

Patients' anxiety and expectations

How they influence family physicians' decisions to order cancer screening tests

Jeannie Haggerty, PHD Fred Tudiver, MD Judith Belle Brown, MSW, PHD
Carol Herbert, MD, CFPC, FCFP Antonio Ciampi, PHD Remi Guibert, MD

ABSTRACT

OBJECTIVE To compare the influence of physicians' recommendations and patients' anxiety or expectations on the decision to order four cancer screening tests in clinical situations where guidelines were equivocal: screening for prostate cancer with prostate-specific antigen for men older than 50; breast cancer screening with mammography for women 40 to 49; colorectal cancer screening with fecal occult blood testing; and colorectal cancer screening with colonoscopy for patients older than 40.

DESIGN Cross-sectional mailed survey with clinical vignettes.

SETTING British Columbia, Alberta, Ontario, Quebec, and Prince Edward Island.

PARTICIPANTS Of 600 randomly selected family physicians in active practice approached, 351 responded, but 35 respondents were ineligible (response rate 62%).

MAIN OUTCOME MEASURES Decisions to order cancer screening tests, physicians' perceptions of recommendations, patients' anxiety about cancer, and patients' expectation to be tested.

RESULTS For all screening situations, physicians most likely to order the tests believed that routine screening with the test was recommended; physicians least likely to order tests believed routine screening was not. Patients' expectations or anxiety, however, markedly increased screening by physicians who did not believe that routine screening was recommended. In regression models, the interaction between physicians' recommendations and patients' anxiety or expectation was significant for all four screening tests. When patients had no anxiety or expectations, physicians' beliefs about screening strongly predicted test ordering. Physicians who believed routine screening was recommended ordered the test in most cases regardless of patient characteristics. But patients' anxiety or expectations markedly increased the probability that the test would be ordered. The probability of test ordering went from 0.28 to 0.54 for prostate-specific antigen (odds ratio [OR] = 1.9), from 0.15 to 0.44 for mammography (OR = 2.8), from 0.33 to 0.79 for fecal occult blood testing (OR = 2.4), and from 0.29 to 0.65 for colonoscopy (OR = 2.2).

CONCLUSION Differences in clinical judgment about recommended practice lead to practice variation, but physicians are also influenced by nonmedical factors, such as patients' anxiety and expectations of receiving tests. In terms of magnitude of influence, clinical judgment is more powerful than nonmedical patient factors, but patient factors are also powerful drivers of family physicians' decisions about cancer screening when practice guidelines are equivocal.

EDITOR'S KEY POINTS

- Physicians' decisions to order cancer screening tests vary widely and depend on both physicians' judgment and patients' expectations. This survey describes the influence of patients' expectations.
- When patients have no anxiety or expectation of being screened, physicians' perceptions of practice recommendations are the main determinants of decisions to screen.
- High anxiety or expectations among patients, however, powerfully influence decisions to screen, even overriding some physicians' inclinations not to order certain screening tests.
- This study illustrates the influence of patient-centred care on evidence-based medicine. Patients' perceptions significantly modified the evidence-based views of physicians.

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Numerous studies have reported large variations in medical practice not explained by differences in medical indications.^{1,2} Variation is highest for clinical procedures where evidence for optimal care is equivocal, resulting in “supplier-induced demand” that reflects differences in physicians' preferences and clinical judgment on issues where there is professional uncertainty.³

Clinical practice guidelines reduce professional uncertainty by synthesizing complex scientific evidence and translating it into clinical decision algorithms. The hypothesis that clear and unambiguous guidelines would reduce variance in practice rests on the notion that clinical decision making is principally a cognitive exercise. Yet variation persists even when there is clear consensus in practice guidelines. For example, guidelines since 1979 have recommended annual or biennial breast cancer screening with mammography for women 50 to 69 years,⁴ but screening rates have only recently achieved the established targets.⁵⁻⁸

This paper reports on part of a group of studies exploring physicians' decisions on cancer screening when guidelines are conflicting or equivocal.^{9,10} We used qualitative inquiry to identify the factors that influence physicians' decisions and to develop a conceptual model for decision making.⁹ Subsequently, we conducted a national survey of Canadian family physicians to test the model and

to estimate the magnitude of the influence of key factors.¹⁰ As expected, we found that both physician and patient factors influenced these discretionary screening decisions, but we did not find that the quality of physician-patient relationships modified the effect of patient factors, as the qualitative inquiry suggested it might.

In this paper, we present a new analysis of the survey showing that patient factors modify physicians' a priori clinical judgment to influence physicians' decisions to order screening tests in clinical situations, regardless of the quality of the physician-patient relationship. We focus on patients' anxiety about cancer and expectations of receiving screening tests.

METHOD

In 1999, a self-administered survey was mailed to 600 family physicians: 120 randomly selected from the records of each licensing body in British Columbia, Alberta, Ontario, Quebec, and Prince Edward Island. Eligible physicians were in active general medical practice (>15 h/wk). Equal numbers of urban and rural physicians were sampled to permit subgroup analysis by geographic location. Ethical approval was obtained from the review boards of all participating institutions. To ensure an adequate response rate, we used reminder postcards, second mailings, and telephone calls.¹¹

Questionnaire design

Part 1 contained 40 questions on physicians' perceptions of recommendations for screening and on the extent to which non-clinical factors influenced decisions to order screening tests that physicians do not usually offer to patients.⁹ The questionnaire also asked about practice characteristics, demographics, and personal experience with cancer and use of cancer screening tests.

Part 2 contained six clinical vignettes depicting situations for which practice guidelines at the time of the study were either conflicting or equivocal. Two vignettes were for prostate cancer screening

Dr Haggerty is an epidemiologist and primary care researcher in the Department of Community Health at the University of Sherbrooke in Longueuil, Que, and is Canada Research Chair on the Impacts of Health Services on the Population. **Dr Tudiver** is Director of Primary Care Research at East Tennessee State University in Johnson City. **Dr Brown** is a Professor in the Centre for Studies in Family Medicine at The University of Western Ontario in London, Ont. **Dr Herbert** is Dean of the Faculty of Medicine at The University of Western Ontario. **Dr Ciampi** is an Associate Professor in the Department of Epidemiology and Biostatistics at McGill University in Montreal. **Dr Guibert** is a practising clinician in the Mornington Peninsular Division of General Practice in Frankston, Australia.

with prostate-specific antigen (PSA) in men older than 50 years, two for breast cancer screening with mammography in women aged 40 to 49 years, and two for colorectal cancer screening with fecal occult blood testing (FOBT) or colonoscopy in adults older than 40 years. In 2001, the Canadian Task Force on Preventive Health Care changed its recommendation to annual or biennial screening with FOBT,¹² but at the time this study was conducted, this screening test would have been considered discretionary.

Clinical vignettes elicit physicians' decision-making behaviour for a hypothetical case. Their usefulness rests on the ability to vary specific factors of interest (independent variables) from one vignette to another, while keeping constant the context of the case (the frame). Patient factors that varied from one vignette to another within the same case frame were anxiety about cancer, expectation of being tested, family history of cancer, and an easy or difficult patient-physician relationship. In this study, our dependent variable was a yes or no decision (to order any of the four screening tests). The vignettes were developed by the clinician investigators (R.G., F.T., C.H., J.B.B.) from their own clinical experience (Figure 1).¹⁰

Each physician received a unique series of the six vignettes. There were 16 different versions of each clinical vignette reflecting all possible combinations of factors. We used a fractional factorial design to create series such that each physician had

one vignette with all factors present, another with all factors absent, and the remaining four with a diversity of possible levels of the independent variables. Each series of clinical vignettes had a random order of presentation to avoid sequence bias.

Analyses

The outcome of interest for each test was the decision to order or not order the screening test. This binary decision was modeled by logistic regression for each of the four screening tests. We examined first the main effects of patients' anxiety, patients' expectations, and physicians' perceptions of whether or not the test was recommended, controlling for family history of cancer. Then we looked for second-order interactions between patients' anxiety or expectations and physicians' perceptions of recommended practice to determine whether patient factors modified the effect of physicians' a priori judgments.

Because each physician responded to two vignettes for each screening test, the logistic regression models included an additional random effect to account for the non-independence of responses from the same physician. The model's parameters were estimated using the Generalized Estimating Equation approach (GENMOD procedure of SAS), with the option of an exchangeable correlation matrix (compound symmetry) to account for the random effect.

Figure 1. Sample clinical vignette: *Intended levels of independent variables: patient expects that testing will be done, is not anxious, has a good relationship with physician, and has a positive family history of colon cancer*

Colorectal cancer screening

Mr Frank Tonelli is a 52-year-old with whom you have a good relationship. He frequently attends your clinic and has a great deal of trust in you. He needs a "full physical" for a life insurance application. He has no current health problems. He recently saw a show about colon cancer among middle-aged men on the Health Channel. He is not anxious about his risk of colon cancer but insists on having a screening test regardless of what you say. His father died of colon cancer at the age of 76. The functional enquiry is negative for blood in the stool, abdominal pain, chronic constipation, or changes in bowel habits.

Based on the information above, at the end of the visit what will you do?

- Order a fecal occult blood test
- Not order a fecal occult blood test

Based on the information above, at the end of the visit what will you do?

- Order colonoscopy
- Not order colonoscopy

RESULTS

Of the 600 physicians contacted, 351 responded but 35 were ineligible, for a final response rate of 62.1% (351/565). Respondents' demographic characteristics reflected the Canadian family physician population, except that respondents were more likely to be Certificants of the College of Family Physicians of Canada than nonrespondents were (Table 1).

Table 1. Physicians' characteristics

CHARACTERISTIC	STUDY POPULATION (N=565)		TOTAL CANADIAN FP POPULATION (N=29 031)*
	RESPONDENTS (N=351)	NONRESPONDENTS (N=214)	
Male sex: %	65.4	67.9	67.3 [†]
Mean age: y (SD)	43.9 (9.6)	Unknown	45.6 [‡]
College Certificants: %	57.0	34.3	33.5
Mean years in practice: y (SD)	15.9 (9.7)	16.8 (19.4)	17.0 [‡]
Group practice: % (n)	71.0 (249)	Unknown	Unknown
Academic affiliation: % (n)	29.3 (103)	Unknown	Unknown
Province: % (n)			
• British Columbia	25.1 (88)	12.9 (32)	14.8 [†]
• Alberta	18.5 (65)	22.1 (55)	8.9
• Ontario	25.8 (94)	10.4 (26)	34.6
• Quebec	13.1 (46)	29.7 (74)	26.6
• Prince Edward Island	16.5 (58)	24.9 (62)	3.3
Location of practice			
• Urban: %	51	48.6	68 [‡]
• Rural: %	49	51.4	32

*Total family physicians and general practitioners in Canada = 29 031 (ie, specialty is family medicine, emergency family medicine or physician in general practice).

[†]1999 National MD Select Profiler Version, Southam's Directories Group.

[‡]1997 National Family Physician Workforce Survey, College of Family Physicians of Canada.

Physicians' perceptions of recommended practices

Most physicians believed that PSA, mammography, FOBT, and colonoscopy were not recommended for routine screening in these clinical situations, in keeping with the most influential Canadian guidelines.¹³ Except for colonoscopy, however, many physicians also believed either that routine screening was recommended or that best practice was unclear (Figure 2).

Nearly all physicians agreed that patients' anxiety (87%) or expressed expectations of being tested

(88%) influence their decision to order a test that they would not usually recommend (Table 2). We found no differences between urban and rural physicians in factors that influence cancer screening decisions.

Table 2. Family physicians' agreement that nonmedical factors would influence test-ordering behaviour

I WILL ORDER A CANCER SCREENING TEST THAT I DO NOT USUALLY RECOMMEND IF:	AGREE (%)	95% CONFIDENCE INTERVALS
Specialists I work with recommend ordering the test	89.6	86.4-92.8
A patient requests the test and insists on having it done	88.1	84.7-91.5
A patient is anxious about having the disease	87.0	83.5-90.5
The test is easy to administer	59.2	54.1-64.3
The test is easily accessible	57.2	52.0-62.4
The test is inexpensive	54.7	49.5-59.9
I hear that my colleagues are recommending it to their patients	37.0	31.9-42.1
The test will take less time to order than convincing patients that they do not need it will	29.4	24.6- 34.2

How factors affect decisions to order screening tests

For each vignette, test ordering was highest among physicians who believed routine screening was recommended, followed by those who perceived that the recommendation was unclear, then by those who believed it was not recommended. Each test was also more likely to be ordered when patients were anxious about cancer or expected to have the test; a test was most likely to be ordered when both anxiety and expectation were present. Figure 3 shows the percentage of physicians who ordered each test as a function of whether or not physicians believed the test was recommended for routine screening and whether or not patients were anxious or expected testing. The data suggest that patients' anxiety and expectation modify physicians' perceptions of recommended practice.

Regression models confirm that each of the variables of interest significantly increased the likelihood that physicians would order a screening test (Table 3). For each screening decision we obtained

Figure 2. Family physicians' perceptions that routine use of four cancer screening tests is recommended, not recommended, or unclear

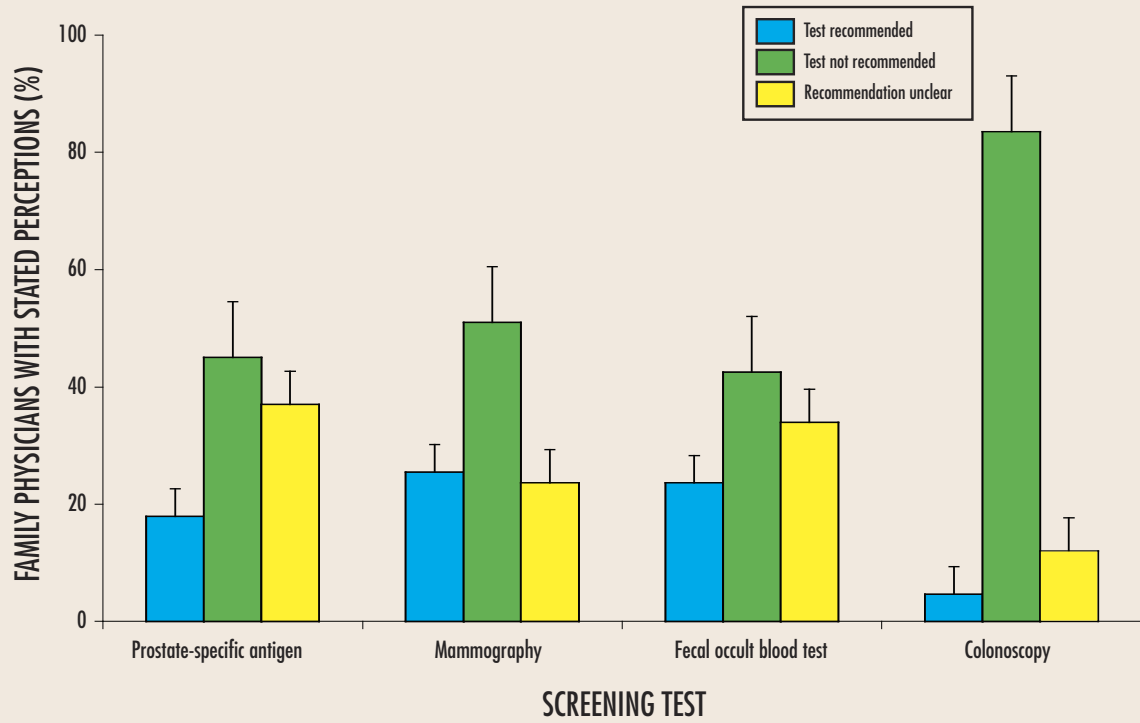


Figure 3. Clinical vignettes where screening test was ordered according to whether patient anxiety or expectation was present and whether physicians perceived that routine screening was recommended (◆), not recommended (△), or unclear (■).

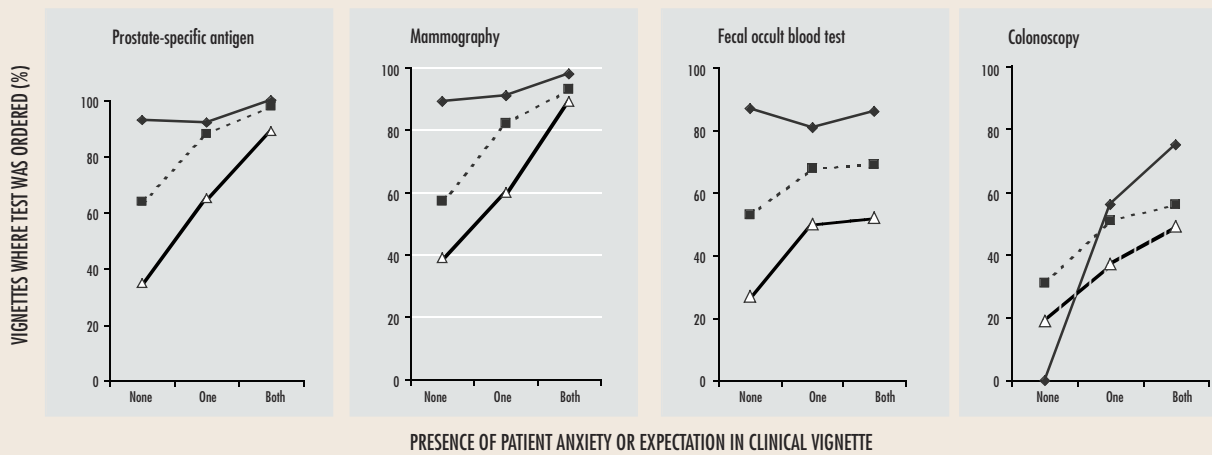


Table 3. Influence of principal factors on the likelihood that family physicians will order cancer screening tests

SCREENING TESTS	UNIVARIATE MODELS (ONE FACTOR AT A TIME)		MULTIVARIATE MODELS* (ALL FACTORS TOGETHER)	
	ODDS RATIO	95% CONFIDENCE INTERVAL	ODDS RATIO	95% CONFIDENCE INTERVAL
DECISION TO ORDER PROSTATE SCREENING TEST				
• Patient anxious about cancer	2.75 [†]	1.93-3.92	1.84 [†]	1.19-2.86
• Patient expects to have test	6.79 [†]	4.42-10.44	6.77 [†]	4.11-11.17
• Physician believes test is recommended [‡]	3.32 [†]	1.21-9.07	5.29 [†]	1.88-14.84
• Physician believes test is <i>not</i> recommended [‡]	0.32 [†]	0.20-0.49	0.25 [†]	0.15-0.41
DECISION TO ORDER SCREENING MAMMOGRAPHY				
• Patient anxious about cancer	3.59 [†]	2.53-5.11	3.00 [†]	1.52-5.92
• Patient expects to have test	4.13 [†]	2.90-5.88	2.14 [†]	1.06-4.34
• Physician believes test is recommended [‡]	3.70 [†]	1.89-7.25	3.15 [†]	1.24-8.03
• Physician believes test is <i>not</i> recommended [‡]	0.47 [†]	0.30-0.74	0.21 [†]	0.09-0.46
DECISION TO ORDER FECAL OCCULT BLOOD TEST				
• Patient anxious about cancer	1.38 [†]	1.05-1.82	0.97	0.70-1.35
• Patient expects to have test	2.22 [†]	1.66-2.96	2.15 [†]	1.54-3.02
• Physician believes test is recommended [‡]	2.99 [†]	1.66-5.37	3.02 [†]	1.65-5.53
• Physician believes test is <i>not</i> recommended [‡]	0.41 [†]	0.28-0.61	0.41 [†]	0.27-0.62
DECISION TO ORDER COLONOSCOPY				
• Patient anxious about cancer	2.63 [†]	1.94-3.58	1.50	0.97-2.32
• Patient expects to have test	2.12 [†]	1.53-2.94	0.96	0.61-1.53
• Physician believes test is recommended [‡]	0.96	0.47-1.94	1.91	0.59-6.15
• Physician believes test is <i>not</i> recommended [‡]	0.60 [†]	0.37-0.98	0.41 [†]	0.18-0.92

*Multivariable regression model also controlled for quality of patient-physician relationships and patients' family history of the cancer.

[†]P < .05.

[‡]Compared with reference category: physicians' perception that recommended practice is unclear.

were anxious, the independent influence of physicians' perceptions diminished.

For mammography, FOBT, and colonoscopy, physicians' perceptions of recommended practice were modified by patients' expectations of receiving the test; only for mammography did patient anxiety remain significant. For instance, if a physician perceived that mammography for women 40 to 49 years old was not recommended or was unclear, then a patient's expressed expectation of having mammography tripled the probability that mammography would be ordered. By contrast, if a physician perceived that routine mammography was recommended, then a patient's expectation did not alter significantly the already high likelihood that a physician would order mammography.

DISCUSSION

Our study partially supports the hypothesis of professional uncertainty in discretionary decision making; that is, differences in physicians' clinical judgment about recommended practice are consistent with differences in their clinical decisions.³ Results of this study demonstrate, however, that nonmedical patient factors are also powerful drivers of decision making and, consequently, of practice variation. The unique contribution of our study is a description of the relative magnitude of these nonmedical patient factors in modifying physicians' a priori clinical judgments. We have shown

an improved model with a significant interaction between a patient factor and a physician's perception of recommended practice (Table 4). For PSA ordering, physicians' perceptions of whether the test is recommended is modified by patients' anxiety about cancer. Physicians' beliefs about PSA screening were the most influential factor in the screening decision when patients were not anxious about having prostate cancer, but when patients

how much physicians' clinical judgment influenced test ordering differed according to patients' anxiety or expectations.

When patients have no anxiety about cancer or expectation of being tested, physicians' perception of recommended practice is the main driver of screening decisions for which guidelines are equivocal. Patients' anxiety or expectations not only increased the likelihood of getting the screening

Table 4. Interaction effects between patient factors and physicians' perceptions of recommended practice on the decision to order cancer screening tests: Models are adjusted for family history.

SCREENING TESTS	ODDS RATIO	95% CONFIDENCE INTERVAL
DECISION TO ORDER PROSTATE CANCER SCREENING FOR MEN > 50 YEARS		
Effect of patients' expectations	5.6*	3.5-8.8
Effect of patients' anxiety when:		
• Physicians perceive test as recommended	0.4	0.1-1.2
• Physicians perceive test as not recommended or unclear	1.9*	1.3-2.9
Effect of physicians' perception that test is recommended when:		
• Anxiety is present	3.7*	1.2-11.3
• Anxiety is absent	18.1*	5.7-58.0
DECISION TO ORDER SCREENING MAMMOGRAPHY FOR WOMEN 40 TO 49 YEARS		
Effect of patients' anxiety	2.8*	1.8-4.4
Effect of patients' expectations when:		
• Physicians perceive test as recommended	0.7	0.2-2.2
• Physicians perceive test as not recommended or unclear	2.8*	1.7-4.5
Effect of physicians' perception that test is recommended when:		
• Expectation is present	4.6*	1.7-12.1
• Expectation is absent	18.7*	8.4-42.0
DECISION TO ORDER FECAL OCCULT BLOOD TESTING FOR ADULTS > 40 Y		
Effect of patients' anxiety	1.0	0.8-1.4
Effect of patients' expectations when:		
• Physicians perceive test as recommended	1.1	0.5-2.4
• Physicians perceive test as not recommended or unclear	2.4*	1.7-3.4
Effect of physicians' perception that test is recommended when:		
• Expectation is present	3.3*	1.6-6.6
• Expectation is absent	7.2*	3.6-14.4
DECISION TO ORDER COLONOSCOPY FOR ADULTS > 40 YRS		
Effect of patients' anxiety	1	0.8-1.4
Effect of patients' expectations when:		
• Physicians perceive test as recommended	0.7	0.3-1.5
• Physicians perceive test as not recommended or unclear	2.2*	1.6-3.0
Effect of physicians' perception that test is recommended when:		
• Expectation is present	1.1	0.4-3.5
• Expectation is absent	3.5*	1.1-10.7

*P < .05.

test, but acted most powerfully on the screening decisions of physicians whose clinical judgment would otherwise make them least inclined to order

the test. Our vignette design did not permit us to show whether an expectation of not being screened would lower the likelihood of test ordering by physicians who believe that the test is recommended, but a modifying effect in that direction is possible.¹⁴

Our model of decision making in cancer screening underlines the fact that there are more than just cognitive processes at work.⁹ Although our study focused on cancer screening decisions, other studies have shown that patients' expectations and anxiety are predictors of physicians' prescribing and referral.¹⁴⁻¹⁶ Family physicians' responsiveness to patients' anxiety and expectations around cancer screening is unsurprising given the emphasis on patient-centred care in family medicine training. This study illustrates how patient-centred medicine and evidence-based medicine converge in clinical practice as patients and doctors find common ground. The patient-centred approach itself becomes an important source of practice variation as physicians respond to each patient's unique experience of illness.^{17,18}

Physicians find it demanding to cope with patient requests for care, however, especially for diagnostic tests.¹⁹ Patient-driven decisions do not always result in optimal care for patients or for society, and thus pose a dilemma for physicians.¹⁸ Qualitative research, including ours,⁹ points to the difficulties physicians face when patients' expectations conflict with their clinical judgment. It takes time to explain the complexities of scientific evidence, and in the end, the evidence might not be convincing to patients—especially when risks and benefits are accrued at a population level rather than at an individual level.²⁰

When patients' expectations conflict with clinical judgment, physicians also run the risk of jeopardizing their relationships with patients. In a qualitative study concerning prescribing antibiotics for colds, Butler and colleagues²¹ found that physicians acquiesce to

patients' expectations against their better judgment on what they perceive as minor issues, as a means of preserving and building relationships for leverage on more important issues. The same study also found that patients who have good relationships with their physicians are more accepting of physicians' personal views.

As patients increasingly form their perceptions of risk of disease and efficacy of tests from information in the media, on the Internet, and in direct-to-consumer advertising, physicians need to be trained to respond to their patients' expectations. One strategy might be to elicit explicitly patients' expectations rather than inferring them. Often what is perceived to be a treatment expectation is, in fact, an expectation of information, reassurance, or symptom management.^{21,22} Physicians might overestimate expectations. In a study of antibiotic prescribing for otitis media, physicians perceived an expectation for antibiotics in 73% of clinical encounters, whereas only 2% of patients reported requesting antibiotics.²³ Audiotape analysis of visits found that patients made direct requests of physicians in 22% of visits and asked specifically for diagnostic tests in 8% of visits.¹⁹

We did not find differences between urban and rural physicians' decisions to order screening tests. This is surprising because other studies have found that contextual factors independently influence physicians' practice patterns.^{1,24,25} Our finding could reflect the limitations of our case vignettes. Vignettes are as valid and reliable as standardized patients and more accurate than chart review in evaluating quality of care,²⁶ but they probably do not reflect fully the complexity of considerations that physicians face in real clinical situations. We believe that the magnitude of odds ratios are underestimated by using clinical vignettes because we represented the patient factors by dichotomous situations, when actual encounters would have a much greater range.

CONCLUSION

This study underlines the importance of nonmedical factors in physicians' decisions about cancer screening when guidelines are equivocal or

conflicting. In the face of professional uncertainty, physicians make decisions by believing one side of the evidence base or the other and by giving serious consideration to patients' anxiety and expectations of clinical care. ❁

Contributors

Dr Haggerty participated in conception and design of the questionnaire and in the strategy for data collection, analyzed the data, and helped to interpret results. She drafted the initial version of the article and integrated the feedback from co-authors. All the other authors critically revised all versions of the article. **Dr Tudiver** led the conception and design of the research proposal, helped lead the analysis that supported the conceptual framework for the survey, led the conception and design of the questionnaire, and helped design the analytic strategy and interpret results. **Dr Brown** participated in conception and design of the study and helped lead the analysis that developed the conceptual framework for the survey. She participated in conception and design of the questionnaire, especially the case vignettes, and in interpreting results. **Dr Herbert** participated in conception and design of the study and of the questionnaire, especially the case vignettes. She participated in interpreting results. **Dr Ciampi** participated in conception and design of the study and led the planning of analytic strategy for the survey, thus contributing to the design of the questionnaire. He consulted closely on the analysis and participated in interpreting results. **Dr Guibert** participated in conception and design of the research proposal and of the questionnaire, especially design of the case vignettes; he helped develop the analytic strategy and interpret results.

Competing interests

None declared

Correspondence to: Jeannie Haggerty, PHD, Centre de recherche de l'Hôpital Charles Lemoyne, 3120 boul Taschereau Greenfield Park, Longueuil, QC J4V 2H1; telephone (450) 466-5000, extension 3682; fax (450) 651-6589; e-mail jeannie.haggerty@usherbrooke.ca

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