

Managing low back pain in the primary care setting: The know-do gap

N Ann Scott PhD, Carmen Moga MD, Christa Harstall MHA

NA Scott, C Moga, C Harstall. Managing low back pain in the primary care setting: The know-do gap. *Pain Res Manage* 2010;15(6):392-400.

OBJECTIVE: To ascertain knowledge gaps in the diagnosis and treatment of acute and chronic low back pain (LBP) in the primary care setting to prepare a scoping survey for identifying knowledge gaps in LBP management among Alberta's primary care practitioners, and to identify potential barriers to implementing a multidisciplinary LBP guideline.

METHODS: English language studies, published from 1996 to 2008, comparing the clinical practice patterns of primary care practitioners with guideline recommendations were identified by systematically searching literature databases, the websites of various health technology assessment agencies and libraries, and the Internet. Data were synthesized qualitatively.

RESULTS: The literature search identified 14 relevant studies. Knowledge gaps were reported among various primary care practitioner groups in the assessment of red flags, use of diagnostic imaging, provision of advice regarding sick leave and continuing activity, administration of some medications (muscle relaxants, oral steroids and opioids) and recommendation of particular treatments (acupuncture, physiotherapy, spinal manipulation, traction, ultrasound, transcutaneous electrical nerve stimulation and spinal mobilization).

CONCLUSIONS: A know-do gap clearly exists among primary care practitioners with respect to the diagnosis and treatment of LBP. The information on know-do gaps will be used to construct a survey tool for unearthing the local knowledge gaps extant among Alberta's primary care practitioners, and to develop a dissemination strategy for a locally produced multidisciplinary LBP guideline, with the aim of ensuring that the know-do gaps inherent within each primary practice discipline are specifically targeted.

Key Words: *Clinical practice guidelines; Continuing medical education; Evidence-based medicine; Knowledge gap; Low back pain*

Between 49% and 90% of people in developed countries will experience at least one episode of low back pain (LBP) during their lifetime (1-5). Pain will resolve within two weeks for the majority of these individuals. However, 20% to 44% of patients, especially those with a history of LBP, will experience further episodes within a year, and more than three-quarters will experience a recurrence at some point in their lives. A small minority of patients (2% to 7%) will develop chronic LBP (4,6). A similar prevalence and clinical course for LBP is reflected in Canadian data (7-9).

Because back pain is more often recurrent than acute and self-limiting, its management can be complex and costly (10). Up to 25% of patients with back pain seek help from a health care provider, with nearly three-quarters of these patients presenting to either a physician or a chiropractor. In the case of

La prise en charge des douleurs lombaires en soins de première ligne : L'écart entre savoir et faire

OBJECTIF : Déterminer l'écart entre savoir et faire dans le diagnostic et le traitement des douleurs lombaires (DL) aiguës et chroniques en soins de première ligne afin de préparer un sondage de délimitation de l'étendue dans la prise en charge des DL chez les praticiens de première ligne de l'Alberta et déterminer les obstacles potentiels à l'implantation de lignes directrices multidisciplinaires sur les DL.

MÉTHODOLOGIE : Les chercheurs ont repéré des études en anglais, publiées entre 1996 et 2008, comparant les modes de pratique clinique des praticiens de première ligne aux recommandations de lignes directrices en faisant des recherches systématiques dans les bases de données de publication, les sites Web de divers organismes d'évaluation technologique et de bibliothèques et Internet. Ils ont synthétisé les données de manière qualitative.

RÉSULTATS : L'analyse bibliographique a permis de repérer 14 études pertinentes. Les divers groupes de praticiens de soins de première ligne ont déclaré des écarts des savoirs dans l'évaluation des signes annonciateurs, le recours à l'imagerie diagnostique, la prestation de conseils au sujet des congés de maladie et la poursuite des activités, l'administration de certains médicaments (relaxants musculaires, stéroïdes par voie orale et opiacés) et les recommandations de traitements précis (acupuncture, physiothérapie, manipulation vertébrale, traction, échographie, stimulation nerveuse électrique transcutanée et mobilisation vertébrale).

CONCLUSIONS : Il existe clairement un écart entre savoir et faire chez les praticiens de première ligne pour ce qui est du diagnostic et du traitement des DL. L'information sur l'écart entre savoir et faire permettra aux chercheurs de préparer un sondage afin de mettre à jour les écarts des savoirs locaux chez les praticiens de première ligne de l'Alberta et d'élaborer des stratégies de diffusion des lignes directrices multidisciplinaires sur les DL produites localement afin de s'assurer que les écarts entre savoir et faire inhérents à chaque discipline des soins de première ligne soient spécifiquement ciblés.

chronic LBP, 91% of patients consult a physician and 25% see a chiropractor (5). Primary care physicians undertake the initial evaluation in 65% of LBP cases and often ultimately become the sole provider for these patients (3,11). Most patients tend to visit more than one provider (12), and between 10% and 50% of patients receive physiotherapy (13,14).

Clinical practice guidelines are systematically developed statements that assist practitioners and patients in choosing appropriate interventions for specific clinical situations (15). Most LBP guidelines emphasize the importance of considering psychosocial risk factors for developing chronic pain, reassuring patients that their condition is not serious and encouraging them to remain active within the limits of their pain (Table 1) (16).

Despite the availability of guidelines, patterns of practice with respect to LBP vary widely and are notoriously resistant to

Institute of Health Economics, Edmonton, Alberta

Correspondence: Dr N Ann Scott, Institute of Health Economics, 1200-10405 Jasper Avenue, Edmonton, Alberta T5J 3N4.

Telephone 780-448-4881, fax 780-448-0018, e-mail capstone@shaw.ca

change (11). Health care providers often rely on shared beliefs and personal opinion rather than research evidence to make treatment decisions (17,18). This ignorance of or unwillingness to follow evidence-based practice recommendations is responsible for what has become popularly known as the know-do gap – the gap between what is known and what is done in practice (19). The know-do gap is particularly apparent in conditions in which treatments are controversial and no single therapy is universally effective (13). The pervasive use of ineffective treatments for LBP is considered a likely contributor to its high prevalence (20).

The objective of the present report was to examine the available published literature pertaining to knowledge gaps in the management of LBP in the primary care setting. This work was conducted as part of the Alberta Ambassador Program (21-23), which aimed to construct an Alberta guideline that aligns guidance on the prevention, diagnosis and treatment of acute, subacute and chronic LBP across multiple primary care disciplines. The review results will be used to prepare a scoping survey for identifying knowledge gaps in LBP management among Alberta's primary care practitioners, and to identify potential barriers to implementing and disseminating a multi-disciplinary guideline on the management of LBP.

METHODS

Inclusion criteria

Studies of any design were included if they were published in English between January 1996 and November 2008, and compared the current practice of primary care practitioners with evidence-based guideline recommendations on the treatment of acute, subacute and chronic LBP. Only studies conducted in countries with developed market economies as defined by the United Nations (24) were included to ensure that the data were clinically relevant to the Canadian health care system. Studies involving trainee practitioners were excluded, as were those that did not report data on clinician practice patterns in a way that allowed the calculation of the proportion of practitioners who made guideline-concordant or guideline-discordant decisions. Data regarding mixed patient populations (eg, patients with LBP together with cancer pain) or mixed practitioner groups (eg, physiotherapists and physicians, or primary and tertiary care practitioners) were not included unless the results for the relevant group could be separated from the aggregate data.

Literature search strategy

Relevant studies were identified by searching The Cochrane Library, EMBASE, PubMed, the NHS Centre for Reviews and Dissemination databases (NHS Economic Evaluation Database, Health Technology Assessment database and the Database of Abstracts of Reviews of Effects), PsycINFO, Scopus, ERIC, the Web of Science and the websites of various health technology assessment agencies and libraries (search strategy available on request). Internet search engines were used to locate unpublished material (grey literature). The bibliographies of all articles retrieved were manually searched for relevant references that may have been missed in the database searches.

Screening, data extraction and quality assessment

Study selection was conducted by one reviewer (AS) based on study abstracts or, in cases of uncertainty, the full-text article.

TABLE 1
Summary of diagnostic and treatment recommendations for low back pain from 11 international guidelines

Diagnosis
Diagnostic triage to classify patients as having nonspecific low back pain, specific low back pain or sciatica/radicular syndrome
History taking and physical examination to exclude red flags (findings that suggest a serious pathology such as cancer)
Neurological screening
Radiography is not useful and should be restricted to patients with red flag indications
Psychosocial factors should be considered if there is no improvement
Treatment
Acute or subacute pain
Provide information and reassurance to the patient
Advise to stay active and progressively increase activity level
Prescribe medication if necessary (time contingent): First choice acetaminophen, second choice nonsteroidal anti-inflammatory drugs; consider muscle relaxants or opioids
Discourage bed rest; if needed for pain severity, then restrict to no more than a few days
Consider spinal manipulation for pain relief
Do not advise back-specific exercises
Only refer to a specialist if a red flag, sciatica/radicular syndrome or a neurological problem is present
Chronic pain
Refer for exercise therapy

Data from reference 16

The primary outcome was the proportion of practitioners complying with the specified guideline recommendations. These data were extracted by one reviewer (AS) using standardized data extraction forms developed a priori. When the same data were reported in more than one publication, only the article reporting the most complete data set was used. Data were synthesized qualitatively. The sampling, data collection and analysis methods of the studies were evaluated, as well as any other feature of the study design or execution that may have introduced bias and affected representativeness.

RESULTS

The literature search identified 14 relevant studies (Table 2). Two studies (11,25) used chart review to track how patients were actually treated by the practitioners. The remaining 12 studies surveyed practitioners and compiled their self-reported answers to questionnaires.

Critical appraisal

The majority of the studies clearly described the selection criteria used as well as any exclusions made, the response rate and the study setting. The median response rate reported across the 10 studies (12,26-34) that surveyed family physicians was 48% (range 22% to 75%); for physiotherapists, the median rate was 71% (range 47% to 83%) across six studies (12,26,30,34-36). The single study (12) that included chiropractors reported a 75% response rate. Only four studies (11,30,32,33) did not provide demographic details about the participants. While valid outcomes were used in all of the studies, only one (25) mentioned the use of independent assessors to collate data. All of the studies assessed knowledge of guidelines, but only two (29,34) specifically asked respondents about their familiarity with the guidelines in question.

TABLE 2
Summary of included studies

Author (reference), year, country	Study design	Study sample	Benchmark guidelines used (reference)
Armstrong et al (25), 2003, Northern Ireland	Retrospective cross-sectional study with chart review. Sampling period: January to December 1998	PT: n=25; response rate = not applicable; patients with acute or chronic LBP: n=200	(44-46)
Bishop and Wing (11), 2003, Canada	Prospective longitudinal study with chart review. Sampling period: Not stated	FP: n=139; response rate = not applicable; patients with acute LBP: n=139	Workers' Compensation Board of British Columbia Clinical Practice Guidelines (reference not provided) (16,47-50)
Bishop et al (26), 2008, United Kingdom	Prospective cross-sectional study. Sampling period: April to November 2005	FP: n=442, PT: n=580; response rate: FP = 22%, PT = 55%; patients with LBP: n = not applicable	(51)
Buchbinder and Jolley (29), 2007, Australia	Nonrandomized comparative study*. Sampling period: May 2004	FP: n=511; response rate = 31%; patients with acute LBP: n = not applicable	(52-54)
Coudeyre et al (27), 2006, France	Prospective cross-sectional study. Sampling period: September 1, 2003 to February 1, 2004	FP: n=864; response rate = 48%; patients with acute or chronic LBP: n = not applicable	(55)
Di Iorio et al (31), 2000, USA	Prospective cross-sectional study. Sampling period: April 1998	FP: n=87; response rate = 48%; patients with acute LBP: n = not applicable	(44,49,55-57)
Harte et al (35), 2005, United Kingdom	Prospective cross-sectional study. Sampling period: November 2002 to February 2003	PT: n=1239; response rate = 83%; patients with LBP: n = not applicable	(55)
Li and Bombardier (36), 2001, Canada	Prospective cross-sectional study. Sampling period: September 8 and October 23, 1998	PT: n=274; response rate = 73%; patients with acute or subacute LBP: n = not applicable	(16,58)
Linton et al (30), 2002, Sweden	Prospective cross-sectional study. Sampling period: Not stated	FP: n=60, PT: n=71; response rate: FP = 75%, PT = 68%; patients with back pain: n = not applicable	(44,55,59,60)
Little et al (32), 1996, United Kingdom	Prospective cross-sectional study. Sampling period: Not stated	FP: n=166; response rate = 70%; patients with acute LBP: n = not applicable	(44,55)
Negrini et al (33), 2001, Italy	Prospective cross-sectional study. Sampling period: Not stated	FP: n=217; response rate = 68%; patients with acute or chronic LBP: n = not applicable	(58)
Overmeer et al (34), 2005, Sweden	Prospective cross-sectional study. Sampling period: March 2003	FP: n=88, PT: n=66; response rate: FP = 58%, PT = 83%; patients with back pain: n = not applicable	(55)
Webster et al (28), 2005, USA	Prospective cross-sectional study. Sampling period: Not stated	FP: n=720; response rate = 25%; patients with acute LBP: n = not applicable	(reference not provided)
Werner et al (12), 2005, Norway	Nonrandomized comparative study*. Sampling period: 2002	FP: n=193, PT: n=255, CP: n=21; response rate: FP = 48%, PT = 47%, CP = 75%; patients with acute LBP: n = not applicable	Norwegian Back Pain Network multidisciplinary guidelines (reference not provided)

*Only data from the control arm of the study were extracted. CP Chiropractors; FP Family physicians; LBP Low back pain; PT Physiotherapists

The study sample sizes were generally small, although five studies (26,29,32,35,36) used power calculations to determine the requisite sample size. Of the 10 studies (11,25-31,35,36) that did not assess an entire population, three (11,30,31) employed a nonrandom sampling approach. Bishop and Wing (11) used a consecutive sample of family physicians obtained from a worker's compensation board database, whereas Linton et al (30) attempted to recruit all practitioners who attended a continuing education activity. Di Iorio et al (31) used a mailing list of physicians obtained from three local hospitals, but it was unclear whether all of the practitioners in the survey area were captured. Among the seven studies (25-29,35,36) that used a random sampling approach, only one (25) actually described the method in detail.

While the methods used in eight studies (11,12,25,29,32-34,36) likely produced representative population samples, the effect of nonresponder bias or sample representativeness was not formally assessed in these studies. Two other studies (30,31) were potentially affected by nonrandom sampling and nonresponder bias. Four of the 12 survey studies described the reasons given by some of the nonresponders (34,36) or sent a follow-up questionnaire to better characterize this subgroup (26,35).

Four studies (26-28,35) formally investigated sample representativeness and nonresponder bias. Bishop et al (26) found that physician nonresponders were similar to responders in sex and years in practice, whereas physiotherapist nonresponders were more likely to be men (25% versus 19%) and less experienced (mean 12 years versus 15 years), but these differences were not analyzed statistically. In addition, there was some indication that nonresponder bias may have caused an underestimation of the number of practitioners in both groups who provided guideline-discordant advice. The study by Harte et al (35) only focused on physiotherapists who used traction in their practice. A follow-up survey of nonresponders found that the most common reason for noncompletion was that the therapist did not use traction in managing LBP. Consequently, any nonresponder bias was unlikely to materially affect the results. Coudeyre et al (27) and Webster et al (28) compared their respondent demographics with the national databases from which their samples were drawn, but no statistical analysis of these comparisons was provided. Coudeyre et al (27) found that respondents were more likely to be men (80% versus 71%), older (mean 48 years versus 47 years) and working in a rural environment (30% versus 24%) compared with

nonresponders, whereas Webster et al (28) found no differences between the two groups with respect to sex, age and geographic distribution.

Diagnosis and referral

Most family physicians asked their patients about the initiating event and conducted a physical examination according to guideline recommendations, but the assessment of red flags was less than ideal (Table 3) (11,31,34). However, it is unclear whether the particularly low scores for assessing red flags in the Bishop and Wing (11) study were due to unfamiliarity with the term 'red flags' or ignorance of the concept. Another study (34) found that even though 40% of physicians and 25% of physiotherapists were unfamiliar with the term 'red flags', the majority of practitioners reported assessing for significant pathology in their patients. Physiotherapists generally had higher rates of compliance than physicians with respect to conducting an adequate physical examination and assessing for red flags.

Referral of patients with acute or chronic LBP to a specialist by family physicians was generally handled in accordance with guideline recommendations (11,27-29,33), although in one study (28) the presence of sciatica increased the likelihood of a referral that was not supported by abnormal findings in patients with acute LBP. In two studies (32,33), a significant minority of physicians (6% to 45%) believed that the presence of danger signs such as saddle anesthesia or neurological signs at multiple levels did not warrant urgent referral to a hospital.

While between 21% and 28% of physicians tend to inappropriately order x-rays for acute LBP (28,29,31), opinions about the usefulness of other diagnostic tests for acute and chronic LBP by the majority of physicians, physiotherapists and chiropractors were mostly in line with guideline recommendations (11,12,26,28,29,31,33). The rates of guideline-concordant behaviour among physicians with respect to diagnostic imaging tended to be higher for patients with chronic LBP compared with those with acute LBP. However, when sciatica was present in addition to acute or chronic LBP, physicians were more likely to request unnecessary diagnostic imaging (28,33).

Recommendations and advice

Although two studies indicated that up to 43% of physicians (30,32) and up to 24% of physiotherapists (30) did not provide specific advice to patients about managing their LBP, four other studies (27,28,34,36) found that, in most cases, physicians and physiotherapists provided adequate education and reassurance (Table 4). The particularly low compliance rate for physicians with respect to providing education and reassurance in the Bishop and Wing (11) study was likely a byproduct of using chart review to collect data. Physicians may not record such information if it is considered to be of less importance than treatment recommendations. Although most physicians, physiotherapists and chiropractors would correctly recommend physical activity and encourage patients with acute LBP to return to work (12,29,34,36), some studies indicated that up to one-quarter of physicians (11,27,30,34) and nearly one-third of physiotherapists (30,34) made inappropriate recommendations regarding sick leave and continuing activity.

Treatments

Generally, nonsteroidal anti-inflammatory drugs and acetaminophen were appropriately prescribed by physicians for acute LBP, and guideline recommendations against using antidepressants were followed (Table 5) (28,29,31). However, a significant minority (4% to 45%) of physicians did not follow guidelines and prescribed oral steroids for acute LBP (28,31). In the case of opioids and muscle relaxants, the data were equivocal (11,28,31).

The majority of practitioners correctly recommended the use of heat or ice, and discouraged prolonged bed rest for patients with acute LBP (11,12,27-29,31,36), although one study (28) recorded higher rates of noncompliance regarding the prescription of bed rest. The reason for this is unclear. Physiotherapists were more likely to follow guidelines regarding exercise therapy than physicians (11,25,28,29). Generally, physicians followed guideline recommendations and did not prescribe epidural steroid or trigger point injection for acute LBP (28,31), although one small study (31) noted that 52% and 66% of physicians incorrectly prescribed injection and massage therapy, respectively. Physiotherapy was inappropriately prescribed for patients with uncomplicated LBP by up to 57% of physicians and by 55% of physicians when the patient also had sciatica (28,29). The symptoms of sciatica resolve spontaneously in more than 50% of patients during the first month. Consequently, guidelines generally recommend conservative treatment initially because more intensive therapy could hinder rehabilitation and prolong disability (28). Passive physiotherapy is still a popular treatment choice of physicians for acute LBP, despite recommendations that it should not be used if symptoms persist beyond four weeks (11).

Less than 30% of physicians and physiotherapists recommended spinal manipulation for pain relief even though it is considered to be an effective treatment for acute LBP (11,25,28,29,31,32,36). In contrast, many physiotherapists and some physicians appeared reluctant to jettison traction as a treatment for patients with LBP, despite mounting evidence of its ineffectiveness for this condition (28,29,35,36). Contrary to guideline recommendations, transcutaneous electrical nerve stimulation and ultrasound are still considered to be effective treatments for acute LBP by many physicians and physiotherapists, and four of five physiotherapists would prescribe spinal mobilization for acute LBP (28,29,31,36). Furthermore, only 21% of physicians and 55% of physiotherapists correctly considered acupuncture to be inappropriate for the treatment of acute LBP (29,32,36).

DISCUSSION

A number of studies (37-41) have reported the proportion of patients with LBP who receive diagnostic tests, referrals or treatments that are not consistent with current guideline recommendations. However, it is sometimes not clear from these studies how many and what types of practitioners are responsible for these practices. The present report systematically reviewed studies that identified differences in guideline compliance according to discipline, which enabled the identification of knowledge gaps peculiar to particular practitioner groups.

Twelve of the 14 included studies used self-reported answers to questionnaires, which do not necessarily reflect

TABLE 3
Results of studies assessing guideline compliance in low back pain (LBP) management – diagnosis and referral*

Aspect of care	Guideline concordant		Guideline discordant		
	Family physician	Physiotherapist	Family physician	Physiotherapist	Chiropractor
History taking					
Information on initiating event	89% (n=139) (11); mixed LBP: 83% (n=88) (34)	Mixed LBP: 92% (n=66) (34)	Mixed LBP: 16% (n=88) (34)	Mixed LBP: 7% (n=66) (34)	
Asked about history of similar symptoms	24% (n=139) (11)				
Physical examination conducted	>82% (n=87) (31); mixed LBP: 98% (n=88) (34)	>99% (n=274) (36); mixed LBP: 100% (n=66) (34)	Mixed LBP: 1% (n=88) (34)		
Neurological examination conducted	63% (n=139) (11)				
Assessed for red flag conditions	5% (n=139) (11), >75% (n=87) (31); mixed LBP: 51% (n=88) (34)	Mixed LBP: 73% (n=66) (34)	Mixed LBP: 5% (n=88) (34)	Mixed LBP: 2% (n=66) (34)	
Inquired about psychosocial factors	Mixed LBP: 73% (n=88) (34)	Mixed LBP: 74% (n=66) (34)	Mixed LBP: 26% (n=88) (34)	Mixed LBP: 24% (n=66) (34)	
Immediate hospital referral					
Saddle anesthesia	58% (n=217) (33)		6% (n=157) (32)		
Neurological signs at multiple levels	65% (n=217) (33)		15% (n=159) (32)		
Extensor plantar response	61% (n=217) (33)		45% (n=150) (32)		
Specialist referral	90% (n=139) (11), 72% (n=217) (33), 36% (n=511) (29), 61% sciatica (n=217) (33); mixed LBP: 74% (n=825) (27); chronic LBP: 84% (n=217) (33), 84% sciatica (n=217) (33)		3% (n=511) (29), 16% without sciatica (n=720) (28), 83% with sciatica (n=720) (28)		
Surgical consult			1% without sciatica (n=720) (28), 49% with sciatica (n=720) (28)		
Laboratory tests	71% (n=511) (29), 62% (n=217) (33), 67% sciatica (n=217) (33); chronic LBP: 70% (n=217) (33), 61% sciatica (n=217) (33)		Mixed LBP: 29% (n=442) (26)	Mixed LBP: 6% (n=580) (26)	
Urinalysis			10% (n=87) (31)		
Diagnostic imaging	95% (n=139) (11)		35% (n=193) (12)	35% (n=255) (12)	25% (n=21) (12)
CT	54% (n=217) (33), 65% sciatica (n=217) (33); chronic LBP: 80% (n=217) (33), 61% sciatica (n=217) (33)		2% without sciatica (n=720) (28), 10% with sciatica (n=720) (28)		
MRI	76% (n=217) (33), 71% sciatica (n=217) (33); chronic LBP: 89% (n=217) (33), 81% sciatica (n=217) (33)		3% without sciatica (n=720) (28), 64% with sciatica (n=720) (28)		
CT or MRI			16% (n=87) (31), 3% (n=511) (29); mixed LBP: 5% (n=442) (26)	Mixed LBP: 10% (n=580) (26)	
X-ray	75% (n=511) (29), 15% (n=217) (33), 36% with sciatica (n=217) (33); chronic LBP: 71% (n=217) (33), 50% with sciatica (n=217) (33)		28% (n=87) (31), 21% (n=511) (29), 23% without sciatica (n=720) (28), 62% with sciatica (n=720) (28); mixed LBP: 13% (n=442) (26)	Mixed LBP: 15% (n=580) (26)	

*Unless stated otherwise, results are for acute/subacute LBP defined as less than 12 weeks' duration. References for the condition descriptions used in the studies – acute/subacute LBP: 11,12,27-29,31-33,36; mixed LBP (acute or chronic LBP, or described as LBP): 25,26,30,34,35; and chronic LBP: 27,33. Countries: Australia (29); Canada (11,36); France (27); Italy (33); Northern Ireland (25); Norway (12); Sweden (30,34); United Kingdom (26,32,35) and the United States (28,31). CT Computed tomography; MRI Magnetic resonance imaging

what respondents actually do in practice and may overestimate their concordance with published guidelines (27,31). In addition, large-scale practitioner surveys are susceptible to

response bias and the reliability of participant responses is not assured (41). On the other hand, while data from the two studies (11,25) that used chart review may be more uniform

TABLE 4
Results of studies assessing guideline compliance in low back pain (LBP) management – recommendations and advice*

Aspect of care	Guideline concordant			Guideline discordant	
	Family physician	Physiotherapist	Chiropractor	Family physician	Physiotherapist
Provided education and reassurance	7% (n=139) (11)				
Advice		Mixed LBP: 93% (n=25) (25)		Up to 42% (n=163) (32); mixed LBP: 43% (n=60) (30)	Mixed LBP: 24% (n=71) (30)
Education	40% (n=87) (31), 90% without sciatica (n=720) (28), 88% with sciatica (n=720) (28); mixed LBP: 86% (n=831) (27), 74% (n=88) (34)	99% (n=274) (36); mixed LBP: 91% (n=66) (34)		Mixed LBP: 26% (n=88) (34)	Mixed LBP: 6% (n=66) (34)
Reassurance	Mixed LBP: 84% (n=88) (34)	Mixed LBP: 82% (n=66) (34)		Mixed LBP: 12% (n=88) (34)	Mixed LBP: 16% (n=66) (34)
Physical activity					
Recommended	97% (n=511) (29)	98% (n=274) (36)			
Recommended despite pain	Mixed LBP: 94% (n=88) (34)	Mixed LBP: 94% (n=66) (34)		Mixed LBP: 17% (n=60) (30), 3% (n=88) (34); chronic LBP: 26% (n=859) (27)	Mixed LBP: 32% (n=71) (30), 6% (n=66) (34)
Recommended maximum bearable activity	29% (n=864) (27)				
Encouraged return to work	22% (n=139) (11), 86% (n=511) (29), 75% (n=193) (12)	65% (n=255) (12)	70% (n=21) (12)		
Encouraged occupational activities despite pain				Chronic LBP: 26% (n=859) (27)	
Encouraged job adaptation	46% (n=511) (29)			Chronic LBP: 3% (n=856) (27)	
Recommended sick leave	Mixed LBP: 82% (n=88) (34)	Mixed LBP: 92% (n=66) (34)		11% (n=855) (27); mixed LBP: 27% (n=60) (30), 14% (n=88) (34)	Mixed LBP: 29% (n=71) (30), 7% (n=66) (34)

*Unless stated otherwise, results are for acute/subacute LBP defined as less than 12 weeks' duration. References for the condition descriptions used in the studies – acute/subacute LBP: 11,12,27-29,31-33,36; mixed LBP (acute or chronic LBP, or described as LBP): 25,26,30,34,35; and chronic LBP: 27,33. Countries: Australia (29); Canada (11,36); France (27); Italy (33); Northern Ireland (25); Norway (12); Sweden (30,34); United Kingdom (26,32,35) and the United States (28,31)

and reliable than those derived from surveys, the results are less generalizable. In addition, these studies are limited by the potential effects of regional norms, and their reliance on the accuracy and completeness of medical records for the veracity of the retrospectively derived data (40). Despite the potential for overestimation of compliance in the data set, high rates of noncompliance were still observed in some areas of practice. Thus, a know-do gap clearly exists among primary care practitioners in many countries with respect to the diagnosis and management of LBP. The assessment of red flag conditions and use of diagnostic imaging among physicians was less than ideal, particularly for patients with chronic LBP or sciatica. In addition, a significant proportion of physicians and physiotherapists made inappropriate recommendations regarding sick leave and continuing activity. Treatments supported by guidelines, such as spinal manipulation, were underused, whereas ineffective treatments (eg, acupuncture, spinal mobilization and traction) were overused.

Practitioner groups are often more receptive to a guideline when they are aware of shortcomings in the care that they provide (42) and, ironically, physicians with a special interest in LBP are probably the group in greatest need of guidance (43). The present review provided a starting point for the Alberta Ambassador Program to quantify and increase awareness of

knowledge gaps in the local primary care milieu. Once the current state of practice and knowledge in LBP management is ascertained, barriers to change can be identified. The dissemination strategy for a newly constructed, locally produced multidisciplinary guideline on LBP management can then be developed to ensure that the know-do gaps inherent within each primary practice discipline are specifically targeted.

While the present review was useful for ascertaining knowledge gaps and targeting guideline dissemination, it also demonstrated that guidelines have not been effective in ensuring that patients receive recommended diagnostic and treatment interventions. One study (31) that measured overall compliance in a sample of 87 family physicians found that 68% adhered to guidelines on LBP, but only 6% achieved a compliance level of greater than 90%. Another study (34) actually found no significant difference in practice behaviour between practitioners who were familiar with guidelines and those who were not, but what this suggests about the utility of guidelines is unclear. Even when practitioners are conversant with current guideline recommendations, various factors can affect their degree of compliance with these directives. In addition, a lack of agreement among health care practitioners who manage patients with LBP can hinder the propagation of evidence-based guideline recommendations, resulting in patients

TABLE 5
Results of studies assessing guideline compliance in low back pain (LBP) management – treatments*

Aspect of care	Guideline concordant			Guideline discordant	
	Family physician	Physiotherapist	Chiropractor	Family physician	Physiotherapist
Acupuncture	21% (n=511) (29)			6% (n=159) (32)	45% (n=274) (36)
Bed rest	90% (n=193) (12), 66% (n=87) (31), 52% with sciatica (n=720) (28); mixed LBP: 74% (n=88) (34) (rest)	85% (n=255) (12); mixed LBP: 84% (n=66) (34) (rest)	100% (n=21) (12)	9% (n=87) (31), 19% (n=511) (29), 7% (n=845) (27), 59% without sciatica (n=720) (28); mixed LBP: 22% (n=88) (34) (rest)	0.1% (n=274) (36); mixed LBP: 14% (n=66) (34) (rest)
≥3 days				17% (n=139) (11), 7% without sciatica (n=720) (28), 25% with sciatica (n=720) (28)	
Epidural steroid injection				1% without sciatica (n=720) (28), 11% with sciatica (n=720) (28)	
Exercise	43% (n=139) (11), 65% (n=511) (29), 65% without sciatica (n=720) (28), 45% with sciatica (n=720) (28)	Mixed LBP: 89% (n=25) (25)			
Heat or ice	89% (n=87) (31)	66% heat, 82% ice (n=274) (36)			
Injection therapy				52% (n=87) (31)	
Massage therapy				66% (n=87) (31)	
Medications	77% (n=139) (11)				
Acetaminophen	72% (n=87) (31), 49% without sciatica (n=720) (28), 46% with sciatica (n=720) (28)				
Antidepressants				23% (n=87) (31), 2% without sciatica (n=720) (28), 8% with sciatica (n=720) (28)	
Muscle relaxants	83% without sciatica (n=720) (28), 67% with sciatica (n=720) (28)			91% (n=87) (31)	
NSAIDs	98% (n=87) (31), 44% (n=511) (29), 93% without sciatica (n=720) (28), 87% with sciatica (n=720) (28)				
Opioids	39% without sciatica (n=720) (28), 69% with sciatica (n=720) (28)			40% (n=139) (11), 62% (n=87) (31)	
Opioids >2 weeks				1% without sciatica (n=720) (28), 5% with sciatica (n=720) (28)	
Oral steroids				45% (n=87) (31), 4% without sciatica (n=720) (28), 24% with sciatica (n=720) (28)	
Passive physiotherapy	66% (n=139) (11) (<4 weeks)			54% (n=139) (11) (>4 weeks)	
Physiotherapy				57% (n=511) (29), 33% without sciatica (n=720) (28), 55% with sciatica (n=720) (28)	
Spinal manipulation	6% (n=139) (11) (<4 weeks), 22% (n=87) (31), 20% (n=166) (32), 28% (n=511) (29), 6% without sciatica (n=720) (28)	30% (n=274) (36); mixed LBP: 3% (n=25) (25)		5% (n=139) (11) (>4 weeks), 3% with sciatica (n=720) (28)	
Spinal mobilization					80% (n=274) (36)
Therapeutic ultrasound				55% (n=87) (31)	61% (n=274) (36); mixed LBP: 2% (n=25) (25)
Traction	55% (n=511) (29)	Mixed LBP: 45% (n=1239) (35)		2% without sciatica (n=720) (28), 16% with sciatica (n=720) (28)	36% (n=274) (36); mixed LBP: 41% (n=1239) (35)
Transcutaneous electrical nerve stimulation	26% (n=511) (29)			4% without sciatica (n=720) (28), 12% with sciatica (n=720) (28)	53% (n=274) (36); mixed LBP: 4% (n=25) (25)
Trigger point injection				6% without sciatica (n=720) (28), 7% with sciatica (n=720) (28)	

*Unless stated otherwise, results are for acute/subacute LBP defined as less than 12 weeks' duration. References for the condition descriptions used in the studies – acute/subacute LBP: 11,12,27-29,31-33,36; mixed LBP (acute or chronic LBP, or described as LBP): 25,26,30,34,35; and chronic LBP: 27,33. Countries: Australia (29); Canada (11,36); France (27); Italy (33); Northern Ireland (25); Norway (12); Sweden (30,34); United Kingdom (26,32,35) and the United States (28,31). NSAIDs Nonsteroidal anti-inflammatory drugs

receiving conflicting advice about treatments. This situation is exacerbated by the lack of definitive evidence for some diagnostic tests and LBP treatments, which engenders confusion and continued disagreement regarding what constitutes optimal patient care.

Because the included studies detailed the true knowledge gaps among health care professionals, it is unclear whether the reported guideline noncompliance was related to the strategies used to implement the guidelines, the guidelines themselves, the systemic deficiencies within the health care systems or the intangible behavioural factors that affect practice patterns. A number of included studies used the same pool of international LBP guidelines to benchmark practitioner responses. This indicates not only a commonality among the studies in terms of what they were measuring, but also the transferability of guidelines across international settings. The corollary of this is the potential limitation of studies (33,36) that expected survey respondents to be familiar with guidelines that were not locally produced. Because few of the studies actually assessed whether the participants were familiar with the guidelines their practices were being benchmarked against, it was also unclear to what extent ignorance and deliberate noncompliance factored in the observed results.

Two studies (29,36) uncovered curious discrepancies between how practitioners view the effectiveness of treatments and what treatments they would actually use in a given clinical situation. For example, Buchbinder and Jolley (29) reported that more than 83% of physicians considered nonsteroidal anti-inflammatory drugs an effective treatment for acute LBP, but only 44% to 68% of them actually prescribed these drugs in response to the patient vignette on uncomplicated acute LBP. In the study by Li and Bombardier (36), 30% of physicians believed that spinal manipulation was effective for acute LBP, but only 5% prescribed it correctly in the patient vignette. These and other incongruities between opinion and stated

practice were not explored further in either report. Nonetheless, these results suggest that there is a gulf between knowledge and action that needs to be bridged if efforts to maximize guideline compliance are to succeed.

CONCLUSION

A know-do gap clearly exists among primary care practitioners with respect to the diagnosis and treatment of LBP, particularly in the assessment of red flag conditions, use of diagnostic imaging and advice given to patients regarding active treatments. Guidelines are often used to establish standards of care and provide a benchmark for evidence-based practice, but the results of the present report demonstrated that their directives are not always heeded. While it is not possible to dictate or change the personal opinion of a health care practitioner, education and experience may eventually erode obstructive attitudes and beliefs that could adversely affect patient care. The information on know-do gaps was used to construct a survey tool for unearthing the local knowledge gaps extant among Alberta's primary care practitioners, and to develop a guideline dissemination strategy that specifically targeted the practitioners and aspects of care that most required guidance.

ACKNOWLEDGEMENTS: The authors are indebted to Ms Patricia Chatterley and Ms Liz Dennett for conducting the literature searches. The authors thank Dr Paul Taenzer, the Principal Investigator for the Ambassador Program, for his invaluable guidance.

DISCLOSURE: Alberta's Health Technology Assessment program was established under the Health Research Collaboration Agreement between the Institute of Health Economics and the Alberta Health Ministry. Funding for this initiative was provided by Alberta Health and Wellness.

REFERENCES

1. Van Tulder M, Koes B, Bombardier C. Low back pain. *Best Pract Res Clin Rheumatol* 2002;16:761-75.
2. Margarido MS, Kowalski SC, Natour J, Ferraz MB. Acute low back pain: Diagnostic and therapeutic practices reported by Brazilian rheumatologists. *Spine* 2005;30:567-71.
3. Devereaux MW. Low back pain. *Prim Care* 2004;31:33-51.
4. Woolf AD, Pleger B. Burden of major musculoskeletal conditions. *Bull World Health Organ* 2003;81:646-56.
5. Nyiendo J, Haas M, Goldberg B, Sexton G. Pain, disability, and satisfaction outcomes and predictors of outcomes: A practice-based study of chronic low back pain patients attending primary care and chiropractic physicians. *J Manipulative Physiol Ther* 2001;24:433-9.
6. Koes B, Van Tulder M, Thomas S. Diagnosis and treatment of low back pain. *BMJ* 2006;332:1430-4.
7. Moulin DE, Clark AJ, Speechley M, Morley-Forster PK. Chronic pain in Canada – prevalence, treatment, impact and the role of opioid analgesia. *Pain Res Manage* 2002;7:179-84.
8. Schopflocher D. Chronic Pain in Alberta: A Portrait from the 1996 National Population Health Survey and the 2001 Canadian Community Health Survey. Edmonton: Alberta Health and Wellness, 2003.
9. Gross DP, Ferrari R, Russell AS, et al. A population-based survey of back pain beliefs in Canada. *Spine* 2006;31:2142-5.
10. Van Tulder M, Koes B. Low back pain (chronic). *Am Fam Physician* 2006;74:1577-9.
11. Bishop PB, Wing PC. Compliance with clinical practice guidelines in family physicians managing worker's compensation board patients with acute lower back pain. *Spine J* 2003;3:442-50.
12. Werner EL, Ihlebaek C, Skouen JS, Laerum E. Beliefs about low back pain in the Norwegian general population: Are they related to pain experiences and health professionals? *Spine* 2005;30:1770-6.
13. Poitras S, Blais R, Swaine B, Rossignol M. Management of work-related low back pain: A population-based survey of physical therapists. *Phys Ther* 2005;85:1168-81.
14. Foster NE, Thompson KA, Baxter GD, Allen JM. Management of nonspecific low back pain by physiotherapists in Britain and Ireland. A descriptive questionnaire of current clinical practice. *Spine* 1999;24:1332-42.
15. Institute of Medicine Committee to Advise the Public Health Service on Clinical Practice Guidelines. *Clinical practice guidelines: Directions for a new program*. Washington, DC: National Academy Press, 1990.
16. Koes BW, Van Tulder MW, Ostelo R, Burton AK, Waddell G. Clinical guidelines for the management of low back pain in primary care. An international comparison. *Spine* 2001;26:2504-14.
17. Spring B, Pagoto S, Kaufmann PG, et al. Invitation to a dialogue between researchers and clinicians about evidence-based behavioral medicine. *Ann Behav Med* 2005;30:125-37.
18. Craig JC, Irwig LM, Stockler MR. Evidence-based medicine: Useful tools for decision making. *Med J Aust* 2001;174:248-53.
19. Pablos-Mendez A, Shademani R. Knowledge translation in global health. *J Contin Educ Health Prof* 2006;26:81-6.
20. Rossignol M, Abenham L, Bonvalot Y, Gobeille D, Shrier I. Should the gap be filled between guidelines and actual practice for management of low back pain in primary care? The Quebec experience. *Spine* 1996;21:2893-8.

21. Institute of Health Economics. Alberta HTA Chronic Pain Ambassador Program. <<http://www.ihe.ca/research/ambassador-program/>> (Accessed on September 24, 2009).
22. Rashiq S, Barton P, Harstall C, Schopflocher D, Taenzer P. The Alberta Ambassador Program: Delivering Health Technology Assessment results to rural practitioners. *BMC Med Educ* 2006;6:21.
23. Taenzer P, Schopflocher D, Rashiq S, Harstall C. The Alberta Chronic Pain Ambassador Program. In: Rashiq S, Schopflocher D, Taenzer P, Jonsson E, eds. *Chronic Pain: A Health Policy Perspective*. Weinheim: Wiley Blackwell, 2008:255-72.
24. United Nations. List of country groupings and sub-groupings for the analytical studies of the United Nations World Economic Survey and other UN reports. New York: United Nations, 2009. <<http://unpan1.un.org/intradoc/groups/public/documents/un/unpan008092.pdf>> (Accessed on September 24, 2009).
25. Armstrong MP, McDonough S, Baxter GD. Clinical guidelines versus clinical practice in the management of low back pain. *Int J Clin Pract* 2003;57:9-13.
26. Bishop A, Foster NE, Thomas E, Hay EM. How does the self-reported clinical management of patients with low back pain relate to the attitudes and beliefs of health care practitioners? A survey of UK general practitioners and physiotherapists. *Pain* 2008;135:187-95.
27. Coudeyre E, Rannou F, Tubach F, et al. General practitioners' fear-avoidance beliefs influence their management of patients with low back pain. *Pain* 2006;124:330-7.
28. Webster BS, Courtney TK, Huang YH, Matz S, Christiani DC. Physicians' initial management of acute low back pain versus evidence-based guidelines. Influence of sciatica. *J Gen Intern Med* 2005;20:1132-5.
29. Buchbinder R, Jolley D. Improvements in general practitioner beliefs and stated management of back pain persist 4.5 years after the cessation of a public health media campaign. *Spine* 2007;32:E156-E162.
30. Linton SJ, Vlaeyen J, Ostelo R. The back pain beliefs of health care providers: Are we fear-avoidant? *J Occup Rehabil* 2002;12:223-32.
31. Di Iorio D, Henley E, Doughty A. A survey of primary care physician practice patterns and adherence to acute low back problem guidelines. *Arch Fam Med* 2000;9:1015-21.
32. Little P, Smith L, Cantrell T, Chapman J, Langridge J, Pickering R. General practitioners' management of acute back pain: A survey of reported practice compared with clinical guidelines. *BMJ* 1996;312:485-8.
33. Negrini S, Politano E, Carabalona R, Mambrini A. General practitioners' management of low back pain: Impact of clinical guidelines in a non-English-speaking country. *Spine* 2001;26:2727-33.
34. Overmeer T, Linton SJ, Holmquist L, Eriksson M, Engfeldt P. Do evidence-based guidelines have an impact in primary care? A cross-sectional study of Swedish physicians and physiotherapists. *Spine* 2005;30:146-51.
35. Harte AA, Gracey JH, Baxter GD. Current use of lumbar traction in the management of low back pain: Results of a survey of physiotherapists in the United Kingdom. *Arch Phys Med Rehabil* 2005;86:1164-9.
36. Li LC, Bombardier C. Physical therapy management of low back pain: An exploratory survey of therapist approaches. *Phys Ther* 2001;81:1018-28.
37. Ehrmann-Feldman D, Rossignol M, Abenham L, Gobeille D. Physician referral to physical therapy in a cohort of workers compensated for low back pain. *Phys Ther* 1996;76:150-6.
38. Frankel BS, Moffett JK, Keen S, Jackson D. Guidelines for low back pain: Changes in GP management. *Fam Pract* 1999;16:216-22.
39. Schers H, Braspenning J, Drijver R, Wensing M, Grol R. Low back pain in general practice: Reported management and reasons for not adhering to the guidelines in The Netherlands. *Br J Gen Pract* 2000;50:640-4.
40. Tacci JA, Webster BS, Hashemi L, Christiani DC. Healthcare utilization and referral patterns in the initial management of new-onset, uncomplicated low back workers' compensation disability claims. *J Occup Environ Med* 1998;40:958-63.
41. Tacci JA, Webster BS, Hashemi L, Christiani DC. Clinical practices in the management of new-onset, uncomplicated low back workers' compensation disability claims. *J Occup Environ Med* 1999;41:397-404.
42. Rashidian A, Eccles MP, Russell I. Falling on stony ground? A qualitative study of implementation of clinical guidelines' prescribing recommendations in primary care. *Health Policy* 2008;85:148-61.
43. Buchbinder R, Staples M, Jolley D. Doctors with a special interest in back pain have poorer knowledge about how to treat back pain. *Spine* 2009;34:1218-26.
44. Clinical Standards Advisory Group. *Back Pain: Report of a CSAG Committee on Back Pain*. London: Her Majesty's Stationery Office, 1994.
45. Royal College of Radiologists. *Making the Best Use of a Department of Clinical Radiology: Guidelines for Doctors*. London: Royal College of Radiologists, 1995.
46. Waddell G, Feder G, McIntosh A, et al. *Low Back Pain Evidence Review*. London: Royal College of General Practitioners, 1996.
47. *Arthritis and Musculoskeletal Alliance. Standards of Care for People with Back Pain*. London: Arthritis and Musculoskeletal Alliance, 2004.
48. Van Tulder M, Becker A, Bekkering T, et al. Chapter 3. European guidelines for the management of acute nonspecific low back pain in primary care. *Eur Spine J* 2006;15(Suppl 2):S169-S191.
49. Waddell G, McIntosh A, Hutchinson A, Feder G, Lewis M. *Low Back Pain Evidence Review*. London: Royal College of General Practitioners, 1999.
50. Waddell G, Burton AK. Occupational health guidelines for the management of low back pain at work: Evidence review. *Occup Med (Lond)* 2001;51:124-35.
51. Roland M, Waddell G, Moffat J. *The Back Book*. London: United Kingdom Stationery Office, 1996.
52. Hagen KB, Hilde G, Jamtvedt G, Winnem MF. The Cochrane Review of advice to stay active as a single treatment for low back pain and sciatica. *Spine* 2002;27:1736-41.
53. Hagen KB, Hilde G, Jamtvedt G, Winnem M. Bed rest for acute low-back pain and sciatica. *Cochrane Database Syst Rev* 2004;(4):CD001254.
54. Ostelo RWJG, Van Tulder MW, Vlaeyen JWS, Linton SJ, Morley S, Assendelft WJJ. Behavioural treatment for chronic low-back pain. *Cochrane Database Syst Rev* 2005;(1):CD002014.
55. Bigos S, Bowyer O, Braen G. Acute low back problems in adults. Clinical practice guideline no. 14. AHCPR Publication No. 95-0642. Rockville: Agency for Health Care Policy and Research (AHCPR), 1994.
56. Accident and Rehabilitation and Compensation Insurance Corporation of New Zealand, National Health Committee. *New Zealand acute low back pain guidelines*. Wellington: Accident and Rehabilitation and Compensation Insurance Corporation of New Zealand, 1997.
57. Philadelphia Panel. Philadelphia Panel evidence-based clinical practice guidelines on selected rehabilitation interventions for low back pain. *Phys Ther* 2001;81:1641-63.
58. Nachemson AL, Jonsson E, eds. *Neck and Back Pain: The Scientific Evidence of Causes, Diagnoses, and Treatment*. Philadelphia: Lippincott Williams & Wilkins, 2000.
59. Scientific approach to the assessment and management of activity-related spinal disorders. A monograph for clinicians. Report of the Quebec Task Force on Spinal Disorders. *Spine* 1987;12:S1-S59.
60. Chartered Society of Physiotherapists. *Guide to the Management of Low Back Pain for General Practitioners*. London: Chartered Society of Physiotherapists, 1994.