## D.5 Hospital Abstraction: Cardiac/Peripheral Arterial Disease

### D.5.1 Introduction

The MESA *Hospital Abstraction*: *Cardiac/Peripheral Arterial Disease* form captures the specific reasons for cardiac or peripheral arterial disease (PAD - also known as peripheral vascular disease or PVD) hospitalizations and the use of various procedures, drugs and treatments.

The purpose of these instructions is to make sure all MESA medical record abstractors are collecting information in the same way. The more specific information you have about each item on the form--and the more you know about where to find the “answers” and how to record them--the more uniform and useful the MESA data will be. Although you may have ample experience in medical record abstraction and medical terminology, these instructions provide many definitions that will help ensure everyone is using the same “tools” to describe an event.

For each item on the form, the instructions will tell you where in the medical record, and in what order, to look for the required information. When consulting several sections of the medical record, you may find that they provide different or even contradictory information. It is, therefore, very important to consult all sections of the medical record listed for a given item on the form. The parts of the medical record you will use to complete the form are listed and defined in section D.5.2, below.

Ideally, the information you need to complete an item on the form will be found in one or more of the medical record sections listed. However, you may have to search other parts of the medical record for an answer. If you are still unable to get the information you need, select “unknown”, where provided. Mark “no” for items in which “unknown” is not an available option.

If you are unable to complete an item on the form because of missing or contradictory information in the medical record, consult your physician reviewer for advice.

**ER Visits and Transfers:** Separate admissions (e.g., b/c of transfers) are abstracted as separate Cardiac Abstraction form entries, even though both abstractions can be entered as a single MESA event at the judgment of the appropriate Events staff. Since an ER visit alone is not an actual admission, there is no need to do two separate abstractions in a situation where a participant has an ER visit at one hospital, without being admitted, but is then transferred to and admitted at a different hospital. In such a situation, the records of the ER visit should be abstracted as part of the admission at the second hospitalization.

**Multiple Care Locations:** In general, there are three different options to make sure everything is abstracted when care is received in two locations:

(a) Two entirely separate investigations, each with its own abstraction form. (Use this method for two events separated by 24 hours, though the Events staff has the option of collapsing events into a single investigation if conditions are directly related and admissions are within 30-day span.)

(b) One investigation with two or more abstraction forms. (Use for a single event involving two admissions linked by a transfer.)

(c) One investigation with one abstraction form, even though care was received in two locations. (Use for one event that involves multiple locations but only one actual admission, such as ER visit at one hospital followed by admission to a different hospital.)

#### D.5.1.1 Sections and Content of the Medical Record Used for Abstraction

You need to consult all of the following sections of the medical record, as appropriate, in order to gather adequate information to complete the form. If the entire chart is available, these sections should be reviewed first. It is a good idea to read through these sections (and others, if possible), before you begin recording information on the form, to familiarize yourself with the course of events that occurred from admission to discharge.

Although the instructions for each individual form item list the **most likely**sources for finding the information sought by that particular question, you can use documentation from anywhere in the chart if these sources do not provide the information you need.

* The **Face Sheet/Admission Sheet** provides participant demographic information and admission and discharge information (dates, treating physician(s), discharge diagnosis(es), and ICD-9-/ ICD-10 CM codes). ICD codes can also be found in Physician’s Attestation and Discharge Summary Codes documents.
* The **Emergency Room (ER) Record** and **Emergency Medical Technician (EMT) or Ambulance Report** describe symptoms, dates and times of symptoms, vital signs, initial treatment during transportation to the hospital, ER treatment and response, and disposition. This section is most useful for participants who are dead on arrival (DOA) or who die in the ER before they are admitted to the hospital. This source may also provide the first 12-lead ECG tracing.
* The **Admission History and Physical Exam** (H&P) is a detailed description of symptoms leading to admission, condition of participant on admission, current medication use, and past medical history; it also includes a physical exam, results of tests and procedures done in the ER or upon admission, provisional diagnosis(es), and treatment plan. Records of elective hospitalizations may include a pre-procedure history and physical done at an earlier date outside the hospital.
* The **Discharge Summary** summarizes the entire hospitalization, including admission and discharge dates, treating physician(s), admission H&P, hospital course, treatments and procedures, and discharge disposition. (If the hospitalization is prolonged or if residents or attending physicians rotate while a participant is admitted, there may also be an **interim summary.**) In the event the admission was too short to produce a discharge summary, the last physician’s progress note may be used in its place.
* The **Death Summary** may replace or augment the discharge summary, in the event of a participant’s death. It may contain, or be attached to, autopsy information or an autopsy report.
* The **Consults** section contains typed or handwritten notes made by specialists (e.g., infectious disease, rehabilitation medicine) consulted while the participant was hospitalized. Consults may also be found in the physician progress notes section.
* **Laboratory Results.** This section will include cardiac enzymes, creatinine, BNP, and pro-BNP, levels.
* **ECG Reports (12-lead tracing images)**
* The **Radiology/Imaging** section contains reports of chest x-rays, MRIs, CTs, and other imaging procedures.
* The **Results/Procedures** section contains reports of Bruce treadmill and pharmacological stress tests, myocardial perfusion tests, echocardiograms, MUGA/SPECT scans, angiograms, angioplasties
* The **Operative/Surgical** section contains operative and pathology reports and may contain autopsy reports.
* **Outpatient Records,** if available, may be used if they can provide more information about the event in question. For instance, they may help to confirm the date of onset of a specific condition, or provide a pre-procedure history and physical report.

If there are conflicting sources of information, take information in this priority: resident/ fellow/certified nurse practitioner, cardiologist, attending physician; ER physician, EMT/ PA, nurse.

Please avoid using the following secondary sources to gather information, unless primary sources are incomplete or unavailable.

* Physician orders
* Nurse’s or multidisciplinary notes
* Vital sign logs
* Physician progress notes, unless there is**no other way**to reconstruct the event.

#### D.5.1.2 Definitions of Terms

Some questions have response categories of “yes,” “no,” and “unknown.” If nothing is written down that definitely answers the question, generally record “unknown.” The following table lists terms you may encounter in the medical record that, when in doubt, should be recorded on the form as “yes,” “no,” or “unknown.” (Obviously, the entire content of the event should be considered as well.) If a response category does not include “unknown” (i.e., includes “yes” and “no” only), record unknowns as “no.”

|  |  |  |
| --- | --- | --- |
| **Yes** | **No** | **Unknown** |
| Present | Not present | Rule out (R/O) |
| Likely | Low probability | Suggestive |
| Apparent | Unlikely | Equivocal |
| Consistent with |  | Suspicious |
| Compatible with |  | Questionable |
| Definite |  | Possible |
| Probable |  | Uncertain |
| Highly suspicious |  | Reportedly |
| Presumed |  | Perhaps |
| Borderline |  | Could be |
| Thought to be |  | Might be |
| Minimal |  | May be |
| Representing |  | May represent |
| Seems to be |  |  |

In the case of “and/or” take the first condition noted as a “yes.” For example, “pneumonia/CHF”, take pneumonia as the “yes.”

The table below contains time-of-day and length-of-time terms that you may encounter in the medical record and how they should be interpreted and/or recorded on the form. (Use 12-hour clock, not 24-hour clock).

|  |  |
| --- | --- |
| **If the medical record says this…** | **You record this…** |
| [If no time is listed] | 1200 |
| Middle of the night | 0100 |
| Early morning | 0600 |
| Morning | 0800 |
| Late morning | 1000 |
| Mid-day or noon | 1200 |
| Early afternoon | 1400 |
| Afternoon or mid-afternoon | 1500 |
| Late afternoon | 1600 |
| Early evening | 1900 |
| Late evening | 2300 |
| Midnight | 2400 |
| Several days | ≥3 days |
| A few days | ≥ 2 but < 4 days |
| Several hours | ≥ 4 but < 6 hours |
| A few hours | ≥ 2 but < 4 hours |

Other specific definitions are included in the instructions for each form item.

#### D.5.1.3 Methods

See specific instructions in Section 3.3.

#### D.5.1.4 Central Abstraction

Eligible events will be prepared for the Central Abstractor as follows:

* The Eligibility Form will be completed and entered into the MESA EDC.
* Medical records received from the provider will be briefly reviewed for completeness and appropriateness. Inappropriate records (not found on the request guideline list) will be purged.
* Records found to be noted, but missing, will be requested from the record provider. It is helpful to review the Discharge Procedure codes, as well as the Discharge Summary, ER Notes, H and P, etc., to determine which procedures should be found in the record, such as ECGs, CXRs, Echos, etc.
* If the provided record is complete and appropriate, the documents are scanned into the EDC in the order noted on the *Final Notice* form, with the exception that the ICD Code sheet should be scanned first.
* DO NOT SCAN THE RECORD UNTIL IT IS COMPLETE. If there are records that are unobtainable even though mentioned in the record, enter an Investigative Note into the Event record and make a note to the Central Abstractor on the coversheet.
* The Central Abstractor will abstract the event and enter the data into the *Cardiac/PVD Hospital Abstraction* form in the EDC. Documents not needed for Physician Review will be deleted.
* Upon completion of the abstraction the Field Center will be notified and the documents selected for review will be de-identified according to the Privacy Act guidelines using Adobe Acrobat Pro program tools.
* Specific details related to de-identification can be found in Section 3.3.

### D.5.2 Item-by-Item Instructions

#### D.5.2.1 Admission Information

(Question 1) Admission Date

* + Sources: Face sheet, discharge or death summary, H&P.
  + Be aware the admission date may be different (e.g., the following day) from the ER date. Remember, however, start of care begins with the EMS in the field or in the ambulance.

(Question 2) Discharge date or date of death

* + Sources: Face sheet, discharge or death summary; autopsy report.
  + If the participant was transferred to a care facility, rehabilitation center, or hospice facility, the discharge date is the date of transfer.
* If the death certificate indicates death-in-hospital for a participant who was transferred from the hospital to in-patient hospice and died, abstract from the date of admission of acute care through the date of death in hospice.

#### D.5.2.2 Hospital Information

(Question 3) What was the participant's vital status at discharge?

* + Sources: Face sheet, ER report (if participant died in ER), discharge or death summary.
  + **If response is “Alive,” skip to Question 5.**

(Question 4) Was there an episode of chest, left arm, or jaw pain during the 72 hours *prior to death?*

* + Sources: EMT/ambulance report, ER report, discharge or death summary, H&P.
  + “Chest pain” synonyms are angina; chest tightness, discomfort or heaviness; ischemic pain.
  + Timing of death is when respiration and heartbeat cease, not when CPR ends or participant is pronounced dead.
  + This may be difficult to determine, if an exact time of pain onset is not recorded in the medical record. If time is not totally clear, follow standard procedures for recording “unknown” or estimated data. (See Appendix D.5.1.2, “Definition of Terms,” for details.)
  + If chart says “no symptoms,” or if there was a sudden collapse, record “no,” not “unknown.”
  + Refer to point 1 in Appendix D.5.4, “Cardiovascular Events: Synonyms and Descriptions,” for more information about these terms.

**D.5.2.3 Acute Cardiovascular Events**

(Question 5) Was there an acute episode of pain, discomfort, or tightness in the chest, left arm, or jaw within 72 hours of the hospitalization or within 72 hours of the in-hospital event?

* + Sources: EMT/ambulance report, ER report, discharge summary or death, H&P, consult; physician or other notes.
  + Chest pain may be recorded as "CP" in the medical record. “Chest pain” synonyms are angina, chest tightness, discomfort or heaviness, ischemic pain.
  + Tooth pain, back pain, and/or jaw pain qualify as “Yes”, if the physician thought the pain was ischemic. SOB, if identified by a physician as an anginal equivalent, qualifies as a “Yes,” however, SOB, not otherwise specified is recorded as “No.”
  + An in-hospital event might include infarction or re-infarction.
  + If chart says “no symptoms” or there was a sudden collapse, record “no,” not “unknown.”
  + For the purposes of this question, EMS and ER visits leading to hospitalization should be considered as in-hospital (i.e., if the participant experienced pain, etc., within 72 hours of an ER visit, record “yes” here).
  + **If you answer “no” or “unknown” to this question, skip to question 8.**

(Question 6) Did the onset of the acute episode occur prior to admission?

* + Sources: EMT/ambulance report, ER report, discharge or death summary, H&P, consult; physician or other notes.

(Question 7) Was the discomfort or pain diagnosed as having a non-cardiac origin?

* + Sources: Discharge or death summary, consult; physician notes.
  + Possible non-cardiac sources include musculoskeletal pain, pleuritic (lung) pain, pericarditis, etc.
  + Answer “yes” only if there is a definite, final conclusion that the pain was non-cardiac.
  + Arrhythmia (e.g. Afib,) heart failure, and defective heart valves are findings with cardiac origins.

(Question 8) Did a physician indicate any of these as being present *during the hospitalization?*

* + Sources: Discharge or death summary, consult, H&P; physician notes.
  + Do not use ICD codes as reasons to answer “yes”. Diagnoses must be listed in the record narrative.
  + No indication either way is recoded as “no.”
  + Mark all that apply to this hospitalization only. Exclude references to old episodes or chronic conditions, except for the last item. Include only if acute, exacerbated, or newly diagnosed, during the hospitalization.
  + Angina diagnosis: Ischemia alone does not qualify as “yes”
  + Myocardial infarction: ECG description alone does not qualify as “yes”
  + Congestive heart failure or pulmonary edema: Both left and right heart failure qualify. CHF is a code description that follows a patient. Make sure symptomatic CHF was “present” according to chest X-ray or MD progress notes. If CHF is listed as an indicator on the chest X-ray, etc., use the results narrative, not the indicator.
  + Lower extremity claudication: “Exertional leg pain relieved by rest” qualifies as “yes”
  + Atherosclerosis of arteries of the lower extremities: PAD (peripheral arterial disease) and PVD (peripheral vascular disease) diagnoses may be found. Make sure that PVD refers to arterial disease to qualify as “yes”
  + Arterial embolism or thrombosis of the lower extremities: Venous (DVT) does not qualify as a “yes”
  + Abdominal aortic aneurysm (AAA): Aneurysm of upper aorta does not qualify as a “yes”
  + Shock or cardiogenic shock: Septic shock is “no”
  + Ventricular fibrillation, cardiac arrest or asystole: Asystole is “no” for any procedure-induced heart stoppage, i.e. CABG. To be considered asystole, the pause must be 60 seconds or longer. All deaths are “yes.”
  + Deep venous thrombosis or pulmonary embolism: An arterial thrombosis or embolus is recorded elsewhere
  + ST elevation > 1 mm with pain that is not present on ECG without pain: ST elevation and chest pain need not be mentioned in the same sentence to answer “yes”, but these should generally be present together, at the same time. Do not match a chest pain day apart from the ST finding. An ECG interpretation showing ST elevation is sufficient if during chest pain
  + History of chest, left arm or jaw (ischemic) pain at any time in the past: For this item **only,** any reference to a history of physician-diagnosed angina or ischemic pain should be recorded as “yes.” History does not include the present illness and, in general, refers to a period of at least 72 hours prior to this admission. Evidence of outpatient nitroglycerin used for historical pain can be taken as evidence that the pain was ischemic. A past history of documented chest pain with subsequent coronary artery intervention qualifies as “yes”.
  + Refer to the entries of Appendix D.5.4, “Cardiovascular Events: Synonyms and Descriptions,” for the list of findings and their synonyms/descriptions.

**D.5.2.4 Electrocardiograms**

(Question 9) Were 12-lead electrocardiograms (ECGs or EKGs) recorded and are they codable?

* + Sources: ECG report(s). Rhythm strips or single-lead monitor strips are *not* acceptable for coding.
  + To be “codable,” the ECG must have +/- 0.5mm calibration or +/- 1.0mm calibration, 12 leads, and date/time.
  + If you have an ECG without calibration boxes and are unable to obtain the tracing with boxes, you may scan it and include the date in Question 9. A note should also be made in the Investigation Notes to indicate this.
  + The same is also true for narrative reports of ECGs. If you cannot obtain the tracing, include the date in Q 9 and include an Investigative Note.
  + If an undated narrative report is found, do not enter it, but you can include it in an Investigative Note
  + 12-lead ECGs are the preferred standard and every effort must be made to obtain them.
  + If you cannot obtain either a narrative report or the image, then leave the question blank and include an Investigative Note.
  + Do not use ECGs taken during stress tests.
  + Do not use pre-Naughton GXT-ECG.

If a procedure or test was performed as part of the person’s participation in a medical study, the results of that procedure/test should still be abstracted for MESA. For example, if a participant is admitted to the hospital for CHF and while there is asked to join a medical study and undergo a test for that study, then the results should be abstracted, even if the reason for the test was unrelated to the original CHF admission.

* + **If you answer “no” or “unknown” to this question, skip to question 10.**
  + **If you answer “yes” to this question, follow the instructions below and on the form.**
  + If no name or date appears on the ECG, then do not use it.
  + If there are ECGs done within 5 minutes of each other, use only the *later* reading. If they are more than 5 minutes apart, take them both.
  + Good copies of ECGs will be needed. Highlight the dates and record on each the order in which it was done (e.g., first, #2, #3, last).
  + Record dates of ECGs.
    - * -- If four or fewer tracings were made, include all tracings.
      * -- If more than four tracings were made, include:

1. First two codable tracings after admission or from ER if ER visit resulted in admission (ECG#1-First and ECG#2).

2. Last codable tracing prior to discharge or death (discharge tracing) (ECG-Last)

3. Last codable tracing on day 3 (or the first tracing thereafter) following an admission or in-hospital event (ECG#3)

* + - * -- If the participant is readmitted (transferred) to the ICU/CCU because of a new episode of chest pain, the first codable tracing may be sent.
      * Even though only a maximum of four ECGs can be listed on the abstraction form, additional significant ECGs can be scanned.

The following table shows examples of how to find ECGs to include in the MESA packet:

Example A Day 1 Day 2 Day 3 Day 4 Day 8 (discharged)

Eight ECGs **1** **2** 3 4 5 **6** 7 **8**

taken 1st 2nd 3rd last

Example B Day 1 Day 2 Day 3 (discharged)

Six ECGs **1** **2** 3 4 **5** **6**

taken 1st 2nd 3rd last

Example C Day 1 Day 2 Day 3 Day(discharged)

Six ECGs **1** **2** 3 4 **5** **6**

taken 1st 2nd 3rd last

Example D Day 1 Day 2 Day 3 Day 4 Day 8 discharge

Two ECGs **1** [No ECG #2 or #3] **2**

taken 1st last

Example E Day 1 Day 2 Day 5 (discharged)

Six ECGs **1** **2** **3** 4 5 **6**

taken 1st 2nd 3rd last

The following examples for finding ECGs include ones for a) no ECG until late in the hospital course, b) hospitalizations of less than three days, and c) ECGs taken over less than three days, but at least four ECGs are available. General rule: Code up to four ECGs if available and codable, even if definitions do not always fit.

Example F Day 1 Day 7 Day 9 Day 10 (discharged)

Three ECGs **1** **2** **3**

taken 1st 2nd last

Example G Day 1 Day 2 (discharged)

Four ECGs **1** **2** **3** **4**

taken 1st 2nd 3rd last

#### D.5.2.5 Serum Enzymes

(Question 10) Were any cardiac enzyme measurements performed during this admission?

* + Sources: Lab report.
  + Cardiac enzymes are intracellular proteins that are released into the blood stream when there is damage to the cells of the heart muscle. They may include:
  + creatinine kinase (CK) or creatinine phosphokinase (CPK)
  + creatine phosphokinase isoenzymes (CK-MB)
  + troponins (T or cTNT; and I or cTNI, I-Stat Troponin)
  + myoglobin (put value in Investigation Notes)
  + lactate dehydrogenase (LD or LDH).
  + Use the lab report as your primary source; if this document is not available, request results from the lab. Use results described in consult, discharge or death summary, or H&P only if the actual results cannot be located (unlikely). Add investigation note to explain if enzymes are found in records other than labs.
  + Enter results in chronological order, with the earliest first.

1. Blood draw/specimen/collected time (preferred)
2. Resulted time
3. MD order time
   * Be sure to extract and record the upper limit of normal ULN for all cardiac-specific tests. The ULNs are used to compute abnormal and borderline results. Telephone the labs for normal ranges used for the specific tests on the specific dates drawn if they are not available in records.
   * Do not record enzyme values without the reference range. General biochemistry tests – BNP, pro-BNP, and creatinine, may be recorded without the ULN if the normal range cannot be obtained.
   * If a procedure or test was performed as part of the person’s participation in a medical study, the results of that procedure/test should still be abstracted for MESA. For example, if a participant is admitted to the hospital for CHF and while there is asked to join a medical study and undergo a test for that study, then the results should be abstracted, even if the reason for the test was unrelated to the original CHF admission.
   * **If you answer “no” or “unknown” to this question, skip to Q 14.**

(Question 11) Did the participant have any active liver disease (cirrhosis, hepatitis, liver cancer, etc.)?

* + Sources: ER report, discharge or death summary, consult, H&P, autopsy report.
  + "Active liver (hepatic) disease" includes or may be described as:
  + acute or chronic hepatitis
  + alcoholic liver disease
  + cirrhosis
  + hepatoma
  + Laennec's cirrhosis
  + liver cancer or carcinoma
  + liver metastasis(es)
  + shock liver
  + hepatic encephalopathy

**(Question 12) Was there any evidence of hemolytic disease during this hospitalization?**

* + Sources: Discharge or death summary, consult, H&P, autopsy report.
  + "Hemolytic disease" refers to the destruction of red blood cells liberating hemoglobin. This includes or may be described as:
  + hemolytic anemia
  + disseminated intravascular coagulation (DIC)
  + myelophthisic anemia
  + "Hemolytic disease" does not include:
  + pernicious anemia
  + macrocytic anemia
  + normocytic anemia
  + microcytic anemia
  + chronic simple anemia
  + anemia due to chronic renal failure (CR
  + iron deficiency anemia
  + thrombocytopenia

(Question 13) Was there any mention of the participant having either trauma, a surgical procedure, or rhabdomyolysis within one week prior to the measurement of the cardiac enzymes?

* + Sources: ER report, discharge or death summary, consult, H&P, autopsy report.
  + The intent of this question is to determine if there has been damage to muscle.
  + “Measurement of the cardiac enzymes” refers to ***any*** cardiac enzymes.
  + Answer “Yes” even if the participant was *already hospitalized*, then experienced a trauma and within one week had his/her cardiac enzymes measured.
  + Event need not be, but are recommended to be, listed chronologically.
  + All events that qualify should be listed. Events occurring on the same date may be grouped. If more than 4 entry spaces are needed, pick the most relevant to the heart.
  + "Trauma and surgical (invasive, cutting) procedures" include:
    - cardioversion
    - coronary artery bypass graft (CABG)
    - CPR (only if compressions are included)
    - crushing injury
    - defibrillation
    - electrical injury
    - extensive bruising
    - major fall
    - major surgery
    - muscle-penetrating laceration
    - placement of permanent pacemaker
    - seizure
    - cardiac catheterization/PTCA/stent placement (if all of these were done as part of a single procedure, record as a single procedure)
  + "Rhabdomyolysis" is the destruction of skeletal muscle cells, often the result of electrical injury, alcoholism, injury (or lying in one position for an extended period of time), drug side effects, or toxins.
  + Answer "no" for the following:
    - barium enema, colonoscopy
    - biopsies taken during a non-qualifying procedure
    - carotid endarterectomy
    - dental surgery
    - dialysis or CRRT
    - EGD or other endoscopy ( e.g. upper GI)
    - insertion of a Swan Ganz catheter or pacer
    - intramuscular (IM) injections
    - intubation
    - lumbar puncture (LP)
    - minor trauma such as scrapes, cuts, nicks
    - PEG/feeding tube placement
    - placement of temporary pacemaker
    - psychological trauma
  + If yes, specify the type of trauma or procedure in the text box(es) and the date(s) of occurrence.

**D.5.2.6 Serum Biochemistry Values**

**Biochemistry Values – BNP, pro-BNP, and Creatinine**

* + When laboratory reports are requested the request should include Patient Value, Normal Range, Collection Date, and Collection Time
  + Use the lab report as your primary source; if this document is not available, use results described in consult, discharge, death summary, H&P, or progress notes. If all lab results cannot be determined from the record, call the provider hospital lab for the specific tests and reference ranges needed. Add investigation note to explain if reported values are found in records other than labs.
  + Collection/specimen time is the preferred time to record, followed by resulted time, then MD order time
  + If more than one method of determining the specific test value has been used, record the additional tests and reference range(s) in the investigative notes.
  + For BNP, pro-BNP, and creatinine ONLY, the participant lab values may be recorded without a reference range. Leave an investigative note.
  + Diagrams may be used to record lab values in some records:

Na (sodium) Cl (chloride BUN

Glucose

K (potassium) CO2 Creatinine

**(Question 14) Was BNP measured?**

* Record the initial BNP measurement if one is present in the chart. Then record the last measurement available (if more than one). If more than two measurements were taken, record the highest measurement of the remaining measurements. Elevated BNP is a marker of CHF.
* In the rare case that values above 99999.9 are found, enter 99999.9 in the form and then add an Investigation Note with the actual value.

**(Question 15) Was pro-BNP measured?**

* Record the initial pro-BNP measurement if one is present in the chart. Then record the last measurement available (if more than one). If more than two measurements were taken, record the highest measurement of the remaining measurements. Elevated pro-BNP is a marker for CHF.
* In the rare case that values above 99999.9 are found, enter 99999.9 in the form and then add an Investigation Note with the actual value.

**(Question 16)** **Was serum creatinine measured?**

* Record the initial serum creatinine measurement if one is present in the chart. Then record the last measurement available. If more than two measurements were taken, record the **second** measurement taken after the initial measurement. Do not use rapid serum creatinine unless that is the only one available.

**(Question 17) Is this patient currently on kidney dialysis (anytime in the last four weeks)?**

* This question should be marked YES if the patient was on kidney dialysis at any time during this hospitalization or any time in the four weeks prior to his or her hospitalization.
* Continuous Veno-Venous Hemodiafiltration (CVVHDF), Continuous Renal Replacement Therapy (CRRT,) ultrafiltration, and peritoneal dialysis are kinds of dialysis.

**D.5.2.7 MESA Enzyme Chart**

|  |  |  |
| --- | --- | --- |
| **Enzymes of interest to MESA are:** | | |
| **Total CK** | Synonyms: CK, CPK, Total CPK, creatine kinase, creatine phosphokinase, CKI  Total CK has heart (MB), skeletal muscle (MM) and brain (BB) fractions. If MB, MM and BB are given separately, add them to obtain Total CK. | |
| **CK-MB** | Synonyms: CPK-MB, CK-heart fraction | |
| **Total LDH** | Synonyms: Lactate dehyrogenase, LD | |
| **LDH1 and LDH2** | These are fractions of LDH. Synonym for LDH1 is heat stable LDH  (There are three other fractions of LDH, 3–5, which are not of interest to MESA.) | |
| **Troponin I or T Synonyms: TnI, TnT, troponin, or I-Stat troponin**  **Myoglobin** | |  |

##### Enzyme Units

Enzyme units are variable from hospital-to-hospital. Some hospitals may use different normal ranges within their own laboratory or may even use normal ranges from another hospital. Possible units are:

|  |  |
| --- | --- |
| **CK-MB** | Units/ml or I.U. Special units may include: negative/positive, absent/present, normal/abnormal, negative/weak, positive/positive, absent/weak, present or trace/present, normal/high normal/abnormal, absent/small/moderate/large.  The result may also be reported as a percent or decimal proportion of total CK. |
| **LDH** | Units/l or I.U. |
| **LDH1, LDH2** | Units/l or I.U.  The results may also be reported as a percent or decimal proportion of total LDH. |
| **TROPONIN I, TROPONIN T** | Results may be reported as ng/L, ng/mL, or ng/dL. Special units may include: negative/positive, absent/present, normal/abnormal, negative/weak, positive/positive, absent/weak, present or trace/present, normal/high normal/abnormal, absent/small/moderate/large. |
| **MYOGLOBIN** | Results may be reported as ng/mL, µg/L, or nmol/L. Reference ranges and participant values must be recorded in the Investigative Notes. |

Refer to hospital charts, or with the hospital lab, for information concerning unusual formats.

##### Recording Procedure – Laboratory Standards

You MUST have lab norm values for the date the blood was collected. Ask for a printed lab sheet with reference ranges/normal values when you request the records. If no normal values are received, you must call the hospital lab and ask for DATE- AND TIME-SPECIFIC enzyme normal values.

Range set 1 is the primary set. Only numbers should go in the upper limit field. Examples:

|  |  |
| --- | --- |
| **CK-MB (O-10 IU)** | 0.0 (lower)  10.0 (higher) |
| **LDH1 (0-50% of total LDH)** | 0.00 (lower)  50.00 (higher) |

Range sets 2 and 3 are alternate sets, which may or may not be available. If no range set numbers are available leave them blank.

Occasionally, there may be more than one method used by a hospital to measure a particular enzyme, (e.g., a total LDH, may be done as part of the admission battery and also as part of the cardiac enzyme routine), with differing normal ranges with each test. List

them as indicated and use the second range set. If enzymes are available in both units and percentages, units are preferred.

If a lower limit is not given, (ie. the range is given as "<0.04 ng/ml"), use 0 as the lower limit. In this example the normal range would be recorded as 0.00 to 0.04.

Record enzyme normal ranges exactly as reported. Do not round any values.

Record all enzymes found including STAT, point of care (POC), and point of service (POS).

**Recording Procedure – Participant Values**

Record all enzymes exactly as reported in chronological order by date and time. (The sequential acquisition number often stamped on the lab reports may be useful in clarifying the testing time order.) If no time is listed, follow standard procedures for recording “unknown” or estimated data. (See Appendix 5.1.2, “Definition of Terms,” for timing details.) Military time will be entered when available.

The EDC can accept an unlimited number of enzyme measures now, so please enter all measures that you find.

If an enzyme is not measured, leave the corresponding blocks blank.

You do not need to zero fill. Leading and trailing zeroes can be omitted.

Record <0.1 as 0.1.

In cases where an enzyme (LDH or CPK) is reported both as a SMAC profile and as part of a specific isoenzyme battery, record the latter value for the total enzyme.

For non-numerical enzyme values: use the directions given on the top of page 5 (Enzyme chart) on the abstraction form: “When a serum enzyme value is recorded using words rather than numerals, use the following codes to record the value: 6666=absent/negative/normal; 7777=trace or weak positive; 8888=present/positive/abnormal.”

### D.5.3 Action Required When Abstraction is Complete

Data entries are reviewed for completeness and accuracy and any discrepancies/questions are resolved by consulting the Field Center, a local MESA physician, or other MESA personnel as needed. The Central Abstractor will notify the Field Center when the Cardiac/PVD Hospital Abstraction has been completed and entered into the electronic database.

The Field Center is then responsible for de-identifying all documents chosen for review by the Central Abstractor, according to the Privacy Act guidelines. See Section 3.2 for additional details about de-identification.

After de-identification is completed, the Central Abstractor will enter the *Final Notice* form to close the abstracted event investigation.

### D.5.4 Cardiovascular Events: Synonyms and Descriptions

1. **Angina** is a squeezing or crushing pain that usually starts in the center of the chest behind the breastbone and may spread to the arms, neck, jaw, or back. The pain can be mild, moderate, or severe. It is caused by reduced oxygen to the heart, usually from poor blood supply. The pain of angina is usually brief. It often, though not always, appears when participants are physically active or emotionally stressed and is relieved in a few minutes with rest. The pain may radiate to the back, left arm, or jaw. Angina may be accompanied by shortness of breath, sweating, nausea and dizziness.

Synonyms or terms that describe angina include:

* + - acute coronary syndrome
    - angina, NOS
    - angina pectoris
    - anginal syndrome
    - arteriosclerotic heart disease
    - chest pain syndrome
    - chronic coronary artery insufficiency
    - chronic ischemic heart disease
    - chronic myocardial ischemia
    - coronary insufficiency
    - crescendo angina
    - impending infarction
    - ischemic heart disease, NOS
    - stable angina
    - nocturnal (also called variant or Prinzmetal) angina, which occurs when a person is at rest, usually at night, and is associated with acute myocardial infarction, severe arrhythmias, and sudden death
    - microvascular angina
    - pre-infarction angina
    - sub-endocardial ischemia
    - unstable angina

**Note**: Demand ischemia due to any cause is a “NO.”

1. **Myocardial infarction** occurs when an area of the heart is deprived of necessary oxygen-supplying blood, and the lack of oxygen causes injury or death to that part of the heart.

Synonyms or terms that describe myocardial infarction (MI) include:

* + - acute myocardial infarction (AMI)
    - heart attack
    - cardiac infarction
    - coronary artery embolism, occlusion, or rupture
    - sub-endocardial infarction
    - coronary occlusion
    - infarction of any wall segment of the heart
    - microinfarct of the heart
    - Non Q Wave MI
    - NSTEMI (non-ST elevation myocardial infarction)
    - ischemic cardiomyopathy

1. **Congestive heart failure** is a condition in which the heart cannot maintain the blood supply required by tissues for oxygenation leading to a back up of blood in vessels and accumulation of fluid in the body tissues, including the lungs. If pulmonary edema is unequivocally due to malignancy, or if it is referred to as “minimal”, answer “no.”

NOTE: Diastolic dysfunction, without other signs, is not an indicator of CHF. Elevated BNP does not equal CHF.

Synonyms or terms that describe congestive heart failure (CHF) include:

* congestive/dilated cardiomyopathy
* congestive heart disease
* right heart failure
* right heart failure, secondary to left heart failure
* left heart failure
* left ventricular failure
* systolic heart failure
* diastolic heart failure
* heart/cardiac/myocardial failure, NOS
* low cardiac output
* pulmonary edema
* cor pulmonale

NOTE: If “mild” is indicated with any of these terms, answer “Yes.” “Minimal” is “No.”

4. **Lower extremity claudication** is an aching, tired, and sometimes burning pain in the legs caused by narrowing of the arteries that carry oxygen-rich blood to the muscles. It is brought on by exercise (e.g., walking) and resolves with rest.

Synonyms or terms that describe lower extremity (LE) claudication include:

* + - intermittent claudication

5. **Atherosclerosis of arteries of the lower extremities** is the deposition of plaque in the arteries of the legs.

Synonyms or terms that describe LE atherosclerosis include:

* + - peripheral vascular disease (PVD)
    - peripheral vascular disease, NOS
    - peripheral artery disease (PAD)
    - atherosclerosis of legs
    - arteriosclerosis of legs
    - arteriosclerotic vascular disease (ASVD) of legs
    - arterial, arteriovascular, or vascular degeneration
    - peripheral angiopathy, NOS

**NOTE**: Venous conditions/disease are NOT included in PAD or PVD diagnoses

* If “mild” is indicated with any of these terms, answer “Yes”.

6. **Arterial embolism of the lower extremities** is the sudden blocking of an artery by an embolus, a piece of atherosclerotic plaque or a clot that has been carried by the bloodstream from another artery and forced into a smaller one; **arterial thrombosis of the lower extremities** is the formation or presence of a thrombus—a type of blood clot that stays where it was formed and may or may not obstruct the flow of blood.

Synonyms or terms that describe LE arterial embolism or thrombosis include:

* + - blood clot

**NOTE**: Do not include deep vein thrombosis (DVT)

7. **Abdominal aortic aneurysm** (AAA) is a weakness in the wall of the aorta in the abdomen that allows the aorta to balloon out as the pressure from the passing blood flow presses against it.

Synonyms or terms that describe abdominal aortic aneurysm include:

* + - aortic aneurysm
    - abdominal aneurysm
    - aortoiliac aneurysm
    - aortic aneurysmal disease
    - atherosclerotic aneurysm

Answer “no” to this question if the aneurysm is the result of injury, infection, or congenital weakening of the connective tissue component of the artery wall.

8. Shock or cardiogenic shock is the failure or the heart to maintain blood supply to the circulatory system and tissues because of inadequate output. If the term “septic shock” is used, answer “no.”

Synonyms or terms that describe shock or cardiogenic shock include:

* + - severe pump failure
    - cardiac shock

9. Ventricular fibrillation is a condition in which disordered electrical activity causes the ventricles to contract in a rapid, unsynchronized, uncoordinated fashion. When this occurs, little or no blood is pumped from the heart. **Ventricular flutter** and **ventricular tachycardia** are orderly rapid ventricular beating. **Asystole** is the sudden and complete cessation of cardiac function lasting more than 60 seconds. **Cardiac arrest** is the cessation of heart pumping due to arrhythmia, most commonly ventricular fibrillation. If the participant has “sinus asystole,” “sinus pause,” this is not asystole. Asystole as part of a surgical procedure should be answered "no."

10. **Deep venous thrombosis** (DVT) is the formation of a thrombus (a type of clot) in the deep veins of the thigh or calf. This may be documented on an ultrasound or duplex scan. **Pulmonary embolus** (PE) is the obstruction of the pulmonary artery or one of its branches by an embolus (a clot that formed in another blood vessel, usually the deep veins of the upper leg, and then traveled in the venous system to the lung). PE may be documented in a lung scan or arteriogram and may be found on a VQ scan or lab (D- Dimer)

Synonyms or terms that describe deep venous thrombosis or pulmonary embolus include:

* + - * deep vein thrombosis
      * clot in the leg
      * lung embolus

11. **ST elevation >1mm with pain that is not present on ECG without pain.** ST elevation on an ECG often means cardiac ischemia, especially if anginal pain is present. However, sometimes ST elevation may be present continuously and not indicative of ischemia. If the MD clearly states the presence of ST elevation >1mm with pain that is not present on ECG without pain, record "yes." If ST elevation is absent, or if ST elevation seems persist even when pain is gone, record "no." If the MD mentions ST segment elevation during pain, but does not describe the ST segments without pain, you may also answer "yes." Obviously, the MD description may be incomplete and you must use your best judgment.

Most likely found in ER or ambulance report.

