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The nexus of evidence, context, and patient preferences in primary care: postal survey of Canadian family physicians

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Abstract

Background: Evidence-based medicine is gaining prominence in primary care. This study sought to examine the relationships among family physicians' attitudes toward EBM, contextual factors, and clinical decision-making and to investigate the factors that contribute to 'contrary to evidence' clinical decisions.

Methods: A postal survey mailed to a random sample of Canadian family physicians, stratified by age, gender, and practice setting. The main outcome measures were respondents' attitudes toward evidence-based medicine and preferred treatment option in four simulated clinical scenarios with wording randomly varied.

Results: Canadian family physicians report positive attitudes toward EBM, believe that EBM improves patient care, and agree that research findings are useful in the day-to-day management of patients. The scenario study showed that physicians were strongly influenced by a patient demanding/requesting either a screening test (adjusted Odds Ratio [OR] 5.15, 95% confidence interval [CI] 2.9 to 9.2 for demand mammogram; adjusted OR 3.11, 95% CI 1.7 to 5.6 for request mammogram) or a diagnostic test (adjusted OR 3.95, 95% CI 2.1 to 7.5 for demand lumbar spine x-ray; adjusted OR 2.08, 95% CI 1.1 to 4.1 for request x-ray). This relationship did not hold for the treatment scenario (prescribing antibiotics for acute bronchitis) where hours of practice (adjusted OR 3.5, 95% CI 1.1 to 11.7 for 50+ hours practice; adjusted OR 1.79, 95% CI 1.0 to 3.2 for 20–49 hours practice) and type of practice (adjusted OR 2.22, 95% CI 1.3 to 3.7 for solo practice) were significant. 80% of respondents reported teaching breast self-examination with female physicians twice as likely as males (adjusted OR 2.11, 95% CI 1.2 to 3.8).

Conclusions: Canadian family physicians are favourably disposed to the precepts of evidence-based medicine; however, patient expectations and practice characteristics can influence physicians such that decisions are taken that are broadly contrary to evidence. Recently revised models of EBM emphasizing the importance of patient preferences and the clinical context appear to reflect more accurately the clinical reality of primary care physicians.

Background

Ten years after its debut, evidence-based medicine (EBM), though still controversial, has become an accepted and integral component of health care practice [1]. Despite its widespread dissemination and adoption, however, the impact of EBM in primary care is decidedly complex [2,3] and remains poorly understood [4], especially regarding the interaction of research evidence with the myriad contextual factors that characterize the primary care setting.

One such factor, the doctor-patient relationship, is increasingly recognized as fundamental to the provision of quality primary care services. The focus of a number of current health policy efforts such as the "concordance initiative" [5] and the "expert patient programme" [6] attest to this fact. Likewise, in the arena of health care research, there is continuing development of theoretical models explicating the complex, multi-faceted nature of the doctor-patient relationship. A substantial and growing body of literature emphasizes the significant (often under-estimated) influence of various patient- and physician-related factors on clinical decision-making in primary care [7–9].

Despite this progress, however, the long-running debate regarding the feasibility and suitability of implementing an evidence-based approach in primary care rages on. Indeed, there is increasing concern that the central assumptions of the EBM movement are at odds with the core principles of primary care [10], particularly that of patient choice [11,12]. To our knowledge, there have been no published studies reporting statistical modelling of the association of attitudinal and contextual factors with the clinical decision-making of primary care providers. Thus, the specific objectives of this study were: a) to examine the relationships among physician attitudes toward EBM, contextual factors, and clinical decision-making in primary care; and b) to investigate the factors that contribute to 'contrary to evidence' clinical decisions.

Methods

Participants and setting

This paper reports on the quantitative component of a larger multi-methods research project based in the Primary Care Research Unit at Sunnybrook & Women's College Health Sciences Centre in Toronto, Canada. (The qualitative component has been published separately [13]). In the spring of 2002 we conducted a cross-sectional postal survey of primary care physicians across Canada. The sampling frame, which was provided by the College of Family Physicians of Canada (CFPC), comprised a computer-generated random list of 1134 family physicians. The inclusion criteria required that the physician be a Certificant of the College of Family Physicians (CCFP) and in active practice at the time of study. The sample was stratified to reflect the age, gender, and rural/urban composition of the CFPC membership (n = 15,000). The study was approved by the Research Ethics Board of the University of Toronto.

Survey instrument

The survey instrument, which was pilot-tested with physicians and health services researchers, was a 4-page pencil-and-paper questionnaire with four main sections. The first section comprised 10 Likert-type items measuring physicians' attitudes toward the practice of EBM in primary care. These 10 items were adapted from a British postal survey of general practitioners [14], whereas the remainder of the questionnaire was developed by the authors for the purposes of the present study. The second section listed a number of contextual factors, such as co-morbidity and the prestige of the patient in the community, for which respondents indicate the likelihood that each would influence their decision to prescribe a particular diagnostic test or treatment. In the third section, respondents were presented with a forced-choice option in four simulated clinical scenarios/case vignettes (see Additional File 1 - Clinical Scenarios). Three versions of each scenario were written such that the patient variously "wondered about," "requested," or "demanded" the test/treatment in question; the mailing was counterbalanced with one-third of the target sample randomly receiving each of the three versions. The final section of the questionnaire asked respondents to supply typical demographic information.

Data collection and analysis

In order to ensure stable estimates in multiple regression analysis, a minimum of 15 data points per predictor is preferred [15]. Assuming a response rate of approximately 50%, we estimated that no fewer than 400 completed questionnaires would be required. On this basis, the initial survey package was mailed to a total of 1134 family physicians. Along with the questionnaire, the package contained a personalized cover letter, a stamped return envelope, and a reply postcard. (The inclusion of the latter was necessitated by the fact that no identifying marks appeared on the questionnaire itself; the reply postcards were to be returned separately from the questionnaire in order to indicate intentions regarding participation in the study.) Non-respondents were sent postcard reminders at 4 weeks and again at 8 weeks. At 12 weeks, residual non-respondents received a second letter accompanied by a replacement copy of the questionnaire. Data were entered into a spreadsheet for statistical analysis using SAS 8.2.

Results

There were 97 deletions from the 1134 in the original target sample: 63 were not practicing family medicine, 23 had moved (incorrect mailing address), and 11 were retired or on leave of absence. Of the remaining 1037 questionnaires, a total of 431 (42%) were completed and

Table 1: Comparison of achieved sample to target sample.

	Achieved sample* (n = 431)	Target sample (n = 1037)	P value of difference
Age group:			0.3701
25–39 years	157 (36)	417 (40)	
40–54 years	186 (43)	429 (41)	
55+ years	88 (20)	191 (18)	
Gender:			0.1989
Male	224 (52)	502 (48)	
Female	206 (48)	535 (52)	
Practice setting:			0.7692
Urban	271 (63)	665 (64)	
Rural	157 (37)	372 (36)	

* Some surveys were returned with missing data. Percentages may not sum to 100 due to rounding. Values are numbers (percentages) of respondents unless otherwise indicated.

Table 2: Demographic profile of survey respondents.

	Gender		
	Female	Male	Total
Personal Characteristics			
Age group:			
25–39 years	94 (60)	63 (40)	157 (37)
40–54 years	102 (55)	83 (45)	185 (43)
55+ years	10 (11)	78 (89)	88 (21)
Total	206 (48)	224 (52)	430 (100)
Years in clinical practice:			
<5 years	56 (64)	32 (36)	88 (21)
5–14 years	72 (57)	55 (43)	127 (30)
15–24 years	58 (53)	52 (47)	110 (26)
25+ years	18 (17)	85 (83)	103 (24)
Total	204 (48)	224 (52)	428 (100)
Practice Characteristics			
Hours/week seeing patients:			
0–19 hours	19 (54)	16 (46)	35 (8)
20–49 hours	154 (52)	141 (48)	295 (69)
50+ hours	33 (34)	65 (66)	98 (23)
Total	206 (48)	222 (52)	428 (100)
Practice setting:			
Urban	110 (41)	160 (59)	270 (63)
Rural	95 (60)	62 (40)	157 (37)
Total	205 (48)	222 (52)	427 (100)
Type of practice:			
Solo	60 (49)	63 (51)	123 (29)
Group	142 (47)	159 (53)	301 (71)
Total	202 (48)	222 (52)	424 (100)
Internet access at office:			
Yes	116 (47)	130 (53)	246 (58)
No	88 (49)	92 (51)	180 (42)
Total	204 (48)	222 (52)	426 (100)

Percentages may not sum to 100 due to rounding. Values are numbers (percentages) of respondents.

Table 3: Physician attitudes toward evidence-based medicine.

Survey item	Very Positive	Positive	Neutral	Negative	Very Negative
How would you describe your attitude towards the current promotion of EBM?	102 (24)	267 (62)	47 (11)	13 (3)	2 (0)
How would you describe the attitude of most of your colleagues towards EBM?	22 (5)	275 (65)	104 (25)	19 (5)	1 (0)
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
The practice of evidence-based medicine improves patient care.	95 (22)	290 (68)	38 (9)	4 (1)	1 (0)
Research findings are useful in the day-to-day management of my patients.	66 (15)	313 (73)	40 (9)	6 (1)	3 (1)
EBM is of limited value in general practice because much of primary care lacks a scientific base.	2 (1)	44 (10)	82 (19)	242 (57)	58 (14)
The adoption of EBM, however worthwhile as an idea, places too great of a demand on my practice.	10 (2)	72 (17)	127 (30)	195 (45)	25 (6)
Consultations on weekends or after-hours can encourage a non-evidence-based treatment or test.	6 (1)	130 (30)	142 (33)	136 (32)	15 (4)
Limited resources encourage non-evidence-based treatment.	34 (8)	213 (50)	87 (20)	88 (21)	8 (2)
The patient profile of my practice does not match the available evidence.	6 (1)	29 (7)	128 (31)	219 (52)	38 (9)
	20%	**40%**	**60%**	**80%**	**100%**
Overall, at present, what percentage of your clinical practice do you consider to be evidence-based?	23 (6)	113 (27)	177 (43)	96 (23)	3 (1)

Values are numbers (percentages) of respondents.

Table 4: Adjusted odds ratios with 95% confidence intervals (95% CI) for offering test/treatment in four clinical scenarios

	Adjusted odds ratio* (95% CI)	P value
CLINICAL SCENARIO 1		
Patient expectation:		
Wonders about mammography	1.00+	
Requests mammography	3.11 (1.72 to 5.64)	<.001
Demands mammography	5.15 (2.87 to 9.23)	<.0001
CLINICAL SCENARIO 2		
Patient expectation:		
Wonders about x-ray	1.00+	
Requests x-ray	2.08 (1.06 to 4.09)	<.0001
Demands x-ray	3.95 (2.07 to 7.54)	<.0001
CLINICAL SCENARIO 3		
Patient expectation:		
Wonders about antibiotics	1.00+	
Requests antibiotics	0.89 (0.49 to 1.63)	0.71 NS
Demands antibiotics	1.51 (0.84 to 2.70)	0.17 NS
Type of practice:		
Group	1.00+	
Solo	2.22 (1.35 to 3.65)	<.001
Hours/week seeing patients:		
0–19 hours	1.00+	
20–49 hours	1.79 (1.02 to 3.15)	<.05
50+ hours	3.52 (1.06 to 11.70)	<.05
CLINICAL SCENARIO 4		
Physician gender:		
Male	1.00+	
Female	2.11 (1.19 to 3.76)	<.01

* Adjusted for physician age, gender, hours/week seeing patients, practice setting, type of practice, Internet access, patient expectation, and self-identification with EBM. + Used as baseline comparison.

returned. Table 1 compares characteristics of the achieved sample with the target sample; chi-squared (χ^2) tests indicated no significant differences between the two groups. A demographic profile of survey respondents is presented in Table 2. The median year of graduation from medical school was 1985; the mean number of years in clinical practice was 15.6 years. On average, respondents spend 38.2 hours per week seeing patients (both the median and modal response were 40 hours per week).

Table 3 presents our findings related to physician attitudes toward EBM. The overwhelming majority of respondents (86%) expressed a positive outlook on the current promotion of EBM; somewhat fewer (70%) rated their colleagues as positive. Fully 90% agreed that the practice of EBM improves patient care, and nearly as many (88%) agreed that research findings are useful in the day-to-day management of patients. While almost 75% of respondents rejected the notion that EBM is of limited value in primary care, only half disagreed with the statement "The adoption of EBM, however worthwhile as an idea, places too great of a demand on my practice." Finally, the median value for the percentage of respondents' clinical practice considered to be evidence-based was 60%.

With regard to the four clinical scenarios, the observed distribution of responses is as follows: in Scenario 1, 37% (n = 152) of respondents would offer screening mammography; in Scenario 2, 23% (n = 99) would order an x-ray of the lumbar spine; 25% (n = 104) would prescribe antibiotics for the bronchitis patient in Scenario 3; and finally, 80% (n = 341) of respondents reported that they currently teach breast self-examination (BSE) to their female patients.

We performed logistic regression analyses to investigate potential factors influencing the decision-making of family physicians responding to the clinical scenarios. Four factors were significant: patient expectations, physician gender, type of practice (solo versus group), and hours per week seeing patients. Table 4 presents the adjusted odds ratios for preferred treatment options associated with these four factors. Respondents who received versions of Scenario 1 in which the patient was either 'requesting' or 'demanding' a screening mammography (as opposed to simply 'wondering' about it) were significantly more likely to offer the screening. Likewise, in Scenario 2, the odds ratio was raised significantly when the patient either 'requested' or 'demanded' an x-ray of the lumbar spine. By contrast, in Scenario 3, the odds ratio was not raised significantly when the patient 'requested' or 'demanded' antibiotics for her bronchitis; in this case, the odds of antibiotics being prescribed were significantly increased for physicians in solo practice and for those reporting higher number of hours per week seeing patients. Finally, in Scenario 4, female family physicians were significantly more likely to report teaching BSE than were their male counterparts.

Discussion

The results of this national survey indicate that the great majority of Canadian primary care physicians hold positive attitudes toward EBM and its application in family medicine. At the same time, however, there is evidence that a sizeable proportion of these physicians make clinical decisions that could be regarded as contrary to evidence and that such decisions are influenced by patient expectations and practice characteristics. Taken together, these findings, while underscoring the complexity of the doctor-patient relationship, further suggest the presence of a disconnect between physician attitudes and day-to-day clinical practice.

We believe these to be the first published data to report on the relationships among physicians' attitudes toward EBM, contextual factors, and clinical decision-making. The strengths of this study are its national scope and a representative sample stratified for age, gender, and rural/urban split. Our final response rate of 42% is somewhat low. While non-response is an important potential source of bias in survey research, a low response rate does *not necessarily* degrade the validity of the data [16]. Sampling bias can be predicted, tested for, and corrected [17]. Evaluation research suggests that representative samples can be achieved without a high response rate; moreover, high response rates are considered less important for homogeneous samples responding as members of a professional group on matters of concern to them (such as with physicians surveyed on medical care issues) than for heterogeneous samples responding as individuals [18]. Present concerns regarding sampling bias and low external validity should be assuaged by the fact that our achieved sample does not differ significantly from the target sample on important demographic factors (age, gender, and practice setting); however, the possibility remains that non-respondents could differ from respondents in other respects, such as degree of reflexivity in clinical practice, model of medical training program, etc. This notwithstanding, we maintain that we achieved a random sample of a random sample and therefore that these results are representative of family physicians in Canada.

We acknowledge that the clinical case vignette/simulated scenario cannot capture the breadth and complexity of actual physician behaviour. At the same time, however, the validity of this method has been demonstrated in a recent comparative evaluation study, in which the authors concluded: "Vignettes appear to be a valid and comprehensive method that directly focuses on the process of care provided in actual clinical practice" [19]. Moreover,

the myriad associated advantages of the clinical vignette – convenience, low cost, absence of observer effect, ease of variable manipulation – contribute to its continuing widespread use as a data collection tool [20].

Our finding that Canadian family physicians hold positive attitudes toward the promotion of EBM in primary care is consistent with the findings of similar surveys in the United Kingdom [14] and Saudi Arabia [21], both of which used a similar survey instrument to that employed in the present study. The median value for the estimated percentage of respondents' clinical practice that is considered to be evidence-based was 60%, which falls midway between the finding of 50% in the UK [14] and the 68% reported for Saudi Arabia [21].

Despite the highly favourable attitudes toward EBM, fully one-third of respondents rated their clinical practice to be only 20%-40% evidence-based. Moreover, as indicated by the responses to our four clinical scenarios, a sizeable proportion of family physicians appear to make clinical decisions that could be considered contrary to evidence. The data also show that the clinical decision-making of family physicians is strongly impacted by contextual factors such as patient expectations, thereby lending support to the findings of the qualitative component of our project which indicated that patient factors exert a powerful influence on physician behaviour and can serve as trumps to research evidence [13].

In Scenarios 1 and 2, patients who requested or demanded the screening/diagnostic test were significantly more likely to receive it, indicating that patient expectations profoundly influence clinical decisions and can result in decisions potentially at odds with research evidence. The salience of patient factors has been previously demonstrated in a number of studies examining the doctor-patient relationship [7–9]. That patient values and expectations so powerfully affect clinician behaviour has tremendous implications given that patient views are shaped strongly by forces other than physicians and health care providers, most notably the media [22] and increasingly the internet [23]. As patient views can be manipulated, and may be informed by less than authoritative sources, it is important for family physicians to be conscious of these forces on their practice patterns. Earlier investigations have indicated that physicians' perceptions of patients' expectations are the strongest predictor of prescribing behaviour and that the writing of non-indicated prescriptions is primarily associated with the physician's sense of feeling pressured [24,25]. Further research is required to understand why family physicians acquiesce in the face of patient expectations that could be regarded as contrary to evidence. Given that the management of competing pressures – patient demands, time constraints, limited resources – is a daily challenge for family physicians, the development of tools to assist clinicians in this regard might prove helpful. As has been noted elsewhere, however, the development of such decision aids is complicated by the presence of conflicting or unclear evidence [22].

Patient expectations did not seem to influence treatment decisions (Scenario 3) as they did with respect to screening and diagnostic decisions (Scenarios 1 and 2). Rather the results suggest that family physicians in solo practice and those reporting higher hours per week seeing patients are significantly more likely to prescribe antibiotics than those in group practice and those reporting lower hours per week seeing patients. This is consistent with prior research that points to a significant relationship between certain practice characteristics (including number of practice days and number of patients per day) and prescribing behaviour [26].

Surprisingly, despite the downgrading of routine instruction of BSE to a 'Grade D' in 2001 [27], the results for Scenario 4 show that most primary care physicians in Canada report still teaching BSE to their female patients. This finding is strikingly at odds with the self-perception of these family physicians as being influenced by and adherent to the precepts of EBM. We do not believe that this finding can be explained by clinicians simply not knowing of the evidence. A recent study of Canadian family physicians indicated that while the great majority (89%) are aware of the new BSE recommendations, very few (16%) have changed their usual practice of routinely teaching BSE [28]. We know that research evidence does not often readily translate into changed patient management [29,30]; indeed, primary care physicians are often reluctant to change their practice in light of new evidence, especially on the basis of a single study [4]. With respect to BSE, physicians may believe that this new evidence (i.e., the Grade D recommendation) is not credible, not applicable to their patients, and/or in need of either supporting evidence from additional studies or endorsement from professional organizations. That female family physicians are significantly more likely to teach BSE than males is consistent with prior research on gender differences in practice styles [31–33]; that such a high percentage overall are not adhering to the new BSE recommendations suggests the need for further studies devoted to determining what constitutes credibility in evidence.

Conclusions

The results of this study indicate that Canadian family physicians earnestly believe in the value of research evidence and are extremely receptive to the promotion of EBM in primary care. On the other hand, the clinical context and patient expectations remain tremendously

important factors in the clinical decision-making process of family physicians – to the extent that decisions are taken that are broadly contrary to evidence. Thus, it appears that the reality of clinical practice in primary care is still removed from the goals of EBM; indeed, the present findings strengthen the argument that the central assumptions of EBM may not be compatible with the core principles of primary care [10].

We conclude that this study provides empirical support to recent revisions to the EBM model of clinical decision-making that places increased emphasis on patient preferences and the clinical context [34]. It is important to bear in mind that the present findings do not report on observations of actual clinical behaviour, but rather on physicians' responses to simulated clinical scenarios, which do not by any means exhaust the possible ways in which diagnostic and treatment decisions can be influenced by patient expectations and other contextual factors. The results do, however, raise a number of important issues that require further consideration by the medical profession.

Competing interests
None declared.

Authors' contributions
REGU initiated and designed the study and is guarantor. CST co-ordinated the survey mail-out and the data entry process. RM performed the statistical analysis of the data. CST prepared the first draft of the manuscript. All authors participated in editing and revising the paper and all have read and approved the final version.

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References
1. Tonelli MR: **The limits of evidence-based medicine.** *Respir Care* 2001, **46:**1435-40.
2. Rosser WW: **Application of evidence from randomised controlled trials to general practice.** *Lancet* 1999, **353:**661-4.
3. Freeman AC and Sweeney K: **Why general practitioners do not implement evidence: qualitative study.** *BMJ* 2001, **323:**1100-2.
4. Putnam W, Twohig PL, Burge FI, Jackson LA and Cox JL: **A qualitative study of evidence in primary care: what the practitioners are saying.** *CMAJ* 2002, **166:**1525-30.
5. Royal Pharmaceutical Society of Great Britain: **From compliance to concordance: Achieving shared goals in medicine taking.** [http://www.concordance.org].
6. UK Department of Health: **The expert patient: A new approach to chronic disease management for the 21st century.** [http://www.doh.gov.uk/healthinequalities/ep_report.pdf].
7. Lings P, Evans P, Seamark D, Seamark C, Sweeney K, Dixon M and Gray D: **The doctor-patient relationship in US primary care.** *J R Soc Med* 2003, **96:**180-84.
8. Tudiver F, Guibert R, Haggerty J, Ciampi A, Medved W, Brown J, Herbert C, Katz A, Ritvo P, Grant B, Goel V, Smith P, O'Beirne M, Williams J and Moliner P: **What influences family physicians' cancer screening decisions when practice guidelines are unclear or conflicting?** *J Fam Pract* 2002, **51:**760.
9. Stewart M, Brown J, Weston W, McWhinney I, McWilliam C and Freeman T: **.** *Patient-centered medicine: Transforming the clinical method* 2nd edition. *Oxford, UK: Radcliffe Medical Press*; 2003.
10. Tomlin Z, Humphrey C and Rogers S: **General practitioners' perceptions of effective health care.** *BMJ* 1999, **318:**1532-5.
11. Howitt A and Armstrong D: **Implementing evidence based medicine in general practice: audit and qualitative study of antithrombotic treatment for atrial fibrillation.** *BMJ* 1999, **318:**1324-7.
12. Rogers WA: **Evidence-based medicine in practice: limiting or facilitating patient choice?** *Health Expect* 2002, **5:**95-103.
13. Tracy C, Dantas G and Upshur R: **Evidence-based medicine in primary care: qualitative study of family physicians.** *BMC Fam Pract* 2003, **4:**6.
14. McColl A, Smith H, White P and Field J: **General practitioner's perceptions of the route to evidence based medicine: a questionnaire survey.** *BMJ* 1998, **316:**361-5.
15. Stevens J: **.** *Applied Multivariate Statistics for the Social Sciences Mahwah, NJ: Lawrence Erlbaum Associates*; 2002.
16. Templeton L, Deehan A, Taylor C, Drummond C and Strang J: **Surveying general practitioners: does a low response rate matter?** *Br J Gen Pract* 1997, **47:**91-4.
17. Barclay S, Todd C, Finlay I, Grande G and Wyatt P: **Not another questionnaire! Maximizing the response rate, predicting non- response and assessing non-response bias in postal questionnaire studies of GPs.** *Fam Pract* 2002, **19:**105-11.
18. Sobal J and Ferentz K: **Comparing physicians' responses to the first and second mailings of a questionnaire.** *Eval Health Prof* 1989, **12:**329-39.
19. Peabody J, Luck J, Glassman P, Dresselhaus T and Lee M: **Comparison of vignettes, standardized patients, and chart abstraction: a prospective validation study of 3 methods for measuring quality.** *JAMA* 2000, **283:**1715-22.
20. Hughes R and Huby M: **The application of vignettes in social and nursing research.** *J Adv Nurs* 2002, **37:**382-86.
21. Al-Ansary LA and Khoja TA: **The place of evidence-based medicine among primary health care physicians in Riyadh region, Saudi Arabia.** *Fam Pract* 2002, **19:**537-42.
22. Tudiver F, Brown J, Medved W, Herbert C, Ritvo P, Guibert R, Haggerty J, Goel V, Smith P, O'Beirne M, Katz A, Moliner P, Ciampi A and Williams J: **Making decisions abouat cancer screening when the guidelines are unclear or conflicting.** *J Fam Pract* 2001, **50:**682-87.
23. Huang Q: **Creating informed consumers and achieving shared decision making.** *Aust Fam Physician* 2003, **32:**335-41.
24. Macfarlane J, Holmes W, Macfarlane R and Britten N: **Influence of patients' expectations on antibiotic management of acute lower respiratory tract illness in general practice: questionnaire study.** *BMJ* 1997, **315:**1211-4.
25. Britten N and Ukoumunne O: **The influence of patients' hopes of receiving a prescription on doctors' perceptions and the decision to prescribe: a questionnaire survey.** *BMJ* 1997, **315:**1506-10.

26. Davidson W, Molloy DW, Somers G and Bedard M: **Relation between physician characteristics and prescribing for elderly people in New Brunswick.** *CMAJ* 1994, **150:**917-21.
27. Baxter N: **Preventive health care, 2001 update: should women be routinely taught breast self-examination to screen for breast cancer?** *CMAJ* 2001, **164:**1837-46.
28. Del Giudice L, Tannenbaum D and Goodwin P: **Physicians' practice and attitudes towards breast self-examination.** *Paper presented at Trillium Primary Care Research Conference, Toronto, Canada* . June 14, 2002
29. Oswald N and Bateman H: **Treating individuals according to evidence: why do primary care practitioners do what they do?** *J Eval Clin Pract* 2000, **6:**139-48.
30. Cranney M, Warren E, Barton S, Gardner K and Walley T: **Why do GPs not implement evidence-based guidelines? A descriptive study.** *Fam Pract* 2001, **18:**359-63.
31. Bensing JM, van den Brink-Muinen A and de Bakker DH: **Gender differences in practice style: a Dutch study of general practitioners.** *Med Care* 1993, **31:**219-29.
32. Bertakis KD, Helms LJ, Callahan EJ, Azari R and Robbins JA: **The influence of gender on physician practice style.** *Med Care* 1995, **33:**407-16.
33. Britt H, Bhasale A, Miles DA, Meza A, Sayer GP and Angelis M: **The sex of the general practitioner: a comparison of characteristics, patients, and medical conditions managed.** *Med Care* 1996, **34:**403-15.
34. Haynes RB, Devereaux PJ and Guyatt GH: **Physicians' and patients' choices in evidence based practice.** *BMJ* 2002, **324:**1350.

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