HRAI Instructions (QxQs)

This table summarizes changes to the HRA QxQ as of 10/22/2025

Question in HRA QxQ	Description of Changes in HRA QXQ
Q25b on page 9	• Added clarifications on how to record the question regarding “Date of onset of pain”.
Q29c2 on page 11	• Revised the Synonyms list in the instructions for the “Coronary atherectomy” question.
Q35 on page 14	• Added clarifications on how to record the question regarding “Is there history of valvular disease or cardiomyopathy”.

INSTRUCTIONS FOR ABSTRACTING
ARIC HOSPITAL RECORD ABSTRACTION FORM
HRA, VERSION I, 01/26/2024
QxQ, 10/22/2025

General Instructions

A. The abstractor must be familiar with the ARIC Instructions for Completion of forms.

B. Several types of responses are used:
Record text answers.
Record number, such as a date, time, medical record number, or measurement.

To answer most questions you will have several choices, the simplest of all being Yes = Y, No = N, or Unknown = U. In that case, "Yes" or "No" will be marked only if there is no doubt due to information in the hospital record. If nothing is written down that definitely answers the question, "U" should be recorded. If the response categories are just Yes = Y or No = N, information not recorded is then marked as "No". In general, the following may be considered synonyms:

NO	YES
• "Rule out" • "Suggestive" • "Equivocal" • "Suspicious" • "Questionable" • "Possible" • "Uncertain" • "Reportedly" • "Could be" • "Perhaps" • "Low probability" • "Might be" • "May represent" • "May be" • "Versus" • "Somewhat" • "Can be"	• "Likely" • "Apparent" • "Consistent with" • "Probable" • "Definite" • "Compatible with" • "Highly suspicious" • "Presumably" • "Borderline" • "Representing" • "Minimal" • "Thought to be" • "Mild" • "Minor" • "Would favor" • "Subtle" • "Marked" • "slight"

C. Complete only the appropriate questions.

D. Be sure to follow correct skip patterns, i.e., follow form logic.

E. To record dates, fill in 2 or 3 digit numbers for month/day/year. Zero is automatically filled in the data entry system for the left box for any single digit numbers (e.g., 03 for March and 06/08/45 for June 8, 1945). If part of the date is missing, record = for that part. For example, if the only information regarding date is June 1945, record 06/==/45.

F. For all times to be recorded on the HRA form, use 24-hour clock notation. For example:
12:00 pm = Noon = 12:00
12:00 am - Midnight = 24:00

If an exact time cannot be recorded (i.e., is not given in the chart), the best estimate should be given. If a time cannot be clearly estimated, the following guidelines for estimating times may be used in conjunction with the admission time. Use these only as a last resort. For no mention of the time of day, please see xii.

I. 03:00 | The middle of the night
II. 08:00 | Early morning/upon awakening
III. 09:00 | Morning
IV. 10:00 | Late morning
V. 12:00 | Midday OR Noon
VI. 14:00 | Early afternoon
VII. 15:00 | Afternoon or midafternoon
VIII. 16:00 | Late afternoon
IX. 19:00 | Early evening
X. 21:00 | Evening AND/OR last night
XI. 22:00 | Late evening
XII. 12:00 | No mention of time of day
XIII. 12:00 | Noon
XIV. 12:00 | Earlier today OR Noon
XV. 12:00 | Today
XVI. 12:00 | Yesterday
XVII. 22:00 | Symptom at bedtime
XVIII. 2 hours ago | short time
XIX. 18:00 | supper time
XX. 22:00 | Tonight
XXI. 00:00 | Midnight (new day)

G. To record other time frames, use the following guidelines:

≥ 3 days	Several days
≥ 1 day and < 3 days	Few days
≥ 4 hours and < 6 hours	Several hours
≥ 2 hours and < 4 hours	Few hours

"X days postoperative": the first postoperative day is the calendar day after the surgery

"Earlier"	4 hours ago
"This morning" (admitted before 8 a.m,)	6 a.m.

I. For timing purposes, when a patient was out of the hospital but not discharged (eg., weekend pass), events will be considered in-hospital (an extension of the hospitalization).

J. Whenever you have questions about the medical information recorded in the hospital record, consult with your surveillance director.

K. **"Aborted" MI** is not an official medical term. The following probably occurred, there was clinical and ECG evidence of evolving MI or reperfusion was attempted (thrombolysis, angioplasty) or serial ECGs suggested that infarction has not occurred (or was limited?). The HRA implications: history of "aborted MI" qualifies as history of MI (Q19f,Q32); "aborted MI" is equivalent to "acute MI" or "acute CHD" applies to the index event (Q20d, Q24b). The abstractor should abstract as all other events.

L. A guideline for hierarchy
Take information from the history of the resident/Nurse pract/Phys Assist, cardiologist, attending physician, ER physician, or nursing notes/EMS, in that order.

Detailed Instructions for Various Questions

Items 0.a, 0.b and 0.c on this form are primarily for assisting the abstractor in confirming the medical record being abstracted matches the CHI form.

It will be the responsibility of the abstractor to verify, visually, that these key fields match the chart being abstracted.

Hospital, medical record number, and discharge date are stored encrypted because of their confidential nature

0.a. Hospital Code Number. Using the hospital selection drop down list, enter the two digit code assigned to this hospital. If outside the study community, use the appropriate code (96-99). See appendix CC for a list of these hospitals.

0.b. Medical Record Number. Enter the record number from the hospital chart. This number will be found stamped or typed on almost every page of the hospital record. The easiest place to find it is both on the medical record folder and in the upper right/left hand corner of the face sheet. List the number from left to right. Enter only digits and letters; omit dashes and spaces. Do not add zeroes to the right of the number. If the number changes with each admission, use the appropriate number for the one (admission) being abstracted.

0.c. Date of discharge. Date of Discharge (for nonfatal case) or Death. This information will generally be found on the face sheet. Enter the date as mm/dd/yyyy. If the patient died, then record the date of death. If transferred from acute care to rehabilitation or chronic care in the same hospital, count the date of transfer as the discharge date.

17. Patient Disposition on Discharge. This information can be found in the discharge summary or on the face sheet. If the patient died in the E.R., this information can be found on the E.R. sheet. Some hospitals keep a separate log book for deaths.

18. Item deleted

19. Dead on Arrival. If the patient died outside of the hospital but was brought in dead, he is considered dead on arrival (DOA). If the patient was brought to the ER alive but died in the emergency room, he is an ER death. If admitted to the ward, CCU, or ICU, answer "No".

If a HRA patient is DOA, an ER death, or hospitalized with no vital signs and dies within 24 hours of admission, s/he is treated as an out-of-hospital death. If s/he lived at least 24 hours in the hospital (or did not die), s/he is treated as an in-hospital event.

b-d. First Recorded Blood Pressure, Pulse. First attempt to obtain BP and pulse may be charted on the ambulance sheet, the ER sheet, the clinical graph or the nursing admission note. The pressure may be from sphygmomanometry or an arterial line. If both right and left arm blood pressures are given, take the one with the highest systolic pressure. If the systolic pressure is the same for both arms, record the highest diastolic value. If a BP or pulse range is given, take the highest value given. If the patient was admitted from a doctor's office, use the first BP recorded in the hospital. If the systolic BP or pulse was unobtainable and the patient died

within 24 hours, enter three zeros (000). If the vitals were unobtainable due to technical problems, use the next set of vitals to be the first. If the systolic blood pressure and/or pulse was unobtainable and the patient lived at least 24 hours, enter '001' for systolic BP or pulse appropriately to trigger skip patterns. If you only have either a BP and or pulse as the first vital sign, enter what values you have and mark other fields of this question as 000 or 001.

e. For the event under consideration, was there acute pain anywhere in the chest, left arm or jaw, (this description may also have involved the back or shoulder, on one or both sides) mentioned anywhere in the hospital chart and present within 72 hours of arrival at this hospital, or at the onset of a CHD event beginning in this hospital? Included in this definition for pain are ischemic pain, angina, cardiac and substernal pain. "Chest tightness" "heaviness" or "discomfort" is equivalent to chest pain. Answer unknown if no history either way or no indication at all of timing. If the pain began in the ER but before admission, consider onset as occurring out of hospital.

f. Previous history refers to a time preceding the onset of the event under consideration. For example, a transfer from another hospital should not be considered a "previous event". Historical questions generally refer to before 72 hours prior to admission or documented as long-standing by chest x-ray, echocardiogram, or other diagnostic test. Also review face sheets of all previous admissions for previous MI. If this information states "previous silent MI," "borderline heart attack," "aborted MI," record the answer as "yes". "Aborted MI" is not an official medical term. The following probably occurred, there was clinical and ECG evidence of evolving MI or reperfusion was attempted (thrombolysis, angioplasty) or serial ECGs suggested that infarction has not occurred or was limited. History of "aborted MI" qualifies as history of MI.

Take information from the history of:

1. the resident
2. nurse practitioner or physician's assistant
3. cardiologist
4. attending physician
5. ER physician
6. nursing notes
7. EMS

An abnormal ECG alone, stating "old MI" cannot be used for positive previous history, unless the physician verifies it. Angiogram evidence cannot be taken as evidence unless explicitly verified by the physician. If conflicting information exists in the medical record, base your answer selection on the most reliable source. Statements such as: "No cardiac problems", "No adult illness", "Previously well", and "No previous history of heart disease" are sufficient to answer "No" to previous MI. If no indication either way, answer "Unknown".

g. If a previous myocardial infarction occurred within four weeks of the event under consideration, answer "Yes".

h. Angina. Examine the history for mention of previous angina pectoris or coronary insufficiency prior to this event i.e., > 72 hours before admission). This would include mention of chronic chest pain, ischemic pain, and "history of chest pain". Chest pain specified as being "of unknown origin" does not qualify. Answer "Yes" if the history includes any mention of the patient taking nitroglycerin for chest pain or if the physician notes that the patient has "substernal pressure, pain, tightness, or burning distress precipitated by exercise or excitement, or both and is relieved by rest and/or nitroglycerin". Answer "No" if the history

explicitly states that the patient has no history of any of the above. Answer U = unknown if none of the criteria for "Yes"/"No" responses apply. **Note: Also see item 33**

i. History of other chronic ischemic heart disease, coronary disease, etc. not specified as angina or MI. This includes CHF described as due to coronary disease or ASHD (Atherosclerotic Heart Disease). CHF due to hypertension or other reasons is "No". Arrhythmias are "No".

20. Discharge Statements. Examine the chart, *i.e.*, the discharge summary, ECGs, laboratory reports, transfers, *etc*.

a. This may be answered from the discharge summary, face sheet, or hospital index, whichever is most complete.

d. Mention of acute MI in the discharge summary. Examine the narrative portion of the discharge summary. If there is specific reference to a confirmed or possible acute MI that resulted in this hospitalization or occurred during this hospitalization record "Yes". "Aborted MI" is equivalent to "acute MI" or "acute CHD" and applies to the index event (abstract as all other events). The following are statements consistent with a "Yes" response--"acute cardia ischemia resulting in tissue damage" and "cardiac biomarker consistent with acute myocardial infarction". "Aborted MI" is not an official medical term. The following probably occurred, there was clinical and ECG evidence of evolving MI or reperfusion was attempted (thrombolysis, angioplasty) or serial ECGs suggested that infarction has not occurred or was limited. History of "aborted MI" qualifies as history of MI.

e. (1-4) Streamlining checklist. The purpose of this question is to reduce abstracting time for cases that would certainly be classified as "NO MI" had they had an entire HRA completed. This four part question asks if specific criteria apply to this chart. Question 20.e.1. will be auto filled in by the DMS as a “YES”. Questions 20.e.2-20.e.4 require the abstractor to evaluate presence of ECG, level of cardiac biomarkers and transfer status. If cardiac biomarkers are missing from the chart, record "No" for 20e (3). (Serum creatinine and BNP are not considered cardiac biomarkers for the purposes of this question.)

When determining the number of ECGs available for a hospitalization, you may encounter situations where an initial 12 lead ECG is available, but subsequent ECGs come from telemetry or other situations where only 6 lead ECGs are produced. In this type of case the 6 lead ECGs are counted in answering the question 20e.2. The appropriate 6 lead ECG should be selected (last and third) and sent to the ECG reading center. For example, a patient could have an initial 12 lead ECG upon arrival at the hospital, and then subsequently monitored with 6 lead ECGs. The answer to 20e2 would be YES and trigger full abstraction. Cases with only one 12 lead ECG and other 2 or 1 lead rhythm strips would not be sufficient to record Yes for 20e2.

Sometimes the upper limit of normal may be defined as one level (e.g. 0.04 for Troponin), but the patient’s result is less than a different upper limit (e.g. <0.05 for Troponin is the lab result). Keep the upper limit of normal as the exact numeric value, but change the patient result to ‘< [upper limit of normal]’. So in this example, the patient’s Troponin would be recorded in the field as ‘<0.04’. In this case, they enzymes would be considered normal.

If 20.e.2 to 20.e.4 are “No” follow the skip pattern and go to item 97.

21.a.-21.d. Items deleted
22. Items deleted

23. a. Acute Cardiac Symptoms. Check the admission history, etc., for mention of the beginning of acute cardiac symptoms which brought the patient to seek medical attention. Examples of cardiac or CHD symptoms are: chest pain, collapse, syncope, shortness of breath, upper gastrointestinal symptoms such as indigestion or nausea, palpitations, throat tightness, pain in the neck, left arm, and sternum and sudden death. Chest tightness, discomfort, squeezing or heaviness is equivalent to chest pain. Marked fatigue and shortness of breath may be considered acute cardiac symptoms if the chart seems to indicate this. If the symptom includes one of these but is obviously noncardiac (e.g. chest pain from pneumonia, nausea from pancreatitis), answer "No". If a patient came in for a scheduled procedure (such as pacer battery replacement), but reported acute cardiac symptoms prior to arrival, then the symptoms should be considered acute symptoms. In cases where a patient collapses during a stay and had no other acute cardiac symptoms, consider the collapse a symptom (answered "No, after arrival") and it should be treated as an in-hospital event. Additionally, if the patient never reported pain or discomfort before the collapse and did not recover, 25a is "Unknown". Neurological syncope or dizziness is "No acute cardiac symptom".

Sometimes, as in cases with chronic angina, there may be no acute symptoms. If there were no acute symptoms, change in symptom quality or frequency such as new unstable angina), or symptoms were only chronic, do not answer "Yes". The symptoms must have begun outside this hospital to answer "Yes". There is no three day limit on the answer to this question, and it is not limited to chest pain. The symptoms must have begun outside this hospital to answer "Yes". For determining the location where symptoms occurred, count the ER as out-of-hospital and the doctor's office as out-of-hospital. If this is a transfer from another hospital, acute symptoms before that hospitalization or in that hospital count as "Yes", because they occurred prior to arrival at this hospitalization.

If a perioperative MI (MI that occurs during the operation or immediately following), answer "No acute cardiac symptoms."

If patient is admitted with chest pain because of atrial fibrillation question 23a should be answered “YES.”

If a patient has procedure-induced chest pain during an elective catheterization which necessitates admission question 23a should be answered “yes” because pain is not expected during a catheterization.

Pain induced for balloon inflation or angioplasty (if temporary), should be answered “No”.

b. Timing between onset and hospital arrival. (see also the timing table on page 1)
The main purpose of this item is to obtain an estimate of the time delay between the onset of the symptoms and arrival at the hospital. We are interested in care-seeking behavior in response to symptoms (most often, chest pain, but could be other symptoms that prompted the patient to take action).

Estimate the time to the best of your ability (refer to instructions for time expressions in General Instructions, item 7). If there were multiple new episodes of symptoms (e.g. chest pain), you must pick the likely onset which would be the first or most severe depending on the circumstances. In the case of someone with documented coronary disease or chronic angina, it is a change in the pain, prompting action, which usually marks the onset of an event. Stuttering pains (growing stronger and weaker) and recurring pains (frequent pains back to back) should generally not be taken as separate events unless it is clear that they are such (i.e., they went away for a good while before returning). Consult your surveillance director when in doubt. You may consider onset time on EMS notes or ED notes; pick the best quantitated time - …

"hours or …minutes"--instead of qualitative – "last night or morning of" - per hierarchy.

For timing of onset, if the time of EMS arrival is clearly specified, then it should be preferred over hierarchy guidelines.

If the patient has no history of angina or coronary disease and develops new chest pain, the onset time of event depends on the course of symptoms. If a single pain stays relatively constant until hospitalization, the Time of this first pain is the onset. If the pain remits but later another occurs that is suddenly severe, prompting hospitalization, then this severe pain is the onset.

If wording in the chart refers to "days" (e.g., chest pain for 4 days), count today as day 1 when counting backward to estimate duration. If wording in the chart is "days ago" (e.g., chest pain started 2 days ago), ignore today when estimating duration.

Table of Onset for Out of Hospital Chest Pain Scenarios

Description	***Onset is:***
Single pain of **constant** intensity leading to care	Start of pain
Single pain increasing or decreasing in intensity leading to care	Start of pain
One or more pains that go **totally** away, then another pain (of any intensity) leading to care	The pain leading to care
Single pain that lessens or waxes and wanes (alternates stronger to weaker)but never totally goes away. Pt seeks care because it seems worse or finally had enough.	Start of pain
First severe pain that totally goes away and then a few days of less severe pains, none more prominent. Pt seeks care because finally had enough.	Start of pain
Pain for hours or days, not otherwise specified	Start of pain
Stuttering pain for hours or days, not otherwise specified	Start of pain if seemed continuous. Otherwise, pain leading to care.
Pt has typical angina most days; pain gets more severe, leading to additional care	Pain leading to additional care
Pt has typical angina most days (no change) but is hospitalized for evaluation	Last pain before hospitalization

24. a. Primary Diagnosis - Admission. If the patient had no pre-hospital cardiac symptoms (Item 23a), check the admit note or admission sheet diagnosis for the primary reason for admission. If a patient is admitted for elective angioplasty, consider this an "other non-acute CHD evaluation" (C).

    TIA = "O"
    Elective cardioversion = "O"
    Valve replacement = "O"
    Permanent placement pacemaker = "O"
    EP studies, elective = "C"

b. In-hospital CHD Event. Check the ER sheet, admit note, and history for reference to when the CHD event took place. CHD events in hospital of interest include new infarction, new acute ischemia**,** reinfarction (including a documented MI "extension" or "aborted MI"), or a new

enzyme leak or enzyme rise >3 times ULN. Do not count procedures (such as CABG) or death, as these are captured elsewhere on the form. Also of note as an event is "primary chest pain" - acute chest pain happening for the first time during a hospitalization and prompting additional procedures. For example, if a patient was admitted electively and develops new cardiac symptoms during the hospitalization, this should be considered a possible in-hospital event.

An answer of "No, After Arrival" to Item 23a does not mean that this question will automatically be answered "Yes". A patient could experience chest pain, shortness of breath, or other symptoms as a continuation of an event begun outside the hospital. Mere continuance of symptoms is not an in-hospital event; nor is the occasional occurrence of a chronic anginal pain. An event should be definitely identified on the medical record as new infarction, new acute ischemia**,** reinfarction, or fit the above definition of primary chest pain.

c. Date of In-hospital CHD Event. If more than one, pick the primary or most important, as described in the Note below.

[NOTE: A problem arises with subsequent questions if the patient had multiple CHD events before and/or during the same admission. (For example, multiple events would occur if a person was admitted for acute angina, recovered, but infarcted before discharge; or if a patient was admitted for an MI, then reinfarcted.) In the case of multiple events, the abstractor must decide which is primary or most important, based on severity, biomarkers, physician notes, etc. In the case of angina followed by infarction, the most important would be the infarction. With a first infarction, then reinfarction or extension, the first infarction is considered primary. If two events seem equal, pick the first. When in doubt, consult your supervisor. Answer subsequent questions for the most important event. If a patient has acute symptoms which can be identified as an event and subsequently has a cardiac arrest, this should be treated as one event. In this case, the arrest is a complication of the first event. Likewise, after a myocardial infarction, additional episodes of pain which do not lead to a new MI are not to be considered new in-hospital events.

Only new and separate infarctions, as determined by the physician, should be considered second events. For example, a person could have been admitted for an inferior myocardial infarction, and the day before discharge suffer a new anterior myocardial infarction. In summary, symptoms and signs that are complications or a continuation of a first MI should not be considered as a second event.]

25. a. Onset of Acute Pain Within 72 Hours.
For the event under consideration, was there acute pain (tightness, heaviness, discomfort) anywhere in the chest, left arm or jaw, (this description may also have involved the back or shoulder, on one or both sides) mentioned anywhere in the hospital chart and present within 72 hours of arrival at this hospital, or at the onset of a CHD event beginning in this hospital? Onset of event means onset of chest pain or other symptom. Included in this definition for pain are ischemic pain, angina, cardiac and substernal pain. If pain was chronic and/or no acute episode was evident (eg., perioperative MI), skip to Q. 26. Answer unknown if no history either way or no indication at all of timing. If the pain began in the ER but before admission, consider onset as occurring out of hospital. Be sure to record chest pain within the 72 hours, even if this is a transfer. General rule about chest pain: If there are conflicting reports about whether chest pain occurred, record your best impression as to whether it was present, absent, or unknown. Do not record yes just because one provider said chest pain was present, if the preponderance of evidence suggests no chest pain.

NOTE: See Appendix DD for examples of how Items 23 and 25 should be answered for typical cases.

25. b. Date of Onset of Pain. This question is only reached if there was acute chest pain or equivalent within 72 hours prior to hospitalization or to an in hospital event. The date entered for the

onset therefore must be within that 72-hour window. If the pain started more than 72 hours prior and continued, enter the earliest date within 72 hours. If the pain is described as "intermittent" or "stuttering" (i.e., came and went, not related to activity or exertion), then pick the most prominent pain in the last 72 hours. If intermittent and none seems more prominent, then give the date of the start of the first episode within 72 hours prior to arrival at the hospital or onset of the in-hospital event.

If wording in the chart refers to "days" (e.g., chest pain for 4 days), count today as day 1 when counting backward to estimate duration. If wording in the chart is "days ago" (e.g., chest pain started 2 days ago), ignore today when estimating duration.

c. Chest location. Indicate specifically if pain involved the chest (yes) or did not (no). If not mentioned either way, answer "unknown".

d. Noncardiac pain. This question is asked to determine if the pain experienced satisfies the ARIC criteria for chest pain by establishing that there is no definite non-cardiac cause of chest pain. It refers to the final conclusion about a pain or discomfort, not the "rule-out" diagnosis. Only specific diagnoses of conditions or diseases made by an M.D. or D.O. to account for the pain in question should be recorded here. The pain may result from an old diagnosis, rather than a new one. Answer "Yes" if there is an explicit statement by a physician that the pain is definitely due to a non-cardiac cause. If yes, specify the diagnosis of what the pain was due to. Examples could be: fractured ribs, costochondritis, esophagitis, or an acute gallbladder attack. Pericarditis should be answered as "yes" and specified. A charted impression "R/O (rule out) fractured rib" should not be recorded as a "Yes" answer. The answer "No" is to be used when an explicit statement that the pain is definitely cardiac (e.g., cardiac tamponade). If patient is admitted with chest pain because of atrial fibrillation question 25d should be answered "no." It is acceptable to say yes, non-cardiac, if (a) there is no evidence that the chest pain was from heart disease and (b) there is a condition present that likely caused the chest pain (e.g., PE, musculoskeletal issue, etc).

If neither a clear positive or negative statement is available, answer "U".

When in doubt, ask the Surveillance Supervisor. (Note: It is preferable, when in doubt, to specify the cause so that the true answer can be determined later.)

e. Specify as described above. If a specific cause is not noted, write "non cardiac chest pain."

f. Death in Hospital. Look in discharge summary or on death record for whether or not the patient died in the hospital.

g. Timing of Death. Estimate time from onset of acute symptoms (defined in previous questions) and death.

26. a. Reperfusion refers to complete or partial restoration of coronary blood flow by coronary angioplasty, coronary atherectomy, coronary artery bypass graft (CABG), or thrombolysis using intracoronary or intravenous streptokinase, urokinase, anistreplase, APSAC, or tissue plasminogen activator (TPA). Check procedure notes, EMS, ER notes, and medication lists. [See ARIC CHD & Heart Failure Drugs List on the ARIC website (URL: https://aric.cscc.unc.edu/aric9/sites/default/files/public/surveillancedata/ARIC%20CHD%20%26%20Heart%20Failure%20Drugs.pdf) for information.] It must occur within 24 hours of onset of acute event (not necessarily the first symptom). Onset of event means onset of chest pain or other symptom. Answer "Yes" even if reperfusion was unsuccessful. Note: The timing is not necessarily the same as that recorded by the physician. Answer "No" to reperfusion for Transmural Myocardial Revascularization (TMR).

Angiomax during PTCA is a reperfusion agent.

For transfers, answer "Yes" if reperfusion given in first hospital within 24 hours after onset, but in this case 29.h. is answered "No".

b. Item deleted

27. Item deleted

28. For this question, not recorded = "No". Record findings in this hospital, which refers to any time after arrival of EMS. If a transfer, do not record findings at the previous hospital.

a. Shock. Cardiogenic shock (pump failure) is failure to maintain blood supply to the circulatory system and tissues because of inadequate cardiac output, i.e., faulty valves and/or faulty muscle action. A person in shock cannot maintain blood pressure or perfuse organs. The administration of Dopamine is a clue, but not definitive evidence that a patient had shock or pump failure. Look for the term "shock" or "pump failure". Answer "Yes" if shock occurred at home, at the ER or hospital or during the hospital stay. Septic shock = "No". Shock not otherwise specified answer "Yes." Shock due to non-cardiac causes is "NO"

1. Note if a physician documented shock as being present during this admission within 24 hours of this event onset of symptoms.

Note: For 28.a.1., 28.b.1., and 28.e.1. If there is a clear onset of the condition then use 24 hours since onset. If there is not a clear onset, then use date of admission and determine if within 24 hours.

b. Congestive Heart Failure or Pulmonary Edema. CHF is an inability to adequately maintain cardiac output, but not as severe as shock. Pulmonary edema is fluid in the lungs due to poor cardiac output. Check the physical exam, ER sheet, admission diagnosis, and x-rays. If the timing is not clear, record "Unknown". This question should be answered yes if the patient currently is in HF, but "no" if s/he has only a history of HF or chronic stable HF. (See table)

No	YES
• Pulmonary edema due to malignancy • Slight, minimal or mild pulmonary/vascular congestion • Fluid overload • Mild CHF	Definite or probable: • pulmonary edema • pulmonary congestion • biventricular failure • CHF noted on x-ray or autopsy • cardiac failure • "Mild to moderate" pulmonary edema or CHF • vascular congestion • Cardiogenic shock

1. Note if a physician documented CHF as being present at time of event and/or on arrival record as "YES". If new onset of CHF occurs within first 24 hours of this event in a patient with

chronic CHF, record "Yes".

Items 28.c., 28.d, 28.e., 28.e.1., 28.f.-28.h. deleted

29. Special Procedures. Check the physician notes on procedures and the laboratory reports for the following procedures during the present hospital stay. If the procedure was mentioned but time course cannot be determined, mark "U". If a transfer, do not record procedures at the previous hospital. Check for operations and procedures codes at the bottom of the face sheet. These codes may appear without a language description of the operations and procedures. If this is true, the codes will have to be translated in order to circle the appropriate procedures. For definitions and descriptions of each of the procedures and ICD procedure codes and the "other" category, please refer to Appendix AA.

a. Item deleted

b. Item deleted

c. Coronary angioplasty-
   - If coronary angioplasty was attempted and completed, "yes" should be answered even if the procedure was not successful in reducing the lesion or increasing blood flow.
   - If angioplasty was attempted, but for some reason the physician cannot get to the lesion because of some complication, then the answer is "No".

c1. Item deleted

c2. Coronary atherectomy - If atherectomy appears in the course of a CABG, read through the reports; it can be part of a PTCA procedure. Synonyms include rotational or directional atherectomy (Rotablator), orbital atherectomy (CSI), laser atherectomy or excimer laser coronary atherectomy (ELCA), or intravascular lithotripsy (Shockwave). Note: enadarterectomy = atherectomy and atherotomy = angioplasty

c3. Item deleted

d. Item deleted

e. Item deleted

f. Coronary bypass surgery- bypass surgery is not necessarily automatic for mitral valve replacement/repair.

f.1. Item deleted

g. Intracoronary reperfusion - If reperfusion was attempted and completed, "yes" should be answered even if the procedure was not successful in reducing the lesion or increasing blood flow.

h. Intravenous reperfusion - If reperfusion was attempted and completed, "yes" should be answered even if the procedure was not successful in reducing the lesion or increasing blood flow.

h.1. Item deleted

i.-p. Items deleted

p.1. Coronary stent -Record “yes” if a coronary stent was placed any time during this hospitalization. Placement of multiple stents counts as “yes”. A coronary stent is a physical

device inserted into the lumen of a coronary artery to establish and/or maintain patency of a vessel for the purpose of revascularization of tissue distal to the stent. If the physician attempted to place one or more stents and was unsuccessful in completing the procedure record "no". The letters "PCI" for primary coronary intervention can refer to a stent, angioplasty or other intervention. However, if a stent is used the word stent should appear in the description. Names for different types of stents may be found in the medical record. These include but are not limited to the following: Mesh stents, Slotted-tube stents, Coil stents, Multidesign stents, and bioabsorbable stents. Coronary stent also includes drug eluting stents stent, angioplasty or other intervention.

Items 29.p.1.a, 29.p.2., 29.p.2.a, 29.p.2.c., 29.p.2.d, 29.q.1., 29.q.2. deleted

30. a. Closed chest massage or cardiopulmonary resuscitation (CPR). This question has two aims: (a) to support or dispute diagnoses of definite myocardial infarction based on chart abstracts, and (b) to inquire after medical care delivery. CPR is defined as a basic emergency procedure for life support, consisting of artificial respiration and manual external cardiac massage. It is used in cases of cardiac arrest. Cardioversion is defined as the use of direct current counter shock through paddles to restore the heart's normal sinus rhythm during cardiac arrest. (Cardioversion may be used in treatment of atrial fibrillation and arrhythmias. Cardioversion for atrial fibrillation. done electively is "NO", done emergently is "YES") Record "Yes" if there is firing of an implanted defibrillator. Refer to the EMS, ER, ICU/CCU, ward notes, CPR or cardiac arrest sheets. When there is precordial thump, the response should be "Yes". When cardioversion is part of CABG or EP studies, the response should be "No". Record Artificial respiration alone = "No". This question should be answered "yes" for internal (or open chest) cardiac message. Question 30a should be answered "yes" if more than one shock is administered during CABG as this should be considered cardioversion.

30. b. Date of CPR/Cardioversion. List the date of the first emergency cardioversion or CPR attempt for this event.

30.c. Item deleted

31.a.-31.l. Items deleted

32. History of Previous MI. **Previous history refers to a time preceding the onset of the event under consideration.** For example, a transfer from another hospital should not be considered a "previous event". Historical questions generally refer to before 72 hours prior to admission or documented as long-standing by chest x-ray, echocardiogram, or other diagnostic test. Take information from the history of the resident, cardiologist, attending physician, ER physician, or nursing notes, in that order. For transplanted heart, use the history of the individual, not the history of the heart. Also review face sheets of all previous admissions for previous MI. "Unequivocal" not open to doubt or misunderstanding.

Answer "Yes":

- If this information states "previous silent MI", "borderline heart attack", history of "aborted MI" record the answer as "yes".
- An old MI noted on the autopsy is recorded as "Yes"; if only acute, record as "no".

Answer "No":

- An abnormal ECG alone, stating "old MI" cannot be used for positive previous history, unless the physician verifies it by mentioning it in the discharge summary, progress note, or history/physician notes.
- Angiogram or other imaging findings cannot be taken as evidence for previous MI unless explicitly verified by the physician.
- The question is answered "No" if there is specific mention of no previous MI. (See Appendix GG)

- If conflicting information exists in the medical record, base your answer selection on the most reliable source. Statements such as: "No cardiac problems", "No adult illness", "Previously well", and "No previous history of. heart disease" are sufficient to answer "No" to previous MI.
- If there is good documentation of a patient's history, the abstractor can answer "No," even if an MI is not specifically stated.
- "Aborted MI" is not an official medical term. The following probably occurred, there was clinical and ECG evidence of evolving MI or reperfusion was attempted (thrombolysis, angioplasty) or serial ECGs suggested that infarction has not occurred or was limited.

Answer "Unknown":

- If no indication either way (an old MI is not mentioned, regardless of what is said about chest pain), answer "Unknown".
- "Essentially unremarkable history" should be answered as "unknown"

33. Angina. Examine the history for mention of previous angina pectoris-diagnosed **prior** to this event.

Synonyms for angina are "coronary insufficiency" or "angina equivalent" or "cardiac pain" or "ischemic chest pain". These do not require the presence of NTG to answer yes for angina.

Answer "Yes":

- For mention of anginal pain or ischemic pain.
- Angina equivalent" and "silent coronary ischemic" are recorded as "Yes."
- Answer "yes" if patient has a positive history of angina but is currently pain free.
- "Artery spasm" on angiography with chest pain = "Yes"
- Answer "Yes" if the history includes any mention of the patient having been prescribed or taking nitroglycerin for chest pain >72 hours prior to this event or if the physician notes that the patient has a history of "substernal pressure, pain, tightness, or burning distress precipitated by exercise or excitement, or both and is relieved by rest and/or nitroglycerin". This does not include nitroglycerin prescribed for another person.
- Has currently active prescription for any nitrates/NTG >72 hours prior to this event and has a history of any of the following: MI, CHD, CAD or chest pain.

Answer "No":

- If the history explicitly states that the patient has no history of "substernal pressure, pain, tightness, or burning distress precipitated by exercise or excitement, or both and is relieved by rest and/or nitroglycerin".
- If there is no history of MI or cardiac disease and chest pain has never been diagnosed as angina, answer "No".
- Prescribed NTG is insufficient by itself to be called angina.

Answer "Unknown":

- Answer "U" = unknown if none of the criteria for "Yes"/"No" responses apply.
- If a patient has a history of CABG and/or PTCA, but no mentioned history of angina or MI, question 33 should be answered "unknown" and then specified in question 34.

34. Other Chronic IHD. History of other chronic ischemic heart disease, coronary disease, etc. not specified as angina or MI. This includes CHF, and ischemic cardiomyopathy, or arrhythmia described as due to coronary disease or ASHD (Atherosclerotic or Arteriosclerotic Heart Disease). If there is no mention of ASHD, coronary insufficiency, coronary or ischemic disease, the answer is generally "No". CHF due to hypertension or associated with an MI, or CHF that is non-chronic or due to non-ischemic reasons is "No". Arrhythmias are "No". CHF not otherwise specified **does not** equal CHD; i.e. CHF not otherwise specified = "No". ASCVD may be taken as "yes" unless the physician is obviously referring to ASCVD in

other vascular beds (e.g. brain, leg). If in doubt, specify, and consult your Surveillance director. Skip 34 if 32 or 33 is answered "Yes". Asymptomatic CAD that is detected by screening tests, performed in the past, requires this question to be answered “yes.”

35. History of valvular disease or cardiomyopathy as rheumatic heart disease, mitral valve prolapse, valvular stenosis or regurgitation? Review echocardiogram and cardiac catheterization reports, as well as the history. The new discovery of valvular disease by echo or angiogram can only be taken as "Yes" if confirmed as long-standing by the physician. Other valvular diseases include: **Aortic Valve** diseases or disorders, aortic valve incompetence, insufficiency, regurgitation, or stenosis, aortic valve failure; **Mitral valve** diseases, disorders, mitral valve incompetence, insufficiency, regurgitation and stenosis or mitral valve failure; or **Pulmonary valve** diseases, disorders, incompetence, insufficiency, regurgitation and stenosis; and **Tricuspid valve** diseases, disorders, incompetence, insufficiency, regurgitation, stenosis and failure. In addition, any mention of valvular endocarditis or the above mentioned in an autopsy warrants an answer of "Yes" to history of valvular disease. For valvular regurgitation or insufficiency, not recorded, no, trace, trivial, mild, mild-moderate, moderate, 1+, or 2+ as seen on echo or catheterization is recorded as “No”; moderate-severe, severe, torrential, or 3+ is recorded as “Yes”. For valvular stenosis, not recorded, no, mild, mild-moderate, or moderate as seen on echo or catheterization is recorded as “No”; moderate-severe, severe, or critical is recorded as “Yes”. History of valvular disease.

    a. May be taken from autopsy or old ECHO.
    b. Valvular sclerosis - generally "No" unless supported by symptoms.
    c. If symptomatic and longstanding, and noted on present admission, "Yes" for history. If incidental on cath/ECHO, minimal or mild = "No".
    d. IHSS = "Yes". (Idiopathic hypertrophic subaortic stenosis.)
    e. Redundant valve = "No".
    f. Mitral annular calcification = "Yes".

    History of cardiomyopathy. Types of cardiomyopathies include: Alcoholic cardiomyopathy, Amyloid cardiomyopathy, Beriberi cardiomyopathy, Congenital cardiomyopathy, Congestive cardiomyopathy, Constrictive cardiomyopathy, Endomyocardial fibrosis, Endomyocardial fibroelastosis, Familial cardiomyopathy, Hypertrophic cardiomyopathy, Idiopathic cardiomyopathy, Ischemic cardiomyopathy, Metabolic cardiomyopathy (Cardiac glycogenosis, Gouty tophi of the heart, and Mucopolysaccharidosis cardiomyopathy), Takotsubo cardiomyopathy. Additional types of cardiomyopathies may be listed as: Nutritional, Obscure Cardiomyopathy of Africa (Becker's Disease), Obstructive, Postpartum, Secondary (Sarcoid or other), Tuberculous or Thyrotoxic cardiomyopathies. Not recorded is "No". Hypertensive and dilated cardiomyopathy = "Yes".

36, 37. Coronary bypass or angioplasty. Has the patient had previous coronary bypass surgery or coronary angioplasty (CABG) before this event (refer to Appendix AA for definitions)? CABG or angioplasty related to the acute event under consideration should be recorded under 26., not here. Not recorded is "No". Record a "Vineberg" as "Yes". An unsuccessful PTCA in the past is "Yes" for history of angioplasty. Please record "Yes" for history of angioplasty if there is a history for atherectomy. If there is a past history of coronary stent, record “Yes” for history of angioplasty. Bypass surgery is not necessarily automatic for mitral valve replacement/repair.

38. a. Hypertension previous to this admission? If there is explicit mention of hypertension (high blood pressure) including labile hypertension as being present, answer "Yes". If hypertension history is explicitly recorded as negative, or "no known cardiac risk factors", answer "No". If no mention either way, record "U". Even if the patient is on a medication sometimes used for hypertension (e.g., beta-blocker), but hypertension is not mentioned, answer "U". "Borderline" or "mild" hypertension = "Yes". Hypertensive cardiovascular disease = "Yes". Pulmonary hypertension = "No".

38. b. Examine first the discharge summary and diagnoses, then the history and progress notes, for mention of either history of diabetes mellitus prior to or diagnosed during this event. This includes mention of "diabetes," "diabetes mellitus or DM," "insulin dependent diabetes (mellitus) (IDDM)," "non-insulin dependent diabetes (mellitus) (NIDDM)," "Type I diabetes (mellitus) (DM)," or "Type II diabetes (mellitus)(DM);" it also includes mention of the term "diabetic." This excludes mention of a history of "glucose intolerance," "hyperglycemia," "hypoglycemia," or "diabetes insipidus" or steroid induced diabetes.

Answer "Yes" if the history includes any mention of the patient taking, either prior to or at discharge, the medication insulin (Medicines within this category fall within one of several classes, including Biguanides, Meglitinides, Sulfonylureas, Thiazolidinediones, Alpha glucosidase inhibitors, Dipeptidyl peptidase inhibitors, Ergot alkaloids; See ARIC CHD & Heart Failure Drugs List on the ARIC website (URL: https://aric.cscc.unc.edu/aric9/sites/default/files/public/surveillancedata/ARIC%20CHD%20%26%20Heart%20Failure%20Drugs.pdf), even if no explicit mention is made of diabetes. Do not look at medications given in the hospital, nor at glucose levels during this hospitalization. Answer "No" if the history explicitly states that the patient has no history of diabetes and there is no mention of diabetes diagnosed during this hospitalization.
Answer “No” to prediabetes.
Answer "Unknown" if there is no mention of the above terms and no mention of the above medications.

39. Item deleted

40. Item deleted

41. Biomarker availability. The cardiac biomarkers of interest are total creatinine kinase (CK or CPK) and its MB (myocardial band markers of heart) fraction, and Troponin I and Troponin T. Refer to laboratory reports. Do not use biomarker values recorded in progress notes unless some or all lab value reports are obviously missing. Were any cardiac biomarkers reported within days 1 to 4 after arrival at this hospital or after the in-hospital CHD event? You must first determine when the event occurred, then determine the appropriate biomarkers to review.

42. a. Trauma. Locate laboratory values for biomarker values and note the date the biomarkers were done. Look in the history, etc., for any mention of trauma (including any major surgery, CPR, CABG, defibrillation - including that for atrial fibrillation, crushing injury, extensive bruising, or electrical injury) or rhabdomyolysis (disintegration of muscle) within one week prior to the measurement of biomarkers. These major trauma factors are non-ischemic causes for elevated biomarkers. A Swan-Ganz insertion or Swan-Ganz pacer is a "No" answer. Minor trauma such as scrapes, cuts, nicks, and psychological trauma call for an answer of "No". Dialysis, abdominal aortogram, dental surgery also should be answered as "No". Consider "nothing recorded" as "No". A lumbar puncture procedure should be considered as "No" trauma. Seizures = "Yes". Precordial thump = "Yes". Thoracentesis = "Yes".

Procedures. Did the patient have any cardiac surgical procedures during the week prior to the measurement of biomarkers? These procedures include invasive (cutting) procedures only, such as cardiac cath, angioplasty, etc. Consider "nothing recorded" as "No". Cardioversion is considered "Yes". EPS is considered "Yes".

When in doubt, ask your Surveillance Director. Note: It is preferable, when in doubt, to answer "Yes" and specify, so that the true answer can be determined later.

42. b. If the participant has had trauma, surgical procedures, or rhabdomyolysis, select all that

occured prior to blood sampling from the list provided. If another type of cardiac trauma or non-cardiac procedure occurred, specify in the space provided in 42.b.4 and 42.b.8 respectively. Included in cardiac procedure (42.b.1) are CABG, coronary angioplasty, coronary angiogram, stent placement and any procedure that has the potential to cut heart muscle.

42. c. Indicate the item number from the biomarker section (CK/CPK, CK-MB, and troponin) corresponding to the first biomarker measurements performed after the cardiac procedure, CPR or cardioversion, other cardiac trauma or other trauma indicated in 42 a.

The biomarkers used in the ARIC diagnostic algorithm include CK/CPK, CK-MB, and troponin. BNP and serum creatinine are NOT used as biomarkers in the ARIC algorithm and should not be considered for this answer.

d. Hemolytic disease. Was there any evidence of hemolytic disease in the Discharge Summary (examples include: hemolytic anemia, disseminated intravascular coagulation, myelophthisic anemia, nonspherocytic anemia, sickle cell, etc.)? Treat "nothing recorded" as "No". Also, pernicious anemia, macrocytic anemia, normocytic anemia, hypochronic microcytic anemia, anemia due to chronic renal failure and microcytic anemia without hemolysis are all recorded as "No".

43. Biomarkers of interest.

Note that if high sensitivity troponin is measured in addition to regular troponin, record the patient values for both and corresponding reference ranges. Double check that the patient values recorded are linked to the correct corresponding reference range.

Total CK Synonyms: CK, CPK, Total CPK, creatine kinase, creatine phosphokinase, CKI It 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

Troponin I Cardiac troponin is a contractile protein not normally found in blood. Its detection in the circulation is a marker for myocardial cell damage. Cardiac troponin may be measured in some hospitals and used for diagnosing myocardial injury. One or both isoforms (I or T) may be measured. Troponin I may be more specific than CPK-MB and not affected by noncardiac trauma. Space to record cardiac troponin was added to the HRA Form in May 1997.

Troponin T Most hospitals assay only Troponin I, but T may also be reported.

BNP B-Type Natriuretic Peptide is hormone measured in serum, most commonly as pg/ml. This peptide is produced by the heart and is elevated in patients with heart failure. BNP may not be done in some hospitals.

Serum Creatinine Serum Creatinine is an indication of kidney function and is measured most commonly in mg/dl units.

pro-BNP N-terminal prohormone brain natriuretic peptide(pro-BNP) is a cardiac neurohormone specifically secreted from the cardiac ventricles as a response to ventricular volume expansion, pressure overload, and resultant increased wall tension.

Biomarker Units

Biomarker 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:

Total CK Units/ml or I.U.

CK-MB Units/ml or I.U. Special units 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.

May also be reported as a percent or decimal proportion of total CK.

Troponin Units/ml or ng/ml. Special units may also be used and would include negative/positive.

BNP **Units pg/ml with one decimal**

Serum Creatinine Units mg/dl with one decimal

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

Recording Procedure

The first step is to find the range sets in use for hospital days 1-4 and record the upper limit of biomarkers pertinent to this patient in Q43. Range Set 1 is the primary in-lab set, Set 2 is the alternate (e.g. Point of Care) if one. If there are two primary or secondary sets, take the first drawn values. Only numbers should go in the upper limit field. If not numbers, leave the upper limit field blank and code special units. Code special units as indicated on the form. (If there are two different units used for a single biomarker determination, select the more informative unit.)

Examples

(Normal Range)	Upper Limit	Special Unit
CK-MB (0-10 IU)	0010.00	
CK-MB (Present/Absent)	..	1
Troponin (0.0-1.0)	000.80	
Troponin (negative/positive)	..	1

When in doubt, consult the hospital lab.

Occasionally, there may be more than one method used by a hospital to measure a particular biomarker, *e.g.*, troponin may be done as part of the admission battery, and also as part of the cardiac biomarker routine, with differing normal ranges with each test. List them as indicated and use the second range set. If biomarkers are available in both units and percentages, units are preferred. Biomarkers recorded for one item number should have been measured at the same time.

If the enzyme report has more than one interpretation, for example a narrative interpretation in addition to the "lab limits", the "lab limit" report is preferred.

If there are multiple reports to choose from, use the following hierarchy for recording hospital labs and their standards: (1) that report the MOST set of lab results for that particular lab; (2) that report the FIRST set of lab results for that particular lab; (3) that are a mix and match and choose the lowest/highest range regardless of the results; and (4) that report the WORST results for that particular lab.

If the biomarkers are drawn three times in a day and there is only room to record two sets, select the sets that have the highest total CPK,CK-MB, and /or Troponin values. Do not mix and match biomarkers drawn at different times unless they are fairly close together (within 1 to 2 hours) and no cardiac procedure took place during that interval.

If a biomarker is not measured, leave the corresponding fields blank.

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

Note: Whenever CK fractions (MB, MM, BB) are recorded in international units but not total CK, total CK should be calculated and recorded as the sum of MB + MM + BB. The upper range for total CK in this case is the sum of the upper ranges for MB + MM + BB.

Troponin I has an upper normal range of approximately 0.01-0.5 ng/mL. However, reference levels can vary by assay used. There may be a semiquantitative assay available that would be negative/positive.

Note: Troponin levels could be affected by cardiac trauma, such as CATH/CABG.

44. - 56. Patient values. Determine which biomarkers are available for Days 1-4. Day 1 is the first calendar day of admission to this hospital or the date of occurrence of in-hospital event. Day 2 is the next calendar day regardless of the time of the event. Days 3 and 4 are the succeeding calendar days. Use date of blood collection, if recorded on the lab report. If not recorded, use the date of arrival at or processing at the lab to determine Days 1-4. If exact onset of event is unknown, use best estimate. (It is better to include biomarkers on form than exclude if dates are questionable.) Record biomarkers starting at 00:01 on the day of the in-hospital event.

Record values for each biomarker in chronological order. (The sequential acquisition number often stamped on the lab reports may be helpful in clarifying order.) If no time is listed, assume a time of 12:00 noon.

Note: If no biomarkers were done on any of days 1-4, indicate this in HRA 41 and all biomarkers will be skipped by the system except for HRA43cc, HRA43dd and HRA43ee. If those three values are not available in the chart, leave the fields blank and set the field status to 'Missing' on each of the 3 fields."

If there are a number of biomarkers in Day 1 (more than one) and all are above normal, select the one with the highest troponin value. If more than 2 sets on days 2,3,4, select the 2 sets with the highest troponin value.

For example:

Date	Time	Troponins Enzymes	Day two Only pick two
6/6	0622	0.10	1. 0900 1.12
6/6	0900	1.12	2. 1700 2.27
6/6	1300	0.95	
6/6	1700	2.27	

Record values accurately, paying careful attention to units and decimal points for proportions and percents. The biomarkers recorded in A, C need not be from the same specimen. If there is no value for a given biomarker, leave blank. As indicated in the note in the instructions for the previous question, do calculate total CPK when all three fractions are given (MB, MM, BB).

When standard units, I.U., or percents are the biomarker units, and the value is given with decimal places, record it as it is. A useful rule is that if the value is greater than one, you may round the decimal places to a whole unit. If less than one, keep the decimal places.

If a value is reported as a range (e.g., CPK = 20-30, or CPK < 30) record the higher value (i.e., 30). However, in the case of patient values of troponin (either I and T), if a value reported is a range (e.g. <0.10) record the range (i.e. <0.10). If values for the laboratory standards for troponin (HRA 43u, 43w, 43y, and 43aa) indicate a range (e.g. <0.10) record the higher value (i.e. 0.10). It is not necessary to record the "<" for the laboratory standards. If a "special value" is used for CK-MB, fill in the corresponding letter (A through E) in the box immediately to the left of the decimal.

If a patient is discharged before day four, leave blank and set the field status to "N/A" in the boxes for date of biomarker draw (Item 54a) and leave item 54b, 55a-p and 56a-p blank. Complete item 48a and 51a similarly if patient is discharged prior to day 2 and 3, respectively.

Note: When the Troponin I questions Q43u, Q43v, Q43y and Q43z are all left blank, the troponin I questions on the rest of the form (Q45m, Q45n, Q46m, Q46n, Q47m, Q47n, Q49m, Q49n, Q50m, Q50n, Q52m, Q52n, Q53m, Q53n, Q55m, Q55n, Q56m, and Q56n) will be skipped. When the Troponin T questions Q43w, Q43x, Q43aa and Q43bb are all left blank, the troponin T questions on the rest of the form (Q45o, Q45p, Q46o, Q46p, Q47o, Q47p, Q49o, Q49p, Q50o, Q50p, Q52o, Q52p, Q53o, Q53p, Q55o, Q55p, Q56o, and Q56p) will be skipped.

56.ab Record the initial BNP measurement if one is present in the chart in 56.ab.1. Then record the last measurement available (if more than one) in 56.ab.3. If more than two measurements were taken, record the highest measurement of the remaining measurements in 56.ab.5.

56.ac Item deleted and captured on the CEL form.

56.ad.1-56.ad.8 Items deleted and captured on the CEL form.

56.ae This question should be marked YES if the patient was on kidney dialysis at anytime during this hospitalization or any time in four weeks prior to his or her hospitalization. Incomplete dialysis should be marked YES.

57. If any 12-lead ECGs were taken during the admission and are available, record "Yes". (Do not count single-lead or 3-lead rhythm strips with the exception to the ECGs from St. Dominic's at Jackson.) If no 12-lead ECGs were taken or none can be found, answer "No" and skip to end.

58. If at least one 12-lead ECG in the chart is codable, answer "Yes". If no ECGs are codable, answer "No"

and skip to end. 6-lead ECGs can be considered codable.

Reasons for uncodable are:

- More than 6 missing leads
- Muscle tremor artifact throughout record that produces possible false initial R's.
- Other technical errors such as extreme lack of centering marked clipping which effect the Q-waves, or no calibration mark or calibration off by greater than ± .5 mm.

When picking ECGs, do not take a 1/2 standard ECG if full standard ECG taken at same time is available.

Note: Some hospitals with computer ECG databases are no longer printing the ECG standard marks. If this is encountered, consider the ECG codable unless for another reason it is not.

59. The "First ECG" (ECGF) is defined as the first codable ECG recorded after arrival regardless of when the event occurred. Find and code that ECG for Q59-69. Do not chose an ECG if it is uncodable.

Record the date of the first ECG (ECGF) in Q59. If time is missing, ECG is uncodable.

59a. Record time of the first codable ECG. See instruction in Q59 for the selection of the "first codable ECG". This question is optional for records that do not need a re-abstraction.

70. If there are other codable ECGs in the chart answer "Yes". If not, answer "No" and skip.

71. Enter the date of the last codable ECG taken during the admission in Q71 and ignore Q72 - 81.

For a one day admit, if there are two ECGs done, use both ECGs, one for ECGF and the other for ECGL.

71a. Record time of the last codable ECG. See instruction in Q71 for the selection of the "last codable ECG". This question is optional for records that do not need a re-abstraction.

82. If the event began outside of hospital, day 3 is the third day after arrival, regardless of time of day of admission. For example, for a patient admitted at 12:01 a.m. on 8/25 day 3 is 8/27. Similarly, if admitted 11:59 p.m. on 8/25, day 3 is 8/27. If the event began in the hospital, day 3 is the third day after the event.

If there are codable ECGs (other than ECGL) taken on or after day 3, pick the last codable one on day three or the first available ECG thereafter that is codable be sure to enter the date into Q83 and skip to Item 94.

83. Date of ECGT: Record the date of the third ECG after the event (Find the last codable ECG on day 3 after admission, or on day 3 after an in-hospital event (ECGT). [If day 3 ECG is not available, use first available ECG thereafter.]

83. Examples on finding ECGT:

	Day 1	Day 2	Day 3	Day 4	Day 8 (discharged)
Example A					
8 ECGs taken	1 2	3 4	5 6	7	8
	ECGF		ECGT		ECGL

	Day 1	Day 2	Day 3 (discharged)
Example B			
6 ECGs taken	1 2	3 4	5 6
	ECGF		ECGT ECGL

	Day 1	Day 2	Day 3	Day 4 (discharged)
Example C				
6 ECGs taken	1 2	3 4	- -	5 6
	ECGF			ECGT ECGL

	Day 1	_____	_____	Day 8 (discharged)
Example D				
2 ECGs taken	1			2
	ECGF	(No ECGT)		ECGL

	Day 1	Day 3	Day 5
Example E			
6 ECGs taken	1 2	3 4 Un-coda-ble	5 6
	ECGF	ECGT	ECGL

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

	Day 1	Day 7	Day 9	Day 10 (discharged)
Example A				
3 ECGs taken	None	1	2	3
		ECGF	ECGT	ECGL

	Day 1			Day 2 (discharged)
Example B				
4 ECGs taken	1	2	3	4
	ECGF		ECGT	ECGL

83a. Record the time of day 3 ECG. See instruction in Q83 for the selection of the "day 3 ECG". This question is optional for records that do not need a re-abstraction.

94. Circle the letter(s) corresponding to the 12-lead ECG(s) that will be duplicated and sent to the ECG Reading Center for coding. For example, all three letters will be circled (F.L.T) if at least three ECGs in the chart were codable. Surveillance ECGs that need review should be handled locally by the field center.

Instructions for sending ECGs to ECG Reading Center for Coding

As of July 2014 ECGS will be sent electronically to the ECG Reading Center (See Manual 3, Appendix IV).

97. Abstractor Number. This should be filled in, even when the chart proves to be ineligible. Double check that your code number has been written in on all the ineligibles since this is a common error. Include the date.

98. Date abstract completed. Enter the date the abstraction was completed.

APPENDIX AA

29c. Coronary Angioplasty - dilation of coronaries via a balloon catheter or laser, sometimes done during an acute MI to reperfuse heart. (36.0 or 02x, 027x, 02Cx, 3E0x, 021x, 02Qx. Where "x" denotes truncated codes to the first three characters, as these represent the category of codes that are further subdivided by the use of any or all of the 4th, 5th, 6th or 7th characters)
Cardiac catheterization is also usually done, so "cardiac catheterization" should also be checked "Yes" when coronary angioplasty was present. It excludes coronary atherectomy.

29c2. Coronary Atherectomy - Involves mechanical (cutting) or thermal removal of an atherosclerotic plaque. It excludes balloon or laser angioplasty (item 29c). Cardiac catheterization and coronary angioplasty are almost always done. Synonym = coronary endarterectomy.

29f. Coronary Bypass Surgery - open-heart surgery in which a prosthesis or a section of blood vessel is grafted onto one of the coronary arteries and connected to the ascending aorta to bypass a narrowing or blockage in a coronary artery. The purpose of CABG is to improve blood supply to the heart, to reduce its workload and to relieve the pain of angina. (36.1 or 02x, 027x, 02Cx, 3E0x, 021x, 02Qx. Where "x" denotes truncated codes to the first three characters, as these represent the category of codes that are further subdivided by the use of any or all of the 4th, 5th, 6th or 7th characters)

29g. Streptokinase, urokinase, eminase, hirudin, hirulog, anistreplase or tissue plasminogen activator (TPA) are coronary reperfusion agents (See ARIC CHD & Heart Failure Drugs List on the ARIC website; URL https://aric.cscc.unc.edu/aric9/sites/default/files/public/surveillancedata/ARIC%20CHD%20%26%20Heart%20Failure%20Drugs.pdf). These are drugs given during the early stages of an MI to dissolve coronary thrombus or clots. The drugs may be administered intracoronary or in a peripheral intravenous solution. If given intracoronary, coronary angiography is almost always done, so item (b) should be marked. If given intravenously, answer (h) with "Yes", but do not mark (b). (99.29 or 3E03317, 3E04317, 3E05317, 3E06317, 3E08317)

APPENDIX CC

HOSPITAL CODES

List of Active Catchment Area Hospitals as of 9/28/2015

Site	Name	Hospital Type	Notes
Forsyth County			
11	North Carolina Baptist	Teaching	
12	Forsyth County Memorial	Nonteaching	
13	Medical Park	Nonteaching	
14	Kernersville Medical Center	Nonteaching	Added in 2013
15	Clemmons Medical Center	Nonteaching	Added in 2014
96	Hospital outside study area	--	
Jackson			
21	University of Mississippi Med Center	Teaching	
22	Veterans Administration Hospital	Teaching	
23	St. Dominic's Hospital	Nonteaching	
24	Merit Health Central Med Center	Nonteaching	Name change 2015
25	Mississippi Baptist Hospital	Nonteaching	
26	Merit Health Hospital	Nonteaching	Name change 2015
27	Merit Health Madison Hospital	Nonteaching	JHS only (name change in 2015)
28	Merit Health Rankin Hospital	Nonteaching	JHS only (name change in 2015)
97	Hospital out of study area	--	
Minnesota Townships			
30	Abbott-Northwestern Hospital – Allina Health	Teaching	Name change 2015
32	Fairview Southdale Hospital – Fairview Health Services	Nonteaching	Name change 2015
34	Hennepin County Medical Center	Teaching	
35	Mercy Hospital – Allina Health	Nonteaching	Name change 2015
36	Park Nicollet Medical Center	Teaching	Name change 2015
40	North Memorial Medical Center	Teaching	
44	Unity Hospital – Allina Health	Nonteaching	Name change 2015
45	University of Minnesota Medical Center, Fairview	Teaching	
46	VA Medical Center	Teaching	
98	Hospital out of study area	--	
Washington County			
51	Meritus Medical Center	Nonteaching -	Name change in 2013
52	Western Maryland Center	Nonteaching	
53	VA Medical Center, WV	Nonteaching	
54	University of Maryland	Teaching	
55	Frederick Memorial	Nonteaching	
56	Johns Hopkins Hospital	Teaching	
57	Washington Hospital Center	Nonteaching	
58	George Washington University	Teaching	
59	Georgetown University	Teaching	
60	Saint Joseph Medical Center	Nonteaching	
61	Washington Adventist	Nonteaching	
62	Sinai Hospital	Nonteaching	
63	Union Memorial	Nonteaching	
99	Hospital out of study area	--	

Inactive Hospitals (Minnesota)

31	Riverside Medical Center	Teaching	Closed
33	Fairview- Ridges	Non-teaching	Closed
37	Metropolitan	Non teaching	Closed
38	Midway	Non teaching	Closed
39	Mt. Sinai	Non teaching	Closed
41	St. Paul Ramsey	Non teaching	Closed
42	St. John's Northeast	Non teaching	Closed
43	St. Mary's	Non teaching	Closed
47	Fairview	Non teaching	
48	Phillips Eye Institute	Non Teaching	

APPENDIX DD

		Symptoms	Answers Q23b	Q25a	Q25b	Q23a
A.	9/1	First episode of acute, severe chest pain, 8 AM	Y	H	Y	9/2
	9/2-4	Many daily, less severe episodes of chest pain; none more prominent				
	9/5	Admission, 10 AM				
		Explanation: The first pain seems most prominent (use judgement based on chart). Although onset of first pain was 9/1, the first within 72 hours was on 9/2.				
B.	9/1	Collapse, no mention of pain, 8 AM	Y	B	N	-
	9/1	Admission, 9 AM				
		Explanation: No chest pain occurred.				
C.	9/1	First acute, severe chest pain, 8 AM, resolved quickly	Y	A	Y	9/5
	9/2-4	No symptoms				
	9/5	Second acute, severe chest pain, 8 AM, did not resolve				
	9/5	Admission, 8:30 AM				
		Explanation: Second pain is most prominent and is the event.				
D.	9/1-4	Chronic anginal pain, 8 AM every day	Y	B	Y	9/5
	9/5	Different, severe pain, 8 AM				
	9/5	Admission, 9:30 AM				
		Explanation: 9/5 pain is the event.				
E.	9/1	Admitted for hernia repair	N	-	Y	9/3
	9/3	First acute chest pain				
		Explanation: In-hospital event.				

	Symptoms	Answers Q23b	Q25a	Q25b	Q23a
F. 9/1	Indigestion, 8 AM	Y	H	Y	9/2
	Settles in chest, 10 AM				
9/2-4	Stays in bed with vague chest pain which gradually gets worse				
9/5	Admission, 10 PM				
	Explanation: Clearest onset is AM 9/1. If pain was continuous, first pain within 72 hours of admission was 9/2 at 10PM.				
G. 9/1	Marked fatigue and shortness of breath, 8 AM	Y	G	N	-
9/2	Admitted after MD does office ECG, 8 AM				
	Explanation: Marked fatigue and shortness of breath can be acute cardiac symptoms. Never had chest pain.				

APPENDIX EE

SOUNDEX

Soundex is a system of converting names and addresses to a short abbreviation. It is used in ARIC abstracting when the hospital, for confidentiality reasons, will not let the patient name or address be abstracted verbatim. In that case it is often acceptable to record the Soundex code for the patient's name and address.

APPENDIX FF

ARIC COHORT SURVEILLANCE ECG SHIPPING INVENTORY

Batch: _____ Date:_____

Type of Case:_____

Pos	Surv.ID	#ECG	Pos	Surv.ID	#ECG	Pos	Surv.ID	#ECG	Pos	Surv.ID	#ECG
01	_____	____	26	_____	____	51	_____	____	76	_____	____
02	_____	____	27	_____	____	52	_____	____	77	_____	____
03	_____	____	28	_____	____	53	_____	____	78	_____	____
04	_____	____	29	_____	____	54	_____	____	79	_____	____
05	_____	____	30	_____	____	55	_____	____	80	_____	____
06	_____	____	31	_____	____	56	_____	____	81	_____	____
07	_____	____	32	_____	____	57	_____	____	82	_____	____
08	_____	____	33	_____	____	58	_____	____	83	_____	____
09	_____	____	34	_____	____	59	_____	____	84	_____	____
10	_____	____	35	_____	____	60	_____	____	85	_____	____
11	_____	____	36	_____	____	61	_____	____	86	_____	____
12	_____	____	37	_____	____	62	_____	____	87	_____	____
13	_____	____	38	_____	____	63	_____	____	88	_____	____
14	_____	____	39	_____	____	64	_____	____	89	_____	____
15	_____	____	40	_____	____	65	_____	____	90	_____	____
16	_____	____	41	_____	____	66	_____	____	91	_____	____
17	_____	____	42	_____	____	67	_____	____	92	_____	____
18	_____	____	43	_____	____	68	_____	____	93	_____	____
19	_____	____	44	_____	____	69	_____	____	94	_____	____
20	_____	____	45	_____	____	70	_____	____	95	_____	____
21	_____	____	46	_____	____	71	_____	____	96	_____	____
22	_____	____	47	_____	____	72	_____	____	97	_____	____
23	_____	____	48	_____	____	73	_____	____	98	_____	____
24	_____	____	49	_____	____	74	_____	____	99	_____	____
25	_____	____	50	_____	____	75	_____	____	00	_____	____

APPENDIX GG

HRA

Table of Response by Type of Past History

	Q. 32 MI	Q. 33 angina	Q. 38 HTN	Q. 38b Diabetes
No prior IHD/CHD	N	N	U	U
Previously well	N	N	N	N
No heart disease	N	N	U	U
No adult diseases	N	N	N	N
Negative medical history	N	N	N	N
No cardiovascular disease	N	N	U	U
No cardiac problems/history	N	N	U	U
No neurological problems	U	U	U	U
No major medical problems	N	N	U	N
General health quite good	N	N	U	N
Denies medical problems	N	N	N	N
In good health	N	N	U	N
Negative health history	N	N	N	N
In general good health	N	N	U	N
Generally in good health (vague)	U	U	U	U
Previous heart disease (vague)	U	U	U	U
No prior history of cardiac problems	N	N	U	U
No previous medical history	N	N	N	N
No major illnesses	N	N	U	N
Unremarkable	N	N	U	N
Essentially unremarkable	U	U	U	U
No known cardiac risk factors	N/A	N/A	N	N
Denies chronic diseases	U	U	U	N
No definite cardiac history (vague)	U	U	U	U
Healthy	N	N	U	N