

Cervical Cancer Screening Rates In Idaho, 2004 and 2006



Analysis From the
Behavioral Risk Factor Surveillance System

June 2009



ACKNOWLEDGMENTS

This project was funded in part by a grant from the Centers for Disease Control and Prevention, number U58/CCU022801, and administered via a cooperative agreement with the Idaho Bureau of Vital Records and Health Statistics. The contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention.

The Idaho Department of Health and Welfare would like to thank the citizens of Idaho who have participated in the Behavioral Risk Factor Surveillance System.

For more details on this project or any of the survey results, please contact the Bureau of Vital Records and Health Statistics at (208) 332-7326.

SUGGESTED CITATION

Cervical Cancer Screening Rates In Idaho, 2004 and 2006. Boise: Idaho Department of Health and Welfare, Division of Public Health, Bureau of Vital Records and Health Statistics. 2009.

ABSTRACT

INTRODUCTION. Idaho's rates of women not receiving cervical cancer screening are consistently above national rates and increased significantly in 2004 and 2006. Idaho's rates are the second highest among the U.S. states, D.C, and territories. Although factors such as access to health care and obesity are known to affect rates nationally, few data have been available to determine whether these or other factors are important in Idaho.

METHODS. Data from the 2004 and 2006 Behavioral Risk Factor Surveillance System were analyzed to determine factors associated with rates of women not receiving cervical cancer screening in Idaho. Women 18 or more years old and with intact cervixes were asked whether they had a Papanicolaou test and, if so, when. Rates of women who did not receive a Papanicolaou test in the past three years were described and compared with demographic, preventive health, and health risk variables. Bivariate associations were determined with chi-square, and multivariate contributions to risk were determined with logistic regression.

RESULTS. Overall, 22.5 percent of Idaho women in 2006 and 21.0 percent in 2004 did not receive timely cervical cancer screening compared with national rates of 16.0 percent and 14.1 percent, respectively. Idaho's rates were significantly higher for both years than the neighboring states of Montana, Oregon, and Washington. Women younger than 25 or older than 65 had significantly higher rates of not receiving a timely Papanicolaou test than did other women, and Idaho's rates approached national rates when these women were excluded from the analyses. Within Idaho, Health District 7 had significantly higher rates for both years than the state as a whole, and Health District 4 had significantly lower rates. Women with less income and less education had higher rates of not receiving screening, as did women who were never married or were widowed. In a multivariate model, the factors with the greatest contributions to overall risk as determined by odds ratios (OR) were being over age 65 (OR = 5.33, 95% CI = 3.03, 9.36), either having never been married (OR = 4.85, CI = 3.18, 7.38) or being widowed (OR = 2.34, 95% CI = 1.47, 3.74), not having a personal health care provider (OR = 2.49, 95% CI = 1.88, 3.29), living in Health District 7 (OR = 2.91, 95% CI = 1.85, 4.54), and having less than a high school education (OR = 2.25, 95% CI = 1.24, 4.09). At least two factors previously shown to be important national determinants of cervical cancer screening, diabetes and obesity, were not important contributors to risk in Idaho.

DISCUSSION. This report suggests that although numerous demographic, preventive health, and health risk factors are individually associated with not receiving cervical cancer screening, the most significant contributors to overall risk statewide have to do with lack of breast cancer screening, age, marital status, geographic area, education, and having a personal health care provider.

TABLE OF CONTENTS

TITLE PAGE	i
ACKNOWLEDGMENTS	ii
ABSTRACT	iii
LIST OF FIGURES	v
LIST OF TABLES.....	vi
INTRODUCTION	1
METHODS	2
Data Collection.....	2
Data Limitations	2
Data Analysis	2
RESULTS	4
National and Idaho Trends.....	4
Idaho and Neighboring States	5
Age.....	6
Health District.....	8
Age and Health District	9
Income	10
Education	11
Employment	12
Marital Status	13
Veteran Status	14
Race and Ethnicity	15
Variables Associated With Cervical Cancer Screening.....	16
Variables Contributing to Risk.....	18
DISCUSSION.....	23
APPENDIX A	25
Cervical Cancer Screening Data for Idaho, 2004 and 2006.....	25
APPENDIX B	27
Questions Used to Determine Whether a Woman Had a Pap Test in the Past Three Years	27
APPENDIX C	28
A Brief Explanation of Odds Ratios.....	28
APPENDIX D	29
References.....	29

LIST OF FIGURES

Figure 1. Percent of Women With No Pap Test in Past Three Years in Idaho and the United States, D.C, and Territories, 1992-2006.	4
Figure 2. Percent of Women With No Pap Test in Past Three Years in Idaho and Neighboring States, 2004 and 2006.	5
Figure 3. Percent of Idaho Women With No Pap Test in Past Three Years by Age Group, 2004 and 2006.	6
Figure 4. Percent of Women With No Pap Test in Past Three Years Nationwide, in Idaho, and Ages 25 to 64 in Idaho, 1992-2006.	7
Figure 5. Percent of Idaho Women With No Pap Test in Past Three Years by Health District, 2004 and 2006.	8
Figure 6. Percent of Idaho Women With No Pap Test in Past Three Years by Age and Health District, 2004 and 2006 Combined.	9
Figure 7. Percent of Idaho Women With No Pap Test in Past Three Years by Income, 2004 and 2006.	10
Figure 8. Percent of Idaho Women With No Pap Test in Past Three Years by Education, 2004 and 2006.	11
Figure 9. Percent of Idaho Women With No Pap Test in Past Three Years by Employment, 2004 and 2006.	12
Figure 10. Percent of Idaho Women With No Pap Test in Past Three Years by Marital Status, 2004 and 2006.	13
Figure 11. Percent of Idaho Women With No Pap Test in Past Three Years by Veteran Status, 2004 and 2006.	14
Figure 12. Percent of Idaho Women With No Pap Test in Past Three Years by Ethnicity, 2004 and 2006.	15

LIST OF TABLES

Table 1. Variables and their associations with women reporting no Pap test within the past three years for 2004 and 2006.....	17
Table 2. Variables with significant odds ratios associated with Idaho women not receiving a Pap test in the past three years for the years 2004 and 2006 combined (significant odds ratios highlighted).....	18
Table 3. Breast cancer screening variables and odds ratios associated with whether Idaho women received a Pap test in the past three years for the years 2004 and 2006 combined (significant odds ratios highlighted).....	19
Table 4. Non-medical test/vaccination variables with significant odds ratios associated with Idaho women having no Pap test in the past three years for the years 2004 and 2006 combined (significant odds ratios highlighted).	20
Table 5. Variables and levels associated with doubling the risk of Idaho women having no Pap test in the past three years for the years 2004 and 2006 combined.	21
Table 6. Interaction of age and marital status and the risk of Idaho women having no Pap test in the past three years for the years 2004 and 2006 combined.....	22

INTRODUCTION

Cervical cancer is among the most preventable and curable cancers (1). Cancerous and precancerous lesions can be detected readily, and treatment is highly effective if lesions are detected early. The Papanicolaou (Pap) test is the most widely used method for detecting and treating precancerous and early stage cancerous lesions because of its relative ease of use and low expense. The use of the Pap test is considered to be a significant factor in the reduction of cervical cancer mortality among women in the United States (2).

In order to increase the accessibility of the Pap test to women with low incomes or who lack health insurance, Idaho joined with other states and the Centers for Disease Control and Prevention (CDC) to develop programs such as Idaho's Women's Health Check to increase the accessibility of Pap tests to women who might otherwise find costs prohibitive (3, 4).

Although reduction of financial barriers has increased accessibility, Idaho's rates of women not receiving cervical cancer screening have consistently been above that of the U.S. in general. For the years 2004 and 2006, the percentage of Idaho women not receiving timely cervical cancer screening has been the second highest among the 50 U.S. states and the District of Columbia (5).

Idaho's rates of women not having a Pap test rose significantly in 2004 and 2006 when compared with a ten year low in 2002 (6, 7). Cervical cancer screening rates are not constant within Idaho. Rates vary among Idaho health districts, with individual districts having higher or lower rates than the state average.

Nationally, several factors are known to be associated with women not receiving cervical cancer screening, e.g., accessibility due to distance or cost, health problems such as obesity, or amount of other health care accessed on a regular basis (8, 9, 10). Little is known whether these factors are equally relevant in Idaho or if other factors have greater influence.

Accessibility has begun to be addressed by Idaho's Women's Health Check, a program providing eligible women with free mammograms and Pap tests. Recent increased rates of women not receiving Pap tests in the state, however, indicate accessibility is not the only factor involved. Income and education have been shown to affect screening rates in Idaho (6, 7), but the relative contributions of these factors are unknown. Because screening rates vary among health districts within Idaho, regional influences may contribute as well.

This report examines available BRFSS data in order to provide insight on factors associated with women not receiving cervical cancer screening in Idaho.

METHODS

Data Collection

The data used in this report were from Idaho's Behavioral Risk Factor Surveillance System (BRFSS), an ongoing telephone survey developed and partially funded by the U.S. Centers for Disease Control and Prevention (CDC). The BRFSS is designed to estimate the prevalence of risk factors for the major causes of death and disability in the United States, to enable comparisons among states, and to measure changes over time. The BRFSS is conducted as a random telephone survey of the non-institutionalized adult population.

National level data were compiled by the CDC from data submitted by participating states, the District of Columbia, and U.S. territories. Data for this report were collected by trained interviewers who surveyed Idaho adults in every month of the year. The interviews included questions about current health status, demographic characteristics, preventive health behaviors, and health risk behaviors. The population for this study consisted of female respondents age 18 years and older with an intact cervix. Missing, don't know, and refused responses were excluded from the analyses.

Data Limitations

Errors in estimates may result due to BRFSS data being self-reported and certain behaviors possibly being underreported (11, 12). Another source of error is based on sampling. Each sample drawn will deviate somewhat from the population. Additional possible errors may occur due to the population from which the sample is drawn. Ideally, all adults aged 18 and older would be potential respondents for the survey. However, in order to be cost effective, the sample was limited to adults aged 18 and older who were non-institutionalized, lived in a household with a landline telephone, and could communicate in English or Spanish. This excluded people in prisons and dormitories, non-English/Spanish speakers, those with only cellular telephones, and others who could not communicate by telephone.

Data Analysis

After annual data collection was complete, individual responses were weighted to be representative of the state's adult population. All analyses were performed on weighted data. Additional information regarding BRFSS methodology is available online at <http://www.cdc.gov/brfss>.

National level data are reported as medians of all U.S. states, the District of Columbia, and U.S. territories and are available from the CDC (5). State level estimates are reported as percentages of weighted data.

Data were manipulated and weighted with SAS® software. Statistical testing and calculation of confidence intervals were performed with SUDAAN® software which takes into account the complex sampling design of the BRFSS. All "don't know," "not sure," and "refused" responses were excluded from the analyses.

Individual year's data were weighted using the original weights calculated for that year. Combined data for the years 2004 and 2006 were reweighted using Idaho midyear population estimates from 2005 for age, gender, and health district (13).

The variable of interest was whether women with intact cervixes received a Pap test within the past three years. The value of this variable was determined using three questions of the BRFSS (Appendix A). Independent variables used for bivariate testing were selected based upon their potential relevance to cervical cancer screening. All independent variables were discreet.

Idaho BRFSS data are stratified by state health district and not by county due to low population densities in some counties. For this report, an additional geographic variable was defined characterizing Idaho counties by the following definitions:

Urban: having a population center of at least 20,000.

Rural: density ≥ 6.0 persons per square mile and with no population center of 20,000.

Frontier: density < 6.0 persons per square mile and with no population center of 20,000.

Idaho health districts contain at least one urban county and a mix of rural and frontier counties. Although data in this report were not analyzed by county, the Urban/Rural/Frontier definitions were used as a proxy for testing density dependence.

Significant bivariate associations were determined using the Cochran-Mantel-Haenszel chi-square statistic to account for sample stratification and potentially small sample sizes for some variables. Multiple logistic regression was used to calculate adjusted odds ratios and proportionate contributions to risk in a multivariate model. To provide a more manageable and practically relevant set of predictive variables, at least one additional multiple logistic regression was calculated using only those independent variables with significant odds ratios from the initial model.

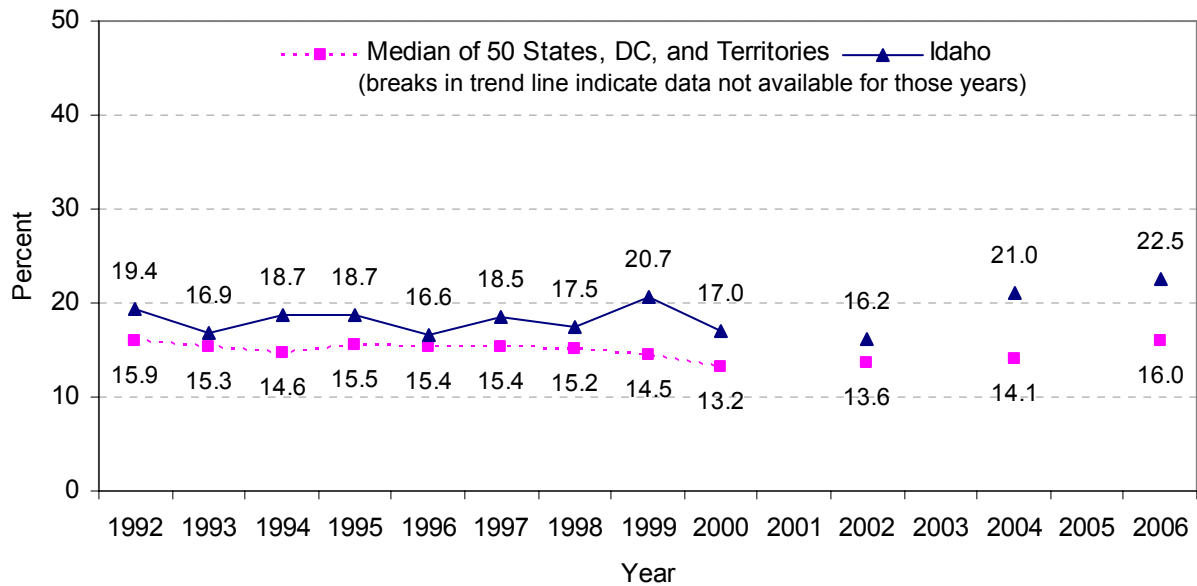
RESULTS

National and Idaho Trends

The percentages of women not receiving a Pap test have increased nationally and in Idaho since 2002. Idaho's rates have been consistently higher than national rates, and the magnitudes of Idaho's increases in 2004 and 2006 were greater than national increases (Figure 1).

Both nationally and in Idaho, rates of women not receiving a Pap test in the past three years were at their highest levels in ten years. The 2004 and 2006 rates of women not receiving timely Pap tests were above 20 percent in Idaho for the first time since 1999.

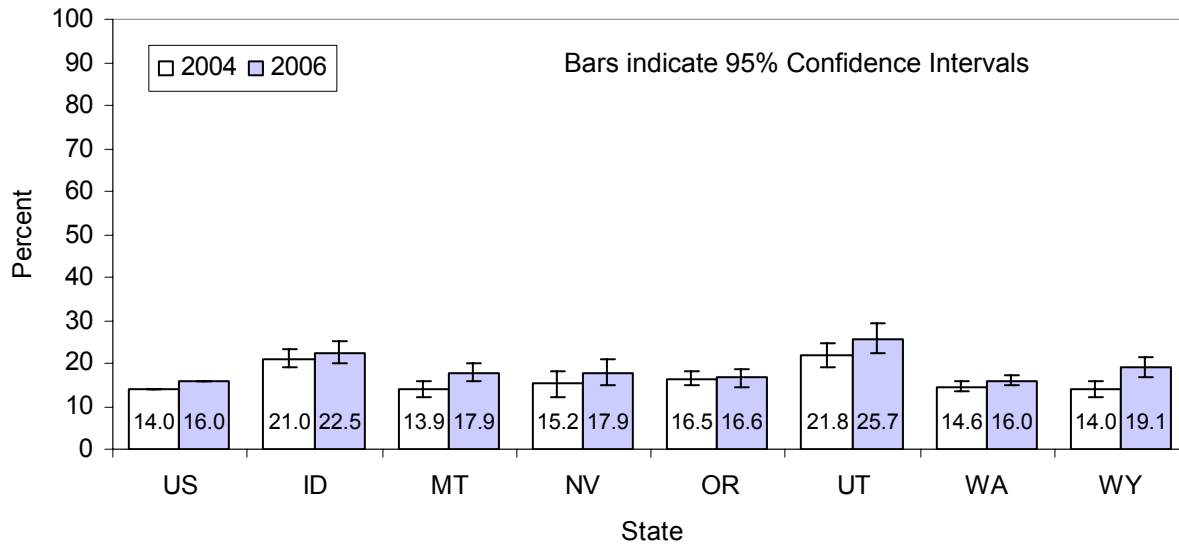
Figure 1. Percent of Women With No Pap Test in Past Three Years in Idaho and the United States, D.C, and Territories, 1992-2006.



Idaho and Neighboring States

When compared with its neighboring states for both 2004 and 2006, Idaho had significantly more women not receiving a Pap test in the past three years than did Montana, Oregon, or Washington. In 2004, Idaho also had more women not receiving a timely Pap test than did Nevada and Wyoming (Figure 2).

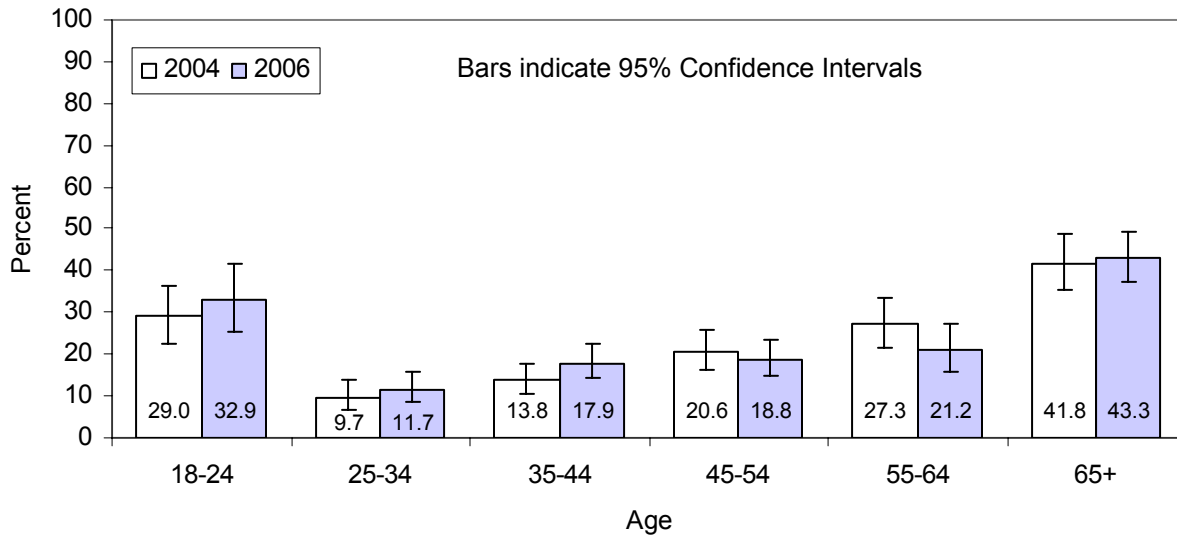
Figure 2. Percent of Women With No Pap Test in Past Three Years in Idaho and Neighboring States, 2004 and 2006.



Age

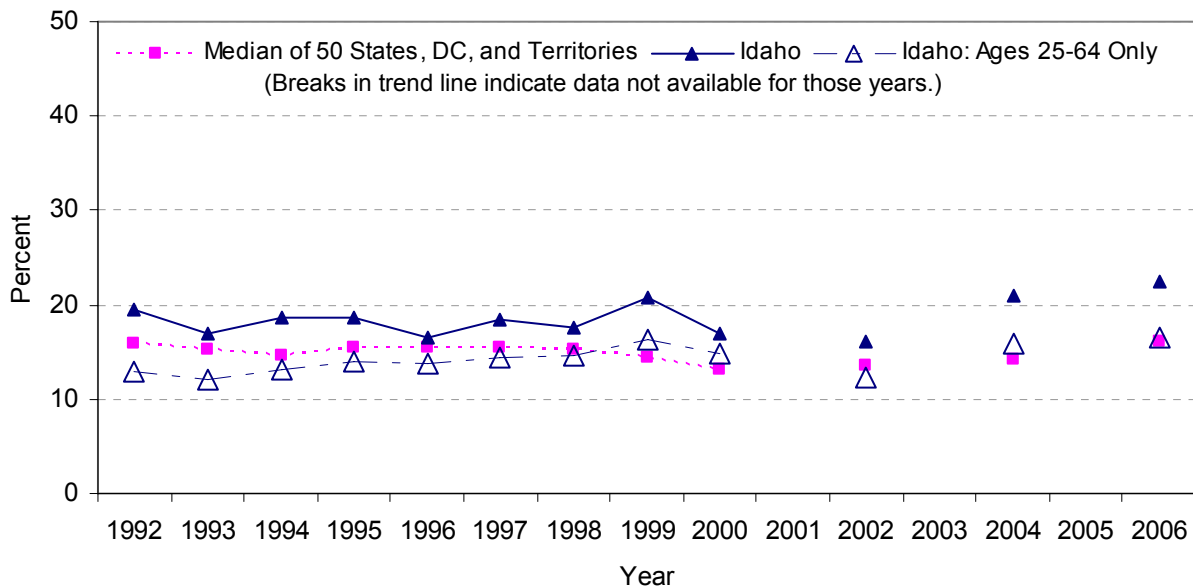
In Idaho in 2004, women over age 65 were significantly less likely to have had a Pap test than younger women. In 2006, women under age 25 joined women over 65 as being significantly more likely to not have received a Pap test than other women in Idaho (Figure 3).

Figure 3. Percent of Idaho Women With No Pap Test in Past Three Years by Age Group, 2004 and 2006.



When women in the youngest and oldest age groups (18 to 24 and 65 and older, respectively) were removed from analysis, the rates of Idaho women not receiving a timely Pap test approached or were lower than the national rates for all years, including 2004 and 2006 (Figure 4). Although Idaho women in the age group 25 to 64 had lower rates of not having a current Pap test than did Idaho women of all ages, the rates for both groups increased significantly between 2002 and 2006.

Figure 4. Percent of Women With No Pap Test in Past Three Years Nationwide, in Idaho, and Ages 25 to 64 in Idaho, 1992-2006.



Year	United States* Median	Idaho Percent [†] Ages 18+	Idaho Percent Ages 25-64
1992	15.9	19.4 (16.3 - 23.0)	12.9 (10.0 - 16.5)
1993	15.3	16.9 (14.0 - 20.3)	12.0 (9.4 - 15.3)
1994	14.6	18.7 (15.7 - 22.2)	13.2 (10.6 - 16.5)
1995	15.5	18.7 (16.3 - 21.3)	14.0 (11.7 - 16.8)
1996	15.4	16.6 (14.4 - 19.0)	13.8 (11.5 - 16.5)
1997	15.4	18.5 (16.6 - 20.5)	14.4 (12.5 - 16.6)
1998	15.2	17.5 (15.6 - 19.5)	14.6 (12.7 - 16.7)
1999	14.5	20.7 (18.6 - 22.8)	16.3 (14.2 - 18.7)
2000	13.2	17.0 (15.1 - 19.0)	14.9 (12.9 - 17.0)
2001 [‡]			
2002	13.6	16.2 (14.3 - 18.2)	12.2 (10.5 - 14.2)
2003 [‡]			
2004	14.1	21.0 (18.9 - 23.2)	15.8 (13.8 - 18.0)
2005 [‡]			
2006	16.0	22.5 (20.2 - 24.9)	16.6 (14.5 - 18.9)

* Includes 50 states, D.C., and territories.

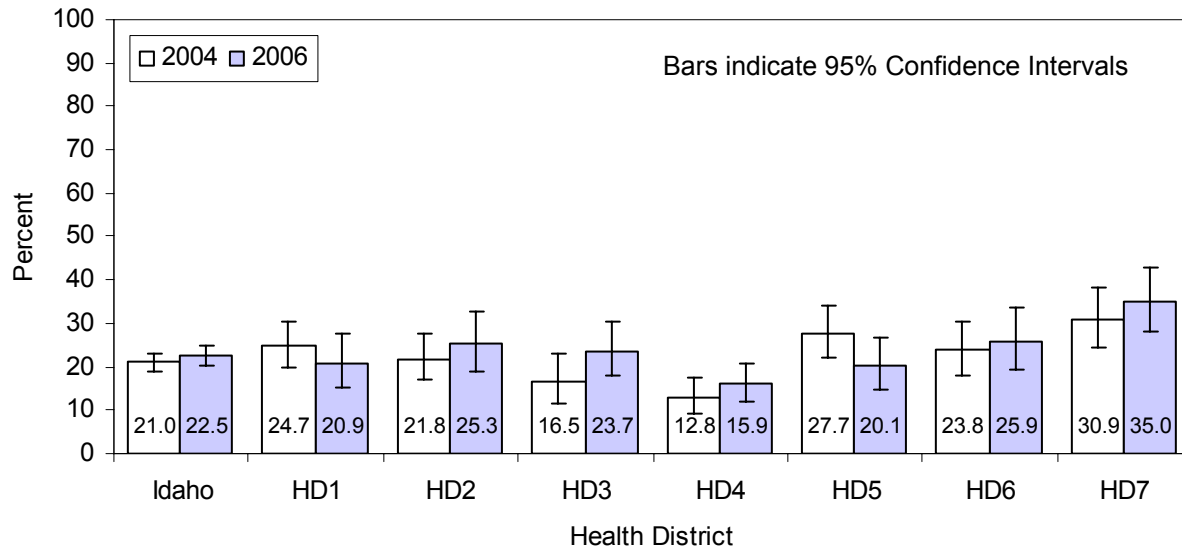
[†] Values in parentheses define the 95% confidence interval.

[‡] Data not available for indicated year.

Health District

Within Idaho, rates of women not receiving a Pap test were significantly higher in both 2004 and 2006 for Health District 7 (Eastern Idaho Public Health District) than statewide (Figure 5). Rates in Health District 4 (Central District Health Department) were significantly lower than statewide rates for both 2004 and 2006.

Figure 5. Percent of Idaho Women With No Pap Test in Past Three Years by Health District, 2004 and 2006.



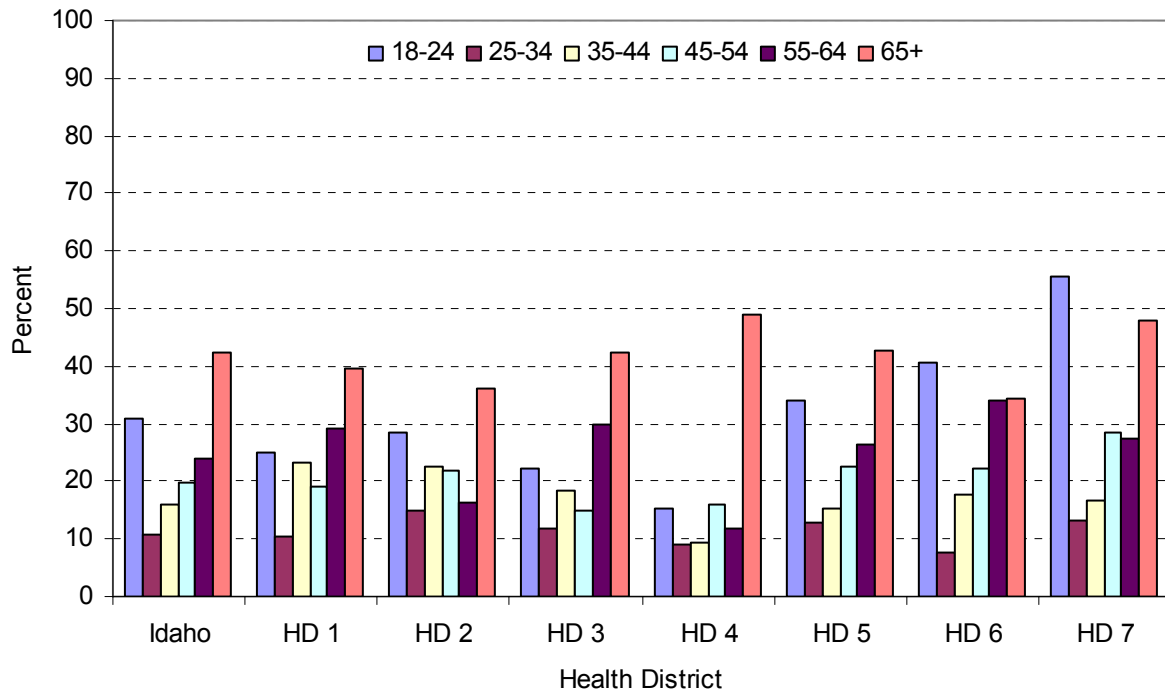
Age and Health District

Within Health District 7, women between 18 to 24 or over 65 years old were significantly more likely to not receive a Pap test within the past three years as were women overall in Health District 7 (Figure 6). When both 2004 and 2006 data were examined, the distribution of women by age within health districts suggests the tendency for older women to not receive timely cervical cancer screening is statewide and not particular to any one district.

Health Districts 6 and 7, however, show pronounced tendencies for women ages 18 to 24 to not receive timely Pap tests. More than half of women ages 18 to 24 in Health District 7 did not receive a Pap test in the past three years. In Health District 6, over 40 percent of women ages 18 to 24 did not receive a Pap test in the past three years.

The statewide age-related trend of a relatively high rate among women 18 to 24 of not receiving a timely Pap test, followed by a relatively low rate among women 25 to 34, then an increasing rate with age thereafter is mirrored most closely in Health Districts 5, 6, and 7.

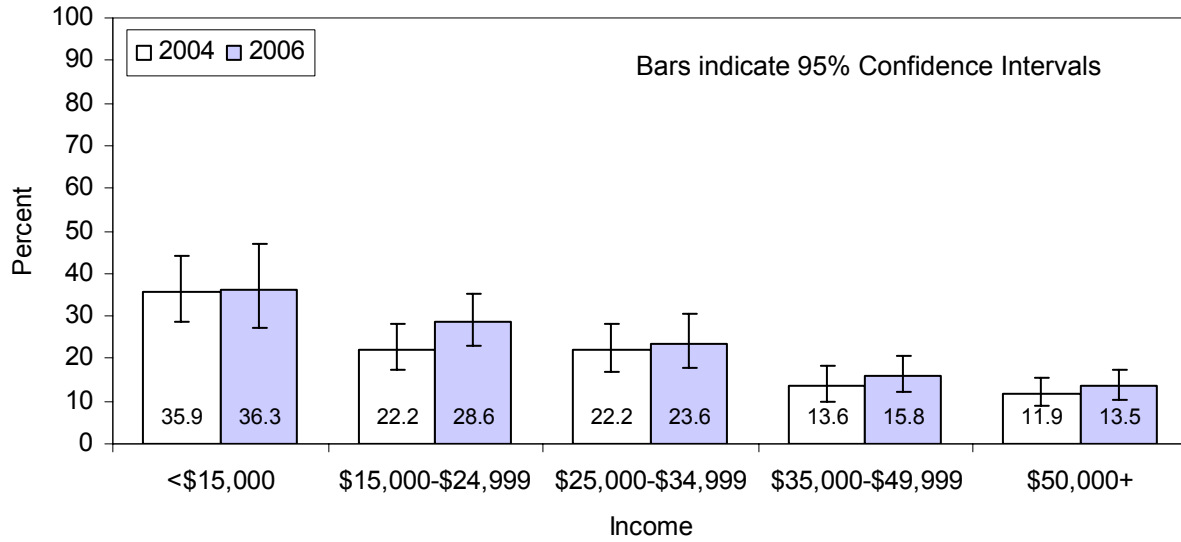
Figure 6. Percent of Idaho Women With No Pap Test in Past Three Years by Age and Health District, 2004 and 2006 Combined.



Income

Women with household incomes less than \$15,000 per year were significantly more likely to not have had a Pap test in both 2004 and 2006 than women whose household incomes were \$35,000 or greater (Figure 7).

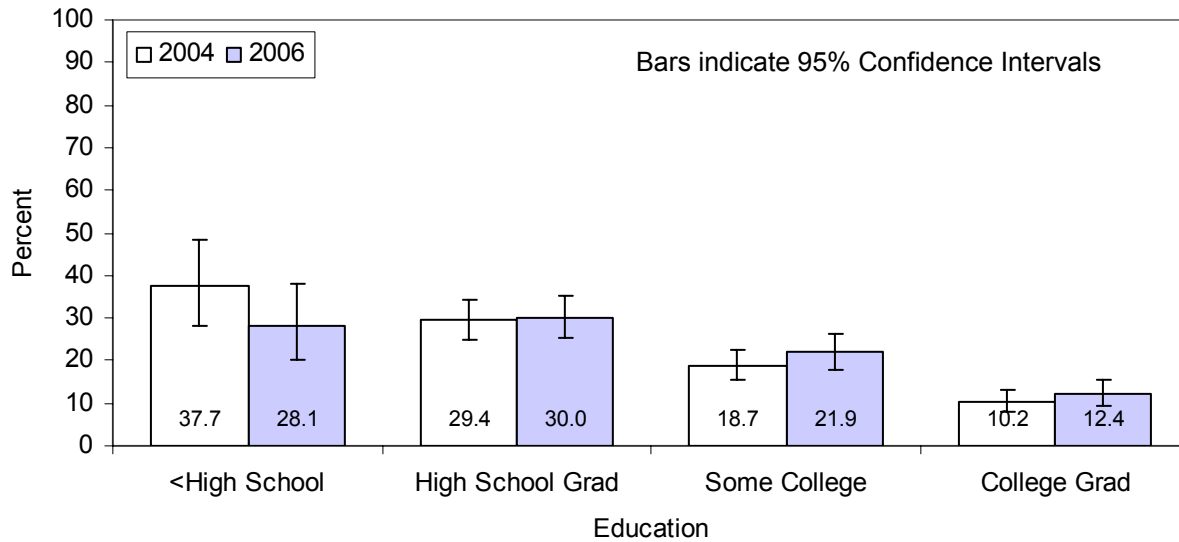
Figure 7. Percent of Idaho Women With No Pap Test in Past Three Years by Income, 2004 and 2006.



Education

Education was related to cervical cancer screening. Women with college degrees were less likely to have not received a Pap test than other education categories in both 2004 and 2006. In 2004, women with some college education were also less likely to not be screened (Figure 8).

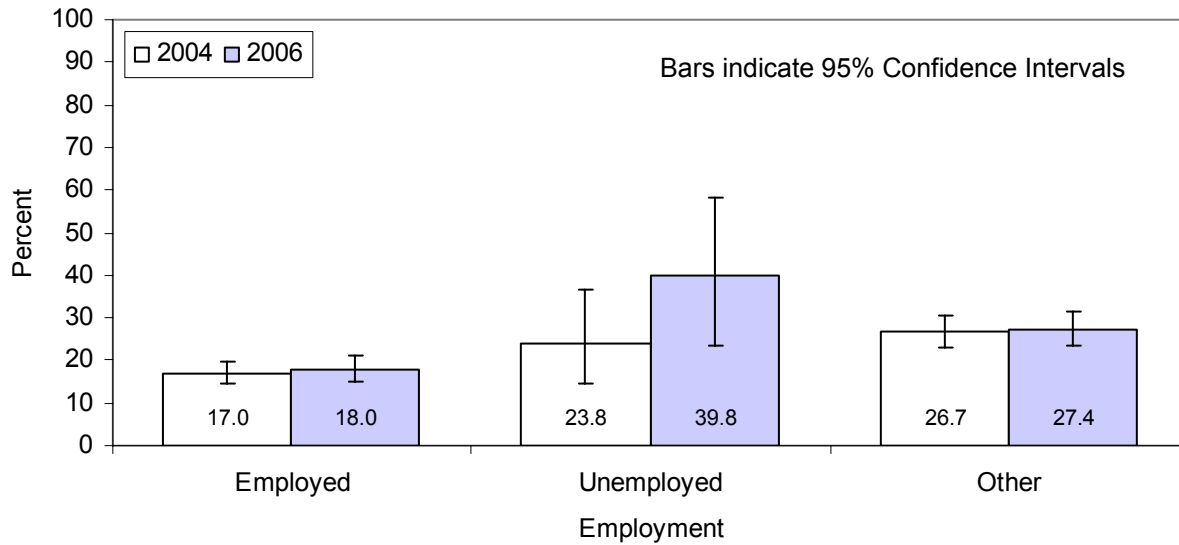
Figure 8. Percent of Idaho Women With No Pap Test in Past Three Years by Education, 2004 and 2006.



Employment

In both 2004 and 2006, employed women were less likely to not be screened for cervical cancer than either unemployed women or those who were homemakers, retired, students, or unable to work. In 2006, unemployed women were more than twice as likely to not have received a timely Pap test (Figure 9).

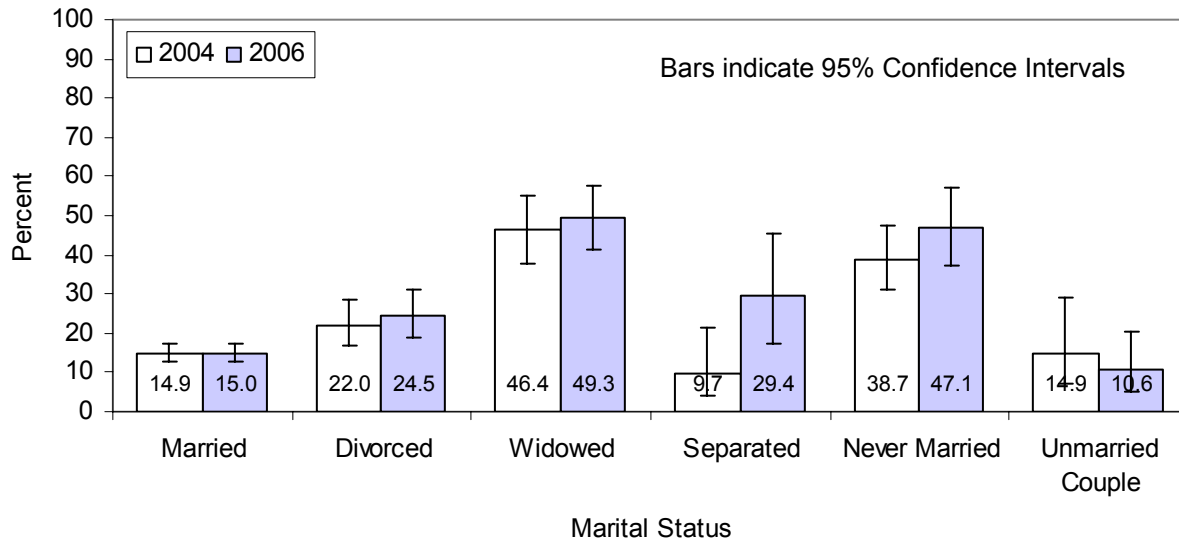
Figure 9. Percent of Idaho Women With No Pap Test in Past Three Years by Employment, 2004 and 2006.



Marital Status

Women who were widowed or had never married were significantly more likely in both 2004 and 2006 to not have received a Pap test in the past three years than women who were married, divorced, or who were part of an unmarried couple (Figure 10).

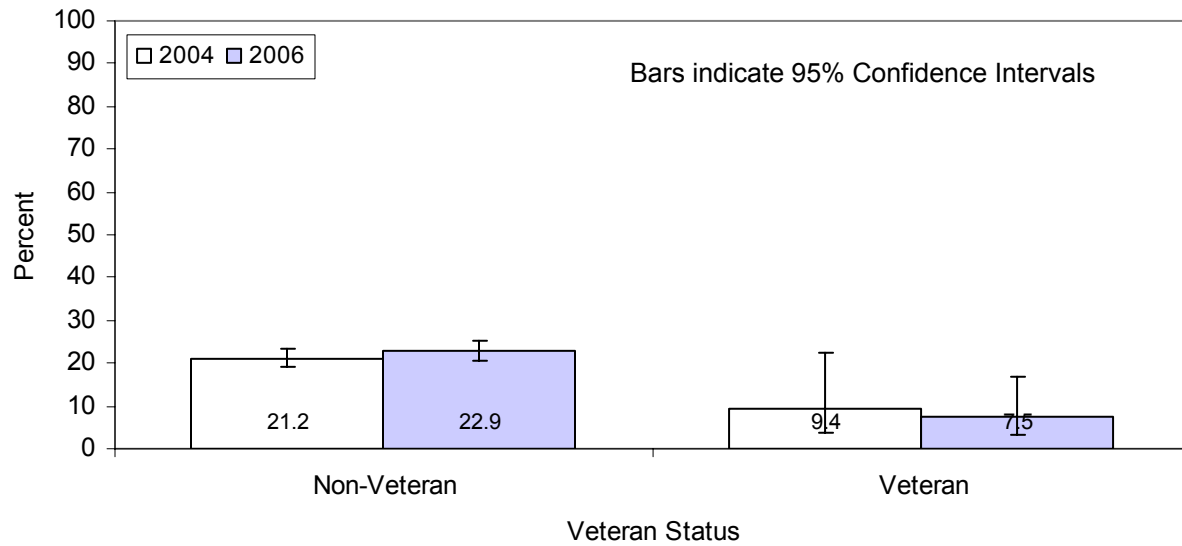
Figure 10. Percent of Idaho Women With No Pap Test in Past Three Years by Marital Status, 2004 and 2006.



Veteran Status

Women who were veterans were more than twice as likely to have received a timely Pap test than non-veterans in both 2004 and 2006 (Figure 11).

Figure 11. Percent of Idaho Women With No Pap Test in Past Three Years by Veteran Status, 2004 and 2006.

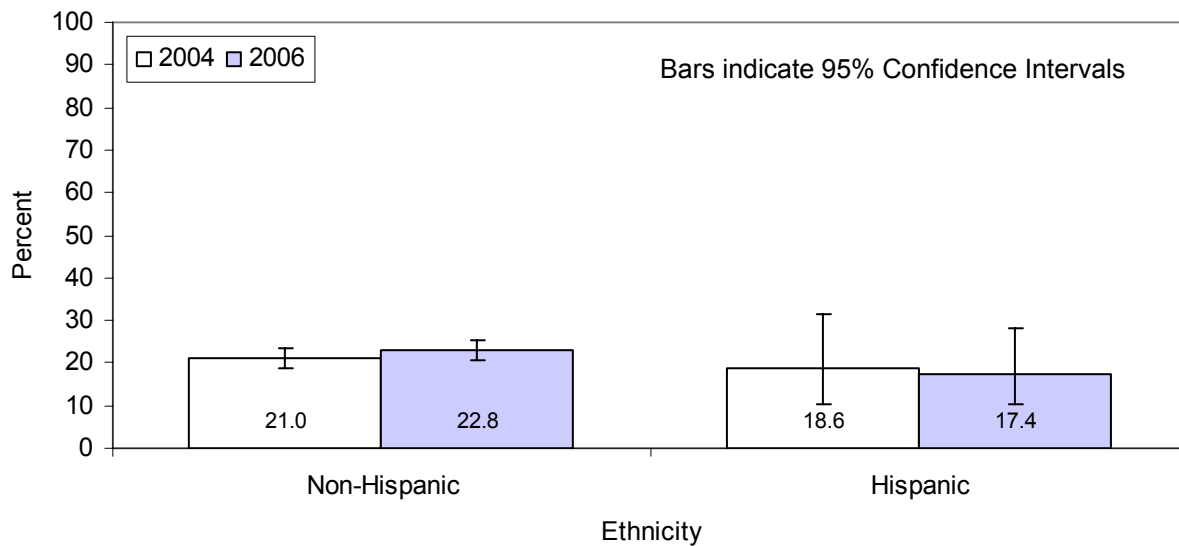


Race and Ethnicity

The racial distribution of women with no timely Pap test was not calculated due to small samples sizes for several racial groups even for combined 2004 and 2006 data. Idaho's 1.47 million people are mostly white (96.2 percent), American Indian (1.6 percent), Asian or Pacific Islander (1.4 percent), and black (0.9 percent). People reporting Hispanic or Latino ethnicity, however, make up 9.5 percent of Idaho's population (14).

Although women reporting Hispanic or Latino ethnicity apparently had lower rates of not receiving a Pap test in the past three years when compared with non-Hispanic women, the difference was not statistically significant (Figure 12).

Figure 12. Percent of Idaho Women With No Pap Test in Past Three Years by Ethnicity, 2004 and 2006.



Variables Associated With Cervical Cancer Screening

Forty-three variables were tested for their associations with having a Pap test in the past three years. Of these variables, nine were categorized as demographic traits, nine were categorized as preventive health behaviors, and 25 were categorized as health risk markers.

Twenty-three variables were significantly associated with cervical cancer screening in 2004. Twenty-two variables were significantly associated with cervical cancer screening in 2006. Two health risk marker variables, both regarding access to emotional support, were measured in only one of the two years. In 2004, the variable Emotional Help Available in the Past 5 Years was not significantly associated with cervical cancer screening rates. In 2006, the variable Emotional Support Available was significantly associated with screening rates.

For both years combined, twenty seven variables measured in both years were significantly associated with women reporting no Pap test within the past three years (Table 1, next page).

Table 1. Idaho BRFSS variables and their associations with women reporting no Pap test within the past three years for 2004 and 2006. (Cochran-Mantel-Haenszel chi-square, * p<0.05, n.s.=not significant).

Variable	2004 & 2006 Combined
<u>Demographic Traits</u>	
Health District	*
Urban/Rural/Frontier County	n.s.
Age	*
Race ¹	n.s.
Hispanic Ethnicity	n.s.
Education	*
Employment	*
Income	*
Marital Status	*
Veteran Status	*
<u>Preventive Behaviors</u>	
Blood Stool Test (past 2 years, age 50 and older)	*
Clinical Breast Exam (past 2 years)	*
Mammography (past 2 years)	*
Clinical Breast Exam and Mammography (past 2 years)	*
Colonoscopy / Sigmoidoscopy (ever, age 50 and older)	*
Flu Vaccine (past year)	*
Pneumonia Vaccine (ever)	n.s.
Dental Visit (past year)	*
Dental Cleaning (past year)	*
<u>Health Risk Markers</u>	
14 Days of Poor Mental Health (past 30 days)	*
Current Asthma Diagnosis	n.s.
Diabetes	*
Binge Drinking	n.s.
Heavy Drinking	n.s.
Emotional Help Available Past 5 Years (2004 only)	n.s.
Emotional Support Available (2006 only)	*
Health-related Equipment Needed	*
Ever Smoked (>100 cigarettes)	n.s.
Former Smoker	*
Current Smoker	n.s.
Smoking Status (Current/Former/Non)	*
General Health Perception	*
No Health Insurance	*
No Health Insurance for >1 Year	*
No Dental Insurance	*
Medical Care Delayed Due To Cost	n.s.
Mental Health Perception	n.s.
Obesity (BMI>=30)	n.s.
Overweight (BMI>=25)	n.s.
Have Personal Health Care Provider	*
Activities Limited Due To Health	n.s.
Illicit Drug Use Ever	*
Illicit Drug Use in Last Year	n.s.
No Leisure Physical Activity	*

¹ Small samples sizes make conclusions based on this test unreliable.

Variables Contributing to Risk

Adjusted odds ratios and 95 percent confidence intervals for tested independent variables are listed in Table 2. An odds ratio is a positive number comparing how likely an event is to happen for two groups. An arbitrary reference group (typically thought least at risk) is defined as having an event likelihood of one (1.0). A comparison group with an odds ratio greater than one is more likely to experience the event, and a comparison group with an odds ratio of less than one (but greater than zero) is less likely to experience the event. An odds ratio with a confidence interval not containing one may be considered statistically significant at $p < 0.05$ ¹.

Table 2. Variables with significant odds ratios associated with Idaho women not receiving a Pap test in the past three years for the years 2004 and 2006 combined (significant odds ratios highlighted).

Independent Variable	Adjusted Odds Ratio	Lower 95% Limit OR	Upper 95% Limit OR
<u>Age</u>			
18 to 24	1.00	1.00	1.00
25 to 34	(Reference)	(Reference)	(Reference)
35 to 44	1.00	1.00	1.00
45 to 54	0.51	0.29	0.92
55 to 64	1.00	1.00	1.00
65 and older	3.86	1.88	7.94
<u>Employment</u>			
Employed	(Reference)	(Reference)	(Reference)
Unemployed	2.32	1.01	5.35
Other	0.98	0.54	1.76
<u>Marital Status</u>			
Married	(Reference)	(Reference)	(Reference)
Divorced	1.46	0.69	3.06
Widowed	3.06	1.57	5.94
Separated	0.91	0.26	3.21
Never Married	1.70	0.34	8.49
Unmarried Couple	2.33	0.69	7.91
<u>Clinical Breast Exam (past 2 years)</u>			
Yes	(Reference)	(Reference)	(Reference)
No	41.26	19.31	88.15
<u>Mammography (past 2 years)</u>			
Yes	(Reference)	(Reference)	(Reference)
No	10.50	4.24	26.01
<u>Clinical Breast Exam and Mammography (past 2 years)</u>			
Yes	(Reference)	(Reference)	(Reference)
No	0.19	0.06	0.58
<u>Any Health Care Coverage</u>			
Yes	(Reference)	(Reference)	(Reference)
No	2.68	1.29	5.60
<u>Dental Insurance</u>			
Yes	(Reference)	(Reference)	(Reference)
No	0.51	0.28	0.92
<u>Health-related Equipment Needed</u>			
No	(Reference)	(Reference)	(Reference)
Yes	3.30	1.28	8.56

When all variables previously determined by chi-square to be significantly associated with cervical cancer screening were entered into a multiple logistic regression model, ten variables had odds ratios

¹ For a further explanation of odds ratios and their interpretation, see Appendix C.

significantly associated with whether Idaho women received a Pap test in the past three years. These ten variables included three breast cancer screening variables.

The largest contributors to the risk of not having a timely Pap test were either not having a clinical breast exam or not having a mammography. Not having either type of breast exam, however, was associated with a reduced risk of not having a timely Pap test. To examine this relationship further, the relative contributions to risk for only the breast exam variables were calculated (Table 3).

Table 3. Breast cancer screening variables and odds ratios associated with whether Idaho women received a Pap test in the past three years for the years 2004 and 2006 combined (significant odds ratios highlighted).

Independent Variable	Adjusted Odds Ratio	Lower 95% Limit OR	Upper 95% Limit OR
<u>Any Breast Cancer Screening (past 2 years)</u>			
Clinical Breast Exam and Mammography	(Reference)	(Reference)	(Reference)
Clinical Breast Exam Only	0.58	0.37	0.91
Mammography Only	9.25	5.56	15.39
None	33.37	24.66	45.17

Women with neither type of breast exam were 33 times more likely to not have a timely Pap test relative to those having both a clinical breast exam and a mammography. Women having only a clinical breast exam, however, had almost half the risk of not having a timely Pap test than did women with both types of breast exam.

Because breast and other cancer screening variables are logically and statistically associated (a person not having one type of test is likely to not have had another), and because of the large relative contributions to risk in the multiple logistic model attributable to the breast cancer screening variables, an alternate logistic model was calculated to gauge the proportionate contributions of demographic and risk marker variables in the absence of the variables indicating whether women had a clinical breast exam, a mammography, a blood stool test, a colonoscopy/sigmoidoscopy, or a flu vaccination.

In the absence of these five medical test and vaccination variables, five demographic and health risk behavior variables were significantly associated with the risk of Idaho women not having a Pap test in the past three years: health district, age, education, marital status, and having a personal health care provider. (Table 4).

Table 4. Non-medical test/vaccination variables with significant odds ratios associated with Idaho women having no Pap test in the past three years for the years 2004 and 2006 combined (significant odds ratios highlighted).

Independent Variable	Adjusted Odds Ratio	Lower 95% Limit OR	Upper 95% Limit OR
<u>Health District</u>			
1 (Panhandle Health District)	1.73	1.09	2.77
2 (North Central Health Department)	1.77	1.08	2.92
3 (Southwest District Health Department)	1.40	0.85	2.31
4 (Central District Health Department)	(Reference)	(Reference)	(Reference)
5 (South Central District Health Department)	1.96	1.24	3.10
6 (Southeastern District Health Department)	1.83	1.14	2.92
7 (Eastern Idaho Public Health District)	2.90	1.85	4.54
<u>Age</u>			
18 to 24	1.19	0.76	1.87
25 to 34	(Reference)	(Reference)	(Reference)
35 to 44	2.17	1.40	3.34
45 to 54	2.83	1.82	4.42
55 to 64	3.05	1.92	4.85
65 and older	5.33	3.03	9.36
<u>Education</u>			
< High School	2.25	1.24	4.09
High School Graduate	2.05	1.43	2.92
Some College	1.50	1.08	2.08
College Graduate	(Reference)	(Reference)	(Reference)
<u>Marital Status</u>			
Married	(Reference)	(Reference)	(Reference)
Divorced	1.72	1.17	2.55
Widowed	2.34	1.47	3.74
Separated	1.25	0.65	2.41
Never Married	4.85	3.18	7.38
Unmarried Couple	0.87	0.42	1.79
<u>Have Personal Health Care Provider</u>			
Yes	(Reference)	(Reference)	(Reference)
No	2.49	1.88	3.29

Ten variable levels were associated with more than double the risk of not having a timely Pap test and included being age 35 or older, never having been married or being widowed, not having a personal health care provider, and living in Health District 7 (Table 5).

Table 5. Variables and levels associated with doubling the risk of Idaho women having no Pap test in the past three years for the years 2004 and 2006 combined.

Independent Variable and Level	Adjusted Odds Ratio	Lower 95% Limit OR	Upper 95% Limit OR
Age 65 and older	5.33	3.03	9.36
Never Married	4.85	3.18	7.38
Age 55 to 64	3.05	1.92	4.85
HD 7 (Eastern Idaho Public Health District)	2.90	1.85	4.54
Age 45 to 54	2.83	1.82	4.42
No Personal Health Care Provider	2.49	1.88	3.29
Widowed	2.34	1.47	3.74
< High School Education	2.25	1.24	4.09
Age 35 to 44	2.17	1.40	3.34
High School Graduate	2.05	1.43	2.92

Because risk of not having a timely Pap test increased for both the youngest and oldest age groups and because risk also increased for women who were never married or were widowed, odds ratios for the interaction of these variables were calculated. Younger women were hypothesized more likely to have never been married than to have been widowed, with just the opposite true for older women.

To simplify the logistic model and help preserve degrees of freedom, levels of each variable were collapsed. For this model, marital status categories were defined as never married, widowed, or other. Age categories were defined as 18 to 24, 25 to 44, 45 to 64, and 65 and older.

Only one interaction between age and marital status had a significant odds ratio, women 18 to 24 years old who were never married (Table 6).

Table 6. Interaction of age and marital status and the risk of Idaho women having no Pap test in the past three years for the years 2004 and 2006 combined (significant odds ratios highlighted).

Independent Variable	Adjusted Odds Ratio	Lower 95% Limit OR	Upper 95% Limit OR
<u>Age</u>			
18 to 24	0.70	0.40	1.23
25 to 44	(Reference)	(Reference)	(Reference)
45 to 64	1.79	1.41	2.26
65 and older	3.48	2.50	4.84
<u>Marital Status</u>			
Other (Married, Divorced, Separated, Unmarried Couple)	(Reference)	(Reference)	(Reference)
Widowed	2.36	0.89	6.27
Never Married	1.93	1.10	3.39
<u>Age x Marital Status</u>			
18 to 24, Other	1.00	1.00	1.00
18 to 24, Widowed	1.00	1.00	1.00
18 to 24, Never Married	5.10	2.19	11.87
25 to 44, Other	1.00	1.00	1.00
25 to 44, Widowed	1.00	1.00	1.00
25 to 44, Never Married	1.00	1.00	1.00
45 to 64, Other	1.00	1.00	1.00
45 to 64, Widowed	0.86	0.26	2.89
45 to 64, Never Married	0.86	0.36	2.06
65 and older, Other	1.00	1.00	1.00
65 and older, Widowed	1.02	0.36	2.92
65 and older, Never Married	0.87	0.26	2.89

DISCUSSION

No single factor explains the increases during 2004 and 2006 in the numbers of Idaho women not receiving timely cervical cancer screening. Idaho and its neighbor Utah are the two states with the highest levels of women not receiving cervical cancer screening, which suggests a regional influence. Other neighboring states, however, have rates more similar to national levels, and the rates in Montana, Washington, and Oregon are significantly lower than those in Idaho.

Rising rates in Idaho mirror a national trend, and little information is available addressing the factors related to rising rates across the U.S. A similar trend has been reported in the United Kingdom, where the percentage of women age 25-29 not receiving screening increased rose from 20 percent to 30 percent between 2004 and 2006 (15, 16).

Nationally, several demographic traits and risk factors have been shown to be associated with an increased risk of not having a timely Pap test. Obesity is associated with reduced cervical cancer screening rates nationally (19), and accessibility of cervical cancer screening services is also considered a factor (9, 10). In Idaho, obesity or being overweight were not associated with rates of receiving a timely Pap test, and the three variables related to the financial or geographic accessibility of health care (i.e., having medical care delayed due to cost, having no health care insurance coverage, or living in a rural or frontier county) were not associated with receiving timely cervical cancer screening.

Individual demographic traits were associated with rates of Idaho women not receiving a Pap test in the past three years, namely age, geography (i.e., Health District), income, education, employment, marital status, and veteran status. Based simply on trend data (Figure 4), age appeared to be the single trait accounting for much of the difference between national and Idaho rates. Age alone, however, does not account for the significant increases in the rates of not having a current Pap test for women in both age groups (all ages combined and ages 25 to 64) between 2002 and 2006.

Women with health risk behaviors, such as binge or heavy drinkers or cigarette smokers, might be considered more at risk for also not practicing preventive health behaviors such as obtaining cervical cancer screening. Several health risk markers, including cigarette smoking, were individually associated with not receiving timely cervical cancer screening in Idaho (Table 1). Nearly half of the health risk markers examined, however, had no individual association with whether women received a Pap test in the past three years, and none was significantly associated with increased risk when analyzed for its proportionate contribution in a multiple logistic regression model (Table 2). These results underscore the importance of examining all traits in a multivariate model to determine those contributing most to the odds of not receiving timely cervical cancer screening.

In the initial multiple logistic regression model, breast cancer screening variables were the greatest contributors to the odds of whether Idaho women would receive timely Pap tests. Nationally, low breast cancer screening rates are associated with lower cervical cancer screening rates (10, 18). Paradoxically, in this initial logistic regression model containing 27 variables, Idaho women who had neither a recent mammography nor a clinical breast exam had reduced odds of not having a timely Pap test.

The reasons for this result are ambiguous, but the large number of independent variables in the initial logistic regression model is a potential factor. When only breast cancer screening variables were entered into a multiple logistic regression model, women having neither type of breast cancer screening were associated with 33 times greater risk of not having a timely Pap test than were women who had both tests (Table 3). The knowledge that women who did not receive one kind of screening were more likely to not receive another is important but can be logically expected. Additional factors affecting the odds of receiving a timely Pap test are also important to determine.

Removal of the large effects of the breast cancer screening variables from the multivariate analysis revealed that only one health risk marker, not having a personal health care provider, contributed significantly to the odds of not having a timely Pap test. This health risk marker and the demographic traits of being more than 35 years old (especially being over 65), living in Health District 7, and having a high school education or less, were each associated with more than double the odds that a woman would not receive timely cervical cancer screening. These results are similar to those found in Appalachia, where women older than age 65, widowed, having less than a high school education, and not having had a doctor's visit within the past two years were more likely to not receive cervical cancer screening (20).

In both Idaho and Appalachia marital status and age were associated with women receiving a timely Pap test. Although marital status is related to age, e.g., older women are more likely to be widowed, the hypothesis that age and marital status need to be considered together to accurately gauge either's effect on cervical cancer screening was only partially true for Idaho women. The only significant interaction between age and marital status in Idaho was an increased risk of not having a Pap test in the past three years for women 18 to 24 years old who had never married. This result should be interpreted with caution, however, due to small sizes (<10) for two cells corresponding to other age and marital status combinations. Nevertheless, being never married or widowed increased the risk of not having a Pap test in the last three years.

This report does not examine trends over time, so it is unknown to what degree the demographic and health risk factors identified with increased odds of not having cervical cancer screening in Idaho in 2004 and 2006 have contributed to the rise since 2002 in rates of women not receiving screening.

These data do show, however, which traits are currently most associated with Idaho women not receiving timely cervical cancer screening: not having breast cancer screening, being over age 35, having a high school education or less, being widowed or never married, or having no personal health care provider.

APPENDIX A

Cervical Cancer Screening Data for Idaho, 2004 and 2006

Table I. Percent of Idaho women who have NOT had a Pap test within past three years, 2004 and 2006.

	2004				2006				2004 & 2006 Combined			
	%	95% CI ¹		n	%	95% CI		n	%	95% CI		n
TOTAL FEMALES	21.0	18.9	23.3	2,041	22.5	20.2	24.9	2,143	21.7	20.2	23.4	4,184
AGE												
18-24	29.0	22.5	36.4	226	32.9	25.4	41.4	181	31.0	25.9	36.7	407
25-34	9.7	6.7	14.0	456	11.7	8.4	16.0	455	10.7	8.4	13.7	911
35-44	13.8	10.6	17.7	430	17.9	14.2	22.4	450	15.9	13.3	18.8	880
45-54	20.6	16.3	25.8	387	18.8	14.8	23.5	417	19.6	16.6	23.1	804
55-64	27.3	21.7	33.7	255	21.2	16.0	27.4	295	23.9	20.0	28.2	550
65+	41.8	35.2	48.8	276	43.3	37.3	49.5	329	42.6	38.1	47.2	605
18-34	18.8	15.2	23.0	682	21.8	17.6	26.7	636	20.4	17.5	23.5	1,318
35-54	16.8	14.1	19.9	817	18.3	15.5	21.5	867	17.5	15.6	19.7	1,684
55+	34.9	30.4	39.8	531	31.9	27.7	36.3	624	33.3	30.2	36.5	1,155
INCOME												
Less than \$15,000	35.9	28.5	43.9	247	36.3	27.0	46.8	209	36.1	30.0	42.6	456
\$15,000 - \$24,999	22.2	17.4	28.0	383	28.6	23.0	35.0	400	25.6	21.8	29.9	783
\$25,000 - \$34,999	22.2	17.1	28.3	290	23.6	17.7	30.6	257	22.9	18.9	27.4	547
\$35,000 - \$49,999	13.6	10.0	18.3	362	15.8	12.0	20.6	363	14.7	12.0	17.9	725
\$50,000+	11.9	9.0	15.6	543	13.5	10.3	17.4	661	12.7	10.5	15.4	1,204
EMPLOYMENT												
Employed	17.0	14.5	19.9	1,176	18.0	15.2	21.1	1,237	17.5	15.6	19.6	2,413
Unemployed	23.8	14.5	36.4	91	39.8	23.7	58.4	55	31.1	21.5	42.5	146
Other ²	26.7	23.0	30.7	770	27.4	23.6	31.5	846	27.1	24.4	29.9	1,616
EDUCATION												
K-11th Grade	37.7	28.1	48.3	135	28.1	20.0	37.9	169	32.0	25.6	39.2	304
12th Grade or GED	29.4	25.1	34.2	619	30.0	25.4	35.0	629	29.7	26.5	33.2	1,248
Some College	18.7	15.4	22.6	713	21.9	18.0	26.3	725	20.3	17.7	23.3	1,438
College Graduate+	10.2	7.8	13.3	571	12.4	9.6	15.7	618	11.3	9.4	13.5	1,189

¹Lower and upper limits of the 95% confidence interval.

²Other includes students, homemakers, retirees, and persons unable to work.

Table II. Percent of Idaho women in categories with levels associated with the odds of NOT having a Pap test within past three years, 2004 and 2006.

	2004				2006				2004 & 2006 Combined			
	%	95% CI ¹		n	%	95% CI		n	%	95% CI		n
TOTAL FEMALES	21.0	18.9	23.3	2,041	22.5	20.2	24.9	2,143	21.7	20.2	23.4	4,184
AGE												
18-24	29.0	22.5	36.4	226	32.9	25.4	41.4	181	31.0	25.9	36.7	407
25-34	9.7	6.7	14.0	456	11.7	8.4	16.0	455	10.7	8.4	13.7	911
35-44	13.8	10.6	17.7	430	17.9	14.2	22.4	450	15.9	13.3	18.8	880
45-54 ²	20.6	16.3	25.8	387	18.8	14.8	23.5	417	19.6	16.6	23.1	804
55-64	27.3	21.7	33.7	255	21.2	16.0	27.4	295	23.9	20.0	28.2	550
65+ ²	41.8	35.2	48.8	276	43.3	37.3	49.5	329	42.6	38.1	47.2	605
EMPLOYMENT												
Employed	17.0	14.5	19.9	1,176	18.0	15.2	21.1	1,237	17.5	15.6	19.6	2,413
Unemployed ²	23.8	14.5	36.4	91	39.8	23.7	58.4	55	31.1	21.5	42.5	146
Other ³	26.7	23.0	30.7	770	27.4	23.6	31.5	846	27.1	24.4	29.9	1,616
MARITAL STATUS												
Married	14.9	12.8	17.2	1,227	15.0	12.9	17.3	1,306	14.9	13.4	16.6	2,533
Divorced	22.0	16.6	28.7	276	24.5	18.9	31.2	308	23.4	19.3	28.0	584
Widowed ²	46.4	37.9	55.0	191	49.3	41.3	57.4	221	47.9	42.1	53.8	412
Separated	*	*	*	*	*	*	*	*	20.3	12.7	30.9	90
Never Married	38.7	30.8	47.2	237	47.1	37.5	56.9	197	42.9	36.6	49.4	434
Unmarried Couple	14.9	7.0	29.0	62	10.6	5.2	20.5	61	12.7	7.5	20.7	123
CLINICAL BREAST EXAM (past 2 years)												
Yes	3.7	2.8	4.9	1,463	4.6	3.4	6.2	1,499	4.2	3.4	5.1	2,962
No ²	64.5	59.6	69.1	561	62.5	57.3	67.5	634	63.4	59.8	66.9	1,195
MAMMOGRAPHY (past 2 years)												
Yes	6.2	4.7	8.3	732	7.8	6.0	10.1	869	7.1	5.8	8.6	1,601
No ²	27.3	24.4	30.3	1,301	30.0	26.8	33.4	1,270	28.6	26.5	30.9	2,571
CLINICAL BREAST EXAM and MAMMOGRAPHY (past 2 years)												
Yes	4.0	2.8	5.8	683	6.5	4.8	8.9	800	5.4	4.2	6.8	1,483
No ²	27.6	24.8	30.6	1,336	29.8	26.6	33.1	1,329	28.7	26.6	31.0	2,665
HEALTH CARE COVERAGE												
Yes	19.4	17.1	21.8	1,705	21.8	19.2	24.6	1,740	20.6	18.9	22.5	3,445
No ²	27.8	22.5	34.0	333	25.0	20.0	30.7	398	26.2	22.5	30.3	731
DENTAL INSURANCE												
Yes	18.0	15.3	21.2	1,124	19.9	16.9	23.4	1,135	19.0	16.9	21.3	2,259
No ²	24.3	21.1	27.8	895	25.0	21.6	28.8	942	24.7	22.3	27.3	1,837
HEALTH-RELATED EQUIPMENT NEEDED												
Yes ²	20.1	18.0	22.4	1,952	22.0	19.7	24.6	2,027	21.1	19.5	22.8	3,979
No	46.1	33.4	59.3	88	32.9	24.0	43.1	111	39.0	31.1	47.5	199

¹Lower and upper limits of the 95% confidence interval.

²Level with statistically significant adjusted odds ratio described in text and Table 2.

³Other includes students, homemakers, retirees, and persons unable to work.

*Figure not reliable by BRFSS standards (n<50).

APPENDIX B

Questions Used to Determine Whether a Woman Had a Pap Test in the Past Three Years

Q15.5 A Pap test is a test for cancer of the cervix. Have you ever had a Pap test?

- 1 Yes
- 2 No
- 7 Don't Know / Not Sure
- 9 Refused

Q15.6 [IF Q15.5=1, Otherwise Skip To Q15.7] 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 (13.8%)
- 7 Don't Know / Not Sure
- 9 Refused

Q15.7 [IF Q13.16=2 AND Q13.17≠1] Have you had a hysterectomy?

- 1 Yes
- 2 No
- 7 Don't Know / Not Sure
- 9 Refused

APPENDIX C

A Brief Explanation of Odds Ratios

The odds ratio helps quantify the risk faced by a designated at-risk group relative to a reference group. The reference group is chosen arbitrarily but is often the group considered least at risk based on prior information.

The odds ratio is always a positive number between zero and infinity. The reference group is defined as having a risk equal to one (1.0). The value of the odds ratio tells us whether there is equal risk between groups (odds ratio equal to 1.0), greater risk for the at-risk group (odds ratio greater than 1.0), or lessened risk for the at-risk group (odds ratio less than 1.0).

For instance, a comparison group with an odds ratio of 2.0 has two times (double) the risk of the reference group, and a group with an odds ratio of 0.5 has half the risk of the reference group. When confidence intervals are provided, intervals not containing 1.0 may be considered statistically significant.

A crude odds ratio measures the association of one risk factor in isolation. An adjusted odds ratio, such as those used in this report, measures the association of a risk factor when other risk factors are also considered.

Example

In the table below, the odds for those at risk and experiencing the event is a/b . The odds for those not at risk and experiencing the event is c/d . The ratio of these odds is $(a/b)/(c/d)$.

	event	no event
at risk	a	b
not at risk	c	d

To illustrate, if we are interested in measuring the risk of not getting flu vaccine for those who live far from a medical provider, we can construct a table (using hypothetical data):

	no flu vaccine	got flu vaccine
lives far from medical provider	12	6
does not live far from medical provider	3	3

The odds ratio describing the risk of not receiving flu vaccine for those living far from a medical provider would be $(12/6)/(3/3) = 2.0$; i.e., those who live far from a medical provider have two times the risk of not receiving flu vaccine compared with those who live closer.

APPENDIX D

References

1. Early Detection of Cervical Cancer. CA Cancer J Clin. 2002;52:375-376. Available from: <http://caonline.amcancersoc.org/cgi/content/full/52/6/375>.
2. Saslow, D., et al. American Cancer Society Guideline for the Early Detection of Cervical Neoplasia and Cancer. CA Cancer J Clin. 2002; 52:342-362. Available from: <http://caonline.amcancersoc.org/cgi/content/full/52/6/342>.
3. Idaho Department of Health and Welfare, Division of Public Health, Bureau of Clinical and Preventive Services. What is Women's Health Check?. Available from: <http://www.healthandwelfare.idaho.gov/DesktopModules/ArticlesSortable/ArticlesSrtView.aspx?abID=0&ItemID=1037&mid=10864&wversion=Staging>.
4. Centers for Disease Control and Prevention (CDC). National Breast and Cervical Cancer Early Detection Program. Available from: <http://www.cdc.gov/cancer/nbccedp>.
5. Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System (BRFSS). Available from: <http://www.cdc.gov/brfss/>.
6. Idaho Department of Health and Welfare, Division of Health, Bureau of Vital Records and Health Statistics. Idaho Behavioral Risk Factors: Results From the 2004 Behavioral Risk Factor Surveillance System. Boise, Idaho. 2005. Available from: http://www.healthandwelfare.idaho.gov/portal/alias_Rainbow/lang_en-US/tabID_3457/DesktopDefault.aspx.
7. Idaho Department of Health and Welfare, Division of Health, Bureau of Vital Records and Health Statistics. Idaho Behavioral Risk Factors: Results From the 2006 Behavioral Risk Factor Surveillance System. Boise, Idaho. 2007. Available from: http://www.healthandwelfare.idaho.gov/portal/alias_Rainbow/lang_en-US/tabID_3457/DesktopDefault.aspx.
8. Wee CC, Phillips RS, McCarthy EP. BMI and cervical cancer screening among white, African-American, and Hispanic women in the United States. Obesity Research 13:1275-1280 (2005).
9. Breen, Nancy, et al. Progress in Cancer Screening Over a Decade: Results of Cancer Screening From the 1987, 1992, and 1998 National Health Interview Surveys. Journal of the National Cancer Institute 2001 93(22):1704-1713.
10. Calle EE, et al. Demographic predictors of mammography and Pap smear screening in US women. Am J Public Health 1993;83:53-60.
11. Centers for Disease Control and Prevention (CDC). Comparability Of Data: BRFSS 2004. URL: http://www.cdc.gov/brfss/technical_infodata/surveydata/compare_04.rtf.
12. Centers for Disease Control and Prevention (CDC). Comparability Of Data: BRFSS 2006. URL: http://www.cdc.gov/brfss/technical_infodata/surveydata/compare_06.rtf.
13. U.S. Census Bureau and the National Center for Health Statistics, Internet release August 16, 2006. Compiled by: Bureau of Vital Records and Health Statistics, Idaho Department of Health and Welfare, September, 2006.
14. National Center for Health Statistics. Estimates of the July 1, 2006, United States resident population from the Vintage 2006 postcensal series by county, age, sex, race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau, August 16, 2007. Compiled by: Bureau of Vital Records and Health Statistics, Idaho Department of Health and Welfare (September, 2007).

15. Cancer Research UK. Doctors warn of cervical screening decline. January 22, 2007. Available from: <http://info.cancerresearchuk.org/news/archive/newsarchive/2007/january/18039392>.
16. Bristol North Primary Care Trust. Cervical cancer rates could rise if screening invitations are ignored. United Kingdom National Health Service, Bristol North Primary Care Trust. Press release. May 4, 2006. Available from: <http://www.bristolnorthpct.nhs.uk/publications/press%20releases/cervical%20cancer%20rates%20could%20rise%20if%20screening%20invitations%20are%20ignored.pdf>.
17. Idaho Department of Health and Welfare, Division of Health, Bureau of Vital Records and Health Statistics. Asthma Among Adults in Idaho: Facts and Figures, 2006. Boise, Idaho. 2007. Available from: http://www.healthandwelfare.idaho.gov/portal/alias_Rainbow/lang_en-US/tabID_3457/DesktopDefault.aspx.
18. Coughlin SS, Uhler RJ, Hall HI, Briss PA. Nonadherence to breast and cervical cancer screening: what are the linkages to chronic disease risk? Prev Chronic Dis [serial online] 2004 Jan. Available from: http://www.cdc.gov/pcd/issues/2004/jan/03_0015.htm.
19. Wee CC, McCarthy EP, Davis RB, Phillips RS. Screening for cervical and breast cancer: is obesity an unrecognized barrier to preventive care? Ann Intern Med 2000;132:697-704. Available from: <http://www.annals.org/content/vol132/issue9>.
20. Hall HI, Uhler RJ, Coughlin SS, Miller DS. Breast and Cervical Cancer Screening among Appalachian Women. Cancer Epidemiol Biomarkers Prev 2002 11: 137-142. Available from: <http://cebp.aacrjournals.org/content/vol11/issue1>.

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Idaho Department of Health and Welfare.
HW-1206 June 2009