

MATERNAL MORTALITY REVIEW COMMITTEE ABTRACTOR MANUAL

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INTRODUCTION

As a medical record abstractor for a Maternal Mortality Review Committee (MMRC), you play a key role in helping save the lives of mothers. The MMRC carefully considered your selection as a medical record abstractor and chose you with confidence in the high caliber of work you do and will produce. As an abstractor, your expertise and skills are closely tied to the quality of information that is presented to the case review committee and ultimately to the accuracy of identified issues and recommendations for improvement. Abstraction can be challenging, highly rewarding work.

Abstraction is a task of many skills. You must know what information to look for, how to record it, where to find it, and when to record it. All records can be difficult to interpret and key information is often written as is appropriate to a medical context. Therefore, it is important to have a basic understanding of the significance of changes in vital signs, reported symptoms, and cascading events, as well as documentation of the escalation of care measures. Noting the timing of recognition and response will also help you to develop a comprehensive case narrative when you sit down to write.

In addition to the technical skills and knowledge required for the task of abstraction, abstractors must have the interpersonal and diplomatic skills to acquire records from real people in the field. When in the field, you will represent the MMRC and hold a great deal of responsibility in ensuring the protection and confidentiality of the information that you gather. Therefore, it is of utmost importance to demonstrate professionalism and to have a full understanding of the authority and/or legislative parameters under which the committee operates. You should receive initial and ongoing training with regard to appropriate practices.

Abstractor experiences vary widely but have at least one thing in common: abstraction can be difficult – both emotionally draining and professionally challenging. Whatever your situation may be, you are not alone. While self-care is a significant ongoing necessity, you and fellow abstractors can expect to be supported by the MMRC and other staff. Understanding your supervisory structure and identifying a support network are important prerequisites for knowing where to turn when you have questions or concerns or when you need emotional support to help process your experiences as an abstractor.

As a successful abstractor, you play an individual role in the greater effort of preventing maternal death. Though abstraction is challenging and carries many responsibilities, remember that yours is a noble pursuit: your contribution helps save mothers' lives, keeps families together, and strengthens communities.

GUIDELINES FOR ABSTRACTION

The Goal of Abstraction

Your goal as an abstractor in a maternal mortality review is to comprehensively gather pertinent information in order to accurately capture the events of a woman's life leading up to and including her death. Autopsy, medical examiner, and other investigative reports are also of critical importance to informing the review. Some committees also abstract information from news articles, social media accounts, and other public resources.

The abstraction process is like finding and placing pieces of a puzzle in order to reveal the full picture. It is not uncommon for some pieces to be missing, but the goal is to gather enough pieces to understand the overall picture of a woman's life and death.

Often the information from vital statistics, medical records, and informant interviews does not match, and this is ok. You are there to record the information, not to interpret it or make it match.

An Overview of Abstractor Duties

The art of abstraction comes with specific requirements

While abstraction processes and responsibilities vary from state to state, here are some primary features for successful abstraction:

- You should receive assigned cases from a program coordinator and then abstract them within a specified time frame.
- You are responsible for reviewing records at each hospital, filling out appropriate abstraction forms, writing a case narrative, and providing additional information on each case based on clinical documentation in the records.
- While most records are found at area hospitals, for some cases you may be required to gather information from other types of facilities.
- You may be solely responsible for contacting hospitals and arranging access to medical records for assigned cases, or this responsibility may be shared with a program coordinator.

“The purpose of reviewing pregnancy-related deaths is to gain insight into the medical and social factors that lead to such events in order to decrease such deaths in the future.”ⁱ

Berg, Danel, Atrash, Zane, Bartlett (Editors). *Strategies to Reduce Pregnancy-Related Deaths: from Identification and Review to Action* (2001).

“Medical record abstraction in general requires searching through a medical record for data pertinent to a secondary use. Abstraction can include categorizing, coding, transforming, interpreting, summarizing, and calculating the data. The abstraction process results in a summary of information about a patient.”ⁱⁱ

Nahm. *Data Accuracy in Medical Record Abstraction* (2010).

- Abstractors typically attend case review committee meetings, but practices vary by committee.

What Information Should You Seek?

Key questions will help you find and use the right information

Many sources of information may be available to you in your abstraction work. Remember that your ability to identify the most pertinent information is the first step in producing high quality abstractions to assist the MMRC. When abstracting, keep in mind the key decisions that the MMRC should make about each case:

1. Was the death pregnancy-related?
2. What was the underlying cause of death?
3. Was the death preventable?
4. If there was a chance to alter the outcome, to what degree?
5. If there was at least some chance that the death could have been averted, what were the specific and feasible actions, which if implemented or altered, might have changed the course of events?
6. What recommendations can the committee make to prevent future deaths?
7. If these recommendations were implemented, what is the expected level of impact?

Any information encountered in records that can help a committee answer these questions should be abstracted.

THE FOLLOWING ARE CONSIDERED PRIORITY DATA ELEMENTS FOR REVIEWING A MATERNAL MORTALITY:

- • **Demographics:** age, weight, height, pre-pregnancy BMI, marital and education status, race/ethnicity, type of insurance, employment status
- • **Autopsy reports**
- • **Coroners' or medical examiners' reports**
- • **Medical history:** personal pre-pregnancy history and family history
- • **Obstetric history:** previous pregnancies, complications, and risk factors
- • **Prenatal history of terminal pregnancy:** gestational age of entry, prenatal visits attended and missed, referrals made, provider and type of clinic, vital signs, diagnostic studies and labs, provider comments
- • **Labor and delivery:** date/time; place; maternal, trauma, and/or neonatal level of care of the delivery facility; chief complaint; nursing and medical assessments; orders; vitals; labs and diagnostic studies; timing of assessments; treatments; diagnoses; delivery information including treatments, labs, complications
- • **Postpartum:** vital signs; complications; discharge instructions, including medications and follow-up visits
- • **Hospitalizations:** details on all outpatient and inpatient visits during the pregnancy and postpartum
- • **Social and environmental:** additional factors not captured under demographics, such as substance use disorder treatment or referrals to social services; notes on case coordination; evidence of mental health screening, referrals and/or treatment; notes on access to care and transportation

THE FOLLOWING PIECES OF INFORMATION ARE EXTREMELY BENEFICIAL TO THE COMMITTEE BUT ARE LESS COMMONLY AVAILABLE FOR ABSTRACTION THAN THOSE LISTED ABOVE:

- • **Other medical care:** Include details on any other care received from ancillary sources, if available, such as preconception/family planning records preceding terminal pregnancy or other primary care/specialist visits other than obstetric referrals.
- • **Informant interviews of family, friends, personal support, or medical staff:** Interviews can help to fill in gaps of information in the medical records; to capture the woman's perceptions regarding the care sought, offered, and received; to shed light on reasons for missed appointments or non-adherence to treatment regimens; and, in injury cases, to determine suicidality.

What Information Is Most Important to Record?

Without certain fundamental data, committees cannot perform valid reviews

When sorting through all the information available in records, be sure to capture these key pieces of information:

- • **Cause of death:** You will find this listed on the death certificate. Key clinical factors to pay attention to can be inferred from the cause of death.
- • **Vital signs and labs:** These are important indicators of health status. Look for vital signs and labs collected during prenatal care, hospital admissions, outpatient visits, and postpartum care.
 - For women with extensive hospital records, you may need to select the most pertinent vital signs and labs to decrease the volume of information abstracted for a case. Use your knowledge and experience to prioritize vital signs and labs collected, for example, upon hospital entry and at critical times such as when condition begins to deteriorate and at death.
 - Associate vital signs and labs with corresponding dates and times.
- • **Healthcare provider responses:** Note the date and time of abnormal vital signs and labs, as well as providers' subsequent response or treatment.
- • **Changes in physical status:** Provide clear benchmarks for identifying changes.
- • **Social context and environment:** Seek out details that help illuminate the circumstances in which the woman lived. These include employment status, marital status, economic stability, and access to care and transportation.
- • **Nursing progress notes and flow charts:** These contain valuable information regarding the flow of events and patient response.¹
- • **Diagnostic studies and procedures:** This is critical information, so be sure to note date, time, and response to any abnormal results.
- • **Care providers' recognition and response to the subtle changes in a patient's status:** The ability to tease out documented information of *the relationship between changes in patient condition and provider responses to those changes* is a critical component of MMR abstracting.
- • **Missing data:** Noting gaps in available information will help you when you are writing the case narrative and cannot remember whether it was there or not.

Note that the cause of death listed on the death certificate may not reflect the cause of death noted in medical records. Contributing factors often overlap; therefore, keep an open mind.

1. Be sure to request these records specifically as they are not always included in a general medical record review.

Additionally, be sure to note any of the following:

- **Patient complaints**
- **Patient responses to treatments**
- **Changes to a patient's mental status**

When Do You Have Enough Information?

If what happened is not clear to you, it will probably not be clear to the committee either

You have the responsibility to make sure the information you bring to the committee is as accurate and as comprehensive as possible. Without complete information on a case, suggested recommendations may be misdirected.

However, medical records can be hundreds or thousands of pages long and patients usually have multiple care encounters, making it difficult for the abstractor to decide what information is important to capture. Try to identify the information that will assist the MMRC. Keep in mind the key decisions that the committee needs to make on the case and aim to provide adequate information in order for the committee to address them:

1. **Was the death pregnancy-related?**
2. **What was the underlying cause of death?**
3. **Was the death preventable?**
4. **If there was a chance to alter the outcome, to what degree?**
5. **If there was at least some chance that the death could have been averted, what were the specific and feasible actions, which if implemented or altered, might have changed the course of events?**
6. **What recommendations can the committee make to prevent future deaths?**
7. **If these recommendations were implemented, what is the expected level of impact?**

LOCATION AND SOURCES OF INFORMATION FOR ABSTRACTION

The MMRC will need to decide if abstractors will go out into the field to obtain information or if information will be requested to be sent to a specified location for abstractor review.

Strengths and Challenges of On-site vs. Off-site Medical Record Abstraction

On-site review can lead to better quality abstractions while off-site reviews can come with quality costs

LOCATION OF ABSTRACTION	STRENGTHS	CHALLENGES
ON-SITE REVIEW	<ul style="list-style-type: none"> • No wait for records to be transmitted – saves time in obtaining information • Increased potential for higher quality abstraction • Ability to view a comprehensive record • Ability to identify and seek out additional providers or places to obtain information during the abstraction process • Possible glimpse into the facility and systems of care • No need to store records at home office or host agency 	<ul style="list-style-type: none"> • Costs of abstractor time and travel • Protection and security of information while on the road

LOCATION OF ABSTRACTION	STRENGTHS	CHALLENGES
<p>OFF-SITE REVIEW HEALTH RECORDS DELIVERED TO ABTRACTOR</p>	<ul style="list-style-type: none"> • Decreased expenses for abstractor travel 	<ul style="list-style-type: none"> • Potential receipt of abbreviated and/or incomplete records sent by the facility • Incomplete fulfillment of records request – you may not receive all records requested • Delays, sometimes extensive, in transmission of records from facility • Need for secure receipt and storage of identified information • Decreased ability to seek out potential additional providers or places to obtain information • Potential receipt of bulky hard copy records that require extensive storage space – consider associated costs

Sources of Information for Abstraction

Search thoroughly: you may find what you need in many places

Due to state-by-state differences in the statutes and authorities under which an MMRC operates, the places where information may be gathered may be restricted. Barring any legislative limitations indicated by your MMRC, you can gather information from as many of the following sources as possible and feasible:

- • **Vital statistics:** death certificates, birth certificates, fetal death records
 - Information on death certificate provides demographic information and descriptive information on cause, place, and time of death.
 - Examples of information on a standard infant birth certificate include: demographic information on mother and father, prenatal care entry, number of visits, birth weight, Apgar scores, gestational age, complications, and name of birth hospital.
- • **Prenatal records:**
 - These records are typically sent by 36 weeks to the delivery facility; therefore, end of pregnancy visits may be missing.
 - You may need to request full records or make an on-site visit to the prenatal clinic.
- • **Hospital records:** including all outpatient and inpatient stays during terminal pregnancy/postpartum period, and notes on social services
- • **Outpatient clinic records:** preconception/family planning clinics, primary care, abortion centers
- • **Autopsy reports and case findings from hospital, coroner, or other medical examiner**
- • **Police/investigative reports**
- • **Medical transport records including timing, notes, vitals, treatments**
- • **Personal interviews with providers, family, or friends**

Tips for Abstracting On-site²

An ounce of planning and preparation prevents a pound of problems

- • **Before going out, organize and secure your equipment.** Information should always be locked in a file cabinet or lockbox when not in use. Consider using a locked briefcase for transporting your supplies. Never leave completed records loose in your car; keep them locked in the trunk.
- • **Carry official identification** such as a badge or business card to foster professionalism and trust.
- • **When abstracting in the field, do not use your authority outside the scope of the MMRC** to access medical information. You are under the authority of the project and no other employing agency.
- • **Identifiers should be removed based on your committee's specific guidelines.** MMRC-specific record identification coding systems should be kept secure to avoid public access and linking of names or facilities.
- • **Keep your activities and employment times separate** if you also work for another organization. Do not identify the name or story of the mother, discuss your abstracting activities, or share the names of providers and/or facilities with coworkers from your "day job."
- • **Be aware** that facilities store and archive medical records in a variety of systems and places.
 - Determine if a facility requires a security agreement for an abstractor to access the electronic medical record (EMR).
 - Determine a location for record review, i.e. are records stored on-site or at an alternate location?

Tips for Abstracting Off-site

Use methods that reduce the burden of distance

Though on-site abstraction often provides more information and can give a fuller picture of the events leading to a woman's death, you may choose to pursue abstraction off-site. If you do, you may find it useful to set up an electronic hub, such as a SharePoint site, through which providers can securely submit records.

2. Accessing records can often be challenging. Not all facilities will freely provide records. Not all information will be ready for you when you get there. Contacts with whom you have made arrangements may not be there when you arrive. When traveling, such problems can be mitigated by making backup plans, such as asking who will be a backup contact person.

TIMING OF ABSTRACTION

Work with Your Committee to Determine the Best Time Frames

For recommendations to maximize relevance and effectiveness, the medical record abstraction should take place as soon as feasibly possible following a death. Unless your jurisdiction mandates that facilities report maternal deaths at the time of death, you often won't be able to abstract a record until a year after the terminal event.

The MMRC should establish protocols and procedures for the consistent and reliable identification and selection of cases, and establish time frames for abstraction and case review. Cases that are undergoing medicolegal or other investigative review may have to be placed on hold until such reviews are complete. The MMRC should establish a policy and procedure for circling back to cases that have been placed on hold and should consider documenting such barriers to accessing medical records.

ABSTRACTION PROCEDURES

Know Your Responsibilities and Look to Your Committee for Guidance

Your committee should have clearly defined procedural steps that guide the entire process for collection and synthesis of case information. Using a standardized case abstraction tool, like the one built into MMRIA, helps to ensure consistent and complete data collection. Your committee may provide sample scripts for you to use to introduce yourself and your work and to request specific information; these allow you to have a consistent message and help foster cooperation between you and the facilities and providers you contact.

In addition, policies must be developed to guide you in approved methods of communication and specific sharing of identified information. For example, although the MMRC is considered confidential and anonymous, you must initiate the records request using identified information. You must fully understand your legal authority and restrictions on sharing such identified information with others. For example, the cause of death on a death certificate may be considered confidential information in your state and therefore should not be shared by you with facility staff.

Make Contact

The first contact is an opportunity to establish a good working relationship

Your committee should develop an official memo or letter of introduction that describes your purpose, mission, and authority, and the need for cooperation from medical facilities and providers in the MMR process. The letter should ensure the privacy, confidentiality, and protection of all those participating in delivery and receipt of information.³

3. If you are a contracted employee working outside of the official email system of your committee's administrative home organization, your MMRC should have policies in place regarding the use of personal email to communicate case information.

The committee may create a standard record letter that references statutory authority and emphasizes that all records are held in strict confidentiality and are not subject to subpoena. The practice of reiterating that the records are used only as necessary to carry out the committee's statutory obligations through a standard letter and sample script allows for a consistent message. It is also often helpful to include a deadline for response, such as within five days of the request.

Medical facilities frequently require the use of a secure fax line for the transmission of any identified information. Your committee should provide you with an official fax cover sheet for submitting case information and records requests to facilities and providers.

Letters may be faxed out to hospitals, addressed to the CEO, CNO, and/or health information managers. Keep a copy of the letter with you when abstracting in the field, in the event that the authority or purpose for abstraction is questioned, particularly when abstracting in settings outside of a hospital.

If your committee has authority to access private provider or clinic records, contact the clinic office manager to establish communication. After obtaining the name of a contact person and a secure fax number, fax your request for approval to abstract records.⁴

In the official letter outlining your authority, include a request for records. Be specific about all of the records you wish to access and how you wish to access them. If you plan to go on-site, propose a date and time for doing so. Be clear on dates, time frames, and types of records needed. Some facilities may not archive nursing notes or Labor and Delivery notes in the main medical record. By clearly specifying the need to review each source of information, you will increase the likelihood of gaining access to each record.

FOR EXAMPLE:

Please review the attached letter of authority. I am an MMR abstractor requesting to review all records pertaining to the following:

- Autopsy report
- Prenatal care record
- ER visits/hospital medical records
- Other medical office visits
- Medical transport records
- Labs and diagnostic studies
- Physician orders/progress notes
- Nursing flow sheets and notes
- Discharge summaries

Follow Up After Initial Contact

The squeaky wheel gets the abstraction done

- • **Place a follow-up call** to the initial contact to ensure your fax was received and to determine if records will be available.

4. If you do not have access to a secure fax service, you may find it necessary to request records via telephone and to submit additional unidentified information via email. Alternately, your committee may have a coordinator who can send the fax request to the facility.

- • **Remember to get a name and direct phone number for a contact person** and always try to get a backup name and phone number in the event the key contact person is away from the facility.
- • **Confirm** that the date and time you have scheduled for record review is acceptable.
- • **Identify potential barriers** and, if you face resistance from the facility, try to address the following questions:
 - Does the facility require more information?
 - Is the delay due to need for legal/risk management review?
- • **Be patient and cordial:** offer to send more information or reschedule your date/time.
- • **Be sensitive to provider grief.**
- • **Be careful not to burn a bridge or threaten:** they may agree to your request if the pressure is decreased.
- • **Document any unsuccessful attempts in the case narrative.**

Develop a Case Narrative

Use the data to tell a clear story

At some point, the case abstraction is complete and the case needs to be summarized. The case narrative should be succinct but provide enough detail to present an easily understood story. Formatting the key case information into a narrative promotes ease of reading and reviewing by the committee members. It fosters an understanding of the chronological flow of events.

HERE ARE SOME TIPS TO WRITING CASE NARRATIVES:

- • **Use reference materials:** While writing the case narrative, you may find it helpful to have access to a variety of reference materials for assistance in using medically appropriate terminology:
 - Medical dictionary
 - Nursing/medical reference books
 - Drug handbook
- • **Capture all relevant medical information.** Without this, committee members often cannot progress in their deliberation process to address the social aspects and systems issues at play in a case.
- • **Acknowledge** that you, as all people do, approach your work through a lens of previous professional and personal experience. Endeavor to be objective and prevent personal bias from impairing your objectivity.
- • **Be mindful** of avoiding abbreviations and acronyms; not all committee members share your knowledge.

- • **Check your work** for accuracy and spelling.
- • **Write events in chronological order** to help the committee understand the timing of events around the woman's death.
- • **Record all information**, not just the portions you think best tell the story. Each discipline and/or provider may tell the woman's story in a different way in its respective medical record.
- • **Provide the relevant de-identified abstracted records to your committee** in addition to the case narrative. Case narratives are meant to supplement the full set of data that you have abstracted, not to replace it.
- • **Allow review committee members time** to review all the information captured in your data system ahead of and/or during the review meeting. This provides them with additional details for decision-making.
- • **Use case narrative templates** to guide the development of the narrative and promote a standardized format for reviewing cases.⁵

SELF-CARE

Caring for Mothers Begins with You

Abstracting mortality records can be physically, mentally, and emotionally exhausting.

Abstracting can be physically taxing. You may find yourself sitting and staring at a computer for hours at a time. Therefore, it is important for you to utilize good posture. Take breaks to stretch, and consider exercises to decrease muscle aches and eyestrain.

Abstracting can also be a lonely work experience because of the need to uphold confidentiality. You may feel sad and want to talk to friends, family, or coworkers about the cases, but you need to maintain confidentiality and cannot discuss individual case information. Try to find a trusted supervisor or co-abstractor, if you need to confide in someone. It is important for your committee to have a system in place to support you when you need to debrief.

Most significantly, abstracting for maternal mortality can be an emotionally draining process. The nature of abstraction in cases of untimely maternal death is sad. We say this not to discourage but to help set expectations. After all, you are bravely looking directly at a subject that most people strive to avoid. Accordingly, sadness, fatigue, and even grief are all normal responses in this line of work. Be as mindful of your own emotional state, and of taking care of yourself, as you are in your abstraction work. Also, be confident that you are capable. Recall that the MMRC, with these challenges in mind, carefully evaluated your skills, expertise, and capabilities, and chose you as an abstractor.

Finally, remember the “why” of your work: you are searching through the dark of untimely deaths to help find a guiding, life-saving light of hope for future mothers. Remember that the weight of this hope is not solely on your shoulders. You are connected to a greater effort and are part of the network of all those working to improve and save the lives of mothers.

5. See APPENDIX B Sample Case Narrative Templates.

A MOMENT OF LEVITY FROM A SEASONED ABTRACTOR

- The distance you have to travel for a record is proportional to the length of your case narrative.
- The incidence of phone calls to providers is inversely proportional to the success of your abstracting.
- The greater past relationship you have with a provider, the less likely they will give you access to their records.
- The record you abstract quickly is most likely to be the hardest to summarize.
- The longer a case is discussed at an MMRC meeting, the more certain it is that nobody has the faintest idea of what happened.
- The probability of crying is directly proportional to the number of cases you have abstracted.
- If you can't figure out what to do next in the abstraction pathway, call another abstractor. They may not have any idea either, but you sure will feel better.

(AUTHOR: DANIELLE NOELL, ARNP, NNP-BC, MSN)

A FINAL NOTE

You are a critical contributor to a stream of health-system improvements that benefit mothers and communities. Know that your work is helping to save lives – real women, real lives. You are keeping a family together and ensuring that a child has a mother.

Thank you.

APPENDIX A: ABSTRACTING MODULES BASED ON CAUSE OF DEATH

Introduction to Cause of Death Abstracting Modules

Abstractors are responsible for obtaining case information that is as complete as possible to help the review committee determine if gaps in assessment, care, or services existed. It is important for the abstractor to bring at least a minimum data set of case information to the review team. Without an understanding of the series of social and medical care events, it can be difficult for the review team to make valid recommendations for action to change systems of care. Medical records can be a few pages or thousands of pages long, often consisting of multiple provider encounters and multiple care locations. All of this can challenge the abstractor to find information that will be meaningful for the case review team.

The following abstraction modules are based on the common causes of maternal deaths and diseases in the United States. The modules represent a framework to guide abstraction for maternal mortality review committees. Each module was developed from a review of nursing and medical literature, national and international maternal mortality reports, CDC maternal mortality review data tools, national perinatal quality collaboratives, and maternal safety toolkits. Modules are structured in a framework consisting of: **definition and other common terms, timing and risk factors, signs and symptoms, treatments, labs and medications, and autopsy findings.**

Modules are structured in a framework consisting of: **definition and other common terms, timing and risk factors, signs and symptoms, treatments, labs and medications, and autopsy findings.**

The modules are intended to assist and guide the abstractor while abstracting medical records. It is beyond the scope of these modules to reference all descriptive information and treatments for each cause of death and disease. The modules are not intended to replace other reference sources the abstractor may be using. Over time, as each maternal mortality case review committee progresses, additional content information may be requested by the review team for specific cause of death scenarios. The abstractor can then personalize the modules as needed. Additionally, as knowledge of disease processes and care treatments evolve, additional content information can be added to update the modules to incorporate new standards of care.

Cause of Death Modules

- | | |
|-----------------------------|----------------------------|
| 1. Amniotic Fluid Embolism | 7. Hypertensive Disorders |
| 2. Anesthesia Complication | 8. Infection |
| 3. Cardiomyopathy | 9. Motor Vehicle Accidents |
| 4. Cardiovascular Deaths | 10. Overdose |
| 5. Cerebrovascular Accident | 11. Suicide |
| 6. Hemorrhage | 12. Thrombotic Embolism |

Additionally, four abstracting modules were developed for *chronic diseases* that the abstractor may encounter.

Chronic Disease Modules

1. Diabetes: Type I and II, and Gestational
2. Seizures
3. Sickle Cell Disease
4. Systemic Lupus Erythematosus

Module Template Category Definitions

Cause of Death/Chronic Disease:

- • **Cause of death:** identification of the assigned determination of why the mother died
- • **Chronic disease:** persistent, long-lasting illness

Other Names:

- • Identification of similar diagnoses that may be noted

Timing/Risk Factors/Associated Characteristics:

- • **Timing:** identification of four periods of health status for women of reproductive age
 - **Medical History:** personal and or family conditions that can influence health status
 - **Prenatal:** from conception to labor (antepartum)
 - **Labor and Delivery:** onset of uterine contractions, ends with delivery placenta (intrapartum)
 - **Postpartum:** period after delivery up to one year
- • **Risk Factors:** identification of associated conditions that may increase potential for poor outcome
- • **Associated Characteristics:** incidence may vary by age, race, ethnicity or marital status

Signs and Symptoms:

- The observed and reported descriptions of a person's response to an illness

Treatment/Labs/Medication:

- **Treatment:** identification of psychological, surgical, or medical management
- **Labs:** identification of fluid or tissue that is obtained for clinical studies
- **Medications:** identification of commonly used drugs

Condition:

- Described state of health

Autopsy:

- Description of examination and pathology of postmortem organs and tissues; often includes tests to look for the presence and concentration of drugs that may have contributed to the death

REFERENCES:

1. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118 (Suppl.1):1-203.
2. Perry S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014.
3. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22; F.A. Davis Company: Philadelphia 2013.

AMNIOTIC FLUID EMBOLISM

DEFINITION

A tear in placental membranes in which amniotic fluid passes into maternal circulation. The amniotic fluid contains fetal cells, meconium, lanugo, and vernix which may produce cerebral or pulmonary emboli when entering maternal circulation. Amniotic fluid embolism may occur during any gestational period but most often occurs during induction, labor, delivery, or the immediate postpartum period. It causes an acute cascade of respiratory and cardiac arrest.

Other name: anaphylactoid syndrome of pregnancy

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Prenatal: amnioinfusion, amniocentesis, cerclage removal, placenta previa, preeclampsia, abortion, blunt abdominal trauma, induction of labor, intrauterine pressure catheter

Labor and Delivery: induction with prostins, forceps, vacuum, cesarean section, precipitous labor, meconium stained fluid, manual removal of placenta

Postpartum: clinical onset during labor or within 30 minutes of delivery of the placenta

Associated Characteristics: African Americans may have a higher incidence; women of advanced maternal age may have a higher incidence

SIGNS / SYMPTOMS

Sudden shortness of breath, cyanosis, increased heart rate, hemorrhage, decreased BP, hypoxia, sudden cardiovascular collapse, altered mental status, seizures in absence of other causes, DIC, restlessness, feeling of panic, feeling cold, pulmonary edema, sudden cardiovascular and respiratory collapse with coagulopathy, endotracheal tube (ETT) suddenly filled with massive amounts of fluid, nausea, vomiting

TREATMENTS / LABS / MEDICATIONS

Treatments: respiratory support: oxygen, face mask, bag and mask, intubation; fluid resuscitation, intravenous fluids, blood products, cardiopulmonary resuscitation, electrocardiogram (EKG), massive transfusion protocol, chest x-ray (CXR), ventilation/perfusion (V/Q) scan, computed tomography (CT) scans, emergency delivery/perimortem cesarean section

Labs: arterial blood gases, coagulation studies, complete blood count (CBC)

Medications: advanced cardiac life support (ACLS) medications

AUTOPSY

Prompt perimortem autopsy important in sudden and unexpected collapse. Diagnosis of amniotic fluid embolism (AFE) is often one of exclusion, no definite test for AFE. On postpartum autopsy – lungs congested, airless with petechial hemorrhages on pleural surfaces; fetal cells and debris may be found in pulmonary vasculature. Look for documentation of lanugo hair squames or mucins in autopsy report. However, their absence does not rule out the diagnosis.

REFERENCES:

1. Brennan M, Moore L. Pulmonary embolism and amniotic fluid embolism in pregnancy. *Obstetrics and Gynecology Clinics North America* 2013; 40:27-35.
2. Centre for Maternal and Child Health Enquiries (CMACE). *Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom.* *BJOG* 2011;118(Suppl.1):1-203.
3. Kizior R, Hodgson B. *Saunders Nursing Drug Handbook 2017.* Elsevier.
4. Lewis, G (ed). *The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom.* 2007.
5. Mhyre J, D'Oria R, Hameed A, Lappen J, Holley S, Hunter S, Jones R, King J, D'Alton M. *The Maternal Early Warning Criteria: A proposal from the national partnership for maternal safety.* 2014. 124(4): 782-786.
6. Perry S, Hockenberry M, Lowdermilk D, Wilson D. *Maternal Child Nursing Care Fifth Edition;* Mosby, Inc.: Canada 2014.
7. Venes, D. (editor) *Taber's Cyclopedic Medical Dictionary Edition 22.;* F.A. Davis Company: Philadelphia 2013.

ANESTHESIA COMPLICATIONS

DEFINITION

Arrest in close proximity to administration of anesthetic. Types: local, epidural, spinal and general, patient-controlled analgesia, and nitrous oxide. Patient is considered to be under anesthesia care until she is fully conscious and her vital signs are stable.

Other names: anesthesia toxicity, aspiration, drug reaction/anaphylaxis, esophageal intubation, failed tracheal intubation, high spinal/epidural, multiple attempts intubation, respiratory failure during anesthesia

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: obesity, small larynx, comorbidities (asthma, heart, liver diseases), family or personal hyperthermia reaction to anesthesia

Prenatal: preeclampsia, hemorrhage

Labor and Delivery: emergency cesarean section with recent oral intake puts mother at risk for aspiration with intubation, cardio-pulmonary arrest after anesthetic administration, general anesthesia, full stomach at delivery, ill pregnant woman, acute anaphylaxis, hemorrhaging, topping off epidural analgesia, maternal hyperthermia

Postpartum: opiate toxicity, hemorrhage, preeclampsia/eclampsia, postoperative respiratory failure, bronchospasm on extubation, spinal headache

Risk Factors: drug use, obesity, recent food/water intake

Associated Characteristics: refusal of blood transfusion; women of advanced maternal age may have a higher incidence

SIGNS / SYMPTOMS

Hypotension, decreased breathing after spinal placed, tachycardia, bradycardia, acidosis, hypoxia, hypoxia after intubation, negative CO₂ color, changes in skin color, mental status changes, cardiac arrest, breathing difficulties after anesthetic administration or removal anesthetic, agitation, nausea vomiting, loss of consciousness

TREATMENTS / LABS / MEDICATIONS

Treatments: cricothyrotomy, respiratory support including intubation and ventilation, arterial line, bronchoscopy, chest x-ray (CXR) for tube placement, blood products

Labs: arterial blood gases, lactate, intraoperative laboratory measurements,

Medications: vasopressors, opiates, anesthetic drugs, advanced cardiac life support (ACLS) medications, Fentanyl, bronchodilators, Lipid rescue, Narcan to reverse sedation

AUTOPSY

Gastric contents in lungs, description placement of ETT and CVL, toxicology reports. Pathology lungs, heart, brain.

REFERENCES:

1. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118 (Suppl.1):1-203.
2. Kasap B, Canverenier E, Karbeyaz K, Balci Y, Erbas M. Sudden death of a woman at postpartum period-myocardial related with peripartum cardiomyopathy: Autopsy diagnosis, case report. Journal Clinical Studies Med Case Rep 2015. 2(2):009. Retrieved <http://www.heraldopenaccess.us/fulltext/Clinical-Studies-&-Medical-Case-Reports/Sudden-Death-of-a-Woman-at-Postpartum-Period-Myocarditis-Related-with-Peripartum-Cardiomyopathy-Autopsy-Diagnosis-Case-Report.php>
3. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
4. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
5. Perry S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014.
6. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

CARDIOMYOPATHY

DEFINITION

Peripartum dilated cardiomyopathy: onset cardiac failure beginning last month of pregnancy up to five months postpartum. Diagnosed after exclusion of other forms of cardiomyopathy, heart failure. Left ventricular dysfunction on echocardiogram.

Other names: myocarditis, sudden cardiac death

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: obesity, poor nutrition, immune disorders, alcoholism, multiple pregnancies, spitting blood, sleep apnea, diabetes, family history of hypertrophic cardiomyopathy

Prenatal: obesity, preeclampsia, hypertension

Labor and Delivery: obesity, preeclampsia

Postpartum: obesity, preeclampsia, hypertension, prolonged swelling after delivery

Risk Factors: obesity, poor nutrition, tobacco use, alcoholism, women of advanced maternal age may have higher incidence

Associated Characteristics: African American, Haitian

SIGNS / SYMPTOMS

Shortness of breath with activity, limitations with physical activity, shortness of breath when lying flat, cough, respiratory/flu-like symptoms, fatigue, swollen neck veins, swelling extremities, palpitations, fluid in the lungs, atrial fibrillation, echocardiogram ejection fraction less than 50%, pleural effusions, cardiomegaly, pulmonary venous congestion, arrhythmia, cardiac arrest, sudden cardiac death

TREATMENTS / LABS / MEDICATIONS

Treatments: chest x-ray (CXR), electrocardiogram (EKG), echocardiogram (ECHO), referral cardiologist, respiratory support, referral to consultants: maternal fetal medicine, cardiology, anesthesiologist, transfer to higher level of care within facility or to outside facility, low salt diet, automated external defibrillator (AED)/pacemaker placement, preconception counseling, access to family planning services, community referral for medications, intake and output, evaluation for heart transplant, education on risks of future pregnancies, early follow-up postpartum appointment for history cardiac symptoms, documentation education to seek care for symptoms

Labs: cardiac enzymes, arterial blood gases, lactic acid

Medications: ACE inhibitors (prior to pregnancy), beta blockers, diuretics, anticoagulants, Digoxin

AUTOPSY

Enlarged heart, dilated cardiomyopathy, fibrosis, myocytes, referral to cardiac pathologist

REFERENCES:

1. American Heart Association. Peripartum Cardiomyopathy (PPCM). Updated Sept.1 2015. Retrieved http://www.heart.org/HEARTORG/Conditions/More/Cardiomyopathy/peripartum-Cardiomyopathy-PPCM_UCM_476261_Article.jsp#.WAEy5dQrKt8
2. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118 (Suppl.1):1-203.
3. Elkayam U, Akhter, M, Singh H, Khan S, Bitar F, Hameed A, Shotan, A. Pregnancy-associated cardiomyopathy: Clinical characteristics and a comparison between early and late presentation. Circulation. 2005.111: 2050-2055. Retrieved <http://circ.ahajournals.org/content/111/16/2050>
4. Florida Department of Health, Pregnancy-Associated Mortality Review 2014 Update. <http://floridahealth.gov/%5C/statistics-and-data/PAMr/-DOCUMENTS/2013-PAMR-UPDATE-092215.PDF>
5. Florida Pregnancy-Associated Mortality Review Urgent Maternal Mortality Message #2. Peripartum cardiomyopathy. 2016.
6. Florida Department of Health. Pregnancy-related deaths due to cardiomyopathy in Florida 1999-2010. Retrieved <http://www.acog.org/-/media/Departments/Public%20Health%20and%20Social%20Issues/20120506-12.pdf>
7. Hernandez L, Burch D, Clark C. Florida's Pregnancy-Associated Mortality Review 2010 Update. Florida Department of Health. Retrieved http://www.floridahealth.gov/statistics-and-data/PAMR/pamr-2010_update.pdf
8. Johnson-Cole L, Jenson L, Sobey A. Peripartum cardiomyopathy: Review and practice guidelines. American Journal of Critical Care. 2012; 2 (2) p. 89-98. Retrieved <http://ajcc.aacnjournals.org/content/21/2/89.full>
9. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
10. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
11. Lundberg G, Dunbar S, Wenger N. Guidelines for the reduction of cardiovascular disease in women. JOGNN, 2016, 45: 402-412. Retrieved [http://www.jognn.org/article/S0884-2175\(16\)00140-4/pdf](http://www.jognn.org/article/S0884-2175(16)00140-4/pdf)
12. Mhyre J, D'Oria R, Hameed A, Lappen J, Holley S, Hunter S, Jones R, King J, D'Alton M. The Maternal Early Warning Criteria: A proposal from the national partnership for maternal safety. 2014. 124(4): 782-786.
13. New Jersey Department of Health. Recommendations from the New Jersey Maternal Mortality Review Team (2006-2008 deaths). Retrieved <http://www.nj.gov/health/fhs/professional/mortality.html>
14. Perry S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014.
15. Sabatine M, Jaffer F, Staats P, Stone J. Case 28-2010: A 32-year-old woman 3 weeks postpartum, with substernal chest pain. New England Journal of Medicine. 2010;363:1164-73. Retrieved <http://www.nejm.org/doi/full/10.1056/NEJMcp1000966>
16. The California Pregnancy-Associated Mortality Review. Report from 2002 and 2003 Maternal Death Reviews. Sacramento: California Department of Public Health, Maternal Child and Adolescent Health Division; 2011. Retrieved [https://www.cmqcc.org/resources?combine=cmqcc&field_resource_topic_tid=All&field_date_published_value\[aiue\]\[year\]=&page=7](https://www.cmqcc.org/resources?combine=cmqcc&field_resource_topic_tid=All&field_date_published_value[aiue][year]=&page=7)
17. Tidswell, M. Peripartum Cardiomyopathy. Critical Care Clinics 2004. 20(4):777-788. Retrieved [http://www.criticalcare.theclinics.com/article/S0749-0704\(04\)00052-1/pdf](http://www.criticalcare.theclinics.com/article/S0749-0704(04)00052-1/pdf)
18. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

CARDIOVASCULAR DEATHS

DEFINITION

The abrupt loss of heart function caused by a malfunction in the heart's electrical system or due to acute thrombosis. Normal changes in pregnancy include increased plasma volume, depressed fibrinolytic activity, and slight cardiomegaly that put women at risk.

Other names: Arrhythmic death, cardiac arrest, cardiac failure, cardiomegaly, coronary ischemic heart disease, dissection of coronary arteries, infarction, ischemic heart disease, myocardial fibrosis, myocardial infarction, myocarditis, mitral prolapse, mitral stenosis, pulmonary hypertension, sudden adult death syndrome (SADS), sudden unexpected cardiac death, valvular disease

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: diabetes, obesity, cardiomegaly, chronic kidney disease, seizures, high cholesterol, asthma, Marfan syndrome, connective tissue disorders, hypertension, congenital heart disease, pulmonary hypertension, rheumatic heart disease, mitral valve prolapse, family history heart disease, thrombophilia, previous pregnancy history of gestational diabetes, preeclampsia, or pregnancy-induced hypertension

Prenatal: obesity, preeclampsia, gestational diabetes, poor prenatal care, known cardiac disease, drug and alcohol abuse

Labor and Delivery: amniotic fluid embolism, bleeding, sepsis, emergency cesarean section, fluid overload

Postpartum: obesity, infection, hypertension signs and symptoms

Risk Factors: obesity, cocaine use, IV drug use, tobacco use, women of advanced maternal age may have higher incidence

SIGNS / SYMPTOMS

Severe chest pain, jaw or back pain, radiating chest pain, agitation, nausea, vomiting, tachypnea, tachycardia, acidosis, syncope, shortness of breath, bleeding, heart failure, epigastric pain, respiratory symptoms, wheezing, murmur, palpitations crackles in lower lobes, cyanosis, low oxygen saturation, pulmonary edema, enlarged heart, hypertension, chest x-ray with edema/congestion, generalized edema in face, fingers, feet, legs

PROCEDURES / LABS / MEDICATIONS

Treatments: echocardiogram (ECHO), electrocardiogram (EKG), computed tomography (CT) pulmonary angiogram, chest x-ray (CXR), coronary angiography, transesophageal echocardiogram (TEE), referral to cardiologist, CPR (bystander or in hospital): note timing initiation chest compressions, external defibrillation, positioning change to left side, emergency cesarean section (document timing), automated external defibrillator (AED), initiation rapid response, transfer to higher level of care (within facility or to an outside facility)

Labs: cardiac enzymes (serial) Troponin levels, CPK, CPK-MB, increased serum lactase, arterial blood gas, electrolytes

Medications: vasopressors, diuretics, hypertensive medications, cardiac medications

AUTOPSY

Cardiac size description and weight in grams, presence interstitial fibrosis, documentation cardiac arteries, ventricle thickness, pathology of cardiac muscles, renal pathology, lung pathology, description aortic valves, vegetation on mitral valve, presence hypertrophy, dissection of arteries, coronary occlusion, aneurysm. Also, check for toxicology.

REFERENCES:

1. American College of Obstetricians and Gynecologists Task Force on Hypertension in Pregnancy. Hypertension in Pregnancy. 2013;1-89. <http://acog.org/Resources-And-Publications/TaskForce-and-work-Group-Reports/Hypertension-in-Pregnancy>.
2. American Heart Association. Statement is first to address cardiac arrest during pregnancy. Retrieved <http://news.heart.org/statement-is-first-to-address-cardiac-arrest-during-pregnancy/>
3. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118(Suppl.1):1-203.
4. Kasap B, Canverenier E, Karbeyaz K, Balci Y, Erbas M. Sudden death of a woman at postpartum period-myocardial related with peripartum cardiomyopathy: Autopsy diagnosis, case report. Journal Clinical Studies Med Case Rep 2015. 2(2):009. Retrieved <http://www.heraldopenaccess.us/fulltext/Clinical-Studies-&Medical-Case-Reports/Sudden-Death-of-a-Woman-at-Postpartum-Period-Myocarditis-Related-with-Peripartum-Cardiomyopathy-Autopsy-Diagnosis-Case-Report.php>
5. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
6. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
7. Lundberg G, Dunbar S, Wenger N. Guidelines for the reduction of cardiovascular disease in women. JOGNN, 2016, 45: 402-412. Retrieved [http://www.jognn.org/article/S0884-2175\(16\)00140-4/pdf](http://www.jognn.org/article/S0884-2175(16)00140-4/pdf)
8. Mhyre J, D'Oria R, Hameed A, Lappen J, Holley S, Hunter S, Jones R, King J, D'Alton M. The Maternal Early Warning Criteria: A proposal from the national partnership for maternal safety. 2014. 124(4): 782-786.
9. Perry S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014
10. Sabatine M, Jaffer F, Staats P, Stone J. Case 28-2010: A 32-year-old woman 3 weeks postpartum, with substernal chest pain. New England Journal of Medicine. 2010;363:1164-73. Retrieved <http://www.nejm.org/doi/full/10.1056/NEJMcp1000966>
11. Romero V, Pearlman M. Maternal mortality due to trauma. Seminars in Perinatology 2012. 36:60-67.
12. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

CEREBROVASCULAR ACCIDENT

DEFINITION

Loss of neurological function caused by sudden loss of blood flow to brain.

Other names: Arteriovenous malformation (A-V malformation), cerebral artery thrombosis, cerebral infarction, cerebral venous sinus thrombosis, hemorrhagic stroke, hypertensive encephalopathy, intracerebral hemorrhage, intracranial hemorrhage, subarachnoid hemorrhage, ruptured aneurysms

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: atrial fibrillation, alcoholism, hypertension, diabetes, history of a close relative with stroke, obesity, hormonal contraception, migraines, anticoagulants, cardiac dysrhythmias, previous stroke, arteriovenous malformation (A-V malformation)

Prenatal: hypercoagulable state of pregnancy, sudden death first trimester, dehydration, hypertension

Labor and Delivery: stress of labor, postdates

Postpartum: immobility, obesity, hypertension

Risk Factors: tobacco use, alcoholism, obesity

SIGNS / SYMPTOMS

Sudden weakness or numbness in face and extremities, loss of vision, difficulty speaking, sudden severe headache, dizziness, changes in neurological status, unreactive pupils, tachycardia, tachypnea, nausea, vomiting, acute hypertension, seizure activity, hemiparesis, eye pain with blurred visions

TREATMENTS / LABS / MEDICATIONS

Treatments: stroke evaluation, airway and ventilatory support, magnetic resonance imaging (MRI), computed tomography (CT) scan, arteriography, consults neurology, neurosurgery, transfer within facility or outside to higher level of care, surgery to evacuate bleeding, Burr holes, external ventriculostomy drains, palliative care, electrocardiogram (EKG), echocardiogram (ECHO), blood products: packed red blood cells, fresh frozen plasma (FFP), cryoprecipitate, intake and output

Labs: urine and serum toxicology, complete blood count (CBC), electrolytes, coagulation studies, liver enzymes

Medications: recombinant tissue plasminogen activator (tPA), Labetalol and other antihypertensive to gradually decrease BP, Mannitol, DDAVP, anticonvulsant drugs

AUTOPSY

Disruption brain pathology, toxicology

REFERENCES:

1. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118(Suppl.1):1-203.
2. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
3. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
4. Mhyre J, D'Oria R, Hameed A, Lappen J, Holley S, Hunter S, Jones R, King J, D'Alton M. The Maternal Early Warning Criteria: A proposal from the national partnership for maternal safety. 2014. 124(4): 782-786.
5. Perry S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014.
6. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

HEMORRHAGE

DEFINITION

Episode of bleeding that compromises tissue or organ perfusion. Defined as over 500ml of blood loss for vaginal delivery or 1000 ml for cesarean section, or over 500 ml of blood loss in first 24 hours after delivery. Transfusion of four or more units of red blood cells.

Other names: Disseminated intravascular coagulation (DIC), hemorrhage shock, hypovolemic shock

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: blood coagulation disorders, previous uterine incision, previous cesarean section, prior uterine surgery, multiple gestation, greater than four vaginal births, hypertension, history of previous postpartum hemorrhage, uterine fibroids

Prenatal: spontaneous or induced abortion, placenta previa, accreta, percreta, ectopic or ruptured ectopic pregnancy, abruptio placentae, abdominal trauma, large uterine fibroids, polyhydramnios, macrosomia

Labor and Delivery: induction or augmentation of labor, prolonged or precipitous labor, uterine overstimulation, lacerations genital tract, morbidly adherent placenta, morbid obesity, uterine inversion

Postpartum: retained placenta fragments, retained products of conception (POC), retroperitoneal hematoma, infection

Associated Characteristics: refusal of blood transfusion

SIGNS / SYMPTOMS

Abdominal pain, abdominal tenderness, one-sided abdominal pain, diarrhea, vomiting, shortness of breath, boggy uterus, bleeding from surgical or puncture sites, spitting blood, descriptions of vaginal bleeding include trickle, gush, clots, oliguria, displaced uterus after bladder emptied, changes in vital signs: hypoxia saturation less than 95%, sustained tachycardia, fainting

TREATMENTS / LABS / MEDICATIONS

Treatments: documentation counseled patient on hemorrhage risks and use blood products in emergency, consent refusal for blood products, documentation consent to alternatives; documentation hemorrhage risk assessments done prenatal, L&D admission and prior to delivery and postpartum, ultrasound and/or MRI documentation of placental site, documentation of cesarean section incision, hemostasis in cesarean section operative (OR) report, massive transfusion protocol (MTP), fundal massage, activation rapid response system, documentation quantification blood loss, escalation of care, uterine artery ligation, embolization, interventional radiology, cell saver, consultants: such as obstetric

(OB) oncology, interventional radiologist (IR), trauma surgeon, anesthesia, vascular surgeon, hematology, Bakri balloon, B-lynch suture, increased documentation of frequency of vital signs, respiratory support including intubation, x2 large bore intravenous catheters prior to surgery, exploratory laparotomy, hysterectomy, readiness and use, blood products packed red blood cells, fresh frozen plasma (FFP), platelets, cryoprecipitate

Labs: beta hCG (quantitative and serial serum qualitative), type and screen/cross for blood products, complete blood count (CBC), prothrombin time (PT), partial thromboplastin time (PTT), d-dimer, fibrinogen, blood type, antibody screen, arterial blood gases

Medications: Oxytocin, Cytotec, Misoprostol, Methergine, Hemabate, Prostins, vasopressors, advanced cardiac life support (ACLS) medications

AUTOPSY

Pale organs, abdominal trauma, bruising, blood in abdominal cavities, cervical tears, source of bleeding, rupture of fallopian tubes, placenta pathology; exclusion of diagnosis pulmonary or amniotic embolus

REFERENCES:

1. American College of Obstetricians and Gynecologists. Obstetric Hemorrhage. Retrieved from <http://www.acog.org/About-ACOG/ACOG-Districts/District-II/SMI-OB-Hemorrhage>
2. Florida Department of Health, Division of Community Health Promotion. Pregnancy-Associated Mortality Review. Pregnancy-related deaths due to hemorrhage, 1999-2012. Retrieved <http://www.floridahealth.gov/statistics-and-data/PAMR/index.html>
3. Florida PAMR Obstetric Hemorrhage Abstraction Tool. 2015.
4. Florida Perinatal Quality Collaborative Obstetric Hemorrhage Toolkit. Retrieved <https://usfhealth.app.box.com/s/g7rlkqckcr5gjiduwtdt6toosizfxadla>
5. Florida Pregnancy Associate Mortality Review. Urgent Maternal Mortality Message to Providers. 2016. Retrieved <http://health.usf.edu/NR/rdonlyres/8808ABE3-D150-4353-BA81-DFAF1751A449/51405/UrgentMaternalMortalityMessageToProviders2016OHI.pdf>
6. Hernandez L, Burch D, Clark C. Florida's Pregnancy-Associated Mortality Review 2010 Update. Florida Department of Health. Retrieved http://www.floridahealth.gov/statistics-and-data/PAMR/pamr-2010_update.pdf
7. Hernandez L, Clark C, Division of Community Health Promotion Florida Department of Health. Pregnancy-Associated Mortality Review: Pregnancy-related deaths 2012 Update. Retrieved <http://www.floridahealth.gov/statistics-and-data/PAMR/index.htm>
8. Improving Health Care Response to Obstetric Hemorrhage, Version 2.0: A California Toolkit to Transform Maternity Care. Retrieved <https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit>
9. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
10. Main E, Goffman D, Scavone B, Low L, Bingham D, Fontaine P, Gorlin J, Lagrew D, Levy B. National partnership for maternal safety, consensus bundle on obstetric hemorrhage. *Obstetrics and Gynecology*, 2015;0(0) 1-8.
11. Mhyre J, D'Oria R, Hameed A, Lappen J, Holley S, Hunter S, Jones R, King J, D'Alton M. The Maternal Early Warning Criteria: A proposal from the national partnership for maternal safety. 2014. 124(4): 782-786.
12. Perry S, Hockenberry M, Lowdermilk D, Wilson D. *Maternal Child Nursing Care* Fifth Edition; Mosby, Inc.: Canada 2014.
13. The Joint Commission Sentinel Event Alert. Preventing Maternal Death, Issue 44, January 26, 2010. Retrieved https://www.jointcommission.org/sentinel_event_alert_issue_44_preventing_maternal_death/
14. Venes, D. (editor) *Taber's Cyclopedic Medical Dictionary* Edition 22.; F.A. Davis Company: Philadelphia 2013.

HYPERTENSIVE DISORDERS

DEFINITION

A condition in which the blood pressure (BP) is noted greater than 140 mm Hg systolic or 90 mm Hg diastolic on three separate readings several weeks apart. Diagnosis of hypertensive disorders in pregnancy may be done based on readings hours apart in a previously normotensive woman.

Present in 50% of all pregnancies and is a major cause of maternal mortality and morbidity globally.

Systolic BP > 160 mm Hg systolic or 110 mm Hg diastolic is a medical emergency and requires urgent effective treatment.

Classification HTN in Pregnancy

- • **Chronic Hypertension:** Documentation BP \geq 140 mm Hg systolic and/or 90 mm Hg diastolic prior to 20 weeks' gestation. Use of medication for hypertension prior to pregnancy
- • **Superimposed Preeclampsia:** New onset hypertension prior to 20 weeks, may include sudden increase proteinuria, BP, HELLP syndrome, headache, epigastric pain, scotomata
- • **Gestational Hypertension:** BP \geq 140 mm Hg systolic or \geq 90 mmHg without proteinuria presenting after 20 weeks in pregnancy
- • **Preeclampsia:** BP \geq 140 mm Hg systolic or \geq 90 mm Hg after 20 weeks' pregnancy with proteinuria 300 mg of higher of protein in 24-hour urine or \geq +1 per dipstick
- • **Eclampsia:** New onset grand mal seizures in a pregnant woman with gestational hypertension or preeclampsia
- • **Severe Preeclampsia:** One or more of the following criteria in presence of preeclampsia
 1. BP \geq 160 mm HG or 110 mm HG diastolic
 2. Less than 500 ml urine in 24 hours
 3. Visual and cerebral complaints
 4. Elevated liver functions (2 times normal values)
 5. Renal insufficiency (Creatinine more than 1.1mg/dL)
 6. Pulmonary edema/respiratory distress
 7. Low platelets less than 100,000
- • **HELLP syndrome:** Hemolysis, elevated liver enzymes, low platelets, occurs in 20% woman with severe preeclampsia that involves the liver
- • **Hypertensive Emergency:** Can occur in prenatal or postpartum period. defined as an acute-onset, severe systolic hypertension \geq 160 mm hg, and/or severe diastolic hypertension \geq 110 mm hg or both, persistent for 15 minutes or longer
- • **Atypical Preeclampsia:** Occurs at < 20 weeks' gestation or more than 48 hours after delivery. Diagnosis by occurrence severe preeclampsia criteria without proteinuria or elevated BP
- • **Late Postpartum Eclampsia:** > 48 after delivery up to four weeks' postpartum. For 63% of affected pregnancies there was no documentation of a previous hypertensive diagnosis. The most common presenting symptom is headache

Other common names: adult respiratory distress syndrome, cardiac failure, cerebral edema, cerebral hemorrhage, cerebral infarction, encephalopathy, hemorrhage/disseminated intravascular coagulation (DIC), hemorrhagic stroke, hepatic failure infarction, hypertensive encephalopathy, intracranial hemorrhage, mild preeclampsia, multiorgan failure, placental abruption, pregnancy induced hypertension, preexisting essential hypertension, stroke, subcapsular hemorrhage, subcapsular hematoma, thrombotic stroke

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: hypertension on/not on medication, previous cerebral vascular accident, preexisting diabetes, obesity, renal disease, previous history of preeclampsia, sleep apnea, renal artery stenosis, obesity, documentation of hypertension 12 weeks postpartum after last pregnancy, systemic lupus erythematosus, family history of hypertension

Prenatal: inadequate prenatal care, delay in diagnosis, acute fatty liver of pregnancy, abruptio placentae, stroke, HELLP (hemolysis, elevated liver enzymes, low platelets) syndrome, oligohydramnios, intrauterine fetal growth restriction (IUGR), weight gain of more than five pounds in a week, hypertension after 20 weeks' gestation, severe IUGR with non-reassuring fetal monitoring, proteinuria, subcapsular hepatic hematoma, decreased fetal movement

Labor and Delivery: non-reassuring fetal heart tones, pulmonary edema, abruption, mode of delivery determined by condition cervix, fetus gestational age, fetal presentation, hemorrhage, DIC, BP stabilization prior to delivery or intubation, multiorgan failure

Postpartum: headache, blurred vision, fluid retention, shortness of breath

Risk Factors: obesity, cocaine use, methamphetamine use, teens and women of advanced maternal age may have higher incidence

Associated Characteristics: African American

SIGNS / SYMPTOMS

Persistent BP > 160 mm Hg systolic and or >110 mm Hg diastolic BPs, headache, epigastric pain, nausea, vomiting, complaints visual disturbances such as spots or blurry vision, generalized edema, change in level of consciousness, hyperreflexia of deep tendon reflexes, shortness of breath, saturation less than 95%, pulmonary edema, rales, rhonchi wheezing, decreased urine output < 30 ml/hour or < 500 cc in 24 hours, complaints of chest pain, bleeding, tonic clonic seizure, complaints "I just don't feel right," liver capsule distention, cardiomegaly

TREATMENTS / LABS / MEDICATIONS

Treatments: monitoring fluid intake and output, fetal surveillance: NST (non-stress test), BPP (biophysical profile NST and fetal movement, tone, breathing and heart rate, amniotic fluid volume and assessment fetal growth), arterial line placement, seizure precautions, radiologic imaging such as computed tomography (CT) scans or computed tomography (CT) angiogram, MRI for encephalopathy, chest x-ray (CXR), airway support and management, monitoring for pulmonary edema, blood product transfusion, transfer to higher level of care within or outside facility, consultants: anesthesiologist, critical care subspecialists, maternal fetal medicine neurology, neonatology, cardiology, hematology, neurology, home BP monitoring, increase in surveillance visits, ongoing assessment at antepartum unit, hospitalized for fetal surveillance, plan for early delivery, note documentation BP at discharge, antihypertensive prescriptions, discharge education warning signs to include shortness of breath and head ache, blurred vision, community resources for follow-up or assistance with medications, access to medications, referral to OB in ER, early postpartum follow up 3-7 days if medications used during labor, 7-14 with no medication

Labs: liver enzymes may be elevated due to liver injury (look for ALT, AST, uric acid, bilirubin levels); serum creatinine, abnormal peripheral hemolysis, magnesium levels, proteinuria >/+ 300 mg protein in 24-hour urine, dipstick 1+, serum amylase, lipase, ammonia, abnormal coagulopathy, elevated PT/PTT, placenta pathology, low platelets

Medications: antihypertensives: Include date/time does and vital sign response. Aggressive treatment BP important. Look for documentation of antihypertensive medications within 60 minutes of persistent BP > 160 mm Hg systolic and /or > /110 mm Hg diastolic. Oral Nifedipine is often given first if no IV access. Other medications: IV Labetalol, Hydralazine, Esmolol, Propofol, magnesium sulfate for seizure precautions, Benzodiazepines or Dilantin for seizures. Medications: low dose aspirin prenatally, corticosteroids for fetal lung maturation before 33 6/7 weeks

AUTOPSY

Look at cerebral pathology, intracerebral hemorrhage, encephalopathy. Also, pathology uterus, placenta, liver, lungs, and kidneys.

REFERENCES:

1. Al-Safi Z, Imudia AN, Filetti LC, Hobson DT, Bahado-Singh RO, Awonuga AO. Delayed postpartum preeclampsia and eclampsia: demographics, clinical course, and complications. *Obstetrics and Gynecology*. 2011. 118(5) 1102-1107.
2. American College of Obstetricians and Gynecologists Committee Opinion. Emergent therapy for acute onset, severe hypertension during pregnancy and the postpartum period. Number 623: February 2015.
3. American College of Obstetricians and Gynecologists Task Force on Hypertension in Pregnancy. Hypertension in Pregnancy. 2013:1-89. <http://acog.org/Resources-And-Publications/TaskForce-and-work-Group-Reports/Hypertension-in-Pregnancy>.
4. American College of Obstetricians and Gynecologists Task Force on Hypertension in Pregnancy. Hypertension in pregnancy: Executive summary. *Obstetrics and Gynecology*, Nov. 2013;122 (5) 1122-111. Retrieved http://journals.lww.com/greenjournal/Citation/2013/11000/Hypertension_in_Pregnancy_Executive_Summary_36.aspx

5. California Maternal Quality Care Collaborative, California Department of Public Health. Preeclampsia Care Guidelines and CMQCC Preeclampsia Toolkit CDPH-MCAH Approved: 12/20/13. Retrieved <https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit>
6. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118(Suppl.1):1-203. Georgia Department of Public Health: Georgia Maternal Mortality 2012 Case Review. 1-27. Retrieved
7. Chagolla B, Berg O, Gabel K. Ante, intra, postpartum nursing management and assessment of preeclampsia: Maternal/fetal assessment and monitoring recommendations. CMQCC Preeclampsia Toolkit Preeclampsia Care Guidelines. 12/20/13: 36-39.
8. Delke I, Hill W, Sappenfield W, Hernandez L, Burch D. Preventability of pregnancy-related deaths from preeclampsia and eclampsia in Florida 1999-2008. AJOG 2012;206(1) Retrieved [http://www.ajog.org/article/S0002-9378\(11\)02111-9/fulltext](http://www.ajog.org/article/S0002-9378(11)02111-9/fulltext)
9. Druzin M, Shields L, Peterson N, Cape V. Preeclampsia toolkit: Improving health care response to preeclampsia. California Maternal Quality Collaborative Toolkit to Transform Maternity Care; Developed under contract #11-10006 with the California Department of Public Health; Maternal Child and Adolescent Health Division. Published by the California Maternal Quality Care Collaborative, November 2013. Retrieved <https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit>
10. Florida Department of Health. Pregnancy-Associated Mortality Review. Pregnancy-related deaths due to hypertensive disorders, 1999-2012. Retrieved <http://www.floridahealth.gov/statistics-and-data/PAMR/index.html>
11. Ghulmiyyah L, Sibai B. Maternal mortality from preeclampsia/eclampsia. Seminars in Perinatology. 2012;36(1).56-58.
12. Hernandez L, Burch D, Clark C. Florida's Pregnancy-Associated Mortality Review 2010 Update. Florida Department of Health. Retrieved http://www.floridahealth.gov/statistics-and-data/PAMR/pamr-2010_update.pdf
13. Hernandez L, Clark C, Division of Community Health Promotion Florida Department of Health. Pregnancy-Associated Mortality Review: Pregnancy-related deaths 2012 Update. Retrieved <http://www.floridahealth.gov/statistics-and-data/PAMR/index.htm>
14. https://dph.georgia.gov/sites/dph.georgia.gov/files/MCH/MMR_2012_Case_Review_June2015_final.pdf
15. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
16. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
17. Louis J, Phelps A. FPQC Hypertension in Pregnancy: A New Florida Collaborative Initiative. Presentation Handouts. FPQC 2016 Annual Conference, Tampa, Florida.
18. Mhyre J, D'Oria R, Hameed A, Lappen J, Holley S, Hunter S, Jones R, King J, D'Alton M. The Maternal Early Warning Criteria: A proposal from the national partnership for maternal safety. 2014. 124(4): 782-786.
19. New Jersey Department of Health. Recommendations from the New Jersey Maternal Mortality Review Team (2006-2008 deaths). Retrieved <http://www.nj.gov/health/fhs/professional/mortality.html>
20. Perry S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014.
21. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

INFECTIONS

DEFINITION

Caused when microorganisms invade body tissues. The altered immune state of pregnancy can make women more susceptible to infection, and infections may also take a more severe course. Documentation of an infection may be noted as *community- or hospital-acquired*; take note of this as it can impact the review committee's recommendations.

Other names: AIDS, bacteremia sepsis, community acquired sepsis, Group A streptococcal sepsis, H1N1, HIV, influenza, meningitis, multiorgan failure, pneumococcus, pneumonia, postpartum pelvic infection, puerperal sepsis, necrotizing fasciitis, septic abortion, septic shock, sepsis, Toxic Shock Syndrome

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: termination of pregnancy, miscarriage, sickle cell disease, obesity, BMI > 30, HIV, immunodeficiency states, history IV drug use, asthma, bronchitis, diabetes

Prenatal: respiratory illness with negative/positive flu swabs, urinary tract infections, prolonged rupture of membranes, positive Group B Streptococcus, late or no prenatal care, preterm birth, flu-like illness, genital tract infection at time of rupture of membranes, gestational age of occurrence, positive HIV

Labor and Delivery: traumatic vaginal delivery, retrovaginal fistula, cesarean section, chorioamnionitis, peritonitis, preterm delivery, fetal tachycardia

Postpartum: cesarean section wound infection, uterine infection, abnormal vaginal odorous discharge, necrotizing mastitis, heart valve endocarditis

Risk Factors: obesity, cocaine use, methamphetamine use, teens and women of advanced maternal age may have higher incidence

Associated Characteristics: African American

SIGNS / SYMPTOMS

Pelvic pain, fever, malaise, abnormal vaginal discharge, abnormal odor in vaginal discharge, severe abdominal pain, enlarged uterus, cough, low temperature, shortness of breath, tachycardia, inflamed genital area, persistent vaginal bleeding, drainage incision, sore throat, low platelets, mastitis, shock, renal failure, adult respiratory distress syndrome, disseminated intravascular coagulation (DIC), multiorgan failure, body aches, chills, syncope, pulmonary edema/congestion, pleural effusions

TREATMENTS / LABS / MEDICATIONS

Treatments: chest x-ray (CXR), purified protein derivative (PPD), flu shot, intravenous fluid bolus, bronchoscopy, fetal surveillance, oxygen and respiratory support, ultrasounds, referral to multiple consultants, infectious disease, higher level of care (within facility and/or to an outside facility).

Labs: sepsis screen, complete blood count (CBC), C-reactive protein (CRP), blood cultures, lactate, throat culture, placental cultures, cervical cultures, vaginal cultures, arterial blood gases, HIV, viral load, rapid OIA for flu, RT-PCR, lactic acid, liver function, fluorescent antibody screen. Cultures may be positive for E. Coli, Enterobacter aerogenes, Proteus vulgargis, Hemolytic Streptococci, Staphylococci, Clostridium Perfringens.

Medications: antibiotics, antifungals, antivirals, immunoglobins (Note: look for time first antibiotic/antiviral given)

AUTOPSY

Check for identification of organisms or source of infection. Bacterial cultures of uterus, blood, lung, meninges, and spleen. Documentation of disseminating necrotizing fasciitis, chorioamnionitis, funisitis in placenta/cord, local inflammation, peritonitis, endomyometritis, retained products of conception.

REFERENCES:

1. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118(Suppl.1):1-203.
2. Florida Department of Health Bureau of Family Health Services. Pregnancy-Associated Mortality Review. Pregnancy-Related Deaths Due to Infection 2005-2014.
3. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
4. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
5. Mhyre J, D'Oria R, Hameed A, Lappen J, Holley S, Hunter S, Jones R, King J, D'Alton M. The Maternal Early Warning Criteria: A proposal from the national partnership for maternal safety. 2014. 124(4): 782-786.
6. Perry S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014.
7. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

MOTOR VEHICLE ACCIDENTS

DEFINITION

Death as passenger, driver, or pedestrian.

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: substance use disorder

Prenatal: improper use of or failure to use seat belt, tachycardia, fetal demise, placental abruption

Labor and Delivery: n/a

Postpartum: failure to use seat belt, substance use

Risk Factor: substance use

SIGNS / SYMPTOMS

Maternal injuries from trauma, hypoxia, signs of shock, hemorrhage, documentation of misuse of seat belt, presence or absence of seat belt use, fetal tachycardia, abruption

TREATMENTS / LABS / MEDICATIONS

Treatments: documentation education on proper seat belt use in pregnancy, multidisciplinary trauma management, fetal surveillance and monitoring, perimortem cesarean section, resuscitation, blood products, ventilatory support, chest x-ray (CXR), computed tomography (CT) scans, blood products

Labs: complete blood count (CBC), arterial blood gas (ABG), toxicology

Medications: ACLS, vasopressors

AUTOPSY

Description trauma, investigation included use/non-use of seat belt, domestic issues, and/or toxicology studies.

REFERENCES:

1. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118(Suppl.1):1-203.
2. Colorado Department of Public Health and Environment. Maternal Mortality Prevention Program. Retrieved from https://www.colorado.gov/pacific/sites/default/files/PF_Maternal-Mortality-fact-sheet.pdf
3. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
4. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
5. New Jersey Department of Health. Recommendations from the New Jersey Maternal Mortality Review Team (2006-2008 deaths). Retrieved <http://www.nj.gov/health/fhs/professional/mortality.html>
6. New York Department of Public Health, New York State Maternal Mortality Review Report, 2006-2008. P. 1-48. Retrieved https://www.health.ny.gov/community/adults/women/docs/maternal_mortality_review_2006-2008.pdf

OVERDOSE

DEFINITION

Intentional or unintentional ingestion of potentially toxic amounts of a substance or medication.

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: anxiety, depression, psychiatric hospitalizations or treatment, prior suicide attempt, family history of suicide or suicide attempt, substance use disorder, termination of pregnancy, referral to child protection, unwanted pregnancy, chronic pain

Prenatal: late entry to care, missed appointments, substance use in pregnancy, documentation of depression and anxiety symptoms, Edinburg Postnatal Depression screening positive, inadequate support systems, sudden onset of symptoms during the last few weeks of pregnancy, statements of inadequacy, adjustments to grief/loss, delusional beliefs about her health, reduction of prescribed medication during pregnancy, domestic violence, financial difficulties, interpersonal conflict, stillbirth, miscarriage, frequent visits emergency room with complaints pain (migraines, abdominal pain, back pain) with negative work up, requests for prescription pain meds, chronic pain

Labor and Delivery: pain control management difficulties in labor and immediate postpartum

Postpartum: inadequate support systems, depression, woman with previous mental health issues, substance use, admission for psychiatric services after delivery, stressful life events, suicidal ideation, birth trauma, mental health care, separation from newborn

Risk Factor: substance use

Associated Characteristics: single, Caucasian, teens may have higher incidence

SIGNS / SYMPTOMS

Anxiety, erratic behavior, lethargy, agitation, unexplained physical illnesses, depression, behavioral disturbances, changes in sleep or appetite, drug use, hypoxia, complaints pain despite pain medication in absence of other factors

TREATMENTS / LABS / MEDICATIONS

Treatments: substance use assessment, referral for treatment, referral pain management, referral for behavioral risk health assessment, referral social services, psychiatric care, community resources, screening perinatal depression, assessment family support systems, inpatient hospitalization

Labs: toxicology, electrolytes, complete blood count (CBC), arterial blood gas (ABG), lactic acetate, urinalysis

Medications: antidepressants, antipsychotics, antianxiety, mood stabilizers, anti-epilepsy, stimulants/ADHD, medications to sleep, Narcan, street drugs

AUTOPSY

Diagnosis of overdose made by autopsy includes circumstances surrounding event and methodology. Descriptions needle marks, tracks. Coroner, medical examiner history may include family/friends interview statements. Toxicology identifies substance misuse.

REFERENCES:

1. American College of Obstetricians and Gynecologists Task Force on Hypertension in Pregnancy. Hypertension in Pregnancy. 2013:1-89. <http://acog.org/Resources-And-Publications/TaskForce-and-work-Group-Reports/Hypertension-in-Pregnancy>.
2. American College of Obstetricians and Gynecologists Committee Opinion, Screening for Perinatal Depression. #630, May 2015.
3. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118(Suppl.1):1-203.
4. Emory University School of Medicine. Women's Mental Health Program Department of Psychiatry and Behavioral Sciences. WMHP Intake- Postpartum. Revision 7/7/2012. Retrieved http://www.womensmentalhealth.emory.edu/New_Patients/WMHP_Intake_-_Postpartum_-_Revision_2012.07
5. Hernandez L, Burch D, Clark C. Florida's Pregnancy-Associated Mortality Review 2010 Update. Florida Department of Health. Retrieved http://www.floridahealth.gov/statistics-and-data/PAMR/pamr-2010_update.pdf
6. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
7. Orsolini L, Valchera A, Vecchiotti R, Tomasetti C, Iasevoli F, Fornaro M, De Beradis D, Perna G, Pompili M, Bellantuono C. Suicide during Perinatal period: Epidemiology, risk Factors, and clinical correlates. Frontiers in Psychiatry 7: 138. Retrieved <http://journal.frontiersin.org/article/10.3389/fpsy.2016.00138/full>
8. Palladino C, Singh V, Campbell J, Flynn H, Gold K. Homicide and suicide during the perinatal period: findings from the national violent death reporting system. Obstet Gynecol 2011; Nov. 118 (5): 1056-1063. Retrieved <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3428236/>
9. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

SUICIDE

DEFINITION

Death by own hands, often violent in nature. Causing one's own death intentionally. Suicide risk is not equated with socioeconomic status. Pregnancy not considered protective for suicide.

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: anxiety, depression, bipolar, schizophrenia, psychiatric hospitalizations or treatment, prior suicide attempt, substance use disorder, obsessive compulsive disorder, termination of pregnancy, family history of bipolar disorder, depression or psychosis after childbirth, referral to child protection services, unwanted pregnancy, intimate partner violence

Prenatal: depression, anxiety symptoms, documented depression on Edinburg Depression screening, inadequate support systems, sudden onset mental health symptoms last few weeks of pregnancy, statements of inadequacy, grief/loss, delusional beliefs about health, substance use, reduction or stopping prescribed antidepressants or mental health medications during pregnancy, intimate partner violence, suicidal ideation

Labor and Delivery: n/a

Postpartum: inadequate support systems, depression six weeks following delivery, woman with previous mental health episodes, substance use, admission for psychiatric services after delivery, delay of prescribed medications, stressful life events, suicidal ideation, birth trauma

Risk Factor: substance use

Associated Characteristics: single, American Indian, Caucasian, teens may have higher incidence

SIGNS / SYMPTOMS

Anxiety, lethargy, agitation, unexplained physical illnesses, depression, behavioral disturbances, changes in sleep or appetite, substance use

TREATMENTS / LABS / MEDICATIONS

Treatments: referral for behavioral risk health assessment and community referral resources, social services psychiatric care, screening perinatal and postpartum depression, assessment family support systems, hospitalization

Labs: toxicology

Medications: antidepressants, antipsychotics, antianxiety, mood stabilizers, anti-epilepsy, stimulants/ADHD, medications to sleep, opiates

AUTOPSY

Diagnosis suicide made by autopsy. Coroner, medical examiner history may include family/friends interview statements, suicide letter may have been written. Toxicology identifies substance misuse. Circumstances surrounding event, mechanism.

REFERENCES:

1. American College of Obstetricians and Gynecologists Committee Opinion, Screening for Perinatal Depression. #630, May 2015.
2. American College of Obstetricians and Gynecologists. Screening for perinatal depression. Committee Opinion 630. May 2015. (Replaces Committee Opinion Number 453, February 2010).
3. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118(Suppl.1):1-203.
4. Emory University School of Medicine. Women's Mental Health Program Department of Psychiatry and Behavioral Sciences. WMHP Intake- Postpartum. Revision 7/7/2012. Retrieved http://www.womensmentalhealth.emory.edu/New_Patients/WMHP_Intake_-_Postpartum_-_Revision_2012.07
5. Hall M. How to help woman at risk for acute stress disorder after childbirth. Nursing for Woman's health. 2014.18(6): 449-454. Retrieved <http://onlinelibrary.wiley.com/doi/10.1111/1751-486X.12157/full>
6. Hernandez L, Burch D, Clark C. Florida's Pregnancy-Associated Mortality Review 2010 Update. Florida Department of Health. Retrieved http://www.floridahealth.gov/statistics-and-data/PAMR/pamr-2010_update.pdf
7. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
8. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
9. Orsolini L, Valchera A, Vecchiotti R, Tomasetti C, Iasevoli F, Fornaro M, De Beradis D, Perna G, Pompili M, Bellantuono C. Suicide during Perinatal period: Epidemiology, risk Factors, and clinical correlates. Frontiers in Psychiatry 7: 138. Retrieved <http://journal.frontiersin.org/article/10.3389/fpsy.2016.00138/full>
10. Palladino C, Singh V, Campbell J, Flynn H, Gold K. Homicide and suicide during the perinatal period: findings from the national violent death reporting system. Obstet Gynecol 2011; Nov. 118 (5): 1056-1063. Retrieved <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3428236/>
11. Pery S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014.
12. Philadelphia Department of Public Health, Medical Examiner's Office. Maternal Mortality in Philadelphia 2010-2012. 2015. 1-22. Retrieved <http://www.phila.gov/health/pdfs/MMR%202010-12%20Report%20-%20final%20060115.pdf>
13. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

THROMBOTIC EMBOLISM

DEFINITION

Sudden obstruction of a blood vessel by debris. Deaths may be described as a collapse.

There is an increased risk of thrombosis in pregnancy due to a hypercoagulability state which is normal in pregnancy. Thrombotic embolisms can occur at any time in prenatal or postpartum period.

Deep vein thrombosis (DVT) occurs when blood clots that have formed in the deep veins of legs or other areas break off and go to the lungs.

Other names: deep vein thrombosis, embolism-non-cerebral, pulmonary embolism

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: thromboembolism, family history of thromboembolism, antiphospholipid antibody syndrome, Protein C or S deficiency, Factor V Leiden, systemic lupus erythematosus, heart disease, sickle cell disease, sickle cell syndrome, varicose veins, diabetes, obesity, BMI > 35, operative delivery, hypertension, immobility, estrogen containing hormonal contraceptives, hyperemesis, dehydration, injury lower extremities causing venous stasis, previous history of miscarriage, multiparity, pelvic inflammatory disease, cancer or cancer therapy, mechanical heart valves

Prenatal: nonadherence anticoagulants use, immobility, obesity, hyperemesis, diabetes, injury lower extremities with venous stasis, dehydration, systemic lupus erythematosus, tobacco use, hypertension, abdominal surgery

Postpartum: recent history miscarriage or termination of pregnancy, cesarean section, obesity, diabetes, bedrest, immobility, delayed ambulation, no sequential compression devices (SCDs) used, infection, trauma

Risk Factors: obesity, tobacco use

Associated Characteristics: African American, women of advanced maternal age may have higher incidence

SIGNS / SYMPTOMS

Sudden shortness of breath, tachypnea with respirations more than 24, low blood pressure, anxious, panic, cough, sudden chest pain, tachycardia, redness, pain, swelling, warmth of extremities, pain in ribs with breathing, dull chest pain, sudden cough with blood, collapse, syncope, low blood pressure, PEA (pulseless cardiac electrical activity)

TREATMENTS / LABS / MEDICATIONS

Treatments: pulse oximetry, computed tomography (CT) scan, computed tomography (CT) angiogram chest, electrocardiogram (EKG), arterial blood gas, doppler ultrasound lower extremities, chest x-ray (CXR), chest ultrasound, ventilation/perfusion (V/Q) scan, magnetic resonance imaging (MRI), sequential compression device (SCDs), anti-embolic stockings, venous filter, respiratory support: nasal cannula, mask, intubation, thrombectomy, spiral computed tomography (CT) scan, referrals to hematologist, higher level of care within or to outside facility, interventional radiologist

Labs: complete blood count (CBC), prothrombin time (PT)T, partial thromboplastin time (PTT), international normalized ration (INR), D- dimer, fibrinogen, platelets

Medications: chemical thromboprophylaxis, anticoagulation medication therapy: Heparin, Warfarin (Postpartum), Lovenox, Enoxaparin, Dalteparin, Tinzaparin, tissue plasminogen activator (tPA). Note: anticoagulation in prenatal period may be suspended before delivery and restarted after delivery to minimize bleeding complications.

AUTOPSY

Identification of source of emboli, description of leg and pelvis veins, documentation of fresh or organizing clot in vessels, inflammation of genital tract, microscopic findings of clots in vessels.

REFERENCES:

1. American College of Obstetricians and Gynecologists. Frequently asked questions (FAQ17.) Preventing deep vein thrombosis. 2011. Retrieved <http://www.acog.org>
2. American College of Obstetricians Gynecologists (ACOG) Practice Bulletin Number 123. Thromboembolism in pregnancy. September 2011.
3. American College of Obstetrician and Gynecologists. Thromboembolism in pregnancy. Practice Bulletin 123: 2011.
4. Brennan M, Moore L. Pulmonary embolism and amniotic fluid embolism in pregnancy. *Obstetrics and Gynecology Clinics North America* 2013; 40:27-35.
5. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. *BJOG* 2011;118(Suppl.1):1-203.
6. D'Alton M, Friedman A, Smiley R, Montgomery D, Paidas M, D'Oria, R, Frost J, Hameed A, Karsnitz D, Levy B, and Clark S. National partnership for maternal safety: Consensus bundle on venous thromboembolism. *JOGNN* 2016. 45:706-717.
7. James A, Jamison M, Brancazio L, Myers E. Venous thromboembolism during pregnancy and the postpartum period: incidence, risk factors and mortality. *American Journal Obstet Gyneco*. 2006; 194(5): 1311-5. Retrieved <http://www.ncbi.nih.gov/pubmed/16647915>
8. Kizior R, Hodgson B. *Saunders Nursing Drug Handbook* 2017. Elsevier.
9. Lewis, G (ed). *The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom*. 2007.
10. Mhyre J, D'Oria R, Hameed A, Lappen J, Holley S, Hunter S, Jones R, King J, D'Alton M. The Maternal Early Warning Criteria: A proposal from the national partnership for maternal safety. 2014. 124(4): 782-786.
11. Okoroh E, Azonobi I, Grosse S, Grant A, Atrash H, James A. Prevention of venous thromboembolism in pregnancy: A review of guidelines, 2000-2011. *Journal Women's Health*, May 3, 2012. Retrieved <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4467199/>
12. Perry S, Hockenberry M, Lowdermilk D, Wilson D. *Maternal Child Nursing Care Fifth Edition*; Mosby, Inc.: Canada 2014.

13. Springel E, Ramus R. Thromboembolism in pregnancy: practice essentials, background, pathophysiology. 2016. Retrieved <http://emedicine.medscape.com/article/2056380-overview>
14. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

DIABETES: TYPE I, II, AND GESTATIONAL

DEFINITION

Metabolic disease with high blood sugar levels and excessive urination caused by defect with insulin secretion. Breakdown of proteins and fats.

Type I: diabetes caused by deficiency in pancreas islet beta cells; usual onset suddenly at a young age

Type II: insulin deficiency develops gradually

Gestational Diabetes: (GDM) glucose intolerance that begins during pregnancy

Other names: diabetes mellitus, hypoglycemic “dead in bed syndrome,” labile diabetes, pregestational diabetes

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: gestational diabetes (GDM) in prior pregnancy, obesity, history delivering infant greater than nine pounds, polycystic ovarian disease, immobility, hypertension, kidney disease, retinopathy, chronic hypertension, family history of diabetes, impaired glucose metabolism

Prenatal: unstable glucose levels, macrosomia, higher risk for cesarean section, pregnancy-induced hypertension, eclampsia, obesity, congenital anomalies, miscarriage, stillbirth, preterm delivery, preeclampsia, polyhydramnios, vaginal infections, urinary tract infections, ketoacidosis, hypoglycemia, fetal hyperinsulinemia

Labor and Delivery: birth trauma, shoulder dystocia, stillbirth, dehydration, immobility

Postpartum: preeclampsia, hemorrhage, infections, obesity, cardiovascular disease

Risk Factors: obesity, sedentary lifestyle

Associated Characteristics: African American, American Indian, Asian, Hispanic, Pacific Islander, women of advanced maternal age may have higher incidence

SIGNS / SYMPTOMS

Irritability, sweating, nervousness, blurred vision, headache, tachycardia, glycosuria, thirst, increased urination, low blood sugar

TREATMENTS / LABS / MEDICATIONS

Treatment: adjustments to insulin doses, nutritional counseling, caloric restricted diet, management by specialty care maternal fetal medicine, neurologists, endocrinologist, ophthalmologist, nutritionist, urine

cultures, thyroid function, self-monitoring blood glucose levels, nutritional counseling, fetal growth surveillance and monitoring, preconception counseling, education on importance control of hypoglycemia and hyperglycemia in pregnancy, exercise therapy, increased prenatal visit monitoring

Labs: HgA1c, electrolytes and random glucose, three-hour glucose tolerance testing 24-28 weeks' gestation, baseline renal function studies, urine testing for ketones

Medications: Metformin, Glyburide, insulin, Vitamin D

AUTOPSY

Postmortem glucose and insulin levels, pathology and weight heart, brain, liver; and renal pathology

REFERENCES:

1. American College of Obstetricians and Gynecologists. Gestational diabetes mellitus. Practice Bulletin Number 137. Obstetrics and Gynecology 2013. 122(2):406-416. Retrieved http://journals.lww.com/greenjournal/Abstract/2013/08000/Practice_Bulletin_No_137_Gestational_Diabetes.46.aspx
2. Center for Disease and Control. Pregnancy Mortality Surveillance System. Page last updated January 21, 2016. Retrieved <http://www.cdc.gov/reproductivehealth/MaternalInfantHealth/PMSS.html>
3. Center for Disease Control and Prevention. Type 1 or type 2 diabetes and pregnancy. Last reviewed 2015. Retrieved <http://cdc.gov/pregnancy/diabetes-types.html>
4. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118(Suppl.1):1-203.
5. Georgia Department of Public Health: Georgia Maternal Mortality 2012 Case Review. 1-27. Retrieved https://dph.georgia.gov/sites/dph.georgia.gov/files/MCH/MMR_2012_Case_Review_June2015_final.pdf
6. Hernandez L, Clark C, Division of Community Health Promotion Florida Department of Health. Pregnancy-Associated Mortality Review: Pregnancy-related deaths 2012 Update. Retrieved <http://www.floridahealth.gov/statistics-and-data/PAMR/index.htm>
7. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
8. Leinon P, Hiilesmaa V, Kaaja R, Terma K. Maternal mortality in Type 1 Diabetes. Diabetes care 2001. 24(8): 1501-1502. Retrieved <http://care.diabetesjournals.org/content/24/8/1501>
9. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
10. Perry S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014.
11. U.S. Department of Health and Human Services Office on Women's Health. Pregnancy complications. 2016. Retrieved <http://womenshealth.gov/pregnancy/you-are-pregnant/pregnancy-complications.html>
12. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

SEIZURE DISORDERS

DEFINITION

Convulsion caused by abnormal electrical discharge activity in the brain. No specific pathological cause is found in majority of cases.

Other names: epilepsy, sudden unexplained death with epilepsy

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: epilepsy, head trauma, alcohol use with history of epilepsy, sleep deprivation, nonadherence seizure medications

Prenatal: increase plasma volume in pregnancy increases effects of drug metabolism, nonadherence to anticonvulsants, increased risk birth defects, intrauterine growth restriction, neural tube defect, maternal hypoxia and fetal distress with seizure occurrence, alcohol, sleep deprivation, injury and falls with a seizure, preterm labor, stillbirth, change in frequency and duration of seizures

Labor and Delivery: management of anticonvulsant therapy in labor, higher risk for cesarean section

Postpartum: adjustments anticonvulsant therapy

Risk Factors: alcohol use

SIGNS / SYMPTOMS

Loss of consciousness, spasms one side of body, tonic clonic movements of extremities, amnesia of event, aura, urinary and fecal incontinence, syncope, maternal hypoxia

TREATMENTS / LABS / MEDICATIONS

Treatments: documentation preconception counseling and pregnancy risks anticonvulsants, documentation adjustment anticonvulsants in pregnancy, MRI, CT scan, fetal growth monitoring, airway management, referrals to neurologist, amniocentesis, chorionic villus sampling

Labs: drug levels

Medications: folic acid prior to pregnancy, Dilantin, Phenobarbital, Valproic acid, Valprate, Carbamazepine, Topiramate, Gabapentin, Tegretol, Depakote

AUTOPSY

Signs of gastric aspiration in the lungs; brain and heart pathology; toxicology

REFERENCES:

1. American College of Obstetricians and Gynecologists: Seizure disorders in pregnancy. Frequently asked questions (FAQ)129, February 2013. Retrieved <http://www.acog.org/Patients/FAQs/Seizure-Disorders-in-Pregnancy>
2. Brewer J, Waltman P. Epilepsy and pregnancy: Maternal fetal effects of phenytoin. Critical Care Nurse. 2003. 23(2):93-98, Retrieved <http://ccn.aacnjournals.org/>
3. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118(Suppl.1):1-203.
4. Georgia Department of Public Health: Georgia Maternal Mortality 2012 Case Review. 1-27. Retrieved https://dph.georgia.gov/sites/dph.georgia.gov/files/MCH/MMR_2012_Case_Review_June2015_final.pdf
5. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
6. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
7. Perry S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014.
8. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

SICKLE CELL DISEASE

DEFINITION

Autosomal recessive disorder with abnormality in hemoglobin gene, hgSS or hgSC, that causes chronic anemia due to increased frequency of breakdown of red cells. The red blood cells are sickle-shaped and with hypoxia are easily damaged, causing painful tissue damage.

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: frequent hospitalizations for crisis

Prenatal: preeclampsia, pulmonary infarction, congestive heart failure, sickle cell crisis, urinary tract infections, chronic anemia, hypoxia, stillbirth, preterm delivery, increased episodes of painful crisis

Labor and Delivery: fluid overload, dehydration, cesarean section

Postpartum: endometritis, sepsis, acute sickle cell crisis

Associated Characteristics: African American, Mediterranean, African origin, South and Central American, Caribbean

SIGNS / SYMPTOMS

Pallor, fatigue, weakness, jaundice, vascular hypoxia, infarction, severe pain abdomen, joints, extremities, fever, chest pain

TREATMENTS / LABS / MEDICATIONS

Treatments: preconception health/care and family planning counseling, supplemental oxygen and respiratory support, blood product transfusions, serial ultrasounds to monitor fetal growth, hydration with intravenous fluids, consultants maternal fetal medicine, hematology, transfer higher level care within or outside of facility

Labs: hemoglobinopathy testing, complete blood count (CBC), reticulocyte count, blood cultures, urinalysis

Medications: narcotics for pain control, iron, antibiotics

AUTOPSY

Organ pathology, Splenic infarcts, myocardial infarction, multiorgan failure

REFERENCES:

1. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118(Suppl.1):1-203.
2. Kizior R, Hodgson B. Saunders Nursing Drug Handbook 2017. Elsevier.
3. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer -2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
4. New Jersey Department of Health. Recommendations from the New Jersey Maternal Mortality Review Team (2006-2008 deaths). Retrieved <http://www.nj.gov/health/fhs/professional/mortality.html>
5. Perry S, Hockenberry M, Lowdermilk D, Wilson D. Maternal Child Nursing Care Fifth Edition; Mosby, Inc.: Canada 2014.
6. U.S. Department of Health and Human Services Office on Women's Health. Pregnancy complications. 2016. Retrieved <http://womenshealth.gov/pregnancy/you-are-pregnant/pregnancy-complications.html>
7. Venes, D. (editor) Taber's Cyclopedic Medical Dictionary Edition 22.; F.A. Davis Company: Philadelphia 2013.

SYSTEMIC LUPUS ERYTHEMATOSUS

DEFINITION

Chronic autoimmune inflammatory disease of the connective tissue that can attack multiple organ systems and present periodically as flare-ups. Is due to activation of T cells and B cells, antibodies that attack individual cells.

Other names: Lupus, SLE

TIMING / RISK FACTORS / ASSOCIATED CHARACTERISTICS

Medical History: documentation flares/exacerbations, miscarriage, preeclampsia, preterm delivery, antiphospholipid syndrome, hypertension

Prenatal: preterm labor, intrauterine growth restriction, preeclampsia, hypertension, proteinuria, documentation of a flare six months prior to conception, premature rupture membranes, renal flare, urinary tract infection, diabetes

Labor and Delivery: increased chance of cesarean section due to maternal complications

Postpartum: exacerbation of symptoms, chronic vascular changes, renal disease

Associated Characteristics: African American, Asian, teens may have higher incidence

SIGNS / SYMPTOMS

Skin rash, fatigue, weakness, fever, malaise, joint pain, proteinuria

TREATMENTS / LABS / MEDICATIONS

Treatments: preconception counseling and family planning, referral to maternal fetal medicine, hematology, rheumatology, infectious disease kick counts, transfer to higher level of care within or outside facility, increased visits for monitoring during prenatal and postpartum care

Labs: platelets, proteinuria, autoantibodies, renal and cardiac labs, PT, INR, PTT, fibrinogen, CBC, blood culture, antiphospholipid, ANA, anticardiolipin antibody, liver function tests, urinalysis, 24-hour urine for creatinine clearance and total protein

Medications: immunosuppressant medications prior to pregnancy, prednisone, Hydroxychloroquine, anticoagulation during pregnancy with heparin and or aspirin

AUTOPSY

Note lungs, kidneys, cardiac pathology. Look for documentation myocarditis, interstitial inflammation.

REFERENCES:

1. Baer AN, Witter FR, Petre M. Lupus and pregnancy. *Obstet Gynecol Surv* 2011. 66(10):639-53. Retrieved <https://www.ncbi.nlm.nih.gov/pubmed/22112525>
2. Centre for Maternal and Child Health Enquiries (CMACE). Saving Mothers' Lives: Reviewing maternal deaths to make motherhood safer: 2006-08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. *International Journal of Obstetrics and Gynaecology* (BJOG) 2011;118(Suppl.1):1-203.
3. Kizior R, Hodgson B. *Saunders Nursing Drug Handbook 2017*. Elsevier, 2017.
4. Lewis, G (ed). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: Reviewing maternal deaths to make motherhood safer - 2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. 2007.
5. Mhyre J, D'Oria R, Hameed A, Lappen J, Holley S, Hunter S, Jones R, King J, D'Alton M. The Maternal Early Warning Criteria: A proposal from the national partnership for maternal safety. *Journal of Obstetric, Gynecologic, & Neonatal Nursing* (JOGNN) 2014. 124(4): 782-786.
6. Perry S, Hockenberry M, Lowdermilk D, Wilson D. *Maternal Child Nursing Care Fifth Edition*; Mosby, Inc.: Canada 2014.
7. Pregnancy complications. *U.S. Department of Health and Human Services Office on Women's Health*. 2016. Retrieved <http://womenshealth.gov/pregnancy/you-are-pregnant/pregnancy-complications.html>
8. Venes, D. (editor) *Taber's Cyclopedic Medical Dictionary Edition 22*; F.A. Davis Company: Philadelphia 2013.

APPENDIX B:

CASE NARRATIVE TEMPLATES

The following case narrative templates are built into the MMRIA data system.

The Case Narrative Template provides an overview of the pertinent details of the case and is a useful tool for introducing a case to the review team.

Additional narrative templates specific to the variety of sources in medical records (prenatal, Labor and Delivery, ED/Hospital Visits, Transport, and Autopsy) are designed to help guide you in collecting critical information and constructing a narrative story for ease of reading and review.

You may find it useful to develop the case narrative for the specific sources of information immediately after completing the data entry for that source. Once all records have been abstracted and the narrative templates completed, you can then copy and paste all of the separate narratives into the single Case Narrative form built into MMRIA.

Core Narrative Template:

She was a **(AGE, PLACE OF BIRTH, RACE/ETHNICITY, MARRIAGE STATUS, LEVEL EDUCATION, OCCUPATION)**. She was a gravida ___ para ___, who died with cause of death ___, ___ **DAYS /MONTHS, BEFORE, DURING OR AFTER DELIVERY**. Medical history was significant for ___ **(PRE-PREGNANCY RISK FACTORS OR PRE-EXISTING MEDICAL CONDITIONS)**. Pre-pregnancy BMI was ___. Life course issues significant for _____ **(PSYCHOSOCIAL FACTORS)**. Entry into prenatal care was at ___ weeks with ___ **(#)** visits at a ___ **(DESCRIBE LOCATION)** with a ___ **(PROVIDER TYPE)**. Prenatal history was significant for ___ **(INCLUDE IDENTIFIED OBSTETRIC RISK FACTORS)**. Referrals during prenatal period were to _____ on ___ **(DATE)**.

Health events prior to delivery included _____. She presented to **CLINIC/HOSPITAL/OTHER** _____ at ___ weeks gestation. Delivery was by a **(PROVIDER TITLE)** ___, method was ___, with ___ anesthesia. Obstetric complications included _____. Fetus/infant was ___ weeks gestation and weighed ___ pounds/ounces, Apgar scores were ___ and complications were _____. Postpartum period significant for developing _____. Mother and infant **WERE/WERE NOT DISCHARGED (IF APPLICABLE)** to _____. At ___ weeks postpartum, she presented to **(DESCRIBE LOCATION)** _____. Postpartum period significant for _____.

(SUMMARIZE TERMINAL EVENT). On ___ **(DATE)** and ___ **TIME, (INCLUDE CRITICAL SYMPTOMS, VITALS, LABS, TREATMENTS)**.

Autopsy was done by a ___ **OR WAS NOT DONE**. Significant findings included _____. **DESCRIBE IF ANY BEREAVEMENT SUPPORT OFFERED** _____.

Prenatal Care Record: Narrative Summary

She was a gravida ___ para ___ with a past obstetric history of _____ **(IDENTIFY ANY COMPLICATIONS OR HIGH RISK FACTORS) OR STATE NO SIGNIFICANT PAST OB HISTORY.** Prior surgical history includes _____. Her family medical history was positive for _____. Pre-existing medical conditions included _____. She was ___ **(HEIGHT)** and weighed _____. Her pre-pregnancy BMI was _____.

In the sentinel pregnancy, she entered care at ___ weeks gestation and weighed _____. She attended ___ **(#)** visits at a _____ **(DESCRIBE CLINIC SETTING)**, with a _____ **(PROVIDER TYPE)** and had _____ **(TYPE OF INSURANCE)**. Screening was/was not performed for substance use and was _____ **(POSITIVE/NEGATIVE)** for _____. Screening was/was not performed for domestic violence and was found to be _____ **(POSITIVE/NEGATIVE; DESCRIBE IF POSITIVE)**. Additional social determinant factors identified include _____.

The pregnancy was complicated by _____ **(DESCRIBE ANY COMPLICATIONS OR HIGH RISK FACTORS)**. She was referred to a(n) _____ **(DESCRIBE SPECIALIST)** for _____. Diagnostic procedures during pregnancy included _____. Abnormal labs during pregnancy include _____. Abnormal vital signs during pregnancy include _____. During the sentinel pregnancy, she was on _____ **(IDENTIFY ALL MEDICATIONS)**.

ER/Hospital Visit Narrative Summary Template

Fill out a separate summary for each hospital visit and label each facility by a different number or letter. If admitted to the hospital, provide brief chronological synopsis of events that occurred during the hospital stay, including condition and vital signs when discharged.

She presented at ___ **(WEEKS GESTATION)** to the _____ **(ED OR L&D TRIAGE OR OTHER)** in a _____ **(HOSPITAL LEVEL OF OB CARE OR TRAUMA/TRAUMA LEVEL)** via _____ **(METHOD OF TRANSPORTATION)** on ___ **(DATE)** at ___ **(TIME)**. Her chief complaint was _____. Her weight on admission was _____ and her presenting vital signs were _____. She was screened for _____ **(DESCRIBE TYPE OF SCREENING I.E. EMBOLISM, HEMORRHAGE, ECTOPIC, INFLUENZA, DOMESTIC VIOLENCE, ETC.)**

Physical examination on admission found _____. Labs performed included _____ with the following abnormal findings noted _____. Diagnostic tests performed included _____ with the following abnormal findings noted _____. Her diagnosis was _____ and she was admitted to _____ **(DESCRIBE UNIT)** OR was transferred to _____ OR was discharged to _____.

Labor and Delivery:

She labored for _____ hours and delivered via _____ (**METHOD – IF CESAREAN SECTION, DESCRIBE REASON**) by a(n) _____ (**PROVIDER TYPE**) under _____ (**ANESTHESIA TYPE**). Medications administered during labor and delivery or postpartum included _____. She received _____ units of blood products (**DELETE IF NOT APPLICABLE**). Infant weighed ____ with Apgar numbers of_____.

Complications during labor, delivery or postpartum included _____.

She was discharged home on day _____. Vitals signs at discharge included_____. She was instructed to _____ (**SPECIAL EDUCATION OR FOLLOW-UP APPOINTMENTS**).

Transport Narrative Summary:

Transport was notified on ____ (**DATE**) at ____ (**TIME**) for _____ (**REASON**). Upon arrival at _____ (**PLACE OF ORIGIN**) she was found to be ____ weeks gestation with _____ (**BRIEFLY DESCRIBE CONDITION**). Procedures during transport included _____. She was taken to _____ (**DESCRIBE DESTINATION, INCLUDING LEVEL OF CARE**).

Autopsy Narrative Summary:

She expired on ____ (**DATE**) at ____ (**TIME**) in the _____ (**FACILITY**). The case **WAS OR WAS NOT** reported to the Medical Examiner/Coroner. Autopsy **WAS OR WAS NOT** performed. Core findings from the autopsy include the following:

- Autopsy performed by
- Height and Weight
- Systems Exam (Gross Findings)
- Microscopic Exam
- Toxicology Results
- Cause of Death, per autopsy

REFERENCES

- i. Berg C, Danel I, Atrash H, Zane S, Bartlett L (Editors). *Strategies to Reduce Pregnancy-Related Deaths: from Identification and Review to Action*. Atlanta: Centers for Disease Control and Prevention; 2001.
- ii. Nahm, M. *Data Accuracy in Medical Record Abstraction* (2010). *UT SBMI Dissertations (Open Access)*. 15. Retrieved from http://digitalcommons.library.tmc.edu/uthshis_dissertations/15