

# BRFSS Statistical Brief on Cervical Cancer Screening Questions

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## Objective

To provide the rationale and procedures for analyzing cervical 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 tests 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 tests 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 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)* (full list is available at [this citation search tool](#)). These publications usually report age-adjusted prevalence estimates for specific cancers by age groups (Appendix 2).

## History

BRFSS surveys have asked questions related to 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 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. A screening test is performed on people who do not show any symptoms of cancer.

More detailed information about the 2018 BRFSS questionnaire used by the states is available in Appendix 3. (Note: CATI instructions were omitted for ease in presenting the questions and their corresponding response categories. For more information, see [www.cdc.gov/brfss/questionnaires/pdf-ques/2018\\_BRFSS\\_English\\_Questionnaire.pdf](http://www.cdc.gov/brfss/questionnaires/pdf-ques/2018_BRFSS_English_Questionnaire.pdf))

# Analytic Code for Cervical Cancer Screening Variable

*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, (2) a combination of Pap test and human papillomavirus (HPV) test every 5 years for women aged 30–65 years, or (3) HPV test every 5 years for women aged 30–65 years. The updated definition includes HPV test alone in the last 5 years, which is a change based on the 2018 recommendation. The code for meeting recommendations yes/no has been simplified, and the original code for Pap test in 5 years and HPV test in 5 years has been preserved for researchers interested in testing type.

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 were added to the breast and cervical screening module on the 2015 questionnaire.

PAP3YR and PAP5YR are calculated variables for respondents who have had a Pap test in the past 3 years or the past 5 years and are derived from HADPAP2 and LASTPAP2. HPV5YR is a calculated variable for respondents who have had an HPV test in the past 5 years and is derived from HPVTEST and HPLSTTST. The variable PAPHVP5YR is a calculated variable derived from PAP5YR and HPV5YR. PAPSCREEN is a calculated variable derived from PAP3YR, HPV5YR, and PAPHVP5YR and uses \_AGE80 to correctly apply the screening definitions. The variables SEX1, \_AGE80, PREGNANT, 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 and 21<=_AGE80<=65), or received an HPV test within the past 5 years (HPVTEST=1 and HPLSTTST=1,2,3,4 and 30<=_AGE80<=65)  |
| 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) and 21<=_AGE80<=65] or did not receive an HPV test within the past 5 years {[HPVTEST=2 or (HPVTEST=1 and HPLSTTST=5)] and 30<=_AGE80<=65}   |
| . | Missing                     | Don't know, not sure, refused, or missing responses for HADPAP2 or don't know, not sure, refused, or missing responses for LASTPAP2 (ages 21–65), and don't know, not sure, or refused responses for HPVTEST or don't know, not sure, refused, or missing responses for HPLSTTST (ages 30–65) |

**Subsetting statement:** SEX1=2 AND (HADHYST2=2 | PREGNANT=1) AND 21<=\_AGE80<=65

**SAS Code:**

```
*Pap in 3 years;
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;

*Pap in 5 years;
if hadpap2=2 then pap5yr=2;
```

```

else if hadpap2=1 then do;
if lastpap2 in (1,2,3,4) then pap5yr=1;
else if lastpap2=5 then pap5yr=2;
end;

*HPV test in 5 years;
if hpvtest=2 then hpv5yr=2;
else if hpvtest=1 then do;
if hplsttst in (1,2,3,4) then hpv5yr=1;
else if hplsttst=5 then hpv5yr=2;
end;

*Pap + HPV test in 5 years;
if pap5yr=1 & hpv5yr=1 then paphpv5yr=1;
else if pap5yr=2 | hpv5yr=2 then paphpv5yr=2;

*Up-to-date cervical screening;
if 21<=_age80<=29 then papscreen=pap3yr;
else if 30<=_age80<=65 then do;
  if pap3yr=1 | hpv5yr=1 then papscreen=1;
  else if pap3yr=2 & hpv5yr=2 then papscreen=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)

pap5yr<-ifelse(hadpap2==2, 2, NA)
pap5yr<-ifelse(hadpap2==1 & lastpap2 %in% c(1,2,3,4), 1, pap5yr)
pap5yr<-ifelse(hadpap2==1 & lastpap2==5, 2, pap5yr)

hpv5yr<-ifelse(hpvtest==2, 2, NA)
hpv5yr<-ifelse(hpvtest==1 & hplsttst %in% c(1,2,3,4), 1, hpv5yr)
hpv5yr<-ifelse(hpvtest==1 & hplsttst==5, 2, hpv5yr)

paphpv5yr<-ifelse(pap5yr==1 & hpv5yr==1, 1, NA)
paphpv5yr<-ifelse(pap5yr==2 | hpv5yr==2, 2, paphpv5yr)

papscreen<-ifelse(age80>=21 & age80<=29, pap3yr, NA)
papscreen<-ifelse(age80>=30 & age80<=65 & (pap3yr==1 |
  hpv5yr==1), 1, papscreen)
papscreen<-ifelse(age80>=30 & age80<=65 & (pap3yr==2 &
  hpv5yr==2), 2, papscreen)

```

**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)

```

```

gen pap5yr=.
replace pap5yr=2 if hadpap2==2
replace pap5yr=1 if hadpap2==1 & lastpap2>=1 & lastpap2<=4
replace pap5yr=2 if hadpap2==1 & lastpap2==5

gen hpv5yr=.
replace hpv5yr=2 if hpvtest==2
replace hpv5yr=1 if hpvtest==1 & hplsttst>=1 & hplsttst<=4
replace hpv5yr=2 if hpvtest==1 & hplsttst==5

gen paphpv5yr=.
replace paphpv5yr=1 if pap5yr==1 & hpv5yr==1
replace paphpv5yr=2 if pap5yr==2 | hpv5yr==2

gen papscreen=.
replace papscreen=pap3yr if _AGE80>=21 & _AGE80<=29
replace papscreen=1 if _AGE80>=30 & _AGE80<=65 & (pap3yr==1 |
hpv5yr==1)
replace papscreen=2 if _AGE80>=30 & _AGE80<=65 & (pap3yr==2 &
hpv5yr==2)

```

## Analytic Note

The 2018 BRFSS dataset contains the variable “\_RFPAP34” which defines women ages 21–65 who report a Pap test within the last 3 years, using the reported age variable rather than the imputed variable (\_age80), and may not include women who report pregnancy at time of survey. Reported age is only available to users in 5-year age groups (or a variable that splits all ages into 2 categories: <65 years and ≥65 years) and cannot create all of the screening measures used by DCPC. For this reason, DCPC defines this screening variable using imputed age. There are small differences in counts and percentages between the DCPC method and the BRFSS-created variable.

## References

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## **Appendix 1. Healthy People: Cervical Cancer Screening Objectives**

### **Healthy People 2000**

**16.12** Pap test, 18 years and over: Ever *and* Past 3 years

### **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)

### **Healthy People 2020**

**C-15** Increase the proportion of women who receive a cervical cancer screening based on the most recent guidelines

## Appendix 2. Age Categories for Age Adjustment

### Healthy People 2020

Cancer Screening Type	Sex/Age Group	Age Categories
Cervical Cancer Screening	Women Aged 21–65 Years	if sex=2; if 21<=_AGE80<=34 then ageadj=1; else if 35<=_AGE80<=44 then ageadj=2; else if 45<=_AGE80<=65 then ageadj=3;

### Other suggested age groups

Cancer Screening Type	Sex/Age Group	Age Categories
Cervical Cancer Screening	Women Aged 21–65 Years	if sex=2; if 21<=_AGE80<=44 then ageadj=1; else if 45<=_AGE80<=65 then ageadj=2;



### **Appendix 3. Questions from the BRFSS Breast and Cervical Cancer Screening Module (Cervical Cancer Questions only)**

**14.03** Have you ever had a Pap test?

- 1 Yes
- 2 No [Go to Q14.05]
- 7 Don't know / Not sure [Go to Q14.05]
- 9 Refused [Go to Q14.05]

**14.04** 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

**14.05** An HPV test is sometimes given with the Pap test for cervical cancer screening. Have you ever had an HPV test?

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

**14.06** How long has it been since your last HPV 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

**14.07** 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