HFAF Instructions (QxQs)

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

Question in HF QxQ	Description of Changes in HF QXQ
List of Synonyms, pg. 2	• Adjusted formatting by placing “Can be” from the “No” column onto a separate line.
Rules for History, pg. 3	• Clarified whose notation takes precedence in the event of disagreement for historical items.
Item 1c, pg. 5	• Clarified criteria for marking “Yes” for increased or new-onset paroxysmal nocturnal dyspnea.
Item 16g, pg. 19	• Added notes clarifying CAP and HAP abbreviations.
Section VII. Medications, pg. 37	• Added clarifications to the medications instructions.

INSTRUCTIONS FOR COMPLETING

HEART FAILURE HOSPITAL RECORD ABSTRACTION FORM

HFA Version F, 10/08/2021

HFAF QxQ, 10/22/2025

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GENERAL INSTRUCTIONS

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 extra key fields match the chart being abstracted.

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

Fields in the data entry system should not be left blank. If data is not available (not reported) for a numeric field leave the field blank and set the field status to “Missing or Not Applicable”.

Synonyms
In general, the following may be considered synonyms:

NO	YES
"Rule out"	"Likely"
"Suggestive" *****	"Apparent"
"Equivocal"	"Consistent with"
"Suspicious"	"Probable"
"Questionable"	"Definite"
"Possible"	"Compatible with"
"Uncertain"	"Highly suspicious"
"Reportedly"	"Presumably"
"Could be"	"Borderline"
"Perhaps"	"Representing"
"Low probability"	"Minimal"
"Might be"	“Minimum”
"May represent"	"Thought to be"
"May be"	“Minor”
“Cannot rule out”	“Subtle”
“Cannot be excluded”	“Mild”
“(Diagnosis/finding) AND/OR (diagnosis/finding)”	“Would favor”
“(Diagnosis/finding) OR (diagnosis/finding)”	“Slight”
“Can be”	
“Somewhat”	

***** see exceptions for Section V for chest x-rays, echocardiogram studies, and left heart catheterizations.

Rules on hierarchy and use of qualitative reports

Rules on hierarchy are generalized below, and may be further detailed in specific sections. The underlying purpose of these rules is to capture information rather than to miss it, as long as the information appears accurate. However, if there is conflicting information for items relating to timing and the timing is the same, use the rules of hierarchy.

Rules for History

In the case of disagreement for historical items, generally take in this order for whose notation takes precedence: resident physician/advanced practice provider history & physical note is superior to the cardiologist (any type of note), who is superior to the attending (any type of note), who is superior to the emergency medicine physician, who is superior to the nurse, who is superior to nursing home notes, which are superior to EMS notes. However, if there is disagreement regarding diagnosis between physicians, the subspecialist for that diagnosis takes superiority. For example, for a cardiology issue, the cardiologist is considered more correct, but for a pulmonary issue, the pulmonologist should be more correct than the non-pulmonologist. In general, when there is discrepancy of presence versus possible presence versus no mention of a condition, take the presence regardless of hierarchy, as long as it makes sense. For hierarchy purposes, NP / PA equals resident. A single mention of a diagnosis on an ICD code list is not sufficient.

Rules for Physical Exam and Symptoms:

In general, the goal is to capture any presence of an abnormal exam finding. For signs and symptoms occurring "at admission or any time during hospitalization" in Section V, any documented description of an abnormal finding by any physician is sufficient. In the case where an exam finding is specifically requested for any one point in time and there is disagreement about the presence of that physical finding at that specific time point (e.g., in emergency department, at discharge), take in the order: cardiologist (any type of note) is superior to the attending (any type of note), who is superior to the resident, who is superior to the RN.

Rules for Vital Signs at Time of Admission:

Use the first in time (not necessarily the H&P) as currently instructed in the QxQ.

Rules for Diagnostic Tests: Qualitative vs Quantitative reports

Generally, physician's qualitative data take precedence over quantitative (technician's) data. If there is a discrepancy between data in qualitative description and data in the conclusion, use data in the qualitative section (i.e. go with text not test). In absence of MD notes on an issue, can use nurses notes as long as they don't contradict any other text of MD. History and physical notes rank higher than emergency room notes.

SPECIFIC ITEM BY ITEM INSTRUCTIONS

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).

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.

0.d. Patient Disposition on Discharge. This information can be found in the discharge summary or on the face sheet. If the patient is deceased skip to 0e. 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.

SECTION I: SCREENING FOR DECOMPENSATION OR NEW ONSET OF SYMPTOMS

Generally, questions 1-4 are meant to distinguish hospitalizations for progression, decompensation, or new onset of symptoms from hospitalizations for conditions unrelated to heart failure yet that contain a heart failure target discharge code (e.g. ICD9 code 428 or ICD10 code I50.x). These latter cases are common. They may occur when a patient with a history of heart failure is hospitalized for an unrelated event yet "carry" their heart failure diagnosis on their discharge code list, along with other chronic conditions. See Appendix for examples of the various potential scenarios of the onset of the HF event or decompensation.

For the purpose of items 1-4, record NO/NOT RECORDED if there is clear indication that a condition was not present OR if it is unclear based on the medical record that a condition was or wasn't present (not recorded). In general, any documented description by any physician or nurse of an abnormal finding for items 1-4 is sufficient to record YES (hierarchy rules do not apply here).

Evidence of the following conditions:

1.a. Increasing or new onset shortness of breath?
Record YES if new onset or increased dyspnea (shortness of breath, SOB) is reported in the medical record at the time of hospital arrival, or at an earlier evaluation (e.g. at physician's office for a patient directly admitted to the hospital), or at any time in the hospital. Record YES if the patient complained of new or increasing shortness of breath or it was found upon assessment by a physician or nurse anytime during hospitalization. Evidence of new or increasing tachypnea, which may be defined as respiratory rate (RR) >22, should be considered YES for this question. If a patient arrived on a ventilator, record YES for this item. If there was no evidence of new onset or increased dyspnea at any time, record No/Not Recorded. The next items about "increasing or new onset" (1b-1e) all follow the same rule: we are interested in new onset or increasing symptom either before admission or at any time during the hospitalization.

1.b. Increasing or new onset edema?
Edema refers to the accumulation of fluid in extra-vascular spaces. Typical sites of edema include the legs, the abdomen (ascites), and the lungs. Pulmonary edema refers to the accumulation of fluid in the extra-vascular spaces of the lung. Peripheral edema, e.g., swelling of the legs or arms or abdomen) is fluid accumulation in various parts of the body outside of the heart and lungs. Record YES if either of these is present at the time of evaluation. Also record YES if the patient has pulmonary congestion or lymphedema; record NO if only angioedema is noted. However, if the only reference for new onset/progressive edema is a "pulmonary edema" statement in a chest x-ray (CXR) or a mere description of a CXR report, answer NO to the pertinent item in this section. On the other hand, when "pulmonary

edema" is stated as part of the clinical assessment separate from (or in addition to) the CXR, answer YES. If edema is present on admission but is not described as a chronic finding, assume the condition is new or worse. But trace peripheral edema is NOT sufficient to answer YES (as also noted in item 22.a).

1.c. Increasing or new onset paroxysmal nocturnal dyspnea?
Record YES if waking up short of breath (paroxysmal nocturnal dyspnea, PND) is noted in the medical record as increasing or new onset. Paroxysmal nocturnal dyspnea is a complaint of waking up in the middle of the night feeling shortness of breath. Classically, people sit straight up in bed and open a window or turn on a fan to try and get "air". This is usually due to accumulation of fluid in the lungs from left sided heart failure, following redistribution of blood in the supine position. Paroxysmal nocturnal dyspnea is often abbreviated as PND. Waking up short of breath (during the night or day) is sufficient to record YES. Note: Orthopnea is not a synonym for PND.

1.d. Increasing or new onset orthopnea?
Record YES if the patient has new or increasing difficulty breathing while lying down (orthopnea). Orthopnea is shortness of breath when lying down that is relieved by sitting up or elevating their head with pillows or a recliner. People with orthopnea usually state that they feel short of breath lying flat so they sleep with multiple pillows or in a recliner chair. This might be written in the medical record in terms of number of pillows needed to sleep. Record No/Not Recorded if the patient did not present with new onset or worsening orthopnea at any time.

1.e. Increasing or new onset hypoxia?
Record YES if hypoxia (low level of blood oxygen) is stated in the record. Do not try to interpret oxygen values yourself, but you may infer, for example, from a decision to administer oxygen. Record YES if the patient has a documented new or increasing oxygen requirement (not just oxygen administration). This may be documented in the nursing or doctor notes that suggest that: the room air (RA) pulse oximetry (pulse ox) or saturation (sat) is <90%; or that the patient was placed on oxygen (nasal cannula or face mask) for low pulse oximetry or required intubation and mechanical ventilation. This item is different from 1.a. Increasing or new onset shortness of breath in that this item 1.e. means that the patient requires supplemental oxygen administration, whereas item 1.a. does not necessarily require that the patient requires oxygen. Also, oxygen is sometimes given (through nasal cannula or face mask) as empiric treatment even when there is no hypoxia; record NO if there is no evidence of hypoxia even though oxygen was given. If new 4 L/m O2 or more is given, record YES.

2. Was there evidence in the doctor's notes that the reason for this hospitalization was heart failure?
The goal of this question is to determine wihether ***a*** reason for this hospitalization ***may be*** heart failure. Focus on the admitting or differential diagnoses rather than the final discharge diagnosis. If upon review of the doctor's notes there is no indication that heart failure was a reason for this hospitalization, record NO. By "a reason for this hospitalization" we mean not only "a reason for admission to the hospital" but also evidence of new onset or progression during the hospital course. Words that may be indicators of heart failure-related hospitalization include but are not limited to: congestive heart failure (CHF), acute heart failure (AHF), acutely decompensated heart failure (ADHF), increasing circulatory congestion, inadequate tissue perfusion, decompensation of cardiac function, pump failure, left ventricular failure, right ventricular failure, pulmonary edema, low-output heart failure, high-output heart failure, acute decompensated heart failure. The mere presence of heart failure is insufficient; it must be either the reason for admission or in-hospital progression to answer "yes". Statements like "volume overload" are NOT equivalent to heart failure but may be sufficient if the rest of the notes suggest the patient was hospitalized for HF decompensation or progression. However, the mention of CHF on only a chest x-ray without further documentation of CHF during the hospitalization is not sufficient.

3. Is this a cohort participant? This item will be auto filled in by the DMS as a "YES"

4. Did the patient have new onset or progressive symptoms/signs of heart failure:

4.a. At the time of admission to the hospital?
Record YES if new or progressive heart failure symptoms/signs were present at the time of this hospitalization (i.e. admission date). Record YES if heart failure symptoms/signs were the cause of the hospitalization and complete item 4b. Record NO if the signs or symptoms began after the patient was admitted to the hospital (in-hospital event) and complete item 4b. If questions 1.a.-1.e. and 2 are NO, then record NO for 4.a. and 4.b. (and record NO for 16.d.-16.k.).

4.b. During this hospitalization?
Record YES if the new onset or progression of symptoms/signs indicated in item 1a-e did not become evident until after admission. These patients presented to the hospital for another problem without symptoms or signs of progression of heart failure, but then developed decompensated heart failure later. The date of new onset or progression (item 5) for these patients should be after the admission date. However, if the patient's symptoms began *after* admission to the hospital but on the same day as admission date, record YES to 4.b, record NO to 4.a, and record the admission date in item 5. Cohort members with no evidence of decompensation or new onset of heart failure, you may answer NO to both 4a and 4b. If questions 1.a.-1.e. and 2 are NO, then record NO for 4.a. and 4.b. (and record NO for 16.d.-16.k.).

Note: If NO is recorded to both item 4a and item 4b, skip item 5 and item 5a.

5. Date of new onset or progression of symptoms/signs.
Record the date of new onset or progression of symptoms or signs. In cases that present to the hospital with new onset or progression/worsening of symptoms/signs, the date may be the admission date or a date leading up to that admission. For example, if a patient was seen in the emergency department on Day 1 with worsening symptoms but not admitted until Day 2 for a full clinical work up, the date of the emergency department visit admission should be recorded. Another example: if a patient had symptoms 7 days prior to admission, the date 7 days prior to admission date should be recorded; however, if the symptoms are described as 1 week prior to admission, skip to 5.a (see below). If the response for item 4.b is YES (onset of symptoms during hospital admission), then the date to be recorded in item 5 should be a date after the admission date. [Exception: If symptoms began in the hospital on the date of admission, then 4b = YES and "date of new onset/progression"=admission date.] In general, the date of new onset or decompensation (item 5) should be the date of onset of the heart failure symptoms/signs that brought the patient to come to clinical recognition, not necessarily the peak of the symptoms/signs that finally brought the patient to the hospital. For example, a patient presents with chest pain (e.g., acute MI) and new dyspnea that began 1 day prior to admission, but might have had mild shortness of breath 2 weeks ago; if it is the chest pain and dyspnea that brought the patient to the hospital and the patient would otherwise not have gone to hospital for the mild dyspnea beginning 2 weeks ago, then the onset was 1 day prior to admission. However, if the patient had dyspnea that began 2 weeks ago but it became intolerable on the day of admission (thus causing the patient to come to hospital), then the onset was 2 weeks ago. You can use pre-hospitalization outpatient data when available (e.g., nursing home notes) for details of the presenting symptoms/signs and their onset.

If the exact date of symptom onset is not specifically stated but the onset is described as a certain number of days prior to admission, record the date as the date minus those number of days, depending on

whether the date (usually the date of admission) is counted or not. Similar to the HRA (item 25.b), if wording in the chart refers to days (e.g., dyspnea for 4 days), count the date (of admission) as day 1 when counting backward to estimate duration. If wording in the chart is "days ago" (e.g., dyspnea started 2 days ago), ignore the date (of admission) when estimating duration. For example, date of admission is July 4: if short of breath 2 days before admission (2 days ago), record July 2; but if short of breath x 2 days, record July 3. If short of breath for a range of days, like 2-3 days, record the longest range: July 1. However, if the unit of time is described as weeks (e.g., 1 week or more), then skip 5 and enter the number of weeks in 5.a. But if specific number of days is noted and longer than a week (e.g., 10 days, 14 days, etc), provide the estimated date for item 5. If there may be two potential dates of onset, record the earlier date (which would give the longest duration). In general, take the longest duration if there are multiple time frames, as long as they are not contradictory. Record the exact date whenever possible.

If you have recorded an exact date in item 5, skip to 6.

If the exact date of symptom onset is not known, leave the field blank" in item 5 and go to item 5a. For example, if the medical record indicates that the patient presented to the hospital with worsening of symptoms of heart failure but does not indicate the date of symptom onset, leave the field blank" and go to item 5a. If a reference is made to a previous time, but without a specific date (e.g. "developed leg edema several days prior to admission",) leave the field blank and go to item 5a.

5.a. <u>If exact date unknown, estimate weeks prior to this hospitalization.</u>
If the exact date of onset of symptoms is not known but a reasonable estimate can be derived from the medical record, estimate here the number of weeks prior to the admission date when symptoms began (there is no maximum number). For example, if the medical record indicates that worsening of shortness of breath occurred "several days prior to" presentation to the hospital, record 1 week. If the unit of time is described as months, do not calculate the number of weeks; instead record "5" as suggested in the table below (i.e., onset of symptoms is more than 1 month).

Description of onset of symptoms	# of weeks to be recorded in 5a
Several days prior to admission	1
A few days / lately	1
Recent onset of symptoms	1
Onset greater than one week prior	2
Several / few weeks prior to admission	3
One month prior to admission date	4
Onset greater than one month prior	5

If unable to estimate the time, seek guidance from the local clinical advisor.

6. <u>Did the physician's note or discharge summary indicate any of the following specific types of heart failure</u>?
Review the physician's notes and the discharge summary for mention of any of the following specific types of heart failure. Record YES to all that apply. If "cardiomyopathy" is stated but no adjective precedes it, enter Yes for 6.j. (Other) and enter No/Not Recorded for all other items. Note: you are not expected to make a clinical judgment as to what type of cardiomyopathy this patient has based on the records; only mark these items if these specific types (or their synonyms) are explicitly mentioned.

6.a. <u>Ischemic cardiomyopathy</u>. This is heart failure due to significant coronary artery disease. This may be abbreviated as "ICM". Use the hierarchy rules for history if there is disagreement.

6.b. Idiopathic/dilated cardiomyopathy. This is heart failure due to unknown causes. This may be abbreviated as "DCM". Synonyms include "nonischemic dilated cardiomyopathy" without other qualifiers (or mention of another cause for the cardiomyopathy). However, "dilated ischemic cardiomyopathy" should be recorded as YES for 6.a. and NO for 6.b.

6.j. Other specific cardiomyopathy/heart failure. This is heart failure due to some other cardiomyopathy that is not included in the above types. Look specifically for "cardiomyopathy" or a specific type of heart failure (e.g., diastolic heart failure, acute systolic heart failure, hypertensive heart failure, hypertensive cardiomyopathy, alcohol-related cardiomyopathy, cardiac sarcoidosis, cardiac amyloidosis, amyloid cardiomyopathy, rheumatic heart disease, cor pulmonale, nonischemic cardiomyopathy not otherwise specified, etc). "Congestive cardiomyopathy", "primary cardiomyopathy", "severe cardiomyopathy", or diastolic dysfunction do not count. Specify the type in 6.j.1. If "cardiomyopathy" is stated with no adjective preceding it, enter "Unspecified" in 6.j.1. It is acceptable to record specific qualifiers as you see them in this section.

SECTION II: HISTORY OF HEART FAILURE

The purpose of this section of the HFA is to help determine if this hospitalization is an INCIDENT or PREVALENT case. An incident case is a person's first (ever) diagnosis of heart failure. A prevalent case is a patient with a history of heart failure prior to this event. This is an important, yet difficult distinction to make. Review the physician's note, history and physical, and the discharge summary for mention of the patient's history of heart failure. Use the hierarchy rule for conflicting information.

7. Prior to this hospitalization was there a history of any of the following:

7.a. Diagnosis of heart failure:
Review the physician's notes, history and physical, and the discharge summary for evidence of a prior diagnosis of heart failure. "Prior" refers to a physician's diagnosis prior to the onset or worsening of symptoms that brought the patient to the hospital. For the purpose of this question, a mention that the patient has a history of heart failure diagnosed and treated as an out-patient (for >1 month) is sufficient evidence to record YES to 7.a. In the case of patients developing symptoms in the hospital, "prior" refers to prior to this hospitalization in which the symptoms developed. Evidence of a prior physician diagnosis of heart failure is required to record YES to item 7.a. Record NO if the patient does not have a history of heart failure. If there was no mention of previous heart failure in the medical record, indicate this as not recorded (NR). History is defined as more than 1 month prior to the event for patients who have new or worsening HF symptoms. If the record indicates that the only previous heart failure was within 1 month, this would not be considered as a history of heart failure, UNLESS the patient was ***hospitalized*** for decompensated HF in the past 1 month and is currently hospitalized with either acute or chronic HF. If, after reviewing the medical record, it is unclear as to whether there was a history of heart failure or there is contradictory evidence, record UNSURE.

Synonyms for heart failure include:

Alcohol Cardiomyopathy	Ischemic Cardiomyopathy (ICM)
Amyloid Cardiomyopathy	Left ventricular failure
Apical Hypertrophic Cardiomyopathy	Left ventricular dysfunction (LVD)
Biventricular failure	Peripartum Cardiomyopathy (PPCM)
Cardiogenic shock	Pulmonary edema

CHF or HF
Congestive heart failure
Cor Pulmonale
Dilated Cardiomyopathy (DCM)
Idiopathic Cardiomyopathy
Idiopathic hypertrophic subaortic stenosis (IHSS)
Infiltrative Cardiomyopathy
Hypertensive Cardiomyopathy
Hypertrophic Cardiomyopathy (HCM)
Hypertrophic nonobstructive cardiomyopathy
Hypertrophic Obstructive Cardiomyopathy (HOCM)
Rheumatic Heart Failure
Pump failure
Right ventricular failure
Restrictive Cardiomyopathy RCM)
Sarcoid cardiomyopathy
Viral Cardiomyopathy
Valvular cardiomyopathy

Note: If records only mention 'volume overload', do not use as a synonym for heart failure.

7.b. Prior hospitalization for heart failure:
Review the physician's notes, history and physical, and the discharge summary for evidence of a prior HOSPITALIZATION for heart failure. If abstracting from an electronic medical record, hospitalizations within the past 2 years of admission may be reviewed. Unlike 7.a., a history of heart failure diagnosed and treated as an out-patient is NOT sufficient evidence to record YES. There may be evidence of a prior physician diagnosis for heart failure (item 7.a.=YES) and no evidence that the patient was hospitalized for this diagnosis (item 7.b.=NO). However, if the patient was previously hospitalized for another problem and management for heart failure was changed or initiated, record YES. If the patient was admitted for heart failure at another hospital and transferred to the current hospital within 1 month, record NO for item 7.b. In general, record NO if heart failure is newly diagnosed during this hospitalization. Record UNSURE if there is a previous diagnosis of heart failure and, after reviewing the medical record, it is unclear as to whether there was a prior hospitalization for heart failure or there is contradictory evidence. For example, if one note reports history of heart failure hospitalization, but another notes say no such history, choose UNSURE.

7.c. Treatment for heart failure:
Review the physician's notes, history and physical, and the discharge summary for evidence of previous treatment for heart failure. Treatment should include either in-patient or outpatient treatment. Examples of treatment that would be considered YES for item 7.c include: (1) Medications such as diuretics, angiotensin converting enzyme inhibitors (ACE inhibitors), angiotensin II receptor blockers (ARBs), beta-blockers, digitalis, aldosterone blockers, hydralazine, nitrates, intravenous inotropes (dobutamine, dopamine, milrinone), intravenous vasodilators (e.g., nitroglycerin, nitroprusside, nesiritide), anticoagulants; (2) Use of medical devices such as implantable cardiac defibrillator, intraaortic balloon pump (IABP), left ventricular assist device (LVAD), ventricular assist device (VAD), biventricular assist device (BiVAD), hemofiltration (i.e., peripheral ultrafiltration and aquapheresis, but *not* dialysis). Since some drugs may be given for various conditions (e.g. diuretics for hypertension), look for the stated indication. Do not record YES if the stated indication is for conditions other than heart failure. If, after reviewing the medical record, it is unclear as to whether there was a previous treatment for heart failure or there is contradictory evidence, record UNSURE. If item 7.b. (prior hospitalization for heart failure) is recorded as YES, then record 7.c. as YES. If item 7.a. (prior diagnosis of heart failure) is recorded as YES and patient is on diuretics (loop diuretics or aldosterone blockers), then record 7.c. as YES.

8. Was cardiac imaging performed prior to this hospitalization?

Review the physician's notes, history and physical, and the discharge summary for evidence of previous cardiac imaging. Examples of imaging that are sufficient for a YES response to item 8 include: echocardiogram, e.g., transthoracic echocardiogram (ECHO), transesophageal echocardiogram (TEE), stress echocardiogram; radionuclide ventriculogram (RNV or MUGA [multiple gated blood pool acquisition] scan); contrast ventriculogram (LV gram, performed during a left heart catheterization or coronary angiogram); computed tomography (CT) scan; cardiac magnetic resonance imaging (MRI) scan. If there is evidence that the patient did not have an echocardiogram, MUGA (RNV), LV gram prior to this hospitalization, but did have a previous CT or MRI for non-cardiac reasons, record NO/UNK for item 8. If there are statements in the medical record that suggest no previous cardiac imaging was done or there is no evidence whether or not cardiac imaging was performed, record NO/UNK and skip to item 9. If the medical record indicates that cardiac imaging was done but no EF or qualitative description of LV function is provided, record NO/UNK and skip to item 9.

8.a. Lowest Ejection Fraction recorded

If there was evidence of prior cardiac imaging or mention of prior ejection fraction by history, record the lowest LV ejection fraction (LVEF) found among the notes and/or all the different types of imaging tests, regardless of the year of this past study; then skip item 8.a.1. If a range or multiple values are given, use the lowest (i.e., worst) value (e.g., if "30-35%", record "30"). If a greater than (>) or less than (<) description is used, record the next numeric value (e.g., if ">55%", record 56; if "<20%", record "19"). Record NR (leave the field blank) if EF is not available. However, if the physician's interpretation states "normal" and a normal range is indicated on the report, record the lowest value of the normal range (e.g., if the normal range is between 55-90%, record "55").

If a numeric ejection fraction is not available but the systolic function is described in qualitative terms, record NR (leave the field blank) for item 8.a and complete item 8.a.1. In general, we are interested in the lowest numeric LVEF assessment more than a qualitative description of the LV systolic function; therefore, an older report with an estimated LVEF takes precedence over a more recent report with only a qualitative description if the qualitative description matches the quantitative estimate. For example, if a chart describes both an echocardiogram report from 2003 reporting "LVEF 35-40%" and a cardiac catheterization report from 2005 reporting "severe LV dysfunction", record "35" for item 8.a, skip item 8.a.1, enter "2003" for item 8.b and "echo" for item 8.c. However, since the goal is to capture the worse documented LV function, if a qualitative description suggest more severe LV dysfunction than a given quantitative assessment, then skip 8.a., and answer 8.a.1 (e.g., if the record describes both a history of "severe" LV dysfunction and a past estimated LVEF of "40%", skip 8.a., and record "severe (S)" in 8.a.1. In general, different hospitals use different cutoffs to describe the severity of LV dysfunction (especially for mild and moderate severity). If you have two different reports—one describing LV dysfunction in percentages and the other by qualitative descriptors—use the following scheme to compare the quantitative and qualitative descriptions to determine which record describes worse LV function (that is, which description should be recorded):

- Normal = LVEF ≥ 50%
- Mild LV dysfunction = LVEF 45-49%
- Moderate LV dysfunction = LVEF 35-44%,
- Severe LV dysfunction = LVEF<35%.

Comment: A viewable formal report is more valuable than any statement/remark quoted anywhere else in the chart.

Take care to look at discharge-related papers for mention of past LVEF in the "Heart Failure Core Measures" section (but do not record the current LVEF for item 8.a.).

8.a.1. Qualitative description
As above, if 8.a. is not recorded (leave the field blank) record the qualitative description of the cardiac systolic (LV) function as “normal”, “decreased mildly”, “decreased moderately”, or “decreased severely”. Description of “preserved EF” is “normal”. If no quantitative or qualitative measures are reported in the medical record, enter “None of the above”.

8.b. Year of lowest ejection fraction:
For the imaging study chosen to answer item 8.a., record the year when that study was performed.
8.c. Type of imaging
For the imaging study chosen to answer item 8.a., indicate the type of imaging procedure. If the imaging procedure used to assess EF was not one of the ones listed, record “Other”.

SECTION III: MEDICAL HISTORY

Introduction
The purpose of this section is to record relevant medical history items and to also determine if there are certain previous events or medical conditions (“precipitating factors”) that precipitated the new heart failure onset, decompensation, or progression of heart failure symptoms. ”History of” is synonymous with a documented history of the disease that was present as a “pre-event” diagnosis prior to the hospitalization, e.g., listed under past medical history section of the history & physical note. Conditions that are newly present with the current hospitalization are not considered historical diagnosis and should not be counted in this section (e.g., do not include atrial fibrillation that is only noted with the hospitalized heart failure exacerbation but not diagnosed prior to hospitalization). However, certain chronic disease conditions which are newly diagnosed but are unlikely new conditions (i.e., congenital heart disease, hypertension, rheumatic heart disease, diabetes, hyperlipidemia) can be counted as historical diagnosis. Unlike for HRA, medical conditions that exist anytime prior to the current hospitalization should be recorded as history=YES.

10. Respiratory Conditions

10.a. Asthma
Record YES if the patient had a history of asthma, or a history of moderate to severe asthma. Synonyms include reactive airway disease (RAD) and obstructive airway disease (but NOT chronic obstructive pulmonary disease, item 10.b). Record NO/NR if the patient has mild asthma (on no medications or inhalers for this condition), does not have a history of asthma or if a history of asthma cannot be determined from the medical record.

10.b. Chronic bronchitis/COPD
Record YES if any of the following is mentioned as part of the patient’s medical history: chronic obstructive pulmonary disease, COPD, chronic bronchitis, emphysema, chronic airway obstruction. A history of asthma alone should not be recorded here. Notation such as “recurrent bronchitis” is recorded “YES".

10.c. Other chronic lung disease
Evidence of other chronic lung disease to be considered as YES to item 10.c. include, for example: cystic fibrosis, bronchiectasis, pulmonary fibrosis, cystic fibrosis, interstitial lung disease (e.g., silicosis, asbestosis, pneumoconiosis), restrictive lung disease, sarcoidosis with lung involvement, pulmonary sarcoidosis, lung disease not otherwise specified, etc. This question does not include pulmonary hypertension; refer to item 11.l to record pulmonary hypertension.

10.d. Pulmonary embolus

Record YES if the patient has a history of pulmonary emboli. Review the physician's notes for results of a lung scan (e.g. ventilation-perfusion scan, spiral CT scan) or pulmonary angiogram.

10.e. Coughing, phlegm, wheezing

Record YES if the patient has a history of significant coughing, phlegm production, or wheezing within the last 6 months. However, if the cough is not historical, but related to the presenting symptoms, record YES for item 23.a, and not for this item (the onset date of presenting symptoms can be used to differentiate history of cough/phlegm/wheezing [item 10.e] versus current cough [item 23.a]). Record NO if the patient does not have history of cough, phlegm, or wheezing. If the medical record does not mention these conditions, record NR. Your response to this item does not depend on your response to the items about asthma and COPD. For example, it is possible to record No/NR for asthma and COPD and still record YES here. If nocturnal cough seems like PND, then this question is 'no', but cough does not have to be continual rather than nocturnal for this answer to be 'yes'.

10.f. Sleep apnea

Record YES if the medical record indicates the patient has a history of sleep apnea or obstructive sleep apnea (OSA). Sleep apnea is transient episodes of apnea (cessation of breathing) during sleep, often resulting in hypoxia and hypertension. Synonyms include sleep obstructive breathing or sleep-disordered breathing. Record YES if the patient uses CPAP at night (continuous positive airway pressure, which is standard treatment for sleep apnea). Record NO/NR if the patient does not have a history of sleep apnea.

11. Cardiovascular Conditions

11.a. Angina

Record YES to item 11.a. if the medical record mentions any of the following: angina, angina pectoris, crescendo angina, atypical angina, anginal equivalent, unstable angina, angina-type pain, angina like pain, or syndrome x. If the patient is currently taking nitroglycerin (NTG) or the calcium channel blocker amlodipine (Norvasc, Norliqva, Katerzia) for chest pain record YES to item 11.a. Additional statements in the medical record that should be considered as YES to item 11.a. include: substernal pressure, pain, tightness or burning distress precipitated by exercise or excitement and/or relieved by rest or nitroglycerin (NTG). Use HRA Guidelines *except in the following scenario* (regarding nitrate use with history of CAD). However, *if the patient is also taking hydralazine and the nitroglycerin use is not specified for chest pain, record NO* because this combination is usually prescribed for heart failure management. Statements such as "no history of angina" or "no history of heart disease" should be considered as NO for item 11.a. "Chest pain" not otherwise specified is not sufficient (record NO).

If the patient has had CABG surgery or PCI or a history of an MI and has had no angina since the surgery/PCI and no mention of pain was made prior to CABG surgery/PCI or prior to the past MI, record NO/NR.

If there is no other information related to the above (in 11.a.), record YES if it is noted that the patient takes nitroglycerin specifically for chest pain or angina.

11.b. Arrhythmia

Review the medical record for evidence of a history of any of the following forms of cardiac arrhythmias.

11.b.1. Atrial fibrillation/atrial flutter:
Atrial fibrillation is a condition where there is disorganized electrical and mechanical activity of the atria. It may be chronic, acute, or occur in a paroxysmal fashion (up to 7 days). On the ECG, it is recognized as an irregular rhythm with absent P waves. Atrial flutter is a rapid, usually regular rhythm with atrial rates of 250-350 bpm. Look for a statement in the medical record. Often this diagnosis may be found on ECGs with confirmed interpretations.
SVT (supraventricular tachycardia) is recorded NO in this section.

11.b.2. Heart block or other bradycardia:
Bradycardia is defined as heart rate < 60 bpm, although elite athletes can have normal heart rates as low as 30 bpm. A mention in the medical record by the physician of heart block, high degree atrioventricular (AV) block, severe bradycardia, or severe sinus bradycardia (heart rate <40 bpm) is required to record YES to 11.b.2. Other terms if found in the patient's history, that are sufficient to record YES to this item include third-degree AV block, complete heart block, second-degree AV block, Type I second-degree AV block (Wenckebach/Mobitz I), Type II second-degree AV block (Mobitz II), AV block with low ventricular response, sick sinus syndrome (SSS), and tachybrady (tachycardia-bradycardia) syndrome, sinus node dysfunction requiring pacemaker. Record NO if there is mention of only sinus bradycardia of 40-60 bpm, (right/left) bundle branch block, or first degree AV block.

11.b.3. Ventricular fibrillation or tachycardia:
Ventricular tachycardia (VT) is an abnormal rapid ventricular rhythm with aberrant ventricular excitation, usually above 150 beats per minute, generated within the ventricle, and most often associated with atrioventricular (AV) dissociation. Ventricular fibrillation (VF) is a chaotic rhythm, often leading quickly to death. In both conditions, the QRS duration is prolonged (>120 msec). Other ventricular rhythm abnormalities that should be considered as YES to item 11.b.3 include wide complex tachycardia (but not "supraventricular tachycardia (SVT) with aberrancy"), Torsades de pointes, monomorphic VT or polymorphic VT.

11.e. Cardiac procedure
Record YES if the patient has a history of any of the following cardiac related procedures.

11.e.1. CABG:
This is heart surgery in which a blood vessel or a section of blood vessel (a bypass graft) is grafted onto one of the coronary arteries and connected to the ascending aorta to bypass a narrowing of, or blockage in a coronary artery (see 13.a.).

Synonyms: coronary bypass, coronary artery bypass graft. Bypass grafts usually include saphenous veins (SVG), internal mammary arteries (left = LIMA, right = RIMA), radial arteries, etc.

11.e.2. PCI:
This stands for percutaneous coronary intervention (PCI), a broad term for any procedure that intends to treat an intracoronary lesion (plaque, thrombus, blockage) with catheters. It always involves coronary catheterization which also includes balloon angioplasty with or without intracoronary stent placement, or laser, or a cutting balloon (atherectomy). This interventional procedure is often performed during an acute myocardial infarction or performed electively when the presence of severe coronary blockages need to be treated. PCI may also include intracoronary thrombolysis which involves injecting clot-busting medicine directly into the coronary artery. An unsuccessful PTCA or stent procedure in the past should be recorded as YES for history of PCI.

Synonyms: Percutaneous transluminal coronary angioplasty (PTCA), percutaneous coronary angioplasty (PCA), directional coronary angioplasty (DCA)

11.e.3. Valve surgery:
Valve surgery includes any surgical procedure to replace or repair a valve in the heart (aortic valve, mitral valve, tricuspid valve, pulmonic/pulmonary valve). Valve replacement may be described in terms of the type of prosthetic valve without specific reference to valve surgery; e.g., mechanical valves such as St. Judes, Bjork-Shiley, ball-in-cage, tilting disc, etc; bioprosthetic valves such as porcine valve, pig valve, cadaveric valve, tissue valve, Ross procedure, etc. Valve repair may be described using terms such as annuloplasty ring without specific reference to valve surgery. Record YES if the patient has a history of any type of valve repair or replacement.

11.e.4. Pacemaker:
A pacemaker is an artificial device designed to reproduce or regulate the rhythm of the heart. It is implanted in the body of the patient, is battery-driven, is usually triggered or inhibited to modify output by sensing intracardiac potential in one or more cardiac chambers, and may also have antitachycardia pacing function. Recording YES to item 11.e.4 includes placing of pacing wires or a temporary or permanent pacemaker. If there is no mention of pacemaker in physician's notes, but physician describes ECG as "paced rhythm" and there is no mention in other reports of a pacemaker such as CXR, record NO. If there is no other mention, other than in radiology report, record No, because it could be another device such as ICD. If only mention of the pacemaker is RN note, and no evidence of such by MD note, ECG, etc., then record No.

Synonyms include single-chamber pacemaker, dual-chamber pacemaker, biventricular pacemaker, cardiac resynchronization therapy (CRT), pacemaker wire, DDD pacemaker, VVI pacemaker, bi-V defibrillator (BiV ICD). Record NO/NR if there is only mention of temporary use of Zoll patches (cutaneous pacing patches).

Of note, even though an ICD always includes a back-up pacemaker, ICD is NOT synonymous with pacemaker. Therefore, record NO/NR if there is only mention of ICD but no mention of pacemaker. Also, certain electrophysiology(EP) procedures such as an EP study involve the use of temporary pacemakers during the procedure for diagnostic purposes; record NO/NR if such temporary pacemaker wires are used during a procedure for diagnostic purposes but not as intentional therapy.

11.e.5. Defibrillator:
May be referred to as an implantable cardioverter defibrillator (ICD) or automatic implantable cardioverter defibrillator AICD. This is an artificial device implanted in the body of the patient to detect potentially-fatal fast arrhythmias and to shock patients out of these rhythms (to prevent "sudden cardiac death" or an "arrhythmic death"). Record NO if patient has had only a past electrical cardioversion or defibrillation but no AICD was implanted.

11.g. Coronary heart disease (within year)
See instructions and definition for item 11.h. Record YES if the patient has an event of any of the conditions indicated in item 11.h. within one year (365 days) of the current hospitalization under consideration. Also record YES if the patient has known coronary heart disease and underwent any relevant testing for coronary heart disease (e.g., stress test or cardiac catheterization) within the one year AND the results were abnormal. However, if the patient has had coronary heart disease for more than a year, but there has not been an active related problem (i.e., has stable

CHD with *no* significant symptoms like angina or coronary event like MI), then record NO. Of note, echocardiograms and right heart catheterizations are not relevant tests for CAD. For example, if the patient has documented long standing CHD but no event (listed in 11h.) within the past year, record "No" to 11g, and "Yes" to 11h.
Note that the consideration is the calendar year (365 days). Calculations of month numbers are not necessary.

11.h. Coronary heart disease (ever)

Record YES if the patient has a history of coronary heart disease (CHD), coronary artery disease (CAD), or ischemic heart disease (IHD). Record NO if a history of CHD, CAD, or IHD is ruled out. Record NO if patient only has heart murmur. Also record YES to item 11.h. if there is a history of any of the following conditions:

Angina
Angina pectoris
Crescendo angina
Atherosclerotic cardiovascular disease (ASCVD)
Ateriosclerotic cardiovascular disease
Atherosclerotic heart disease
Coronary atherosclerosis
Coronary insufficiency
Myocardial infarction (MI)
Nonobstructive coronary atherosclerosis
Coronary artery bypass graft (CABG) surgery
Percutaneous transluminal coronary angioplasty (PTCA)
Coronary angioplasty
Directional coronary angioplasty (DCA)
Percutaneous coronary Intervention (PCI)
Coronary atherectomy
Prinzmetal angina
Stable or chronic angina
Unstable angina
Variant angina
Anginal equivalent
Syndrome X
Acute coronary syndrome

11.j. Hypertension

Record YES if the patient has a history of systemic hypertension (controlled or uncontrolled). Uncontrolled hypertension includes chronic hypertension or a hypertensive crisis. Record NO if the patient does not have a history of hypertension. Be sure to check the history and physical, cardiovascular summary, doctor's progress notes and or discharge summary for this information. For the purposes of this item, look for explicit terms stating the presence or absence of hypertension. Do not consider notes regarding medications and blood pressure measurements. If newly diagnosed during this hospitalization, consider this as a historical diagnosis (record YES).

Terms that are sufficient to record YES include: hypertension (HTN), borderline hypertension, renal hypertension, renovascular hypertension, history of hypertensive heart disease, hypertensive crisis, or history of labile hypertension. Pulmonary hypertension is not equivalent

to systemic hypertension. Similarly, pulmonary heart disease and cor pulmonale are not equivalent to systemic hypertension.

11.k. Myocardial infarction

Record YES if the patient has a history of myocardial infarction (MI).Take information from the history of the cardiologist, attending physician, resident physician, emergency department physician, or nursing notes, in that order. If the patient has a transplanted heart, use the history of the individual (heart transplant recipient) not the history of the heart. For the purpose of this item, information that states previous silent MI, borderline heart attack, history of aborted MI, non-Q wave MI, and history of primary (emergent) angioplasty, thrombolytic therapy, or PCI should be considered as YES. An abnormal ECG or angiogram evidence alone, stating old MI or MI whose "age is undetermined" cannot be used to determine history of MI unless verified by the physician that patient had or probably had a MI. However, a nuclear stress test or MRI scan that demonstrates an old myocardial infarction in a patient *with known CHD* can be used to document a historical diagnosis of MI (record Yes). Statements such as no cardiac problems, no adult illness, previously well, no previous history of heart disease, essentially unremarkable history are sufficient to record NO.

11.l. Pulmonary hypertension

Record YES if the patient has a history of pulmonary hypertension. High blood pressure in the pulmonary arteries that supply the lungs is called pulmonary hypertension (PHT or PHTN). The medical record may refer to PHT as secondary PHT if a pre-existing disease triggered the PHT. Record NO if the patient does not have a history of pulmonary hypertension. If the only mention of pulmonary hypertension is in an echocardiogram (echo) report, record NO.

11.m. Peripheral vascular disease

Record YES if the patient has a history of peripheral vascular disease (PVD). This condition may also be referred to as peripheral artery disease (PAD), which includes atherosclerotic disease of arteries in the legs and arms. Synonyms include intermittent claudication, lower extremity arterial disease (LEAD), and history of peripheral arterial bypass surgery (e.g., femoral-popliteal bypass). PVD does not include carotid disease. If newly diagnosed during this hospitalization, consider this as a historical diagnosis (record YES).

11.o. Valvular heart disease

Record YES if the patient has a history of valvular heart disease or valve surgery (item 11.e.3). For the purposes of this item a history of aortic stenosis (AS) , aortic regurgitation, mitral stenosis (MS), mitral regurgitation (MR), mitral valve prolapse (MVP), tricuspid valve disease (including stenosis, regurgitation), or pulmonary valve disease are sufficient to record YES. If the patient does not have a history of valvular heart disease, record NO. However, an explicit statement about a history of valvular heart disease (in general or a specific valve disease) in the medical record is required to record YES. Echocardiogram results alone reporting these findings are not sufficient if the only echo report available is a current one. However, record YES if an echo report preceding this hospitalization specifically describes severe valvular regurgitation (of any valve; mild or moderate severity do not count), or valvular stenosis of mild severity or greater (of any valve).

12. Gastrointestinal / Endocrine

12.a. Diabetes

Diabetes is any disorder related to inadequate control of blood sugars because of a problem with the body's response to or making of insulin. Uncontrolled or newly diagnosed diabetes is characterized by excessive urine excretion. When used alone, the term refers to diabetes mellitus. Record YES if the patient has a history of diabetes A history of diabetes includes a history of previous hospitalizations for ketoacidosis, hyperosmolar coma, or out of control of glucose levels and those with juvenile onset diabetes, brittle diabetes, or diabetes treated with insulin or oral hypoglycemic drugs, a history of type I diabetes, a history of type II diabetes and current treatment with an oral hypoglycemic or insulin. It does not include patients treated with diet alone, unless they show evidence of end-organ disease. Evidence of end-organ disease includes diabetic retinopathy, diabetic nephropathy, and peripheral neuropathy. Record NO if the patient does not have a history of diabetes. A history of gestational diabetes, type II diabetes successfully treated with diet alone, elevated glucose during the hospital stay that is associated with steroid treatment or a possible history of impaired glucose tolerance is insufficient evidence for a history of diabetes. If newly diagnosed during this hospitalization, consider this as a historical diagnosis (record YES).

Synonyms: insulin dependent diabetes (IDDM), insulin dependent diabetes mellitus (IDDM), diabetes mellitus (DM), non-insulin dependent diabetes (NIDDM), non-insulin dependent diabetes mellitus (NIDDM)

13. Renal

13.a. Dialysis

Record YES if the patient has a history of kidney dialysis. Record NO if the patient has never been on kidney dialysis. Include all dialysis types, both hemodialysis (HD) and peritoneal, both successful/complete dialysis as well as incomplete dialysis (attempted but the procedure had to be aborted for some reason, e.g., complications, death, etc). Do not include "aquapheresis".

Synonyms: hemodialysis, peritoneal dialysis, renal replacement therapy (RRT), ultrafiltration, hemofiltration.

14. Neurology

14.a. Stroke/TIA

Record YES if the patient has a history of stroke or transient ischemic attack (TIA). Record YES if the medical record mentions previous stroke or probable stroke, or a history "consistent with stroke", a diagnosis of CVA or TIA, reversible ischemic neurological deficit (RIND), or partially reversible ischemic neurological deficit lasting > 24 hours (PRIND). Record NO if the patient does not have a history of stroke or TIA or there is no mention of stroke or TIA in the medical record. Homonymous hemianopia (HH) or subdural hematoma (hemorrhage) alone should be recorded as NO/NR.

Synonyms: cortical infarction, intracranial hemorrhage (ICH), cerebral thrombosis, cerebral artery occlusion, cerebral infarction, subarachnoid hemorrhage, apoplexy, cerebrovascular accident (CVA), intracerebral hemorrhage.

14.b. Depression

Record YES if the patient has a history of depression. Depression is described as a mental state of altered mood characterized by feelings of sadness, despair, and discouragement. Look for the mention of major depression in the medical record. Major depressive disorders include: agitated depression, major depression, neurotic depression, psychotic depression, bi-polar or uni-polar depression, and bi-polar

disorder. Record NO if the patient did not have a history of depression. Record NR if there is no mention of depression in the patient's history.

16. Were any of the following medical problems listed as precipitating factors (i.e. precipitated the onset of this event)?

Precipitating factors are defined as etiologic factors occurring prior to the event that may have contributed to the recent progression or decompensation of heart failure. In order to record YES for any condition listed in this item, there should be a clear statement in the physician's notes or discharge summary that the condition was a precipitating factor of this event. However, an exception may be made for a condition that is described as new and appears temporally related to the heart failure event; in this case, a suggestion rather than a clear statement that the condition was a precipitating factor may be sufficient. For example, record YES for angina as a precipitating factor (item 16.j) if you read something like this: "new onset angina-like chest pain at the time of heart failure decompensation" or "admitted for heart failure with new onset angina". If the angina or MI is occurring at the same time as the heart failure, then assume angina or MI is the precipitating factor for the HF (item 16.j).

Words/phrases that are sufficient to record YES to any condition in item 16 include:

"(Factor or condition) was likely a precipitating factor of this event"
"Onset of this event is thought to be a result of (factor or condition)"
"(Factor or condition) triggered the onset of this event"
"(Factor or condition) led directly to the onset"
"Onset (of heart failure) was a direct consequence of (factor or condition)"

Phrases that are sufficient to record YES to a condition in item 16 that is BOTH described as new AND appears temporally related to the event include:

"New onset (factor or condition) at the time of heart failure decompensation"
"Admitted for heart failure with new onset (factor or condition)"

Recall that "this event" is that episode whose onset was determined in item 5 ("Date of new onset or progression of symptoms/signs"). The date of the event may not be the same as the admission date. The event might have started right before this admission or it might have begun sometime during this hospital admission. Note that precipitating factors could include behaviors like medication or diet noncompliance or could be conditions such as atrial fibrillation or ventricular tachycardia.

If there is uncertainty whether something is a precipitating event, look for consistency or confirmation in the medical chart (e.g., cardiology consultation, discharge summary); an item listed below listed in the differential diagnosis only (e.g., ED report) but not later confirmed does not count.

If questions 1.a.-1.e. and 2 are NO, then record NO for 16.d.-16.k. (and record NO for 4.a. and 4.b.).

16.d. Noncompliance on diet

Record YES if the medical record indicates that the patient was on a specific diet regimen (e.g. low sodium or restricted fluid consumption) for a chronic heart failure diagnosis and that the patient was non-compliant. If the patient was not on a specific diet regimen, but the patient ingested excess salt or excess fluids, record YES. But record NO f the patient ingested excess salt and has a new heart failure diagnosis during the current hospitalization (since patient probably would not have been advised to follow a "heart failure diet").

16.e. Noncompliance on medication

Record YES if the medical record indicated that the patient was noncompliant with a prescribed heart failure or cardiac drug regimen (i.e. voluntary or involuntary). Noncompliance includes running out of prescribed medications. If there was noncompliance with medications in general, record YES; but if there was noncompliance with medication that is not for heart failure or cardiac reasons (e.g., antibiotics), record NO. Even though dialysis or oxygen is a treatment, do not view hemodialysis or oxygen as a medication.

16.g. Pneumonia

Record YES if the patient has pneumonia precipitating this event or occurring at the same time. A nonspecific description of a "lung infection" or a chronic pulmonary infection (requiring chronic antimicrobial therapy to suppress this infection) is not sufficient. If unsure, use the antibiotic rule ≥ 5days = yes, < 5 days = no. If it is unclear if the antibiotics are for pneumonia or bronchitis/COPD, record YES if IV antibiotics were given for ≥5 days. (Abbreviations of note, CAP = community-acquired pneumonia, HAP = hospital-acquired pneumonia)

16j. Was Angina or Myocardial infarction listed as a precipitating factor (i.e. precipitated the onset of this event)?

Record YES to item 16.j. if the medical record mentions angina (as described below) or if the patient has a recent history of myocardial infarction (MI) (as described under item 11.k) as precipitating this event.

Synonyms for angina include: angina, angina pectoris, crescendo angina, atypical angina, anginal equivalent, unstable angina, angina-type pain, angina like pain, or syndrome x. Additional statements in the medical record that should be considered as YES to item 16.r. include: substernal pressure, pain, tightness or burning distress precipitated by exercise or excitement and/or relieved by rest or nitroglycerin (NTG). Use HRA Guidelines. Statements such as "no history of angina" or "no history of heart disease" should be considered as NO for item 16.r. "Chest pain" not otherwise specified is not sufficient (record NO).

If the patient has had CABG surgery or PCI or a history of an MI and has had no angina since the surgery/PCI and there is no mention of pain prior to CABG surgery/PCI or prior to the past MI, record NO/NR.

The timing of whether MI is a precipitating factor for or consequence of the HF event should be discernable. For example, MI is a precipitating factor when the patient comes in with manifestations of both MI and CHF; alternatively, if the HF was the primary presentation, then the patient subsequently ruled in for MI by enzymes only, then the MI was probably a consequential complication of the [current] exacerbation of CHF.

16.k. Atrial fibrillation/flutter

Record YES to item 16k. if the patient has a recent history of atrial fibrillation or flutter (as described under item 11.b.1) precipitating this event. Record YES if the records suggest that atrial fibrillation is new and its rapid ventricular response (RVR) is causing heart failure. If the atrial fibrillation is chronic, record YES if the RVR is described as causing heart faiure; RVR is a heart rate >100 bpm. To record YES, both Afib and RVR should be present. But record NO if there is no mention that the associated heart rate is causing heart failure.

SECTION IV: PHYSICAL EXAM – VITAL SIGNS

Introduction

The purpose of this section is to record vital signs taken at the time of admission/first presentation (or at onset of the event) and again at the time of discharge (or at the latest available time point). In general, record the first set of vital signs for "at hospital admission (or at onset of event)". It is acceptable to record a single vital sign (blood pressure or heart rate) if the set is incomplete (other component missing). First documented vital signs include those taken by EMS if the event occurred at presentation (this may include 0/0 and 0 if the patient was being resuscitated at the time). If the first documented vital signs are after the date of admission or onset of event, and not recorded, NR (leave the field blank and set the field status to "Missing") However, if time of arrival is late evening (near midnight) and the date changes for when the "first" vital signs are documented, record those first vital signs even if the date has changed to a day later from the official admission date. If measurements are not available, record NR (leave blank fields blank and set the field status to "Missing or "Not Applicable") where appropriate. If the event began after admission (i.e., in-hospital onset or progression), do not record the values from the time of admission; take the first recorded value after the onset of the event. Recall that date of onset is determined in question 5 and might not coincide with date of admission. For recording the last set of vital signs, use vital signs measured in the hospital (e.g., not vital signs recorded at the receiving hospital if patient is being transferred). In all instances, blood pressure (BP), heart rate (HR or pulse rate, P), and respiration rate (RR or R) should be recorded from a single measurement time (i.e., do not record a BP from one time point and a HR from a different time point). However, height and weight can be from different time points from each other and from the other vital signs.

Note: When recording vital signs, the data at hospital admission cannot be the same as the data at hospital discharge.

17. Blood pressure

Record the first blood pressure (see the meaning of "first" in the Introduction above). This pressure may be charted on the ambulance sheet, Emergency Department sheet, the clinical graph, the nursing flow sheet, or the nursing admission note. If both right and left arm blood pressures are available, take the one with the highest systolic value. If the systolic pressure is the same for both arms, record the highest diastolic value. If a range is given, record the lowest; e.g., "BP 110-120/80-90": record "110/80". However, if the range is stated as "BP 120/80-110/90", record "110/90" (instead of "110/80") in order to avoid "mixing and matching" blood pressure readings taken at different time points.

18. Heart rate

Record the first heart rate (HR) in beats per minute. The first heart rate measurement may be charted on the ambulance sheet, Emergency Department sheet, the clinical graph, the nursing flow sheet, or the nursing admission note. For in-hospital onset, record the first heart rate after onset or progression of heart failure symptoms.

19. Height

Enter the patient's height closest to the date of the event. Indicate the units of height (centimeters or inches). Height is usually not recorded in the vital signs on nursing flow sheets. However, height might be found in testing reports (e.g., catheterization report, echocardiogram report) or in the medication sheets from pharmacy. If the height of the patient is not recorded in the medical record, (leave the field blank and set the field status to "missing" or Not applicable").

If both inches and meters are reported in chart, use inches.

20. Weight

Enter the patient's measured weight at the time of the event. This would be the time of admission for patients presenting with new onset or decompensation or progression of heart failure symptoms. In general, record a *measured* weight, not a *reported* weight. Usually weights listed in the ambulance record or radiology reports are reported. Weight from emergency room visit may either be measured or reported; use your best judgment to decide. Also, if there are two weights recorded for the same day which are quite different, use the first weight unless it is a reported weight. Use the earliest weight if there is no admission day weight regardless of the date of that weight. If the event occurred after admission, record the first weight available after onset of the event. Also record the weight on the day of discharge. If weight of the patient is not recorded on the day of discharge, take the last recorded weight. Indicate the units of weight (i.e., pounds or kilograms). Weight is usually recorded with the vital signs on nursing flow sheets, or may be found in testing reports (e.g., catheterization report, echocardiogram report), or in the medication sheets from pharmacy. Do not calculate weights; the weights must be recorded in the chart. If only an admission weight is available, record NR (leave the field blank and set the field status to "Missing") for the hospital discharge weight. If only one weight is available, record it as the admission weight if date is closer to admission date, or record it as the discharge weight if date is closer to weight date; if the weight measurement date is in the middle (e.g., day 3 of 5 hospital days), record as the admission weight. If there are no measured weights and only reported weights are available, record the reported weight closest to admission for item 20a (admission weight) and leave the field blank and set the field status to "Missing" for 20b (discharge weight). Admission weight and discharge weight generally cannot be the same weight unless truly measured as such.

If both kilograms and pounds are reported in chart, use kilos.

If more than one weight is noted for the same day, use the weight from the nursing vital sign sheet regardless of time since it is presumably measured.

SECTION V: DIAGNOSTIC TESTS

Introduction

The purpose of this section is to acquire the essential information from various diagnostic tests related to the heart. For all these tests, you only need to look at the official report (signed report). If there are no official reports, then look elsewhere in the patient's chart. Record the results of the following tests that were performed during the course of this hospitalization. If a *left heart catheterization (coronary angiography)* (item 32) was *not* performed during *this* hospitalization but was performed during a *prior* hospitalization or as an *outpatient* in the *past 2 years*, please record the most recent test results. If there is no transthoracic echocardiograms performed during this hospitalization but reports for past *transthoracic echocardiograms* (item 29) or *transesophageal echocardiograms* are available, record the items from the echo report in the respective section (item 29 or 30) that has the lowest ejection fraction; please limit past echo reports to the past 2 years. For *chest x-rays* (item 28), *transthoracic echocardiograms* (item 29), *transesophageal echocardiograms* (item 30), and *left heart catheterizations* (item 32), record "suggest" as yes (in contrast to the general hierarchy rules on page 2).

25. Was an electrocardiogram performed (or reported) during this hospitalization?

ECG history is across hospitalization. Record YES if an electrocardiogram (ECG or EKG) was performed since hospital arrival or the onset of an in-hospital event up to the time of hospital discharge date. This includes 12 lead ECGs or rhythm strips, but does not include telemetry monitoring without a paper tracing unless confirmed by a physician. Record NO if no ECG reports or tracings are found in the medical record. If there is an ECG tracing with no documented interpretation, then record YES here and 'No/Unknown' for

all items under item 26. Do not attempt to interpret the results of raw ECG tracing. Use all ECGs to answer the following questions in order to provide a summary of findings. If, for example, there are 10 ECGs, use any data that is included. Physician must confirm strip if data on strip is to be recorded. If tracing is 'not confirmed' by a physician, do not use the computer interpretation. If cases of disagreement (e.g., whether a finding is present or not), the official ECG report or a cardiologist's interpretation is superior to a noncardiologist's interpretation. If no report is available, information from physician's notes may be used to answer items in 26.
Until the HFA form has been revised to rephrase this question as, "Was an electrocardiogram performed or reported during this hospitalization?', please note that an official report is not necessary to account for ECG(s) having been done; physician notation referring to an ECG strip is considered sufficient to answer YES to the above question.

26. Did the patient have any of the following ECG abnormalities at any time during this hospitalization?
Information regarding abnormalities on the ECG may be found on the header or top-middle of the raw ECG tracing as well as on dictated summary reports (e.g., admission note, discharge summary, etc). If an abnormal finding is present on one ECG but not the other(s), record YES to that abnormal finding as long as there is a doctor's signature or report that accompanies the interpretation. Otherwise, record 'No/Unknown'. An unsigned ECG interpretation should be ignored (record 'No/Unknown'). If no paper tracings, but clearly documented on physician's note, record YES. An official ECG report is one signed (electronically or in ink) by an MD.

26.c. Atrial fibrillation / atrial flutter
Record YES if there is evidence of atrial fibrillation ("a fib") or atrial flutter ("a flutter") according to the ECG finding. For item 26.c, include only atrial fibrillation or atrial flutter documented on a 12-lead ECG tracing interpreted by a physician or confirmed in physician's notes referring to a 12-lead ECG. Include here "supraventricular tachycardia (SVT)", "paroxysmal supraventricular tachycardia (PSVT)", "atrial tachycardia (AT)", and "paroxysmal atrial tachycardia (PAT)". Atrial fibrillation is an irregular rhythm where P waves are not clearly identified; atrial flutter can be an irregular or a regular rhythm where there are several P waves for every QRS complex. Do NOT include "frequent premature atrial contractions (PAC)" if the underlying rhythm is not an "atrial" rhythm. If atrial fibrillation or atrial flutter was not seen on a 12-lead ECG but is documented on a telemetry recording and confirmed by a physician, record NO here and YES to 26.c.1 "Afib/Aflutter On Telemetry". Record NO in 26.c.1. if there is no evidence of Afib or Aflutter on telemetry monitoring or if telemetry monitoring was never performed during this hospitalization. However, record YES in 26.c.1.if there is no paper tracing but a doctor's note clearly documents that Afib or Aflutter was present; nurse notes are not sufficient.

26.e. Left bundle branch block
Record YES if there is evidence of left bundle branch block (LBBB). Left bundle branch block is an abnormality in the conduction pattern of the QRS complex which is characterized by a prolonged QRS duration (>120 msec). Do NOT include "incomplete LBBB", "right bundle branch block (RBBB)", "nonspecific interventricular conduction delay (IVCD)", "bifascicular block", "trifascicular block", or "hemiblock".

26.f. Ventricular tachycardia
Record YES if there is evidence of ventricular tachycardia (VT), whether nonsustained or sustained, according to the ECG finding. VT includes ventricular fibrillation and nonsustained VT (NSVT). A premature ventricular contraction (PVC) is not sufficient to record yes. If VT was not seen on a 12-lead ECG but is documented on a telemetry recording and confirmed by a physician, record NO here and YES to 26.f.1 "VT On Telemetry". There is no minimum number of consecutive ventricular beats to qualify for VT.

However, the VT must be spontaneous and not induced by a diagnostic test like an electrophysiology (EP) study or testing after defibrillator (ICD) implantation. Record NO in 26.f.1. if there is no evidence of VT on telemetry monitoring or if telemetry monitoring was never performed during this hospitalization. However, record YES in 26.f.1 if there is no paper tracing but a doctor's note clearly documents that VT was present.

27. Was a chest X-ray performed during this hospitalization?
Use all available chest x-rays in the medical record to provide a summary of findings. Record YES if there is evidence that a chest x-ray was performed during this hospitalization. In general, interpret "suggest" as yes (in contrast to the general hierarchy rules on page 2).

28. Did the patient have any of the following signs on chest X-ray at any time during this hospitalization?
Record YES to any of the below items present on any chest x-ray reports (or on dictated summary reports that refer to a chest x-ray if not contradicted by the official CXR report). An official CXR report is one signed (electronically or in ink) by an MD. The official CXR report takes precedence over any non-radiology MD notes. If there are no official CXR reports, non-radiology MD notes can be used. But if there are both official CXR reports and non-radiology MD notes describing CXR findings, use only the reports (which can include descriptions of comparisons to earlier CXRs from the current hospitalization). CXR reports that locate in emergency department notes can be used as long as they are reports and not an unofficial reading from a non-radiology MD. Include all chest x-rays available, performed anytime during the course of the hospitalization, whether before or after the HF diagnosis. This includes chest x-rays that may have preceded the onset of the event if the event occurred during the hospitalization (but after the admission date). However, if the hospitalization for HF decompensation/progression was longer than 7 days, limit your review of the total number of chest x-rays to those obtained during the first 7 chest x-rays subsequent to the date of HF decompensation/progression. If an item is not found on any chest x-ray, record 'No/Unknown'. An official CXR report is one signed (electronically or in ink) by an MD. The official CXR report takes precedence over any non-radiology MD notes. Unlike the rules for synonyms on page 2, for CXR, preceding adjectives such as "suggestive", "suggesting", "concerning for", "worrisome for", "and/or", "or", and "versus" are synonyms for YES. If there are both a "yes" and a "no" descriptions or synonyms, then "yes" is favored.

28.b. Alveolar/pulmonary edema
Record YES if "alveolar edema", "pulmonary edema", "alveolar pulmonary edema", or "edema" not otherwise specified is described. Include both unilateral and bilateral alveolar or pulmonary edema. Do NOT include "interstitial edema" (see item 28.c. below). Record YES if "probable" or "definite" alveolar or pulmonary edema, but record NO/Unknown if "possible" edema.

28.c. Interstitial pulmonary edema
Synonyms include "interstitial edema", "interstitial infiltrates", "interstitial lung markings", "interstitial prominence", "interstitial opacities","interstitial thickening", "perivascular edema", "interstitial densities", "fluid in the fissures", "perihilar interstitial changes", "perihilar pulmonary edema", and "perivascular congestion". Include both unilateral and bilateral interstitial edema. Do NOT include "alveolar edema" or "pulmonary edema (not otherwise specified)" (see item 28.b. above). Record YES if "probable" or "definite" interstitial or perivascular edema, but record NO/Unknown if "possible" edema. Record NO for "interstitial stranding".

28.d. Cardiomegaly
Synonyms include "enlarged heart", "hypertrophy (of the heart)", "ventricular hypertrophy", "LVH", "borderline heart size", "increased cardiac/thoracic (C/T) ratio", "left ventricular enlargement (LVE)",

"upper limits of normal to mildly increased", "marked cardiomegaly", "the heart is enlarged", "cardiopericardial silhouette is enlarged (or increased)", "heart is consistently enlarged in its transverse diameter." Do NOT include "magnified heart", "upper limits of normal", "generous heart size", "accentuated (or prominent) cardiac silhouette", "slightly prominent (heart)". Record YES if "probable" or "definite" or "borderline" cardiomegaly, but record NO/Unknown if "possible" cardiomegaly.

28.e. Cephalization/upper zone redistribution
Synonyms include "cephalization of the pulmonary vasculature", "prominence of upper lobe vasculature", "prominent upper lobe vessels", and "pulmonary vasculature is redistributed". Record YES if "probable" or "definite", but record NO/Unknown if "possible".

28.g. Bilateral pleural effusion
Synonyms include "bilateral effusion", "blunting of both (or bilateral) costophrenic angles or sulci", "basilar pleural fluid", and "left-sided and right-sided effusions". Include effusions of any size (trace, small, moderate, large). Do NOT include unilateral pleural effusion (item 28.h.) or "pericardial effusion". Record YES if "probable" or "definite", but record NO if "possible". If this item (bilateral pleural effusion) is recorded as YES, then item 28.h (unilateral pleural effusion) is automatically recorded as NO.

28.h. Unilateral pleural effusion
Synonyms include "left(-sided) pleural effusion", "right(-sided) pleural effusion", and "blunting of the costophrenic angle (on one side only) or sulcus". Include unilateral effusions of any size (trace, small, moderate, large). Do NOT include bilateral pleural effusions (item 28.g.) or "pericardial effusion". Record YES if "probable" or "definite", but record NO/Unknown if "possible".

Note: One can never have both bilateral and unilateral pleural effusion, only one or none. If bilateral, automatic NO for unilateral (28.h).

28.k. Cardiothoracic ratio ≥ 0.5
Record YES if the cardiac/thoracic (C/T) ratio is 0.5 or greater. Record NO/Unknown if the C/T ratio is < 0.5 or never mentioned, or if a ratio of 0.5 or greater is attributed to shallow inspiration (e.g., the patient's not having taken a full breath).

28.l. Congestive heart failure/Pulmonary vascular congestion
Record YES if the following is described in the interpretation or in the conclusions of the chest x-ray report: "congestive heart failure", "mild congestive failure", "consistent with CHF", "congestive failure", or "suggestive of" or "suggesting CHF" (in contrast to the general rule that 'suggestive of' = NO). Record NO if "congestive heart failure" is only listed in the indication or diagnosis section of the report. Record YES if "probable" or "definite", but record NO/Unknown if "possible". Mention of CHF in the chest x-ray report without further documentation is insufficient to record YES. Synonyms include "pulmonary congestion", "patchy bilateral pulmonary infiltrates suggesting pulmonary vascular congestion", "marked congestion of the pulmonary vasculature", "increase in pulmonary vasculature", "pulmonary vascular prominence", "distinct pulmonary vasculature". Synonyms also include "perihilar congestion", "perihilar edema", "perihilar or peribronchial cuffing","peribronchial thickening", "perihilar vascular changes", "engorged pulmonary vessels", "central congestion", "prominence of bronchovascular markings", and "congestion" not otherwise specified. Do not include "perivascular congestions" (item 28.c.) Record NO/Unknown if nothing is listed to describe this finding. Record NO if the report describes that the pulmonary vascular congestion or prominence is clearly attributed to poor inspiratory effort. Record NO for "pulmonary vascular crowding".

29. Was a transthoracic echocardiogram performed?

A transthoracic echocardiogram (echo, TTE) is an ultrasound test of the heart where images are obtained through the chest wall. The results of this study describe the structures of the heart and the function of the ventricles (systolic or contractile function, diastolic function or relaxation) and of the valves. Record YES if a TTE was performed during this hospitalization. If there is no current TTE report but there is a report of a TTE performed in the past 2 years, record YES and abstract this past TTE report; otherwise record "No/NR". If more than one TTE study is documented in the medical record, complete the following information based on the TTE study with the *worst* finding (defined as the echo study with the lowest LVEF) performed after the onset or progression of the event. (You can use the same scheme as described under Item 8 to compare the quantitative estimates of LVEF and qualitative descriptions of LV systolic function to determine which is worse LV function.) However, if there are two TTE studies performed on the same day with the same LVEF description, use *both* reports to complete this section; if there are discrepancies between the reports regarding abnormal findings, record the specific or more severe abnormal finding even if the other report of the same day does not note it. For example, if one report describes "regional wall motion abnormality" and the other report of same day does not, record YES for "regional wall motion abnormality". If there is only one TTE study which was performed during this hospitalization before the onset or progression of heart failure, record YES and its information below. An official echo report is one signed (electronically or in ink) by an MD. If there is no official echo report available, record the lowest EF and the worst findings based on whatever information you have; however, if there is a disagreement that looks significant (e.g., a difference of EF by 10% or more, no regurgitation versus severe), a cardiologist's interpretation in the notes is superior to any other interpretation by a non-cardiologist. In general, interpret "suggest" as yes (in contrast to the general hierarchy rules on page 2).

29.a. Date

Record the date of the TTE study. If more than one TTE study is documented in the medical record, record the date of the TTE study with the *worst* finding (defined as the echo study with the lowest LVEF) performed after the onset or progression of the event, and complete the following information based on that study. If it is unclear on the report what date the TTE study was performed, use whichever hospital-related date is listed on the report.

29.b. Ejection fraction

This generally refers to the left ventricular ejection fraction (EF or LVEF). Record the EF in percent (%) in the space provided. If a range or multiple values are given, use the lowest (i.e., worst) value (e.g., if "30-35%", record "30"). If "greater than (>)" or "less than (<)" description is used, record the next numeric value (e.g., if ">55%", record 56; if "<20%", record "19"). In general, record the numeric value described in the text portion of the report; e.g., if there is a discrepancy between a numeric value listed in the text portion and a numeric value in the quantitative portion of the report, record the value (or lack of value) in the text. If a specific EF is given in the quantitative section and within the range described in the text, record the exact number. If EF is not available, leave the field blank. However, if the physician's interpretation states "normal" and a normal range is indicated on the report, record the lowest value of the normal range (e.g., if the normal range is between 55-90%, record "55"). If ejection fraction is described as "low" with no quantitative estimate, leave the field blank and make sure item 29.d.2 (Impaired LV systolic function) is recorded as "severe".

If only "normal" is stated (and no range is indicated); leave the field blank and do not give a normal range. An official echo report takes priority as the official reading over any doctor's interpretation; but if there is no official echo report, use the cardiologist's interpretation (e.g., in physician notes) over a non-cardiology doctor's interpretation.

29.c. Wall thickness

This refers to the left ventricular wall thickness. It is usually reported as a single number in the qualitative part of the report under Left Ventricle and/or in the conclusions. It is typically measured during diastole in the septal wall (interventricular septum, IVS) and in the posterior wall. LV wall thickness may be abbreviated as LVWT (LV wall thickness) with an indication that it is measured in the septum (IVS) or in the posterior wall (PW). In the rare case that there are several measurements for a single location (e.g., septal wall thickness), take the average. If LVWT values are provided under both M-mode and 2-D sections of the measurement table, record the 2-D values. Common abbreviations for LV wall thickness in the septal wall include "IVSd, IVSed and "LV IVS diastole". Common abbreviations for LV wall thickness in the posterior wall include "LVPWd" and "LV post wall diastole". Please record units (cm or mm). If the number is an integer, enter zero to the right of the decimal point. Round up to the thousandth decimal point; e.g., 1.0007 cm should be recorded as 1.001; 1.03 should be recorded as 1.03. If the respective wall thickness measurements are not available, leave the field blanks. If no units of measurements are given, assume values given as less than 5 are in centimeter (e.g., 1.9 or 3.2 cm) and values given as > 5 are in millimeters (e.g., 7 or 12 mm).

29.d.1. Left ventricular hypertrophy (LVH)

This refers to increased left ventricular wall thickness. It is usually reported in the qualitative part of the report under Left Ventricle and/or in the conclusions. If LVH is described, record its severity (mild, moderate, severe). If a range is given, use the higher (i.e., worst) severity grade (e.g., if "mild-to-moderate", record "moderate"). Of note, the description of "moderately severe" should be recorded as "moderate", and "markedly" is synonymous with "severe". If LVH severity is not described but LVH is otherwise reported (e.g., "thickened LV wall"), record "PRESENT". If there is no mention of LVH and left ventricular wall thickness is reported as normal or upper normal or thin, record LVH as "NONE". Record "NR" if there is no mention of LVH and no mention of LV wall thickness in the text (regardless of wall thickness measurements, i.e, do not *interpret* the quantitative part of the report). Do not include left ventricular enlargement (LVE, item 29.d.12.). Synonyms include: assymetric hypertrophy, concentric hypertrophy, septal hypertrophy, concentric remodeling.

29.d.2. Impaired LV systolic function

This refers to decreased left ventricular contractile performance or systolic function. It is usually reported in the qualitative part of the report under Left Ventricle and/or in the conclusions. Synonyms for LV systolic function include "LV function", "LV contraction", "LV contractile performance", "LV contractile function". Synonyms for impaired LV systolic function include "LV dysfunction", "LV systolic dysfunction", "decreased LV contraction (or contractile performance)", "decreased LV ejection fraction (LVEF)", "depressed LVEF", and "impaired LVEF". If the LV systolic function or contraction is decreased, record its severity (mild, moderate, severe). If a range is given, use the higher (i.e., worst) severity grade (e.g., if "mild-to-moderate", record "moderate"). If you have a specific LVEF and no qualitative description of severity, use the same rule as for item 8a. Of note, the description of "moderately severe" should be recorded as "moderate", and "markedly" is synonymous with "severe". If the severity of the impaired LV systolic function is not described, but LV systolic dysfunction is otherwise reported, record "PRESENT". If LV systolic function is reported as "poor"; record "SEVERE"; if reported as "fair", record "PRESENT"; if reported as "good", record NONE. If there is no mention of impaired LV systolic function and LV contraction (or systolic function or contractile performance) is reported as normal or upper normal, record "NONE". If there is no mention of impaired LV systolic function and no mention of LV contraction (or systolic function or contractile performance), record "NR". Do not record here "wall motion abnormalities" (items 29.d.11.) or "dilated ventricle" (29.d.12.). However, if the LV systolic dysfunction is described as "global hypokinesis" (of any severity), then record the severity or, if severity is not otherwise mentioned, record "PRESENT". But, if the echo describes a hypokinetic or

akinetic wall segment of the LV but otherwise describes that the overall function is normal, record 'NONE'. If the LV function or contraction is described as "hyperdynamic", treat this as normal and record NONE.

29.d.3. Impaired RV systolic function

This refers to decreased right ventricular contractile performance or systolic function. It is usually reported in the qualitative part of the report under Right Ventricle and/or in the conclusions. Synonyms for RV systolic function include "RV function", "RV contraction", "RV contractile performance", "RV contractile function". Synonyms for impaired RV systolic function include "RV dysfunction", "RV systolic dysfunction", "decreased RV contraction (or contractile performance)", etc. If the RV systolic function or contraction is decreased, record its severity (mild, moderate, severe). If a range is given, use the higher (i.e., worst) severity grade (e.g., if "mild-to-moderate", record "moderate"). Of note, the description of "moderately severe" should be recorded as "moderate", and "markedly" is synonymous with "severe". If RV systolic function is reported as "poor"; record "SEVERE"; if reported as "fair", record "PRESENT"; if reported as "good", record NONE. If the severity of the impaired RV systolic function is not described, but RV systolic dysfunction is otherwise reported, record "PRESENT". If there is no mention of impaired RV systolic function and RV contraction (or systolic function or contractile performance) is reported as normal or upper normal, record "NONE". If there is no mention of impaired RV systolic function and no mention of RV contraction (or systolic function or contractile performance), record "NR". Do not record here "wall motion abnormalities" (items 29.d.11) or "dilated ventricle" (item 29.d.13).

29.d.4. Aortic regurgitation

This refers to the backwards flow through the aortic valve, from the aorta back to the left ventricle during diastole. It is usually reported in the qualitative part of the report under Aortic Valve and/or in the conclusions. Synonyms for aortic regurgitation include "AR", "aortic insufficiency (AI)", "incompetence". If aortic regurgitation is described, record its severity (mild, moderate, severe). "Minimal" is synonymous with "mild"; "insignificant" is synonymous with "none". If a range is given, use the higher (i.e., worst) severity grade (e.g., if "mild-to-moderate", record "moderate"). If the severity is graded as "trace" or "trivial", record "NONE". Of note, the description of "moderately severe" should be recorded as "moderate." If the severity of the aortic regurgitation is not described, but aortic regurgitation is otherwise reported, record "PRESENT". If there is evidence of no aortic regurgitation, record "NONE". If there is no mention of aortic regurgitation anywhere on the report, record "NR". Do not assume a normal valve means no regurgitation.

29.d.5. Aortic stenosis

This refers to significantly limited flow through the aortic valve because of a diseased valve. It is usually reported in the qualitative part of the report under Aortic Valve and/or in the conclusions. Synonyms for aortic stenosis include "AS", "calcific aortic stenosis", and ""aortic valve with significantly limited mobility and a hemodynamically significant transvalvular gradient". However, do NOT include "aortic sclerosis" or "sclerotic aortic valve" unless there is report of a "hemodynamically significant transvalvular gradient" or concomitant aortic stenosis. If aortic stenosis is described, record its severity (mild, moderate, severe). "Minimal" is synonymous with "mild"; "insignificant" is synonymous with "none". If a range is given, use the higher (i.e., worst) severity grade (e.g., if "mild-to-moderate", record "moderate"). If the severity is graded as "trace" or "trivial", record "NONE". Of note, the description of "moderately severe" should be recorded as "moderate." If the severity of the aortic stenosis is not described, but aortic stenosis is otherwise reported, record "PRESENT". If there is no mention of aortic stenosis and the aortic valve is reported as having normal or mildly limited "leaflet mobility" or "cusp excursion" or only as sclerotic, record "NONE". If there is no mention of aortic stenosis or the valve

function anywhere on the report, record “NR”. If there is no mention of stenosis, but gradient is described as increased of moderate or severe degree, record the severity described (but do not include mild). If the valve is described as “structurally normal” or “functionally normal” without additional description, record “NONE”. If there is a prosthetic valve and the only qualitative description is that it is “well-seated”, record “NONE”. If “patient-prosthesis mismatch” is described for a prosthetic valve (regardless of severity), record “PRESENT”.

29.d.6. Tricuspid regurgitation

This refers to the backwards flow through the tricuspid valve, from the right ventricle back to the right atrium during systole. It is usually reported in the qualitative part of the report under Tricuspid Valve and/or in the conclusions. Synonyms for tricuspid regurgitation include “TR”, “tricuspid insufficiency (TI)”. Do NOT include “tricuspid valve prolapse,” “prolapsed tricuspid valve”, or “thickened tricuspid valve” unless there is report of concomitant tricuspid regurgitation. If tricuspid regurgitation is described, record its severity (mild, moderate, severe). “Minimal” is synonymous with “mild”; “insignificant” is synonymous with “none”. If a range is given, use the higher (i.e., worst) severity grade (e.g., if “mild-to-moderate”, record “moderate”). If the severity is graded as “trace” or “trivial”, record “NONE”. Of note, the description of “moderately severe” should be recorded as “moderate.” If the severity of the tricuspid regurgitation is not described, but tricuspid regurgitation is otherwise reported, record “PRESENT”. If there is evidence of no tricuspid regurgitation, record “NONE”. If there is no mention of tricuspid regurgitation anywhere on the report, record “NR”. Do not assume a normal valve means no regurgitation.

29.d.7. Mitral regurgitation

This refers to the backwards flow through the mitral valve, from the left ventricle back to the left atrium during systole. It is usually reported in the qualitative part of the report under Mitral Valve and/or in the conclusions. Synonyms for mitral regurgitation include “MR”, “mitral insufficiency (MI)”. Do NOT include “mitral valve prolapse,” “prolapsed mitral valve”, or “thickened mitral valve” unless there is report of concomitant mitral regurgitation. If mitral regurgitation is described, record its severity (mild, moderate, severe). “Minimal” is synonymous with “mild”; “insignificant” is synonymous with “none”. If a range is given, use the higher (i.e., worst) severity grade (e.g., if “mild-to-moderate”, record “moderate”). If the severity is graded as “trace” or “trivial”, record “NONE”. Of note, the description of “moderately severe” should be recorded as “moderate.” If the severity of the mitral regurgitation is not described, but mitral regurgitation is otherwise reported, record “PRESENT”. If there is evidence of no mitral regurgitation, record “NONE”. If there is no comment about mitral regurgitation anywhere on the report, record “NR”. Do not assume a normal valve means no regurgitation. On rare occasion, numbers are used instead of words to describe the severity of the valvular regurgitation; in this setting, use the following list to match the severity: 0 = none, 1+ = mild, 2+ = moderate, 3+ = moderate-to-severe, 4+ = severe.

29.d.8. Mitral stenosis

This refers to significantly limited flow through the mitral valve because of a diseased valve. It is usually reported in the qualitative part of the report under Mitral Valve and/or in the conclusions. Synonyms for mitral stenosis include “MS”, “rheumatic mitral stenosis”, and “mitral valve with significantly limited mobility and a hemodynamically significant transvalvular gradient”. However, do NOT include “mitral annular calcification,” “calcified mitral annulus”, “sclerotic mitral valve”, “mitral valve sclerosis”, or “thickened mitral valve” unless there is report of a “hemodynamically significant transvalvular gradient” or concomitant mitral stenosis. If mitral stenosis is described, record its severity (mild, moderate, severe). “Minimal” is synonymous with “mild”; “insignificant” is synonymous with “none”. If a range is given, use the higher (i.e., worst) severity grade (e.g., if “mild-to-moderate”, record “moderate”). If the

severity is graded as “trace” or “trivial”, record “NONE”. Of note, the description of “moderately severe” should be recorded as “moderate.” If the severity of the mitral stenosis is not described, but mitral stenosis is otherwise reported, record “PRESENT”. If there is no mention of mitral stenosis and the mitral valve is otherwise described without specific mention of leaflet mobility or function, record NONE. For example, if mitral annular calcification is the only description of the mitral valve (excluding any mitral regurgitation description) then this is sufficient to record NONE. If there is no mention of mitral stenosis and the valve is reported as having normal or mildly limited leaflet mobility, or only sclerotic, record “NONE”. If there is no mention of mitral stenosis or the valve function anywhere on the report, record “NR”. If there is no mention of stenosis, but gradient is described as increased of moderate or severe degree, record the severity described (but do not include mild). If the valve is described as “structurally normal” or “functionally normal” without additional description, record “NONE”. If there is a prosthetic valve and the only qualitative description is that it is “well-seated”, record “NONE”. If “patient-prosthesis mismatch” is described for a prosthetic valve (regardless of severity), record “PRESENT”.

29.d.9. Estimated RVSP/PASP

This refers to the estimated right ventricular systolic pressures (RVSP), which is synonymous with pulmonary arterial systolic pressures (PASP). This is a quantitative assessment of the presence or absence of pulmonary hypertension, which is usually measured in “mmHg” and described under Tricuspid Valve and/or in the conclusions. If a range is given, use the higher (i.e., worst) estimate (e.g., if “40-45 mmHg”, record “45”). If a greater than (>) or less than (<) estimate is given, record the next numeric value (e.g., if ">55”, record 56; if "<20”, record “19”). If the RVSP/PASP is described as a number “plus the right atrial pressure”, record the next numeric value (e.g., if “55 plus RA value”, record 56). The number can be rounded to the nearest whole integer. In general, record the numeric value described in the text portion of the report; e.g., if there is a discrepancy between a numeric value listed in the text portion and a numeric value in the quantitative portion of the report, record the value (or lack of value) in the text. If a range is given in the text of the report AND there is a single number on the report that is within that range, record the single number. However, if the number is not within that range, take the highest value of the range in the text. If there is no mention of an estimated RVSP or PASP anywhere on the report, leave the field blank. If the estimated RVSP/PASP is just described as elevated with no quantitative measurement of the estimated pressure in mmHg, then leave the field blank and skip to item 29.d.9.a. But make sure that your response to item 29.d.10. (pulmonary hypertension) has captured the presence or severity of pulmonary hypertension.

29.d.9.a. TR jet velocity

This refers to the tricuspid regurgitant jet velocity used to estimate RVSP and PASP. This is a quantitative assessment of the presence or absence of pulmonary hypertension, which is usually measured in “meters/second” and described under Tricuspid Valve and/or in the conclusions. If the units of measurement are different (e.g., in cm/sec), convert this to “m/s” (e.g., 100 cm/s = 1 m/s). If a range is given, use the higher (i.e., worst) estimate (e.g., if “3.0-3.2 m/s”, record “3.2”). If a greater than (>) or less than (<) estimate is given, record the next numeric value (e.g., if ">3”, record 3.1; if "<2”, record “1.9”). If there is no mention of a tricuspid regurgitant jet velocity anywhere on the report, leave the field blank. If the estimated RVSP/PASP is just described as elevated with no quantitative measurement of the estimated peak TR jet velocity, leave the field blank. But make sure item 29.d.10 (pulmonary hypertension) has captured the presence or severity of pulmonary hypertension. Synonyms include “TR max velocity” and “TR peak velocity.”

29.d.10. Pulmonary hypertension

This refers to elevated pressures in the pulmonary vasculature, mainly the pulmonary arteries. It is usually reported in the qualitative part of the report under Tricuspid Valve and/or in the conclusions. Synonyms for pulmonary hypertension include "PHTN", "elevated pulmonary arterial (systolic) pressures (PASP)", "elevated right ventricular systolic pressures (RVSP)". If pulmonary hypertension is described, record its severity (mild, moderate, severe). "Marked" is synonymous with "severe". If a range is given, use the higher (i.e., worst) severity grade (e.g., if "mild-to-moderate", record "moderate"). Of note, the description of "moderately severe" should be recorded as "moderate." If the severity is graded as "borderline" or "upper normal", record "NONE". If the severity of the pulmonary hypertension is not described, but pulmonary hypertension is otherwise reported, record "PRESENT". If there is no mention of pulmonary hypertension and there is mention of normal "(estimated) pulmonary arterial (systolic) pressures (PASP)/ right ventricular systolic pressures (RVSP)", record "NONE". If there is no mention of pulmonary hypertension anywhere on the report, record "NR". If there is no mention of the presence, absence, or severity of pulmonary hypertension, but you can do the math (adding RAP to estimate RVSP/PASP), then a RVSP/PASP ≥40 mmHg is sufficient to choose pulmonary hypertension "PRESENT"; but if RVSP/PASP <40, then choose "NR".

29.d.11. Regional wall motion abnormality

This refers to abnormal regional wall motion of the left ventricle if there are segments of LV that do not contract normally (for example, after myocardial infarction). It is usually reported in the qualitative part of the report under Left Ventricle and/or in the conclusions. Record YES if regional wall motion abnormality is described. Synonyms for regional wall motion abnormality include "regional WMA", "segmental WMA", "segmental LV contractile dysfunction". Frequently, specific segments are described with abnormal motion without mention of the overall description of regional wall motion abnormality; for example, specific regions of the LV include anterior, anteroseptal, septal, inferoseptal, inferior, inferoposterior, posterior, posterolateral, lateral, anterolateral, apical, basal, and mid-portions of the LV walls. Record YES if certain parts of the wall have "hypokinesis", "akinesis", "dyskinesis", or "abnormal wall motion", regardless of severity (mild, moderate, severe). Record "NO/Unknown/NR" if regional wall motion abnormality is absent or it is unclear based on the report whether regional wall motion abnormality is present. Global wall motion abnormality or diffuse hypokinesis does not include regional or segmental wall motion abnormality. Record YES for "abnormal septal motion" or "septal dyssynchrony" due to pacing or interventricular conduction delay, or bundle branch block. But record NO if there is abnormal or paradoxical septal motion "consistent with post operative state".

29.d.12. Dilated left ventricle

This refers to an enlarged chamber size of the left ventricle (LV enlargement, LVE). It is usually reported in the qualitative part of the report under Left Ventricle and/or in the conclusions. Record YES if dilated LV is described of any severity. Record "NO/Unknown/NR" if the left ventricular chamber size is described as small or normal, or it is unclear based on the report whether the left ventricle is dilated.

29.d.13. Dilated right ventricle

This refers to an enlarged chamber size of the right ventricle. It is usually reported in the qualitative part of the report under Right Ventricle and/or in the conclusions. Record YES if dilated RV is described of any severity. Record "NO/Unknown/NR" if the right ventricular chamber size is described as small or normal, or it is unclear based on the report whether the right ventricle is dilated.

29.d.14. Diastolic dysfunction

This refers to the impairment of left ventricular compliance or of the left ventricle's ability to relax during diastole. It is usually reported in the qualitative part of the report under Left Ventricle and/or in

the conclusions (use the typewritten report if available). Synonyms for diastolic dysfunction include "diastolic LV dysfunction", "impaired LV relaxation", "impaired LV compliance", "impaired LV diastolic filling", "reversed E-A ratio", "late diastolic filling", "prolonged relaxation", "stiff ventricle", "abnormal mitral annulus tissue Doppler signal", "pseudonormalization of transmitral Doppler flow", "restrictive filling pattern", "increased left ventricular filling pressures", "Grade 1 diastolic dysfunction", "Grade 2 diastolic dysfunction", and "Grade 3 diastolic dysfunction". Record YES if diastolic dysfunction is described of any severity. Record "NO/Unknown/NR" if LV diastolic function/compliance/filling is described as normal (including "normal for age" even if diastolic dysfunction is stated), or it is unclear based on the report whether diastolic dysfunction is present. A qualitative description in the report is higher priority than conclusions.

30. Was a transesophageal echocardiogram performed?

A transesophageal echocardiogram (TEE) is an invasive ultrasound test of the heart where images are obtained by inserting an ultrasound probe into the mouth down to the esophagus and stomach. This test is much less common than a transthoracic echocardiogram (TTE). Of note, TEEs are commonly performed in the operating room for patients undergoing cardiac surgery; as such, the only report may be in the operative report or in the anesthesiology intraoperative note. Like the TTE, the results of a TEE study describe the structures of the heart and the function of the ventricles and of the valves. Record YES if a TEE was performed during this hospitalization. If more than one TEE study is documented in the medical record, complete the following information based on the FIRST TEE study performed after the onset or progression of the event. Please note, there must be a TEE report in order to complete this section; don't assume a quote of "TEE" was correct unless report is documented as this could have meant TTE.

Complete all items of the section using the corresponding instructions from item 29 for "transthoracic echocardiogram".

Specific items (for 30)	Follow instructions for corresponding item:
30.a. Date	= 29.a.
30.b. Ejection fraction	= 29.b
30.c.1. Impaired LV systolic function	= 29.d.2
30.c.2. Impaired RV systolic function	= 29.d.3
30.c.3. Regional wall motion abnormality	= 28.d.11
30.c.4. Dilated left ventricle	= 28.d.12
30.c.5. Dilated right ventricle	= 28.d.13

32. Was coronary angiography performed?

A coronary angiogram is an invasive test of the heart where a catheter in inserted into an artery and advanced to the coronary arteries to assess for coronary blockages. The catheters can be used to measure pressures in, and the function of, the left ventricle (during a "left ventriculogram" or "left ventriculography"), the pressures in the aorta (during an "aortogram" or "aortography"), as well as to assess the function of mitral and aortic valves. Synonyms for coronary angiography include "left heart catheterization (cath)", "coronary catheterization", and "coronary arteriography". This test is usually performed in a cardiac catheterization laboratory (cath lab), and there will be a separate report that describes this procedure and the results. Both actual coronary catheterization reports and descriptions of left heart catheterization reports are sources for this section; but if both are present, the actual report should be used. If a person had a percutaneous coronary intervention (PCI, PTCA, coronary stent) during the hospitalization, record YES. If more than one coronary angiography procedure is performed during this hospitalization (e.g., there is both a diagnostic procedure followed by an interventional

procedure like percutaneous coronary intervention, PCI), record the items from the first, diagnostic one. In general, use the cath report which has the worst stenoses recorded, ideally for all the coronary arteries (i.e., do not necessarily use the report that has the worse EF). Record "NO/NR" if there is no mention of this procedure, and skip to next question. Note: do not include CT angiography. If coronary angiography (left heart catheterization) was *not* performed during *this* hospitalization but was performed *within the past 2 years* during a *prior* hospitalization or as an *outpatient*, please record the worst test results; focus on detecting the worst coronary stenosis rather than the worst ejection fraction for this section. In general, interpret "suggest" as yes (in contrast to the general hierarchy rules on page 2).

32.a. Date
Record the date the coronary angiogram or left heart catheterization (LHC) was first performed.

32.b. Measurements
The following measurements are often reported in a section by section format, often using abbreviations for the measurement. If any or all of the measurements are not recorded anywhere in the medical record, leave the fields blank.
32.b.1. Ejection fraction
This refers to the left ventricular ejection fraction (LVEF) assessed during the "left ventriculogram" or "left ventriculography" part of the LHC. Record the EF in percent (%) in the space provided. If a range or multiple values are given, record the lowest (i.e., worst) value (e.g., if "30-35%", record "30"). If "greater than (>)" or "less than (<)" description is used, record the next numeric value (e.g., if ">55%", record 56; if "<20%", record "19"). If EF is not available leave the field blank. However, if the physician's interpretation states "normal" and a normal range is indicated on the report, record the lowest value of the normal range (e.g., if the normal range is between 55-90%, record "55"). However, if ejection fraction is described as "low" with no quantitative estimate, leave the field blank

32.b.2.a-e. Coronary stenosis
This refers to the amount of blockage, organized in terms of each of the major coronary arteries and their related branches.

Left main: The left main (LM) coronary artery is usually described by itself.

Left anterior descending artery and branches: Related branches to the "left anterior descending (LAD) artery" include "diagonal", "LADD", "septal", and "septal perforator" branches. There may be more than one diagonal or septal branch described, e.g., 2 LADD branches may be described as LADD1, LADD2.

Left circumflex/marginal artery: Related branches to the "left circumflex (LCX) artery" include "(left) circumflex marginal", "LCM", "CM", "(left) obtuse marginal", "OM", "left posterior descending artery", and "L-PDA" branches. There may be more than one marginal branch described, e.g., 2 branches may be described as OM1, OM2.

Right coronary artery and branches: Related branches to the "right coronary artery (RCA)" include "posterior descending artery", "PDA", "posterolateral artery", "PL", or "PLA" branches.

Intermediate ramus: Related branches to the "intermediate ramus" include "ramus branches".

In general, record the documented % stenosis within the given categories whenever possible, no matter where it is found on the report, whether in the quantitative portion or the text portion of the report. Of note, a "stump" is synonymous with occluded (100%). If there are multiple stenoses described for the same artery and its related branches, use the highest (i.e., worst) stenosis grade to choose the category (0%, 1-24%, 25-49%, 50-74%, 75-94%, 95-99%, 100%, NR). If there is more than one report, record the highest blockage among the reports. If the coronary artery or its branches are described as "normal" or "no significant disease", record "0%". If a coronary artery or its branches are described as diseased (stenotic) in terms of severity, but no exact % stenosis is given, record the % stenosis according to the following grading system:

"normal or none"	= 0%
"mild", "minimal" or "luminal irregularities" ("MLI")	= 1-24%
"mild-to-moderate" or "intermediate"	= 25-49%
"moderate"	= 50-74%
"severe", "extensive"	= 75-94%
"subtotal"	= 95-99%
"occluded"	= 100%.

If the coronary artery is described as "*diffusely diseased*" but no further specifics are provided (e.g., no exact % stenosis), record the % stenosis according to the following grading system:

"Unspecified or "mildly diffusely diseased"	= 1-24%
"Moderately diffusedly diseased"	= 50-74%
"Severely diffusedly diseased"	= 75-94%
"Widely patent"	= 0%.

However, if the specific coronary arteries are not individually described but there is an overall description about them (e.g., all coronaries were widely patent or diffusely diseased), use the above grading system for each coronary artery (items 2a-e). If "3 vessel CAD" is described, assume the 3 coronary arteries are the left anterior descending (LAD), left circumflex (LCX), and right coronary artery (RCA) (the left main and intermediate ramus would otherwise be specified). If a coronary artery is noted but not otherwise described (i.e., assumed normal), record 0%.

If the only description about a coronary artery is that it is "*heavily or severely calcified*" but there is no other qualifying information (e.g., % stenosis), then record 50-74% ("moderate"). Conversely, if there is description of "calcified artery with X% stenosis, record the X%. If stenosis is described but is not specified, record as 1-24% ('mild"). Record "high grade stenosis" as 75-94% ("severe"). If collaterals are described for a coronary branch with no other mention of that coronary's anatomy, that coronary is typically occluded; record as 100%.

Record NR if there is no mention of that artery and its anatomy.

32.b.3. <u>Were coronary bypass grafts present?</u>

This refers to the surgical coronary artery bypass grafts that are evaluated during coronary angiography in patients who have undergone coronary artery bypass grafting surgery (CABG). Bypass grafts include arterial bypass grafts (e.g., left internal mammary artery [LIMA], right internal mammary artery [RIMA], radial arteries, gastroepiloic artery), as well as saphenous vein grafts (SVG). Record YES if grafts were assessed during the procedure. Record NO/NR if there are no bypass grafts (in a patient who has never undergone CABG) or if bypass grafts were not assessed during the procedure.

32.b.3.a. Number of occluded grafts

Record the number of occluded bypass grafts (100% stenosis) assessed during the procedure in a patient who has had CABG. Record NR if it is unclear whether any bypass grafts are considered occluded or if the bypass grafts were not assessed during the procedure. Do not include bypass grafts with stenosis of 99% or less. Record the number of occluded grafts. For example, if the patient had 2 grafts and one was 100% occluded, record 1. If there is a discrepancy, use details in the body of the report instead of the conclusions.

SECTION VI: BIOCHEMICAL ANALYSES

Introduction

The purpose of this section is to record the results of blood laboratory values taken during the hospitalization. Separate data items refer to the worst value and the last value. For the purposes of this section, worst refers to the highest value with the exception of item 37 (hemoglobin), item 38 (hematocrit), and item 43 (sodium). For these three items, the worst is defined as the lowest value. The last value refers to the last measurement taken during the hospitalization. If only some of the hospitalization labs are available, use the last values available even if they are not close to the discharge date. If the worst value and the last value are the same, record in both places. If no measurements are included in the medical chart, leave the fields blank for that laboratory value. For items 39-42, be sure to record the upper limit normal of the laboratory standard for that hospital on the day the test was run. Some of these tests may be only written in doctor's notes using a stick diagram as detailed below:

Sodium | Chloride | BUN / Glucose
Potassium | Bicarbonate | Creatinine \

White blood cells \ Hemoglobin / Platelets
/ Hematocrit \

If both POC and in-lab reports are present, use the in-lab reports for the values and normal ranges, for items 37-45 (no POC results should be used unless they are the only available results). If there are multiple reports to choose from, use all the available labs and choose the lowest/highest range regardless of the results. The standard should be based on the reference range from the WORST results for BNP, proBNP, troponin T, and troponin I.

37. Hemoglobin (g/dL)

Hemoglobin (Hgb) is the oxygen-carrying pigment of erythrocytes formed by developing erythrocytes in the bone marrow. The lower value is the worse value.

Record the value of hemoglobin (in grams per deciliter) reported in the medical record. Of note, hemoglobin values obtained from arterial blood gas (ABG) analysis can be included. Leave the field blank if a value of hemoglobin was not available or performed during the course of this hospitalization. The lowest value is the worst value.

Reference levels for hemoglobin are gender specific
Men: 13.0-18.0 gm/dl
Women: 12.0-16.0 gm/dl

38. Hematocrit (%)

Hematocrit is the volume percentage of erythrocytes in whole blood. Record the value of hematocrit (HCT) (as %) reported in the medical record. Leave the field blank if a value for hematocrit was not available or performed during the course of this hospitalization. The lowest value is the worst value. Unlike for hemoglobin, do NOT include hematocrit values obtained from arterial blood gas (ABG) analysis.

39. BNP (pg/ml)

Brain or B-type natriuretic peptide (BNP) is a cardiac hormone (also present in the brain) specifically secreted from the cardiac ventricles as a response to ventricular volume expansion, pressure overload, and resultant increased wall tension. Synonyms may include "B-peptide". Record the value of BNP (as pg/ml) reported in the medical record. The highest is the worst value. Leave the field blank if a value for BNP was not available or performed during the course of this hospitalization. When numbers are preceded by a greater-than (">") or less-than ("<"),–record both the symbol ('<' or '>') as well as the numeric value, for the worst and last.

For the upper limit of normal, record the numeric value. If the value is preceded by '>' or '<', record just the value from the hospital record, in item 39c. For example, if the upper limit of normal is in the medical chart as "<100", record "100".

Reference levels: 0–99 picograms per milliliter (normal)

40. ProBNP (pg/mL)

N-terminal prohormone brain natriuretic peptide (pro-BNP or NT-proBNP) is a cardiac neurohormone specifically secreted from the cardiac ventricles as a response to ventricular volume expansion, pressure overload, and resultant increased wall tension. Record the value of proBNP (as pg/ml) reported in the medical record. The highest is the worst value. Leave the field blank if a value for proBNP was not available or performed during the course of this hospitalization. When numbers are preceded by a greater-than (">") or less-than ("<"),–record both the symbol ('<' or '>') as well as the numeric value, for the worst and last.

For the upper limit of normal, record the numeric value. If the value is preceded by '>' or '<', record just the value from the hospital record, in item 40c. For example, if the upper limit of normal is in the medical chart as "<353", record "353".

Reference levels for ProBNP are age and gender specific, e.g.,:

Age	*Male*	*Female*
<45 yrs	0-93	0-178
45-54	0-138	0-192
55-64	0-177	0-226
65-74	0-229	0-353
75+	0-852	0-624

41. Troponin T (ng/mL)

Troponin (TnT) is a complex muscle protein, which when combined with Calcium ions influences the contraction of heart muscle. It is normally not found in blood. Its detection in the circulation is a marker for myocardial cell damage. Record the value of troponin T (as ng/mL) reported in the medical record. The highest is the worst value. Leave the field blank if a value for troponin T was not available or performed during the course of this hospitalization. When numbers are preceded by a greater-than

(“>”) or less-than (“<”),–record both the symbol (‘<’ or ‘>’) as well as the numeric value, for the worst and last.

For the upper limit of normal, record the numeric value. If the value is preceded by ‘>’ or ‘<’, record just the value from the hospital record, in item 41c. For example, if the upper limit of normal is in the medical chart as “<0.029”, record “0.029”.

Reference level: <0.029 ng/mL

42. Troponin I (ng/mL)

Troponin (Tn I) is a complex muscle protein, which when combined with Calcium ions influences the contraction of heart muscle. It is normally not found in blood. Its detection in the circulation is a marker for myocardial cell damage. Record the value of troponin I (as ng/mL) reported in the medical record. The highest is the worst value. Leave the field blank if a value for troponin I was not available or performed during the course of this hospitalization. When numbers are preceded by a greater-than (“>”) or less-than (“<”),–record both the symbol (‘<’ or ‘>’) as well as the numeric value, for the worst and last.

For the upper limit of normal, record the numeric value. If the value is preceded by ‘>’ or ‘<’, record just the value from the hospital record, in item 42c. For example, if the upper limit of normal is in the medical chart as “<0.5”, record “0.5”. If there is mention of a “negative” range and a “borderline” range, take the upper limit of the negative range.
Reference levels: 0.01-0.5 ng/mL. Reference levels can vary by assay used.

43. Sodium (mEq/L)

Record the value of sodium (Na) (mEq/l) reported in the medical record. Leave the field blank if a value of sodium was not available or performed during the course of this hospitalization. The lowest value is the worst value.

Reference levels: 135-145 mEq/l

44. Serum creatinine (mg/dL)

Creatinine (Cr) is a marker of kidney function. Record the value of creatinine (mg/dl) reported in the medical record.

In-lab creatinine values are preferred. Take Point of Care blood creatinine only if in-lab creatinine is not available. Record the value of the first, last and highest measurements of serum creatinine. If there is only one serum creatinine value, then “last” and “highest” values and dates are left blank. Likewise, if there are only two values, ‘highest’ is left blank.

44.a1.-44.c2. Items deleted and captured on the CEL form.

45. BUN (mg/dL)

Urea nitrogen is the urea concentration of serum or plasma conventionally specified in terms of nitrogen content and called blood urea nitrogen (BUN) or serum urea nitrogen (SUN). Record the value of urea nitrogen (mg/dl) reported in the medical record. The highest is the worst value. Leave the field blank if a value of urea nitrogen was not available or performed during the course of this hospitalization.

Reference level: 7 - 18 mg/dL

SECTION VII: MEDICATIONS

The purpose of this section is to determine what medications were prescribed to the patient. Record separately whether any of the medications were being used by patient "Prior to hospitalization" or "Prior to progression in hospital" (first column), and whether they were being prescribed to patient "At hospital discharge" (second column). Record YES if any of the following drugs were given to the patient; record NO/NR if there is no mention of the drug. If patient is known to be non-compliant with medication, still record the prescribed list of medications prior to hospitalization or progression of event. Use the hierarchy (p.3) for discrepancies between medications prior to admission: the H&P medication list outranks the ED note medication list (because it is presumed the medications were reconciled on admission). Of note, if the patient is hospitalized for a condition unrelated to heart failure but develops heart failure in the hospital, record the medications given to the patient in the hospital prior to the progression. *Except* for the intravenous medications in item 73, we are not looking for medications given during the hospitalization, *unless* they predated the "progression/exacerbation of heart failure" if the onset occurred *in* the hospital. If the patient was transferred from another hospital to the current hospitalization, record the medications that were being taken by the patient prior to any hospitalization whenever possible; if that medication list is not available, record the medications that were being administered on the day of transfer. If the patient is transferred out to another hospitalization, and no discharge summary is available, record the medications that were being taken (not just ordered) by patient on day of discharge, which may be found on the medication administration sheets. Both p.o. and i.v. medications can be recorded in this setting; for example, if the patient is being transferred on nitroglycerin IV drip, then record Yes for Nitrates at hospital discharge (Item 71a). If the patient died during the hospitalization, record NO/NR for all drugs in the second column, "At hospital discharge". Medications given in the ambulance count as in-hospital medications and should not be included for "prior to hospitalization".

Sources for abstracting medications include medication administration records (MAR), physician notes, and orders. If possible, the medications should be confirmed as being given; if that is not possible, use your best judgement. Note that in MARs, nursing notation of a circle (with or without a "H" sign) around a time indicates that the medication was held during that time; a documented subsequent time indicates that the medication was given at that later time. If there is no discharge medication list, assuming patient remains on the same medications after hospital discharge, use the MAR for the last medications administered; or in the absence of a MAR, use the last inpatient note that lists the medications. If physician note mentions specific medications to be described at discharge but that are not on the discharge medication list, choose NO for those specified medications "at hospital discharge" unless you see some other confirmation that the patient was prescribed those medicines within 24 hours of discharge.

Some of the trade names contain medications that belong to two classes. For example, Accuretic is a combination of an ACE inhibitor and a diuretic. If so, record such medications in both classes. Such medications are marked with '+' followed by an abbreviation for the other class involved. (The following abbreviations are used: ACE = ACE inhibitor, BB=beta blocker, D=diuretic, CCB = calcium channel blocker). Please refer to the 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 an alphabetical list of medications.

When a notation such as "held at discharge" accompanies a discharge medicine, include that medicine as a discharge medicine. The assumption is that this held medicine will be resumed soon. If a time range is given regarding when to resume that medicine, use a time limit of 1 month.

59. ACE inhibitors

ACE (angiotensin-converting enzyme) inhibitors are vasodilators that lower blood pressure and can improve the pumping action of the heart in those with heart failure. They are used for hypertension (especially those with diabetes) and heart failure.

Refer to the 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 an alphabetical list of medications.

60. Angiotensin II receptor blockers

Angiotensin receptor blockers (ARB) act on the same pathway as ACE inhibitors, but at a different point. They are vasodilators that lower blood pressure and can improve the pumping action of the heart in those with heart failure. They are used for hypertension (especially those with diabetes) and heart failure.

Refer to the 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 an alphabetical list of medications.

60b. Angiotensin Receptor-Neprilysin Inhibitor (ARNI)

This medication is a combination of ARB + neprilysin inhibitor, and has been been used in place of ACE inihibitors and ARBs. There is only one FDA-approved ARNI which is Sacubitril-Valsartan (Entresto).

Refer to the 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 an alphabetical list of medications.

62. Anticoagulants

This class of medications thins the blood so that it is less likely to clot. Anti-coagulants are used to prevent or treat heart attacks, strokes, pulmonary embolus, and other blood clots.

Refer to the 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 an alphabetical list of medications.

64. Anti-platelets

Anti-platelet agents affect platelets such that they are less likely to form clot. Aspirin is an analgesic, but its main use is to prevent heart attack and stroke. For these indications, usually a low-dose aspirin is given. Record aspirin under item 64.a., separately from other anti-platelet agents (item 64.b.).

64.a. Aspirin

Refer to the 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 an alphabetical list of medications.

64.b. Other Anti-platelet
Refer to the 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 an alphabetical list of medications.

65. Beta-blockers
Beta-blockers (BB) block beta-adrenergic receptors, thereby decreasing the stress on the heart. They are used to treat arrhythmias, hypertension, and heart failure. However, do not include beta-blocker eyedrops (e.g., record "No/NR" for Timolol eye drops).

Refer to the 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 an alphabetical list of medications.

67. Digitalis
Digitalis is used to slow the heart beat in certain arrhythmias and is used in heart failure to improve the pumping action of the heart.

Refer to the 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 an alphabetical list of medications.

68. Diuretics
Diuretics promote the excretion of urine. They are used as an anti-hypertensive and in people who are fluid overloaded, or have a history of heart failure or liver failure.

Refer to the 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 an alphabetical list of medications.

69. Aldosterone blocker
Aldosterone blockers are a specific type of diuretic that is recommended for people with heart failure or from fluid overload from liver failure.

Refer to the 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 an alphabetical list of medications.

70. Lipid lowering agents
Lipid lowering agents are used to lower cholesterol. This is especially recommended in those with known cardiovascular disease. Record statin drugs under item 68.a., separately from other lipid lowering agents (item 68.b.).

70.a. Statins

Refer to the 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 an alphabetical list of medications.

70.b. Other lipid lowering
*The niacin-related products marked with an * may be used for nutritional supplementation or lipid-lowering. Try to determine if use is for lipid-lowering from the record; is so, record "Yes".

Refer to the 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 an alphabetical list of medications.

71. Nitrates
Nitrates are vasodilators used to treat angina, hypertension, and heart failure.

Refer to the 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 an alphabetical list of medications.

72. Hydralazine
This is a vasodilator medication used to treat hypertension and heart failure.

Refer to the 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 an alphabetical list of medications.

72b. SGLT2 (Sodium-glucose co-transporter-2) Inhibitor
These medications were originally approved to lower blood sugars in those with type 2 diabetes. They have been recently used for those heart failure, regardless of whether they have diabetes or not.

Refer to the 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 an alphabetical list of medications.

72c. Soluble guanylate cyclase (sGC) stimulator
These are medications than sensitize sGC to the body's own nitric oxide and can increase sGC activity in the absence of NO. can can reduce risk of cardiovascular death and heart failure hospitalizations. The only soluble guanylate cyclase stimulator approved for heart failure is Vericiguat (generic), Verquvo (brand).

Refer to the 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 an alphabetical list of medications.

73. IV drugs during this hospitalization
The purpose of this section is to record intravenous (IV or i.v.) medications commonly used to treat decompensated heart failure. These medications will be noted on medication sheets from pharmacy, physician notes, nursing notes, and nursing flow sheets. Record the administration of these medications if given at any time during the hospitalization (unless otherwise specified below).

73.a. IV inotropes
These are medications that generally increase the contractility of the heart to help it pump more strongly. These medications may also increase the heart rate and cause arrhythmias; some may cause

vasodilation of blood vessels while others cause vasoconstriction of blood vessels. These are usually administered as a continuous infusion.

Refer to the 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 an alphabetical list of medications.

Do NOT include ephedrine, epinephrine (adrenalin), midodrine (ProAmatine, Amatine), norepinephrine (Levophed), or phenylephrine (Neo-Synephrine).

73.b. IV diuretics
These are diuretic medications that are available in IV form. They may be administered either as bolus injections or as a continuous infusion.

Refer to the 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 an alphabetical list of medications.

SECTION VIII: ADMINISTRATIVE

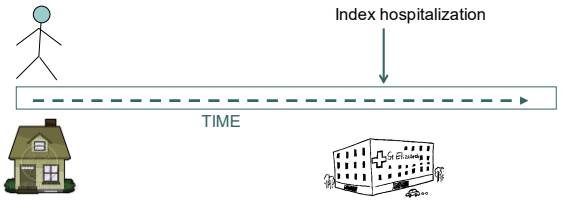
77. Time taken to abstract (mins)
Record the time (in minutes) it took to abstract the medical records in order to complete this form.

78. Abstractor number
This should be filled in even if the chart proves to be ineligible from answers to Section I.

79. Date abstraction completed
Record the date the abstraction was completed.

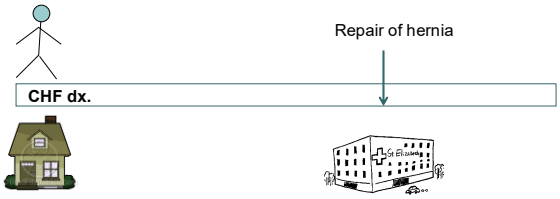
APPENDIX
Potential Scenarios of the Onset of Heart Failure Event or Decompensation

1. Levels of complexity: Types of cases



2. Levels of complexity: Types of cases

The irrelevant case (historical diagnosis)

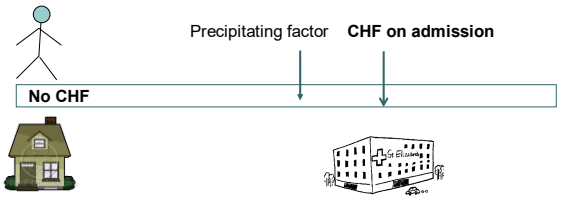


Don't abstract (unless a cohort member with 428 code): Section I: Is this a cohort pt with a 428 hospital code?

If a cohort pt with historical 428 code, you might have many missing items

3. Levels of complexity: Types of cases

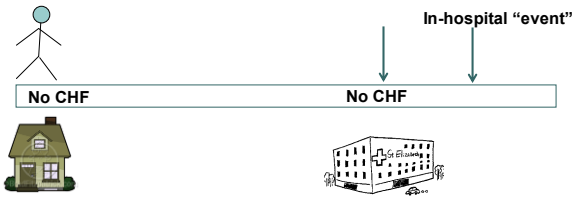
The easy case



Note: symptoms might have begun days or weeks before admission

4. Levels of complexity: Types of cases

Another easy case

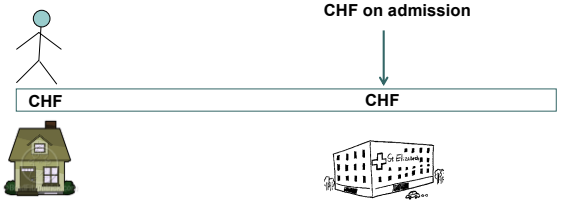


Example: Hospitalized for some reason. Developed CHF on day 3.

Note: symptoms should have begun after admission

5. Levels of complexity: Types of cases

The tough case

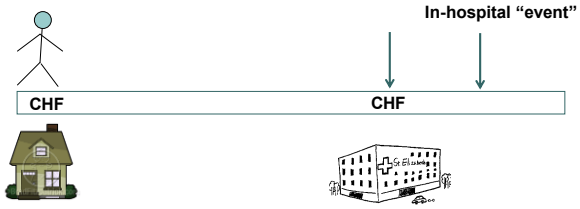


The key question: Is there progression/exacerbation/decompensation of the baseline CHF status? Are the symptoms/signs new?

Section I (screening). Q1 and Q2

6. Levels of complexity: Types of cases

Maybe a little easier



Since we have the CHF-status on admission, it may be easier to tell the change later on.

Section I (screening). Q1 and Q2