

CALCULATED VARIABLES

Physical Characteristics

AVZMSYS

Average zero muddler systolic blood pressure: average of first and second corrected reading (corrected for zero value). BL & YEAR 3 ONLY.

AVZMDIA

Average zero muddler diastolic blood pressure: average of first and second corrected reading (corrected for zero value). BL & YEAR 3 ONLY.

AVESYS

Average standard systolic blood pressure: average of first and second readings. YEARS 4 through 7.

AVEDIA

Average standard diastolic blood pressure: average of first and second readings. YEARS 4 through 7.

ORTHOSTATIC HYPOTENSION

Change in systolic blood pressure between supine and standing position

ORTH = 0 Normal

ORTH = 1 Abnormal: If drop in Systolic BP > 20 mmHg OR drop in Diastolic BP > 10 mmHg OR standing procedures not performed due to ppt dizziness

ISOLATED SYSTOLIC HYPERTENSION (IHYPERS)

IHYPER = 4 Diastolic Hypertension: If Diastolic BP > 90

IHYPER = 3 Isolated Systolic Hypertension: If Systolic BP > 160 AND Diastolic BP < 90

IHYPER = 2 Borderline Isolated Systolic Hypertension: If Systolic BP 140 - 159 AND Diastolic BP > 90

IHYPER = 1 Normotensive

BMI

Body Mass Index = weight (kg)/height (m) squared.

OVRWT120

Weight > 120% of ideal weight (BMI > 27 in males or 25 in females).

OVRWT130

Weight > 130% of ideal weight (BMI > 29.613 in males or 27.311 in females).

BSA

Body Surface Area (BSA) has been computed using the following formula:

$BSA = 0.0071 * EXP(0.725 * LN(STHT13)) * EXP(0.425 * LN(WEIGHT13 * 0.4536))$.

BRACH

Average of first and second brachial bp from Supine Ankle-Arm BP.

RTIB

Average of first and second right tibial bp from Supine A-A BP.

LTIB

Average of first and second left tibial bp from Supine A-A BP.

RTAAI

RTIB/BRACH.

LTAAI

LTIB/BRACH.

AAI

Minimum of RTAAI and LTAAI.

RENAL FUNCTION

RENAL = 3 Renal Insufficiency: Creatinine > 1.5 mg/dl

RENAL = 2 Mild-moderate renal Insufficiency: Creatinine 1.0 - 1.49 mg/dl

RENAL = 1 Normal: Creatinine < 1.0 mg/dl

Physical Function

ADL

Activities of Daily Living: Number of tasks the participant has difficulty with from the following list: walking around the home, getting out of bed, eating, dressing, bathing, using the toilet.

IADL

Instrumental ADL's: Number of tasks the participant has difficulty with from the following list: heavy housework, light housework, shopping, preparing meals, paying bills, using the phone.

UES

Upper Extremity Score: Number of tasks the participant has difficulty with from the following list: lifting, reaching, gripping.

DOMGRIP

Average of three grip strength attempts in dominant hand.

Medical History

VISPROB

Vision problem: Coded yes if unable to see to drive, to watch TV or to recognize someone across a room with or without glasses.

HEARPROB

Hearing problem: Coded yes if unable to hear well enough to use the phone, listen to the radio or carry on a conversation in a crowded room, with or without a hearing aid.

ROSEIC

Intermittent claudication from Rose Questionnaire.

ROSEANG

Angina from Rose Questionnaire.

CHFSYMPT

Number (0-3) of the following CHF symptoms: sleep on ≥ 2 pillows to breathe, awakened at night by trouble breathing, swelling of feet and ankles during the day which goes down overnight.

FAMILY HISTORY

FHHA = 0 If No Heart Attack in siblings

FHHA = 1 If Heart Attack in siblings

FHHA = 9 If No siblings

ASPIRIN USE

ASPIRIN = 1 If reported using aspirin 3 or more days in past 2 weeks

ASPIRIN = 0 Otherwise

ESTROGEN USE

Two variables describing estrogen use at baseline have been added to the file BASEBOTH.SAV. At baseline for the original cohort, use was assessed by medicine bottle or by self-report of EVER use. Those who brought in meds were coded current users. Self-reported EVER use in the absence of meds was coded former use. If a participant answered "don't know" to the question of ever use and did not bring in a prescription for estrogen, information obtained in later years on former or current use and its duration was used to fill in the missing whenever possible. Otherwise, these "don't know" responders were coded as never users. The two variables are:

ESTBL = any estrogen use at baseline

ESTBLNC = estrogen use at baseline, excluding creams from the current meds

Both are coded:

0 = never 1 = former 2 = current

HYPERTENSION

HYPER = 3 Hypertensive Seated blood pressure average systolic ≥ 160 mmHG, OR seated blood pressure average diastolic ≥ 95 mmHG, OR hx of hypertension = Yes AND participant takes antihypertensive medication

HYPER = 2 Borderline Hypertension Seated blood pressure average systolic = 140 - 159 mmHG, OR Seated blood pressure average diastolic = 90 - 94 mmHG

HYPER = 1 Normotensive Antihypertensive medications: Beta-blockers, Calcium-channel blockers, Diuretics, Vasodilators, Beta-blockers with Diuretics, Angiotensin converting enzyme inhibitors, Angiotensin converting enzyme with diuretics, Vasodilators with Diuretics

DIABETES

1. Baseline (original cohort), year 9 (both cohorts)

DIABWHO = Diabetes by World Health Organization (WHO) guidelines:

1=Normal

2=Impaired fasting glucose (fasting glucose* < 140 mg/dl AND two hour post load glucose* 140 - 199 mg/dl)

3=Diabetes (fasting glucose ≥ 140 mg/dl, OR two hour post glucose load > 200 mg/dl, OR takes insulin medication, OR takes oral hypoglycemic medication)

2. Baseline (original cohort), year 5 (both cohorts, new cohort baseline), year 9 (both cohorts)

DIABADA = Diabetes by American Diabetes Association (ADA) guidelines:

1=Normal

2=Impaired fasting glucose (if fasting glucose = 110-125)

3=Diabetes (if taking insulin or oral hypoglycemics or if fasting glucose \geq 126)

* fasting glucose=GLU44, two hour post load glucose=GLU244

COPD

Chronic Obstructive Pulmonary Disease (COPD), is defined as self-reported physician diagnosis of at least one of: chronic bronchitis, asthma or emphysema.

Neurological History

There are six stroke/TIA variables which have been computed from the baseline Neurologic History Questionnaire. Values for the original cohort can be found in BASE2.zip and values for the African American cohort in YR5NEW.zip, along with other Record 22 variables for each cohort. The computed variables are based on six different symptoms, any of which can indicate a possible stroke or TIA. These symptoms and their variable names are:

SPLOSS22 Sudden loss or change of speech

VSLOSS22 Sudden loss or blurring of vision

DBLVIS22 Sudden spell of double vision

NUMTNG22 Sudden numbness, tingling, or loss of feeling on one side of body

PARWK22 Sudden paralysis or weakness on one side of body

DIZBAL22 Sudden dizziness, loss of balance or sensation of spinning

For each symptom there are numerous questions about its location, duration, and other associated problems. Based on the responses to these questions, a value is computed for each symptom indicating the possible origin of a stroke or TIA. A zero value for a given symptom indicates either that 1) the symptom did not occur, or 2) if the symptom did occur, the subsequent responses did not suggest a stroke or TIA. Other possible values are:

- TIA, vertebrobasilar insufficiency
- TIA, right carotid
- TIA, left carotid
- Stroke, vertebrobasilar insufficiency
- Stroke, right carotid
- Stroke, left carotid

Behaviors

BEER

Number of 12oz cans of beer consumed per week.

WINE

Number of 6oz glasses of wine consumed per week.

LIQUO

Number of shots of liquor consumed per week.

ALCOH

Number of alcoholic beverages (beer, wine, or liquor) consumed per week.

SMOKE AMOUNT (Passive, Light, Moderate, Heavy)

SMKAMT = 1 Passive Smoker---If ANYONE08 = 1 AND Never Smoker (SMOKE)

SMKAMT = 2 Light Smoker-----1-25 percentile of PKYRS = 1 – 13

SMKAMT = 3 Moderate Smoker--25-75 percentile of PKYRS = 14 – 50

SMKAMT = 4 Heavy Smoker-----75-100 percentile of PKYRS > 51

Exercise

KCAL

Kilocalories expended in all physical activities listed in question 1 of record 4. (Note: the Year 5 variable is not directly comparable to the baseline KCAL, which included questions on tennis and racketball that were not included at year 5.)

KCAL2

Kilocalories expended in physical activities as above, but excluding household chores.

EXINTENS

Categorical exercise intensity variable, calculated from physical activities in question 1 of record 4.

BLOCKS

Blocks walked per week.

Cognitive Function

COGNITIVE FUNCTION - Based on 30 Point Mini-Mental Score (Baseline)

COG = 4 Severe Impairment-----0 – 17

COG = 3 Moderate Impairment---18 – 23

COG = 2 Mild impairment-----24 – 26

COG = 1 Normal-----27+

SEASON = (Summer=1, Fall=2, Winter=3, Spring=4) BASELINE ONLY

Summer---June 21, 1989-September 20, 1989

Fall-----September 21, 1989-December 20, 1989

Winter---December 21, 1989 - March 20, 1990

Spring---(June 1, 1989-June 20, 1989)+(March 21, 1990-May 31, 1990)

Note: All components of the 3MSE score (SCORE134) are labeled as such in the data files. In lieu of individual variables used to calculate a composite component (e.g. 4-legged animals named), the composite component (e.g. animal) is included in the data.

ECG variables

Ventricular Conduction Defect

VCD = 1 If Minnesota Code = 7-1, 7-2 or 7-4

VCD = 0 Otherwise

Major Q-Wave Abnormalities

QQS = 1 If Minnesota Code = 1-1 through 1-2 (except 1-2-8)

QQS = 0 Otherwise

Minor Q, QS Waves with ST-T abnormalities

QST = 1 If Minnesota Code = (1-3 or 1-2-8) and (4-1 to 4-3 or 5-1 to 5-3)

QST = 0 Otherwise

Isolated ST-T Wave Abnormalities

STT = 1 If Minnesota Code = 4-1, 4-2, 5-1, 5-2 without LVH or QQS

STT = 0 Otherwise

Left Ventricular Hypertrophy

ECGLVH = 1 If Minnesota Code = (3-1, 3-3) and (4-1 to 4-3 or 5-1 to 5-3)

ECGLVH = 0 Otherwise

Atrial Fibrillation

ECGAFIB = 1 If Minnesota Code = 8-3

ECGAFIB = 0 Otherwise

First Degree Atrio-Ventricular (AV) Block

AVB = 1 If Minnesota Code = 6-3

AVB = 0 Otherwise

Major ECG Abnormalities

MAJABN = 1 If any of the following abnormalities are present: (VCD, QQS, LVH, STT, AFIB, AVB).

Minor ECG Abnormalities

MINABN = 1 If any of the following abnormalities are present: Minor Q, QS waves; High R waves; Minor Isolated ST-T abnormalities; ST Elevation; Incomplete RBBB, RR1; Long QT Interval; Short PR; Right Axis Deviation; Left Axis Deviation.

Echocardiography

A. CODING AND DEFINITIONS FOR SELECTED CATEGORICAL VARIABLES FROM THE YEAR 7 ECHO

MR43, AR43, TR43, MAC43, AOAC43, RWMA43, AOTHCK43

0 = CANT ASSESS

1 = NONE

2 = MILD

3 = MODERATE

4 = SEVERE

For Mitral and Tricuspid Regurg (MR43 and TR43), MILD signifies maximal displacement of atrial area by the color flow jet in any view is less than 1/3. MODERATE signifies maximal displacement is 1/3 to 1/2, SEVERE means maximal displacement is > 1/2.

For Aortic Regurg (AR43), MILD means the width of color flow jet in LV outflow tract is less than 1/2 of the LVOT width. MODERATE means the width of the jet is 1/2 to 3/4 LVOT width, SEVERE means the width of the jet > 3/4 LVOT width.

For Qualitative Mitral Annular Calcification (MAC43), MILD signifies focal, limited increased echodensity of mitral annulus, MODERATE signifies marked echodensity involving more than 1/3 of ring, SEVERE signifies marked echodensity involving 1/2 or more of ring, with at least some compression of LV inflow tract.

For Qualitative Aortic Ring Thickening/Calcification (AOAC43), MILD signifies focal, limited increased echodensity of aortic annulus, MODERATE signifies extensive echodensity involving more than 1/2 of ring circumference, but with preserved leaflet mobility, SEVERE indicates extensive echodensity involving entire circumference of aortic ring, with limitation of leaflet excursion.

For Regional Wall Motion Abnormalities (RWMA43), NORMAL means no dyssynchronous LV wall segments, at least 75% of 16 segments available, MILD means hypokinesis of 1/3 or less of evaluable segments, MODERATE means hypokinesis of 1/2 to 2/3 of evaluable segments, or akinesis/dyskinesis of 1/3 of evaluable segments, SEVERE signifies akinesis/dyskinesis of 1/3 evaluable segments and hypokinesis of additional 1/3 or more.

For Qualitative Aortic Leaflet Thickening (AOTHCK43), MILD means focal, limited increased echodensity of aortic leaflets, MODERATE indicates diffuse or extensive increased echodensity, some thin leaflet echos appreciable, SEVERE signifies diffuse "white out" of aortic valve tissue.

VARIABLE LVFNCT43

0 = CANT ACCESS

1 = NORMAL

2 = MILD DECREASE

3 = MOD DECREASE

4 = SEV DECREASE

For Qualitative LV Function (LVFNCT43), NORMAL signifies that the ejection fraction is estimated equal or more than 55%, MILD signifies ejection fraction equal to 45-54%, MODERATE signifies ejection fraction of 30-45%, and SEVERE indicates an ejection fraction < 30%.

AOEXC43

0 = CANT ACCESS

1 = NORMAL

2 = MILD IMP

3 = MODERATE IMP

4 = SEVERE IMP

For Qualitative Aortic Leaflet Excursion (AOEXC43), NORMAL signifies maximal cusp separation 1.5 cm or greater, MILD means cusp separation 1.0 to 1.4 cm, MODERATE indicates cusp separation 0.5 to 0.9 cm, SEVERE signifies cusp separation < 0.5 cm.

B. FORMULAE FOR COMPUTED BASELINE AND YEAR 7 ECHO VARIABLES

LV PERCENT FRACTIONAL SHORTENING

$$\text{MMLVFS43} = 100 * (\text{MMLVDD43} - \text{MMLVDS43}) / \text{MMLVDD43}$$

LV MASS

NEWLVM43 (Baseline) or MMLVMS43 (Year 7):

$$(0.80 * 1.04 * (((\text{MMLVDD43} + \text{MMVSTD43} + \text{MMLVWD43}) ** 3) - (\text{MMLVDD43} ** 3))) + 0.6$$

END SYSTOLIC STRESS

NEWESS43 (Baseline) or MMLVSS43 (Year 7):

$$(0.334 * \text{SUPSYS16} * \text{MMLVDS43}) / ((1 + (\text{MMLVWS43} / \text{MMLVDS43})) * \text{MMLVWS43})$$

C. FORMULAE FOR ADJUSTING YEAR 7 VARIABLES TO BASELINE

The Echo lab had done some duplicate reading of records, which were originally considered Quality Control readings but were meant to replace the original readings. The replacement has been done. In addition, for some of the Echo variables, there is an original value and an adjusted value. The adjustment value aligns the Yr 7 readings with the baseline ones for analyses examining change over time or for analyses combining the baseline and Yr 7 echo readings. The adjustment variables are indicated by an "AD" ending and the originals by the record "43" ending in the YR7 file. The adjustment variables are defined as follows:

$$\begin{aligned} \text{DPMAPAD} &= (\text{DPMAP43} + 3.24) / 100 & \text{DPMEPAD} &= (\text{DPMEP43} + 2.41) / 100 \\ \text{MMARDAD} &= \text{MMARD43} - 0.097 & \text{MMLVDDAD} &= \text{MMLVDD43} + 0.067 \\ \text{MMLVDSAD} &= \text{MMLVDS43} + 0.089 & \text{MMVSTSAD} &= \text{MMVSTS43} - 0.112 \\ \text{MMLVFSAD} &= 100 * (\text{MMLVDDAD} - \text{MMLVDSAD}) / (\text{MMLVDDAD}) \end{aligned}$$

BASELINE EVENTS STATUS VARIABLES

For each of the six major disease classifications in CHS there are two baseline status variables. The original status variable ends in BASE, and the updated status variable ends in BLMOD.

The *BASE variables use only information available at baseline, including self-report, exam, ECG's, and review of medical history. The coding of the *BASE variables is as follows:

0=no history
1= definite past history, confirmed by exam or medical records
2= possible past history;

reported but not confirmed³= past unreported history; not reported, but found on exam(for MI, Angina, and Claudication only).

The *BLMOD variables classify a participant according to whether or not they are at risk for an incident event. Anyone with a *BASE value of 1=definite past history has a *BLMOD value of 1=prevalent. Initially, possible past history and past unreported history are coded in *BLMOD as 0=at risk for an incident event. During the review of hospitalization records for our events adjudication process, it may become evident that a participant was prevalent for one of the six major diseases at baseline. If so, the baseline status is modified to incorporate this new information. Thus, the *BLMOD variables have changed over the years.

For example, a participant with no history of MI at baseline will have MIBASE=0. If, during the review of records for a hospitalization after baseline, records were found indicating that an MI had occurred before the person was enrolled in CHS, the MIBLMD variable would be set to 1, while the MIBASE variable would remain 0. Both variables give prevalent disease status at baseline, but the *BLMOD variable reflects the latest and most accurate information we have about baseline status. The current values reflect the results of our adjudication of events through June 30, 2002.

Composite CHD variable

The variable CHDBLMOD is set to 1 if MIBLMD = 1 or ANBLMD = 1 or there is a report of angioplasty or bypass surgery prior to entry into CHS.

Adjusting for laboratory drift

Blood constituent values were collected at years 2, 5 and 9. For many of the variables, longitudinal plots showed that the average change between visits was larger than expected. This change is presumed to be the result of "laboratory drift", that is continuous small changes in laboratory operating conditions and procedures that are noticeable in magnitude when comparing measurements 3-4 years apart. The variables which have been adjusted incorporate the letters "ADJ" in their names.

Adjusted variables are defined as follows:

- Year 2, Old Cohort (baseline):
Total Cholesterol: $CHOLADJ = CHOL44 - 3.24$
LDL Cholesterol: $LDLADJ = LDL44 - 3.24$
- Year 5, Both Cohorts (New Cohort baseline):
Total Cholesterol: $CHOLADJ = CHOL44 + 6.97$
LDL Cholesterol: $LDLADJ = LDL44 + 6.97$
Uric Acid: $URICADJ = URIC44 - 0.22$
Potassium: $KADJ = K44 - 0.03$
Creatinine: $CREADJ = CRE44 - 0.05$
- Year 9, Both Cohorts:
Total Cholesterol: $CHOLADJ = CHOL44 - 1$
Creatinine: $CREADJ = CRE44 + 0.02$

$$\text{Albumin: ALBADJ} = \text{ALB44} + 0.4$$

$$\text{Fasting Glucose: GLUADJ} = \text{GLU44} + 3.65$$

C-reactive protein (CRP) was initially measured only on baseline bloods. Later, it was measured on year 5 bloods using a different assay. The values obtained from the two assays were not directly comparable without adjustment. The original baseline measurements were adjusted using the following formula:

- $$\text{CRPBLADJ} = \exp[\ln(\text{CRPBLORG, original values}) + 0.2781]$$

Note: for the New Cohort, while all three CRP values (adjusted, original and year 5) contain valid data, they all originate from the same blood sample. It is only appropriate to consider change in CRP from baseline (year 2) to year 5 for the Original Cohort.

Guidelines for categorizing selected continuous variables

TOTAL CHOLESTEROL - NCEP Guidelines

CHOL = 3 High-----Cholesterol > 240 mg/dl
CHOL = 2 Borderline High-----
Cholesterol 200-239 mg/dl
CHOL = 1 Desirable-----Cholesterol < 200 mg/dl

LDL - NCEP Guidelines

LDL = 3 High-----LDL > 160 mg/dl
LDL = 2 Borderline High-----LDL 130-159
mg/dl
LDL = 1 Desirable-----LDL < 130 mg/dl

HDL

HDL = 2 Low-----HDL < 35 mg/dl
HDL = 1 Desirable-----HDL > 35 mg/dl

Ankle-Arm Index

AAI ≤ 0.9 = low
AAI > 0.9 = normal

Depression score

DEPSCR05 < 8 = normal
DEPSCR05 ≥ 8 = at risk for clinical depression

Guidelines for Retinal Summary Data:

ARM - Age-related Maculopathy (ARM)

ARM = 0 None
ARM = 1 Early----- Soft drusen = 1 or
RPE depigmentation = 1
ARM = 2 Late----- Geographic atrophy = 1 or
Subretinal fibrosis = 1 or
Subretinal hemorrhage = 1 or
SSR detachment = 1

MACED - Macular Edema

MACED = 0 No----- Macular Edema ≤ 1
MACED = 1 Yes----- Macular Edema > 1

RETINOP - Retinopathy

RETINOP = 0 No----- Diabetic retinal level = 10

RETINOP = 1 Yes----- Diabetic retinal level > 10