

# How are family physicians managing osteoporosis?

## *Qualitative study of their experiences and educational needs*

Susan B. Jaglal, PHD June Carroll, MD, CCFP Gillian Hawker, MD, MSC, FRCPC  
 Warren J. McIsaac, MD, MSC, CCFP Liisa Jaakkimainen, MD, CCFP Suzanne M. Cadarette, MSC  
 Cathy Cameron, MHSC Dave Davis, MD, CCFP, LMCC

### ABSTRACT

**OBJECTIVE** To explore family physicians' experiences and perceptions of osteoporosis and to identify their educational needs in this area.

**DESIGN** Qualitative study using focus groups.

**SETTING** Four Ontario sites: one each in Thunder Bay and Timmins, and two in Toronto, chosen to represent a range of practice sizes, populations, locations, and use of bone densitometry.

**PARTICIPANTS** Thirty-two FPs participated in four focus groups. Physicians were identified by investigators or local contacts to provide maximum variation sampling.

**METHOD** Focus groups using a semistructured interview guide were audiotaped and transcribed. The constant comparative method of data analysis was used to identify key words and concepts until saturation of themes was reached.

**MAIN FINDINGS** Family physicians order bone densitometry and try to manage osteoporosis appropriately, but lack a rationale for testing and are confused about management. Participants' main concern was clinical management, followed by disease prevention and their educational needs.

**CONCLUSION** Family physicians are confused about how to manage osteoporosis. To reduce the burden of illness due to osteoporosis, educational interventions should be tailored to family physicians' needs.

### RÉSUMÉ

**OBJECTIF** Préciser la perception qu'ont les médecins de famille (MF) de l'ostéoporose, l'expérience qu'ils en ont et leurs besoins de formation en ce domaine.

**TYPE D'ÉTUDE** Étude qualitative au moyen de groupes de discussion.

**CONTEXTE** Quatre endroits de l'Ontario : un à Thunder Bay, un à Timmins et deux à Toronto, de façon à représenter une diversité de volumes de pratique, de populations, de sites et d'utilisation de l'ostéodensitométrie.

**PARTICIPANTS** Trente-deux MF ont participé à quatre groupes de discussion. Les médecins ont été choisis par les chercheurs ou leurs contacts locaux de façon à constituer l'échantillonnage le plus varié possible.

**MÉTHODE** Les groupes ont utilisé un guide des interviews semi-structurés et leurs discussions ont été enregistrées sur ruban magnétique, puis transcrites. La méthode d'analyse des données par comparaison continue a été utilisée pour identifier les mots et concepts clés jusqu'à ce que la saturation des thèmes soit atteinte.

**PRINCIPAUX RÉSULTATS** Les MF prescrivent l'ostéodensitométrie et s'efforcent de traiter adéquatement l'ostéoporose, mais ils connaissent mal les indications de l'examen et sont dans l'incertitude quant au traitement. Le traitement du malade était la principale préoccupation des participants, suivie de la prévention de la maladie et des besoins de formation.

**CONCLUSION** Les MF sont dans l'incertitude quant au traitement de l'ostéoporose. Pour réduire les conséquences cliniques de cette maladie, les outils de formation devraient être adaptés aux besoins des MF.

*This article has been peer reviewed.*

*Cet article a fait l'objet d'une évaluation externe.*

*Can Fam Physician 2003;49:462-468.*

**I**nterest in osteoporosis has increased dramatically among family physicians (FPs) and patients in recent years due to the increased availability of treatments and public awareness of osteoporosis as a health issue. Analysis of health insurance data in Ontario revealed that the number of bone mineral density (BMD) tests increased sevenfold between 1992 and 1999; 302 721 tests were billed in 1999.<sup>1,2</sup>

Family physicians' role in managing osteoporosis has also increased considerably. The proportion of BMD scans ordered by FPs increased from 47.3% in 1992 to 80.1% in 2000, marking a shift from specialist to primary care. Whether this shift has translated into better prevention of osteoporotic fractures is unknown, and some are concerned about the costs and quality of osteoporosis care.<sup>3,4</sup>

One approach to improving medical practice is effective implementation of evidence-based clinical practice guidelines, which could improve both process of care and patient outcomes.<sup>5</sup> Several guidelines on management of osteoporosis have been published.<sup>6-10</sup> A recent systematic review found that passive distribution of educational materials had only small effects of unknown clinical importance.<sup>11</sup> Printed materials might be necessary to transmit knowledge, but they are probably insufficient to change practice. Despite this, most guidelines have been disseminated through journals, printed educational materials, and

**Dr Jaglal** is an Assistant Professor in the Departments of Rehabilitation Science and Health Policy, Management, and Evaluation at the University of Toronto (U of T) in Ontario; at the Institute for Clinical Evaluative Sciences (ICES); and in the Osteoporosis Research Program at Sunnybrook and Women's College Health Science Centre (SWCHSC). **Dr Carroll** and **Dr McIsaac** are Assistant Professors in the Department of Family and Community Medicine at U of T and Mount Sinai Hospital Family Medicine Centre. **Dr Hawker** is an Associate Professor in the Departments of Medicine and Health Policy, Management, and Evaluation at U of T and in the Osteoporosis Research Program at SWCHSC and is a researcher at ICES. **Dr Jaakkimainen** is a researcher at ICES and in the Department of Family and Community Medicine at U of T. **Ms Cadarette** is a student in the Department of Health Policy, Management, and Evaluation at U of T and in the Osteoporosis Research Program at SWCHSC. **Ms Cameron** is a researcher in the Osteoporosis Research Program at SWCHSC. **Dr Davis** is Director of the Knowledge Translation Program in the Faculty of Medicine at U of T.

continuing education conferences and workshops, which have consistently been shown not to change behaviour.<sup>12</sup> We need to consider the nature of the information, the characteristics and beliefs of the physicians to whom it is directed, and environmental factors that could facilitate or impede its adoption to create clinical practice guidelines or other educational material that will bring about improved performance and health care outcomes.<sup>13</sup>

This study is part of a program to develop and evaluate dissemination and implementation strategies for improving management of osteoporosis in family practice. Its purpose was to explore the experiences, perceptions, and opinions of family physicians about osteoporosis and to identify the kind of information they need.

## METHODS

A qualitative approach was chosen to explore factors influencing decision making about diagnosis and management of osteoporosis and information needs in these areas. The University of Toronto's Research Ethics Board approved the study.

Focus groups of eight to 10 FPs were conducted across Ontario. Communities selected were of various sizes and had various levels of bone densitometry use (two had high use, one medium, and one low).<sup>2</sup> Purposive sampling of community physicians was used to identify participants. At each location, a physician known to members of the research team was contacted and asked to identify local FPs who would represent a range of practice experiences and various patient populations. The study team sent a letter to these FPs inviting them to respond if they were interested in participating in a focus group.

Focus groups were conducted in the communities where the physicians practised to facilitate participation, and participants received honoraria. Participation was voluntary; sessions lasted less than 2 hours. All prospective participants were mailed a package in advance containing a study information sheet, consent form, participant demographic survey, and description of the focus group process. Participants received confirmation letters and telephone contact a week before each scheduled focus group to maximize attendance.<sup>14</sup> All focus groups were moderated by the research coordinator, who was experienced in conducting focus groups.<sup>14</sup> Each focus group used a "funnel approach" starting with broad open-ended questions, then focusing on more specific issues.<sup>14</sup>

## RESEARCH

### How are family physicians managing osteoporosis?

Focus groups were audiotaped with permission of participants and transcribed verbatim. The moderator took field notes to be used in the analysis. Investigators met following the first focus group to discuss emerging themes and concepts to be pursued in subsequent groups. After each focus group, the investigators reviewed the transcripts independently to identify key words, phrases, and concepts used by participants. The investigators then met to compare and combine their independent analyses. Eight focus groups were planned, but after four, saturation of ideas and suggestions was reached. The next phase involved determining similarities, differences, and potential connections among the key words, phrases, and concepts within each focus group and between groups. Through this process, themes emerged.

## RESULTS

Four focus groups were conducted with 32 FPs (12 men and 20 women) between October 12 and November 30, 2000. One was held in Thunder Bay, one in Timmins, and two in Toronto. Participants' average number of years in practice was 14.4 (range 2 to 50). Most physicians (28) did some teaching; 19 practised full time, and 13 practised part time; 23 defined their practice groups as large (more than three physicians), four as small, and five as solo.

The overall finding from the focus groups was that osteoporosis is an evolving area of family medicine in which both family physicians and patients are interested. Physicians are trying to order bone densitometry and manage osteoporosis appropriately, but lack a rationale for ordering these tests and are confused about how to manage this condition. Issues arising from focus groups could be organized into three main themes: specifically clinical management of osteoporosis, dilemmas associated with disease prevention in general, and educational needs and strategies (Table 1).

### Clinical management of osteoporosis

Bone densitometry screening and reporting. Questions were raised about indications for BMD testing, the reliability of the test, and follow up. All participants agreed they were more likely to order bone densitometry for menopausal women than for any other patient group. Results of bone densitometry were used as a baseline but also to assist decision making regarding hormone replacement therapy (HRT). If bone densitometry showed osteopenia or osteoporosis, it "may tip the balance for women to go on hormone replacement therapy."

**Table 1. Summary of themes and issues**

#### CLINICAL MANAGEMENT

Indications for screening or testing  
Repeat testing frequency  
Treatment (who, when, and with what?)  
Appropriate follow up  
Bone densitometry reports need improvement

#### PRACTICE DILEMMAS CONCERNING PREVENTION

Patient requests  
Elderly patients using multiple medications  
Limited time  
Competing demands

#### EDUCATIONAL NEEDS AND STRATEGIES

Need to address gaps in knowledge  
Improve clinical practice guidelines so they are easier to use  
Implement reminders and prompts  
Educate patients to prompt physicians to act

Participants also commented that elderly women tend not to ask for bone densitometry so physicians rarely raise the issue with these women because they "assume they have it [osteoporosis]." Similarly, men are "not thought about" when it comes to osteoporosis.

Participants wanted information on frequency of testing: "How long should follow-up testing be done if osteoporosis is treated?" "How often should you repeat a test if it is normal or shows osteopenia or osteoporosis?" and "How soon should you expect to see a change with treatment?"

Participants said they were not satisfied with bone densitometry reports and "would appreciate a meaningful report from a radiologist—not just a computer report." They said that reports were "too complex" and there were "too many pages" even though relevant information was missing. They would like to see reports containing "interpretation of results," "risk of fracture," the "meaning and clinical relevance of T scores," a comparison to previous results, and recommendations for follow-up testing.

**Treatment.** Participants expressed great confusion about available medications for osteoporosis (Table 2). There was much discussion about when to start treatment and which drugs to use. Some physicians said they were sceptical about the long-term safety of the medications. Another issue was adherence to medications: seniors do not want to take additional drugs because they "tend to be on a

lot of medications already,” but “they may be more willing after they have had a fracture.” Physicians thought the decision about which drug to prescribe is complex and based on many factors: aspects of menopause, history or family history of breast cancer, age, whether patients have drug plans, compliance, and side effects.

---

### **Table 2. Questions and issues raised about treating osteoporosis**

---

What should be first-line prevention?
How should we treat osteopenia?
Is one bisphosphonate better than another?
Are bisphosphonates better than hormone replacement therapy?
When should we start bisphosphonates?
Is there evidence for combining drugs?
Is there evidence that treatment prevents fractures?
Do drugs work equally well for vertebral and femoral sites?
How do you treat older people with osteoporosis, including those in nursing homes?
When should we increase the dose of medication?
What should we do if there is no improvement with therapy or a falling off?
What is the long-term safety of medications?
We need a treatment algorithm
What can be done to improve access to “better” medications if patients cannot afford them and are not covered on drug plans?
We need medications that are easier to take (eg, once daily at any time) and have fewer side effects
Do we treat without knowing bone density scan results?

---

### **Practice dilemmas concerning prevention**

Participants thought osteoporosis was typical of many practice issues facing FPs today when dealing with disease prevention. Patient requests, limited time and competing demands during appointments, and the complex medical conditions of elderly patients complicated preventive care. One physician commented, “Patients are now very aware of health promotion or disease prevention issues.” Another said, “Patients like technology—they want the latest tests,” but it is usually menopausal and perimenopausal women, often not at high risk of osteoporosis, who demand bone densitometry. Participants thought the media drove a lot of inappropriate patient demand.

Participants commented that limited time during visits does not allow physicians to address prevention issues adequately. As one physician said, “There is no time to think about prevention.” These physicians

concurred that “they treat more than just osteoporosis,” that “in reality, osteoporosis is a complex issue,” and that “it is hard to keep up with the current literature.”

Several issues specifically concerned elderly patients. Participants commented on their perceptions of elderly patients’ perspectives on prevention: “They don’t want any more interventions” because they are “already on multiple drugs.” Also, “they are not keen on health promotion” because they are preoccupied with their illnesses. They perceived that elderly people often have “more pressing issues—no time for disease prevention,” and they “don’t raise the issue of osteoporosis unless the patient fractured.”

### **Educational needs and strategies**

Participants discussed clinical practice guidelines, physician reminders, and patient education. They said that clinical practice guidelines should be credible, user-friendly, and up-to-date. They expected guidelines to be evidence-based, unbiased (“not sponsored by companies”), and developed with FPs on the development committee. They wanted FP input into any guideline or program “so it reflects the reality of practice and their type of patient.”

Feedback was not always positive. Cynicism was expressed about fear of litigation because “guidelines set the standards of care.” Some participants were aware of existing clinical practice guidelines for osteoporosis, but none used them because they were too detailed. When asked about information sources, participants cited journals most often. *Canadian Family Physician* and the *Canadian Medical Association Journal* were the most widely read, along with materials produced by the Institute for Clinical Evaluative Sciences. Participants did not use the Internet as a source of information; some did not trust the information on the Internet.

Following discussion of clinical practice guidelines, participants suggested how they would like to receive information to keep them up-to-date on managing osteoporosis. They wanted guidelines to be presented in a format that is “easy, simple, and one page, and could be kept in the office.” Many supported the idea of laminated cards showing a risk score and treatment algorithm for osteoporosis. They would also like to have reminders or prompts. A notable theme that emerged from this discussion was the importance of patient education. They “need the public to be made more aware so [patients] can come in and prompt the physician and then the physician can react.” Patient education material was seen as extremely important

## RESEARCH

### How are family physicians managing osteoporosis?

because "it prompts the physician to act." Participants would like to have pamphlets for patients on bone densitometry, lifestyle factors, and calcium supplementation.

## DISCUSSION

This study identified several issues within three themes: clinical management, practice dilemmas with prevention, and educational needs and strategies. Many issues raised by FPs in our study have been reported in other studies of managing osteoporosis in primary care.

### Bone densitometry

Some studies support our finding that FPs are most likely to discuss screening for osteoporosis with postmenopausal women. A 1998 survey of 1153 general practitioners in England indicated that more than 83% of GPs thought it was important to discuss osteoporosis with patients older than 40.<sup>15</sup> In Wisconsin, Schrage et al<sup>16</sup> interviewed 449 American women aged 18 to 65 years immediately following their health maintenance examinations at eight FP clinics to determine how often osteoporosis prevention was discussed. Such discussions were reported by 35% of women younger than 40, 50% of women in their 40s, 60% in their 50s, and 68% between 60 and 65.

Another consistent theme was that BMD testing initiates discussion. Similarly, some studies have shown that women are more likely to start HRT and initiate other preventive measures for osteoporosis if they are aware that they have low bone mass.<sup>17-24</sup>

### Treatment

In our study, as in others, we found that physicians did not know enough about pharmacologic treatment of osteoporosis. Werner and Vered<sup>25</sup> used a mailed questionnaire to assess the attitudes and practice patterns of 323 Israeli physicians regarding management of osteoporosis. Physicians had relatively little knowledge about adequate dosages of drugs other than estrogen. These findings highlight the fact that physicians' knowledge of appropriate treatment regimens for osteoporosis needs to be increased.

Further support for this comes from a retrospective chart review in a random sample of women aged 51 to 75 years with osteoporosis in 1996 at the Cleveland Clinic Foundation.<sup>26</sup> Researchers found that 73% were taking some form of drug treatment for osteoporosis but that treatment rates differed substantially depending on the specialty of ordering

physicians: 96% for metabolic bone disease specialists, 63% for endocrinologists, 75% for rheumatologists, and 53% for general internists. They hypothesized that the reason for the variation was that general internists, who are largely responsible for preventive care, are less likely to be exposed to education or updates on treatment recommendations for osteoporosis.

### Education and information sources

Many answers to questions about treatment raised by our study participants could be found in the peer-reviewed literature and in various guidelines.<sup>6-10</sup> The types of questions they asked, however, clearly indicated that current methods of disseminating information on treating osteoporosis are inadequate because they have not led to changes in practice. Most articles on new treatments for osteoporosis are published in mainstream medical journals in the United States; in our study, the two most widely read journals were *Canadian Family Physician* and the *Canadian Medical Association Journal*.

Family physicians in England had similar gaps in knowledge. Taylor et al<sup>15</sup> reported that education on osteoporosis for GPs is considered inadequate. When asked what kind of information on osteoporosis they would like, almost 90% of GPs in the North Thames region wanted information on prevention and treatment, 80% on services, and only 64% on research.<sup>15</sup>

Our study participants thought that increasing physicians' knowledge and educating patients about what to ask for and when could lead to improved management of osteoporosis. Studies have commented on patients' requests for bone densitometry.<sup>15,27,28</sup> Sahota et al<sup>27</sup> assessed the criteria for requests for bone densitometry in 413 primary care patients. They reported that most referrals (91%) were for women rather than men, supporting our finding that "men are not thought about." Elderly women were much less likely to be referred for densitometry (52% of those 45 to 64 compared with 28% of those aged 65 and older). Sahota et al<sup>27</sup> reported that, among women 55 to 64 years old, one of the main reasons for the request was patient concern, a consistent theme in our study. A study of 554 women who underwent bone densitometry in 1996 showed that 22% requested the scan.<sup>28</sup>

In addition to education for physicians, an important theme was the need for patient education. A study by Tellier et al<sup>29</sup> highlights the importance of educating patients as well as physicians to increase awareness. They evaluated a 15-year health promotion strategy for osteoporosis.<sup>29</sup> From a population survey of health status in two Belgian cities, 4800

people older than 45 were randomly selected. The medical community and the general population in one city (Liège) received a constant health promotion strategy aimed at increasing awareness of osteoporosis in postmenopausal women. The other city (Aalst) was the control. Self-reporting of osteoporosis prevalence was significantly higher in Liège (10.8%) than in Aalst (4.8%,  $P < .0001$ ), as was use of prescription drugs for osteoporosis among women aged 45 to 64 (26.0% in Liège, 10.5% in Aalst). People in the two communities had similar levels of physical activity, obesity, and alcohol consumption.

### **Strengths of the study**

Our study had several strengths. No similar study in a Canadian setting has been published in the literature. Other published studies comment on lack of knowledge but do not explore the underlying reasons for it. Qualitative methods allowed us to do that. The main contribution of our study is increased understanding of the issues FPs face in managing osteoporosis and why they face them. A cross section of FPs from various parts of the province participated.

### **Limitation of the study**

It could be that these are the opinions of the physicians who are most interested in osteoporosis as a health concern. The issues identified, however, are common to FPs in many parts of the world.

### **Conclusion**

In a systematic review, Bero et al<sup>30</sup> identified educational outreach visits, reminders, and multifaceted interventions (a combination of audit and feedback, reminders, local consensus processes and marketing, and interactive educational workshops that include discussion or practice) as consistently effective for promoting changes in behaviour. The literature also shows that clinical guidelines accompanied by “consumer” versions for patients allow patients to make more informed health care choices and could serve as reminders for physicians.<sup>31</sup>

The results of our study concur with this literature, but more importantly will inform the next phase of our research, which focuses on development of educational interventions for managing osteoporosis. If the burden of illness due to osteoporosis and related fractures is to be reduced, we need to implement educational interventions that are effective for physicians and their patients. ❖

### **Editor's key points**

- This qualitative study was designed to investigate family physicians' experience of osteoporosis and identify their educational needs.
- Participants wanted more information about use of screening bone densitometry and how to manage patients with osteoporosis. They were dissatisfied with bone densitometry reports that did not provide them with useful information.
- Participants thought there was a great deal of confusion about the available treatments for osteoporosis. They believed that evidence-based simple practice guidelines and checklists would be useful in daily practice.
- Among the obstacles physicians met in trying to prevent osteoporosis were the complexity of elderly people's health problems, lack of time, and elderly patients' reluctance to add more medications to their already long lists.

### **Points de repère du rédacteur**

- Cette étude qualitative avait pour objectifs de comprendre l'expérience des médecins de famille face à l'ostéoporose et d'identifier leurs besoins de formation.
- Les médecins souhaitent avoir plus d'information sur l'utilisation rationnelle de l'ostéodensitométrie pour le dépistage et le suivi de l'ostéoporose. Les participants ont exprimé une insatisfaction face aux rapports d'ostéodensitométrie, qui ne présentent pas toujours l'information utile pour les cliniciens.
- Les participants estiment qu'il y a beaucoup de confusion quant aux différents traitements disponibles pour l'ostéoporose. Ils croient que des guides de pratique crédibles, simples et brefs ainsi que des aides-mémoires peuvent être utiles dans leur pratique quotidienne.
- Parmi les obstacles rencontrés par les médecins dans la prévention de l'ostéoporose, mentionnons la complexité des problèmes de santé des patients âgés, le manque de temps et la faible motivation des patients âgés à ajouter d'autres médicaments à une liste déjà longue.

### **Acknowledgment**

*We thank the physicians who participated in the study.*

### **Contributors**

*All the authors were involved in obtaining the grant supporting this project and in development of study objectives, design, analysis, and writing up results. Drs Jaglal and Carroll drafted the article; all the other authors participated in revising it critically for important intellectual content and approved the final version to be published.*

## RESEARCH

.....

### How are family physicians managing osteoporosis?

#### Competing interests

This study was funded by a grant from the Ontario Program for Optimal Therapeutics. Dr Jaglal is a Career Scientist with the Ontario Ministry of Health and Long-Term Care. Dr Hawker is a Canadian Institutes of Health Research Scientist and Ms Cadarette is a doctoral fellow. Dr Carroll is the Sydney G. Frankfort Chair in Family Medicine at the University of Toronto.

**Correspondence to:** Dr Susan Jaglal, Department of Rehabilitation Science, University of Toronto, 500 University Ave, 8th floor, Toronto, ON M5G 1V7; telephone (416) 978-0315; fax (416) 946-8562; e-mail [susan.jaglal@utoronto.ca](mailto:susan.jaglal@utoronto.ca)

#### References

- Jaglal SB, McIsaac WJ, Hawker G, Jaakkimainen L, Cadarette SM, Chan BT. Patterns of use of the bone mineral density test in Ontario, 1992-1998. *Can Med Assoc J* 2000;163:1139-43.
- Jaglal SB. Bone density testing. In: Stewart DE, Cheung AM, Ferris LE, Hyman I, Cohen MM, Williams JI, editors. *Ontario women's health status report*. Toronto, Ont: Ontario Women's Health Council; 2002. Chap 9.
- Blumenthal D. The variation phenomenon in 1994. *N Engl J Med* 1994;331:1017-8.
- Phelps CE, Parente ST. Priority setting in medical technology and medical practice assessment. *Med Care* 1990;28:703-23.
- Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *BMJ* 1996;312:71-2.
- Australian National Consensus Conference. The prevention and management of osteoporosis. Consensus statement. Australian National Consensus Conference 1996. *Med J Aust* 1997;167(Suppl 1):1-15.
- Kanis JA, Delmas P, Burckhardt P, Cooper C, Torgerson D. Guidelines for diagnosis and management of osteoporosis. The European Foundation for Osteoporosis and Bone Disease. *Osteoporos Int* 1997;7:390-406.
- National Osteoporosis Foundation. *Physician's guide to prevention and treatment of osteoporosis*. Belle Mead, NJ: Excerpta Medica Inc; 1998. Available at: <http://www.nof.org>. Accessed 2003 Feb 4.
- Scientific Advisory Board, Osteoporosis Society of Canada. Clinical practice guidelines for the diagnosis and management of osteoporosis. *Can Med Assoc J* 1996;155:1113-33.
- Ontario Ministry of Health and Long-term Care. *Ontario guidelines for the prevention and treatment of osteoporosis. Ontario Program for Optimal Therapeutics*. Toronto, Ont: Ontario Ministry of Health and Long-term Care; 2000. Available at: <http://www.opot.org/guidelines/osteoporosis.pdf>. Accessed 2003 Feb 4.
- Freemantle N, Harvey EL, Wolf E, Grimshaw JM, Grilli R, Bero LA. Printed educational materials: effects on professional practice and health care outcomes (Cochrane Review). *Cochrane Database Syst Rev* 2000;2:CD000172.
- Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance: a systematic review of continuing medical education strategies. *JAMA* 1995;274:700-5.
- Davis DA, Taylor-Vaisey A. Translating guidelines into practice. *Can Med Assoc J* 1997;157:408-16.
- Morgan DL. *Planning focus groups*. Thousand Oaks, Calif: Sage Publications; 1998. p. 25, 32, 53, 104.
- Taylor JC, Sterkel B, Utley M, Shipley M, Newman S, Horton M, et al. Opinions and experiences in general practice on osteoporosis prevention, diagnosis and management. *Osteoporos Int* 2001;12:844-8.
- Schrager S, Plane M, Mundt MP, Stauffacher EA. Osteoporosis prevention and counseling during health maintenance examination. *J Fam Pract* 2000;49:1099-103.
- Torgerson DJ, Thomas RE, Campbell MK, Reid DM. Randomized trial of osteoporosis screening. Use of hormone replacement therapy and quality of life results. *Arch Intern Med* 1997;157:2121-5.
- Rubin SM, Cummings SR. Results of bone densitometry affect women's decisions about taking measures to prevent fractures. *Ann Intern Med* 1992;116:990-5.
- Ryan PJ, Harrison R, Blake GM, Fogelman I. Compliance with hormone replacement therapy after screening for postmenopausal osteoporosis. *Br J Obstet Gynaecol* 1992;99:325-8.
- Phillipov G, Mos E, Scinto S, Phillips PJ. Initiation of hormone replacement therapy after diagnosis of osteoporosis by bone densitometry. *Osteoporos Int* 1997;7:162-4.
- Silverman SL, Greenwald M, Klein RA, Drinkwater B. Effect of bone density information on decisions about hormone replacement therapy: a randomized trial. *Obstet Gynecol* 1997;89:321-5.
- Papaionannou A, Parkinson W, Adachi J, O'Connor A, Jolly EE, Tugwell P, et al. Women's decisions about hormone replacement therapy after education and bone densitometry. *Can Med Assoc J* 1998;159:1253-7.
- Marci CD, Viechnicki MB, Greenspan SL. Bone mineral densitometry substantially influences health-related behaviors of postmenopausal women. *Calcif Tissue Int* 2000;66:113-8.
- Fitt NS, Mitchell SL, Cranney A, Gulenchyn K, Huang L, Tugwell P. Influence of bone densitometry results on the treatment of osteoporosis. *Can Med Assoc J* 2001;164:777-81.
- Werner P, Vered I. Management of osteoporosis: a survey of Israeli physicians' knowledge and attitudes. *Isr Med Assoc J* 2000;2:361-4.
- Saadi H, Litaker D, Mills W, Kippes C, Richmond B, Licata A. Practice variation in the diagnosis and treatment of osteoporosis: a case for more effective physician education in primary care. *J Womens Health Gen Based Med* 1999;8:767-71.
- Sahota O, Worley A, Hosking DJ. An audit of current clinical practice in the management of osteoporosis in Nottingham. *J Public Health Med* 2000;22:466-72.
- Solomon DH, Levin E, Helgott SM. Patterns of medication use before and after bone densitometry: factors associated with appropriate treatment. *J Rheumatol* 2000;27:1496-500.
- Tellier V, De Maeseneer J, De Prins L, Sedrine WB, Gosset C, Reginster JY. Intensive and prolonged health promotion strategy may increase awareness of osteoporosis among postmenopausal women. *Osteoporos Int* 2001;12:131-5.
- Bero LA, Grilli R, Grimshaw JM, Harvey E, Oxman AD, Thomson MA. Closing the gap between research and practice: an overview of systematic reviews of interventions to promote implementation of research findings. *BMJ* 1998;317:465-8.
- Lockyer J, Davis D, Thivierge R, Langille D, Behrens A. Patient education materials: physician perception of their role and usefulness. *J Contin Educ Health Prof* 1997;17:159-62.