ELSEVIER

The Spine Journal 10 (2010) 514–529

THE SPINE JOURNAL

Review Article

Synthesis of recommendations for the assessment and management of low back pain from recent clinical practice guidelines

Simon Dagenais, DC, PhD[a,b,*], Andrea C. Tricco, PhD[a], Scott Haldeman, DC, MD, PhD[a,c,d,e]

[a]*Palladian Health, 2732 Transit Rd, West Seneca, NY 14224, USA*
[b]*Department of Social and Preventive Medicine, University at Buffalo, Buffalo, NY 14260, USA*
[c]*Department of Neurology, University of California, Irvine, CA 92697, USA*
[d]*Department of Epidemiology, University of California, Los Angeles, CA 90095, USA*
[e]*Research Division, Southern California University of Health Sciences, Whittier, CA 90604, USA*

Received 4 November 2009; revised 24 February 2010; accepted 29 March 2010

Abstract

BACKGROUND CONTEXT: Low back pain (LBP) is a prevalent, costly, and challenging condition to manage. Clinicians must choose among numerous assessment and management options. Several recent clinical practice guidelines (CPGs) on LBP have attempted to inform these decisions by evaluating and summarizing the best available supporting evidence. The quality and consistency of recommendations from these CPGs are currently unknown.

PURPOSE: To conduct a systematic review of recent CPGs and synthesize their recommendations on assessing and managing LBP for clinicians.

STUDY DESIGN/SETTING: Systematic review.

METHODS: Literature search using MEDLINE, National Guidelines Clearinghouse, National Institute for Clinical Excellence, Internet search engines, and references of known articles. Only CPGs related to both assessment and management of LBP written in English were eligible; CPGs that summarized evidence from before the year 2000 were excluded. Data related to methods and recommendations for assessment and management of LBP were abstracted independently by two reviewers. Methodological quality was assessed using the Appraisal of Guidelines Research and Evaluation (AGREE) instrument by two reviewers.

RESULTS: The search uncovered 669 citations, of which 95 were potentially relevant and 10 were included in the review; 6 discussed acute LBP, 6 chronic LBP, and 6 LBP with neurologic involvement. Methods used to develop CPGs varied, but the overall methodological quality was high as defined by AGREE scores. Recommendations for assessment of LBP emphasized the importance of ruling out potentially serious spinal pathology, specific causes of LBP, and neurologic involvement, as well as identifying risk factors for chronicity and measuring the severity of symptoms and functional limitations, through the history, physical, and neurologic examination. Recommendations for management of acute LBP emphasized patient education, with short-term use of acetaminophen, nonsteroidal anti-inflammatory drugs, or spinal manipulation therapy. For chronic LBP, the addition of back exercises, behavioral therapy, and short-term opioid analgesics was suggested. Management of LBP with neurologic involvement was similar, with additional consideration given to magnetic resonance imaging or computed tomography to identify appropriate candidates willing to undergo epidural steroid injections or decompression surgery if more conservative approaches are not successful.

FDA device/drug status: not applicable.

Author disclosures: SD (salary, Palladian Health; stock ownership, including options and warrants, Palladian Health; training grant, NCMIC Foundation; speaking and/or teaching arrangements, NCMIC Foundation); ACT (consulting, Palladian Health; research support: investigator salary, Palladian Health); SH (royalties, multiple publishing companies; stock ownership, including options and warrants, Palladian Health; consulting, Palladian Health, NCMIC Foundation, University of New York; speaking and/or teaching arrangements, multiple organizations; trips/travel, multiple meetings per prior field; scientific advisory board, NYCC; other office, WFC Research Council).

The authors are consultants, employees, or officers of Palladian Health, LLC, a company that manages specialty health benefits on behalf of other health insurers.

* Corresponding author. Palladian Health, 2732 Transit Rd, West Seneca, NY 14224, USA. Tel.: (949) 466-8132.

E-mail address: simon@spine-research.com (S. Dagenais)

1529-9430/$ – see front matter
doi:10.1016/j.spinee.2010.03.032

CONCLUSIONS: Recommendations from several recent CPGs regarding the assessment and management of LBP were similar. Clinicians who care for patients with LBP should endeavor to adopt these recommendations to improve patient care. Future CPGs may wish to invite coauthors from targeted clinician user groups, increase patient participation, update their literature searches before publication, conduct their own quality assessment of studies, and consider cost-effectiveness and other aspects in their recommendations more explicitly.

Keywords: Low back pain; Clinical practice guidelines; Systematic review; Evidence-based medicine

Introduction

Low back pain (LBP) is a common musculoskeletal condition, with a lifetime prevalence of 84% in the general adult population [1]. The severity of LBP varies from patient to patient and episode to episode, with only 15% suffering from severe disability and 20% to 25% visiting a health provider [1–4]. However, the economic burden of LBP is very heavy because of direct health-care costs and indirect costs from lost productivity. Health-care costs associated with spine problems, including LBP and neck pain, were estimated at $102 billion in the United States in 2004 [5]. Data from other countries suggest that indirect costs may be five to six times higher than direct costs, bringing the total annual costs of LBP in the United States to $500 billion or more [6].

Care for LBP is fragmented. Patients may first present to a primary care provider (PCP), where it ranks as one of the top five reasons for seeking care and accounts for 5% of all PCP visits; doctors of chiropractics (DCs) and physical therapists (PTs) are also frequently consulted for LBP [3,7–10]. A sizable number of those with LBP also seek care in secondary care (2°) settings, including nonsurgical spine specialists, such as neurologists, physiatrists, and rheumatologists, and surgical spine specialists, such as orthopedic and neurologic surgeons. Allied health providers, such as acupuncturists, naturopaths, psychologists, and other health providers also play a role in managing LBP. Differences in the training, education, and scope of practice of these providers have lead to heterogeneity in the management of LBP [11,12].

Ideally, all providers involved in managing LBP should be guided by the best available scientific evidence to minimize the use of ineffective, excessively costly, or even harmful procedures. However, the volume of literature related to LBP precludes clinicians reading all studies in their fields [4]. Clinical practice guidelines (CPGs) endeavor to locate, evaluate, and summarize the scientific evidence on particular topics and are considered important tools in the implementation of evidence-based medicine [8,13–15]. However, methods for developing CPGs are not yet standardized, which may impact the perceived validity of their recommendations [15,16]. Previous reviews of CPGs for LBP reported that although many recommendations were similar, discrepancies were noted regarding the use of medication, spinal manipulation therapy (SMT), exercise, and patient education [12,17,18]. Conclusions from previous reviews on this topic may no longer be valid because newer CPGs were subsequently published.

Adherence to recommendations from CPGs on the management of LBP has been associated with both improved clinical outcomes and decreased costs [19–22]. However, compliance with such recommendations from CPGs has been consistently low in studies of physicians, chiropractors, PTs, and other clinicians involved in managing LBP [20,21,23–37]. Interventions aimed at increasing compliance with CPGs among health practitioners have reported mixed results [19,28,38–40]. Barriers noted to the adoption of CPGs have included lack of understanding about how they arrive at their recommendations, insufficient clarity to apply them, inconsistency among different CPGs, or disagreement with their recommendations [41].

The primary objective of this study was to synthesize recommendations from recent CPGs to provide guidance to clinicians on evidence-based assessment and management of acute LBP, chronic LBP, and LBP with substantial neurologic involvement, which are defined below. Secondary objectives were to compare methods used in different CPGs, rate their methodological quality, and make suggestions for developing future CPGs related to LBP.

Methods

Information sources

Clinical practice guidelines were primarily identified through electronic searches in MEDLINE (OVID Interface, 1996 to August Week 1, 2009). Searches of the Internet also were conducted as CPGs are rarely published in medical journals [42]. The National Guideline Clearinghouse (www.guideline.gov), Clinical Evidence (clinicalevidence.bmj.com), Intute (www.intute.ac.uk), National Institute for Health and Clinical Excellence (www.nice.org.uk), and other Web sites were searched [43]. Clinical practice guidelines were also identified by scanning the reference lists of previous reviews [12,18].

Search

MEDLINE was searched using an established method that involved combining the following terms: {guideline* (text word) OR recommendation* (text word) OR ''practice guideline'' (medical subheading)} AND ''low back pain'' (medical subheading) [44]. The Internet searches were conducted in a similar manner.

Study selection

Two reviewers (SD and ACT) independently screened the literature search results using predefined eligibility criteria. Conflicts were resolved by discussion until consensus was reached.

Eligibility criteria

Evidence-based CPGs providing information pertaining to the assessment and management of LBP were eligible for inclusion. The CPGs were not limited by country of origin or publication status. However, CPGs were not included if they were not endorsed by a national government agency or professional health provider group, were written in a language other than English, did not include both assessment and management of LBP in their scope, or were focused on a single discipline or intervention. To include recent CPGs based on current evidence, those whose literature search did not extend beyond the year 1999 were also excluded.

Data collection process

A draft data abstraction form was developed, piloted, and modified as necessary. Data were subsequently abstracted by one reviewer and verified independently by another reviewer.

Data items

Abstracted data included CPG characteristics, methods used to develop the CPGs, and scope of CPGs. Recommendations for the assessment and management of LBP were also abstracted.

Risk of bias

The Appraisal of Guidelines Research and Evaluation (AGREE) tool was used to assess the risk of bias [45]. This validated tool consists of 23 items allocated to six domains: 1) scope and purpose (three items), 2) stakeholder involvement (four items), 3) rigor of development (seven items), 4) clarity and presentation (four items), 5) applicability (three items), and 6) editorial independence (two items). Each item is rated from one (strongly disagree) to four (strongly agree). An additional item asks the rater if they would recommend use of the CPG in clinical practice. No summary score is derived for this tool. Two reviewers rated the CPGs independently; conflicts were resolved by discussion until consensus was reached.

Synthesis of results

Recommendations for the assessment of LBP were synthesized according to the main goals, whether they were mostly delivered in primary care (1°), 2°, or tertiary care (3°) settings and for acute LBP, chronic LBP, and LBP with substantial neurologic involvement. Acute LBP was generally defined as symptom duration of less than 3 months, whereas chronic LBP was greater than 3 months. Low back pain with substantial neurologic involvement was generally defined as LBP with moderate, severe, or progressive (collectively termed substantial) signs or symptoms of neurologic dysfunction in the lower extremities secondary to neural impingement from common causes, such as spinal stenosis or intervertebral foramen stenosis; mild radiculopathy, referred pain, and cauda equina syndrome were generally excluded from this category.

Recommendations from CPGs about the use of specific assessment or management options were dichotomized to ''recommended'' if there was strong, moderate, or limited evidence of efficacy (or similar wording), or ''not recommended'' if there was insufficient, conflicting, or evidence against a particular intervention (or similar wording). A distinction was often made in CPGs with respect to weak opioid analgesics (eg, codeine and tramadol) and strong opioid analgesics (eg, oxycodone and morphine); recommendations were categorized accordingly [46]. When CPGs contained multiple recommendations about a particular form of assessment or management, the one contained in its summary was abstracted.

Results

Methods

The search strategy uncovered 669 citations, of which 95 were potentially relevant and 10 were deemed eligible, as summarized in the Figure [7–9,42,46–51]. Two CPGs represented joint efforts by several European countries, including the Netherlands, France, Germany, United Kingdom, Denmark, Finland, Switzerland, and Sweden: one on acute LBP [42] and one on chronic LBP [46]. The two CPGs from the United States originated from the same groups but were published 2 years apart and reported on different aspects of LBP: one mostly on 1° interventions [7] and one mostly on 2° interventions [51]. Most CPGs (n=6) discussed LBP with substantial neurologic involvement [7–9,48,49,51].

All CPGs included at least one PCP and one nonsurgical spine specialist among their authors, in addition to a surgical spine specialist (n=8), PT, or occupational therapist (n=7), and DC or osteopath (n=6). Six CPGs appeared to be endorsed by a national association of PCPs [7,9,47,49–51], four by PTs [8,9,47,49], four by nonsurgical spine specialists [7,9,47,51], three by DCs [8,47,49],

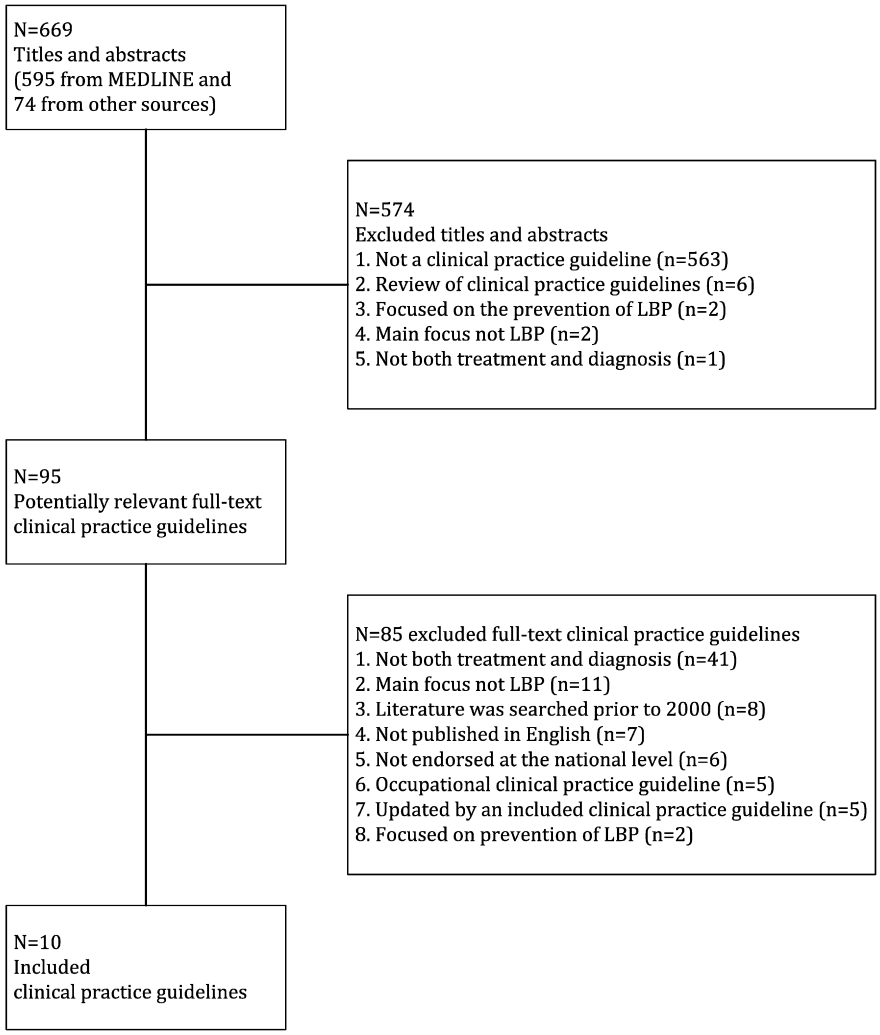

Figure. Study flow: The figure presents the study flow for the systematic review.

and two by surgical spine specialists [9,49]. All CPGs appeared to have been sponsored or funded by their respective national governments, with the exception of those from the United States [7,51]. A slight majority (n=6) discussed potential conflicts of interest among authors [4,7,42,46,48,51].

The most common database searched by CPGs to uncover evidence was the Cochrane Library (n=10), followed by MEDLINE (n=9) and EMBASE (n=7). Five CPGs considered previous CPGs in their review of evidence [8,9,42,47,48], nine included prior systematic reviews (SRs) [7–9,42,46–48,50,51], nine included randomized controlled trials (RCTs) [7–9,42,46–48,50,51], and two included observational studies [42,47]. Clinical practice guidelines most commonly summarized evidence into four levels [42,46,49], although some had as few as three [7,8,51] and as many as eight levels [50]. The highest level of evidence usually required SRs of RCTs or multiple high-quality RCTs. Clinical practice guidelines most commonly assessed study quality using criteria developed by the Cochrane Collaboration [7,9,42,46,48,49,51]. Key methods used by the CPGs are summarized in Table 1.

Methodological quality

The AGREE domain with the highest item scores was scope and purpose (mean, 3.6), whereas the lowest was stakeholder involvement (mean, 2.6). The AGREE items with the highest scores were ‘‘objectives are specifically described’’ and ‘‘recommendations are specific and unambiguous’’ (mean, 3.9 each), whereas the lowest was ‘‘guideline has been piloted among target users’’ (mean, 1.5). The CPGs with the highest number of items rated as four were from Europe on acute LBP and the United Kingdom (18 of 23, 78%) [42,50]; the mean item score for these CPGs was 3.6. The CPGs with the highest number of items rated as one were those from Norway [8] and New Zealand [49] with 6 (6 of 23, 26%) each; the mean item score for those CPGs was 2.6 and 2.4, respectively. Methodological quality according to the AGREE tool is summarized in Table 2.

Table 1
Methods used in clinical practice guidelines about assessment and management of low back pain

	Australia	Belgium	Europe (acute)	Europe (chronic)	Italy	New Zealand	Norway	United Kingdom	United States (1°)	United States (2°)	Count
Reference	[47]	[48]	[42]	[46]	[9]	[49]	[8]	[50]	[7]	[51]	
Funding/ sponsorship	National Health and Medical Research Council	Minister of Public Health and Social Affairs	European Commission and Research Directorate-General	European Commission and Research Directorate-General	Italian Health Ministry	1. Accident Compensation Corporation 2. NZ guidelines group	Ministry of Health and Social Affairs	NICE and NHS	1.American College of Physicians 2.American Pain Society	American Pain Society	
Report											
Full	×	×	×	×		×	×	×			7
Journal			×	×	×				×	×	5
Scope											
Acute LBP	×		×		×	×	×		×		6
Chronic LBP		×		×	×			×	×	×	6
Neurologic involvement		×		×	×	×	×		×	×	7
Clinician authors											
Chiropractor/ osteopath	×		×			×	×	×		×	6
General practitioner/ internist	×	×	×	×	×	×	×	×	×	×	10
Physical/ occupational therapist	×		×	×	×	×	×	×			7
Nonsurgical spine specialist	×	×	×	×	×	×	×	×	×	×	10
Surgical spine specialist			×	×	×	×	×	×	×	×	8
Evidence considered											
Clinical practice guidelines	×	×	×		×		×				5
Systematic reviews	×	×	×	×	×		×	×	×	×	9
RCTs	×	×	×	×	×		×	×	×	×	9
Observational studies	×		×								2
Health technology assessments		×						×			2
Economic evaluations	×	×		×	×		×	×	×		7

Literature search											
CINAHL	×					×		×			3
Cochrane Library	×	×	×	×	×	×	×	×	×	×	10
EMBASE	×	×	×	×		×		×	×		7
Guidelines databases		×						×			2
MEDLINE	×	×	×	×	×	×		×	×	×	9
Other databases		×		×		×		×			4
English only	×					×		×	×	×	5
End of literature search	08/2002	03/2006	10/2003	11/2002	12/2004	02/2002	12/2000	07/2008	11/2006	07/2008	
Publication date	12/2003	02/2007	03/2006	11/2004	06/2006	10/2004	07/2002*	05/2009	10/2007	05/2009	
Months since publication (as of 10/09)	70	32	43	59	40	60	87	5	22	5	10
Levels of evidence†	6	5	4	4	6	4	3	8	3	3	10
Highest	I: SR of RCTs	High—further research very unlikely to change effect	A (strong): consistent SR of high-quality RCTs	A (strong): consistent SR of high-quality RCTs	I: many RCTs or SR of RCTs	A: high-quality SR or RCT	3 (very good): high-quality SR with one high-quality RCT	1++: high-quality SR of RCTs or RCTs	Good: 2 or more consistent, high-quality RCTs	Good: 2 or more consistent, high-quality RCTs	
Lowest	Consensus: no scientific evidence	No evidence	D (none): no RCTs or CCTs	D (none): no RCTs or CCTs	VI: expert opinion/ consensus	D: expert opinion	1 (lacking): no high-quality studies	4: expert opinion/ consensus	Poor: inconsistent high-quality RCTs and low-quality RCTs	Poor: inconsistent high-quality RCTs, low-quality RCTs	

1°, primary care; 2°, secondary care; CINAHL, Cumulative Index to Nursing and Allied Health Literature; NICE, National Institute for Health and Clinical Excellence; NHS, National Health Service; NZ, New Zealand; LBP, low back pain; RCTs, randomized controlled trials; SR, systematic review; CCT, controlled clinical trials.

* Publication date was not provided, so midyear was assumed.

† Levels of evidence are for therapeutic studies only.

Table 2
Methodological quality of clinical practice guidelines about low back pain (AGREE)

	Australia	Belgium	Europe (acute)	Europe (chronic)	Italy	New Zealand	Norway	United Kingdom	US (1°)	US (2°)
Reference	[47]	[48]	[42]	[46]	[9]	[49]	[8]	[50]	[7]	[51]
Scope and purpose										
Overall objectives of the guideline are specifically described	4	4	4	4	3	4	4	4	4	4
Clinical questions covered by the guideline are specifically described	3	3	4	2	3	2	3	4	2	4
Patients to whom the guideline is meant to apply are specifically described	3	4	4	4	4	3	4	4	4	4
Stakeholder involvement										
Guideline development group includes individuals from all the relevant professional groups	4	2	4	4	3	4	4	4	2	2
Patients' views and preferences have been sought	4	1	1	1	1	4	1	4	1	1
Target users of the guideline are clearly defined	4	4	4	4	4	2	4	4	4	4
Guideline has been piloted among target users	2	2	1	1	1	2	1	2	1	2
Rigor of development										
Systematic methods were used to search for evidence	4	4	4	4	3	2	2	4	4	4
Criteria for selecting the evidence are clearly described	4	4	4	4	2	3	2	4	4	4
Methods used for formulating the recommendations are clearly described	4	4	4	4	3	2	3	4	4	4
Health benefits, side effects, and risks have been considered in formulating the recommendations	4	4	4	4	2	3	3	4	4	4
Explicit link between the recommendations and the supporting evidence	4	4	4	4	1	1	4	4	4	4
Guideline has been externally reviewed by experts before its publication	4	4	4	4	3	3	4	4	4	4
A procedure for updating the guideline is provided	3	1	3	3	3	1	1	1	1	4
Clarity and presentation										
Recommendations are specific and unambiguous	4	4	4	4	3	4	4	4	4	4
Different options for management of the condition are clearly presented	4	4	4	4	3	2	3	4	3	4
Key recommendations are easily identifiable	4	4	4	4	3	4	3	4	4	4
Guideline is supported with tools for application	4	3	3	2	4	2	1	3	4	2
Applicability										
Potential organizational barriers in applying the recommendations have been discussed	4	3	4	2	3	1	1	3	1	2
Potential cost implications of applying the recommendations have been considered	4	4	2	4	3	1	3	4	3	3
Guideline presents key review criteria for monitoring and/or audit purposes	3	2	4	3	4	4	2	3	3	4
Editorial independence										
Guideline is editorially independent from the funding body	2	4	4	2	2	1	2	4	2	3

(*continued*)

Table 2 (*continued*)

	Australia	Belgium	Europe (acute)	Europe (chronic)	Italy	New Zealand	Norway	United Kingdom	US (1°)	US (2°)
Conflicts of interest of guideline development members have been recorded	1	4	4	4	1	1	1	4	4	4
Overall score*										
Would you recommend these guidelines for use in practice?	3	3	3	3	2	2	2	3	2	3

AGREE, Appraisal of Guidelines Research and Evaluation; US, United States; 1°, primary care; 2°, secondary care.

* The overall score for the AGREE instrument is not intended to be a sum of the scores for individual questions.

Assessment

There was general agreement among CPGs that the main goals when assessing a patient with LBP were to sequentially rule out potentially serious spinal pathology [7–9,42,46–50], specific causes of LBP [7,9,46,47,50], and substantial neurologic involvement [7–9,42,46–50]. The two additional reported goals of the assessment were to evaluate the severity of symptoms and functional limitations [9,42,46–49] and to identify risk factors for chronicity [7,42,46,47,52]. Findings from CPGs pertinent to each of these goals are discussed below and summarized in Tables 3–4.

Ruling out potentially serious spinal pathology

All CPGs discussed the possibility that symptoms of LBP—in very rare cases—could be because of potentially serious spinal pathology that could be identified with specific red flags, which are signs, symptoms, or patient characteristics that may indicate the need for additional screening to eliminate the possibility of underlying medical conditions. The number of red flags specified in each CPG ranged from 7 to 17, with a mean of 11. Overall, 22 red flags were identified, the most common being age more than 50 (n=9), history of cancer (n=9), and steroid use (n=9); the least common was structural deformity (n=3). Of the 22 red flags, 8 were potentially associated with spinal cancer, 6 with cauda equina syndrome, 5 with spinal fracture, and 5 with spinal infection; 2 red flags (age >50 and urinary retention) were each associated with both cancer and fracture.

Red flags suggesting spinal cancer included a history of cancer, unexplained weight loss, nonresponsiveness to care, night pain, pain at multiple sites, pain at rest, age more than 50, and urinary retention; X-rays and blood tests or magnetic resonance imaging (MRI) were suggested in those patients. Red flags suggesting cauda equina syndrome included fecal incontinence, gait abnormality, saddle numbness, urinary retention, weakness in limbs, and widespread neurologic symptoms; surgical evaluation or MRI was generally recommended in those patients. Red flags suggesting spinal fracture included age more than 50, osteoporosis, steroid use, structural deformity, and trauma; X-rays and blood tests or MRI/computed tomography (CT) were recommended in those patients. Red flags suggesting spinal infection included fever, immune suppression, intravenous drug use, systematic unwellness, and trauma; blood tests and X-rays or MRI were recommended in those patients.

Ruling out specific causes of LBP

Clinical practice guidelines also discussed the need to rule out rare but specific causes of LBP other than serious spinal pathology. Characteristics reported for ankylosing spondylitis included a gradual onset of symptoms, night pain, morning stiffness, symptoms that improve with exercise, alternating buttock pain, and a family history of spondyloarthritis; X-rays of the spine and pelvis along with blood tests were recommended in those patients [7,9]. Characteristics reported for aortic aneurysm included age more than 60, atherosclerosis, pulsating abdominal mass, night pain, pain at rest, and radiating leg pain; referral to a surgeon was recommended in those patients [9]. Other specific causes of LBP reported in CPGs were enteropathic, reactive, or psoriatic spondyloarthritis, as well as endocarditis, nephrolithiasis, or pancreatitis [7,9].

Ruling out substantial neurologic involvement

Clinical practice guidelines generally recommended ruling out substantial neurologic involvement, such as severe lower extremity pain or substantial neurologic deficits indicative of neural impingement or other neurologic conditions. The main tools suggested to accomplish this were the history, including specific characteristics of symptoms in the extremities (eg, location, description, and aggravating/ameliorating factors), physical examination, and neurologic examination [7–9,42,47–50]. The straight leg raise test was discussed as a component of the physical examination but not recommended because of concerns about its validity, reliability, and interpretation [7–9,42,46,48]. A neurologic examination of the lower extremities focused on the myotomes, dermatomes, and deep tendon reflexes of L4, L5, and S1 was recommended [7–9,47]. For LBP with substantial neurologic involvement that did not improve with conservative management, MRI or CT was recommended to identify potential candidates for surgical interventions [7,9,46,48].

Table 3
Recommendations from clinical practice guidelines about assessment of patients with low back pain

	Australia	Belgium	Europe (acute)	Europe (chronic)	Italy	New Zealand	Norway	United Kingdom	United States (1°)	United States (2°)	Count
Reference	[47]	[48]	[42]	[46]	[9]	[49]	[8]	[50]	[7]	[51]	
Goals of assessment											
Assess risk factors for chronicity	×		×	×	×				×		5
Assess severity of symptoms and function	×	×	×		×	×			×		6
Rule out neurologic involvement	×	×	×	×	×	×	×	×	×		9
Rule out potentially serious pathology	×	×	×	×	×	×	×	×	×		9
Rule out specific causes	×			×	×			×	×		5
Medical history											
Pain characteristics	×	×	×		×	×			×		6
Red flags	×	×	×		×	×	×		×		7
Review of systems	×		×						×		3
Risk factors for chronicity	×	×			×	×			×		5
Red flags definition											
Nonmusculoskeletal origins		×									1
Potentially serious disorder	×		×	×		×	×		×		6
Require additional investigation	×	×	×	×	×				×		6
Require urgent evaluation	×				×	×			×		4
Specific cause of LBP		×							×		2
Specific causes of LBP											
Aortic aneurysm	×				×				×		3
Inflammatory disorder	×		×	×	×		×	×	×		7
Examination											
Deep tendon reflexes							×		×		2
Dermatomes	×				×		×		×		4
Manual palpation	×				×		×				3
Manual provocative	×			×			×				3
Myotomes	×				×		×		×		4
Straight leg raise			×		×		×		×		4
Visual inspection	×						×				2
Visual range of motion							×				1
Diagnostic testing (indications)											
X-rays											
Red flags	×	×	×	×	×	×	×		×		8
Blood tests											
Red flags	×				×	×	×		×		5
MRI/CT											
Red flags	×	×	×	×	×	×	×	×	×		9
Neurologic involvement		×		×	×				×		4
EMG/NCV											
Neurologic involvement					×				×		2
None		×		×							2
Risk factors for chronicity											
Compensation issues	×	×	×	×		×			×		6
Emotional issues	×	×	×	×		×	×		×		7
Family problems	×					×	×				3
Fear avoidance behavior	×	×	×	×		×	×		×		7
Inappropriate beliefs	×	×	×	×		×	×				6
Neurologic involvement		×					×				2
Poor job satisfaction	×	×	×	×		×	×		×		7
Prior LBP		×				×					2
Severity of pain		×							×		2
Unrealistic treatment expectations	×	×	×	×		×	×				6

1°, primary care; 2°, secondary care; LBP, low back pain; MRI, magnetic resonance imaging; CT, computed tomography; EMG, electromyography; NCV, nerve conduction velocity.

Table 4
Categories of red flags and recommended follow-up examinations*

	Potentially serious spinal pathology				Diagnostic testing suggested					
Red flag	Cancer	Infection	Fracture	Cauda equina syndrome	X-rays	Blood tests	MRI	CT	Surgical evaluation	References
Age <20					×					[8,42,46,48]
Age >50	×		×		×	×				[7–9,42,46–50]
Fecal incontinence				×			×		×	[7–9,42,49,50]
Fever		×			×	×	×			[7–9,42,46–50]
Gait abnormality				×			×		×	[8,9,42,49,50]
History of cancer	×				×	×	×			[7–9,42,46–50]
Immune suppression		×			×	×	×			[7–9,42,46–48,50]
Intravenous drug use		×			×	×	×			[7–9,42,46–50]
Night pain	×				×	×	×			[7–9,42,46–50]
Nonresponsive to care	×				×	×	×			[7–9,42,46–48,50]
Osteoporosis			×		×	×	×			[7–9,47,50]
Pain at multiple sites	×				×	×	×			[8,9,42,46–48,50]
Pain at rest	×				×	×	×			[8,9,42,46–50]
Saddle numbness				×			×		×	[7–9,42,49,50]
Steroid use			×		×	×	×	×		[7–9,42,46–50]
Structural deformity			×		×					[8,46,48]
Systemic unwellness		×			×	×	×			[8,9,42,46,48,50]
Trauma		×	×		×	×	×	×		[8,9,42,47,49,50]
Unexplained weight loss	×				×	×	×			[7–9,42,46–50]
Urinary retention	×			×			×		×	[7–9,42,47,49,50]
Weakness in limbs				×			×		×	[8,9,42,49,50]
Widespread neurological symptoms				×			×		×	[7–9,42,46–50]

CT, computed tomography; MRI, magnetic resonance imaging.
* References are cited if they recommended any of the diagnostic tests for any of the suspected underlying serious pathology; not all references suggested all forms of diagnostic testing.

Evaluating the severity of symptoms and functional limitations

Several CPGs noted the importance of assessing the severity of pain and other symptoms related to LBP as well as associated physical functional limitations encountered in activities of daily living [7,9,42,47–49]. Although it was generally indicated that validated and standardized outcome measures should be used to accomplish this goal, little specific guidance was offered by CPGs on selecting appropriate questionnaires related to LBP, using this information to evaluate minimum clinically important difference (MCID), or the frequency of reassessment.

Identifying risk factors for chronicity

Almost all CPGs recommended evaluating the presence of risk factors associated with a delayed recovery from LBP, the term yellow flags was often used. Overall, 10 risk factors were identified, 7 of which were psychosocial in nature, including emotional issues (eg, anxiety and depression) and fear avoidance behavior (eg, profound worry of aggravating LBP by doing normal activities).

Management

Findings from CPGs pertinent to the management of acute LBP, chronic LBP, and LBP with neurologic involvement are summarized in Table 5.

Acute LBP

Six CPGs discussed the management of acute LBP and recommended advice to stay active (n=6), brief education about LBP (n=6), acetaminophen (n=5), nonsteroidal anti-inflammatory drugs (NSAIDs) (n=5), SMT (n=5), reassurance (n=5), muscle relaxants (n=4), and weak opioid analgesics (n=4) [7–9,42,47,49]. One CPG recommended massage and none recommended bed rest, back exercises, lumbar supports, acupuncture, biofeedback, transcutaneous electrical nerve stimulation, traction, or ultrasound. Although strong opioid analgesics were recommended by one CPG [7], the recommendations in that particular CPG may have lacked specificity as it combined both weak and strong opioid analgesics [7].

Chronic LBP

Six CPGs discussed the management of chronic LBP and recommended brief education about LBP (n=5), advice to stay active (n=4), back schools (n=4), NSAIDs (n=5), weak opioid analgesics (n=5), back exercises (n=5), and SMT (n=5) [7,9,46,48,50,51]. None recommended bed rest, biofeedback, lumbar supports, heat/cold, traction, or ultrasound for chronic LBP. Recommended 2° interventions included multidisciplinary rehabilitation (n=6), adjunctive analgesics (n=5), behavioral therapy (n=5), strong opioid analgesics

Table 5
Recommendations from clinical practice guidelines about management of patients with acute, chronic, or low back pain and neurologic involvement

	Australia	Belgium	Belgium	Europe	Europe	Italy	Italy	Italy	New Zealand	New Zealand	Norway	Norway	United Kingdom	United States (1°)	United States (1°)	United States (1°)	United States (2°)	United States (2°)
Reference	[47]	[48]	[48]	[42]	[46]	[9]	[9]	[9]	[49]	[49]	[8]	[8]	[50]	[7]	[7]	[7]	[51]	[51]
Type of LBP	Acute	Chronic	Neurologic	Acute	Chronic	Acute	Chronic	Neurologic	Acute	Neurologic	Acute	Neurologic	Chronic	Acute	Chronic	Neurologic	Chronic	Neurologic
Primary care																		
Education																		
Advice to stay active	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	—
Bed rest	No	No	No	No	—	No	No	Yes	No	No	No	No	—	No	No	No	—	—
Brief education on LBP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	—
Back exercises	No	Yes	Yes	No	Yes	No	Yes	No	No	No	Yes	Yes	Yes	No	Yes	Yes	—	—
Reassurance	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	—	—	—	—	—	—	—
Medication																		
Acetaminophen	No	No	No	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	—
Muscle relaxants	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	—	Yes	Yes*	Yes	—	—
NSAIDs	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	—	—
Weak opioid analgesics	No	Yes	Yes	Yes	Yes	Yes	Yes	—	—	—	Yes	—	Yes	Yes	Yes	Yes	—	—
Manual therapy																		
Massage	No	Yes	Yes	No	No	No	No	No	No	No	Yes	—	Yes	No	Yes	Yes	—	—
SMT	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	—
Physical modalities																		
Heat/cold	Yes	No	No	—	No	No	No	No	No	No	No	—	—	Yes†	No	No	—	—
TENS	No	Yes	Yes	No	No	No	No	No	No	No	—	—	No	No	No	No	—	—
Traction	No	No	No	No	No	No	No	—	No	No	No	No	No	—	No	Yes‡	—	—
Ultrasound	—	No	No	—	No	No	No	No	No	No	No	—	No	—	No	No	—	—
Other																		
Acupuncture	No	No	No	—	No	No	No	No	No	No	No	—	Yes	No	Yes	Yes	—	—
Back schools	No	Yes	Yes	No	Yes	Yes	Yes	—	—	—	Yes	Yes	No	No	Yes	Yes	—	—
Biofeedback	No	No	No	—	—	—	—	—	No	No	—	—	—	—	No	No	—	—
Lumbar supports	No	No	No	—	No	No	No	—	No	No	No	—	No	No	No	No	—	—
Secondary care																		
Medication																		
Adjunctive analgesics	—	Yes§	Yes§	—	Yes§	—	Yes¶	—	—	—	—	—	Yes#	No	Yes	Yes	—	—
Strong opioid analgesics	No	Yes	Yes	—	Yes	—	—	—	—	—	—	—	Yes	Yes	Yes	Yes	—	—
Injections																		
ESI	No	No	Yes	No	No		No	Yes	No	No	—	Yes	No	—	—	—	No	No
TFESI	—	Yes	Yes	—	No	—	—	—	—	—	—	Yes	No	—	—	—	—	
Facet injections	No	Yes	Yes	—	No	—	No	—	—	—	—	—	No	—	—	—	No	No
Soft-tissue injections	No	Yes	Yes	—	No	—	No	—	—	—	—	—	No	—	—	—	No	No

Surgery																			
Decompression surgery	—	No	No	—	No	No	—	Yes	Yes	Yes	No	Yes	—	—	—	—	—	—	Yes
Fusion surgery	—	No	No	—	No	No	Yes	—	No	No	No	—	Yes	—	—	—	Yes	—	
Other																			
Behavioral therapy	No	Yes	Yes	No	Yes	—	Yes	—	—	—	Yes	Yes	Yes	No	Yes	—	—	—	
IDET/ nucleoplasty	—	No	No	—	No	—	No	—	—	—	—	—	No	—	—	—	No	No	
Multidisciplinary rehabilitation	No	Yes	Yes	Yes	Yes	—	Yes	—	Yes	Yes	—	—	Yes	No	Yes	Yes	Yes	No	
Tertiary care																			
Spinal cord stimulation	—	Yes	Yes	—	No	—	No	—	—	—	—	—	—	—	—	—	No	No	

1°, primary care; 2°, secondary care; LBP, low back pain; NSAIDs, nonsteroidal anti-inflammatory drugs; SMT, spinal manipulation therapy; TENS, transcutaneous electrical nerve stimulation; ESI, epidural steroid injections; TFESI, transforaminal epidural steroid injection (a type of epidural steroid injection); IDET, intradiscal electrothermal therapy.

* Benzodiazepines recommended only.

† Heat recommended only.

‡ Autotraction recommended only.

§ Noradrenergic and noradrenergic-serotoninergic antidepressants recommended only.

¶ Antidepressants (unspecified) recommended only.

Tricyclic antidepressants recommended only.

(n=4), and fusion surgery (n=3). Facet injections, transforaminal epidural steroid injections (TFESIs), soft-tissue injections, or spinal cord stimulation were only recommended in one CPG [48]. None recommended decompression surgery or intradiscal electrothermal therapy/nucleoplasty.

Low back pain with substantial neurologic involvement

Six CPGs discussed the management of LBP with substantial neurologic involvement and recommended advice to stay active (n=5), brief education about LBP (n=5), acetaminophen (n=4), muscle relaxants (n=4), NSAIDs (n=4), and SMT (n=4) [7–9,48,49,51]. Back exercises and back schools were recommended by three CPGs, whereas massage was recommended by two CPGs. Transcutaneous electrical nerve stimulation, acupuncture, bed rest, and autotraction were each recommended by one CPG. None recommended biofeedback, lumbar supports, heat/cold, or ultrasound. Recommended 2° interventions included ESIs (n=3), multidisciplinary rehabilitation (n=3), behavioral therapy (n=3), and decompression surgery (n=4), followed by TFESIs (n=2), strong opioid analgesics (n=2), and adjunctive analgesics (n=2). Facet injections, soft-tissue injections, and spinal cord stimulation were each recommended by one CPG [48]. None recommended fusion surgery or intradiscal electrothermal therapy/nucleoplasty.

Discussion

Most CPGs originated in Europe, where some countries not only participated in multinational efforts but also developed their own national CPGs. Reasons for doing this were unclear but may be because of a perceived need to adapt ‘‘generic’’ recommendations to the particular societal, cultural, legal, or economic realities of their countries. An equal number of CPGs were related acute and chronic LBP, countering previous reports that relatively few CPGs existed for the management of chronic LBP [46]. It was unclear why two CPGs used much shorter thresholds of 4 to 6 weeks to distinguish acute from chronic LBP rather than the 12 weeks recommended by the Cochrane Back Review Group (CBRG) [53]. Such temporal classifications are somewhat arbitrary, given that patients with LBP often have symptoms that fluctuate over time but facilitate comparison of recommendations when used consistently [50]. It was unclear why some CPGs excluded LBP with substantial neurologic involvement from their scope when this group is often targeted for advanced diagnostic imaging or invasive interventions.

The multidisciplinary nature of managing LBP was evident in the composition of CPG authors. It should be noted that professional associations for PCPs, DCs, PTs, nonsurgical spine specialists, and surgical spine specialists only

endorsed CPGs on which they were represented by at least one author with that type of clinical training. If the goal of CPGs is to make recommendations that will be adhered to by practicing clinicians, representation among their authors seems worthwhile both to inform the content of the recommendations and to secure subsequent endorsement of CPGs by professional organizations. All future CPGs should endeavor to discuss potential conflicts of interest among its authors.

Most CPGs appeared to follow many CBRG recommendations in their literature search, but few included non-English language or unpublished studies [53]. The delay between completing the literature search and publication of the CPG report varied from 10 [50,51] to 32 months [49], with a mean of 19 months. In some cases, recommendations could have become outdated by the time CPGs were published, if new studies appeared in the interim; updated literature searches should be conducted immediately before publication to avoid this scenario. Few CPGs specified the conditions under which they should be updated (eg, every 2 years, whenever new evidence is published that could change recommendations). Considering that CPGs are based on the best available evidence at the time of their literature search, their recommendations have a limited shelf life; the average CPG included in this review is now nearly 4 years old.

Many CPGs relied on previous SRs to identify relevant primary studies, which can be an efficient way to begin a literature search. However, some CPGs also relied on previous SRs for quality assessments, which may overstate the objective nature of that process. Researchers who conduct SRs must make numerous decisions regarding study eligibility, data extraction, and synthesis of results, all of which may impact their quality assessment. Although these criteria are intended to be absolute, the relative quality among the studies considered can also be considered. Because quality assessment is important when determining the level of evidence supporting a recommendation, future CPGs may wish to evaluate methodological quality independently. Future CPGs may also wish to reconsider the number of levels of evidence and qualifiers used in their recommendations because clinicians looking for clear guidance may prefer a simple yes or no.

A synthesis of recommendations regarding the assessment of acute LBP suggests that a history, physical examination, and neurologic examination should be sufficient in the vast majority of patients. Because there were more than 20 red flags proposed in these CPGs, an intake questionnaire could conceivably be devised to ask patients about each one, with clinicians asking appropriate follow-up questions based on those answers. A similar approach could also be taken to screening for specific causes of LBP, such as systemic inflammatory, abdominal, genitourinary, or cardiovascular disorders. A brief physical examination and a neurologic examination of the L5, L5, and S1 dermatomes, myotomes, and deep tendon reflexes should then be conducted. It was estimated that this approach would be sufficient to identify 99% of potentially serious spinal pathology [46].

Should this assessment suggest that potentially serious spinal pathology or specific causes of LBP are present, diagnostic testing, such as X-rays and blood tests, MRI/CT, or urgent surgical evaluation may be appropriate, although few details were provided about management of these disorders. It may be helpful for future CPGs to provide a synopsis of how serious spinal pathology may be managed (eg, decompression surgery for cauda equina syndrome and fusion surgery for spinal fracture with instability). For LBP with substantial neurologic involvement, CPGs generally did not recommend conducting any further assessment until appropriate conservative management (which was rarely defined) had failed, after which MRI or CT was generally recommended. Even in such cases, however, it was suggested that because the goal of advanced imaging was to identify candidates for surgical interventions, those who are not a priori interested in those options may not wish to undergo presurgical assessment.

Despite the widespread use of diagnostic tests for LBP, none of the CPGs reviewed recommended them without specific indications and numerous caveats. It should also be noted that none of the CPGs reported it was necessary, or even beneficial, for a clinician to attempt to identify the specific anatomical structures involved in LBP after having eliminated potentially serious spinal pathology, specific causes, and substantial neurologic involvement [7]. It was even suggested that needlessly ordering diagnostic testing could independently increase the risk of chronicity [52]. In the context of LBP, it may be preferable for both clinicians and patients to accept that assessment is a more feasible objective than diagnosis, which implies a specific pathoanatomic cause that simply cannot be established for the vast majority of LBP [52].

Although most CPGs suggested identifying patients with risk factors for chronicity, only one made any recommendations about what to do when these patients were identified [49]. Because many of the risk factors for chronicity are related to inappropriate beliefs and behaviors about LBP, clinicians may wish to recommend a combination of education and focused cognitive behavioral therapy to overcome these barriers [42,49]. Suggestions were also made to emphasize function over pain when measuring outcomes, to support patients remaining employed, and to schedule frequent reassessments to reinforce these messages [49]. It is unclear if implementing such an approach for patients deemed at high risk of developing chronic LBP would be feasible or cost-effective on a population level.

It was somewhat disappointing for CPGs to recommend that clinicians evaluate the severity of symptoms and functional limitations for LBP without offering some guidance on specific outcome measures. Numerous validated instruments are available to assess pain, including the visual analog scale (0- to 100-mm line), numerical rating scales

(whole numbers from 0 to 10) among many others [54]. Several instruments are also available to measure physical function or disability specific to LBP, including the Roland-Morris disability questionnaire, Oswestry Disability Index, and others [54]. The MCID for many of those instruments has already been established for LBP and corresponds to an improvement of 25% to 35% [54]. Alternatively, a generic health instrument, such as the Short Form-12 can also be used to evaluate physical function, with the added benefits of measuring mental function and yielding utility scores that can be used in health economic evaluations that are currently lacking for LBP [55,56].

The scope of interventions discussed for the management of LBP in each CPG was slightly different, and it was unclear why certain interventions were included or excluded from their literature search and summary recommendations. A synthesis of recommendations for acute LBP suggests that clinicians should educate patients about its etiology (eg, unknown and nonspecific), prognosis (eg, likely to improve within weeks with or without care), recurrence (eg, future occurrences are common), recommend staying active despite discomfort associated with activities of daily living, whereas relying mostly on acetaminophen, NSAIDs, or SMT for short-term symptomatic relief.

Those recommendations also held true for the management of chronic LBP, with the judicious addition of one or more interventions, such as back exercises, behavioral therapy, acupuncture, multidisciplinary rehabilitation, and adjunctive or strong opioid analgesics. Management recommendations for LBP with substantial neurologic involvement were largely similar, although patients who did not improve following conservative management were generally considered appropriate candidates for ESIs or decompression surgery. Future CPGs may wish to provide additional guidance on what constitutes appropriate conservative management, acceptable improvement at various time intervals, and proper escalation of interventions to help both clinicians and patients to determine the next course of action. Such clarification may prevent the unintended interpretation of these recommendations as an endorsement of decompression surgery for patients whose symptoms do not disappear completely after only a few weeks of using common analgesics. Recommendations generally did not support the use of injections, minimally invasive approaches, or surgical procedures for LBP. Although this does not eliminate the possibility that individual patients may benefit from these interventions, current adherence to these recommendations by clinicians appears minimal.

Given the apparent similarity in the recommendations for managing acute LBP, chronic LBP, and LBP with substantial neurologic involvement, it was unclear why some CPGs excluded one or more of these categories from their scope. Although it may be more feasible for sponsors or authors of CPGs to prepare them on limited aspects of the assessment and management of LBP, this approach may not reflect the universe of possibilities routinely faced by stakeholders attempting to choose among the hundreds of available options for LBP [11]. Rather than excluding acute LBP, chronic LBP, or LBP with substantial neurologic involvement, or focusing exclusively on 1°, 2°, or even 3° interventions, future CPGs may simply wish to consider including all aspects of LBP and making simplified sequential sets of recommendations that can be applied to progressively narrower patient populations (eg, recommendations for acute LBP that can also be applied to chronic LBP and LBP with substantial neurologic involvement).

It was noted in some CPGs that trial and error would likely be required when managing LBP as not all patients will respond to the same interventions [47]. It was also reported that no single intervention is likely to completely eliminate symptoms, and that some form of multidisciplinary care may be necessary [46]. This should not be construed as an encouragement for clinicians to simultaneously institute all recommended interventions in a haphazard manner. Although the clinical effects of such an approach are currently unknown, its financial consequences can easily be imagined for all stakeholders. Rather, these observations suggest that limited trials of one or more recommended interventions guided by a clinician familiar with evidence-based assessment and management of LBP may be appropriate. Once initiated, the decision to continue these therapies should be made on the basis of documented improvement noted with periodic outcome measures that surpass the MCID.

Only one CPG suggested specific parameters for some of the recommended interventions for chronic LBP that were based on repeated visits to clinicians. For supervised exercise therapy, a maximum of eight sessions over 12 weeks in a group setting was suggested. For SMT, it was a maximum of nine sessions over 12 weeks. For acupuncture, it was a maximum of 10 sessions over 12 weeks [50]. The evidence on which these parameters were based is unclear, but the concept of applying restrictions to potentially unlimited interventions for chronic LBP appears prudent, given that costs are rapidly escalating while outcomes are generally worsening [57]. This principle should likely apply to all interventions for LBP, modifying the clinical approach and/or patient expectations when measurable outcomes fail to improve.

For a costly, recurring, and non–life-threatening disorder, such as LBP for which there are many competing interventions, none of which can definitely offer a cure, the concept of relative cost-effectiveness should be an important factor when making CPG recommendations. Although six CPGs reported that costs were considered [7–9,46–48,50], only two explicitly included health technology assessments in their literature search [48,50], and only one CPG explicitly summarized cost-effectiveness analyses (CEAs) and cost-utility analyses (CUAs) [50]. Failure to incorporate this aspect more prominently in CPGs may be related to a paucity of high-quality clear

studies related to cost-effectiveness analyses and cost-utility analyses of interventions for LBP [56]. As only one CPG included both a health economist and an information scientist among its authors, it is possible that other CPGs were simply not aware of the pertinent literature or were unable to incorporate its findings into their clinical recommendations [4]. It would also be interesting to compare the recommendations made in these CPGs about specific interventions with the current reimbursement policies of third-party insurers; their effects on clinician adoption of specific recommendations should not be understated.

Study limitations

The results of this review may have been limited by its searching methodology, which focused on English language CPGs indexed in major health databases. Bias may have been introduced by overlooking non-English or unpublished CPGs [58,59]. However, the search methods used were consistent with the study objectives to uncover most relevant methodologically sound CPGs intended for distribution to clinicians [16]. It is also possible that broad recommendations made in CPGs were misunderstood or unintentionally modified when applied to the specific research questions in this review. Although this review attempted to provide a broad summary of high-level evidence, it cannot reflect all the details and nuances located in the CPGs, let alone account for uncertainty in the primary studies that were themselves summarized in those CPGs. Recommendations from evidence-based CPGs often ignore practical realities faced by clinicians, such as ordering diagnostic testing to practice defensive medicine and the reimbursement policies of third-party insurers dictating management recommendations.

Conclusion

A total of 10 CPGs related to the assessment and management of LBP have been published in the past 10 years. Methods for conducting these CPGs varied, but most were of high methodological quality and had generally similar recommendations. Although CPGs differed in their scope with respect to acute LBP, chronic LBP, and LBP with substantial neurologic involvement, recommendations were broadly similar and erecting such barriers when formulating recommendations for clinicians appears somewhat artificial. Recommendations from CPGs suggest that the assessment of patients with LBP should be centered on the history, physical and neurologic examination, and ordering diagnostic testing only when potentially serious spinal pathology or specific causes of LBP are suspected. Management of LBP should focus mostly on patient education, with short-term use of acetaminophen, NSAIDs, or SMT for symptomatic relief of acute LBP, with the judicious addition of opioid analgesics, back exercises, behavioral therapy, or acupuncture for additional symptomatic relief with chronic LBP. Adopting these recommendations should provide satisfactory care for the vast majority of patients with LBP within 1° settings and may decrease the number of patients who unnecessarily seek advanced diagnostic testing or interventions in 2° when not warranted.

References

[1] Cassidy JD, Carroll LJ, Cote P. The Saskatchewan health and back pain survey. The prevalence of low back pain and related disability in Saskatchewan adults. Spine 1998;23:1860–6.
[2] Cassidy JD, Cote P, Carroll LJ, Kristman V. Incidence and course of low back pain episodes in the general population. Spine 2005;30: 2817–23.
[3] Cote P, Cassidy JD, Carroll L. The treatment of neck and low back pain: who seeks care? who goes where? Med Care 2001;39:956–67.
[4] Savigny P, Kuntze S, Watson P, et al. Low back pain: early management of persistent non-specific low back pain. London, UK: Royal College of General Practitioners, 2009.
[5] Martin CR, Gruszczynski AT, Braunsfurth HA, et al. The surgical management of degenerative lumbar spondylolisthesis: a systematic review. Spine 2007;32:1791–8.
[6] Dagenais S, Caro J, Haldeman S. A systematic review of low back pain cost of illness studies in the United States and internationally. Spine J 2008;8:8–20.
[7] Chou R, Qaseem A, Snow V, et al. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. Ann Intern Med 2007;147:478–91.
[8] The Norwegian Back Pain Network. Acute low back pain: interdisciplinary clinical guidelines. Oslo, UK: The Norwegian Back Pain Network, 2002.
[9] Negrini S, Giovannoni S, Minozzi S, et al. Diagnostic therapeutic flow-charts for low back pain patients: the Italian clinical guidelines. Eura Medicophys 2006;42:151–70.
[10] Lind BK, Lafferty WE, Tyree PT, et al. The role of alternative medical providers for the outpatient treatment of insured patients with back pain. Spine 2005;30:1454–9.
[11] Haldeman S, Dagenais S. A supermarket approach to the evidence-informed management of chronic low back pain. Spine J 2008;8:1–7.
[12] Koes BW, van Tulder MW, Ostelo R, et al. Clinical guidelines for the management of low back pain in primary care: an international comparison. Spine 2001;26:2504–13.
[13] Manchikanti L, Heavner JE, Racz GB, et al. Methods for evidence synthesis in interventional pain management. Pain Physician 2003;6:89–111.
[14] Manchikanti L, Abdi S, Lucas LF. Evidence synthesis and development of guidelines in interventional pain management. Pain Physician 2005;8:73–86.
[15] Chou R. Evidence-based medicine and the challenge of low back pain: where are we now? Pain Pract 2005;5:153–78.
[16] Manchikanti L. Evidence-based medicine, systematic reviews, and guidelines in interventional pain management, part I: introduction and general considerations. Pain Physician 2008;11:161–86.
[17] Arnau JM, Vallano A, Lopez A, et al. A critical review of guidelines for low back pain treatment. Eur Spine J 2006;15:543–53.
[18] van Tulder MW, Tuut M, Pennick V, et al. Quality of primary care guidelines for acute low back pain. Spine 2004;29:E357–62.
[19] Becker A, Leonhardt C, Kochen MM, et al. Effects of two guideline implementation strategies on patient outcomes in primary care: a cluster randomized controlled trial. Spine 2008;33:473–80.
[20] Fritz JM, Cleland JA, Brennan GP. Does adherence to the guideline recommendation for active treatments improve the quality of care for patients with acute low back pain delivered by physical therapists? Med Care 2007;45:973–80.

[21] Fullen BM, Maher T, Bury G, et al. Adherence of Irish general practitioners to European guidelines for acute low back pain: a prospective pilot study. Eur J Pain 2007;11:614–23.
[22] Tacci JA, Webster BS, Hashemi L, et al. Clinical practices in the management of new-onset, uncomplicated, low back workers' compensation disability claims. J Occup Environ Med 1999;41:397–404.
[23] Webster BS, Courtney TK, Huang YH, et al. Physicians' initial management of acute low back pain versus evidence-based guidelines. Influence of sciatica. J Gen Intern Med 2005;20:1132–5.
[24] Webster BS, Courtney TK, Huang YH, et al. Survey of acute low back pain management by specialty group and practice experience. J Occup Environ Med 2006;48:723–32.
[25] Walsh L, Menzies D, Chamberlain K, et al. Do occupational health assessments match guidelines for low back pain? Occup Med (Lond) 2008;58:485–9.
[26] Hush JM. Clinical management of occupational low back pain in Australia: what is the real picture? J Occup Rehabil 2008;18:375–80.
[27] Somerville S, Hay E, Lewis M, et al. Content and outcome of usual primary care for back pain: a systematic review. Br J Gen Pract 2008;58:790–7.
[28] Bishop PB, Wing PC. Knowledge transfer in family physicians managing patients with acute low back pain: a prospective randomized control trial. Spine J 2006;6:282–8.
[29] 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.
[30] Gonzalez-Urzelai V, Palacio-Elua L, Lopez-de-Munain J. Routine primary care management of acute low back pain: adherence to clinical guidelines. Eur Spine J 2003;12:589–94.
[31] Jackson JL, Browning R. Impact of national low back pain guidelines on clinical practice. South Med J 2005;98:139–43.
[32] Hourcade S, Treves R. Computed tomography in low back pain and sciatica. A retrospective study of 132 patients in the Haute-Vienne district of France. Joint Bone Spine 2002;69:589–96.
[33] Ammendolia C, Taylor JA, Pennick V, et al. Adherence to radiography guidelines for low back pain: a survey of chiropractic schools worldwide. J Manipulative Physiol Ther 2008;31:412–8.
[34] Swinkels IC, van den Ende CH, van den BW, et al. Physiotherapy management of low back pain: does practice match the Dutch guidelines? Aust J Physiother 2005;51:35–41.
[35] Strand LI, Kvale A, Raheim M, Ljunggren AE. Do Norwegian manual therapists provide management for patients with acute low back pain in accordance with clinical guidelines? Man Ther 2005;10:38–43.
[36] 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.
[37] Poitras S, Blais R, Swaine B, Rossignol M. Practice patterns of physiotherapists in the treatment of work-related back pain. J Eval Clin Pract 2007;13:412–21.
[38] Bekkering GE, Hendriks HJ, van Tulder MW, et al. Effect on the process of care of an active strategy to implement clinical guidelines on physiotherapy for low back pain: a cluster randomised controlled trial. Qual Saf Health Care 2005;14:107–12.
[39] Bekkering GE, van Tulder MW, Hendriks EJ, et al. Implementation of clinical guidelines on physical therapy for patients with low back pain: randomized trial comparing patient outcomes after a standard and active implementation strategy. Phys Ther 2005;85: 544–55.
[40] Rao JK, Kroenke K, Mihaliak KA, et al. Can guidelines impact the ordering of magnetic resonance imaging studies by primary care providers for low back pain? Am J Manag Care 2002;8:27–35.
[41] Cote AM, Durand MJ, Tousignant M, Poitras S. Physiotherapists and use of low back pain guidelines: a qualitative study of the barriers and facilitators. J Occup Rehabil 2009;19:94–105.
[42] van Tulder MW, Becker A, Bekkering T, et al. European guidelines for the management of acute nonspecific low back pain in primary care. Eur Spine J 2006;15(Suppl 2):S169–91.
[43] Canadian Agency for Drugs and Technologies in Health. Grey matters: a practical search tool for evidence-based medicine. Ottawa, Canada: Canadian Agency for Drugs and Technologies in Health, 2009.
[44] Haase A, Follmann M, Skipka G, Kirchner H. Developing search strategies for clinical practice guidelines in SUMSearch and Google Scholar and assessing their retrieval performance. BMC Med Res Methodol 2007;7:28.
[45] AGREE Collaboration. Development and validation of an international appraisal instrument for assessing the quality of clinical practice guidelines: the AGREE project. Qual Saf Health Care 2003;12: 18–23.
[46] Airaksinen O, Brox JL, Cedraschi C, et al. European guidelines for the management of chronic nonspecific low back pain in primary care. COST B13 Working Group on Guidelines for Chronic Low Back Pain, European Commission, 2005.
[47] Australian Acute Musculoskeletal Pain Guidelines Group. Evidence-based management of acute musculoskeletal pain. Brisbane, Australia: Australian Academic Press Pty. Ltd., 2003.
[48] Nielens H, Van Zundert J, Mairiaux P, et al. Chronic low back pain. Good Clinical practice (GCP). Brussels, Belgium: Belgian Health Care Knowledge Centre (KCE), 2006. Report No.: 48 C (D/2006/10.273/71).
[49] Accident Compensation Corporation, New Zealand Guidelines Group. New Zealand acute low back pain guide. Wellington, New Zealand: Accident Compensation Corporation (ACC), 2004.
[50] National Institute for Health and Clinical Excellence (NICE). Low back pain: early management of persistent non-specific low back pain. London, UK: National Institute of Health and Clinical Excellence, 2009. Report No.: NICE clinical guideline 88.
[51] Chou R, Loeser JD, Owens DK, et al. Interventional therapies, surgery, and interdisciplinary rehabilitation for low back pain: an evidence-based clinical practice guideline from the American Pain Society. Spine 2009;34:1066–77.
[52] SBU—Swedish Council on Technology Assessment in Health Care. Back pain, neck pain: an evidence based review. Summary and conclusions. Stockholm, Sweden: SBU—Swedish Council on Technology Assessment in Health Care, 2000. Report No.: 145.
[53] Furlan AD, Pennick V, Bombardier C, van TM. 2009 updated method guidelines for systematic reviews in the Cochrane Back Review Group. Spine 2009;34:1929–41.
[54] Ostelo RW, de Vet HC. Clinically important outcomes in low back pain. Best Pract Res Clin Rheumatol 2005;19:593–607.
[55] Brazier J, Usherwood T, Harper R, Thomas K. Deriving a preference-based single index from the UK SF-36 Health Survey. J Clin Epidemiol 1998;51:1115–28.
[56] Dagenais S, Roffey DM, Wai EK, et al. Can cost utility evaluations inform decision making about interventions for low back pain? A systematic review. Spine J 2009;9:944–57.
[57] Martin BI, Deyo RA, Mirza SK, et al. Expenditures and health status among adults with back and neck problems. JAMA 2008;299:656–64.
[58] Moher D, Pham B, Lawson ML, Klassen TP. The inclusion of reports of randomised trials published in languages other than English in systematic reviews. Health Technol Assess 2003;7:1–90.
[59] Conn VS, Valentine JC, Cooper HM, Rantz MJ. Grey literature in meta-analyses. Nurs Res 2003;52:256–61.