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# A Study Guided by the Health Belief Model of the Predictors of Breast Cancer Screening of Women Ages 40 and Older

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## Synopsis

*In late 1987, a total of 852 Rhode Island women ages 40 and older were interviewed by telephone (78 percent response rate) to measure their use of breast cancer screening and to investigate potential predictors of use. Predictors included the women's socioeconomic status, use of medical care, a provider's reported recommendations for screening, and the women's health beliefs about breast cancer and mammography.*

*The Health Belief Model guided the construction of the interview questions and data analysis. Logistic regression was used to identify leading independent predictors of breast cancer screening according to contemporary recommendations: reporting that a medical provider had ever recommended a screening mammogram (odds ratio [OR] = 18.77), having received gynecological care in the previous year (OR = 4.92), having a regular source of gynecological care (OR = 2.63), having ever had a diagnostic mammogram (OR = 2.32), and perceiving mammography as safe enough to have annually (OR = 1.93).*

*The findings suggest that programs intended to increase the use of breast cancer screening should include "inreach" and "outreach" elements; inreach to patients with established patient-provider relationships, by assuring that physicians recommend screening to all eligible patients, and outreach to all eligible women, by helping them overcome barriers to effective primary care, and by promoting mammography, emphasizing its effectiveness and safety. The findings also suggest that socioeconomically disadvantaged women, who are less likely to be screened than other women, should become special targets of inreach and outreach interventions.*

BREAST CANCER IS A MAJOR CAUSE of death among American women. In 1989, an estimated 142,000 women were diagnosed with breast cancer, and an estimated 43,000 succumbed to it (*1*). Screening with mammography and physical breast examination has been shown to reduce breast cancer mortality among women ages 50 and older (*2–7*), and possibly among women ages 40–49 (*8*). In 1986, after extensive review of this subject, the National Cancer Institute's (NCI's) Screening and Detection Working Group recommended annual screening with mammography and physical breast examination for women ages 50 through 70, proposing as a national objective for the year 2000 that 80 percent of women ages 50–70 receive breast cancer screening annually (*9*).

Data from the 1985 and 1987 National Health Interview Surveys reveal substantial gaps between then-prevailing screening practices and the NCI's year 2000 objective for breast cancer screening (*10,11*). In 1985, only 45 percent of women 45–64 years and 39 percent of women 65 years and older had received a breast examination in the previous year (*10*). In 1987, only 16 percent of women 40 years and older had received a screening mammogram in the previous year (*11*). Results from the 1987 Behavioral Risk Factor Survey (conducted in 33 of the 50 States) paralleled these findings: about 29 percent of women 50 years and older had received a mammogram in the previous year (*12*). In 1989, after reviewing the latest results of long-term screening studies, the NCI, the American Cancer Society (ACS), and nine other national organizations reached a new consensus on breast cancer screening recommendations: annual physical breast examination with annual mammography for women ages 50 and older, and annual physical breast examination with annual or biennial mammography for women ages 40–49 (*13*).

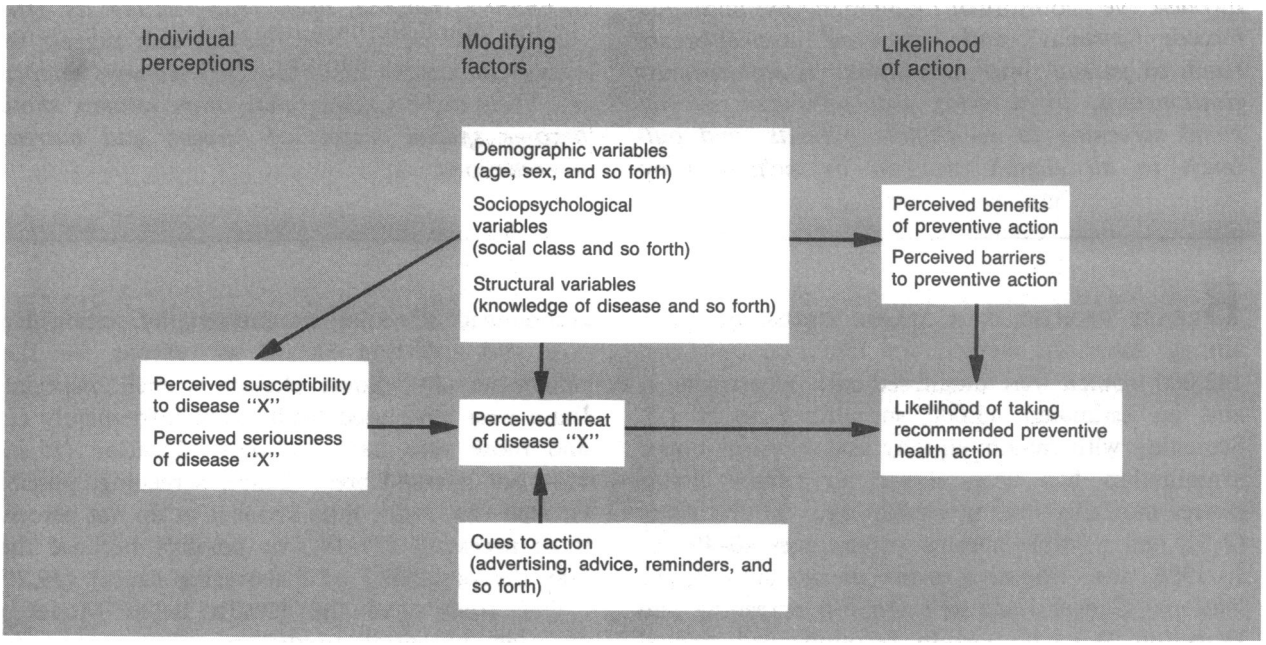
Studies on the use of breast cancer screening have identified attitudinal barriers to screening among physicians and eligible women, alike (*14–20*). Some physicians have been reluctant to recommend screening mammography, citing high cost and radiation hazard as reasons for their reluctance (*14*). Some eligible women, especially those who have used health care infrequently (*15*) and those who have had less education (*15,16*), have not pursued breast cancer screening, possibly because they know little about it or do not perceive it as necessary (*17–19*), or possibly because they fear the possibility of discovering cancer (*19,20*).

Our study uses the Health Belief Model to examine potential predictors of recommended breast cancer screening (physical breast examination combined with mammography), employing a statewide sample of 852 Rhode Island women 40 years of age and older. These women were interviewed about breast cancer screening practices, individual perceptions, and modifying factors, to develop a statistical baseline for evaluating a statewide breast cancer screening program. The Health Belief Model was used to construct interview questions and to organize multivariate analysis of interview responses.

## The Health Belief Model

The Health Belief Model (see chart) has been used extensively to organize theoretical predictors of preventive health actions, including individual perceptions of disease, individual perceptions of preventive actions, and modifying factors such as social, demographic, and structural characteristics. Levine and Sorenson have concluded that the model is most successful when applied to secondary prevention, such as immunization and screening programs, and that it is less clear how useful the model is for understanding health behaviors that involve lifestyle changes. Thus, it is possible that modifying factors such as income, education, access to health services, number and type of provider encounters, and specifically, certain cues to action, take on greater importance for periodic examinations than for lifestyle changes (*21*). A wide variety of preventive health actions have been

The Health Belief Model and preventive health action




Derived from Becker, M.H., editor: "The Health Belief Model and Personal Health Behaviors." Charles B. Slack, Inc., Thorofare, NJ, 1974, p. 7.

studied from this theoretical perspective: preventive dental activity (*22*), smoking behavior (*23,24*), dieting and exercise (*24,25*), immunization of various types (*26–31*), compliance with preventive medical regimens (*25,32–34*), screening for hypertension (*35*), and contraceptive use (*36*). Breast self-examination (BSE) has been studied with the Health Belief Model (*37–43*) as has mammography (*15,16,37*).

## Methods

As described in a previous report (*44*), 852 Rhode Island women ages 40 and older were interviewed by telephone in the fall of 1987 to obtain baseline data for a breast cancer screening program. The households of potential respondents were located with random digit dialing. If more than one potential respondent lived in the household (true of 6 percent of households), one was selected at random to be interviewed. One eligible person was interviewed in 78 percent of the households that contained one or more eligible persons. Comparisons with a 1985 statewide health interview survey conducted by telephone revealed no apparent biases attributable to the 22 percent nonresponse rate. Nonetheless, telephone surveys cannot reach respondents without telephones, typically people of low income and high mobility. Fortunately, this built-in bias is limited in Rhode Island, where more than 95 percent of all households have telephones.

Weights were prepared to adjust for the lower probability of being selected as a respondent in households where more than one potential respondent resided. So few households (6 percent) contained more than one potential respondent, however, that when weights were applied to the data, no observable differences could be found between weighted and unweighted frequency distributions. Therefore, weights were not used in subsequent analyses; all results in this report are unweighted.

Survey questions were written to operationalize predictors of breast cancer screening as defined by the Health Belief Model, including questions on the following factors:

- individual perceptions: perceived susceptibility to breast cancer and perceived seriousness of breast cancer;
- modifying factors: demographic variables of age, education, income, and marital status; structural variables of access to primary care, access to gynecological care, and history of breast problems; cues to action consisting of recommendations for screening mammography, use of breast self-examination, and use of the Papanicolaou (Pap) test;
- likelihood of action: benefits consisting of perceived effectiveness of mammography and barriers

consisting of perceived safety of mammography and perceived comfort of mammography; and
- screening behavior: time since last physical breast examination and time since last screening mammogram.

Operationalization of the model was limited by budget constraints, which resulted in scant measurement of variables listed under "individual perceptions" and "likelihood of action." In the analysis that follows, each variable in these categories was constructed from responses to one survey question, except "perceived effectiveness of mammography," which was constructed from responses to two questions. The questions and responses from which these variables were constructed are listed in the box.

Dichotomous dummy variables were created from nominal, ordinal, and continuous variables for use in logistic regression analysis, including a dependent variable that indicated whether a respondent's breast cancer screening status was within ACS recommended guidelines at the time of the interview: women ages 40–49 were considered up-to-date if they had received a screening breast physical examination within the previous year and a screening mammogram within the previous 2 years; respondents ages 50 and older were considered up-to-date if they had received a screening breast physical examination and a screening mammogram within the previous year. Because self-reporting of past events is subject to recall bias, a careful analysis was made of self-reported elapsed time since last mammogram and physical breast examination. Although particular responses were favored, such as 3, 6, and 12 months, the pattern and extent of "heaping" was such that the categories "within the previous year" and "within the previous 2 years" appear to be robust estimates of actual behavior. As a further precaution against recall bias, however, parallel analyses (described in the results section) were undertaken to ascertain the dependence of analytical results on self-reports of elapsed time since last screening.

Frequency distributions were constructed for each dummy variable to describe the sample of respondents (table 1). The dependent variable was cross-tabulated with all independent variables to describe the screening behaviors of women in various sociodemographic and belief categories (table 2). This analysis and the regression analysis that followed excluded women who had recently sought care for breast problems (women ages 40–49 who had received a breast physical examination for a perceived breast problem within the previous year or a diagnostic mammogram within the previous 2 years; women ages 50 and older who had received a breast physical examination for a perceived breast problem or a diagnostic mammogram within the previous year); the effective sample size was thus lowered from 852 to 786. Using logistic regression analysis as operationalized in SAS Logist software (*45*), the dependent variable was regressed on all independent variables. A "forward stepwise" procedure was chosen to simplify the identification of variables with independent predictive power; independent variables were added to the logistic regression equation in the order of their independent contribution to the model until no additional contribution was statistically significant at $P<0.05$. Regression coefficients were converted to odds ratios, and are presented with 95 percent confidence intervals.

**Questions Used to Create the Variables "Individual Perceptions" and "Likelihood of Mammography"**

*Individual Perceptions*

Perceived susceptibility to breast cancer:

"What are your chances of not getting breast cancer in the next 10 years? Would you say excellent, good, fair or poor?"

Perceived seriousness of breast cancer:

"If a woman *does* get it (breast cancer), what do you feel her chances are of being *cured*? Would you say excellent, good, fair, or poor?"

*Likelihood of Action*

Perceived effectiveness of mammography:

"Which is more effective for finding cancer early, a mammogram or a breast exam by a medical person?"

"Which is more effective for finding cancer early, a mammogram or a breast self-exam?"

Perceived safety of mammography:

"What about *safety* . . . Would you say it is safe enough to get a mammogram every year?" (responses: yes, no, don't know)

Perceived comfort of mammography:

"Do you think mammograms are uncomfortable?" (responses: yes, no, don't know)

## Results

The sample of 852 Rhode Island women ages 40 and older is described in table 1, which contains frequencies for the variables designed from Health Belief Model concepts. The age distribution of the

Table 1. Percentage of 852 women 40 years of age and older categorized by variables of the Health Belief Model, Rhode Island, 1987

| Health Belief Model variables | Percent |
|---|---|
| *Individual perceptions* | |
| Perceived susceptibility to breast cancer as high | 24 |
| Perceived seriousness of breast cancer as high | 30 |
| *Modifying factors* | |
| Demographic variables: | |
| Ages 40–49 | 28 |
| Ages 50–59 | 22 |
| Ages 60–69 | 27 |
| Ages 70–79 | 16 |
| Ages 80 and older | 7 |
| High school diploma not received | 31 |
| High school diploma, no further schooling | 36 |
| High school diploma and further schooling | 33 |
| Income information refused | 9 |
| Income below 100 of the poverty level | 19 |
| Income from 100 to 200 percent above the poverty level | 20 |
| Income from 200 to 300 percent above the poverty level | 18 |
| Income above 300 percent of the poverty level | 34 |
| Currently married | 59 |
| Structural variables: | |
| Have regular individual provider for general medical care | 81 |
| Visited any provider for general medical care in previous year | 93 |
| Have regular source of gynecological care | 87 |
| Visited any provider for gynecological care in previous year | 67 |
| Ever had a diagnostic mammogram | 11 |
| Ever had a diagnostic breast examination | 19 |
| Cues to action: | |
| Screening mammography ever recommended by a provider | 44 |
| Breast self-examination ever performed in previous year | 76 |
| Papanicoloau test received in previous year | 54 |
| *Likelihood of action* | |
| Perceived effectiveness of mammography as high | 45 |
| Perceived safety of mammography as high | 62 |
| Perceived physical comfort of mammography as high | 64 |
| *Screening behavior in previous year* | |
| Any breast examination performed by provider | 70 |
| Screening breast examination performed by provider | 65 |
| Any mammogram performed[1] | 40 |
| Screening mammogram performed[1] | 34 |
| Any breast examination and mammogram performed[1] | 37 |
| Screening breast examination and mammogram performed[1] | 30 |

[1] For women ages 40–49, mammogram in previous 2 years, breast examination in previous year; for women ages 50 and older, mammogram and breast examination in previous year.

women in the sample was very similar to the age distribution of Rhode Island women as projected from the 1980 census to October 1, 1988, the mid-point of the survey. The Rhode Island population tends to be older than the U.S. population as a whole, which is reflected in the age distribution of the sample. Of all respondents 40 years and older, one-half had attained the age of 60. About one-third had not received a high school diploma, about a third had received a high school diploma but no further schooling, and about a third had received further schooling after completing high school. Roughly one-fifth of the respondents reported incomes in each of the three lowest categories: below 100 percent of the poverty level (as defined by the Federal Government at the time of the survey on the basis of family income and family size) (*46*), between 100 and 200 percent of the poverty level, and between 200 and 300 percent of the poverty level. About one-third of the respondents reported incomes that exceeded 300 percent of the poverty level. Nine percent refused to provide interviewers with information on income. A majority of respondents (59 percent) were currently married at the time of the survey.

Almost all respondents had seen a medical provider for general medical care in the previous 12 months, even though 19 percent had no regular provider. In contrast, only about two-thirds of the respondents had received gynecological care in the previous year, even though 87 percent had a regular source of gynecological care. About one-fifth of the sample had been examined for perceived breast problems sometime in the past.

Among potential cues to action, breast self-examination was reported most commonly by respondents, followed by the Pap test, then providers' recommendations for screening mammograms.

Compared with other women in the sample, about one-fourth perceived their susceptibility as high (more likely to get breast cancer), while 30 percent perceived the seriousness of breast cancer as high (less likely to be cured). About half the women perceived the effectiveness of mammography as high (more effective than a breast physical examination or breast self-examination), and 6 of 10 perceived the safety of mammography as high (safe enough to have annually).

Seventy percent of the respondents had received a breast physical examination according to current recommendations, 5 percent for breast symptoms (including chronic breast problems) and 65 percent for screening in the absence of symptoms. Forty percent had received mammograms according to

Table 2. Percentage of 786 women[1] 40 years of age and older who were screened for breast cancer according to current recommendations categorized by Health Belief Model variables, Rhode Island, 1987

| Health Belief Model variables | Percent |
|---|---|
| *Individual perceptions* | |
| Perceived susceptibility to breast cancer as high | 30 |
| Perceived susceptibility to breast cancer as low | 34 |
| Perceived seriousness of breast cancer as high | 36 |
| Perceived seriousness of breast cancer as low | 32 |
| *Modifying factors* | |
| Demographic variables: | |
| Ages 40–49 | 38 |
| Ages 50–59 | 32 |
| Ages 60–69 | 35 |
| Ages 70–79 | 27 |
| Ages 80 and older | 19 |
| High school diploma not received | 25 |
| High school diploma, no further schooling | 34 |
| High school diploma and further schooling | 39 |
| Income below 100 percent of the poverty level | 18 |
| Income from 100 to 200 percent above the poverty level | 31 |
| Income from 200 to 300 percent above the poverty level | 30 |
| Income above 300 percent of the poverty level | 46 |
| Currently married | 37 |
| Not currently married | 27 |
| Structural variables: | |
| Have regular individual provider for general medical care | 36 |
| Have no regular individual provider for general medical care | 20 |
| Visited any provider for general medical care in the previous year | 36 |
| Visited no provider for general medical care in the previous year | 0 |
| Have any regular source of gynecological care | 37 |
| Have no regular source of gynecological care | 9 |
| Visited any provider for gynecological care in the previous year | 45 |
| Visited no provider for gynecological care in the previous year | 10 |
| Ever had a diagnostic mammogram | 53 |
| Never had a diagnostic mammogram | 30 |
| Ever had a diagnostic breast examination | 46 |
| Never had a diagnostic breast examination | 30 |
| Cues to action: | |
| Screening mammography ever recommended by a provider | 67 |
| Screening mammography never recommended by a provider | 8 |
| Breast self-examination ever performed in previous year | 35 |
| Breast self-examination not performed in previous year | 27 |
| Papanicolaou test received in previous year | 49 |
| Papanicolaou test not received in previous year | 15 |
| *Likelihood of action* | |
| Perceived effectiveness of mammography as high | 41 |
| Perceived effectiveness of mammography as low | 26 |
| Perceived safety of mammography as high | 42 |
| Perceived safety of mammography as low | 18 |
| Perceived physical comfort of mammography as high | 28 |
| Perceived physical comfort of mammography as low | 42 |

[1] Excludes women ages 40–49 who received a diagnostic mammogram in the previous 2 years or a diagnostic breast examination in the previous year and women ages 50 and older who received either a diagnostic mammogram or a diagnostic breast examination in the previous year.

current recommendations, 6 percent for breast symptoms and 34 percent for screening in the absence of symptoms. When the two procedures are considered together, 37 percent of the sample had received both breast physical examination and mammography according to current recommendations, 7 percent for breast symptoms, 30 percent for screening in the absence of symptoms.

When screening status was cross-tabulated with other health belief model variables (excluding women with recent diagnostic tests) it was shown to be strongly related to indicators of medical care use, especially a provider's recommendation, and moderately related with indicators of previous breast symptoms and the perception that mammography is safe (table 2). Also, women of low educational achievement and low income were less likely than others to have been screened according to current recommendations.

When screening status was regressed on the variables specified in tables 1 and 2, a provider's recommendation for a screening mammogram had the greatest independent effect in predicting screening status (odds ratio [OR] = 18.77). One other modifying factor, having visited a provider for gynecological care in the previous year, had a moderately independent effect in predicting screening status (OR = 4.92). Also predictive of screening status was having a regular source of gynecological care (OR = 2.63), ever having had a diagnostic mammogram (OR = 2.32), and the perception that mammograms are safe enough to have annually (OR = 1.93).

The analyses presented in tables 2 and 3 were repeated using a relaxed screening schedule to define the dependent variable: physical breast examination every year and mammography every 2 years. This schedule is similar to the one recom-

Table 3. Results of logistic regression analysis:[1] predictors of having been screened for breast cancer according to current recommendations among 786 women[2] 40 years of age and older, Rhode Island, 1987

| Predictors among Health Belief Model variables | Odds ratio | 95 percent confidence interval |
|---|---|---|
| *Modifying factors* | | |
| Structural variables: | | |
| Have any regular source of gynecological care | 2.63 | 1.08–6.39 |
| Visited any provider for gynecological care in previous year | 4.92 | 2.87–8.42 |
| Ever had a diagnostic mammogram | 2.32 | 1.24–4.35 |
| Cues to action: | | |
| Screening mammography ever received by a provider | 18.77 | 11.92–29.49 |
| *Likelihood of action* | | |
| Perceived safety of mammography as high | 1.93 | 1.23–3.05 |

[1] Overall $R = 0.63$.

[2] Excludes women ages 40–49 who received a diagnostic mammogram in the previous 2 years or a diagnostic breast examination in the previous year and women ages 50 and older who received either a diagnostic mammogram or a diagnostic breast examination in the previous year.

mended by the U.S. Preventive Services Task Force in 1989, with one difference: the task force did not recommend regular mammography for women ages 40–49 or 75 years and older (*47*). The parallel analysis was undertaken to test the robustness of the original results and their relevancy to alternative recommendations. The only substantive difference found was that women ages 40–49 were less likely than others to have been screened according to the relaxed schedule (OR = 0.56 with 95 percent confidence limits: 0.35–0.90).

## Discussion

Screening with a combination of mammography and physical breast examination was shown to reduce mortality from breast cancer well before the 1987 survey in Rhode Island. Landmark findings had been published in the Journal of the National Cancer Institute (*2*) and CA, A Cancer Journal for Clinicians (*4*) in 1982, in The Lancet in 1984 (*6*) and 1985 (*3*), and the Journal of Surgical Oncology in 1985 (*5*). In 1983, the ACS adopted formal recommendations for breast cancer screening (*48*), and the NCI followed suit in 1986 (*9*).

Against this backdrop, the 1987 survey revealed large gaps between screening as recommended and screening as practiced in Rhode Island. Although Rhode Island women appear to have been screened for breast cancer more adequately than women of many other States (*49*), a majority of eligible women had not been screened according to contemporary recommendations in 1987, and Rhode Island was far from meeting NCI's breast cancer screening goals for the year 2000 (*9*). Sixty percent of respondents had not received a mammogram in the previous year (or 2 years for women ages 40–49). In 1987, 707 Rhode Island women were found to have malignant neoplasms of the breast (36 percent of which had spread regionally or distantly at the time of diagnosis), and 199 Rhode Island women died of the disease (*50*).

A cursory look at raw survey responses suggests a number of reasons for the gap between recommendations and practices. Less than half the respondents reported ever having received a recommendation for screening mammography from a medical provider. Almost one-fifth of the women surveyed had no regular provider for general medical care, and 13 percent had no regular source of gynecological care. Only one-fourth of the respondents felt especially susceptible to breast cancer, and less than a third perceived the disease as especially serious (life threatening). About half perceived mammograms as less effective than some form of breast examination, and more than a third thought mammograms too unsafe to have annually. About a third perceived mammography as uncomfortable.

The cross-tabulation results presented in table 2 reveal the relative importance of modifying factors, especially structural variables and cues to action, among predictors of screening behavior. As previously noted in the literature (*51–55*), screening is strongly related to a reported provider's recommendation, suggesting little independent public demand for breast cancer screening in 1987. Having visited a provider for gynecological care in the previous year and having had a Pap test in the previous year are also predictive of breast cancer screening, similar to findings reported recently by Hayward and coworkers (*56*). Gynecological care may include mammography for some women and may sensitize others to its importance. Screening is also more likely if a woman has had a diagnostic mammogram or diagnostic breast examination sometime in the past. Finally, having a regular provider for general medical care (*55*) and having visited a provider for regular medical care in the previous year are predictive of screening, suggesting the importance of continuity in preventive care (*57*).

At least two previous studies have found knowledge and education to be more predictive of screening behavior than was evidenced in Rhode Island. In a study of breast cancer screening among 1,700 women employees of a university and a medical center who had been offered low-cost mammography, acceptance of screening was related to educational attainment and knowledge of screening (*15*). In another study of breast cancer screening among 187 black women who used an inner-city clinic for primary care, acceptance of screening was related to knowledge of age as a risk factor in breast cancer and knowledge of mammography (*58*). Unlike the statewide Rhode Island study, both previous studies focused on circumscribed study populations in which recommendations for breast cancer screening were rather uniform. These factors may have reduced the variance, thus the predictive power, of cues to action and certain structural variables (for example, income and use of primary care), enhancing the relative predictive importance of education, and other modifying factors.

Of the health beliefs studied, perceived benefits of mammography and perceived barriers to mammography were more predictive of screening than perceived susceptibility to breast cancer or perceived severity of breast cancer. Similar findings have been discussed in the literature on preventive health actions (*15,27,31,40,42*). The authors of a recent study of screening mammography concluded, "One specific benefit, value of mammography as a screening test, was a major influence for the majority of women who participated in the mammogram program" (*15*). Conversely, the high cost of mammography and fear of radiation were observed to act as barriers to screening (*15*). Unfortunately, limitations in the length of the survey probably compromised the predictive power of health beliefs in this study. The reliability of the health belief constructs would have improved with additional questions (*59*).

In retrospective studies of beliefs and behaviors, it is difficult to determine which precedes the other (*41*). Our study provides one example of beliefs following behavior: women who had undergone mammography perceived the procedure as more uncomfortable than women who had not. A researcher who studied health beliefs and breast cancer screening prospectively found that health beliefs were "amongst the best predictors of attendance at each of the different services although the overall variance explained by the Health Belief Model in both sets of analysis was small" (*37*). Despite the advantage of prospective studies in sorting out temporal relationships, retrospective studies will continue to dominate the literature, because they tend to cost less. In any case, it is prudent to interpret relationships between health beliefs and health behaviors probabilistically, not causally.

*'Of the health beliefs studied, perceived benefits of mammography and perceived barriers to mammography were more predictive of screening than perceived susceptibility to breast cancer or perceived severity of breast cancer.'*

The results of logistic regression analysis demonstrate the independent roles of gynecological care, reported providers' recommendations, and patients' perceptions in breast cancer screening. The strength of these modifying factors, compared with attitudes and beliefs about susceptibility to breast cancer or the efficacy of mammography, suggest that encounters with providers afford a greater opportunity to increase compliance with screening recommendations than modifying women's attitudes and beliefs. In the past, some providers have been reluctant to recommend mammograms for cancer screening in asymptomatic women, although obstetricians and gynecologists have been more likely to recommend breast cancer screening than other physician groups (*60*). Among respondents in the Rhode Island sample, only 44 percent reported having ever received a recommendation for screening mammography.

Health care providers must be urged to recommend breast cancer screening for all eligible patients. The growing evidence of screening's effectiveness and the recent national consensus on its use should help in this regard, although additional interventions with providers may be helpful (*61*). Nonetheless, as the Rhode Island data show, 7 percent of respondents did not visit a general medical provider in the previous year, and one-third did not receive gynecological care in the previous year. Furthermore, almost one-fifth did not have a regular medical provider, and 13 percent had no regular source of gynecological care.

"Outreach" to these women is as necessary as "inreach" to women with established patient-provider relationships (*60*). The most effective outreach intervention may be one which helps women overcome barriers to continuous primary care with

a specific medical provider. Additionally, health promotion efforts may convince some women to seek mammography, especially if they stress the effectiveness and safety of breast cancer screening, while avoiding strong negative messages about women's susceptibility to breast cancer and the seriousness of the disease. These messages are not directly related to the use of screening and may detract from those positive messages that appear to be motivational.

Among respondents in the Rhode Island sample, as elsewhere, the socioeconomically disadvantaged appear less likely to receive recommended preventive care than others. Previous studies have shown that women with low incomes are less likely than others to use breast cancer screening (*44,55,56*), although health insurance may mitigate this effect (*55,56*). Similarly, the relatively high cost of breast cancer screening, even in special reduced-cost programs (*16*), appears to prevent its use by some women (*15,16,58*). In Rhode Island, although income is positively related to the use of breast cancer screening (table 2), its effect becomes negligible when other variables are controlled (table 3).

Rhode Island has begun to meet the need for breast cancer screening among socioeconomically disadvantaged women by covering screening mammograms under the State's Medicaid program. Nonetheless, as a recent, sobering report from the ACS on "Cancer in the Poor" illustrates, many barriers to effective screening remain among women of low income and low educational attainment (*62*). In the presence of the increasing use of mammography by those with middle and high incomes, we may expect to see a growing gap between income groups in mortality rates from breast cancer. If breast cancer mortality is to be reduced among all women, women of low income and low educational attainment must become the special targets of inreach and outreach interventions.

Preliminary results of the 1987 survey of Rhode Island women have been used to plan interventions for the promotion of breast cancer screening in the State. Thus far, physicians have been approached through direct mailings to increase the frequency with which they recommend screening mammography to their patients. Women ages 40 and older have been approached through direct mailings and the mass media to promote the use of screening mammography and breast physical examinations. Promotional messages have been positive, stressing the safety and effectiveness of breast cancer screening while deemphasizing women's susceptibility to breast cancer and the seriousness of the disease. Finally, a campaign with multiple interventions has been planned to promote breast cancer screening among socioeconomically disadvantaged women, addressing their special needs in culturally sensitive ways.

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# Interpretative Views on Hispanics' Perinatal Problems of Low Birth Weight and Prenatal Care

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**Synopsis**

*From a public health perspective, there is a need to recognize that Hispanics, and in particular Mexican Americans, are a very heterogeneous group. They represent all shades of acculturation, education, income, and citizenship status. As this minority group continues to increase in numbers, pertinent information about their perinatal health problems in the context of their sociocultural characteristics will be required.*

*This review examines critically the recent literature related to low birth weight and prenatal care and suggests alternative ways to address these perinatal health issues.*

*Low birth weight is examined in the context of the problem of intrauterine growth retardation and the potential mechanisms and consequences of different types of growth limitation in utero which have not been studied in this population.*

*The use of prenatal care by Mexican American women and its association with birth weight is examined as an indication of maternal behavior or as a health care intervention.*

*The implications for public health policy are discussed in relation to the identification, interpretation, and evaluation of these perinatal health issues in this minority population.*

THE NATION'S HISPANIC POPULATION has grown by 39 percent since 1980, rising to a record number of 20.1 million, according to the U.S. Census Bureau (*1*). Hispanics now comprise 8.2 percent of the U.S. population, and their numbers continue to increase at five times the rate of non-Hispanics. In Arizona, for example, the 1989 population projection for Hispanics was 594,453 or 16 percent of the total population. It is estimated that by the end of this decade, Hispanics will constitute the largest ethnic minority group in the United States.

Hispanics in this country are a heterogeneous group; a great majority are of Mexican origin, and they generally live in the southwestern States of California, Arizona, New Mexico, Texas, and Colorado. Although distinguished by similarities of culture, tradition, and language, Mexican Americans are also heterogeneous, representing all shades of acculturation, education, income, and citizenship status. As this minority group continues to grow, pertinent information about their health and sociocultural characteristics will be needed.