

Physicians' Recommendations for Mammography: Do Tailored Messages Make a Difference?

ABSTRACT

Objectives. Message tailoring, based on individual needs and circumstances, is commonly used to enhance face-to-face patient counseling. Only recently has individual tailoring become feasible for printed messages. This study sought to determine whether printed tailored recommendations addressing women's specific screening and risk status and perceptions about breast cancer and mammography are more effective than standardized printed recommendations.

Methods. Computer-assisted telephone interviews were conducted with 435 women, aged 40 to 65 years, who had visited family practice groups within the previous 2 years. Subjects were randomly allocated to receive individually tailored or standardized mammography recommendation letters mailed from physicians to patients' homes. Follow-up interviews were conducted 8 months later.

Results. Tailored letter recipients were more likely to remember and to have read more of their letters than standardized version recipients. After controlling for baseline status, tailored letter receipt was associated with more favorable follow-up mammography status for women with incomes below \$26 000 and for Black women.

Conclusions. Tailored messages are a more effective medium for physicians' mammography recommendations; tailoring may be especially important for women of low socioeconomic status. (*Am J Public Health*. 1994;84:43-49)

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Introduction

Breast cancer affects about 1 in 10 women and is one of the three most frequent causes of death among women in the United States.¹ Regular mammography screening has demonstrated effectiveness in reducing breast cancer mortality.²⁻¹¹ Although nearly all health organizations recommend mammography screening¹²⁻¹⁹ and rates have been increasing,^{20,21} most women are still not screened regularly.^{21,22} Women of lower socioeconomic status are least likely to have regular mammograms.^{20,23-27}

Most identified factors influencing women's mammography decisions can be classified as variables from the Health Belief Model,^{28,29} which purports that perceptions about benefits and barriers associated with a health behavior, perceived personal risk and severity of the relevant health threat, and various cues to action work together to influence a person's likelihood of taking a preventive health action.

It is also likely that with regard to mammography as well as other health-related behaviors,³⁰⁻³² individuals move through a series of motivational and behavioral stages in which the behavior is not considered ("precontemplation"), the behavior is contemplated but not yet acted upon ("contemplation"), an initial behavior change is made ("action"), and the behavior is maintained over time ("maintenance") or the person relapses from action or maintenance to a previous stage. Research with other behaviors has found utility in considering health-related behavior changes in these categories³²⁻³⁶ and has found a broad range of psychosocial determinants predicting movement from one stage to another.

Among factors correlated with mammography status are women's beliefs about breast cancer and the ability of mammography to detect early breast cancer^{23,25,37-40} and perceived barriers to mammography screening, such as cost, concern about radiation exposure, or fear of finding cancer.^{25-27,39-43} A physician's recommendation, however, has emerged as an even stronger predictor of mammography than women's perceptions about the procedure.^{21,26,39,42-44}

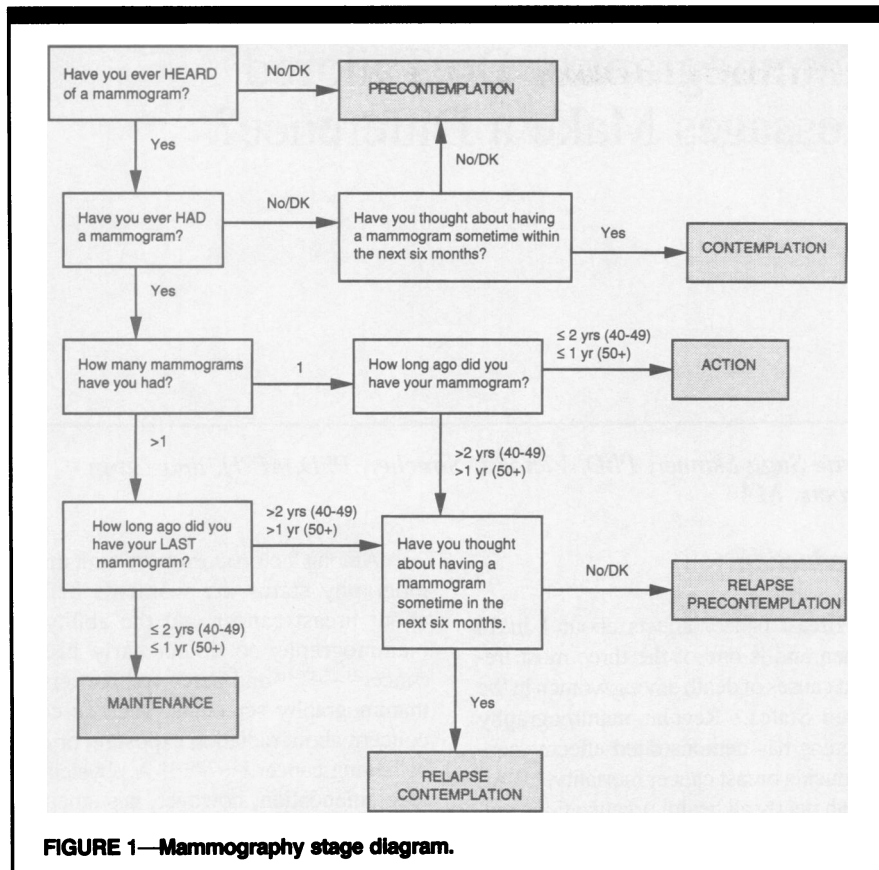
Therefore, it is likely that mammography recommendations in the form of letters mailed from physicians to patients' homes would have an impact on women's propensity to be screened. We used computer technology to assemble individualized letters tailored according to women's responses in baseline interviews. Message adaptation, based on individual needs and circumstances, is commonly used to enhance the effectiveness of face-to-face patient counseling,^{45,46} but only recently has such individual tailoring become feasible for printed messages. We sought to determine whether printed tailored recommendations addressing women's specific screening and risk status and their perceptions about breast cancer and mammog-

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raphy are more effective than standardized printed recommendations.

Methods

The eligible study population was a random sample of women aged 40 through 65 years who had visited one of two North Carolina family practice groups within the previous 2 years, had telephones, and had never been diagnosed with breast cancer. Study subjects were interviewed at baseline and randomly allocated to receive individually tailored or standardized letters. Whereas the general letter delivered a standardized message to all recipients, tailored letters addressed individual beliefs and barriers associated with mammography, as well as breast cancer risk factors and screening status. Follow-up interviews 8 months later reassessed the subjects' screening status and perceptions and measured letter recall and readership. Data were collected via computer-assisted telephone interviews.

The eligible study population consisted of 899 patients from both practices. Fifty-eight women (6%) refused to be interviewed, 10 interviews were terminated (1%), and 334 (37%) patients were never reached after an average of 7 attempts over 10 days. Two hundred patients from

practice A and 297 from practice B were enrolled. Samples from the two practices were similar in racial and age distributions but differed somewhat in income and education levels. To minimize effects of differences, half of the subjects from each practice were randomly allocated to receive tailored versus standardized letters.

Baseline interviews asked the women about their mammography stage, their knowledge and beliefs about breast cancer and mammography, their objective and perceived risk status, and barriers to screening. Descriptions of measures follow.

Stage Determination (Likelihood of Taking Action)

We adapted a stage model of smoking cessation developed by Prochaska and DiClemente.³⁰⁻³² On the basis of their responses to several questions, women were classified as precontemplators, contemplators, actors, or maintainers. Figure 1 depicts the measures by which stages were defined.

The respondents were asked whether they had heard of mammograms and, if so, whether they had had one or more. All respondents who had heard of mammography but had not yet been screened were asked whether they had thought about be-

ing screened in the 6 months immediately following the interview. Respondents who had never heard of mammography or who had not thought about having a mammogram in the following 6 months were *precontemplators*. Those who had thought about having mammograms in the following 6 months were *contemplators*.

Following study physicians' recommendations and the American Cancer Society guidelines for frequency of mammography screening, women aged 50 years and older were considered due for repeat mammograms if their last mammograms had been more than a year ago and women aged 40 through 49 were considered due for rescreening if more than 2 years had passed since their last mammograms. Those who had not thought about having another mammogram in the following 6 months were *relapse precontemplators*, whereas those who had thought of being rescreened in the following 6 months were *relapse contemplators*. Those not yet due for rescreening were *actors* (had had one mammogram) or *maintainers* (had had two or more mammograms).

Beliefs about Benefits and Barriers Associated with Mammography

The interview assessed the subjects' beliefs about the ability of mammograms to detect early breast cancers and about the likelihood of curing breast cancers detected at an early stage. Responses were measured on 5-point scales.

Perceived barriers were elicited by the open-ended question "What would keep you from having a mammogram in the next 6 months?" Additionally, closed-ended questions assessed the extent to which respondents would be bothered by cost, discomfort, fear of finding cancer, and concern about radiation.

The Mammography Letters

A library of texts and graphics files was created to address varying beliefs, mammography stages, risk factors, and barriers. Messages were pretested in physicians' waiting rooms among patients not included in the sample. The brief message texts were written in a simple, popular style and could occur in any possible text combination. Desktop publishing techniques were used to enter message texts in predefined locations in the letter layout. Specifically, interview data from women in the experimental group were transferred from an SAS⁴⁷ data set to an ASCII file that delineated which text version each woman should receive. Data in each woman's ASCII file were then read by a Microsoft

Word⁴⁸ program that inserted message texts appropriate for her. A combination of messages was created to specifically address each woman's beliefs about mammography and breast cancer, mammography stage, risk status, and perceived barriers. More than 391 000 different tailored letters were possible. Every woman's letter was different from every other woman's unless the women had given identical responses in the baseline interview.

Five months after the baseline interview, the subjects received tailored or standardized letters according to the previous random assignment. Each letter was accompanied by a cover letter on a physician's letterhead with a digitized signature. Envelopes bore physicians' logos, address labels, and commemorative stamps.

The standardized message typifying usual care communications was an adaptation of the 1987 surgeon general's mammography letter.⁴⁹ To minimize differences in appearance, standardized and tailored letters were printed in the same typeface on the same stationery and were similar in length. Both had a picture of a woman, but tailored letters had digitized photographs tailored by race, accompanied by captions tailored by stage.

Whereas the standardized letters addressed a variety of factors that *might* be relevant to recipients, the tailored letters addressed only those that, according to the baseline interviews, *were* relevant to the recipients. For instance, tailored messages reported the risk factor of age only for women who were older than 50 and the risk factor of family history only for women who had a relative with breast cancer.

The tailored letters contained individual-specific information but were framed to sound as though they were written for general audiences. They were written as reports of findings from the telephone interviews in which all letter recipients had participated. For example, instead of "Since you, personally, have never even thought about having a mammogram . . .," the messages read, "Many women surveyed have never even thought about having a mammogram. . . ."

Follow-Up Interviews

Second telephone interviews—conducted 3 months after the letters were mailed and 8 months after the baseline interviews—measured letter recall and readership and reassessed respondents'

stage, perceived barriers, knowledge, and beliefs.

Recall of letter receipt was assessed in both unaided and aided format. The unaided question asked whether respondents had recently received any health information in the mail from the study physicians. If respondents did not remember or were unsure, they were prompted with a reminder about the letters and then asked again. For those who remembered the letters, readership was assessed on a 4-point scale ranging from "Read all of the information" to "Didn't read any of it."

Eight study subjects whose mammography recommendation letters had been returned to sender and for whom no new addresses could be found were dropped from the sample between baseline and follow-up. Of the remaining 489 subjects interviewed at baseline, 435 (89%) were reinterviewed at follow-up (170 women from practice A and 265 from practice B). Twenty-four subjects (5%) refused the second interview, 26 (5%) were never reached after an average of 7 attempts over 10 days, and 4 (1%) interviews were terminated.

Analyses

Assignment to experimental (tailored) or control (standardized) group was an independent variable for all analyses. Follow-up data were used to assess letter recall and readership. Both baseline and follow-up data were used to assess behavioral changes. Rather than conducting separate analyses for women who did and did not recall their letters or for women who did and did not read any of the information, in analyses for the full sample we controlled for letter recall and readership in assessing changes in mammography screening stage. Multivariate analyses were used to examine the main effects of the intervention on changes in mammography stage and on having a mammogram. Effects of the intervention were also examined within demographic groups (race, income, education, and age) for which mammography stage differed significantly at baseline. These demographic variables were entered into multivariate analysis models as interaction terms.

Results

The sample's demographic make-up was as follows: 53% were in their 40s, 84% were White (the remaining 16% were Black), and 68% were employed. Ten percent had not finished high school, 47% had at least attended college, and 16% had

done graduate work. Forty percent had household incomes of \$36 000 or more, 17% had incomes of \$26 000 to \$36 000, and 43% had incomes below \$26 000. Bivariate analyses revealed no significant differences in any demographic characteristics, in family history of breast cancer, or in baseline mammography stage between experimental and control groups.

Recall and Readership

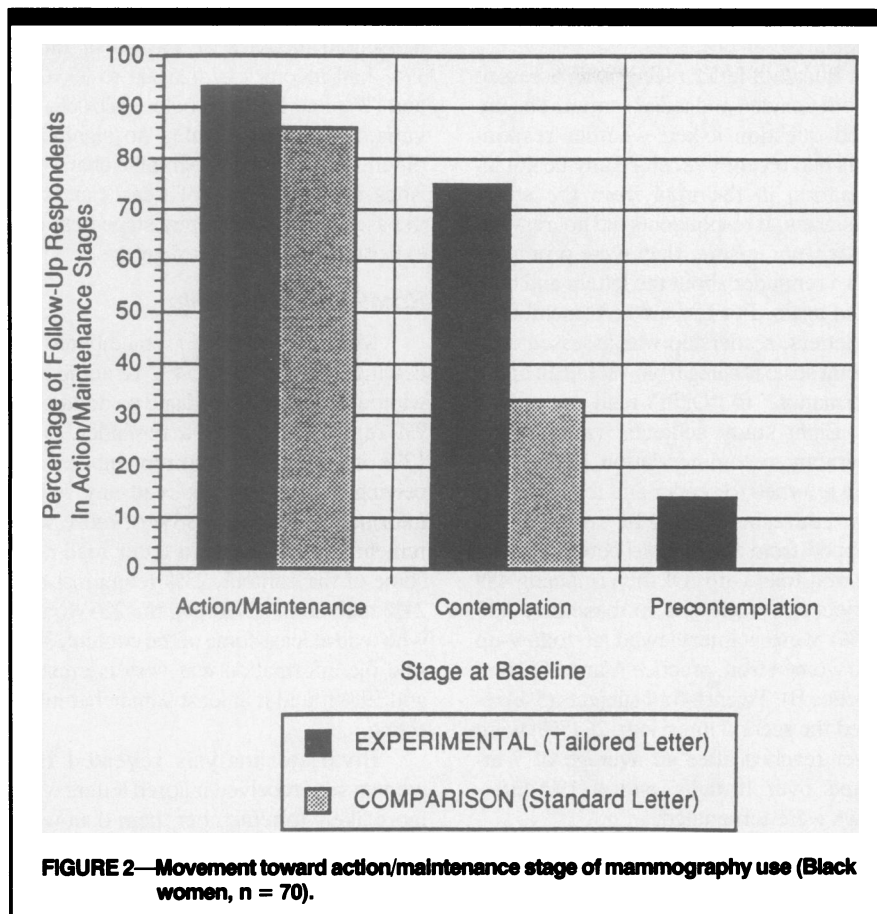
Most women (63%) remembered receiving their letters; 54% remembered without being prompted and an additional 9% remembered after a reminder. Only 17% of the women who remembered receiving a letter did not read any of the information. Whereas 36% of those who remembered receiving a letter read only some of the content, 23% read most and 24% read all of it. Among the 226 women who read at least some of the content, 30% said the information was very interesting and 59% found it at least somewhat interesting.

Bivariate analysis revealed that women who received tailored letters were more likely to remember them than were standardized letter recipients ($P < .05$). Further, among the 272 women who remembered the letters, tailored letter recipients were significantly more likely to read more of the content ($P < .01$). More than half (53%) of the tailored letter recipients who recalled the letter reported reading all or most of it, compared with 40% of standardized letter recipients.

Although women with higher educational levels were more likely to remember receiving the letters ($P < .01$), among those who read at least some of their letters, more well-educated women were less likely to report interest in the content ($P < .01$). Also, White women were more likely to remember receiving the letters ($P < .05$), but among women who remembered and read at least some of the letters, Black women reported more interest in the content ($P < .01$). A baseline perception of being at elevated risk for breast cancer was significantly related to reading more of the letter ($P < .01$). However, tests for interactions revealed no significant effects of these correlates and letter type on recall, readership, or interest.

Mammography Stage Movement

The study categorized respondents into mammography stages. Precontemplators, whether they had never had a mammogram or were due for rescreening, needed mammograms but had not thought about having them in the following 6



months. Contemplators, also due for mammography, had thought about having mammograms at some time in the following 6 months. Actors and maintainers (grouped together for these analyses) were not due for repeat screening within the next 6 months. Within these stages, the possibility of forward and backward movement is apparent. The goal of the intervention was to move women into the action/maintenance category and keep them there by preventing relapse.

At baseline, 64% of all women in the sample had had mammograms within the recommended interval and were not due for rescreening. Women were more likely to have had recent mammograms at baseline if they were White ($P < .05$), had higher incomes ($P < .001$), and had higher education levels ($P < .01$). Thirty-five percent of White women, compared with 43% of Black women, were due for mammography screening at baseline. Only 28% of women with incomes over \$26 000, compared with 47% of women with lower incomes, were due for screening at baseline. Forty-three percent of women who did not attend college, compared with 29% of those who did, were due for mammography at baseline. Age was associated with screening; women in

their 40s were less likely than women aged 50 years and older to be due for a mammogram ($P < .001$).

The rate of women who had had recent mammograms increased from 64% at baseline to 68% at follow-up. Of the 152 women who were due at baseline, 37% had had mammograms by follow-up. Among those due for screening at baseline, more of the tailored letter recipients (44%) than the standardized letter recipients (31%) had had mammograms by follow-up. However, the difference was not statistically significant ($P = .16$).

A woman could progress from precontemplation (not thinking about having a mammogram in the next 6 months) to contemplation (thinking about having a mammogram in the next 6 months) without actually having a mammogram. Conversely, she could regress from contemplation to precontemplation. Actors and maintainers could relapse to precontemplation or contemplation stages if, by the follow-up interview, they had become overdue for rescreening. The majority of subjects (71%) did not change stage between baseline and follow-up (14% advanced one stage, 4% advanced two stages, 8% moved one stage back, and 3% regressed by two stages). There were no

significant main effects for stage movement by letter type.

Analyses were conducted to determine whether the intervention had a significant effect on mammography within demographic subgroups. Letter type was not differentially associated with stage movement for different education or age groups. For Black and low-income women, however, receipt of tailored letters, compared with standardized letters, influenced mammography stage improvement and mammography screening rates. After controlling for stage at baseline, significant race \times intervention ($P < .05$) and income \times intervention ($P < .01$) interactions were found.

To determine the nature of the interaction effects, we ran four separate models for lower-income, higher-income, Black, and White women. Letter type was significantly associated with stage movement among Black women ($P < .05$) but not among White women ($P = .47$). Twenty-seven percent of Black women who received tailored letters, compared with 8% in the standardized letter group, exhibited forward stage movement at follow-up. Further, letter type was significantly associated with stage movement among women with incomes below \$26 000 ($P < .01$) but not among higher-income women ($P = .30$). In the lower-income group, more tailored letter recipients moved forward (28% vs 17% of standardized letter recipients) and fewer moved backward (8% vs 15% of standardized letter recipients).

Figure 2 depicts percentages of Black women in the action/maintenance stage at follow-up, delineated by baseline stage and letter type. Figure 3 depicts corresponding breakdowns for women with household incomes below \$26 000. For both Black and low-income women, baseline precontemplators and contemplators were more likely to have had mammograms at follow-up if they had received tailored rather than standardized letters. Similarly, among both groups, baseline action/maintainers who received tailored letters were less likely to have relapsed than were standardized letter recipients.

Discussion

In this study we sought to determine whether printed physicians' recommendations for mammography would be more effective if they were tailored to individual women's specific perceptions about mammography and breast cancer, their breast cancer risk factors, and their mammo-

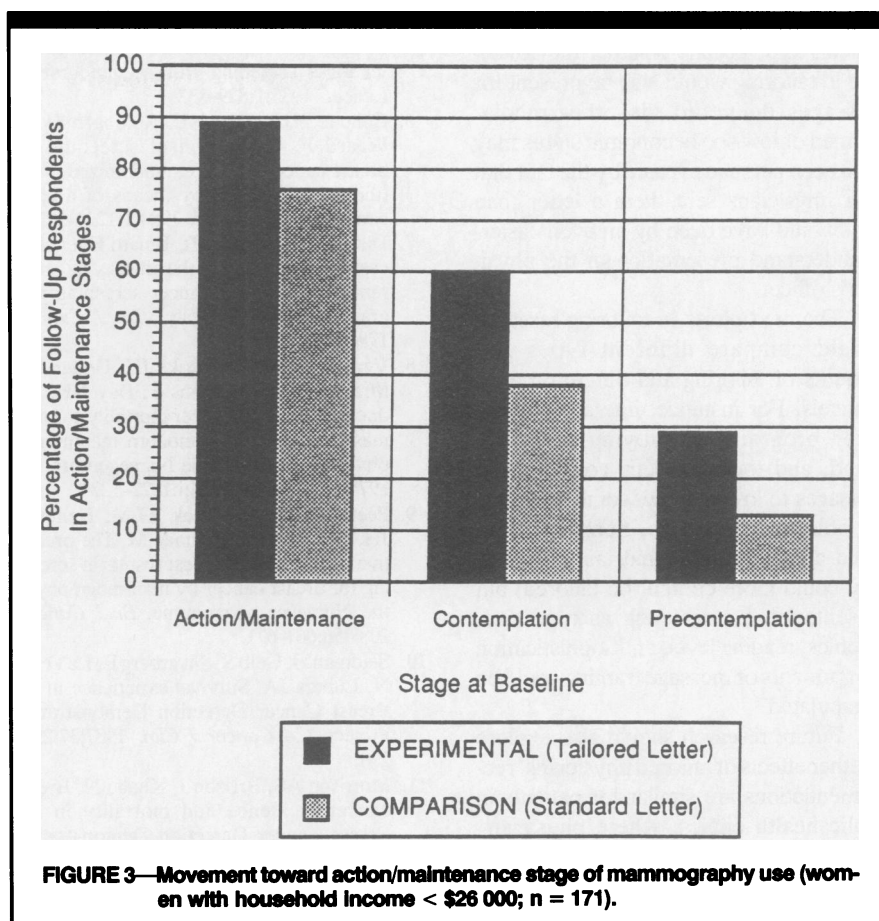
graphy screening status. The results indicate that tailored letters were a more effective medium for delivering the message: tailored letters were more likely to be remembered and, among women who remembered the letters, were more thoroughly read.

There are several explanations for why the tailored letters were better remembered and more thoroughly read. Although the tailored and standardized letters were designed to be equally attractive, tailored letters may have had a greater chance of capturing attention at first glance because of their tailored pictures, captions, and headlines. Tailoring allowed for a specificity in the letters' eye-catching elements that was not possible in the standardized version. For example, the caption for relapse precontemplators' letters read, "I've had a mammogram but I never even thought about having another one."

Had the standardized letter contained such specificity, some of its elements would have been irrelevant, and possibly off-putting, for a portion of its recipients. Further, the specificity of content allowed in the tailored letter kept recipients from reading information that did not apply to them. In other words, tailoring enhanced relevance. For instance, because only risk factors relevant to the recipient were printed, a woman could not read a list of three risk factors and feel consoled by the fact that only one applied to her. Tailored letters may have simply received enhanced attention, which in turn led to forward stage movement. In the context of the Health Belief Model,²⁹ they may have been more effective cues to action.

Most women (64%) entered the study with an up-to-date mammography status. This rate increased to 68% by follow-up. Although more women in the tailored than the standardized group had had recent mammograms at follow-up, the difference did not achieve statistical significance. Among Black and low-income women, whose recent screening levels were lower at baseline, tailored letter recipients were more likely than standardized letter recipients to move toward mammography. In addition, those who received the tailored letters were less likely than standardized letter recipients to move backward or relapse.

This study has several limitations. For instance, its generalizability is limited by the exclusion of women without telephones. In addition, there is a possibility that women who were never reached were different from those who were contacted.



Women not reached may have been out of town during the calling period, may have been generally busier and at home less often than those who were reached, or may have screened their calls via answering machines and chosen not to answer. It seems unlikely, however, that any differences between those who were and those who were not reached would be associated with the effect of receiving a tailored or standardized letter.

For the sample as a whole, higher-than-expected mammography rates at baseline resulted in limited statistical power to detect postintervention differences between tailored and standardized groups. Among subgroups, it is unclear whether there were aspects of the tailored letters that were particularly effective for Black and low-income women or whether there was a ceiling effect for White and higher-income women because their percentage of possible change was limited by elevated baseline rates. Either way, the most important finding of this study is its demonstration that tailored physicians' recommendations effected health behavior change among hard-to-reach populations. Minority and low-income women have historically had lower mammography rates than White women and those

with higher incomes, and they remain underscreened although screening rates continue to rise in the general population. In fact, the mammography gap between higher-income White women and lower-income minorities may be widening.²⁰ Therefore, an intervention found to be effective among lower-income and minority groups is especially timely and important.

It is somewhat surprising that the effect of the tailored letters was significant for Black and low-income women, because print media are not generally expected to be as effective among lower socioeconomic groups as among higher socioeconomic groups. To combat this disadvantage, letters were targeted toward lower reading levels by means of simple vocabulary and clear, one-sided arguments. In effect, the intervention delivered a low-socioeconomic-status message through a high-socioeconomic-status channel. This may explain why Black and low-income women were among the least likely to have read their letters but, for women who read at least part of the letters, the most likely to report interest in the content.

The effect of tailored recommendations cannot, in this study, be disentangled from the personal nature of letters coming

from physicians to women's homes. It is difficult to determine whether the advantage in tailoring would also be present for messages delivered via other media. Women of low socioeconomic status may have been persuaded more by the fact that their physicians sent them a letter than they would have been by an even easier-to-understand presentation in the physician's office.

The next phase in tailoring research should compare different types and amounts of tailoring and different media channels. For instance, interactive computer programs employing graphics, sound, and touch screens could deliver messages to low-literacy women who are not able to read letters. Such messages could allow for additional tailoring. Not only could more content be tailored, but presentation factors such as type size, graphics, reading level, and sophistication of arguments or message framing could be manipulated.

Future research should also explore whether effects of tailored physicians' recommendations are similar for patients in public health clinics, where physician-patient relationships may be very different from those in family practice settings. Even if tailored recommendations are found to be more effective in moving women toward mammography, they may not provide women with the skills needed to negotiate the medical system and actually obtain mammograms. □

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The Collaborative Registry of Smoking Cessation Trials Issues a Request for Help

Over the past 10 years there has been a significant increase in the number of randomized controlled trials that compare the effectiveness of different interventions in smoking cessation. Recently, a number of researchers have been approached to obtain information about current trials for a prospective registry of planned or ongoing trials in the area of smoking cessation. Although the initial response has been encouraging, it is possible that some people have been inadvertently missed. To ensure that a registration form is completed by the principal investigator for all relevant trials, we are seeking the help of all researchers.

To be eligible for inclusion in the registry, a trial must be unpublished and include at least two groups; allocation to the groups must be by either a random or quasi-random method (e.g., alternation, year of birth, etc.); and the trial must be related to an aspect of smoking cessation. Trials examining abstinence rates, relapse prevention, withdrawal symptoms, training or encouraging health professionals in smoking cessation techniques, or any aspect of smoking cessation research are all eligible for inclusion. If you are in doubt as to whether

a trial is suitable for inclusion, we suggest you still complete a registration form.

Once the register has been assembled, a copy will be distributed to all contributors, as well as published in summary form on an annual or biannual basis. The registry will not collect any trial result data or participant information, although the existence of such a register may facilitate the establishment of collaborative groups who wish to undertake more detailed systematic reviews, similar to those undertaken in other fields.

Trial registration forms are available on request from The Collaborative Registry of Smoking Cessation Trials, General Practice Research Group, Gibson Building, Radcliffe Infirmary, Oxford OX2 6HE, United Kingdom; tel +44-865-319 124; fax +44-865-310 545.

The coordinators would also appreciate being informed of any completed but unpublished smoking cessation trials. No special form is provided for this purpose; however, any information that researchers can provide will assist in updating our current register of completed trials and ensure its comprehensiveness.