California, Irvine
Orange, CA
United States

## The measure developer is different from the measure steward

Yes

## Steward Address

Afshan Hameed
Orange, CA
United States

## Steward Organization

University of California, Irvine

## Steward Organization URL

https://sites.uci.edu/cvdriskassessmentmeasures/

## Steward POC email

ahameed@hs.uci.edu