



Atherosclerosis Risk in Communities Study

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**Cohort Surveillance Heart Failure Occurrences  
Data Dictionary**

# Cohort Surveillance Heart Failure Occurrences Data Dictionary

Occurrence: An occurrence refers to a single hospitalization, fatal or non-fatal, with a unique ID.

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## 1. Classification Variables

### 1.1. ADHFTYPE\_EVER

#### Purpose

To determine for an acute decompensated heart failure event if this can be classified as heart failure with preserved ejection fraction, systolic heart failure or recovered.

#### Description

ADHFTYPE\_EVER is a categorical variable. ADHFTYPE\_EVER is derived from the variables ADHF, LVEF\_CUR\_LOW and LVE\_PRE\_LOW. The classification of the HF occurrence is based on the type of HF(HFDIAG) and the prior (LVEF\_PRE\_LOW) and current (LVEF\_CUR\_LOW) ejection fraction data.

#### Type

Occurrence

#### Algorithm

If the HF occurrence is NOT classified as {Definite Decompensated HF or Probable Decompensated HF} then set ADHFTYPE\_EVER as missing.  
If the HF occurrence is classified as {Definite Decompensated HF or Probable Decompensated HF} then set ADHFTYPE\_EVER as follows:  
If LVEF\_CUR\_LOW=. and LVEF\_PRE\_LOW=. then ADHFTYPE\_EVER="";  
If LVEF\_CUR\_LOW=. and LVEF\_PRE\_LOW=0 then ADHFTYPE\_EVER="ADHFPEF";  
If LVEF\_CUR\_LOW=. and LVEF\_PRE\_LOW=1 then ADHFTYPE\_EVER="SADHF";  
If LVEF\_CUR\_LOW=0 and LVEF\_PRE\_LOW=. then ADHFTYPE\_EVER="ADHFPEF";  
If LVEF\_CUR\_LOW=0 and LVEF\_PRE\_LOW=0 then ADHFTYPE\_EVER="ADHFPEF";  
If LVEF\_CUR\_LOW=0 and LVEF\_PRE\_LOW=1 then ADHFTYPE\_EVER="RECOVERED";  
If LVEF\_CUR\_LOW=1 and LVEF\_PRE\_LOW=. then ADHFTYPE\_EVER="SADHF";  
If LVEF\_CUR\_LOW=1 and LVEF\_PRE\_LOW=0 then ADHFTYPE\_EVER="SADHF";  
If LVEF\_CUR\_LOW=1 and LVEF\_PRE\_LOW=1 then ADHFTYPE\_EVER="SADHF";

#### Related Variables

ADHF, HFDIAG, LVEF\_CUR\_LOW, LVEF\_PRE\_LOW

## 1.2. CHFDIAG

### Purpose

To determine the final heart failure classification for an occurrence.

### Description

CHFDIAG is a character variable. For all cohort heart failure events, MMCC review by two physicians is required. If the diagnoses of the two reviewers are in agreement then this becomes the final classification for the occurrence. If the diagnoses of the two reviews are in disagreement then a third review by an adjudicator is completed and the adjudicator's diagnosis is the final classification for the occurrence.

**This is the definitive heart failure classification for an occurrence.**

### Algorithm

Hospitalizations are reviewed by a single member of the heart failure MMCC with the classification determined by the MMCC reviewer becoming the event's final ARIC classification with the following exception.

a. If the Framingham, NHANES, and Modified Boston computer classification scoring algorithms meet the formula below\* AND the heart failure MMCC classification is either "chronic stable heart failure" or "no heart failure", the case is sent to the Chair of the heart failure MMCC for adjudication. The Chair's adjudicated classification becomes the event's final ARIC classification.

\* Framingham criteria equal "heart failure present", and NHANES criteria equals "heart failure present", and Modified Boston criteria equal "definite or possible heart failure".

Hospitalizations NOT reviewed by the MMCC:

If BNP (HFAA39a) is greater than 875 pg/ml and:

There is evidence in the doctor's notes that the hospitalization was for HF (HFAA2),

Or

There is evidence of edema (HFAA22a),

Or

There is evidence of basilar rales (HFAA23j),

There is evidence in the doctors notes that the hospitalization was for HF (HFAA2) and:

There is increasing or new onset paroxysmal nocturnal dyspnea (HFAA1c),

Or

There is increasing or new onset orthopnea (HFAA1d),

Or

There is an indication of paroxysmal nocturnal dyspnea during this hospitalization (HFAA23h).

Or

An x-ray showed signs of congestive heart failure during this hospitalization (HFAA28l).

If either criteria #2 or #3 above is met and there is at least one left ventricular function measurement available in the HFA these events are classified as acute decompensated heart failure.

### Remarks

This variable was created from HDX form, question 6.

Type

Occurrence

Related Variables

CHFDIAG3

## 1.3. CHFDIAG3

### Purpose

To determine the final heart failure classification for an occurrence.

### Description

CHFDIAG3 is a numeric variable. CHFDIAG is similar to CHFDIAG except classifications 'A' and 'B' have been collapsed into one category and classifications 'D' and 'E' have been collapsed into one category.

### Type

Occurrence

### Algorithm

If CHFDIAG is Definite Decompensated HF or Probable Decompensated HF then CHFDIAG3 = 1  
If CHFDIAG is Chronic Stable HF then CHFDIAG = 2  
If CHFDIAG is Unlikely HF or Unclassifiable then CHFDIAG3 = 3

### SAS Code

```
If CHFDIAG= 'A' or 'B' then CHFDIAG3=1  
If CHFDIAG= 'C' then CHFDIAG3=2  
If CHFDIAG= 'D' or 'E' then CHFDIAG3=3
```

### Related Variables

CHFDIAG

## 1.4. HFTYPE\_EVER

### Purpose

To determine if a hospitalization can be classified as heart failure with preserved ejection fraction, systolic heart failure or recovered.

### Description

HFTYPE\_EVER is a categorical variable. HFTYPE\_EVER is calculated from the variables: HFDIAG, LVEF\_CUR\_LOW and LVEF\_PRE\_LOW. The classification of the HF occurrence is based on the type of HF(HFDIAG) and the prior (LVEF\_PRE\_LOW) and current (LVEF\_CUR\_LOW) ejection fraction data.

### Type

Occurrence

### Algorithm

If the HF occurrence is not classified as {Definite Decompensated HF, Probable Decompensated HF, Chronic Stable HF} then set HFTYPE\_EVER as missing.

If the HF occurrence is classified as {Definite Decompensated HF, Probable Decompensated HF, Chronic Stable HF} then set HFTYPE\_EVER as follows:

If LVEF\_CUR\_LOW=. and LVEF\_PRE\_LOW=. then HFTYPE\_EVER="";

If LVEF\_CUR\_LOW=. and LVEF\_PRE\_LOW=0 then HFTYPE\_EVER="HFPEF";

If LVEF\_CUR\_LOW=. and LVEF\_PRE\_LOW=1 then HFTYPE\_EVER="SHF";

If LVEF\_CUR\_LOW=0 and LVEF\_PRE\_LOW=. then HFTYPE\_EVER="HFPEF";

If LVEF\_CUR\_LOW=0 and LVEF\_PRE\_LOW=0 then HFTYPE\_EVER="HFPEF";

If LVEF\_CUR\_LOW=0 and LVEF\_PRE\_LOW=1 then HFTYPE\_EVER="RECOVERED";

If LVEF\_CUR\_LOW=1 and LVEF\_PRE\_LOW=. then HFTYPE\_EVER="SHF";

If LVEF\_CUR\_LOW=1 and LVEF\_PRE\_LOW=0 then HFTYPE\_EVER="SHF";

If LVEF\_CUR\_LOW=1 and LVEF\_PRE\_LOW=1 then HFTYPE\_EVER="SHF";

### Related Variables

HFDIAG, LVEF\_CUR\_LOW, LVEF\_PRE\_LOW



## **1.5. HF\_HX**

### **Purpose**

To determine a prior history of hospitalized heart failure.

### **Description**

HF\_HX is a character variable. This variable takes the value from the response abstracted into question 7b of the HFA form.

### **Type**

Occurrence

### **Algorithm**

#### SAS Code

```
HF_HX=HFAA7b
```

### **Related Variables**

HFAA7b

## 1.6. INCADHFTYPE\_EVER

### Purpose

To indicate for a first acute decompensated heart failure with preserved ejection fraction.  
To determine if a hospitalization can be classified as heart failure with preserved ejection fraction, systolic heart failure or recovered.

### Description

INCADHFTYPE\_EVER is a categorical variable. INCADHF\_EVER is derived from the variables HFDIAG, INCADHF, LVEF\_CUR\_LOW, LVEF\_PRE\_LOW. The classification of the HF occurrence is based on the type of HF(CHFDIAG) , no evidence of prior HF (INCADHF), and the prior (LVEF\_PRE\_LOW) and current (LVEF\_CUR\_LOW) ejection fraction data.

### Type

Occurrence

### Algorithm

If the HF occurrence is NOT classified as {Definite Decompensated HF or Probable Decompensated HF} OR INCADHF ≠ 1 then set INCADHFTYPE\_EVER as missing.

If the HF occurrence is classified as {Definite Decompensated HF, Probable Decompensated HF, Chronic Stable HF} AND INCADHF=1 then set INCADHFTYPE\_EVER as follows:

```
If LVEF_CUR_LOW=. and LVEF_PRE_LOW=. then INCADHFTYPE_EVER="";
If LVEF_CUR_LOW=. and LVEF_PRE_LOW=0 then INCADHFTYPE_EVER="INCADHFPEF";
If LVEF_CUR_LOW=. and LVEF_PRE_LOW=1 then INCADHFTYPE_EVER="INCSADHF";
If LVEF_CUR_LOW=0 and LVEF_PRE_LOW=. then INCADHFTYPE_EVER="INCADHFPEF";
If LVEF_CUR_LOW=0 and LVEF_PRE_LOW=0 then INCADHFTYPE_EVER="INCADHFPEF";
If LVEF_CUR_LOW=0 and LVEF_PRE_LOW=1 then INCADHFTYPE_EVER="RECOVERED";
If LVEF_CUR_LOW=1 and LVEF_PRE_LOW=. then INCADHFTYPE_EVER="INCSADHF";
If LVEF_CUR_LOW=1 and LVEF_PRE_LOW=0 then INCADHFTYPE_EVER="INCSADHF";
If LVEF_CUR_LOW=1 and LVEF_PRE_LOW=1 then INCADHFTYPE_EVER="INCSADHF";
```

### Related Variables

CHFDIAG, INCADHF, LVEF\_CUR\_LOW, LVEF\_PRE\_LOW

(INCADHF=1 if ADHF=1 and HFAA7b (prior hospitalization for HF)=No or Unknown)

## 1.9. LVEF\_CUR

### Purpose

To indicate the ejection fraction for the current hospitalization.

### Description

LVEF\_CUR is a continuous variable that is derived from the HFA ejection fraction variables: HFAA29B, HFAA30B, HFAA32B1, HFAA33B, HFAA34B, HFAA35B and HFAA36C.

Only those variables with test date on or after (arrival date – 90 days) and on or before discharge date are eligible. LVEF\_CUR is set to the first non-missing value using the following order: HFAA29B, HFAA34B, HFAA35B, HFAA33B, HFAA32B1, HFAA36C, HFAA30B.

### Type

Occurrence

### Algorithm

From the 7 variables:

HFAA29B, HFAA30B, HFAA32B1, HFAA33B, HFAA34B, HFAA35B and HFAA36C select those ones that have their respective date in the time interval:

hospital arrival date (CHIA6A)-90 days <= date <= discharge date (HFAA0C)

Take the first non-missing value using the following order:

HFAA29B, = EF Transthoracic echocardiogram

HFAA34B = EF MRI

HFAA35B = EF CT SCAN

HFAA33B = EF Radionuclide ventriculogram

HFAA32B1 = EF Coronary angiography

HFAA36C = EF Stress test

HFAA30B = EF Transesophageal echocardiogram

### Related Variables

HFAA29B, HFAA30B, HFAA32B1, HFAA33B, HFAA34B, HFAA35B,, HFAA36C

LVEF\_CUR\_DAT, LVEF\_CUR\_SOU, LVEF\_CUR\_LOW, LVEF\_PRE, HFTYPE\_EVER

## 1.10. LVEF\_CUR\_DAT\_FollowUpDays

### Purpose

To indicate the follow-up time in days from v1date to the date of the current ejection fraction.

### Description

LVEF\_CUR\_DAT is a numeric variable. It is the date of the HFA ejection fraction variable from which LVEF\_CUR was derived.

### Type

Occurrence

### Algorithm

If LVEF\_CUR was derived from HFAA34B then LVEF\_CUR\_DAT = HFAA34A  
If LVEF\_CUR was derived from HFAA35B then LVEF\_CUR\_DAT = HFAA35A  
If LVEF\_CUR was derived from HFAA33B then LVEF\_CUR\_DAT = HFAA33A  
If LVEF\_CUR was derived from HFAA29B then LVEF\_CUR\_DAT = HFAA29A  
If LVEF\_CUR was derived from HFAA30B then LVEF\_CUR\_DAT = HFAA30A  
If LVEF\_CUR was derived from HFAA32B1 then LVEF\_CUR\_DAT = HFAA32A  
If LVEF\_CUR was derived from HFAA36C then LVEF\_CUR\_DAT = HFAA36A

### Related Variables

HFAA29B, HFAA30B, HFAA32B1, HFAA33B, HFAA34B, HFAA35B,, HFAA36C, LVEF\_CUR,  
LVEF\_CUR\_SOU

## **1.11. LVEF\_CUR\_LOW**

### **Purpose**

To indicate if the current ejection fraction is less than 50.

### **Description**

LVEF\_CUR\_LOW is an indicator variable. LVEF\_CUR\_LOW is derived from the variables HDXA5, LVEF\_CUR, HFAA29D2, HFAA30C1, HFAA29A and HFAA30A.

LVEF\_CUR\_LOW takes the first non-missing value in the following hierarchy. The reviewer assessment is the first preference ( HDXA5, collapsed across multiple reviewers) then the quantitative abstracted value (LVEF\_CUR) and finally the qualitative abstracted value recorded in the variables HFAA29D2 and HFAA30C1.

### **Type**

Occurrence

### **Algorithm**

LVEF\_CUR\_LOW is the first non-missing value from the following hierarchy: HDXA5 (reviewer qualitative assessment), LVEF\_CUR (cut-off is 50%), HFAA29D2 (TTE, qualitative) and HFAA30C1 (TEE, qualitative).

The qualitative variables HFAA29D2 and HFAA30C1 are only considered if their respective dates are in the time interval [hospital arrival date, (CHIA6A)-90 days, discharge date (HFAA0C)]

### **Related Variables**

HDXA5, HFAA29D2, HFAA30C1, LVEF\_CUR, HFTYPE\_EVER

## 1.12. LVEF\_CUR\_SOU

### Purpose

To indicate the source of the current ejection fraction.

### Description

LVEF\_CUR\_SOU is a character variable that indicates the current HFA ejection fraction variable from which LVEF\_CUR was derived.

### Type

Occurrence

### Algorithm

If LVEF\_CUR was derived from HFAA34B then LVEF\_CUR\_SOU = ' 34B MRI'  
If LVEF\_CUR was derived from HFAA35B then LVEF\_CUR\_SOU = ' 35B CT SCAN'  
If LVEF\_CUR was derived from HFAA33B then LVEF\_CUR\_SOU = ' 33B RADIO VENTRI'  
If LVEF\_CUR was derived from HFAA29B then LVEF\_CUR\_SOU = ' 29B TRANSTHORACIC'  
If LVEF\_CUR was derived from HFAA30B then LVEF\_CUR\_SOU = ' 30B TRANSESOPHAGEAL'  
If LVEF\_CUR was derived from HFAA32B1 then LVEF\_CUR\_SOU = '32B1 ANGIOGRAPHY'  
If LVEF\_CUR was derived from HFAA36C then LVEF\_CUR\_SOU = '36C STRESS TEST'

### Related Variables

HFAA29B, HFAA30B, HFAA32B1, HFAA33B, HFAA34B, HFAA35B,, HFAA36C, LVEF\_CUR,  
LVEF\_CUR\_DAT

## 1.13. LVEF\_PRE

### Purpose

To indicate the ejection fraction for previous hospitalizations.

### Description

LVEF\_PRE is a continuous variable. LVEF\_PRE is derived from the variables: HFAA29B, HFAA30B, HFAA32B1 and HFAA8A.

### Type

Occurrence

### Algorithm

Consider continuous ejection fraction variables: HFAA29B, HFAA30B, HFAA32B1 taken during the time interval: [arrival date (CHIA6A)-2 years, arrival date (CHIA6)]. Consider also HFAA8A if its year HFAA8B >= year of the arrival date.

HFA Q29B = EF TTE

HFA Q32B1 = EF Coronary angiography

HFA Q30B = EF TEE

If two values recorded with same imaging modality, give preference to more recent measure. Apply hierarchy based on modality, as defined in LVEF\_CUR.

The qualitative variables HFAA29D2 and HFAA30C1 are only considered if their respective dates are in the time interval [CHIA6A)-2 years, arrival date (CHIA6))

### Related Variables

HFAA29B, HFAA30B, HFAA32B1, HFAA8A, LVEF\_CUR, LVEF\_PRE\_LOW, LVEF\_PRE\_SOU, LVEF\_PRE\_YEAR.

## **1.14. LVEF\_PRE\_LOW**

### **Purpose**

To indicate if the previous ejection fraction is less than 50.

### **Description**

LVEF\_PRE\_LOW is an indicator variable. LVEF\_PRE\_LOW is derived from the variables: HDXA5, LVEF\_CUR, HFAA29D2, HFAA30C1, HFAA29A and HFAA30A.

The quantitative abstracted value is the first preference ( LVEF\_PRE), then the qualitative abstracted value in the variables HFAA29D2, HFAA30C1 and HFAA8A.

### **Type**

Occurrence

### **Algorithm**

LVEF\_PRE\_LOW is the first non-missing value from the following hierarchy: LVEF\_PRE (cut-off is 50%) and then qualitative abstracted value from HFAA29D2 (TTE, qualitative), HFAA30C1 (TEE, qualitative) and HFAA8A (prior imaging).

The qualitative variables HFAA29D2 and HFAA30C1 are only considered if their respective dates are in the time interval [CHIA6A)-2 years, arrival date (CHIA6))

### **Related Variables**

LVEF\_PRE, HFAA29D2, HFAA8A, HFAA30C1, HFTYPE\_EVER



## 1.15. LVEF\_PRE\_SOU

### Purpose

To indicate the source of the previous ejection fraction.

### Description

LVEF\_PRE\_SOU is a character variable that indicates the current HFA ejection fraction variable from which LVEF\_PRE was derived.

### Type

Occurrence

### Algorithm

```
IF LVEF_CUR COMES FROM HFAA8A THEN LVEF_CUR_SOU = 'HFAA8A'  
IF LVEF_CUR COMES FROM HFAA29B THEN LVEF_CUR_SOU = '29B TRANSTHORACIC'  
IF LVEF_CUR COMES FROM HFAA30B  
    THEN LVEF_CUR_SOU = '30B TRANSESOPHAGEAL'  
IF LVEF_CUR COMES FROM HFAA32B1 THEN LVEF_CUR_SOU = '32B1 ANGIOGRAPHY'
```

### Related Variables

HFAA8A, HFAA29B, HFAA30B, HFAA32B1, LVEF\_PRE

### Remarks:

In the definition of LVEF\_PRE, the variable HFAA8A is used even if it missing. This implies that most of the 8987 missing values of LVEF\_PRE, correspond to HFAA8A.

## 1.16. LVEF\_PRE\_YEAR

### Purpose

To indicate the date of the previous ejection fraction.

### Description

LVEF\_PRE\_YEAR is a numeric variable. It is the year of the HFA ejection fraction variable from which LVEF\_PRE was derived.

### Type

Occurrence

### Algorithm

```
IF LVEF_CUR COMES FROM HFAA8A THEN LVEF_CUR_YEAR = HFAA8B  
IF LVEF_CUR COMES FROM HFAA29B THEN LVEF_CUR_YEAR = YEAR(HFAA29A)  
IF LVEF_CUR COMES FROM HFAA30B THEN LVEF_CUR_YEAR = YEAR(HFAA30A)  
IF LVEF_CUR COMES FROM HFAA32B1 THEN LVEF_CUR_YEAR = YEAR(HFAA32A)
```

### Related Variables

LVEF\_PRE, HFAA8B, HFAA29A, HFAA30A, HFAA32A

## **1.17. TRIALISTHF**

### **Purpose**

To determine a heart failure diagnosis based on selected variables from the HFA form.

### **Type**

Occurrence

### **Description**

TRIALIST is an indicator variable used to classify heart failure based on a modified version of an algorithm developed by the Cardiovascular Clinical Trialists (CCT) Workshop. The criteria were operationalized and automated as described in Loehr et al 2013. The value 1 indicates HF present, and 0 HF absent.

### **Algorithm**

See Loehr et al, 2013.

### **Related Variables**

## 2. Identification Variables

### 2.1. CELB02

#### Purpose

To map a surveillance ID to the Cohort participant ID.

#### Type

Occurrence

#### Description

CELB02 is a character variable. CELB02 is the cohort participant ID from question number 2 of the Cohort Event Eligibility (CEL) form. CELB02 is the same for all occurrences within a person.

#### Related Variables

ID

## **2.2. CENTER**

### Purpose

To identify the field center from which a participant for a given occurrence originates

### Type

Occurrence

### Description

CENTER is a character variable.

## **2.3. ID**

### **Purpose**

To determine an occurrence-level ID for cohort surveillance.

### **Type**

Occurrence

### **Description**

ID is a character variable. ID is a unique identifier for each heart failure occurrence. There may be multiple ID values for the same cohort participant ID (CELB02).

### **Related Variables**

CELB02

## **2.4. TEACHING**

### **Purpose**

To determine an occurrence hospital 's teaching status

### **Type**

Occurrence

### **Description**

TEACHING is a character variable.

### **Algorithm**

See the algorithm under HFAA01A (hospital codes) for details.

### **Related Variables**

HFAA0A

## 3. Demographic / Eligibility Variables

### 3.1. AGE

#### Purpose

To determine a participants age at each occurrence in cohort Surveillance.

#### Type

Occurrence

#### Description

AGE is a numeric variable.

#### Algorithm

##### SAS Code

```
PREBDAY=not((month(DDATE)>month(DOB1)) or  
(month(DDATE)=month( DOB1) & day(DDATE)>= day( DOB1)));  
AGE=year(DDATE)-year(DOB1)-PREBDAY;
```

#### Related Variables

DDATE, DOB1



## **3.2. RACE1**

### Purpose

To determine the race/ethnicity of a participant for occurrences in cohort surveillance.

### Type

Occurrence

### Description

RACE1 is a character variable. The value of RACE1 is derived from question number 4 of the Common Hospital Information (CHI) form.

### Algorithm

#### SAS Code

```
RACE1=CHIA4;
```

### Related Variables

CHIA4

### **3.3. SEX**

#### **Purpose**

To determine a participants sex for occurrences in cohort surveillance.

#### **Type**

Occurrence

#### **Description**

SEX is a character variable. The value of SEX is derived from question number 3 of the CHI form.

#### **Algorithm**

##### SAS Code

```
SEX=CHIA3;
```

#### **Related Variables**

CHIA3

## 3.4. CSKIPOUT

### Purpose

To identify occurrences where the hospital record suggests there are no signs /symptoms indicative of heart failure.

### Type

Occurrence

### Description

CSKIPOUT is a character variable. CSKIPOUT indicates an occurrence that does not need to be abstracted beyond questions 1, 2, and 3a of the HFA form. These questions are related to the onset of signs and symptoms of heart failure and the presence of an ICD-428 discharge code in the medical record. A response of 'No' to all of these questions suggests the occurrence is not heart failure related.

### Algorithm

If HFA questions 1, 2, 3a='No' then CSKIPOUT=1.  
Otherwise CSKIPOUT=0.

#### SAS Code

```
if Celighfa=1 then do;
if (not (hfaa1a="Y"| hfaa1b="Y"| hfaa1c="Y"| hfaa1d="Y"| hfaa1e="Y" or hfaa2="Y")) AND
(hfaa3="N" or hfaa3a="N")
then cskipout=1; else cskipout=0;
cprereview=1- cskipout;
end;
```

### Related Variables

HFAA1a, HFAA1b, HFAA1c, HFAA1d, HFAA1e, HFAA2, HFAA3, HFAA3a

## 4. Occurrence Follow-up Time Variables

### 4.1. DDATE\_FollowUpDays

#### Purpose

To determine the follow-up time in days since visit 1 and date of discharge for each occurrence.

#### Type

Occurrence

#### Description

DDATE is a numeric variable. DDATE is derived from question 0c of the HFA form.

#### Algorithm

DDATE is taken from the HFA form, Question 0C.

#### SAS Code

```
DATE=HFAA0c
```

#### Related Variables

HFAA0c, YEARDOD, V1date01

### 4.2. DDATE\_Year

#### Purpose

To determine the year of date of discharge for each occurrence.

### **4.3. HFEVTDATE\_FollowUpDays**

#### **Purpose**

To determine the follow-up time in days since visit 1 and the occurrence date for heart failure cohort surveillance.

#### **Type**

Occurrence

#### **Description**

HFEVTDATE is a numeric variable. HFEVTDATE is derived from question number 6a of the CHI form. This is the date of admission for each occurrence. IF CHIA6a is missing then the date of discharge is used.

#### **Algorithm**

The HFEVTDATE takes the first non-missing date from this ordering of variables (questions on forms CHI, HFA, and CFD): CHIA6a, CHIA0c, HFAA0c, and CFDA0c. If they are all missing then HFEVTDATE is missing.

#### **SAS Code**

HFEVTDATE follows this hierarchy:

```
If CHIA6a ne . then HFEVTDATE=CHIA6a;  
Else If CHIA0c ne . then HFEVTDATE= CHIA0c;  
Else If HFAA0c ne . then HFEVTDATE= HFAA0c;  
Else If CFDA0c ne . then HFEVTDATE= CFDA0c;  
Else HFEVTDATE= .;
```

#### **Related Variables**

CHIA6a, CHIA0c, HFAA0c, CFDA0c, V1date01

### **4.1 HFEVTDATE\_Year**

#### **Purpose**

To determine the year of the occurrence date for heart failure cohort surveillance.

## 5 Miscellaneous Variables

### 5.1 BMI

#### Purpose

To determine the body mass index for the current hospitalization.

#### Type

Occurrence

#### Description

BMI is a continuous variable. BMI is derived from questions HFAA20b (discharge weight), HFAA20a (admission weight) and HFAA19a, height; after transforming both variables to metric system using the unit information recorded in HFAA20b1, HFAA20a1 and HFAA19a1; BMI is set to  $\text{weight}/(\text{height}*\text{height})$ .

#### Algorithm

To calculate weight use discharge weight in metric units (both HFAA20b and HFAA20b1 should not be missing). If any of them is missing use admission weight in metric units (both HFAA20a and HFAA20a1 should not be missing). Calculate height in metric units (both HFAA19a and HFAA19a1 should not be missing). Finally set BMI to  $\text{weight}/(\text{height}*\text{height})$ .

#### Related Variables

BMI\_CAT

## 5.2 BMI\_CAT

### Purpose

To determine the body mass index category for the current hospitalization.

### Type

Occurrence

### Description

BMI\_CAT is a numeric variable. BMI\_CAT is derived from BMI. The standard categories are: underweight, normal, overweight and obese.

### Algorithm

If BMI is missing set BMI\_CAT to missing. If BMI is not missing and less than 18.5 set BMI\_CAT to 1 (underweight). If BMI is in the interval [18.5,25) set BMI\_CAT to 2 (normal). If BMI is in the interval [25,30) set BMI\_CAT to 3 (overweight). If BMI is greater or equal than 30 set BMI\_CAT to 4 (obese).

### Related Variables

BMI

## 5.3 BNP\_LAST

### Purpose

To determine the last laboratory value of brain natriuretic peptide (BNP) for the current hospitalization.

### Type

Occurrence

### Description

BNP\_LAST is a continuous variable. BNP\_LAST is derived from question HFAA39b. For all occurrences where HFAA39b is > 5000 then BNP\_LAST is set to 5001.

### Algorithm

If HFAA39b is missing then set BNP\_LAST to missing.

If HFAA39b is >5000 then BNP = 5001.

If HFAA39b is not missing and less than or equal to 5000, set BNP\_LAST = HFAA39b.

### Related Variables

BNP\_WORST



## 5.4 BNP\_WORST

### Purpose

To determine the worst laboratory value of brain natriuretic peptide (BNP) for the current hospitalization.

### Type

Occurrence

### Description

BNP\_WORST is a continuous variable. BNP\_WORST is derived from question HFAA39a. For all occurrences where HFAA39a is > 5000 then BNP\_WORST is set to 5001.

### Algorithm

If HFAA39a is missing then set BNP\_LAST to missing.

If HFAA39a is >5000 then BNP = 5001.

If HFAA39a is not missing and less than or equal to 5000, set BNP\_LAST = HFAA39a

### Related Variables

BNP\_LAST

## 5.5 EGFREPI\_LAST

### Purpose

To determine the last laboratory value of eGFREpi for the current hospitalization.

### Type

Occurrence

### Description

EGFREPI\_LAST is a continuous variable. EGFREPI\_LAST is derived from the variables: age, race, sex and Creatinine\_last (HFAA44b); using the Epi algorithm defined below.

### Algorithm

```
brace=0;
if race1='B' then brace=1;

If sex='F'
EGFREPI_LAST=141*[min(CREATININE_LAST/0.7,1)^-
0.329]*[max(CREATININE_LAST/0.7,1)^-1.209]*(0.993^age)*[brace*0.159+1]*1.018
If sex='M'
EGFREPI_LAST=141*[min(CREATININE_LAST/0.9,1)^-
0.411]*[max(CREATININE_LAST/0.9,1)^-1.209]*(0.993^age)*[brace*0.159+1]

If race1 is missing or equal to 'U' or sex is missing or Creatinine_last is missing set
EGFREPI_LAST to missing.
```

### Related Variables

EGFREPI\_WORST, CREATININE\_LAST, CREATININE\_WORST

## 5.6 EGFREPI\_WORST

### Purpose

To determine the worst laboratory value of eGFREpi for the current hospitalization.

### Type

Occurrence

### Description

EGFREPI\_WORST is a continuous variable. EGFREPI\_WORST is derived from the variables: age, race, sex and Creatinine\_worst (HFAA44a); using the Epi algorithm defined below.

### Algorithm

brace=0;  
if race1='B' then brace=1;

If sex='F'  
 $EGFREPI\_WORST = 141 * [\min(CREATININE\_WORST/0.7, 1)]^{-0.329} * [\max(CREATININE\_WORST/0.7, 1)]^{-1.209} * (0.993^{age}) * [brace * 0.159 + 1] * 1.018$

If sex='M'  
 $EGFREPI\_WORST = 141 * [\min(CREATININE\_WORST/0.9, 1)]^{-0.411} * [\max(CREATININE\_WORST/0.9, 1)]^{-1.209} * (0.993^{age}) * [brace * 0.159 + 1]$

If race1 is missing or equal to 'U' or sex is missing or Creatinine\_worst is missing set EGFREPI\_WORST to missing.

### Related Variables

EGFREPI\_LAST, CREATININE\_LAST, CREATININE\_WORST

## 5.7 LOS

### Purpose

To determine the length of stay for the current hospitalization.

### Type

Occurrence

### Description

LOS is an integer variable. LOS is derived as the difference of HFAA0c (discharge date) and CHIA6a (arrival date).

### Algorithm

```
If HFAA0c-CHIA6a>=0
  then LOS=HFAA0c-CHIA6a
  else LOS=.
```

### Related Variables

## **5.8 TROPONINI\_LAST**

### **Purpose**

To determine the last laboratory value of troponin I for the current hospitalization.

### **Type**

Occurrence

### **Description**

TROPONINI\_LAST is a numeric variable. TROPONINI\_LAST is derived from question number 42b of the HFA form.

### **Algorithm**

IF HFA Question 42b is anything < 0.10 then TROPONINI\_LAST = 0.000001. Otherwise TROPONINI\_LAST is the response to HFA Question 42b.

### **Related Variables**

TROPONINI\_WORST, TROPONINT\_LAST, TROPONINT\_WORST

## **5.9 TROPONINI\_WORST**

### **Purpose**

To determine the worst laboratory value of troponin I for the current hospitalization.

### **Type**

Occurrence

### **Description**

TROPONINI\_WORST is a numeric variable. TROPONINI\_WORST is derived from question number 42a of the HFA form.

### **Algorithm**

IF HFA Question 42a is anything < 0.10 then TROPONINI\_WORST = 0.000001. Otherwise TROPONINI\_WORST is the response to HFA Question 42b.

### **Related Variables**

TROPONINI\_LAST, TROPONINT\_LAST, TROPONINT\_WORST

## **5.10 TROPONINT\_LAST**

### **Purpose**

To determine the last laboratory value of troponin T for the current hospitalization.

### **Type**

Occurrence

### **Description**

TROPONINT\_LAST is a numeric variable. TROPONINT\_LAST is derived from question number 41b of the HFA form.

### **Algorithm**

IF HFA Question 41b is anything < 0.1 then TROPONINT\_LAST = 0.000001. Otherwise TROPONINT\_LAST is the response to HFA Question 41b.

### **Related Variables**

TROPONINT\_WORST, TROPONINI\_LAST, TROPONINI\_WORST

## **5.11 TROPONINT\_WORST**

### **Purpose**

To determine the worst laboratory value of troponin T for the current hospitalization.

### **Type**

Occurrence

### **Description**

TROPONINT\_WORST is a numeric variable. TROPONINT\_WORST is derived from question number 41a of the HFA form.

### **Algorithm**

IF HFA Question 41a is anything < 0.1 then TROPONINT\_WORST = 0.000001. Otherwise TROPONINT\_WORST is the response to HFA Question 41a.

### **Related Variables**

TROPONINT\_LAST, TROPONINI\_LAST, TROPONINI\_WORST