Examination of a death due to cardiomyopathy by a maternal mortality review committee

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Deaths related to pregnancy were relatively common in the United States at the beginning of the twentieth century. A dramatic reduction of 99% in maternal mortality rate, from 850.0—7.5 per 100,000 live births from 1900—1982, is 1 of the most noteworthy public health success stories of the time period. This plateau continued until the late 1990s when the maternal mortality rate began to rise again. The reasons for this increase are unclear. Vital statistics data alone cannot answer the many questions surrounding this increase. The need for detailed and reliable information about causes of death and underlying factors has led to the development of state- and urban-based maternal death reviews. Although processes may vary, an expert panel is convened to review individual cases and make recommendations for systems change. Review of maternal deaths is considered to be a core public health function. There are multiple purposes for this article. The first goal is to highlight the components of a maternal mortality review. The second goal is to provide an example for new review committees. A mock case of cardiomyopathy is used to illustrate both the process and development of actionable recommendations for clinical intervention. Recommendations to address community- and system-level contributing factors and the social determinants of health are discussed. The third goal is to educate providers regarding presentation and management of cardiomyopathy. Fourth, it is hoped that policymakers in the area of maternal health and facilities that review maternal morbidity and mortality rates at the institutional level will find the article useful as well. Finally, the article provides facility-level committees with a process example for review of the circumstances of maternal deaths beyond clinical factors so that they may make recommendations to address nonclinical contributors to pregnancy-related deaths. Documenting both clinical and nonclinical contributors to maternal death are critical to influence public opinion, develop coalitions for collective impact, and engage at risk populations in proposing interventions.

Key words: cardiomyopathy, maternal mortality review, postpartum

Pregnancy-related deaths are those that occur during pregnancy or within 1 year of the end of pregnancy and have a cause that is considered to be related directly to the pregnancy.[1] The US rate is disturbingly high with the 2014 pregnancy-related mortality ratio being 18.0 deaths per 100,000 live births;[2] cardiomyopathy was a leading cause of death overall.[3] Surveillance and review of maternal deaths are core public health functions; state- and urban-based maternal death reviews convene an expert panel to review individual cases and make recommendations for systems change.

There are multiple goals for this article: (1) to highlight the components of a maternal mortality review, (2) to assist new maternal mortality review committees (MMRCs) by providing an example, (3) to educate providers regarding presentation and management of cardiomyopathy, (4) to assist policymakers in the area of maternal health, and (5) to provide an example for institutional review of such cases at the local level. A mock case of cardiomyopathy is used to illustrate actionable recommendations for clinical intervention and recommendations to address the social determinants of health.[3]

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Received Oct. 30, 2018; revised Jan. 8, 2019; accepted Jan. 14, 2019.

The authors report no conflict of interest.

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0002-9378/$36.00

https://doi.org/10.1016/j.ajog.2019.01.211

MMRC Process

Authorities and protection

MMRCs must operate under certain authorities and protections. Public health statutes and/or specific legislation address the process and provide direction for data collection, committee review, and public reporting. Dedicated legislation assures the entire process has adequate protections to foster full abstraction, review, and reporting.[4] Protection of collected data and provision of immunity for committee members from subpoena are necessary. MMRC case discussions must adhere to principles of confidentiality, anonymity, and objectivity.[5] Some states provide an appropriation for review staffing and convening, but the majority rely on limited Title V Maternal and Child Health federal block grant dollars to fund reviews. States can refer to standard abstractor time estimates for assistance in calculating the number of hours of abstraction required annually.[6]

Team assembly

It is imperative to assemble a multidisciplinary team of experts from various disciplines and organizations to ensure both clinical and nonclinical causes of death and contributors to death are examined. Examples of team members include obstetricians, maternal fetal medicine specialists, anesthesiologists, nurses, midwives, primary care

physicians, Emergency Department physicians, cardiologists, social workers, nutritionists, medical examiners and representatives of state medical societies, public health departments, social services programs for women, and managed care organizations. The team should represent the diverse make-up of the state and incorporate community advocacy to give context to the lives of the women who were lost.

Before the review

The first step in the process of review is to identify the cases that meet the definition of pregnancy-associated death. Deaths are identified from vital statistics in a combination of 3 ways: assessment of pregnancy checkbox selection on the death certificate, review of the cause of death, and linkage of death certificates of women of reproductive age to a corresponding birth or fetal death certificate that is identified within the 365-day time period. The widest scope is to review all pregnancy-associated deaths, defined as any deaths of women who were pregnant within the preceding 365 days, regardless of cause (ie, motor vehicle accidents during pregnancy, motor vehicle accidents after delivery, suicide, homicide).[1] A high volume of cases may require some committees to limit the scope of the cases reviewed. For some MMRCs, this may mean reviewing only cases that are deemed most likely to be pregnancy-related; this determination is made by a subcommittee that conducts a preliminary review of vital records. Individual MMRCs establish scope based on resources available for review and localized or emerging public health issues.

The next step of a review includes gathering information from death certificates, birth certificates; medical, social, and mental health records; autopsy reports, and other pertinent resources. Records are abstracted by a trained nurse abstractor, who prepares de-identified case narratives for committee members to use at the time of the review meeting.[7] Complete abstraction with the use of a standard form, such as the Maternal Mortality Review Information Application (MMRIA),[8] requires 12−15 hours per case.[9] This time estimate is based on a survey of abstractors in the field and includes travel time for those states who abstract hospital and prenatal care records on site. The time involved is also dependent on the complexity of the case. This does not include time from a written request until reception, which can include multiple requests. It does include travel time for those reviews that abstract on site. Twenty-five states are currently using the MMRIA. Training for nurse abstractors is provided on-site, during MMRIA user meetings at the Centers for Disease Control and Prevention, and via distance-based technical assistance (David Goodman; personal communication; October 10, 2018). Use of the MMRIA system for abstraction promotes a systematic data collection with the MMRC and comparison of data across different MMRCs.[8]

Starting the meeting

At the start of each review committee meeting, members are reminded to review the authorities and protections under which the committee operates and sign a confidentiality pledge. Then, members receive a review of the meeting process that includes criteria for identifying and selecting cases, including a summary of cases on the agenda for review. Some committees also provide a brief summary of the most recent committee meeting and provide a list of recent recommendations made by the committee.

Case review

Members who attend the MMRC meeting should review each case in its entirety before the meeting. A designated member of the MMRC, either an abstractor or coordinator, presents the case summary to the group for discussion. The presenter reads the case narrative and highlights relevant information that is needed for the MMRC to make their decisions. Some states designate committee members to serve as Primary and Secondary Reviewers. In those states, the reviewers present and highlight case elements from a subject matter expert or subspecialist perspective. After a case is presented, the MMRC enters an interactive and iterative discussion, while building on elements previously presented and introducing other related topics that evolve from the discussion or from supporting case documentation and evidence. Case review during a meeting averages 20−30 minutes per case to complete the standard committee decisions form.[5]

Determinations and recommendations

The team is responsible for answering 6 key questions for each case. The question order may vary.

1. Was the death pregnancy-related? Consensus must be met on the decision of "pregnancy-relatedness" because it is a fundamental concept at the core of the review.[5] A pregnancy-related death is the death of a woman during pregnancy or within 1 year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. In considering the relationship to pregnancy, it is often helpful to ask the simpler question, "If she had not been pregnant, would she have died?" This decision might be very clear, as in the case of death because of postpartum hemorrhage. In other situations in which the physiology of pregnancy had an impact on an unrelated disease or condition, the opinions of subject matter experts and reviews of pertinent literature will be important.
2. What was the cause of death? If the death is deemed pregnancy-related, an underlying cause of death is determined with the use of the Centers for Disease Control and Prevention's MMRIA.[3] The listing is categorized into groups such as hemorrhage, thromboembolism, hypertension, cardiac, or others.
3. What were the contributing factors? Contributing factors are broken down by patient/family, provider, facility, system, and community; such issues as knowledge, access,

communication, continuity of care, and clinical skill are considered.

4. Was there an opportunity to alter the outcome? Was it preventable? A death is considered preventable if the committee determines that there was at least some chance of the death being averted by ≥1 reasonable changes to patient/family, community, provider, facility, and/or systems factors.[10]
5. Are there any actionable recommendations? In making specific and feasible recommendations, committee members do not consider the individual case but consider systems improvements and assign responsible parties.[3] The idea here is not to consider retrospectively what to do to prevent the death being discussed, but what to do to prevent all such future deaths going forward.
6. What is the level of impact that could be anticipated from these actions? This determination may be made by the full committee or, for the sake of time, by a smaller group (ie, committee leadership or a subcommittee responsible for moving recommendations to action).

Reaching consensus

During the meeting, the team must make a number of decisions, as described. This can be difficult, but it is important to reach consensus. The consensus-building process for MMRCs is grounded in a public health approach and is multidisciplinary and retrospective. This process involves synthesis of clinical information, nonclinical information, reports and evidence from a variety of sources that is presented to the multidisciplinary expert panel for the purpose of establishing pregnancy-relatedness, an agreed upon underlying cause of maternal death, determination of preventability, contributing factors, and recommendations to prevent future deaths, and the estimated level of potential impact if those recommendations were implemented.[3] The process does not necessarily imply unanimity but seeks a decision that everyone actively supports. The process is facilitated, egalitarian, inclusive, and participatory; it seeks a collective opinion based on evidence and is collaborative and cooperative.[11]

The facilitator keeps the group focused, the discussion on track and within time parameters, and elicits input from the entire MMRC membership. With the help of the coordinator, the facilitator also captures the essence/core elements of the case and summarizes MMRC decisions on each case.[5] There may be times when some MMRC decisions may not end with consensus and will require majority vote. If the MMRC cannot reach a decision for a case and requests additional information, the case may be tabled with documentation of the reason that it is tabled and what additional information and/or research is needed to assist with final decision-making.

Specific steps toward consensus decision-making include the following items: (1) introduce the case, (2) identify and explore key elements of the case, (3) have a broad ranging discussion of key case elements, (4) discuss varying views and positions related to key questions, (5) discuss prevailing and dominant case elements, (6) synthesize MMRC member views and ideas, (7) establish consensus, (8) if additional information is needed to establish consensus, then table the case.

Application of this process to a case

It should be noted that the following example of case presentation is based on an actual case, but some details have been changed to preserve anonymity. The decedent was a 30-year-old black-Haitian (born in Haiti) gravida 6 para 0414 with a medical history significant for heart failure; asthma developed after her last delivery in 2005, and she had a brother who died of heart failure at 19 years old.

First opportunity. Patient falls into the highest risk category of "personal history of cardiovascular disease" that requires consultation with maternal fetal medicine and cardiologist/internal medicine. Cardiomyopathy may be familial (Figure).

The patient entered late into prenatal care at 36 weeks gestation with a total of 4 visits at a hospital clinic with an obstetrician. Prenatal history is significant for anemia. The obstetrician at intake recorded indicated history of congestive heart failure; however, no referrals or evaluation was performed. At delivery hospitalization, she presented at 38.3 weeks gestation for induction/augmentation of labor. On admission, she requested her sister adopt the infant, and a social service consult was made. According to anesthesia and nursing notes, the patient indicated that she had a history of congestive heart failure.

Second opportunity. History of heart failure puts the patient at risk and requires intervention.

At 38 weeks gestation, the patient underwent induction/augmentation labor for advanced cervical dilation of 4 cm. She received epidural anesthesia and was delivered vaginally by an obstetrician in a hospital with a level 1 nursery. There were no obstetric complications. The infant weighed 7 lbs 2 ounces. The patient was discharged on postpartum day 2. Patient discharge instructions state that the patient had no special problems and that no special instructions were given to the patient.

Third opportunity. Baseline electrocardiogram, B-type natriuretic peptide, and an echocardiogram was indicated. Additionally, the patient should have been educated on the risks of recurrence of cardiomyopathy and the potential mode of presentation.

She went to the Emergency Department 2 weeks after delivery with shortness of breath and chest pain and was diagnosed with reactive airway disease.

Fourth opportunity. Not all wheezing is due to asthma. We have repeatedly learned from mortality reviews that it is not uncommon for the "new onset asthma" to signify an underlying cardiac dysfunction. Diagnosis of reactive airway disease should be made with caution during pregnancy or postpartum period. Typically cardiomyopathy presents in the early postpartum period. Cardiac

TABLE 1
Contributing factors

Patient/family	Provider	Facility	System	Community
Access/financial: late entry prenatal care	Quality of care: failure to perform risk assessment—history of heart failure	Policies/procedures: interpretive services	Access/financial: patient did not have a personal physician or obstetrics—maternal fetal medicine provider until very late in the pregnancy	Cultural/religious: language discordance
Social support/isolation: single mother/marital separation	Assessment: brother died at age 19 year of cardiac disease	Quality of care: autopsy not offered/recommended	Access/financial: no continuity of care after delivery, and patient used the Emergency Department	Unstable housing: transient housing
Chronic disease: history of heart failure	Quality of care: delayed diagnosis of cardiomyopathy/ congestive heart failure	Continuity of care/care coordination: delay in transferring patient to higher level of care at regional trauma center and cardiac catheter and transplant evaluation	Access/financial: patient had Medicaid during pregnancy but was self-pay after delivery	
History of intimate partner violence	Quality of care: possible bias contributing to conclusion "concerns for her overall long-term ability for compliance with medical therapy"	Continuity of care/care coordination: Emergency Department doctors did not consult with obstetrics—maternal fetal medicine doctors, initially no cardiology consult	Continuity of care/care coordination: no evidence patient was referred to social services for social needs screening during or after pregnancy	
History premature rupture of membranes×4	Quality of care: record did not document needs related to financial resources, nutritional needs, child care, or other potential social determinants		Access/financial: no record of interconception care	
Chronic disease: body mass index=33.8 kg/m^2				
Tobacco use: chronic smoker				

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etiology should remain high in the differential diagnosis.

She continued to have chest pain and shortness of breath, so she went back to the Emergency Department approximately 3 weeks later, and she was found to be in congestive heart failure and to have had an a non—ST segment myocardial infarction in the past.

Fifth opportunity. Cardiac symptoms should be fully evaluated in pregnancy. A number of patients with peripartum cardiomyopathy may show evidence of myocardial damage, such as elevated cardiac enzymes. It should be noted that peripartum cardiomyopathy is a diagnosis of exclusion.

She was transferred to a tertiary care center and died there with cause of death officially being cardiogenic shock because of cardiomyopathy and non—ST segment myocardial infarction 6 weeks after delivery. Autopsy was not performed.

Sixth opportunity. Autopsy is critical in accurately determining the cause of death.

At the time of her last Emergency Department presentation, it was noted that, at the time of her last delivery in 2005, she had been diagnosed with cardiomyopathy in the postpartum period. She followed with a cardiologist for a while and was on an angiotensin converting enzyme inhibitor, spironolactone, and a beta-blocker.

Seventh opportunity. Ensure that the patient understands the implications of future pregnancy and discuss birth control options.

She was eventually lost to follow up and discontinued these medications when she found out about the current pregnancy.

Eighth opportunity. Patient education is the key to ensure compliance and follow up.

The decedent was a homemaker with a high school education who was separated from her husband. Her body mass index was 33.8 kg/m^2. Life course issues

TABLE 2
Recommendations: opportunities to alter outcomes

Provider	Facility	System	Community
Obstetric providers/maternal fetal medicine should refer patients with a reported cardiac condition or significant family history to cardiologist during prenatal care and postpartum period.	Facilities should implement and adhere to policy/procedures for referrals to subspecialty care.	Implement systemwide policy to screen pregnant women for chronic medical needs and transition to primary/subspecialty care in postpartum period.	Raise awareness on the importance of early access to prenatal care.
Obstetric provider should provide family planning consult to patients with chronic medical conditions.	Facilities should implement and adhere to use of official translation services.	Obstetric and emergency medicine providers should be educated about diagnosis and management of postpartum cardiac conditions.	Promote tobacco cessation.
Anesthesiology provider should evaluate patients with reported cardiac conditions who present to labor and delivery.	Facilities should implement and adhere to a policy to review of signs/symptoms of peripartum cardiomyopathy with patients and provide the information in postpartum discharge instructions.	Obstetric providers should be educated about identification and management of intimate partner violence during pregnancy and the postpartum period.	Promote community cohesion and outreach to neighbors who lack social support.
Obstetric provider should screen for depression, intimate partner violence, housing stability, and nutritional needs and provide referrals to supportive community resources.	Facilities should implement and adhere to a policy of cultural competency and introduce Culturally and Linguistically Appropriate Services to all staff.	Implement systemwide promotion of patient-centered medical home (primary care) for care coordination.	Expand resources/capacity for intimate partner violence victims during pregnancy and the postpartum period.
All providers should be mindful of implicit bias and engage in anti-bias training.		Implement systemwide promotion of "The Fourth Trimester" concept that expands postpartum care.	Promote healthy eating and safe, walkable communities.
			Implement systemwide policy that prioritizes housing for pregnant women.

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were significant for being a chronic smoker and single mom, living with her sister, being Creole-speaking on Medicaid, and having a restraining order against the father of baby.

Case discussion

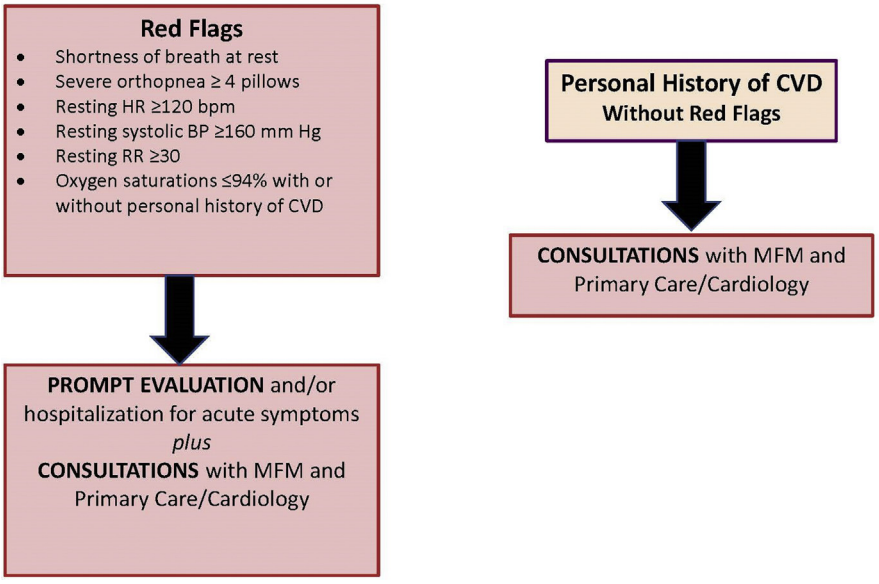
After review of the case and subsequent discussion, the 6 key questions were considered. The committee believed that the death was pregnancy-related. The physiologic condition of pregnancy aggravated the underlying cardiac condition. The committee agreed with the cause of death on the death certificate: cardiogenic shock because of underlying cardiomyopathy. The contributing factors were then identified and discussed (Table 1).

An intersection of several variables contributed to the death of this patient. Dominant factors included late entry to prenatal care, the patient's medical comorbidities (anemia, history of heart disease, asthma), her family history (brother died age 19 years of heart disease), provider obtained an incomplete and inadequate assessment of her medical condition during pregnancy, misdiagnosis, lack of referral and coordination of care between providers in the health system, English as a second language (Creole), discordance of language between healthcare providers and the patient, and lack of appropriate interpreter services (sister was interpreter).

Other significant contributing factors included history of smoking, body mass index of 33.8 kg/m^2, lack of culturally and linguistically appropriate services, biased clinical decision-making, patient's unstable domestic circumstance, and history of intimate partner violence (restraining order). There was a lack of health insurance coverage with essential benefits and access to care during the postpartum period (self-pay); the patient obtained care through the Emergency Department instead of care covered by health insurance, which could have been provided through a medical home, medical provider, or healthcare institution that was appropriate for her presenting symptoms.

Contributing factors in this case are consistent with previously reported variables that are associated with maternal deaths that are related to cardiovascular and coronary conditions. Such variables include chronic medical conditions, patient level variables, provider misdiagnoses, ineffective or unequal treatment, and inadequate coordination of communication between providers that supports timely and coordinated care within the health system. The medical-social culture's "moral astigmatism" or blind spot[12] toward black and other nonmainstream designated

FIGURE
Cardiovascular assessment algorithm



This clinical flow chart shows the evaluation and treatment of pregnant and postpartum women who with cardiopulmonary signs and symptoms. (From Afshan B. Hameed, Christine H. Morton, Allana Moore. Improving health care response to cardiovascular disease in pregnancy and postpartum. Developed under contract #11-10006 with the California Department of Public Health, Maternal, Child and Adolescent Division. Published by the California Department of Public Health, 2017. Available at: https://www.cmqcc.org/resource/improving-health-care-response-cardiovascular-disease-pregnancy-and-postpartum.)

BP, blood pressure; *CVD*, cardiovascular disease; *HR*, heart rate; *MFM*, maternal fetal medicine; *RR*, respiratory rate.

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patients largely contributes to inequities in care; poor health outcomes; racial-, ethnic-, class-, and gender-based disparities, and excess of deaths.[13,14]

After the assessment of contributing factors, the committee considered the chance to alter outcome and determined it to be good. It then determined that this was a preventable death. The committee developed recommendations with opportunities for quality improvement at both clinical and public health systems levels (Table 2). Although the MMRC develops recommendations, other stakeholders are more likely to have the infrastructure to support implementation of those recommendations. Examples of such stakeholders include a state perinatal quality collaborative, perinatal center, medical or hospital association, or an advocacy organization. In this case, the recommendations revolved around provider education, both obstetric and emergency medicine, on the diagnosis and treatment of cardiomyopathy, implementation of and adherence to facility and system level policies and procedures, promotion of greater access to care and coordination of that care, family planning, and community leadership on supportive resources for women during pregnancy and the postpartum period. Different states will have different types of stakeholders; therefore, implementation of recommendations for similar issues will vary by state.

Comment

This case highlights a number of issues, both medical and psychosocial, that are faced by pregnant and postpartum women and their caregivers. The first issue is risk assessment. Use of a formal interpreter is the key to obtaining a comprehensive history. Note that a history of any type of cardiac problem in a pregnant woman warrants further investigation. The second issue is seeking appropriate consultation and referrals for further evaluation. There were several decision points in the patient's history at which she did not undergo a complete medical or psychosocial assessment and subsequent referral. Providers must keep cardiac disease in the differential when evaluating pregnant or postpartum women within a year of delivery. Pregnancy and postpartum care should extend beyond the customary 6-week postpartum visit, and every effort should be made to provide targeted interconception care to optimize maternal health before a next pregnancy. There is a need for an educational campaign not only for healthcare providers but also for young women and prospective new mothers for them to be able to identify risk factors, concerning symptoms, and resources to seek timely medical attention.

Finally, the history of intimate partner violence was not collected initially. Its presence may have contributed to the patient's reproductive health choices, late entry into care, discontinuation of medications, and lack of cardiology follow up. Social determinants of health also played a role in this case because studies have suggested that factors such as socioeconomic status and geography or location are related to maternal death.[15–17] It is important to recognize that racial disparities in pregnancy-related deaths; related indicators of geographic differences and income disparities are symptoms of a larger societal and systemic problem of structural inequity.

For example, non-Hispanic black women experience maternal deaths at a rate 3–4 times that of non-Hispanic white women.[18] The recent report from 9 MMRCs found racial differences in causes of death.[3] Taking action to identify opportunities to prevent these causes could help reduce disparities.

Providers and facilities are not immune to larger societal and systemic context. MMRCs should consider the role of implicit bias in the timely diagnosis and treatment of pregnant and postpartum women of color. Since the

release of the landmark report, "Unequal Treatment" in 2003, there has been an expanding body of evidence that confirms physician/healthcare provider unconscious bias as a contributor to poor health outcomes and health disparities.[19] A 2015 systematic review of implicit racial/ethnic bias among healthcare professionals and its influence on health outcomes suggests that implicit bias against black, brown, and Hispanic/Latino patients is present among many health professionals of different specialties, levels of training, and levels of experience.[20] Implicit bias has been documented as a contributor to excess morbidity, disability and excess deaths in many conditions. Its impact on maternal death must be quantified. MMRCs can document this relationship and recommend actions to measure implicit bias through facility electronic health records and other quality improvement projects. Documentation of implicit bias raises awareness and allows providers and facilities to address this unacceptable contributor to excess morbidity and mortality rates.

A powerful combination of provider-, facility-, system-, and community-level influences on maternal health are considered by MMRCs. Case discussions go beyond consideration of a woman's access to care and consider the quality of her care beyond consideration of her community's level of access to services to considering its level of racism, structural inequity, and discrimination and the chronic stress it causes. Although making recommendations that address the quality of care that is provided to women of color, MMRCs should also consider the presence of supportive motherhood groups and other faith- and community-based outreach organizations in communities where women of color live. We must also consider that MMRC members could be influenced by bias during the review itself. For example, the Mississippi MMRC combats bias in the review setting by moving the woman's race/ethnicity to the end of the case presentation (C. Collier, personal communication May 25, 2018).

This case and the accompanying discussion are useful as a teaching tool for the multiple disciplines that comprise MMRC membership and for clinicians of several specialties: obstetricians/gynecologists, primary care physicians, emergency medicine physicians, and cardiologists. It is crucial to making a correct diagnosis for all types of providers to elicit a history of a current or recent pregnancy and to understand the impact of changes in physiologic condition that are found in the pregnant and postpartum states. Continuity is a key element of care. In this case, the patient was seen at the same hospital for a number of different visits, including former and current pregnancy, and by different specialties. The lack of coordination was detrimental. This case reviews the signs and symptoms of cardiomyopathy in pregnancy and the postpartum period and provides an algorithm for clinical management and recommendations to eliminate these preventable maternal deaths.

This case and accompanying discussion provide a template for how an MMRC may conduct a review and for how facilities might do a root-cause analysis. This case illustrates the process with the use of the clinical scenario of cardiomyopathy, which is a leading cause of pregnancy-related death. There are a number of other causes, and, although the process is similar for cases with other causes, the contributing factors and recommendations will be very different. Not all states have an MMRC currently; of those that do, a significant number are just in the beginning stages. In October 2018, 36 states and 2 urban areas had MMRCs; 8 of them had been in existence for <1 year. In addition, 12 more reviews are in the planning stage (David Goodman, personal communication October 10, 2018). This article serves as a resource for new committees and as an example to consider in similar cases and to apply to other clinical scenarios. Individual facilities also review complications of pregnancy and delivery, which includes both morbidity and death. They are looking for changes that can be made in hospital procedures and policies to increase patient safety and improve outcomes. Although MMRCs and facilities operate at different levels, they are each looking to identify underlying factors that cause morbidity and death and opportunities to improve outcomes for women and their infants.

This case and accompanying discussion are useful for policymakers and community leaders in mother and child healthcare who are in the position to either fund or implement recommendations for change or both. These and other stakeholders can influence public opinion, develop coalitions for collective impact, and engage at risk populations in proposing interventions. Many of the background contributors to maternal deaths are societal in nature and can be approached only at the community or even higher level. Just as we look at contributing factors at the level of patient, provider, facility, system, and/or community so must we also look at those same levels for solutions. ■

ACKNOWLEDGMENT

Building U.S. Capacity to Review and Prevent Maternal Deaths is an initiative led by the CDC Foundation in partnership with the CDC Division of Reproductive Health and the Association of Maternal and Child Health Programs. The project is supported by funding from Merck, through an award agreement with its Merck for Mothers program. We thank William M. Callaghan, MD, for his meticulous review of and thoughtful comments about this article.

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