

Differences in Preventive Screening Rates in Wisconsin Farm and Non-Farm Resident Women

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ABSTRACT

Purpose: To determine the proportion of rural women who met screening recommendations for Pap smears, mammograms, blood cholesterol, and blood pressure measurements.

Methods: Women aged 25-75 were recruited for a population-based study of chronic diseases in rural residents. In addition to a self-administered health questionnaire and a brief examination, the most recent Pap smear, mammogram, blood pressure, and blood cholesterol measurements were documented from electronic medical records.

Results: The study population was comprised of 675 farm and 825 non-farm residents. Fifty-five women (3.7%) had no documentation in their medical records of having ever had a Pap smear, and 19.3% (95% CL 16.9, 21.7) of women aged 40 and older had no documentation of a mammogram. Ninety-two percent of the women (95% CL=90.2, 93.7) had a blood pressure measurement in the previous 2 years and 74.9% (95% CL=72.2, 77.6) had a blood cholesterol measurement in the previous 5 years. Age was inversely related to Pap smears and positively correlated with mammograms, blood pressure, and blood cholesterol measurements. Farm residents were significantly less likely to have Pap smears or blood pressure measurements at recommended time intervals.

Discussion: To increase the proportion of rural women in compliance with preventive screening recommendations, public health education efforts should target farm residents and younger women.

INTRODUCTION

Cardiovascular disease is composed of a number of vascular conditions, including hypertension, coronary heart disease and stroke.¹ Coronary heart disease (CHD) is the leading cause of morbidity and mortality in the United States and is predominantly caused by atherosclerosis. Controllable risk factors for atherosclerosis include elevated blood cholesterol, hypertension, tobacco, diabetes mellitus, obesity, and physical inactivity. Appropriate screening and treatment of the controllable risk factors for atherosclerosis can lead to a decrease in the incidence of CHD.¹ To this end, there are a number of Healthy People 2010 goals related to heart disease and stroke, with screening for disease as the first step toward decreasing mortality.²

Cancer is the second leading cause of mortality in the United States, and Healthy People 2010 goals for the nation include a number of objectives for the early detection of cancer.³ Although the death rate from breast cancer in women has dropped, in part due to mammography screening,⁴ breast cancer continues to be the leading cause of new cancers and the second leading cause of cancer death in women.⁵ Secondary prevention of cervical cancer by Pap smears has been shown to reduce mortality, and yet over 4000 US women each year die from this disease.^{3,6}

The purpose of this study was to determine the proportion of rural women who met screening recommendations for Pap smears, mammograms, blood pressure, and blood cholesterol measurements. A second aim was

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to identify predictors on non-compliance with screening recommendations in this rural cohort.

METHODS

The Rural Women's Health Study (RWHS) is a prospective cohort study to investigate risk factors for chronic diseases in rural women aged 25 to 75. A total sample size of 1500 women was selected to allow sufficient power to detect a relative risk of 2.0 comparing disease rates between farm and non-farm residents. Details of the RWHS have been published previously.⁷

Between 1995 and 2001, 1500 women, stratified by farm residency status, were recruited from the Marshfield Epidemiologic Study Area (MESA), a 14 ZIP code region comprising approximately 50,000 residents in rural central Wisconsin.

Stratified sampling was employed to select eligible farm and non-farm residents aged 25-75 years. Letters of introduction and invitation to eligible residents were followed by telephone calls from research coordinators to recruit participants and organize appointment times. Self-administered questionnaires were mailed along with the appointment reminders.

Examinations included seated auscultatory blood pressure, anthropometric measurements (height, weight, waist and hip circumference), a fasting blood draw for subsequent biochemical analyses, and the self-administered questionnaire. The questionnaire included items about demographics, personal health history, use of medications, symptoms of anxiety and depression, quality of life, social support, job control, socioeconomic status, reproductive history, smoking and alcohol intake, physical activity, and a semi-quantitative food frequency questionnaire. One of the survey questions asked the extent to which health insurance was a personal problem for the participants. (Response options included: a big problem, a bit of a problem, not a problem, does not apply to me.) Medical records were abstracted to verify self-reported health events and to record the year of the most recent Pap smear, mammogram, blood cholesterol, and blood pressure measurement prior to the baseline examination. The Institutional Review Board of the Marshfield Clinic approved all study procedures, and all women signed informed consent documents prior to participation.

Data were entered twice, verified, and range checks were performed prior to analysis. Statistical analyses were performed with SAS (SAS Institute, Cary, NC). Chi-square and t-tests were used to assess the statistical significance of univariate associations, while generalized linear and logistic models were used for multivari-

ate analyses. Five-year age-specific counts of US white women from the 2000 census were used to directly age-standardize the rates and to calculate 95% confidence limits.⁹

RESULTS

Fifty-eight percent of eligible women participated (675 farm and 825 non-farm residents); participation did not vary by residence. Ninety-nine percent (1483 of 1500 women) were non-Hispanic white. The mean age did not differ between farm (47.6 years) and non-farm (47.0 years) residents ($P=0.36$). Approximately half of the farm residents (334/675) reported that they worked on a farm.

Fifty-five women (3.7%) had no documentation in their medical records of having ever had a Pap smear, and 19.3% (95%CL 16.9, 21.7) of women aged 40 and older had no documentation of a mammogram. Almost all the women reported that they had had their blood pressure measured at some time in the past, while 183 (12.2%) women reported that they had not. The proportion of women aged 18+ in rural Wisconsin receiving a Pap smear within the previous 3 years was significantly less than the US baseline and Healthy People 2010 target (Table 1). Conversely, recent mammography use was significantly higher in the cohort. Although better than the national average, the proportion of women in the cohort with recent blood pressure and blood cholesterol measurements was still below the Healthy People 2010 objectives.

Age was inversely related to Pap smears and correlated positively with use of mammograms ($P<0.05$ for both) (Figure 1). Having a blood pressure measurement within the previous 2 years was relatively constant over the age groups ($P=0.107$, Figure 2).

We assessed the extent to which health insurance was a barrier to using preventive health screenings in this cohort. Overall, 163 (10.9%) women said that health insurance was a big problem for them, 312 (20.8%) a bit of a problem, 991 (66.1%) not a problem, and 34 (2.3%) said that it did not apply to them. Farm residents were significantly more likely to report that health insurance was a problem for them (43.9% versus 21.7%, $c^2=84.2$, $P<0.001$). Women who reported that health insurance was a problem for them were less likely to undertake screening at the Healthy People 2010 levels, but these findings were not statistically significant after adjusting for age and farm residence (Table 2).

DISCUSSION

This study has quantified rates of primary screening in

Table 1. Proportion of Rural Wisconsin Women Receiving Pap Smears, Mammograms, Blood Pressure and Blood Cholesterol Measurements According to Healthy People 2010 Recommendations

Screening Recommendation	1998 US Baseline ^{1*} Percent	Healthy People 2010 Target ^{1,2} Percent	Percent of Women in RWHS [†] who Meet Recommendation (95% CL)*
Pap smear within preceding 3 years (women aged 18+)	79	90	71.7 (68.8, 74.6)
Mammogram within preceding 2 years (women aged 40+)	67	70	80.7 (78.3, 83.1)
Blood pressure measurement within the preceding 2 years (adults aged 18+)	90	95	92.0 (90.2, 93.7)
Blood cholesterol check within the preceding 5 years (adults aged 18+)	67	80	74.9 (72.2, 77.6)

* age-adjusted to the year 2000 white women census

† Rural Women's Health Study

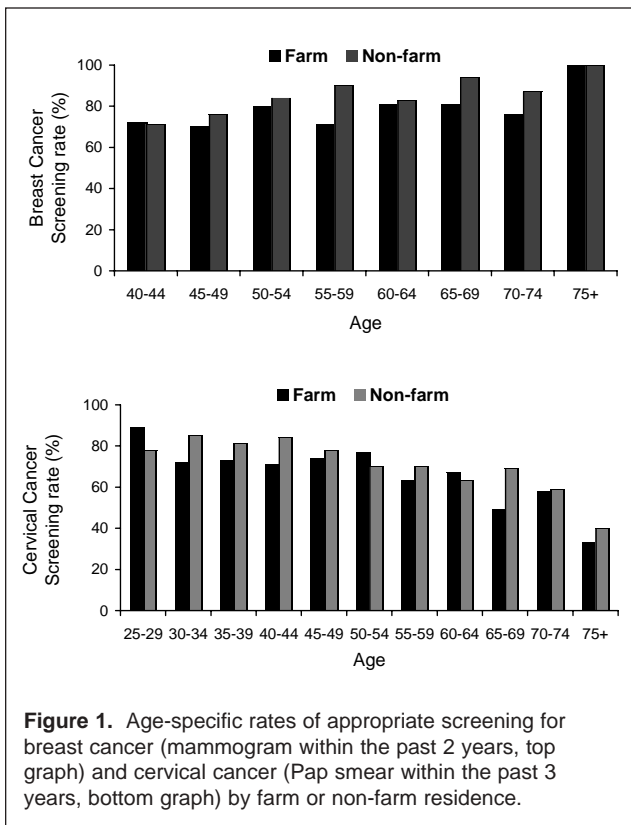


Figure 1. Age-specific rates of appropriate screening for breast cancer (mammogram within the past 2 years, top graph) and cervical cancer (Pap smear within the past 3 years, bottom graph) by farm or non-farm residence.

a population-based cohort of rural women in central Wisconsin. To our knowledge, a comparison of compliance rates for the common primary prevention screenings and an analysis of predictors for which targeted interventions could be designed has not been published previously. With the exception of Pap smears, rural Wisconsin women use preventive screenings more regularly than US women as a whole, but they do not meet the Healthy People 2010 targets, other than for mammograms.

Early detection and treatment of breast and cervical cancer has been shown to decrease mortality rates from these 2 diseases.¹⁰ Screening for breast and cervical cancer meets the basic requirements for successful mass screening programs: 1) relatively long latent period, 2) acceptable sensitivity and specificity, and 3) treatment options for the early, preclinical stages of disease. Organizations consider a number of factors when developing screening guidelines, including age-specific incidence, sensitivity and specificity of screening tests, and expected compliance with screening recommendations.

Mammography use was higher in this cohort than US women and the Healthy People 2010 targets. Similarly, the rate was significantly higher than was reported in studies of farm women in southern Minnesota,¹¹ Iowa,¹² and Michigan.¹³ The higher mammogram utilization in our cohort may be due to higher access to health care services than is usually the norm for rural areas in the United States, or it could be due to differences in response rate or other methodological issues between the studies.

Security Health Plan, an insurance plan owned by the Marshfield Clinic, has a mobile van for community breast cancer screening; results are recorded in the clinic's electronic medical record. The current data suggest, but cannot entirely prove, that this measure has been highly successful in getting women to comply with mammography recommendations. This hypothesis may be further supported by the fact that breast cancer mortality rates are lower in the northern and western regions of Wisconsin than in Wisconsin as a whole,¹⁴ and Wisconsin itself has lower breast cancer mortality rates than the rest of the United States.¹⁵

The discrepancy between Pap smear and mammogram use suggests that there should be more encourage-

Table 2. Predictors of Compliance with Screening Recommendations, OR* (95% CL)

Risk Factor	Pap Smear	Mammogram	Blood Pressure	Blood Cholesterol
Non-farm residence	0.75 (0.59, 0.96)	0.73 (0.53, 1.02)	0.57 (0.39, 0.84)	0.84 (0.64, 1.12)
Age (yrs)	0.97 (0.96, 0.98)	1.04 (1.02, 1.06)	1.01 (0.99, 1.03)	1.07 (1.05, 1.08)
Health insurance is a problem	0.94 (0.72, 1.21)	0.75 (0.53, 1.05)	0.99 (0.66, 1.48)	0.84 (0.63, 1.14)

* Based on unconditional logistic regression models including all risk factors shown in the table.

† Statistically significant factors are bold.

ment and facilitation of women to meet the Pap smear recommendations and/or the guidelines should be changed to reflect the lower compliance. Updated screening guidelines for cervical cancer, with generally fewer Pap Smears recommended, have been released recently and may impact future use of services.¹⁶ The current data suggest that perhaps Marshfield Clinic physicians are responding to the newer evidence base (in comparison with the Healthy People 2010 targets which remain static for 10 years) by conducting Pap smears less regularly, which is currently known to be appropriate.

Within the Marshfield Clinic system, blood pressure is a vital sign, to be recorded in the electronic medical record by a medical assistant at every patient visit. This policy's success is obvious in the very high rates of blood pressure measurements in this cohort within the preceding 2 years. Along with appropriate treatment of detected hypertension, this high level of blood pressure screening should result in lower rates of CHD and stroke in the population.

Somewhat surprisingly, after adjustment for age and farm residence, concern about health insurance was not statistically related to compliance with screening recommendations in this cohort. The Marshfield Clinic allows access to health care to all individuals, regardless of a patient's ability to pay, and that policy may be reflected in the fact that insurance problems did not significantly influence use of screenings in this population. If so, the Marshfield Clinic model of integrated health care delivery may be a useful model for other rural areas in the United States.

Advantages of this study include the representation of both farm and non-farm residents in the cohort and the availability of electronic medical records to confirm self-reported health events and screening. A potential disadvantage of the study is the response rate. Although residence was not related to study participation, it is possible that women who are more likely to follow screening recommendations were also more likely to participate in the study, thus artificially increasing the population screening rates.

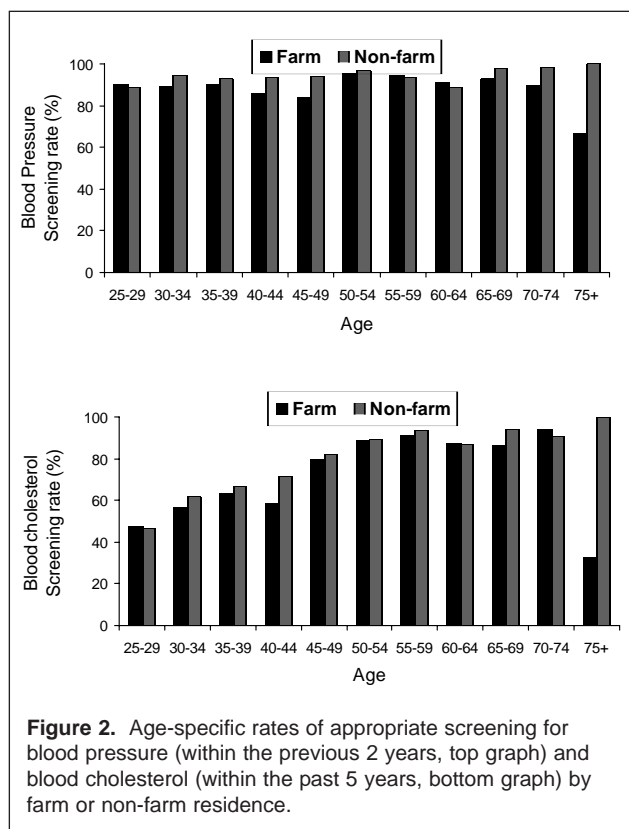


Figure 2. Age-specific rates of appropriate screening for blood pressure (within the previous 2 years, top graph) and blood cholesterol (within the past 5 years, bottom graph) by farm or non-farm residence.

CONCLUSION

Data from this study are useful to the state health department and the CDC for tracking regional progress towards the Healthy People 2010 goals, to policy makers developing and revising screening recommendations, and to local health and medical officials developing priorities for limited public health dollars. Health education initiatives should be targeted toward farm residents and younger rural women to encourage them to be screened at regular intervals for breast and cervical cancer, blood pressure, and blood cholesterol.

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