

What influences family physicians' cancer screening decisions when practice guidelines are unclear or conflicting?

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East Tennessee State University (F.T.); State University of New York at Buffalo (R.G.); University of Montreal (J.H.); McGill University (A.C., P.M.); University of Toronto (W.M., P.R., V.G.); University of Western Ontario (C.H., J.B.B.); University of Manitoba (A.K.); State University of New York Upstate Medical University (B.G.); University of Prince Edward Island (P.S.); University of Calgary (M.O.); Toronto Rehabilitation Institute (J.I.W.). This work was presented at the annual NAPCRG meeting, November 20, 2000.

KEY POINTS

Four factors are significant determinants, independently, of a physician's decision to order a screening test when recommendations are unclear or conflicting: a patient's anxiety about having cancer; a patient's expectation to undergo screening; a family history of cancer; and (in most cases) the quality of the patient-physician relationship. Particularly in the context of breast cancer screening, when a patient and physician have a good relationship, they are more likely than when the relationship is poor to discuss the pros and cons of a conflicting screening guideline and reach a mutually agreeable decision.

In instances of conflicting recommendations, the importance physicians attribute to the practice of colleagues influences their screening decisions.

- **OBJECTIVES:** To determine: a) the respondents' perceptions of 4 unclear or conflicting cancer screening guidelines: prostate specific antigen (PSA) for men over age 50, mammography for women ages 40-49, colorectal screening by fecal occult blood testing (FOBT), and colonoscopy for patients over age 40; and b) the influence of various patient and physician factors on the decision to order these tests.
- **STUDY DESIGN:** National Canadian mail survey of randomly selected family physicians.
- **POPULATION:** Family physicians in active practice (n=565) selected from rural and urban family medicine sites in 5 provinces representing the main regions in Canada: British Columbia, Alberta, Ontario, Quebec, Nova Scotia.
- **OUTCOMES MEASURED:** Agreement with guideline statements, and decision to order screening test in 6 clinical vignettes.
- **RESULTS:** Of 565 surveys mailed, 351 (62.1%) were returned. Most respondents agreed with the Canadian Task Force recommendations, and the majority believed that various guidelines for 3 of the 4 screens were

conflicting (PSA 86.6%; mammography 67.5%; FOBT 62.4%). Patient anxiety about cancer, patient expectations of being tested, and a positive family history of cancer significantly increased the odds that the 4 tests would be ordered. A good quality patient-MD relationship significantly decreased the odds of ordering a mammogram. Screening decisions were also significantly influenced by the respondents' beliefs about whether screening was recommended and whether screening could cause more harm than good. A physician's sensitivity to his or her colleagues' practice influenced screening decisions regarding PSA and mammography.

- **CONCLUSIONS:** These results suggest a conceptual framework for understanding the determinants of screening behavior when guidelines are unclear or conflicting.

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Although most studies of the determinants of physicians' cancer screening behavior have dealt with facilitators or barriers to the adoption of guidelines with clear recommendations, virtually no studies have examined factors affecting physician practice when guidelines are unclear or conflicting. When guidelines are unclear, many physicians are left with little direction. By performing cancer screening procedures that are not clearly effective,¹ physicians are diverting limited resources to areas where there is uncertain or no benefit to patients.

We studied physician decision-making in cancer screening when guidelines are "unclear" or conflicting. We defined an unclear guideline as a C recommendation (insufficient evidence to recommend the maneuver or not) from the Canadian Task Force on the Periodic Health Examination.^{2,3} We defined a "conflicting" guideline as one for which there were different recommendations from at least 2 different organizations for the same cancer screening maneuver.

The authors conducted a qualitative study of 10 focus groups across Canada, and identified factors that influence family physicians' cancer-screening decisions when guidelines are unclear or conflicting.⁴ The findings supported a conceptual model with 8 factors: 1) patient factors (patient anxiety, expectations, and family history); 2) physician factors (perception of guidelines, clinical practice experience, influence of family physician and specialist colleagues, and time/financial costs; 3) the patient-physician relationship (quality of rapport). Four of these 8 factors were considered the most influential: patient anxiety about having cancer, patient expectations to have a screening test, family history of cancer, and the quality of the patient-physician relationship.

Although we know of many factors that determine cancer-screening decisions, it is not known how much each of these factors contributes to physicians' decisions to perform tests in specific situations. The aim of this study was to verify these determining factors and to quantify the strength of the influence of each one on cancer screening decisions.

■ METHODS

We conducted a national survey of family physicians in Canada because they are the main preventive care providers in Canada and because a physician's recommendation is the strongest predictor of an individual's decision to have a screening test.⁵

The self-administered questionnaire was mailed to a random sample of 600 family physicians, 120 from each of 5 provincial licensing bodies from 5 regions in Canada: British Columbia, Alberta, Ontario, Quebec, and Nova Scotia. We stratified by postal codes to ensure equal representation of urban and rural physicians (oversampled) to permit subgroup analysis. Ethical approval was obtained from all participating institutions. We followed a modified 4-step Dillman⁶ method, using initial full mailing, follow up reminder postcards, second full mailing, and phone call reminders.

The questionnaire was composed of 2 parts. Part 1 contained 40 single-item questions on physicians' perceptions of guideline recommendations for cancers of interest, and the perceived influence of various factors on their decision to order screening tests (all factors identified in the literature and in our previous study). The questionnaire also contained

items on practice characteristics, demographics, and respondents' personal experience with cancer or cancer screening tests.

Part 2 contained 6 clinical case vignettes; 2 for prostate specific antigen (PSA), 2 for mammography, and 2 for fecal occult blood testing (FOBT) and colonoscopy, for which recommendations can be unclear according to Canadian guidelines, or conflicting.² As for screening for prostate cancer with PSA for men over age 50, there is fair evidence for when not to screen, but conflicting recommendations from at least 2 major organizations. Mammography for breast cancer screening in women age 40 to 49 has conflicting recommendations (different recommendations from at least 2 different organizations). FOBT and colonoscopy for colorectal cancer detection over age 40 are unclear C recommendations (insufficient evidence to either recommend or not).

The Clinical Case Vignettes

Clinical case vignettes have been shown to be a useful, inexpensive, and effective method for eliciting physicians' decision-making behavior in a simulated situation.⁷ Case vignettes have been used to examine physicians' practice behavior with cancer patients.⁸⁻¹¹ For research purposes, the usefulness of the clinical case vignette rests on the ability to vary specific factors (relevant independent variables under study) from one vignette to another, while keeping constant the surrounding factors of the case presented (the frame).

For each clinical case vignette, the dependent variable was the physician's decision to order the screening test presented or not. The independent variables were the 4 most influential factors identified in the prior qualitative study,⁴ embedded within the description of each clinical case vignette. Each independent variable had 2 levels: presence or absence of patient anxiety, patient expectations for testing, and family history of cancer, and easy or difficult relationship. This enabled 16 different versions of each clinical case vignette frame, and 2 frames were developed for each cancer screening. The clinical case vignettes were developed and tested in 4 steps. First, 6 investigators (R.G., F.T., C.H., A.K., M.O., J.B.B.) generated case vignettes from their own clinical experience that reflected specified levels of the factors. Second, 12 family physician colleagues empirically validated the descriptions in the case vignettes. A minimum of 9 of these physicians had to correctly identify the intended level of each of the factors in question. Third, factors not attracting 75% agreement were corrected or replaced. Fourth, the modified clinical case vignettes were submitted to another group of 12 family physicians for their perceptions of the intended levels of the relevant factors. The final versions of the vignettes reflected concordance between the perceived and the intended levels in the factors for each case vignette.

Figure 1.

Our design was "fractional" in the sense that we sampled from only a fraction of all possible combinations of independent variables. We had estimated that each family physician could respond to no more than 6 case vignettes (2 per cancer screening). The reduced set represented the vignettes that were clinically realistic. As a result, each physician received set of 6 vignettes offering a clinically meaningful spread of possible levels of the independent variables to maximize the opportunity to detect practice behavior variation. The clinical case vignettes were presented in random order to avoid sequence bias. This design ensured that each physician had 1 vignette with all independent factors absent, 1 with all factors present, and the remaining 4 with a diversity of the possible combinations of levels of patient factors.

Analyses

The analysis of the binary response for each test (order versus not order screening test) included the factors listed in the theoretical framework, with an additional random effect to take into account possible correlations among responses to 2 vignettes from the same physician. The estimation of each model's parameters was performed using the Generalized Estimating Equation approach of SAS; this variant of logistic regression accounts for the non-independence of observations. We examined first the effect of each of the 4 principal factors-individually and together-on the decision to order a screening test. Then we looked for additional significant effects of physician demographics and perceptions of guidelines. We looked for interactions between the quality of the relationship with other factors. For each screening test, we developed a final parsimonious model which included all factors that were statistically significant at $P = 0.05$.

■ RESULTS

Of the original 600 physicians, there were 351 respondents, 214 non-respondents, and 35 ineligible (16 were not in full-time practice, defined as < 15 hours a week; 8 were not practicing; 6 were in another specialty; 4 had moved out of the jurisdiction; and 1 had died). The final response rate was 62.1% (351/565). The respondents' demographic characteristics **Table 1** reflected the Canadian family physician population, except that there were more certificants of the College of Family Physicians of Canada (akin to Board certification in the US) among the respondents.

By [the fractional factorial] design, the versions of the vignettes with all patient factors present or all absent were the most frequent versions of the vignettes, and the frequency of the remaining versions were uniformly distributed for each vignette. There was no evidence of a systematic under-representation of any versions as a result of non-response.

Perceptions of Guidelines

The respondents' perceptions of the guideline recommendations for the 4 cancer screening tests are shown in **Table 2**. Although the respondents' perceptions of guidelines agreed with the Canadian Task Force guidelines for PSA and mammography, they diverged for colorectal cancer screening. For example, 83.5% of respondents thought colonoscopy was not recommended for patients over 40. A majority of respondents believed that the guidelines for PSA, mammography, and FOBT were conflicting.

The Influence of the Four Principal Factors

Individually, the 4 principal factors were significant determinants of the physician's decision to order the screening test when the evidence was unclear or conflicting **Table 3**. The patient's anxiety about having cancer, their expectations of having a screening test, the quality of the patient-physician-relationship (in most cases), and a positive family history of the relevant cancer all increased the odds of screening. When all 4 factors were analyzed as a combined group adjusting for the presence of other factors **Table 3**, the principal factors that remained significant determinants of the physician's decision to order the screening were as follows: anxiety for PSA and mammography; patient expectations for PSA, mammography, and FOBT; a high quality patient-physician relationship for mammography (reduced the likelihood of ordering); and positive family history for all but mammography.

The Combined Influence of the Principal Factors and Physician Factors Physician variables were added to the initial logistic regression models to derive a final parsimonious model for each screening test. **Table 4** shows that for each of the screening maneuvers, there were differences not only in the factors that significantly influenced the decision to screen, but also in the magnitude of influence as manifested by the odds ratios. The direction of the influence was similar across examples: all the factors increased the odds of screening except perception that the test is not recommended or does more harm than good, and a good patient-doctor relationship (in the mammography example). PSA and mammography had a similar pattern: patient anxiety, expectations, family history, the physician's perception of the level of recommendation of the test, whether it creates more harm than good, and the influence of colleagues all significantly influenced the decision to screen. For FOBT, patient expectations, the level of perceived recommendations and the perception of harm were significant. For colonoscopy, patient anxiety, family history, and the perception of the level of recommendation were significant determinants.

■ DISCUSSION

The results of this study add to the findings from the focus groups and suggest a conceptual framework or model for understanding the determinants of screening behaviour in unclear and conflicting recommendation situations. Although this model offers a more complex picture of the determinants of cancer screening in these instances, there is a great deal of consistency. Patient anxiety, patient expectations, family history of cancer, physicians' perceptions of the relevant guideline, and physicians' perceptions of the benefit or harm in screening were all important determinants of screening decisions. One of the important differences in the 2 studies is the relative strength of the influence of family history in this

survey study, in particular for mammography and colonoscopy.

Family physicians are trained to heed patient anxiety, but it has only been described as an indirect determinant of cancer screening.¹² Patient expectations has been described in the literature in a number of studies as an important determinant of screening.^{1,13} In addition, other patient-specific factors have been shown to be associated with physician adoption of guidelines, such as patient concerns about finances, quality of life, and location of care.¹⁴ Recent research has found an increase in physicians' wish for more patient involvement in the development of clinical guidelines, and they have suggested that practice guidelines should reflect patient preferences.¹⁵

In the final model, the quality of the patient-physician relationship was related to one cancer screening maneuver: mammography for women aged 40-49. It is interesting that a good relationship halved the odds of screening tests being ordered when accounting for other patient factors. The importance of the influence of the patient-physician relationship on screening has been described in previous studies.^{12,16} In a good patient-physician relationship, patient and physician are more likely to discuss the pros and cons of a conflicting screening guideline and to find common ground than when the relationship is poor.¹⁶

The patient-physician relationship did not appear to be an important determinant in the prostate and colorectal screening examples. For PSA screening it may be due to the unique character of the relationship male patients have with their physician. A recent study found that male patients experience many barriers to seeking help, and they find it difficult to discuss their health concerns and preventive care issues with their physicians.¹⁷ For colorectal screening by colonoscopy the relationship may not have been an important determinant because 2 other determinants appeared to be so important and may overshadow any others: the great majority of respondents believed that it was not recommended (83.5%); and family history played a very important role in influencing screening.

In the final statistical modeling, several additional physician factors appeared to influence screening decisions. In particular, both the perception of whether the screening test was recommended and the belief that the screening test could cause more harm than good contributed independently to the screening decision. The same factors were noted in our qualitative study, a finding supported by many examples in the literature.^{1,18,19} In addition, the importance that physicians attribute to the practice of colleagues appeared to influence screening decisions in the 2 conflicting examples (from a Canadian perspective)-PSA screening and mammography. This suggests an important role of colleagues in conflicting examples. Previous research has suggested that social influences play an important role-in particular, when uncertainty is high, or when the evidence is still evolving and recommendations based on the evidence are not in common practice.²⁰

Our emerging model **Figure 2** shows that there are more than just cognitive processes at work in this sort of decision-making. The findings suggest that aspects of the patient-physician relationship and the influence of colleagues affect decision-making as well. Further, our findings indicate that these determinants are important when the guidelines are unclear or conflicting.

Many of the factors identified in this study have been described previously.^{1,13,21, 34} There are also recent theories to help explain how and why physicians decide to screen their patients for cancer, including whether they agree with and adhere to recommended guidelines.^{24,35} However, these theories were developed within the context of clinical decision making when the guidelines are clear. The unique contribution of our study and emerging model is that it concerns screening decisions with unclear or conflicting guidelines. The impact of uncertainty on this aspect of physician decision-making is important. Physicians need to make decisions in the face of uncertainty. They appear to do this by believing one side of the argument or another, by balancing the perceived good or harm from screening, and by looking for support from colleagues to bolster their decision. In addition, their patients play a key role in influencing these decisions, with the doctor and patient finding common ground, often resulting in a shared decision.

Limitations

We represented the clinical factors with dichotomous situations, when, in real encounters, there would be a much greater range in the level of intensity of factors such as patient anxiety, expression of expectation, and quality of the relationship.

Also, even though the case vignettes provided some background, for the physician respondent it was a “one of” situation which does not reflect a typical primary care situation that includes continuing care of patients who have a variety of coexisting clinical issues. The magnitude of the influence of these factors may be considerably underestimated or overestimated with the use of clinical case vignettes.

The generalizability of the respondents may be a limitation, as they were younger (1.7 years, not significant) and more likely to be certificants than the non-respondents. The latter difference may have contributed to a trend that stressed the influence of patient anxiety and wishes, which reflects residency training issues in family medicine. Last, although the study was done in Canada, we believe the findings likely apply to US family physicians, as graduate training is quite similar in the two countries.

Conclusions

This study underlies the importance of the cognitive component in decision making-in particular, of perceptions of guidelines, and of the influence of patients and their needs and the patient-physician relationship.

Our results verify our model in general terms, but also build on and advance the conceptual model that evolved from our qualitative findings. It provides a useful framework for understanding clinical decision-making in the face of uncertainty or controversy, and may be applicable to other clinical domains.

In future research we plan to test the effect of race and cultural aspects of the patient and of the physician on physicians' screening decisions. Ultimately, the model could be used to design interventions to assist with the implementation of preventive services guidelines, and to be included in future CME programs for practicing physicians.

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