Final Report #121

Trends in Cervical and Breast Cancer Screening Practices Among Women in Rural and Urban Areas of the United States

August 2008

by

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This University of Washington Rural Health Research Center study was funded by the federal Office of Rural Health Policy, Health Resources and Services Administration, Department of Health and Human Services.

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ABSTRACT

BACKGROUND

Women who reside in rural locations may be less likely to receive evidence-based screenings than their urban counterparts.

OBJECTIVE

To assess for geographical differences in mammography and Papanicolaou (Pap) smear screening.

METHODS

Data from the Behavioral Risk Factor Surveillance System from 1994 through 2004 were used to examine differences in receipt of these tests by rural-urban residence location.

RESULTS

Although overall participation in mammography increased over time, a persistent rural-urban gap was identified. By 2004, 70.8% of rural and 75.7% of urban respondents had received timely mammography, and this difference remained statistically significant in multivariate analyses. The gap was even greater between women in the more remote rural locations compared to urban women. In contrast, in 2004 the adjusted difference between the 83.1% of rural and 86.1% of urban respondents who had received a timely Pap test was not significant. Pap testing rates did not improve over time. Characteristics that predicted lack of cervical or breast cancer screening included advanced age and low socioeconomic status (SES). The relationship between screening and race/ethnicity was variable.

CONCLUSIONS

Over an 11-year interval, participation in mammography improved nationally, but women living in rural locations remained less likely to receive this test than those living in urban settings. In contrast, no secular improvement in Pap testing was found, and no significant rural-urban differences were observed.

POLICY IMPLICATIONS

Coordinated efforts by insurers, funding agencies, health care providers, and public health departments are needed to improve receipt of cancer screening among high-risk women residing in rural America.

INTRODUCTION

Periodic screening for breast cancer with mammography and cervical cancer with Papanicolaou (Pap) smear testing can reduce the risk of premature death.[1,2] Receipt of these tests among women who reside in rural locations has been reported to be relatively low in studies comparing the broadly-defined Metropolitan Statistical Area (MSA) (i.e., urban) vs. non-MSA (i.e., rural) populations[3-5] and when comparing urban, suburban and rural locations.[6] Exploration of trends in mammography and Pap smear screening using more detailed categorization of the rural-urban continuum may reveal populations in especially great need for these services.

Appropriate screening intervals have been defined by the U.S. Preventive Services Task Force (USPSTF) as having a screening mammogram every one to two years for women aged 40 and older.[7] and a Pap smear test at least every three years in women who have been sexually active and have a cervix.[8] Increases in mammography during the 1990s have been attributed to increased insurance coverage for this test, subsidized mammography services for low-income women, and educational outreach to providers and the public.[5,9] In contrast, while rates of Pap testing in many locations had achieved the Healthy People 2000 target of 85% of women screened by the 1990s,[10] the proportion of women receiving Pap smear testing during the 1990s did not improved beyond this goal.[5]

Possible explanations for the less frequent use of preventive services by rural women, compared with non-rural women, include greater distances to medical facilities and less accessibility of services; both of these factors are associated with lower education and income levels in rural areas.[11,12] Inadequate health insurance coverage may also be an important barrier to the use of preventive health care services for people living

in rural areas.[11] Also, race/ethnicity in relation to residence location may be associated with screening. In an analysis of data from the 1985 National Health Interview Survey, no difference in Pap testing occurred between white women living in urban vs. rural areas, but a much lower rate of Pap testing occurred among African American women living in rural areas than among their counterparts living in urban areas.[13] Some authors have, therefore, posited that urban-rural differences in the use of cancer screening tests may be more pronounced among members of racial/ethnic minority groups.[14]

In 1984, the Centers for Disease Control and Prevention (CDC) established the Behavioral Risk Factor Surveillance System (BRFSS) for monitoring health risk behaviors.[15] BRFSS collects data annually on health-related behaviors that are useful for planning, monitoring, and evaluating health promotion and disease prevention programs. BRFSS data are collected from all 50 states and include a sufficiently large sample to allow in-depth examination of the prevalence of and recent trends in preventive service use among rural residents.

The primary aim of this study is to examine the prevalence of and trends in mammography and Pap smear screening among adults living in rural and urban locations using several years of data from BRFSS. By combining several years of data, the prevalence of screening can be ascertained for persons living in relatively remote rural locations. The secondary aim is to explore trends in the uptake of these tests among groups of rural women, such as minority group members and those with low educational attainment or low income, who might be relatively unlikely to benefit from any temporal improvements in screening.

METHODS

SAMPLE AND SUBJECTS

BRFSS is a state-based, random-digit-dialed telephone survey of the non-institutionalized U.S. adult population aged 18 years and older. Trained interviewers administered computer-assisted interviews in the 50 states as well as the District of Columbia, Guam, Puerto Rico, and the Virgin Islands; this study is limited to respondents from those states with persons residing in non-metropolitan and metropolitan counties (i.e., New Jersey is excluded because all counties are classified as metropolitan). Also, Alaska was excluded because county-level FIPS codes for Alaska were not available, which makes differentiation between rural and urban residents impossible for this state. Data retaining all county-level Federal Information Processing Standards (FIPS) codes[16] were obtained by written request from the CDC. To increase statistical power, multiple years of BRFSS data were combined; annual data from 1994 (n = 105,853) through 2004 (n = 303,822) were examined. (The annual BRFSS sample size increased during each year examined.) Median response rates declined over this time frame; for example, the response rate was 69.9% (range: 42.6%-86.8%) in 1994 and 52.7% (range: 32.2%-66.6%) in 2004. Additional information describing the BRFSS data collection process, BRFSS publications, and public use data itself can be accessed at: http://www.cdc.gov/brfss/index.htm#about_BRFSS.

DEPENDENT MEASURES

Each female respondent was asked whether she had ever had a mammogram; participants who responded positively were then asked when they had received their last mammogram. Similar questions were asked concerning Pap tests. The respondents also were asked whether they had undergone a hysterectomy. Analyses of mammography were limited to women aged 40 years and older; those who reported receipt of a mammogram within the preceding two years were classified as being up-to-date. Analyses of Pap smear testing were limited to women aged 18 years of age or older who had not had a hysterectomy; those who reported receipt of a Pap smear within the preceding three years were classified as being up-to-date. While different intervals could have been selected for both mammography and Pap testing, the selected intervals fall within current USPSTF guidelines.[7,8]

INDEPENDENT MEASURES

Rural residence was ascertained by classifying county FIPS codes available on BRFSS. These were broadly grouped as metropolitan (urban) or non-metropolitan (rural) county of residence based on the widely used standard, county-based Office of Management and Budget (OMB) taxonomy, and this classification was further categorized using the 2003 Urban Influence Code (UIC) groupings of the Economic Research Service of the U.S. Department of Agriculture[17] as follows: "Metropolitan"—large and small metropolitan counties (codes 1-2); "Adjacent Non-Metro"—geographically adjacent to a metropolitan area, including both micropolitan and non-core counties (codes 3-7); "Remote Micropolitan"—not adjacent to a metropolitan county and with a town/urban cluster of 10,000 residents or greater (code 8); and "Remote Non-Core"—not adjacent to a metropolitan county and without a city of 10,000 residents or greater (codes 9-12). UIC adjacency is determined by county boundaries and a minimum work commuting criterion. Geography was also classified by state. Other measures included: race/ethnicity (Hispanic, African American, American Indian/Alaska Native, Asian/Pacific Islander, and non-Hispanic white); sex; age (ages 18-34, 35-49, 50-64, and 65 years or older); educational attainment (less than high school degree, high school degree or equivalent or some college, college degree or more); annual household income (less than $25,000, $25,000-

$49,999, $50,000-$74,999, and $75,000 or greater) and employment status (employed, unemployed, and out of the workforce). Because Alaska was excluded from these analyses, the term American Indian is used in lieu of American Indian/Alaska Native, although some BRFSS respondents residing outside of Alaska may, in fact, be Alaska Natives.

ANALYTICAL PLAN

BRFSS employs multistage cluster sampling in each participating state in order to sample non-institutionalized adults living in a residence that had a telephone. Accordingly, estimates were weighted using the BRFSS weighting formula by the sex, age, and race/ethnicity distributions of the population in each area. For unadjusted analyses, Chi-square testing and 95% confidence intervals (CIs) were calculated by using SUDAAN software,[18] which adjusts the standard errors to account for the complex sample design of the BRFSS. For multivariate assessment, logistic regression was performed. Temporal changes in receipt of the screening tests were analyzed by contrasting estimates from 1994 against those from 2004.

RESULTS

In 2004, 70.8% of women residing in all rural locations combined and 75.7% of women residing in urban locations reported that they had received a mammogram in the preceding two years; this overall rural-urban difference remained significant after adjustment for sociodemographic covariates ($p < 0.0001$; data not shown in tables). Furthermore, women who lived in the most isolated rural locations were the least likely to have received a timely mammogram ($p < 0.0001$) (Table 1). In contrast, 83.1% of women residing in all rural locations combined and 86.1% of women residing in urban locations reported that they had received Pap smear screening in the preceding three years; however, this small rural-urban difference did not remain statistically significant after adjustment for covariates ($p = 0.09$; data not shown in tables). In the adjusted analyses, the proportion receiving Pap testing did not vary significantly along the four category, urban-rural continuum ($p = 0.26$) (Table 1).

The overall rural category was compared to the urban category to explore the contributory role of sociodemographic factors to possible rural-urban differences in breast and cervical cancer screening (Table 2 presents mammography by sociodemographic characteristics; Table 3 presents Pap smear screening by sociodemographic characteristics). After adjustment, the racial/ethnic groups with the lowest rates of mammographic screening regardless of rural vs. urban residence location were non-Hispanic whites, American Indians, and Asian Pacific Islanders (Table 2). Also, within specific racial/ethnic group strata, rural non-Hispanic whites and rural African Americans had lower screening rates than their urban counterparts. A rural-urban gap in receipt of mammography was demonstrated for all age groups, but this difference was greatest among elderly women. Low levels of education and low income, particularly among women who resided in rural locations, were associated with low uptake of mammography. For Pap smear testing, Asian/Pacific Islanders regardless of urban vs. rural residence location were less likely than non-Hispanic whites to have received this test, while African Americans and Latinos regardless of residence location were relatively more likely to have received Pap screening (Table 3). Persons aged 65 and older were least likely to have received Pap screening. Although women aged 18 to 34 years residing in rural locations were slightly more likely to receive Pap testing than their urban counterparts, women aged 35 to 64 in rural locations were slightly less likely to have received this screening test. Women with low income

Table 1: Percent Women with Current Mammogram or Pap Screening by Rural/Urban (2004)*

	Metro		Adjacent to Metro		Remote			
					Micropolitan		Non-Core	
Factor	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Mammogram, aged 40+								
Unadjusted	75.7	(75.2 , 76.2)	71.2	(70.0 , 72.4)	71.8	(70.1 , 73.5)	68.3	(66.6 , 70.0)
Adjusted	75.4	(74.9 , 76.0)	73.4	(72.3 , 74.4)	73.7	(72.1 , 75.4)	71.1	(69.4 , 72.7)
Pap, aged 18+								
Unadjusted	86.1	(85.7 , 86.6)	83.4	(82.5 , 84.4)	83.2	(81.7 , 84.8)	81.7	(80.2 , 83.1)
Adjusted	86.0	(85.5 , 86.4)	85.4	(84.5 , 86.4)	85.2	(83.8 , 86.6)	84.9	(83.5 , 86.2)

* Variables modeled but not shown are age, sex, race/ethnicity, education, income, employment status, Census region, self-reported health, and having a health insurance plan.

Table 2: Percent Women Aged 40+ with Current Mammogram by Rural/Urban and Selected Characteristics (2004), Adjusted*

Factor	Metro %	Metro (95% CI)	Non-Metro %	Non-Metro (95% CI)
Overall	75.4	(74.9 , 76.0)	73.0	(72.2 , 73.9)
Race				
Non-Hispanic white	74.3	(73.7 , 74.9)	72.0	(71.1 , 72.8)
African American	79.6	(78.0 , 81.3)	76.7	(74.2 , 79.1)
Asian/Pacific Islander	66.4	(60.9 , 71.9)	71.3	(57.0 , 85.6)
American Indian	72.6	(65.6 , 79.5)	71.9	(65.6 , 78.3)
Hispanic	80.9	(78.9 , 82.9)	77.0	(72.4 , 81.5)
Age				
40-49	66.6	(65.4 , 67.7)	64.7	(62.9 , 66.4)
50-64	80.2	(79.3 , 81.0)	78.9	(77.7 , 80.0)
65+	79.1	(78.1 , 80.1)	75.1	(73.8 , 76.5)
Education				
< high school	71.8	(69.7 , 73.8)	65.6	(63.5 , 67.7)
High school	75.1	(74.4 , 75.9)	73.4	(72.4 , 74.4)
College degree	77.9	(76.9 , 78.9)	75.8	(74.1 , 77.5)
Income				
< $25,000	69.7	(68.4 , 70.9)	65.6	(64.0 , 67.2)
≥ $25,000, < $50,000	75.3	(74.2 , 76.4)	73.8	(72.4 , 75.2)
≥ $50,000, < $75,000	79.1	(77.7 , 80.4)	78.9	(76.4 , 81.3)
$75,000 +	81.0	(79.7 , 82.3)	80.9	(78.8 , 83.0)
Missing	76.3	(74.9 , 77.6)	71.9	(70.0 , 73.7)

* Variables modeled but not shown are employment, Census region, self-reported health, and having a health insurance plan.

or education were less likely to have been screened for cervical cancer regardless of residence location, although women with low educational attainment residing in rural locations were particularly unlikely to have received Pap testing.

For the United States overall, the likelihood of having received a mammogram improved by roughly 10% in absolute terms between 1994 and 2004 and the magnitude of this improvement was similar for rural and urban locations (Figure 1). In other words, the rural-urban gap in mammography persisted at roughly 3 to 5% throughout the time interval studied and women residing in the most remote locations remained least likely to receive this test throughout this time period. In contrast, roughly 85% of women received a timely Pap smear

Figure 1: Adjusted Percentage of Women Aged 40+ with Current Mammogram

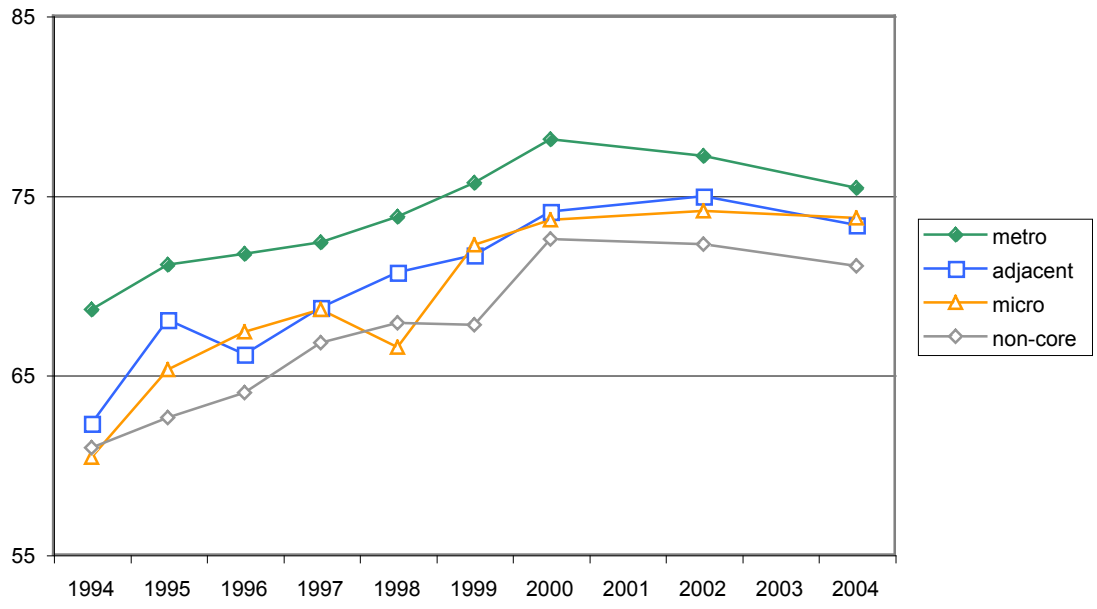


Table 3: Percent Women Aged 18+ with Current Pap Smear Screening by Rural/Urban and Selected Characteristics (2004), Adjusted*

Factor	Metro %	Metro (95% CI)	Non-Metro %	Non-Metro (95% CI)
Overall	86.0	(85.5 , 86.4)	85.3	(84.6 , 86.0)
Race				
Non-Hispanic white	85.6	(85.0 , 86.1)	84.6	(83.8 , 85.4)
African American	89.0	(87.8 , 90.2)	90.3	(88.7 , 91.9)
Asian/Pacific Islander	68.5	(63.9 , 73.1)	67.6	(57.6 , 77.6)
American Indian	83.5	(77.6 , 89.4)	83.6	(78.3 , 88.9)
Hispanic	88.0	(86.6 , 89.3)	87.6	(85.0 , 90.2)
Age				
18-34	87.2	(86.4 , 88.1)	88.7	(87.5 , 90.0)
35-49	89.2	(88.5 , 89.9)	86.7	(85.5 , 88.0)
50-64	86.2	(85.2 , 87.2)	84.7	(83.3 , 86.1)
65+	75.9	(74.3 , 77.6)	74.0	(72.0 , 76.0)
Education				
< high school	84.4	(82.9 , 85.9)	81.6	(79.8 , 83.4)
High school	84.8	(84.1 , 85.4)	84.3	(83.4 , 85.2)
College degree	89.5	(88.8 , 90.2)	89.5	(88.2 , 90.8)
Income				
< $25,000	82.8	(81.8 , 83.7)	81.4	(80.0 , 82.8)
≥ $25,000, < $50,000	87.6	(86.8 , 88.5)	86.9	(85.7 , 88.1)
≥ $50,000, < $75,000	88.9	(87.7 , 90.1)	89.5	(87.8 , 91.2)
$75,000 +	91.0	(90.0 , 92.0)	91.3	(89.5 , 93.2)
Missing	82.4	(81.0 , 83.8)	81.4	(79.4 , 83.4)

* Variables modeled but not shown are employment, Census region, self-reported health, having a health insurance plan, and pregnancy status.

throughout this eleven-year interval and no significant rural-urban differences in this trend were found (Figure 2).

Figure 3 presents mammography in 2004 by state for women residing in rural locations. States with the lowest prevalence of this screening in rural locations included: Idaho, Missouri, Nevada, Oklahoma and Texas; states with the highest prevalence of mammography in rural locations included: Arizona, Delaware, Maine, Massachusetts, and Michigan. In general, the states with the lowest prevalence of mammography among rural residents were predominantly located in the south central and western mountain states, while its prevalence tended to be highest in the upper Midwest and Northeast.

Figure 2: Adjusted Percentage of Women Aged 18+ with Current Pap

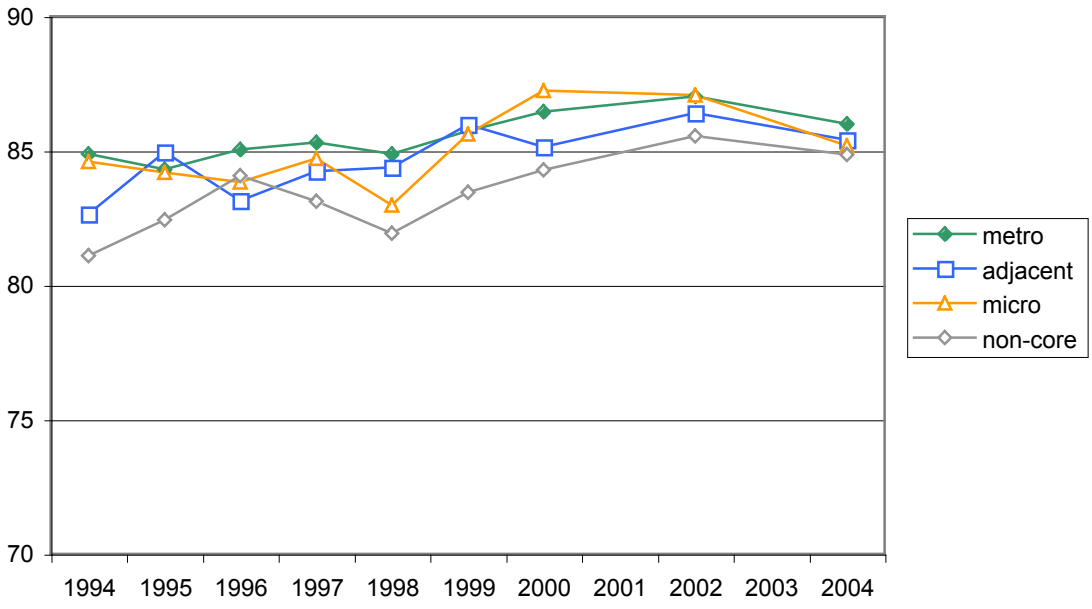


Figure 3: Percentage of Rural Women with Mammography (2004)

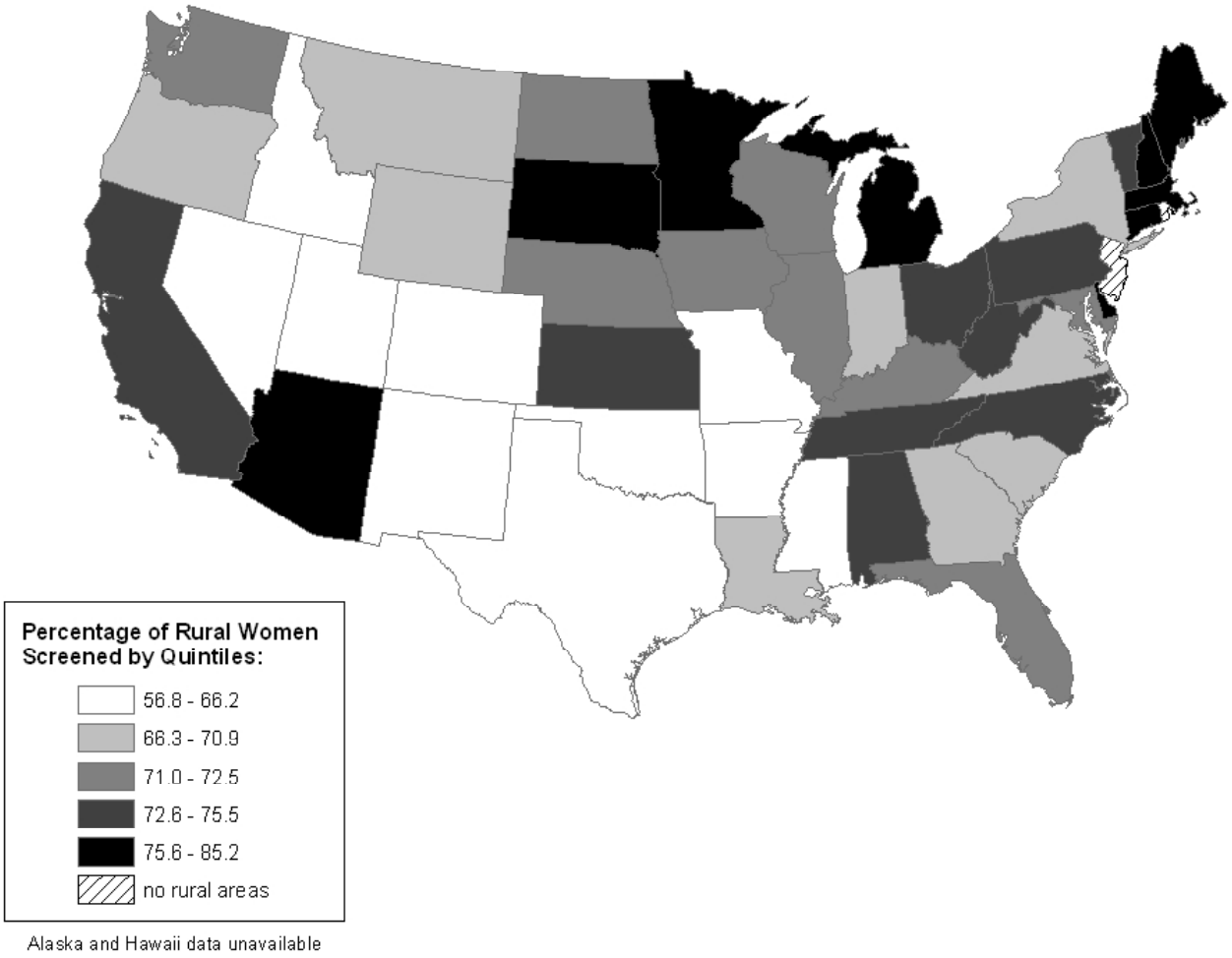
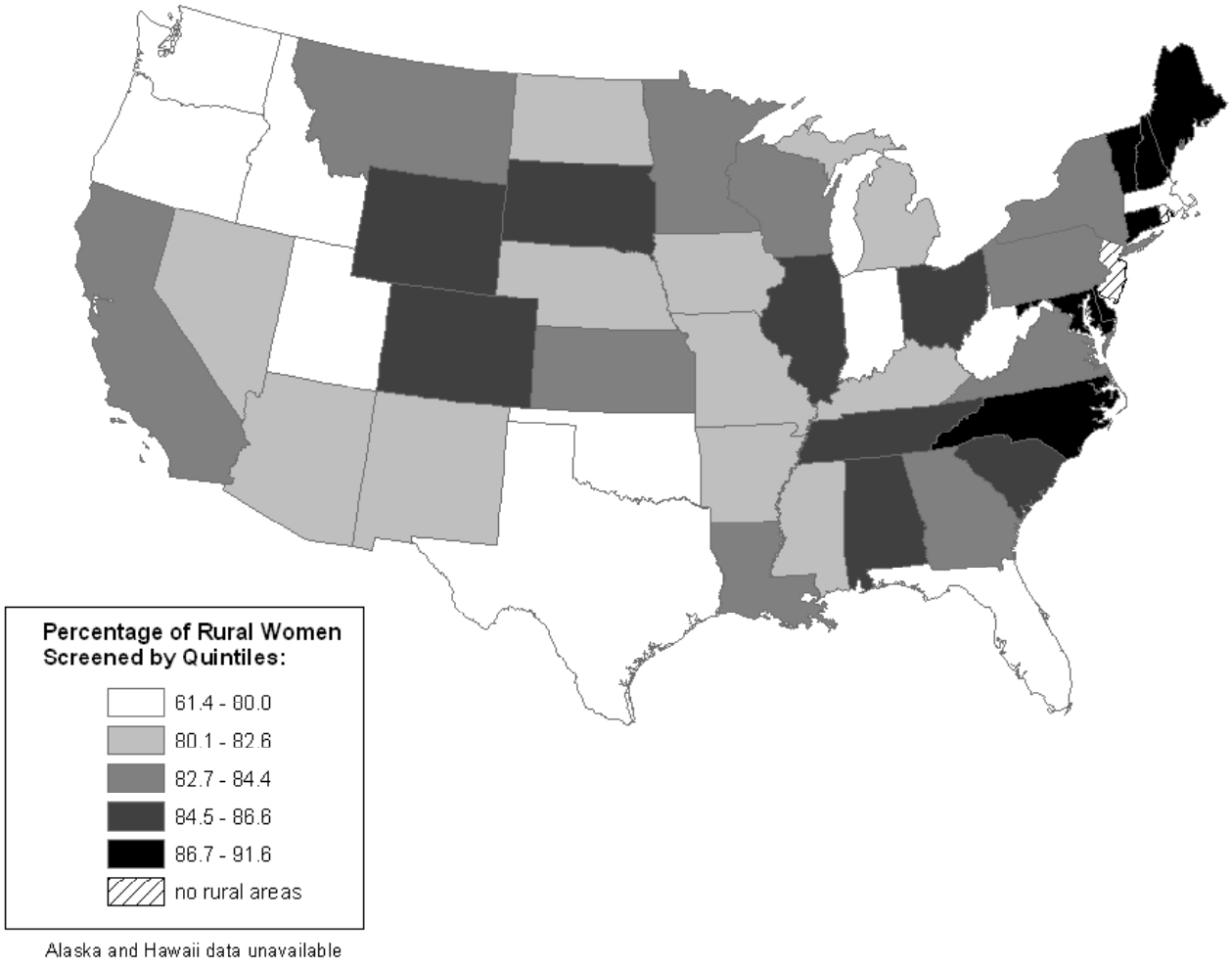


Figure 4 presents Pap smear screening in 2004 by state for women residing in rural locations. States with the lowest prevalence of Pap screening included: Idaho, Indiana, Massachusetts, Texas, and Utah; states with the highest prevalence of this screening included: Connecticut, Delaware, Maine, Maryland, and New Hampshire. In general, states located east of the Mississippi River, and especially several of the northeastern states, had a higher prevalence of Pap smear testing among rural residents than states in the western portions of the country.

DISCUSSION

Policies and interventions to improve cancer screening may be most effective when they are tailored toward women who have a high risk of not being tested. We observed that rural residence itself, particularly residence in an isolated rural location, is a risk factor for not having received a screening mammogram, which lends credence to arguments for improving access to mammography in rural settings, particularly remote ones. We also confirmed that several well-known risk factors for lacking preventive services, including Asian/Pacific Islander ethnicity, low socioeconomic status, and advanced age, independently identified groups of women residing in both rural and urban settings who were at high risk for not being screened for breast or cervical cancer. However, we also observed that for some groups, such as those with low educational attainment, rural disparities were particularly pronounced. We also found that after adjustment for covariates, non-Hispanic whites and American Indians were less likely to receive mammograms than African Americans and Latinos; this finding was true for both rural and urban locations. Moreover, compared to urban African Americans, rural African Americans were less likely to receive mammograms and a similar pattern was seen for non-Hispanic whites.

Figure 4: Percentage of Rural Women with Pap Smear Testing (2004)



Our observation that rural and urban African Americans were more likely to participate in mammography and Pap testing than non-Hispanic whites is consistent with published research showing that African American women are more likely to engage in preventive measures such as breast examinations and Pap tests.[13,19] We did, however, observe that *rural* African Americans had lower rates of mammography than urban African Americans, which has not been documented using national data. Also, Latino women have been reported elsewhere to be less likely than non-Hispanic whites to have received Pap smears,[20,21] but we observed that rural and urban Latinas actually were more likely to participate in mammography and Pap testing than non-Hispanic whites. The literature documents that American Indians are less likely to receive mammograms than non-Hispanic whites, African American, or Latino women,[22] but we found that American Indians did not differ significantly from non-Hispanic whites on either screening test. Others have reported low rates of mammography[22] and Pap testing[23] among Asian women, which is similar to what we found using the heterogeneous Asian/Pacific Islander category that is available in the BRFSS data set.

The BRFSS survey is designed to permit the monitoring of trends in the rate of cancer screening; such monitoring is needed to determine whether efforts to improve screening uptake have been effective. We found that mammography participation improved between 1994 and 2004, but its prevalence remained consistently lower among rural residents throughout this time period and, in the rural locations of some states, had not yet achieved the Healthy People 2010 target to increase the proportion of women aged 40 years and older who have received a mammogram within the preceding 2 years to 70%.[24] In contrast, the prevalence of timely Pap smear testing remained at roughly 85% across the rural-urban continuum and across time. Although the older Healthy People 2000 goal of 85% of women being screened with Pap smears has been achieved, the 2004 prevalence of

testing falls short of the more recent Healthy People 2010 goal to increase the proportion of women aged 18 years and older who have received a Pap testing within the preceding 3 years to 90%.[24] Continued monitoring of trends, particularly among women having characteristics placing them at high risk for not receiving breast and/or cervical cancer screening, would be needed to track any future gains in screening participation and, importantly, the progress of high risk groups towards the Healthy People 2010 goals.

The manner of classifying health insurance coverage employed in the BRFSS data set, prevented us from including health insurance as a covariate. Health insurance is a critical factor governing access to preventive services, and ability to examine this in relation to geography, SES and race/ethnicity would have been desirable. However, we were able to consider two socioeconomic factors that are highly correlated with insurance coverage, income and educational attainment, as well as age. Our observations regarding income, education and age are consistent with other research that has documented substantial disparities by socioeconomic characteristics[25-27] and age[25,28] in rates of use of preventive services and our findings add to this literature by documenting disparities among residents of rural counties. Mammography and Pap smears occurred less frequently among poor, older, or less than college-educated women, particularly among persons who resided in rural locations.

States exhibited wide variability in both mammography and Pap smear screening among rural residents. Part of this variability may reflect overall rates of health insurance coverage and, among those with insurance, the generosity of the covered benefits. Given that states can influence participation in Medicaid and other insurance programs (such as the non-group insurance market) and can mandate coverage for preventive services, they can play an important role in improving screening rates. Yet per capita annual total health care spending in 2004 varied widely by state of residence,[29] ranging from an average of $6,683 per resident in Massachusetts to $3,972 in Utah. Similarly, Medicaid spending per Medicaid enrollee for 2004 varied widely, ranging from $10,199 in New Jersey to $3,664 in California.[29] Given such wide differences in state-driven funding levels, it seems likely that the emphasis placed on preventive services would also vary considerably by state. For example, eight of the top ten states in terms of per capita personal health care spending in 2004 were located in the New England and Mideast regions, which are regions in which participation in screening for breast and cervical cancer tended to be relatively high.

Findings in this report are subject to several limitations. We were not able to evaluate the effect that speaking a language other than English might have on screening. For example, much greater disparities in preventive care have been observed among predominately Spanish-speaking Latino women compared to English speaking Latino women.[30] Because the BRFSS was administered in English, we were not able to evaluate the role of language barriers in screening uptake among Latino women, Asians/Pacific Islanders and American Indians.

Other factors influencing screening participation may include attitudes towards risk, perceptions of discrimination or bias in the health care system, and other social and cultural beliefs that affect care-seeking behavior. Although the BRFSS data sets do not permit whether persons from high-risk groups might hold beliefs that may impede access to and participation in screening programs, some research points to this possibility. For example, Hubbell and colleagues reported that Latino women express relatively fatalistic beliefs about the outcome of having a cancer diagnosis.[31] They also found that Latino women who are new immigrants were more likely than U.S.-born Latino or white women to believe that a Pap test is necessary only when symptoms are present. Also, cultural beliefs affected the likelihood of receiving a Pap test, even when controlling for socioeconomic status. It is possible that cultural beliefs may mediate the impact of socioeconomic status, a hypothesis that is beyond the scope of our study. Efforts to identify and address beliefs that may reduce participation in invasive tests (breast imaging and pelvic examination) might help improve screening rates in some high-risk rural and urban populations.

BRFSS does not sample persons living in institutions or persons living in households without a telephone, both of which may be subgroups at higher risk for not receiving preventive tests. Findings could have been affected by the trend towards lower response rates in telephone-based surveys. However, BRFSS employs post-stratification weights to minimize the problem of non-response.[32] Further, data were based on self-report, which might be subject to recall bias, and medical record verification was not used to assess screening status. Validation studies have suggested that patients over-report screening participation and under-report the time lapse since their last screening.[33-36] However, bias introduced from self-report of screening should not have materially affected rural vs. urban comparisons. Finally, care must be taken in drawing conclusions based on data aggregated by county, as there is a significant degree of variation in population characteristics within many counties. For example, counties classified as urban may also encompass rural populations. This aggregation may attenuate the observed rural-urban difference in the prevalence of breast and cervical cancer screening.

POLICY IMPLICATIONS

Breast and cervical cancer continue to be major health problems in the United States. Screening is required to reduce the burden of these conditions. This study documents the receipt of timely breast and cervical cancer screening using the refined rural-urban grouping of county-level urban-influence codes and nationally representative data. Our findings indicate that improvements in mammography are needed among women living in rural areas. More specifically, increased access to mammography is needed among women having high-risk characteristics, including low socioeconomic position, being elderly, and having non-Hispanic white, American Indian, or Asian or Pacific Islander ethnicity regardless of rural-urban geographic location of residence as well as among rural African Americans. Similarly, improvements in Pap smear testing are needed among rural and urban women having low socioeconomic position, advanced age, or Asian or Pacific Islander ethnicity.

Importantly, for low-income persons, the costs of screening can be prohibitive. Public insurance programs, such as Medicaid for those aged 64 years and younger, have been shown to be especially important for African Americans and Hispanics.[37] Because Medicaid coverage for treatment of women diagnosed with breast or cervical cancer is now immediately available through the Breast and Cervical Cancer Prevention and Treatment Act of 2000, low-income women and their providers may feel more comfortable taking the first step: age-appropriate screening. Despite fiscal stress, preservation and, insofar as possible, expansion of Medicaid coverage could help improve screening rates.

In addition to the role that Medicaid insurance coverage provides for low-income persons, federal-state partnerships have been undertaken to improve screening in high-risk groups. For example, the National Breast and Cervical Cancer Early Detection Program (NBCCEDP), through federal, state, territorial, and tribal governments, in collaboration with national and community-based organizations, was shown to increase access to breast and cervical cancer screening among low-income and uninsured women.[37] However, NBCCEDP has been estimated to reach only 12%-15% of uninsured women aged 50-64 years who are eligible for screening services,[38] indicating the need to increase these types of interventions to reach larger numbers of women.

In rural areas, relatively low rates of health insurance and limited availability of health care, including primary care and radiographic services, decrease access to breast cancer screening services[3] and this situation undoubtedly affects persons with low SES disproportionately. Also, many rural communities may be too small to provide mass media messages about prevention of cancer affecting women. Therefore, coordinated efforts by insurers and funding agencies, health care providers, public health departments, and local media would be required to improve receipt of cancer screening services among women residing in rural America. A continuing challenge will be to increase state and national commitments to providing screening services for all eligible women to ultimately reduce morbidity and mortality from breast and cervical cancer.

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