

# BRFSS Statistical Brief on Cancer Screening Questions

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# BRFSS Statistical Brief on Cancer Screening Questions

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## Objective

To provide the rationale and procedures for analyzing cancer screening measures that align with Healthy People 2020 screening objectives.

## Background

Cancer remains a leading cause of death in the United States, second to heart disease, and one of the top areas of public health focus.<sup>1-4</sup> Because evidence-based cancer screening tools have contributed to a decline in the number of new cancer cases and prevented deaths from some cancers,<sup>5</sup> cancer screening measures have been included since the inception of the Healthy People national health objectives (Appendix 1). Previous Healthy People objectives for cancer screening focused on screening test with or without a time interval. [Healthy People 2020 objectives](#) focus on the timeliness of receiving an evidence-based screening test recommended by the United States Preventive Services Task Force (USPSTF).<sup>6</sup> Healthy People 2020 also includes the objective for colorectal cancer (CRC) as a leading health indicator.

Healthy People screening measures have been adapted for state use in different settings, including comprehensive cancer control plans and chronic disease indicators, with the Behavioral Risk Factor Surveillance System (BRFSS) as the data source.<sup>7-9</sup> CDC's Division of Cancer Prevention and Control has analyzed BRFSS data for several publications in the *Morbidity and Mortality Weekly Report (MMWR)* (Appendix 2). These publications usually report age-adjusted prevalence estimates for specific cancers by age groups (Appendix 3).

## History

BRFSS surveys have asked questions related to breast and cervical cancer screening in two ways:

- (1) Have you ever had the test?
- (2) If "Yes" to (1), then, "When was your last test"?

The surveys have followed a similar format for CRC screening, asking questions about fecal occult blood tests (FOBTs) and endoscopy.

Endoscopic tests for CRC screening have changed over time and have included proctoscopy, sigmoidoscopy, and colonoscopy. In 2008, questions were added to differentiate between sigmoidoscopy and colonoscopy, the two endoscopic tests used most commonly in medical practice for screening. These questions are asked as follows:

- (1) Have you ever had either of these exams?
- (2) If "Yes" to (1), then, "Which exam did you have"?
- (3) If "Yes" to (1), then, "When was your last exam"?

The BRFSS does not include questions to distinguish between a diagnostic test and a screening test. A diagnostic test is used to determine the presence or absence of cancer when a patient shows signs or symptoms. For example, if a patient sees his or her primary care physician for blood in his or her stool, then a colonoscopy for diagnostic purpose may be ordered. A screening test is performed on people who do not show any symptoms of cancer.

More detailed information about the 2012 BRFSS questionnaire used by the states is available in Appendix 4 and Appendix 5. (Note: CATI instructions were omitted for ease in presenting the questions and their corresponding response categories. For more information, see [http://www.cdc.gov/brfss/questionnaires/pdf-ques/2012\\_BRFSS.pdf](http://www.cdc.gov/brfss/questionnaires/pdf-ques/2012_BRFSS.pdf).)

## Analytic Code for Breast Cancer Screening Variable

*Meets Healthy People 2020 Objective C-17*

The USPSTF recommends breast cancer screening with a mammogram every 2 years for women aged 50–74 years.

MAM2YR is a calculated variable for respondents who have had a mammogram in the past 2 years. It is derived from HADMAM and HOWLONG. The variables SEX and AGE are used to define the appropriate subpopulation.

1	Met recommendation	Received a mammogram within the past 2 years. (HADMAM=1 and HOWLONG=1,2)
2	Did not meet recommendation	Did not receive a mammogram within the past 2 years. [HADMAM=2 or (HADMAM=1 and HOWLONG=3,4,5)]
.	Missing	Don't know, not sure, or refused responses for HADMAM or Don't know, not sure, refused, or missing responses for HOWLONG

**Subsetting statement:** SEX=2 AND 50<=AGE<=74;

**SAS Code:**

```
IF HADMAM=2 THEN MAM2YR=2;
ELSE IF HADMAM=1 THEN DO;
  IF HOWLONG IN (1,2) THEN MAM2YR=1;
  ELSE IF HOWLONG IN (3,4,5) THEN MAM2YR=2;
END;
```

**R Code:**

```
mam2yr<-ifelse(hadmam==2, 2, NA)
mam2yr<-ifelse(hadmam==1 & howlong %in% c(1,2), 1, mam2yr)
mam2yr<-ifelse(hadmam==1 & howlong %in% c(3,4,5), 2, mam2yr)
```

**Stata Code:**

```
gen mam2yr=.
replace mam2yr=2 if hadmam==2
replace mam2yr=1 if hadmam==1 & (howlong==1 | howlong==2)
replace mam2yr=2 if hadmam==1 & howlong>=3 & howlong<=5
```

## Analytic Code for Cervical Cancer Screening Variable

*Partially meets Healthy People Objective C-15*

The USPSTF recommends cervical cancer screening (1) every 3 years with a Pap test for women aged 21–65 years or (2) a combination of Pap test and human papillomavirus (HPV) testing every 5 years for women aged 30–65 years.

In 2012, the USPSTF recommendations included the HPV test for cervical cancer screening. BRFSS questions on HPV testing were included as a separate optional module on the 2014 questionnaire. HPV testing questions will be added to the breast and cervical screening module beginning with the 2015 questionnaire. This statistical brief will be updated when these data become available.

PAP3YR is a calculated variable for respondents who have had a Pap test in the past 3 years. It is derived from HADPAP2 and LASTPAP2. The variables SEX, AGE, and HADHYST2 are used to define the appropriate subset.

1	Met recommendation	Received a Pap test within the past 3 years. (HADPAP2=1 and LASTPAP2=1,2,3)
2	Did not meet recommendation	Did not receive a Pap test within the past 3 years. [HADPAP2=2 or (HADPAP2=1 and LASTPAP2=4,5)]
.	Missing	Don't know, not sure, or refused responses for HADPAP2 or Don't know, not sure, refused, or missing responses for LASTPAP2

**Subsetting statement:** SEX=2 AND HADHYST2=2 AND 21<=AGE<=65

**SAS Code:**

```
IF HADPAP2=2 THEN PAP3YR=2;
ELSE IF HADPAP2=1 THEN DO;
  IF LASTPAP2 IN (1,2,3) THEN PAP3YR=1;
  ELSE IF LASTPAP2 IN (4,5) THEN PAP3YR=2;
END;
```

**R Code:**

```
pap3yr<-ifelse(hadpap2==2, 2, NA)
pap3yr<-ifelse(hadpap2==1 & lastpap2 %in% c(1,2,3), 1, pap3yr)
pap3yr<-ifelse(hadpap2==1 & lastpap2 %in% c(4,5), 2, pap3yr)
```

**Stata Code:**

```
gen pap3yr=.
replace pap3yr=2 if hadpap2==2
replace pap3yr=1 if hadpap2==1 & lastpap2>=1 & lastpap2<=3
replace pap3yr=2 if hadpap2==1 & (lastpap2==4 | lastpap2==5)
```

## Analytic Code for Colorectal Cancer Screening: Fecal Occult Blood Test

The USPSTF recommends several tests for the prevention or early detection of CRC among adults aged 50–75 years: (1) high-sensitivity FOBT (guaiac-based FOBT or fecal immunochemical test [FIT]) annually, (2) colonoscopy every 10 years, or (3) sigmoidoscopy every 5 years with FOBT every 3 years. Because of limitations on the number of questions in the CRC screening module, analysts will not be able to differentiate between the guaiac-based FOBT and the FIT.

This section explains the codes used to analyze data for people who have had a high-sensitivity FOBT in the past year. It is an interim step to calculating prevalence estimates for meeting the USPSTF recommendation and Healthy People objective C-16 (see page 10). See pages 7–9 for information on other parts of the recommendation.

HFOB1YR is a calculated variable for respondents who have had a home FOBT in the past year. It is derived from BLDSTOOL and LSTBLDS3. The variable AGE is used to define the appropriate subset.

- |   |  |   |
|---|--|---|
| 1 | Met high-sensitivity FOBT portion of recommendation          | Received a home FOBT within the past year. (BLDSTOOL=1 and LSTBLDS3=1)  |
| 2 | Did not meet high-sensitivity FOBT portion of recommendation | Did not receive a home FOBT within the past year. [BLDSTOOL=2 or (BLDSTOOL=1 and LSTBLDS3=2,3,4,5)]                         |
| . | Missing  | Don't know, not sure, or refused responses for BLDSTOOL or Don't know, not sure, refused, or missing responses for LSTBLDS3 |

**Subsetting statement:** 50<=AGE<=75

**SAS Code:**

```
IF BLDSTOOL=2 THEN HFOB1YR=2;
ELSE IF BLDSTOOL=1 THEN DO;
  IF LSTBLDS3=1 THEN HFOB1YR=1;
  ELSE IF LSTBLDS3 IN (2,3,4,5) THEN HFOB1YR=2;
END;
```

**R Code:**

```
hfob1yr<-ifelse(bldstool==2, 2, NA)
hfob1yr<-ifelse(bldstool==1 & lstbllds3==1, 1, hfob1yr)
hfob1yr<-ifelse(bldstool==1 & lstbllds3 %in% c(2,3,4,5), 2, hfob1yr)
```

**Stata Code:**

```
gen hfob1yr=.
replace hfob1yr=2 if bldstool==2
replace hfob1yr=1 if bldstool==1 & lstbllds3==1
replace hfob1yr=2 if bldstool==1 & lstbllds3>=2 & lstbllds3<=5
```

## Analytic Code for Colorectal Cancer Screening: Colonoscopy

The USPSTF recommends several tests for the prevention or early detection of CRC among adults aged 50–75 years: (1) high-sensitivity FOBT (guaiac-based FOBT or fecal immunochemical test [FIT]) annually, (2) colonoscopy every 10 years, or (3) sigmoidoscopy every 5 years with FOBT every 3 years. Because of limitations on the number of questions in the CRC screening module, analysts will not be able to differentiate between the guaiac-based FOBT and the FIT.

This section explains the codes used to analyze data for people who have had a colonoscopy in the past 10 years. It is an interim step to calculating prevalence estimates for meeting the USPSTF recommendation and Healthy People objective C-16 (see page 10). See pages 6, 8, and 9 for information on the other parts of the recommendation.

COL10YR is a calculated variable for respondents who have had a colonoscopy in the past 10 years. It is derived from HADSIGM3, HADSGCOL, and LASTSIG3. The variable AGE is used to define the appropriate subset.

- |   |  |   |
|---|--|---|
| 1 | Met colonoscopy portion of recommendation          | Received a colonoscopy within the past 10 years. (HADSIGM3=1 and HADSGCOL=2 and LASTSIG3=1,2,3,4,5)   |
| 2 | Did not meet colonoscopy portion of recommendation | Did not receive a colonoscopy within the past 10 years. [HADSIGM3=2 or (HADSIGM3=1 and LASTSIG3=6)]   |
| . | Missing  | Don't know, not sure, or refused responses for HADSIGM3 or Don't know, not sure, refused, or missing responses for LASTSIG3 or Last test was a sigmoidoscopy or unknown type that occurred within the past 10 years |

**Subsetting statement:** 50<=AGE<=75

**SAS Code:**

```
SUBSET: 50<=AGE<=75;

IF HADSIGM3=2 THEN COL10YR=2;
ELSE IF HADSIGM3=1 THEN DO;
  IF HADSGCO1=2 & LASTSIG3 IN (1,2,3,4,5) THEN COL10YR=1;
  ELSE IF LASTSIG3=6 THEN COL10YR=2;
END;
```

**R Code:**

```
col10yr<-ifelse(hadsigm3==2, 2, NA)
col10yr<-ifelse(hadsigm3==1 & hadsgco1==2 & lastsig3 %in% c(1,2,3,4,5),
1, col10yr)
col10yr<-ifelse(hadsigm3==1 & lastsig3==6, 2, col10yr)
```

**Stata Code:**

```
gen col10yr=.
replace col10yr=2 if hadsigm3==2
replace col10yr=1 if hadsigm3==1 & hadsgco1==2 & lastsig3>=1 &
lastsig3<=5
replace col10yr=2 if hadsigm3==1 & lastsig3==6
```

## Analytic Code for Colorectal Cancer Screening: Sigmoidoscopy in Combination with Home Fecal Occult Blood Test

The USPSTF recommends several tests for the prevention or early detection of CRC among adults aged 50–75 years: (1) high-sensitivity FOBT (guaiac-based FOBT or fecal immunochemical test [FIT]) annually, (2) colonoscopy every 10 years, or (3) sigmoidoscopy every 5 years with FOBT every 3 years. Because of limitations on the number of questions in the CRC screening module, analysts will not be able to differentiate between the guaiac-based FOBT and the FIT.

This section explains the codes used to analyze data for people who have had both a sigmoidoscopy in the past 5 years and an FOBT in the past 3 years. It is an interim step to calculating prevalence estimates for meeting the USPSTF recommendation and Healthy People objective C-16 (see page 10). The subinterim steps for calculating data for people who have had only a sigmoidoscopy should not be used for analysis. See pages 6 and 7 for information on the other parts of the recommendation.

FOBTFS is a calculated variable for respondents who have had a sigmoidoscopy in the past 5 years and a home FOBT in the past 3 years. FOBTFS is derived from BLDSTOOL, LSTBLDS3, HADSIGM3, HADSGCOL, and LASTSIG3.

- |   |  |   |
|---|--|---|
| 1 | Met combined sigmoidoscopy and FOBT portion of recommendation          | Adults aged 50–75 years who have had a sigmoidoscopy within the past 5 years <i>and</i> a home FOBT within the past 3 years. (HADSIGM3=1 and HADSGCOL=1 and LASTSIG3=1,2,3,4 and BLDSTOOL=1 and LSTBLDS3=1,2,3) |
| 2 | Did not meet combined sigmoidoscopy and FOBT portion of recommendation | Did not receive a sigmoidoscopy within the past 5 years [HADSIGM3=2 or (HADSIGM3=1 and LASTSIG3=5,6)] OR Did not receive a home FOBT within the past 3 years. [BLDSTOOL=2 or (BLDSTOOL=1 and LSTBLDS3=4,5)]     |

**Subsetting statement:** 50<=AGE<=75

**SAS Code:**

```
IF BLDSTOOL=2 THEN HFOB3YR=2;
ELSE IF BLDSTOOL=1 THEN DO;
  IF LSTBLDS3 IN(1,2,3) THEN HFOB3YR=1;
  ELSE IF LSTBLDS3 IN (4,5) THEN HFOB3YR=2;
END;

IF HADSIGM3=2 THEN FS5YR=2;
ELSE IF HADSIGM3=1 THEN DO;
  IF HADSGCO1=1 & LASTSIG3 IN (1,2,3,4) THEN FS5YR=1;
  ELSE IF LASTSIG3 IN (5,6) THEN FS5YR=2;
END;

IF HFOB3YR=1 AND FS5YR=1 THEN FOBTFS=1;
ELSE IF HFOB3YR=2 | FS5YR=2 THEN FOBTFS=2;
```

**R Code:**

```
hfob3yr<-ifelse(bldstool==2, 2, NA)
hfob3yr<-ifelse(bldstool==1 & lstbls3 %in% c(1,2,3), 1, hfob3yr)
hfob3yr<-ifelse(bldstool==1 & lstbls3 %in% c(4,5), 2, hfob3yr)

fs5yr<-ifelse(hadsigm3==2, 2, NA)
fs5yr<-ifelse(hadsigm3==1 & hadsgco1==1 & lastsig3 %in% c(1,2,3,4), 1,
fs5yr)
fs5yr<-ifelse(hadsigm3==1 & lastsig3 %in% c(5,6), 2, fs5yr)

fobfs<-ifelse(hfob3yr==1 & fs5yr==1, 1, 2)
```

**Stata Code:**

```
gen hfob3yr=.
replace hfob3yr=2 if bldstool==2
replace hfob3yr=1 if bldstool==1 & lstbls3>=1 & lstbls3<=3
replace hfob3yr=2 if bldstool==1 & (lstbls3==4 | lstbls3==5)

gen fs5yr=.
replace fs5yr=2 if hadsigm3==2
replace fs5yr=1 if hadsigm3==1 & hadsgco1==1 & lastsig3>=1 &
lastsig3<=4
replace fs5yr=2 if hadsigm3==1 & (lastsig3==5 | lastsig3==6)

gen fobtfs=.
replace fobtfs=1 if hfob3yr==1 & fs5yr==1
replace fobtfs=2 if hfob3yr==2 | fs5yr==2
```

## Analytic Code for Colorectal Cancer Screening: Composite Measure

*Meets Healthy People 2020 Objective C-16*

CRC\_REC is a calculated variable for respondents who have fully met the USPSTF recommendation. It is derived from HFOB1YR, FOBTFS, and COL10YR.

- |   |                                     |   |
|---|-------------------------------------|---|
| 1 | Met USPSTF recommendations          | Received one or more of the recommended CRC tests within the recommended time interval. (HFOB1YR=1 or FOBTFS=1 or COL10YR=1)          |
| 2 | Did not meet USPSTF recommendations | Did not receive one or more of the recommended CRC tests within the recommended time interval. (HFOB1YR=2 and FOBTFS=2 and COL10YR=2) |

**Subsetting statement:** 50<=AGE<=75

**SAS Code:**  
IF HFOB1YR=1 | FOBTFS=1 | COL10YR=1 THEN CRC\_REC=1;  
ELSE IF HFOB1YR=2 & FOBTFS=2 & COL10YR=2 THEN CRC\_REC=2;  
ELSE IF HFOB3YR=1 & HADSIGM3=1 & LASTSIG3 IN (1,2,3,4) THEN  
CRC\_REC=1;

**R Code:**  
crc\_rec<-ifelse(hfob1yr==1 | fobtfs==1 | col10yr==1, 1, 2)  
crc\_rec<-ifelse(is.na(crc\_rec) & hfob3yr==1 & hadsigm3==1 & lastsig3  
%in% c(1,2,3,4), 1, crc\_rec)

**Stata Code:**  
gen crc\_rec=.  
replace crc\_rec=1 if hfob1yr==1 | fobtfs==1 | col10yr==1  
replace crc\_rec=2 if hfob1yr==2 & fobtfs==2 & col10yr==2  
replace crc\_rec=1 if hfob3yr==1 & hadsigm3==1 & lastsig3>=1 &  
lastsig3<=4

## References

1. Murphy SL, Xu JQ, Kochanek KD. Deaths: final data for 2010. *Natl Vital Stat Rep.* 2013;61(4). [http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61\\_04.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_04.pdf). Accessed June 30 2014.
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3. National Center for Health Statistics. *Healthy People 2010 Final Review*. Hyattsville, MD: National Center for Health Statistics, US Dept of Health and Human Services; 2012. PHS publication 2012-1038. [http://www.cdc.gov/nchs/healthy\\_people/hp2010/hp2010\\_final\\_review.htm](http://www.cdc.gov/nchs/healthy_people/hp2010/hp2010_final_review.htm). Accessed June 30 2014.
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6. US Preventive Services Task Force. USPSTF A-Z Topic Guide website. <http://www.uspreventiveservicestaskforce.org/uspsttopics.htm>. Accessed June 30 2014.
7. Centers for Disease Control and Prevention. Comprehensive Cancer Control (CCC) Plans Search website. <http://apps.nccd.cdc.gov/CCCSearch/Default/Default.aspx>. Accessed June 30 2014.
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9. Pelletier AR, Siegel PZ, Baptiste MS, Maylahn C. Revisions to chronic disease surveillance indicators, United States, 2004. *Prev Chronic Dis.* 2005;2(3). [http://www.cdc.gov/pcd/issues/2005/jul/05\\_0003.htm](http://www.cdc.gov/pcd/issues/2005/jul/05_0003.htm). Accessed June 30 2014.

## Appendix 1. Healthy People: Cancer Screening Objectives

### Healthy People 2000

- 16.11 Breast exam/mammogram: Women aged 50 years and over
- 16.12 Pap test, 18 years and over: Ever *and* Past 3 years
- 16.13 Colon screening, 50 years and older: Fecal occult blood test (past 2 years) *and* Sigmoidoscopy (ever)

### Healthy People 2010

- 3-11a Women receiving a Pap test—Ever received (age adjusted, 18+ years)
- 3-11b Women receiving a Pap test—Received within past 3 years (age adjusted, 18+ years)
- 3-12a Colorectal cancer screening—Fecal occult blood test (FOBT) within past 2 years (age adjusted, 50+ years)
- 3-12b Colorectal cancer screening— Proctoscopy, colonoscopy, or sigmoidoscopy ever received (age adjusted, 50+ years)
- 3-13 Women receiving a mammogram within past 2 years (age adjusted, 40+ years)

### Healthy People 2020

- C-15 Increase the proportion of women who receive a cervical cancer screening based on the most recent guidelines
- C-16 Increase the proportion of women who receive a colorectal cancer screening based on the most recent guidelines (leading health indicator)
- C-17 Increase the proportion of women who receive a breast cancer screening based on the most recent guidelines

## **Appendix 2. Morbidity and Mortality Weekly Report Publications that Use BRFSS Cancer Screening Data**

1. Centers for Disease Control and Prevention. Trends in screening for colorectal cancer — United States, 1997 and 1999. *MMWR Morb Mortal Wkly Rep.* 2001;50(09):162-166.
2. Centers for Disease Control and Prevention. Colorectal cancer test use among persons aged >50 years — United States, 2001. *MMWR Morb Mortal Wkly Rep.* 2003;52(10):193-196.
3. Centers for Disease Control and Prevention. Increased use of colorectal cancer tests — United States, 2002 and 2004. *MMWR Morb Mortal Wkly Rep.* 2006;55(11):308-311.
4. Centers for Disease Control and Prevention. Use of mammograms among women aged >40 years — United States, 2000–2005. *MMWR Morb Mortal Wkly Rep.* 2007;56(03):49-51.
5. Centers for Disease Control and Prevention. Use of colorectal cancer tests — United States, 2002, 2004, and 2006. *MMWR Morb Mortal Wkly Rep.* 2008;57(10):253-258.
6. Centers for Disease Control and Prevention. Vital signs: breast cancer screening among women aged 50–74 years — United States, 2008. *MMWR Morb Mortal Wkly Rep.* 2010;59(26):813-816.
7. Centers for Disease Control and Prevention. Vital signs: colorectal cancer screening among adults aged 50–75 years — United States, 2008. *MMWR Morb Mortal Wkly Rep.* 2010;59(26):808-812.
8. Rim SH, Joseph DA, Steele CB, Thompson TD, Seeff LC. Colorectal cancer screening — United States, 2002, 2004, 2006, and 2008. *MMWR Surveill Summ.* 2011;60(1):42-46.
9. Centers for Disease Control and Prevention. Vital signs: colorectal cancer screening, incidence, and mortality — United States, 2002–2010. *MMWR Morb Mortal Wkly Rep.* 2011;60(26):884-889.
10. Miller JW, King JB, Joseph DA, Richardson LC. Breast cancer screening among adult women — Behavioral Risk Factor Surveillance System, United States, 2010. *MMWR Surveill Summ.* 2012;61(2):46-50.
11. Joseph DA, King JB, Miller JW, Richardson LC. Prevalence of colorectal cancer screening among adults — Behavioral Risk Factor Surveillance System, United States, 2010. *MMWR Surveill Summ.* 2012;61(02):51-56.
12. Centers for Disease Control and Prevention. Cervical cancer screening among women aged 18–30 years — United States, 2000–2010. *MMWR Morb Mortal Wkly Rep.* 2013;61(51):1038-1042.
13. Centers for Disease Control and Prevention. Cervical cancer screening among women by hysterectomy status and among women aged ≥65 years — United States, 2000–2010. *MMWR Morb Mortal Wkly Rep.* 2013;61(51):1043-1047.
14. Steele CB, Rim SH, Joseph DA, King JB, Seeff LC. Colorectal cancer incidence and screening — United States, 2008 and 2010. *MMWR Surveill Summ.* 2013;62(3):53-60.
15. Centers for Disease Control and Prevention. Vital signs: colorectal cancer screening test use — United States, 2012. *MMWR Morb Mortal Wkly Rep.* 2013;62(44):881-888.

### Appendix 3. Age Categories for Age Adjustment

Cancer Screening Type	Sex/Age Group	Age Categories
Breast Cancer Screening	Women Aged 50–74 Years	if sex=2; if 50<=age<=59 then ageadj=1; else if 60<=age<=69 then ageadj=2; else if 70<=age<=74 then ageadj=3;
Cervical Cancer Screening	Women Aged 21–65 Years	if sex=2; if 21<=age<=44 then ageadj=1; else if 45<=age<=65 then ageadj=2;
Colorectal Cancer Screening	Adults Aged 50–75 Years	if 50<=age<=64 then ageadj=1; else if 65<=age<=75 then ageadj=2;  OR  if 50<=age<=59 then ageadj=1; else if 60<=age<=69 then ageadj=2; else if 70<=age<=75 then ageadj=3;

```

*SAMPLE SAS CODE;
options nofmterr;
LIBNAME brfs12 'BRFSS\2012';

data one;
set brfs12.BRFSS2012 (keep=_llcpwt _ststr _psu age sex);

*** standard population for men and women aged 50–75 years;
if 50<=age<=64 then ageadj=1;
else if 65<=age<=75 then ageadj=2;

proc freq data=one noprint;
weight _llcpwt;
tables ageadj / list out=stdpop;
run;

proc print data=stdpop;
title 'Standard Population - 2012 BRFSS';
run;

```

## Appendix 4. Questions from the BRFSS Breast and Cervical Cancer Screening Module

**15.1** A mammogram is an x-ray of each breast to look for breast cancer. Have you ever had a mammogram?

- 1 Yes
- 2 No [Go to Q15.3]
- 7 Don't know / Not sure [Go to Q15.3]
- 9 Refused [Go to Q15.3]

**15.2** How long has it been since you had your last mammogram?

- 1 Within the past year (anytime less than 12 months ago)
- 2 Within the past 2 years (1 year but less than 2 years ago)
- 3 Within the past 3 years (2 years but less than 3 years ago)
- 4 Within the past 5 years (3 years but less than 5 years ago)
- 5 5 or more years ago
- 7 Don't know / Not sure
- 9 Refused

**15.3** A clinical breast exam is when a doctor, nurse, or other health professional feels the breasts for lumps. Have you ever had a clinical breast exam?

- 1 Yes
- 2 No [Go to Q15.5]
- 7 Don't know / Not sure [Go to Q15.5]
- 9 Refused [Go to Q15.5]

**15.4** How long has it been since your last breast exam?

- 1 Within the past year (anytime less than 12 months ago)
- 2 Within the past 2 years (1 year but less than 2 years ago)
- 3 Within the past 3 years (2 years but less than 3 years ago)
- 4 Within the past 5 years (3 years but less than 5 years ago)
- 5 5 or more years ago
- 7 Don't know / Not sure
- 9 Refused

**15.5** A Pap test is a test for cancer of the cervix. Have you ever had a Pap test?

- 1 Yes
- 2 No [Go to Q15.7]
- 7 Don't know / Not sure [Go to Q15.7]
- 9 Refused [Go to Q15.7]

**15.6** How long has it been since you had your last Pap test?

- 1 Within the past year (anytime less than 12 months ago)
- 2 Within the past 2 years (1 year but less than 2 years ago)
- 3 Within the past 3 years (2 years but less than 3 years ago)
- 4 Within the past 5 years (3 years but less than 5 years ago)
- 5 5 or more years ago
- 7 Don't know / Not sure
- 9 Refused

**15.7** Have you had a hysterectomy? [Only asked of women who are not pregnant.]

- 1 Yes

2 No  
7 Don't know / Not sure  
9 Refused

## Appendix 5. Questions from the BRFSS Colorectal Cancer Screening Module

**17.1** A blood stool test is a test that may use a special kit at home to determine whether the stool contains blood. Have you ever had this test using a home kit?

- 1 Yes
- 2 No [Go to Q17.3]
- 7 Don't know / Not sure [Go to Q17.3]
- 9 Refused [Go to Q17.3]

**17.2** How long has it been since you had your last blood stool test using a home kit?

- 1 Within the past year (anytime less than 12 months ago)
- 2 Within the past 2 years (1 year but less than 2 years ago)
- 3 Within the past 3 years (2 years but less than 3 years ago)
- 4 Within the past 5 years (3 years but less than 5 years ago)
- 5 5 or more years ago
- 7 Don't know / Not sure
- 9 Refused

**17.3** Sigmoidoscopy and colonoscopy are exams in which a tube is inserted in the rectum to view the colon for signs of cancer or other health problems. Have you ever had either of these exams?

- 1 Yes
- 2 No [Go to next section]
- 7 Don't know / Not sure [Go to next section]
- 9 Refused [Go to next section]

**17.4** For a SIGMOIDOSCOPY, a flexible tube is inserted into the rectum to look for problems. A COLONOSCOPY is similar, but uses a longer tube, and you are usually given medication through a needle in your arm to make you sleepy and told to have someone else drive you home after the test. Was your MOST RECENT exam a sigmoidoscopy or a colonoscopy?

- 1 Sigmoidoscopy
- 2 Colonoscopy
- 7 Don't know / Not sure
- 9 Refused

**17.5** How long has it been since you had your last sigmoidoscopy or colonoscopy?

- 1 Within the past year (anytime less than 12 months ago)
- 2 Within the past 2 years (1 year but less than 2 years ago)
- 3 Within the past 3 years (2 years but less than 3 years ago)
- 4 Within the past 5 years (3 years but less than 5 years ago)
- 5 Within the past 10 years (5 years but less than 10 years ago)
- 6 10 or more years ago
- 7 Don't know / Not sure
- 9 Refused