MORTALITY FORM
H98

Variables of Interest

H9805 -	**Date of Death**	Month, Day, Year
H9806A -	**Place of Death Hospital**	00=Not in Hospital 01-91=Specific Hospital 92=Doctor's Office 94=At Work 97=Nursing Homes 99=Unknown
H9806B -	**Place of Death If not admitted to hospital**	2=Institutional 3=At Home 4=ER 5=DOA 6=Other 9=Unknown
H9807 -	**Necropsy**	0=No 1=Head 2=Thorax 3=Head & Thorax 4=Abdomen 5=Head & Abdomen 6=Thorax & Abdomen 7=Complete 8=External or other 9=Unknown
H9810A - Underlying Cause **H9810B - Contributing Cause 1** **H9810C - Contributing Cause 2**		International Classification of Diseases - 8th revision ICD codes. Usually use the first 3 digits of the ICD code to identify cause of death.

Brief Description of How to Use Data

The first 3 digits of the Underlying Cause of Death (H9810A) is usually used to identify the cause of death, but all three cause of death fields (H9810A, H9810B, H9810C) may be used to identify specific deaths.

Programming Example

The following SAS code identifies all CHD deaths.

```
DATA H98; INFILE H98;
INPUT HHP 2-6 H9810A 47-49 H9810B 52-54 H9810C 57-59;
LABEL H9810A = 'Underlying COD'
      H9810B = 'Contributing COD 1'
      H9810C = 'Contributing COD 2';

IF ((H9810A IN (410,411,412)) | (H9810B IN (410,411,412)) |
(H9810C IN (410,411,412))) THEN CHDDTH = 1;
```

HEART SURVEILLANCE CODE SHEET - CHD
H20

Variables of Interest

04. **Myocardial Infarction (MI)**

H2004A - ECG evidence

0 = **No evidence of MI**
1 = **Definite acute MI** in the presence of abnormal Q/QS(positive, doubtful, or possible by HHP criteria) and typical evolutionary changes of ST-T on serial ECGs.
3 = **Definite old (or age undetermined) MI** consistent with the HHP criteria, with or without temporal changes (normal to positive MI).
4 = **Doubtful acute MI** (suggestive but non diagnostic Q/QS with serial ST-T changes), or ECG temporal changes suggestive of interim silent MI.
5 = **ECG temporal changes** consistent with a change from normal to doubtful or possible MI.
6 = **Indeterminable**, because of altered QRS patterns due to complete heart block, complete LBBB, WPW, ventricular tachycardia, idioventricular rhythm, pacing, etc.
8 = **Presence of doubtful or possible old MI** by HHP criteria, without temporal changes.
9 = **ECG not done**, or technically poor and difficult to make diagnosis of MI.

H2004B - Enzyme evidence

0 = **All enzymes within the upper limit of normal** for specific hospital laboratories.
1 = **The peak level of any enzyme (especially CPK) is ≥ 2X normal**, and the elevation is considered to be due to MI. The abnormal level of isoenzymes such as CPK-MB and LDH-1 should also be regarded as important diagnostic indicators. In some cases, definite elevation of isoenzymes, especially CPK-MB, in the absence of total CPK elevation may be considered diagnostic of acute MI. Also, the interval from the onset of MI to the date of enzyme determination should be taken into account. SGOT was used as the only enzyme for diagnosis of acute MI in early period of the study. However, recently CPK and LDH were used as more specific and reliable indicators of MI. Therefore, whenever CPK was determined, its level should primarily be used for diagnosis of MI. The elevation of SGOT alone should not be considered diagnostic for MI.
2 = **The peak level of enzymes (especially CPK) exceeds the upper normal limit, but not more than 2X normal**, and this elevation is thought to be caused by acute MI. However, isoenzymes are not measured or of borderline level.
8 = **The elevation of enzymes exceeding the upper normal limit**, but isoenzymes were negative or not measured. There exists no clinical event consistent with acute MI, but some conditions possibly responsible for the elevation of enzymes are present.
9 = **Enzymes were not measured or unknown**

H2004C - Locations of MI

0 = **No abnormal Q-wave in any lead.**
2 = **The presence of abnormal Q/QS in extensive anterior or anterolateral leads** [any two combinations of the following three groups of lead: (1) I or $_aV_L$, (2) $V_{1,2,3, \text{ or } 4}$ and (3) $V_{5 \text{ or } 6}$] or in high lateral lead ($_aV_L$ alone).
3 = **Abnormal Q/QS in antero-septal leads** (V_{1-4}).
4 = **Abnormal Q/QS in inferior leads** (II, III, $_aV_F$) or infero-posterior leads (Q/QS in II, III, $_aV_F$ and R/S >1.0 with ST-T changes in V_1).
5 = **Combination of 2 or 3 plus 4.**
7 = **The presence of R/S>1.0 with ST-T changes** in strictly posterior lead (V_1).
9 = L**ocation unknown.**

H2004D - Date of MI

Code the same month/year as the date of hospitalization. Sometimes, acute MI developed in a different month during the same hospitalization. In this case, code the month/year when MI occurred.
Code 9999 if the date of MI is entirely unknown.
Code 99(87) if only the year of MI is known.
Code 0000 if MI is absent.

05. **Acute Coronary Insufficiency (CI)**

H2005A - Acute CI - Diagnostic code

0 = **No CI**
1 = **Definite CI,** with severe coronary-type chest pain usually lasting 30 minutes or longer, and accompanied by ECG evidence of transient ST-T changes. However, there should be no ECG or enzyme evidence of acute MI.
2 = **Possible CI,** with severe chest pain, but not accompanied by transient ST-T changes on ECG. However there must be fixed ST-T changes which were not present on previous ECGs.
8 = **Doubtful CI,** with severe prolonged chest pain alone, without any ECG evidence of new ST-T changes.
9 = **No information available** on chest pain

H2005B - Date of event

Same as described in H2004D for MI.

06. **Angina pectoris**

H2006A - Diagnosis code

0 = **No chest pain**
1 = **Episodic substernal chest pain or discomfort,** with or without radiation to the shoulder, arm, or jaw, caused by exertion and usually lasting 15 minutes or less. This pain must be relieved shortly by rest or taking nitroglycerin.
2 = **Same type of pain occurring at rest.**
3 = **Same type of pain both on exertion and at rest.**
4 = **Discharge diagnosis or documented history of angina with use of nitrates,** but no details of information on the nature of chest pain are available.
8 = **Chest pain suggestive of possible angina,** but non-diagnostic.
9 = **No clinical information on chest pain available.**

H2006B - Date of angina

Same as described in H2004D for MI.
In great majority of angina cases, the date of onset is usually indeterminable.

17. **H2017 - Associated Conditions**

If the occurrence of MI or acute CI is considered to be caused or precipitated by associated conditions, the following codes should be used accordingly.

0 = **No associated condition present.**
1 = **Severe bleeding usually from G-I organs** and the level of hemoglobin is ≤ 8 gm.
2 = **Major surgery** (including CABG and PTCA) which caused MI during or shortly after the surgery.
3 = **Malignancy** (in terminal stage).
4 = **Precipitating conditions** such as severe renal failure, COPD, diabetic ketoacidosis, septicemia, acute CVA (not resulting from MI), etc.

22. **H2022 - Cardiac Scan**

The following codes are used according to the results of thallium or other myocardial scan tests. If the test is done along with exercise (treadmill) both categories should be coded simultaneously.

0 = **Negative**
1 = **Positive**
2 = **Doubtful**
9 = **Not done or unknown**

23. **H2023 - Treadmill Test**

0 = **Negative**
1 = **Positive (ST ≥1mm, or chest pain developed)**
2 = **Doubtful**
9 = **Not done or unknown**

24. **Coronary Angiography**

Use the worst value listed below for each branch of the coronary artery.

H2024A - Left Main
H2024B - Left Anterior Descending
H2024C - Left Circumflex
H2024D - Right

0 = **No stenotic lesion**
1 = **Total occlusion**
2 = **≥ 90% stenosis**
3 = **70-89% stenosis**
4 = **50-69% stenosis**
5 = **<50% stenosis**
6 = **Severe stenosis** (without numerical data)
7 = **Moderate stenosis**
8 = **Mild or minimal stenosis**
9 = **Not done or unknown**

25. **H2025 - Left Ventriculography**

0 = **Normal**
1 = **Aneurysm**
2 = **Segmental akinesis**
3 = **Segmental hypokinesis**
4 = **Resting end diastolic pressure > 15 mmHg**
5 = **Ejection fraction <0.50**
6 = **1, 2, or 3 plus 4 or 5**
8 = **Other abnormal or doubtful findings**
9 = **Not done or unknown**

26. **H2026 - Status of Previous Grafts**

0 = **No previous graft present**
1 = **All grafts patent**
2 = **Some grafts occluded**
3 = **All grafts occluded patency**
8 = **Indeterminate on the patency of previous grafts**
9 = **Angiography not done or unknown**

27. **H2027 - Coronary Bypass Surgery**

0 = **Not done**
1 = **One graft**
2 = **Two grafts**
3 = **Three grafts**
4 = **Four grafts**
5 = **Five grafts**
6 = **Six or more grafts**
9 = **Unknown**

28. **H2028 - Other Cardiac Surgery**

0 = **Not done**
1 = **Coronary angioplasty (PTCA)**
2 = **Ventricular aneurysmectomy**
3 = **Valvular replacement**
9 = **Unknown**

If multiple surgeries are done, choose one according to the priority shown above.

29. **H2029 - Date of Surgery**

Code the month/year of surgery
If not done, code 0000
If date unknown, code 9999

30. **H2030 - Echocardiography**

0 = **Normal**
1 = **Wall motion abnormality** (consistent with ischemic myocardial lesions)
2 = **Doubtful for ischemic myocardial disease**
8 = **Other abnormalities**
9 = **Not done or unknown**

Brief Description of How to Use Data

The **worst** manifestation of CHD is based on the following priority:

Sudden death < 1 hour with unknown underlying cause of death has the highest priority. CHD death from underlying or any contributing cause of death is worse than non-fatal myocardial infarction. Non-fatal MI is worse than acute coronary insufficiency. Acute CI is worse than angina. For multiple events with the same diagnostic severity, the worst manifestation is the earliest one. CHD death or Sudden death is dated by date of death.

The **first** manifestation of CHD is based on the following priority:

The first CHD is the earliest dated event of sudden death < 1 hour with unknown underlying cause of death, CHD death, non-fatal myocardial infarction, coronary insufficiency or angina. CHD death or sudden death is dated by date of death.

Programming Example

This program identifies CHD prevalence at Exam 1 and worst manifestation incident cases after Exam 1. It uses variables from the Surveillance data base as well as data from examinations.

```
LIBNAME IN 'C:\SAS\DATA';

DATA T1; SET IN.EX1; * EXAM1 FILE ;
KEEP HHP X1MO X1YR X1DY;

DATA T2; SET IN.H20; * MORBIDITY FILE H20 ;

label H2006A='ANGINA PECTORIS H2006A'
   H2006BMO ='AP MONTH H2006B'
   H2006BYR ='AP YEAR H2006B '
     H2005A ='ACUTE CI H2005A '
   H2005BMO ='CI MONTH H2005B '
   H2005BYR ='CI YEAR H2005B '
    H2003DY ='HOSPITALIZATION DAY '
    H2003MO ='HOSPITALIZATION MONTH'
    H2003YR ='HOSPITALIZATION YEAR '
     H2004A ='MI BY ECG H2004A '
     H2004B ='MI BY ENZYMES H2004B'
   H2004DMO ='MI MONTH H2004D '
   H2004DYR ='MI YEAR H2004D'
;
KEEP HHP  H2006A H2006BMO H2006BYR H2005A H2005BMO H2005BYR H2003MO
H2003YR H2003DY H2004A H2004B H2004DMO H2004DYR;

PROC SORT; BY HHP H2003YR H2003MO H2003DY;

DATA CHD1; MERGE T1 T2(IN=H20S); BY HHP;
IF H20S=1;
```

```
DATA TMPAP1; SET CHD1;
IF H2006A=1 OR H2006A=2 OR H2006A=3 OR H2006A=4;
IF H2006BYR = 99 AND H2006BMO = 99 THEN H2006BYR = H2003YR;
IF H2006BYR > 88 THEN DELETE; * FOLLOW-UP THROUGH END OF 1988;
DATA TMPAP2; SET TMPAP1; BY HHP;
IF FIRST.HHP;
KEEP HHP H2006A H2006BMO H2006BYR;

DATA TMPCI1; SET CHD1;
IF H2005A=1;
KEEP HHP H2005A H2005BMO H2005BYR;
IF H2005BYR > 88 THEN DELETE; * FOLLOW-UP THROUGH END OF 1988;
DATA TMPCI2; SET TMPCI1; BY HHP;
IF FIRST.HHP;
KEEP H2005A HHP H2005BMO H2005BYR;

DATA TMPMI1; SET CHD1;
IF H2004B=1 OR H2004A=1 OR H2004A=3 OR H2004A=5 ;
MI=1;  LABEL MI='POSITIVE MI FROM SURV';
IF H2004DYR = 99 AND H2004DMO = 99 THEN H2004DYR = H2003YR;
KEEP MI HHP H2004DMO H2004DYR;
IF H2004DYR > 88 THEN DELETE; * FOLLOW-UP THROUGH END OF 1988;
DATA TMPMI2; SET TMPMI1; BY HHP;
IF FIRST.HHP;
KEEP HHP MI H2004DMO H2004DYR;

DATA T3; MERGE TMPAP2 TMPCI2 TMPMI2 T1; BY HHP;
* IDENTIFY CHD PREVALENCE AND INCIDENCE FROM MORBIDITY FILE ;
IF H2006BMO = 99 THEN H2006BMO=1;
IF H2004DMO > 12 THEN H2004DMO=1;
EX1PREV=0; LABEL EX1PREV='EXAM1 CHD PREV FROM SURVEILLANCE';
CHDINC =0; LABEL CHDINC ='CHD INCIDENCE FROM SURVEILLANCE';

IF (MI = 1   AND (MDY(H2004DMO,1,H2004DYR) <= MDY(X1MO,X1DY,X1YR)))
OR (H2005A=1 AND (MDY(H2005BMO,1,H2005BYR) <= MDY(X1MO,X1DY,X1YR)))
OR (1<=H2006A<=4 AND
   (MDY(H2006BMO,1,H2006BYR) <= MDY(X1MO,X1DY,X1YR)))
THEN EX1PREV=1;
ELSE CHDINC=1;

DATA T4; SET IN.H98; * MORTALITY FILE (H98);
LABEL H9805MO ='DEATH MONTH H9805'
       H2018A ='SUDDEN DTH DURATION H2018A '
      H9805YR ='DEATH YEAR H9805'
       H9810A ='UNDERLYING CAUSE OF DEATH H9810A'
       H9810B ='CONTRIBUTING CAUSE1 OF DEATH H9810B'
       H9810C ='CONTRIBUTING CAUSE2 OF DEATH H9810C'
;
IF H9805YR > 88 THEN DELETE; * FOLLOW-UP PERIOD THRU END OF 1988;
* IDENTIFY CHD DEATH, SUDDEN DEATH FROM MORTALITY ;
CHDDTH=0;
IF (410<=H9810A<=414 OR 410<=H9810B<=414 OR 410<=H9810C<=414) THEN
CHDDTH=1;
SUDDTH=0;
IF (H9810A=999 AND H2018A=1) THEN SUDDTH=1;
```

```
LABEL CHDDTH='ANY CAUSE OF DEATH=410-414'
      SUDDTH='UNDERLY=999 + SDN < 1HR';
KEEP HHP CHDDTH SUDDTH H9805YR;


DATA CHD2; MERGE T3 T4; BY HHP;
CHDWST=0;
IF 1<=H2006A<=4  THEN CHDWST=1;   * AP ;
* ADD ANGINA FROM EXAM2, EXAM3 DIAGNOSTIC IMPRESSION;
* IF T112=1 THEN CHDWST=1; * AP (POSITIVE) FROM EXAM2;
* IF V286=1 THEN CHDWST=1; * AP (POSITIVE) FROM EXAM3;
IF H2005A=1      THEN CHDWST=2;   * CI ;
IF MI=1          THEN CHDWST=3;   * NON-FATAL MI ;
* ADD MI FROM EXAM2 AND EXAM3;
* IF T215=1 OR T215=2 THEN CHDWST=3; * MI TEMP CHANGE FROM EXAM2;
* IF V322=1 OR V322=2 THEN CHDWST=3; * MI TEMP CHANGE FROM EXAM3;
IF CHDDTH=1      THEN CHDWST=4;   * CHD DEATH ;
IF SUDDTH=1      THEN CHDWST=5;   * SUDDEN DEATH ;
IF EX1PREV=1     THEN CHDWST=20;  * EXAM1 PREVALENCE ;
LABEL CHDWST='1=AP 2=CI 3=NFT MI 4=SDN DTH 5=CHDDTH';

* EXAM1 TO 1988 CHD INCIDENCE BY WORST MAINIFESTATION FROM SURVEILLANCE
;

RUN;
```

HEART SURVEILLANCE CODE SHEET - CVA
H20

Variables of Interest

07. **H2007 - CVA**

0 = **Not applicable** (Non cerebrovascular event, no CVA found, CVA due to an associated condition, no clinical diagnosis, history nor residual although neuroimaging reveals "lacunes", leukoariosis or ischaemic changes)

1 = **Definite CVA**

a. Nonhemorrhagic - Neurological deficit which lasts over two weeks with evidence of infarction by neuroimaging or surgery, neurological deficit of less than two weeks with death intervening and with evidence of infarction by neuroimaging or surgery of postmorten examination, neurological deficit of less than two weeks with conversion of neuroimaging from the first neuroimaging for current event to subsequent neuroimaging, or

b. Hemorrhagic - Atraumatic hemorrhagic lumbar puncture with focal neurological deficit or signs and symptioms of meningismus, subarachnoid or intrasial hemmorrhage demonstrated on neuroimaging, surgery or postmortem examination, or

c. Lacunar CVA - Clinical diagnosis and/or history of with neuroimaging on admission which shows either no CVA or an old CVA combined with followup neuroimaging which shows a new lacunar CVA which cleared without residual

2 = **Probable CVA**

a. Nonhemorrhagic - Clinical course compatible with infarction but no confirmatory neuroimaging and death intervened, clinical course strongly suggestive of infarction with residual over two weeks but not confirmatory neuroimaging, Old event: strong history compatible with CVA in the past with residual over two weeks but further documentation of old event unavailable, or

b. Hemorrhagic - Clinical course compatible with hemorrhagic CVA but with questionable traumatic lumbar puncture or questionable neuroimaging, Old Event: Strong history compatible with hemorrhagic CVA in the past with residual over two weeks but further documentation of old event unavailable, or

c. Clinical course strongly compatible with hemorrhagic or nonhemorrhagic CVA but death precluded diagnostic workup and no post mortem was performed, or

d. Lacunar CVA - Presents with lacunar CVA clinically with negative neuroimaging not performed.

3 = **Possible CVA**
   a. Nonhemorrhagic - Clinical course compatible with CVA but neuroimaging either normal or not performed, surgery not performed, and duration of residual under two weeks or duration of residual unknown, or
   b. Hemorrhagic - With focal neurological signs or signs and symptoms of meningismus or both but lumbar pucture and/or neuroimaging not performed, or
   c. Lacunar CVA - Neuroimaging negative or positive with residual which clears in two weeks: code as Possible CVA and RIND (**R**eversible **I**schemic **N**eurologic **D**eficit), neuroimaging negative or positive with residual which clears in 24 to 48 hours: code as Possible CVA and TIA (**T**ransient **I**schemic **A**ttack).

4 = **Doubtful CVA**
   a. Nonhemorrhagic - Clinical course more compatible with TIA or noncerebrovascular disease than RIND or infarction, or
   b. Hemorrhagic - Questionable traumatic or traumatic hemorrhagic lumbar puncture without focal neurological signs or signs and symptoms of meningismus, or
   c. A non-study event with an associated condition may not be coded as a doubtful CVA, or
   d. A code of TIA may also be coded Doubtful CVA.

5 = **Definite CVA/Non-study Criteria**
   a. An event which by all available evidence is a definite CVA but does not meet the criteria for this study. Most likely, there is an associated condition which precipitated or mimicked the CVA, or
   b. A new hemorrhagic event superimposed onto an old CVA by neuroimaging for both events is to be coded as Definite Non-study with precipitating cause (old CVA) as the associated condition. #60/3 will be coded SC/associated. Both events are seen on neuroimaging and the event can be related to heparinization, ITP or other causes.

6 = **Probable CVA/Non-Study Criteria** (An event which by all available evidence is a probable CVA but does not meet the criteria for this tudy. Most likely, there is an associated condition which precipitated or mimicked the CVA.)

7 = **Possible CVA/Non-Study Criteria** (An event which by all available evidence is a possible CVA but does not meet the criteria for this study. Most likely, there is an associated condition which precipitated or mimicked the CVA.)

8 = **Doubtful CVA/Non-Study Criteria** (An event which by all available evidence is a doubtful CVA but does not meet the criteria for this tudy. Most likely, there is an associated condition which precipitated or mimicked the CVA.)

9 = **Unknown CVA** (Past history of CVA but with no residual or documentation of the event including lumbar puncture and

neuroimaging.)

08. **H2008 - Intracranial Hemorrhage**

0 = **Not applicable** (Noncerebrovascular event, no CVA found, no hemorrhage documented, intracranial hemorrhage due to an associated condition)

1 = **Definite Intracranial Hemorrhage** (Atraumatic hemorrhagic lumbar puncture with focal neurological deficit or signs and symptoms of meningismus, surgical eveidence of intracranial hemorrhage, neuroimaging or post mortem eveidence of intracranial hemorrhage)

2 = **Probable Intracranial Hemorrhage** (Same clinical picture as definite intracranial hemorrhage but without confirmation by neuroimaging, surgery or post mortem examination, Old Event: Strong history of hemorrhagic CVA in the post with residual over two weeks but further documentation unavailable)

3 = **Possible Intracranial Hemorrhage** (Focal deficit and/or signs or meningismus but with traumatic lumbar puncture, questionable traumatic lumbar puncture or lumbar puncture not performed, Old Event: Suggestive history of hemorrhagic CVA in the past with residual over two weeks but further documentation unavailable. Some sudden deaths are included here with negative lumbar puncture if the total picture is consistent with hemorrhage.)

4 = **Doubtful Intracranial Hemorrhage** (Questionable traumatic lumbar puncture or traumatic lumbar puncture without focal signs or signs and symptoms of meningismus, clinical course more compatible with thromboembolism or non-cerebrovascular event)

5 = **Definite Intracranial Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a definite intracranial hemorrhage but does not meet the criteria for this study. Most likely, there is an associated condition which precipitated or mimicked the CVA)

6 = **Probable Intracranial Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a probable intracranial hemorrhage but does not meet the criteria for this study. Most likely, there is an associated condition which precipitated or mimicked the CVA)

7 = **Possible Intracranial Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a possible intracranial hemorrhage but does not meet the criteria for this study. Most likely, there is an associated condition which precipitated or mimicked the CVA)

8 = **Doubtful Intracranial Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a doubtful intracranial hemorrhage but does not meet the criteria for this study. Most likely, there is an associated condition which precipitated or mimicked the CVA)

9 = **Unknown Intracranial Hemorrhage** (No lumbar puncture, neuroimaging, surgery or post mortem performed or the results are unobtainable, insufficient evidence for coding)

H2008A - Intracerebral Hemorrhage

0 = **Not applicable** (Nonhemorrhagic event, subarachnoid event, non-cerebrovascular event, intracerebral hemorrhage due to an associated condition)

1 = **Definite Intracerebral Hemorrhage** (Evidence of intracerebral hemorrhage on neuroimaging, surgery or postmortem examination, atraumatic hemorrhagic lumbar puncture with unquestionable unilateral focal neurologic deficit)

2 = **Probable Intracerebral Hemorrhage** (Less evidence for unilateral focal neurologic deficit with atraumatic hemorrhagic lumbar puncture but without neuroimaging, surgery or postmortem examination)

3 = **Possible Intracerebral Hemorrhage** (Questionable neuroimaging or questionable traumatic or atraumatic hemorrhagic lumbar puncture with focal neurologic signs of death precluded diagnostic workup)

4 = **Doubtful Intracerebral Hemorrhage** (Questionable traumatic or atraumatic hemorrhagic lumbar puncture without focal neurologic signs or symptoms, focal neurologic signs or symptoms but no workup performed)

5 = **Definite Intracerebral Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a definite intracerebral hemorrhage but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA. Includes traumatic intracerebral hematoma.)

6 = **Probable Intracerebral Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a probable intracerebral hemorrhage but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA.)

7 = **Possible Intracerebral Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a possible intracerebral hemorrhage but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA.)

8 = **Doubtful Intracerebral Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a doubtful intracerebral hemorrhage but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA.)

9 = **Unknown Intracerebral Hemorrhage** (No lumbar puncture performed or the results are unobtainable, insufficient evidence for coding)

H2008B - Subarachnoid Hemorrhage

0 = **Not Applicable** (Nonhemorrhagic event, intracerebral event, non-cerebrovascular event, subarachnoid hemorrhage due to an associated condition)

1 = **Definite Subarachnoid Hemorrhage** (Atraumatic hemorrhagic lumbar puncture with signs and symptoms of meningismus and no focal deficit, difinite eveidence for subarachnoid hemorrhage on neuroimaging, surgery or post mortem examination)

2 = **Probable Subarachnoid Hemorrhage** (Questionable traumatic hemorrhagic lumbar puncture with signs and symptoms of meningismus, no focal deficit and no other workup, hemorrhagic lumbar puncture with signs and symptoms of meningismus and equivocal focal neurological deficit)

3 = **Possible Subarachnoid Hemorrhage** (Signs and symptoms of meningismus but no lumbar puncture or other workup performed, atraumatic nonhemorrhagic lumbar puncture with signs and symptoms of meningismus, no focal neurological deficit and no other workup)

4 = **Doubtful Subarachnoid Hemorrhage** (Questionable traumatic lumbar puncture with nonfocal neurological deficit without signs and symptoms of meningismus and no other workup)

5 = **Definite Subarachnoid Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a definite subarachnoid hemorrhage but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA. Includes traumatic intracerebral hematoma.)

6 = **Probable Subarachnoid Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a probable subarachnoid hemorrhage but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA.)

7 = **Possible Subarachnoid Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a possible subarachnoid hemorrhage but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA.)

8 = **Doubtful Subarachnoid Hemorrhage/Non-Study Criteria** (An event which by all available evidence is a doubtful subarachnoid hemorrhage but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA.)

9 = **Unknown Subarachnoid Hemorrhage** (Symptoms of meningismus without further documentation available, insufficient evidence for coding)

09. **H2009 - Thrombo-embolic CVA**

0 = **Not Applicable** (Hemorrhagic event, non-cerebrovascular event)

1 = **Definite Thrombo-embolic CVA** (Neurologic deficit with evidence of infarction by neuroimaging, surgery or post mortem examination, neurologic deficit in a patient who meets the criteria for definite CVA with obvious source of emboli and atraumatic clear or mildly hemorrhagic lumbar puncture)

2 = **Probable Thrombo-embolic CVA** (Neuroimaging negative for hemorrhage and nonconfirmatory for infarct but clinical course strongly suggestive of thrombo-embolic CVA with residual over two weeks)

3 = **Possible Thrombo-embolic CVA** (Clinical course compatible with thrombo-embolic CVA but neuroimaging, surgery or post mortem not performed, and duration of residual under two weeks or duration of residual unknown. Old Event: strong history of thrombo-embolic CVA in the past with residual over two weeks but further documentation unavailable)

4 = **Doubtful Thrombo-embolic CVA** (Clinical course more compatible with TIA, intracranial hemorrhage or noncerebrovascular disease than RIND or infarction.)

5 = **Definite Thrombo-embolic CVA/Non-Study Criteria** (An event which by all available evidence is a definite thrombo-embolic CVA but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA.)

6 = **Probable Thrombo-embolic CVA/Non-Study Criteria** (An event which by all available evidence is a probable thrombo-embolic CVA but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA.)

7 = **Possible Thrombo-embolic CVA/Non-Study Criteria** (An event which by all available evidence is a possible thrombo-embolic CVA but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA.)

8 = **Doubtful Thrombo-embolic CVA/Non-Study Criteria** (An event which by all available evidence is a doubtful thrombo-embolic CVA but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA.)

9 = **Unknown Thrombo-embolic CVA** (Past history of thrombo-embolic CVA without any residual or specific documentation of the event, insufficient evidence for coding)

H2009A - Thrombotic CVA

0 = **Not Applicable** (Hemorrhagic event, non-cerebrovascular event)

1 = **Definite Thrombosis** (Same criteria as definite thrombo-embolic but with no evidence for either hemorrhage or embolism)

2 = **Probable Thrombosis** (Same criteria as probable thrombo-embolic but neuroimaging negative for hemorrhage, clinical course more compatible with thrombotic infarction or RUND and no clear indication for embolism)

3 = **Possible Thrombosis** (Same criteria as possible thrombo-embolic but neuroimaging negative for hemorrhage, clinical course compatible with thrombotic infarction and no clear indication for embolism)

4 = **Doubtful Thrombosis** (Clinical course more compatible with TIA, embolism or hemorrhage but workup not adequate for confirmation)

5 = **Definite Thrombosis/Non-Study Criteria** (An event which by all available evidence is a definite thrombotic CVA but does not meet the criteria for this study. Most likely there is as associated condition which precipitated or mimicked the CVA)

6 = **Probable Thrombosis/Non-Study Criteria** (An event which by all available evidence is a probable thrombotic CVA but does not meet the criteria for this study. Most likely there is as associated condition which precipitated or mimicked the CVA)

7 = **Possible Thrombosis/Non-Study Criteria** (An event which by all available evidence is a possible thrombotic CVA but does not meet the criteria for this study. Most likely there is as associated condition which precipitated or mimicked the CVA)

8 = **Doubtful Thrombosis/Non-Study Criteria** (An event which by all available evidence is a doubtful thrombotic CVA but does not meet the criteria for this study. Most likely there is as associated condition which precipitated or mimicked the CVA)

9 = **Unknown Thrombosis** (Past history of thrombosis without any residual or documentation, insufficient evidence for coding)

H2009B - Embolic CVA

0 = **Not Applicable** (Thrombotic or hemorrhagic event, non-cerebrovascular event)

1 = **Definite Embolism** (Neurologic deficit in a person who meets the criteria for definite Thrombo-embolic CVA with an obvious source of emboli, and an atraumatic clear or mildly hemorrhagic lumbar puncture or post mortem evidence)

2 = **Probable Embolism** (neurologic deficit in a person who meets the criteria for probable Thrombo-embolic CVA with an obvious source of emboli regardless of whether lumbar puncture was performed)

3 = **Possible Embolism** (Neurologic deficit in a person who meets the criteria for possible Thrombo-embolic CVA with or without an obvious source of emboli. No confirmation by lumbar puncture)

4 = **Doubtful Embolism** (Neurologic deficit present but with an equivocal source of emboli. No confimation by lumbar puncture)

5 = **Definite Embolism/Non-Study Criteria** (An event which by all available evidence is a definite embolism but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA)

6 = **Probable Embolism/Non-Study Criteria** (An event which by all available evidence is a probable embolism but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA)

7 = **Possible Embolism/Non-Study Criteria** (An event which by all available evidence is a possible embolism but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA)
8 = **Doubtful Embolism/Non-Study Criteria** (An event which by all available evidence is a doubtful embolism but does not meet the criteria for this study. Most likely there is an associated condition which precipitated or mimicked the CVA)
9 = **Unknown** (Documentation of serach for embolic source not available or information insufficient for coding)

H2010 - RIND/TIA (**R**eversible **I**schemic **N**eurologic **D**eficit/**T**ransient **I**schemic **A**ttack)

Note:
a. Many "lacunar strokes" will be included in #1-5, #8-9
b. Some posterior circulation TIA's may last up to 48 hrs
c. Lumbar puncture is not essential for diagnosis after 1980
d. RIND may also be coded as possible CVA (H2007, H2009, H2009A, H2009B)
e. TIA may also be coded as doubtful CVA (H2007, H2009, H2009A, H2009B)

0 = **Not Applicable** (Not RIND or TIA event, Non-cerebrovascular event)
1 = **Definite RIND** (Focal Signs and symptoms of neurological deficit which cleared completely in a period over 24-48 hours but within two weeks without residual, with both nonhemorrhagic lumbar puncture and negative neuroimaging performed between the 4th and 14th day (1988 revision))
2 = **Probable RIND** (Focal signs and symptoms of neurological deficit which cleared completely in a period over 24-48 hours but within two weeks without residual. Either nonhemorrhagic lumbar puncutre or neuroimaging was not performed between the 4th and 14th day)
3 = **Possible RIND** (Focal signs and symptoms of neurological deficit which cleared completely in a period over 24-48 hours but within two weeks. Neither nonhemorrhagic lumbar puncture nor neuroimaging performed between the 4th and 14th day. Partial clearing of focal signs and symptoms over 24 hours but with death (or discharge) intervening prior to two weeks and neither nonhemorrhagic lumbar puncture nor neuroimaging between the 4th and 14th day sas performed.)
4 = **Doubtful FIND** (Focal signs and symptoms which persisted for over 24 hours but cleared completely without residual and clinical status at the 14th day is unknown)
5 = **Probable TIA** (Focal neurological signs and symptoms which cleared completely within 24 hours without residual)
6 = **Possible TIA** (Focal neurological signs and symptoms which probably cleared completely within 24 hours without residual but information as to clinical status at the 24 hour period is inadequate for confirmation)
7 = **Doubtful TIA** (Focal neurological symptoms without signs

and which cleared completely within 24 hours)

8 = **Undetermined** (Focal neurological symptoms without signs which subsided completely within a short but undetermined time. Atypical signs and symptoms for cerebrovascular disease which cleared within two weeks without residual)

9 = **Unknown** (Signs and/or symptoms for cerebrovascular disease which cleared in an undocumented length of time. Insufficient information for coding)

H2011 - Lumbar Puncture

0 = **Not Applicable** (No lumbar puncture performed, non-cerebrovascular event)

1 = **Normal LP** (RBC can be up to 50-100 and still be normal)

2 = **Abnormal Atraumatic LP** (With increased opening pressure of over 200 mm)

3 = **Abnormal Atraumatic LP** (With normal opening pressure. If no opening pressure is indicated the assumption is that it was normal)

4 = **Questionable Traumatic LP** (With increased opening pressure over 200 mm)

5 = **Questionable Traumatic LP** (With normal opening pressure)

6 = **Traumatic LP** (With increased opening pressure over 200 mm)

7 = **Traumatic LP** (With normal opening pressure)

8 = **Blank**

9 = **Unknown** (LP done and results unavailable or it is unknown that an LP was done)

H2012 - RBC

0 = **Not Applicable** (No lumbar puncture performed, non-cerebrovascular event)

1 = **0 - 10 RBC**

2 = **11 - 25 RBC**

3 = **26 - 100 RBC**

4 = **101 - 500 RBC**

5 = **501 - 1000 RBC**

6 = **1001 - 2000 RBC**

7 = **2001 - 5000 RBC**

8 = **Over 5000 RBC**

9 = **Unknown** (LP done and results unavailable or it is unknown that an LP was done)

H2013 - Lumbar Puncture - Other Abnormalities

0 = **Not Applicable** (No lumbar puncture performed, non-cerebrovascular event)

1 = **P+W+E_1** (Protein, WBC and enzymes all abnormal)

2 = **P+W_1** (Protein, WBC all abnormal)

3 = **P+E_1** (Protein and enzymes all abnormal)

4 = **W+E_1** (WBC and enzymes all abnormal)

5 = **P** (Protein abnormal (over 45))

6 = **W** (WBC abnormal)

7 = **E_1** (Enzymes abnormal)

8 = Normal (Any tests done and results in normal range. An abnormal result in categories 1-7 precludes the use of

this category)
9 = Unknown (LP done and results unavailable or it is unknown that an LP was done)

H2014 - Other Evidence

0 = **Not Applicable** (No other tests performed, non-cerebrovascular event)
1 = **S+A+E_2** (Brain scan, angiography and EEG all abnormal)
2 = **S+A** (Brain scan and angiography all abnormal)
3 = **S+E_2** (Brain scan and EEG all abnormal)
4 = **A+E_2** (Angiography and EEG all abnormal)
5 = **S** (Brain scan & radioisotope flow study abnormal)
6 = **A** (Angiography abnormal)
7 = **E_2** (EEG abnormal)
8 = **Normal** (Any tests done and results in normal range. An abnormal result in categories 1-7 precludes the use of this category)
9 = **Unknown** (Other tests were done and results unavailable or it is unknown that an LP was done)

H2015 - Date of Event

Date of admission. If the event to be coded was not during admission, use the specified date of the event. Use 9's for any part of the date that is unknown.

H2016 - Status at Discharge

Note: If it is not suspected or known that an associated condition exists, use 0 (alive) or 1 (expired) for coding this column.

0 = **Alive**
1 = **Expired or dead on discharge**
2 = **Alive with diagnosis of CHD due to associated condition**
3 = **Alive with diagnosis of CVA due to associated condition**
4 = **Alive with diagnosis of CHD + CVA due to associated condition**
5 = **Expired with diagnosis of CHD due to associated condition**
6 = **Expired with diagnosis of CVA due to associated condition**
7 = **Expired with diagnosis of CHD + CVA due to associated condition**
8 = **Alive with diagnosis of CHD and/or CVA and existence of associated condition is suspected but unconfirmed**
9 = **Expired with diagnosis of CHD and/or CVA and existence of associated condition is suspected but unconfirmed**

H2017 - Associated Condition

Note: Conditions which may precipitate or mimic the episode of MI, CI, CVA, RIND or TIA which occurred during the current hospitalization being reviewed. If one or more of these events (MI, CI, CVA, RIND or TIA) occurred during one hospitalization and if there is a codable associated condition which is related to only one of the events being coded, a separate code sheet will be compiled for each event. If the associated condition is related to both events being coded, separate code sheets will not be completed. CHD/CVA/combinations plus the associated condition will be

indicated by the appropriate codes in the STATUS column. An unknown associated condition may coexist with a study stroke. A questionable associated condition may coexist with study stroke: it need not be called a non-study stroke if the associated condition is questionable and unable to be verified.

0 = **Not Applicable** (No associated conditions, as defianed above, were clinically detected or no diagnosis of MI, CI, CVA, RIND or TIA can be made)
1 = **Bleed** (Significant bleeding episode preceded the episode of MI, CI, CVA, RIND or TIA being coded)
2 = **Post Operative (Non-Brain)** (The episode of MI, CI, CVA, RIND or TIA being coded occurred during the (non-brain surgery) postoperative convalescence in the hospital)
3 = **Malignancy** (An advanced malignancy existed at the time of the episode of MI, CI, CVA, RIND or TIA being coded. This includes benign brain tumors.)
4 = **Precipitate** (A condition other than a bleeding episode, postoperative state or advanced malignancy exists at the time of the episode of MI, CI, CVA, RIND or TIA being coded which is likely to precipitate the episode being coded. Excluded are atherosclerotic heart or cerebrovascular lesions, hypertension and diabetes. Includes ITP, uremia, etc.)
5 = **Mimic** (A condition other than a bleeding episode, post operative state of advanced malignancy exits at the time of the episode of MI, CI, CVA, RIND or TIA being coded which is likely to mimic the episode being coded)
6 = **Trauma** (The episode of MI, CI, CVA, RIND or TIA being coded occurred during or after trauma)
7 = **Brain Surgery** (The episode of MI, CI, CVA, RIND or TIA being coded occurred during the postoperative (brain surgery) convalescence in the hospital)
8 = **Combinations** of any of the above associated conditions.
9 = **Unknown** (Insufficient evidence to determine if an associated condition is present. This includes the possibility of an associated condition but with no conclusive evidence)

H2018A - Sudden Death (excludes suicide and homicide)
Death from nontraumatic causes occurring within 24 hours after the onset of symptoms of illness judged to be the immediate cause of death. Code on a priority basis according to the length of time between the onset of terminal symptoms and death.

H2018B - Unwitnessed Death
Death from nontraumatic causes which occurred outside the facility and was not observed. Code on a priority basis according to the length of time between the time the person was last seen alive and the time he was found dead.

H2019 - Angiography: invasive/noninvasive
Note: This category includes angiography, MRA and duplex

studies
Coding hierarchy: Angiography takes precedence over all tests, MRA over Duplex

0 = **Normal**
1 = **Total Occlusion** (96-100%)
2 = **Partial Occlusion** (stenosis up to 95%)
3 = **Aneurysm**
4 = **A-V malformation**
5 = **Infarction**
6 = **Intracerebral hematoma**
7 = **Nonspecific abnormality** (All subdurals, duplex with irregularity)
8 = **Combination**
9 = **Not done or results unknown**

H2020 - Brain Scan/Cerebral Blood Flow and Blood Flow component of SPECT

Note: Old Scans (BS/CBF 1965-1990)
Initial blood flow. Delayed component was based on blood/brain barrier breakdown.
New Scans (SPECT 1990 to present)
Initial blood flow. Delayed component is based on perfusion deficit in the area of the stroke

0 = **Not done**
1 = **SDx:** Scan confirms CVA diagnosis
2 = **FDx:** Blood flow confirms CVA diagnosis
3 = **SFDx:** Both confirm CVA diagnosis
4 = **S/O:** Scan show other abnormality
5 = **F/O:** Flow shows other abnormality
6 = **S&F/O:** Both show other abnormality
7 = **ASSOC:** Associated condition present
8 = **WNL:** Normal tests
9 = **UNK:** Not done, unknown if done or results unknown

H2021 - Neuroimagery

0 = **Not Done**
1 = **SC:** Confirms study criteria stroke
2 = **SNC:** Does not confirm study criteria stroke. This includes all subdurals, MID and normal scans.
3 = **SC/ASSOC:** Confirms CVA but stroke due to an associated condition
4 = **SC/PRIOR:** Confirms prior study criteria stroke which was previously documented
5 = **PROB/PRIOR:** Confirms probable prior study criteria stroke which was not previously documented
6 = **POSS/PRIOR:** Confirms possible prior study criteria stroke which was not previously documented
7 = **SC/PNS:** Confirms prior non-study criteria stroke
8 = **PC:** Possibly confirms new study stroke
9 = **UNK:** Not done or results unknown

Brief Description of How to Use Data

The **worst** manifestation of stroke is based on the following priority:

Stroke death is worse than definite stroke. Definite stroke is worse than probable stroke. For multiple non-fatal events with the same diagnostic severity, the worst manifestation is the earliest one. Stroke death is dated by date of death.

The **first** manifestation of stroke is based on the following priority:

The first stroke is the earliest dated definite or probable stroke. For stroke death without any definite or probable stroke, the first event is the fatal event. Stroke death is dated by date of death.

Programming Example

The following program identifies stroke prevalence at Exam 1 and worst manifestation incident cases after Exam 1.

```
LIBNAME IN 'C:\SAS\DATA';
```

a) Prevalent Stroke

```
DATA T1; SET IN.H20; * MORBIDITY FILE (H20);
* IDENTIFY DEFINITE/PROBABLE/POSSIBLE CVA PREVALENCE TO EXAM1 ;
LABEL H2015MO='CVA MONTH H2015'
      H2015YR='CVA YEAR  H2015'
      H2007='CVA'
      H2008='INTRACRANIAL HEMORRHAGE H2008'
     H2008A='INTRACEREBRAL HEMORRHAGE H2008A'
     H2008B='SUBARACHNOID HEMORRHAGE H2008B'
     H2009 ='THROMBO-EMBOLIC H2009'
     H2009A='THROMBOTIC H2009A'
     H2009B='EMBOLIC H2009B'
     ;

IF H2007=1 OR H2007=2 OR H2007=3; * DEFINITE/PROBABLE/POSSIBLE ;
PROC SORT; BY HHP H2015YR H2015MO;

DATA PREV; SET T1; BY HHP;
IF FIRST.HHP;
IF H2015MO=99 THEN H2015MO=1;
IF MDY(H2015MO,1,H2015YR) <= MDY(X1MO,X1DY,X1YR);
EX1PREV=1; LABEL EX1PREV='EXAM1 CVA PREV FROM SURVEILLANCE';
KEEP HHP EX1PREV;
```

b) Incident Stroke (worst event)

```
DATA T2; SET IN.H20; * MORBIDITY FILE (H20);
IF H2007=1 OR H2007=2; * KEEP DEF/PROB CVA ONLY;
IF H2015YR > 88 THEN DELETE; * FOLLOW-UP THROUGH END OF 1988;
KEEP HHP H2015MO H2015YR H2007 H2008 H2009 ;

DATA CVA1; MERGE PREV(IN=PR) T2(IN=H20); BY HHP;
IF H20=1;
IF EX1PREV=1 THEN DELETE;
* ID TYPE OF CVA BY TE OR ICH SEVERITY CODE;
IF H2009=0 OR H2009=4 THEN H2009=9;
IF H2008=0 OR H2008=4 THEN H2008=9;
IF H2009 < H2008 THEN TYPE=1; * TE;
ELSE IF H2009 > H2008 THEN TYPE=2; * INTRACRANIAL HEMORRHAGE;
ELSE TYPE = 3; * UNKNOWN;
LABEL TYPE='TYPE OF CVA: 1=TE 2=ICH 3=UNK ';
PROC SORT; BY HHP H2007 H2015YR H2015MO ;
* SORT BY SEVERITY & CVA DATE TO GET EARLIEST WORST CVA;

DATA CVA2; SET ; BY HHP;
IF FIRST.HHP;

DATA PH98; SET IN.H98; * MORTALITY FILE H98;
* ADD CVA DEATHS;
LABEL H9805MO='DEATH MONTH (H9805)'
      H9810A ='UNDERLYING CAUSE OF DEATH (H9810A)'
      H9805YR='DEATH YEAR (H9805)';

IF H9805YR > 88 THEN DELETE; * FOLLOW-UP PERIOD THROUGH END OF 1988;
IF 430<=H9810A<=438; * KEEP ONLY STROKE DEATHS;
KEEP HHP H9810A H9805MO H9805YR;

DATA CVA3; MERGE PH98(IN=H98) CVA2(KEEP=HHP TYPE H2015MO H2015YR)
                              PREV(KEEP=HHP EX1PREV); BY HHP;
DEAD=H98; LABEL DEAD='H98 CVA DEATHS 0=NO 1=YES';
IF DEAD=0 THEN DO;
  IF TYPE=1 THEN CVAWST=4; * NONFATAL TE ;
  IF TYPE=2 THEN CVAWST=5; * NONFATAL ICH;
  IF TYPE=3 THEN CVAWST=6; * NONFATAL UNK ;
END;
IF DEAD=1 THEN DO;
  IF 432<=H9810A<=434           THEN CVAWST=1; * FATAL TE ;
  IF H9810A=430 OR H9810A=431   THEN CVAWST=2; * FATAL HEM;
  IF 435<=H9810A<=438           THEN CVAWST=3; * FATAL UNKNOWN;
END;

IF EX1PREV=1 THEN CVAWST=20; * EXAM1 PREVALENCE;

LABEL CVAWST='FTL:1=TE 2=HM 3=UNK NFT:4=TE 5=HM 6=UNK';
* EXAM1 TO 1988 CVA INCIDENCE BY WORST MANIFESTATION FROM SURVEILLANCE;
```

```
* CODE FATAL/NONFATAL DEF/PROB THROMBO-EMBOLIC STROKE BY WORST
MANIFESTATION;
TE_WST=0;
IF CVAWST=1 OR CVAWST=4 THEN TE_WST=1;
IF CVAWST=20 THEN TE_WST=20;
LABEL TE_WST='FATAL/NONFATAL DEF/PROB TE BY WORST';
* CODE FATAL/NONFATAL DEF/PROB HEMORRHAGIC STROKE BY WORST
MANIFESTATION;
HM_WST=0;
IF CVAWST=2 OR CVAWST=5 THEN HM_WST=1;
IF CVAWST=20 THEN HM_WST=20;
LABEL HM_WST='FATAL/NONFATAL DEF/PROB HM BY WORST';

RUN;
```