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A systematic review of the effect of waiting for treatment for chronic pain

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Abstract

In many countries timely access to care is a growing problem. As medical costs escalate health care resources must be prioritized. In this context there is an increasing need for benchmarks and best practices in wait-time management. The Canadian Pain Society struck a Task Force in December 2005 to identify benchmarks for acceptable wait-times for treatment of chronic pain. As part of the mandate a systematic review of the literature regarding the relationship between waiting times, health status and health outcomes for patients awaiting treatment for chronic pain was undertaken. Twenty-four studies met the inclusion criteria for the review. The current review supports that patients experience a significant deterioration in health related quality of life and psychological well being while waiting for treatment for chronic pain during the 6 months from the time of referral to treatment. It is unknown at what point this deterioration begins as results from the 14 trials involving wait-times of 10 weeks or less yielded mixed results with wait-times amounting to as little as 5 weeks, associated with deterioration. It was concluded that wait-times for chronic pain treatment of 6 months or longer are medically unacceptable. Further study is necessary to determine at what stage the deterioration begins from the onset of pain to treatment and the impact of waiting on treatment outcomes. Most important is the need to improve access to appropriate care for patients with chronic pain, an escalating public health care problem with significant human and economic costs.

Keywords: Pain; Chronic pain; Waiting times; Pain management; Pain clinics; Health outcomes; Benchmarks

1. Introduction

On October 11, 2004, during the Global Day Against Pain the World Health Organization (WHO), the International Association for the Study of Pain (IASP) and the European Federation of IASP Chapters (EFIC) issued a joint declaration supporting that "The Treatment of Pain Should be a Human Right". Documents released at that time acknowledged that the control of pain has been a neglected area of governmental concern despite the fact that cost-effective methods of pain control are available (Bond et al., 2004). Pain, both acute and chronic, is under-treated, even in developed nations with access

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to the best health care, in part due to timely access to care, which is a growing problem.

A recent study has identified that wait-times for treatment at publicly funded pain clinics across Canada were unacceptably long (over 1 year at 30% of clinics with a range of up to 5 years) and that there were large regions of Canada where there is no access to a pain clinic (Peng et al., 2006). In order to begin addressing this problem, in December 2005, the Canadian Pain Society (CPS) established a taskforce to study wait-times for treatment of chronic pain. As part of the mandate a systematic review of the literature regarding the relationship between waiting times, health status and health outcomes for patients awaiting treatment for chronic pain was undertaken. The current paper presents the results of the systematic review.

2. Methods

2.1. Search strategy

A comprehensive search of peer reviewed and grey literature[1] was conducted to identify studies about wait-times for treatment for chronic pain. These included studies examining the impact of waiting for treatment on health related quality of life (HRQL) as well as studies examining the impact of wait-times on outcomes of treatment for chronic pain. Twenty-two databases were searched using key terms appropriate to the search topic and the database searched (Appendix A). Chronic pain was generally defined as pain that had continued for 6 months or longer. For purposes of the search all studies using the term chronic pain were included, however studies were not excluded on the basis of the definition of chronic pain used.

2.2. Selection criteria and quality assessment

The task force members used a similar screening process to that established by the Canadian Institutes of Health Research (CIHR) funded research team who reported on wait-times for joint replacement surgery (Noseworthy et al., 2005). This process was adapted for studies regarding wait-times for treatment of chronic pain (Fig. 1). An initial broad screen of all abstracts and titles was undertaken by three teams of two independent raters (J.S./F.C., D.G./P.P., A.C./M.L.) for articles containing any content relating to untreated pain and impact on HRQL and/or treatment outcome. These abstracts were then subjected to a second screening using the criteria outlined in Appendix B by two teams of three raters (the rating pairs from the first screen were separated to make up the teams of three (J.S./D.G./M.L., F.C./P.P./A.C.). The full text publications were then reviewed and screened using criteria in Appendix C and references were hand searched for further related papers. Duplicate reports were excluded as were articles regarding wait times for joint replacement, cancer or cardiac care, as this literature has been (joint replacement (Noseworthy et al., 2005)) or will be (cancer, cardiac care) reviewed by the CIHR funded wait times projects for these areas. Throughout the process consensus on disagreements was reached through discussion.

A quality assessment form was adapted from the checklist developed by Downs and Black (1998) for the assessment of methodological quality of health care interventions. This checklist is a 28-item assessment tool examining quality of reporting, internal validity, external validity and has evidence of high internal consistency, test, re-test and inter-rater reliability as well as validity. A 7-point global score is also included where 1 = extensive flaws and 7 = minimal flaws. The adapted checklist used in the wait-times for joint replacement project (Noseworthy et al., 2005) was reviewed by three members of the current task force (F.C./J.S./M.L.) and found to be well suited to the current project. The only modification required was in item 4 where the definition of end of wait was based on when patients received treatment for the pain rather than surgery (Appendix D).

Items are scored 0–1 with a partial score of 0.5 for some items. Items that are not applicable to the paper are not included in the score. The quality index (QI) was calculated by taking the average value of the applicable items and multiplying by 27 to give a total score ranging from 0 to 27.

2.3. Data extraction

Data relevant to the questions of the task force were extracted from the full text articles using the data extraction form in Appendix D. These articles were also rated by two members of the task force[2] using the quality assessment form. The inter-rater reliability of the QI and the global score was assessed with the intra-class correlation coefficient (ICC). The Spearman correlation coefficient was used to determine the relationship between raters QI scores and the global assessment score. The final quality score for each paper consisted of the mean of the QI scores given by the two independent raters.

3. Results

3.1. Results of search

The search produced 3811 abstracts. The initial screening process produced 95 abstracts. The second screening (Appendix B) produced 20 abstracts for which the full text publications were retrieved. On review of the full text articles 12 were rejected having failed to reveal information relevant to the task force questions as presented in Appendix C, leaving 8 papers meeting the inclusion criteria. The hand search

[1] Grey literature consists of non-conventional and semipublished works such as technical and research reports, dissertations, conference materials, discussion and working papers and government reports.

[2] Or one member of the task force and a trained research assistant.

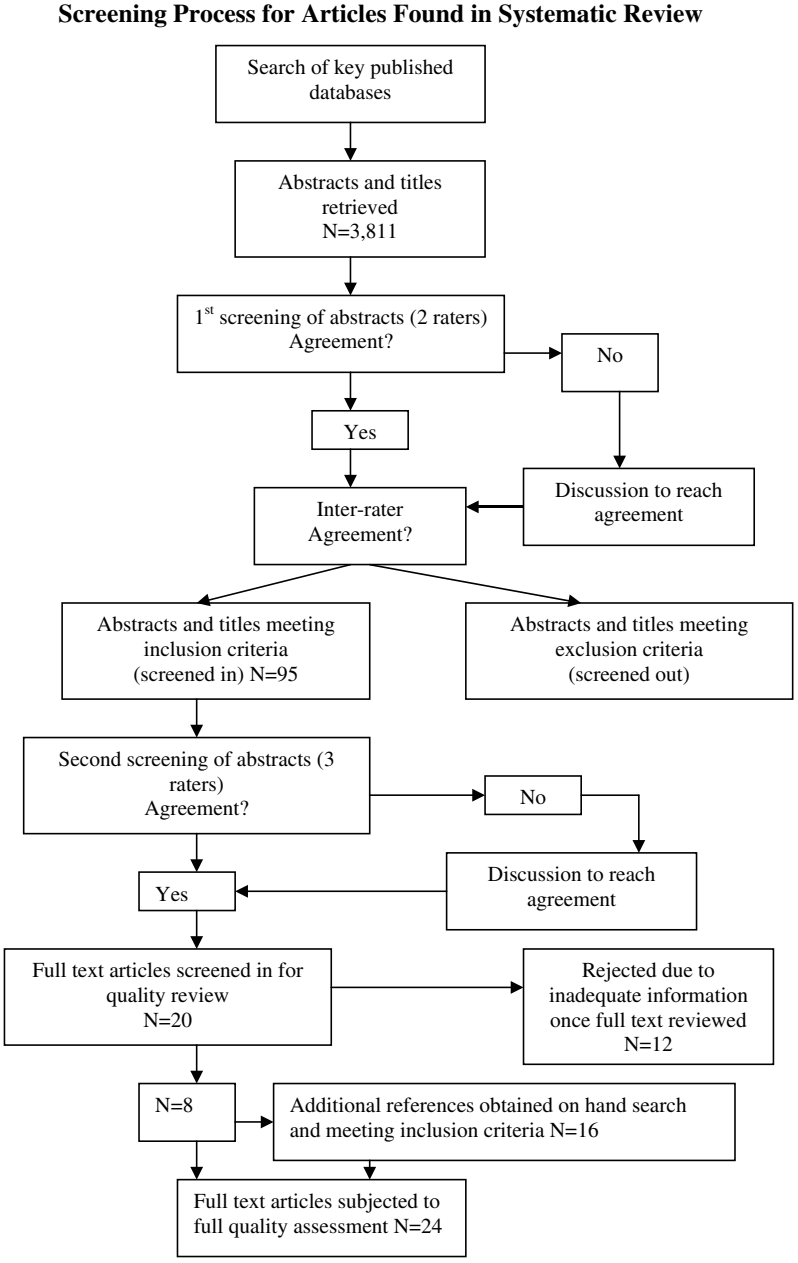

Fig. 1. Screening process for articles found in systematic review.

revealed 16 further articles containing information related to the objectives of the task force. Thus a total of 24 articles were subjected to full quality assessment (Table 1).

3.2. Results of review

The results of the review are discussed under two subheadings:

1. The relationship between waiting time and health status and HRQL while waiting.
2. The relationship between waiting time and outcomes of treatment for chronic pain.

3.2.1. The relationship between waiting time on health status and HRQL while waiting

There were 23 controlled trials that included information regarding the impact of waiting for treatment for chronic pain on health status, clinical condition or HRQL (Table 3). In these studies the main focus was to examine efficacy of various treatments for chronic pain. There were no controlled trials examining the

Table 1
Description of studies included in the review

First author	Year of publication	The relationship between wait time and health status while waiting	The relationship between wait time and health outcomes
Barlow	2000	X	
Becker	2000	X	
Cedraschi	2004	X	
Douglas	2004	X	
Fransen	1998	X	
Gustafsson	2002	X	
Haas	2005	X	
Hurst	2000	X	X
Kerns	1986	X	
Kole-Snijders	1999	X	
Larsson	1990	X	
Moore	1985	X	
Newton-John	1995	X	
Nikolakis	2001	X	
Nouwen	1983	X	
Ordeberg	1991		X
Puder	1988	X	X
Spence	1989	X	
Turner	1982	X	
Turner	1988	X	
Turner	1990	X	
Turner	1993	X	
Vlaeyen	1996	X	
Williams	1996	X	

Table 2
Quality assessment scores of accepted reviewed full papers

Reference	Rater 1 (M.L./J.S./J.C.)		Rater 2 (F.C./D.G./P.P./S.B.P.[a])	
	QI	GS	QI	GS
Barlow et al. (2000)	20.8	6	21.6	5
Becker et al. (2000)	24.3	6	24	7
Cedraschi et al. (2004)	24.9	6	23.8	5
Douglas et al. (2004)	18.7	5	18.6	4
Fransen et al. (1998)	26.5	6	22.8	5
Gustafsson et al. (2002)	18.6	6	18.6	5
Haas et al. (2005)	20.9	5	23.5	7
Hurst et al. (2000)	20.4	5	24.9	6
Kerns et al. (1986)	21.3	6	22.7	5
Kole-Snijders et al. (1999)	21.6	5	27	7
Larsson et al. (1990)	17.3	4	22.1	4
Moore and Chaney (1985)	18	4	21.6	5
Newton-John et al. (1995)	18.7	6	21.1	5
Nicolakis et al. (2001)	19.6	6	18.6	3
Nouwen (1983)	17	5	18.9	4
Ordeberg et al. (1991)	6.4	3	7.9	1
Puder (1988)	21.5	4	23.8	5
Spence (1989)	23.2	6	21.9	5
Turner (1982)	5.4	2	22	5
Turner and Clancy (1988)	17	4	23.8	6
Turner et al. (1990)	22.8	7	23.2	6
Turner and Jensen (1993)	17.5	4	22.8	5
Vlaeyen et al. (1996)	23.4	5	21.8	6
Williams et al. (1996)	25.5	6	23.4	6

[a] S.B.P. research assistant, QI, quality index; GS, global score.

specific question as to what happens to patients while they wait, however, these studies were of interest to the Canadian Pain Society Wait Times Task Force (CPSWT) because they contained a wait listed control group with baseline and follow-up measures. Three of these studies related to patients awaiting uni-modal treatment such as physiotherapy targeting osteoarthritis of the knee (Fransen et al., 1998), exercise therapy for internal derangement of the temporomandibular joint (Nicolakis et al., 2001) or EMG biofeedback targeting para-spinal muscle tension in low back pain (Nouwen, 1983). One study examined a group of participants recruited by the Arthritis Care Branch Network and wait-listed for an arthritis self-management program delivered by lay leaders (Barlow et al., 2000) and another study recruited community dwelling seniors who then awaited a self-management program delivered by lay leaders weekly over 6 weeks (Haas et al., 2005).

The CPSWT was primarily interested in studies about patients with chronic pain who were waiting for treatment at a pain centre, pain clinic or for multidisciplinary treatment targeting chronic pain, these studies as well as those pertaining to cognitive or cognitive-behavioral treatments are listed in Table 4. The trials are listed in the order of the length of time the wait-listed group had to wait for treatment.

Fourteen trials involved a wait-time of 10 weeks or less, of these six demonstrated no change (Kerns et al., 1986; Puder, 1988; Newton-John et al., 1995; Vlaeyen et al., 1996; Hurst et al., 2000; Douglas et al., 2004), five a deterioration (Turner, 1982; Moore and Chaney, 1985; Spence, 1989; Larsson et al., 1990; Kole-Snijders et al., 1999) and three improvements (Turner and Clancy, 1988; Turner et al., 1990; Turner and Jensen, 1993) in the trial outcome measures over the wait-listed period.

Four trials involved a wait-time of 12 weeks or longer (Williams et al., 1996; Becker et al., 2000; Gustafsson et al., 2002; Cedraschi et al., 2004). In these trials all but one demonstrated significant deterioration in outcome measures over the time patients waited for treatment. The study which demonstrated no change in the wait listed group involving a wait-time of 12 weeks was designed to compare an inpatient versus outpatient cognitive-behavioral pain management program in the treatment of mixed chronic pain. (Williams et al., 1996). Patients were randomly assigned to one of three conditions; inpatient pain management, outpatient pain management or a wait-list control. The wait-list control group consisted of 30 patients. Measures included the Beck Depression Inventory (BDI), Multidimensional Pain Inventory (MPI), Pain Self-Efficacy Questionnaire (PSEQ), Spielberger State-Trait Anxiety Inventory (STAI), Coping Strategies Questionnaire (CSI) and

the Pain Cognitions Questionnaire (PCQ) as well as physical measures described as a 10-min walk, 2-min stair climb and 2-min stand-ups. Wait-listed controls were assessed at "pre-treatment" and again 12 weeks later without new treatments initiated during this time. Analysis of the wait-list control group data showed no statistically significant changes over the 3-month waiting time.

A second study involving a 12-week wait sought to evaluate the efficacy of a 12-week multidisciplinary rehabilitation program, mainly emphasizing physiotherapy for patients with fibromyalgia or chronic widespread pain (Gustafsson et al., 2002). Outcome measures included Body Awareness Scale-Health (BAS-H), visual analog scales (VAS) for pain intensity, the Quality of Life Scale (QLS) and Multidimensional Pain Inventory (MPI). Groups were assessed at baseline and again at 3 and 6 months. The control group showed significant deterioration after 3 and 6 months in three of the main scales of the BAS-H, with a trend toward less satisfaction on the QLS and more interference on the MPI after 6 months but not to a statistically significant degree.

Two other studies involved patients who waited for up to 6 months. One investigated the effect of outpatient multidisciplinary pain centre treatment compared with treatment by a general practitioner after initial supervision by a pain specialist and a wait-list control group (Becker et al., 2000). All patients referred to the multidisciplinary pain centre were consecutively considered for inclusion in the study, consenting patients were randomly assigned to one of the three groups. A total of 167 patients participated 53 of whom were included in the wait-list group. At inclusion and after 3 and 6 months patients completed questionnaires evaluating pain intensity, HRQL, Medical Outcome Study-Short Form, SF-36, Hospital Anxiety and Depression Scale (HAD) and the Psychological General Well Being Scale (PGWB). In the wait-list group pain intensity remained stable but a statistically significant deterioration was observed in PGWB, HAD and 5 out of 8 of the SF-36 sub-scores over the 6 months observation period.

Another 6-month randomized controlled trial evaluated an outpatient multidisciplinary program for patients with fibromyalgia compared to a wait listed control group (Cedraschi et al., 2004). One-hundred and sixty-four patients took part in the trial of which 68 completed the 6 month follow-up period in the wait-list control condition. Participants were evaluated at baseline and at 6 months follow-up. Outcome measures included the PGWB index, SF-36, subscales of the Fibromyalgia Impact Questionnaire (FIQ) and a physician clinical global impression scale. At 6 months significant deterioration was noted in the FIQ subscale for pain and the physician's clinical rating with deterioration noted in sub-scores on the PGWB (depression and general health) and the SF-36 (role-physical and social functioning).

In summary there were 18 controlled trials containing information about wait-list control groups with chronic pain who were waiting for treatment at a pain centre, pain clinic or multidisciplinary treatment centre targeting chronic pain which contained information regarding the relationship between waiting time and health status and HRQL while waiting. These studies examined outcomes to the treatment as compared to a wait list control and did not go into detail regarding health impact in the wait-list group. In addition it is difficult to compare studies as populations and outcome measures varied widely. However, given these limitations, there remains evidence to support that waits for treatment of 6 months are associated with significant deterioration in HRQL and psychological general well being with worsening of depression scores. Based on information to date it cannot be determined at what stage this deterioration begins although even at less than 12 weeks some patients show deterioration.

3.2.2. The relationship between waiting time and outcomes of treatment for chronic pain

There were no controlled studies examining the impact of wait-times on outcomes of treatment for patients with chronic pain. There were three papers containing potentially relevant information (Table 1). The first involved a study regarding "non-urgent" patients referred to a rheumatology service for treatment. This study included a measure of pain as one of the primary outcome measures and was therefore included in this review (Hurst et al., 2000). This was a randomized controlled trial evaluating a "fast track appointment" with a 6-week target waiting time against an "ordinary appointment". Patients considered to be "urgent by the consultant or experienced registrar according to clinical information provided by the referring general practitioner" were excluded from the study. Of the 250 patients considered to be non-urgent, 180 gave consent with 96 being randomized to a "fast-track" and 84 assigned an "ordinary" appointment. Pain and physical function were the primary health outcomes and were measured using a VAS for pain intensity and the SF12 physical component summary score. Actual mean waiting times were 43 days for the "fast-track" group and 105 days for the "ordinary" appointment group. There was no significant difference in the fast track versus ordinary group at the time of clinic appointment, 1 month post or 15 months on the primary outcome measures. All participants demonstrated no change at 1 month and improvements in pain,

Table 3
Data extraction from articles containing a wait list control group

First author	Year	Total N (WL group)	Study population	Information relevant to wait times task force	Effect of waiting
Barlow	2000	544 (233)	Patients recruited through advertisements regarding a 6-week arthritis self-management program. Program was given by lay leaders with arthritis	All patients received assessment, 311 received immediate treatment and 233 became the ''wait list control'' waiting *4 months* for treatment, in this case the ''control group'' experienced a small but statistically significant improvement in arthritis self-efficacy (ASE scale)	Small improvement
Becker	2000	167 (53)	Patients with chronic non-cancer pain who had been referred to a multidisciplinary pain centre in Copenhagen	After waiting *6 months* for treatment patients exhibited statistically significant deterioration on the PGWB, the HAD and 5 of 8 subscales on the SF-36.	Deterioration
Cedraschi	2004	164 (80)	Volunteers from among fibromyalgia patients referred to divisions of rheumatology and re-education at Geneva University Hospital interested in a 12 session multidisciplinary self-management program	The *6 month* wait-listed control group experienced significant deterioration on the FIQ for pain, and deterioration on physician clinical rating while awaiting a 12 session multidisciplinary self-management program	Deterioration
Douglas	2004	152 (48)	Consecutive patients with chronic pain attending a multidisciplinary pain management program in Fremantle Australia	''Control'' patients were tested at baseline and *5 weeks* later without having received treatment No change in pain (VAS), mood (ZDS) or HRQL (SF-36) over 5 weeks while waiting	No change
Fransen	2001	(43)	Patients referred for physical therapy for osteoarthritis of the knee	There was no significant difference in pain or function after *8 weeks* without treatment in 43 patients assigned to the 'waiting list control group'' No change in pain or function (WOMAC), HRQL (SF-36) or response to physical therapy over 8 weeks while waiting	No change
Gustafsson	2002	43 (17)	Women with fibromyalgia referred to the Hospital for Rheumatology and Rehabilitation in Ostersund, Sweden awaiting a multiprofessional rehabilitation program	Wait list control group showed deterioration after *3 and 6* months in 3 of the main scales of the BAS-H	Deterioration
Haas	2005	101 (47)	Community dwelling seniors with mechanical low back pain awaiting a self-management workshop delivered by lay leaders	Pain, disability, self-efficacy and general health did not change significantly over the *6 month* wait according to the MVK, ASE and SF-36. Note; Approximately 10% of those assigned to the wait-list refused allocation to the control group saying the wait was too long	No change
Hurst	2000	180 (84)	Non-urgent referrals to the main rheumatology outpatient clinic for Edinburgh, UK	No significant difference in pain (VAS) or function (SF12-PCS) at 1 month and 15 months post-consultation between non-urgent rheumatology patients who waited 1.4 vs 3.5 months for assessment.(ie. *2 months* additional wait resulted in no significant change in pain or function)	No change
Kerns	1986	28 (8)	Consecutive patients referred to the Pain Management Program at the West Haven VA Medical Center, and awaiting cognitive-behavioral treatment	There was no significant change in pain severity (MPQ and 5 point NRS), affective distress (BDI) or impact of pain (WHYMPI) while waiting over *10 weeks* in the wait list group	No change
Kole-Snijders	1999	148 (31)	Patients with chronic low back pain referred to the Hoensbroeck Rehabilitation Center awaiting cognitive-behavioral treatment for chronic low back pain	After *10 weeks* waiting there was a significant increase in negative affect (BDI) and a decrease in coping (CSQ) and control (MPLC)	Deterioration

Larsson	1990	48 (17)	Adolescents with chronic recurrent tension headache who responded to an announcement letter delivered to their classroom awaiting self-help relaxation training and muscle relaxant medication	Adolescents waiting *5 weeks* experienced increased headache activity with increased frequency and peak intensity of headache	Deterioration
Moore	1985	43 (12)	Patients from any hospital service at the Northwestern Veterans Administration Hospital in Seattle, WA, with chronic pain referred for outpatient group treatment	After waiting *6–8 weeks* for treatment wait listed controls exhibited deterioration in pain (VAS), depression (MMPI-168 depression scale) and pain related dysfunction (SIP)	Deterioration
Newton-John	1995	44 (12)	Patients with chronic low back pain doctor or self-referred through media publicity awaiting EMG Biofeedback vs cognitive-behavioral therapy	Essentially no significant change over *4 weeks* on a variety of measures of pain (NRS), mood (BDI) disability (PDI)	No change
Nikolakis	2001	15	Patients attending the Craniomandibular Disorders service Department of Dentistry, University of Vienna willing to participate in exercise therapy for internal derangement of the TMJ	"Control" period of waiting was *unspecified* and consisted of time between assessment and treatment. While waiting there was no significant change in pain but 6/20 participants experienced moderate-distinct deterioration in subjective impairment in daily activities on a VAS	Deterioration
Nouwen	1983	20 (10)	Patients with chronic low back pain awaiting EMG biofeedback training	There was no significant difference in paraspinal EMG or pain levels (5 point scale) over *3 weeks* in wait-listed patients	No change
Ordeberg	1991	51	Patients awaiting surgery for pelvic or lumbar external fixation	Report on 51 patients waiting an average of *4 years* for evaluation of lumbar or pelvic pain, found only 11 patients were still working full time and 6 half-time, authors conclude poor prognosis for return to work if untreated/	Deterioration
Puder	1988	69 (38)	Patients with chronic pain and no serious medical disorders who responded to a request for volunteers for a treatment study recruited from clinics and advertisements	Patients were randomly assigned to immediate cognitive-behavioral group or group delayed by *10 weeks.* Those who waited demonstrated no significant change in pain intensity (6 point NRS) or pain interference (5 point NRS) over 10 weeks, and after treatment exhibited similar decrease in perceived pain interference and increased coping to those who did not wait.	No change
Spence	1989	45 (16)	Patients with occupational pain of the upper limbs referred by GP or applying directly following media publicity then awaiting cognitive-behavior therapy	During the *9-week* waiting period patients in the wait list control group demonstrated deterioration on the BDI, STAI, pain (MPQ) and self-monitored interference in daily living	Deterioration
Turner	1982	36 (9)	Patients with chronic low back pain referred by orthopedic surgeons and judged to have undergone adequate trial conservative medical treatment, then awaiting relaxation and cognitive-behavioral group therapy	Patients in the wait list condition for *5 weeks* demonstrated a significant increase in pain ratings according to a VAS	Deterioration
Turner	1988	81 (21)	Mildly dysfunctional patients with chronic low back pain referred by physicians or self-referred following media publicity to take part in the study then, awaiting behavioral group treatment	After pre-treatment assessment and an *8-week wait*, wait-listed patients experienced significant improvement in pain related dysfunction (SIP)	Improved
Turner	1990	96 (23)	Patients with chronic low back pain referred to the study by physicians or self-referred following media publicity then awaiting behavioral therapy	*8-week* wait between pre-treatment and post-treatment assessments, no within group analysis on main outcomes, all patients improved on fitness measures	Slight improvement in fitness testing
Turner	1993	102 (18/30)	Patients with chronic low back pain referred to the study by physicians or self-referred following media publicity then cognitive therapy	After pre-treatment assessment and *6-week* wait all groups including the wait list control exhibited improvements in disability (SIP), and depression (BDI)	Improved

(*continued on next page*)

Table 3 (*continued*)

First author	Year	Total N (WL group)	Study population	Information relevant to wait times task force	Effect of waiting
Vlaeyen	1996	131 (43)	Patients with fibromyalgia referred by the department of rheumatology of a regional general hospital then awaiting cognitive educational treatment	No significant changes in pain coping or control over an 8-week period while awaiting cognitive educational treatment (CSQ, MPQ, MPLC)	No change
Williams	1996	121 (33)	Patients with chronic pain referred to the Pain Management Unit for treatment from throughout the UK then awaiting cognitive-behavioral treatment as either an inpatient or an outpatient	No statistically significant change identified in pain intensity[a], depression (BDI) or coping (PCQ) over the 12-week wait for treatment	No change

VAS = Visual Analog Scale.
HRQL = Health related QOL.
ASE Scale = Arthritis Self-Efficacy Scale (Lorig et al., 1989).
BAS-H = Body Awareness Scale-Health (Gyllenstein et al., 1999).
BDI = Beck Depression Inventory (Beck et al., 1979).
CSQ = Coping Strategies Questionnaire (Rosensteil and Keefe, 1983).
FIQ = Fibromyalgia Impact Questionnaire (Burckhardt et al., 1991).
HAD = Hospital Anxiety and Depression Scale (Zigmond and Snaith, 1983).
MMPI-168 = Minnesota Multiphasic Personality Inventory (Overall and Gomez-Mont, 1974).
MPLC = Multidimensional Pain Locus of Control Questionnaire (ter Kuile et al., 1993).
MPQ = McGill Pain Questionniare (Melzack, 1987).
MVK = Modified Von Korff Scales, a series of 11 point numeric rating scales for pain and disability (Underwood et al., 1999).
NRS = Numeric Rating Scale.
PDI = Pain Disability Index (Tait et al., 1987).
PGWB = Psychological General Well Being Index (Dupuy, 1984).
SF-36 = Medical Outcomes Study Short Form is a validated, extensively used self-report questionnaire measuring 8 dimensions of health status (Ware and Sherbourne, 1992).
SF-12-PCS = SF-12 Physical Component Summary Score(Ware et al., 1995).
SIP = Sickness Impact Profile (Bergner et al., 1981).
STAI = Speilberger State -Trait Anxiety Inventory (Speilberger et al., 1970).
WHYMPI = West Haven-Yale Multidimensional Pain Inventory (Kerns et al., 1985).
WOMAC = Western Ontario and McMaster Universities Arthritis Index, a validated disease specific self-report questionnaire using VAS to assess pain and physical disability (Bellamy et al., 1988).
ZDS = Zung Depression Scale (Main and Waddell, 1984; Main et al., 1992).
[a] difficult to determine source of outcome.

Table 4
Studies containing information regarding patients with chronic non-cancer pain conditions waiting for multidisciplinary or cognitive-behavioral treatment programs

First author	Year	Study population	Length of wait	Effect of Waiting
Newton-John	1995	Patients with chronic low back pain awaiting cognitive-behavioral treatment	4 weeks	No change
Douglas	2004	Patients with chronic pain awaiting a multidisciplinary pain program	5 weeks	No change
Larsson	1990	Adolescents with tension headache awaiting self-help relaxation training and muscle relaxant medication	5 weeks	Deterioration
Turner	1982	Patients with low back pain awaiting relaxation and cognitive-behavioral group therapy	5 weeks	Deterioration
Turner	1993	Patients with chronic low back pain awaiting cognitive therapy	6 weeks	Improved
Moore	1985	Patients with chronic pain awaiting outpatient group treatment	6–8 weeks	Deterioration
Turner	1988	Mildly dysfunctional patients with chronic low back pain awaiting behavioral group treatment	8 weeks	Improved
Turner	1990	Patients awaiting behavioral therapy for chronic low back pain	8 weeks	Slight improvement in fitness testing
Vlaeyen	1996	Patients with fibromyalgia referred for cognitive-educational treatment	8 weeks	No change
Hurst	2000	Non-urgent rheumatology outpatient referrals	8 weeks	No change
Spence	1989	Patients with occupational pain of the upper limbs awaiting cognitive-behavior therapy	9 weeks	Deterioration
Puder	1988	Patients with chronic pain awaiting a cognitive-behavioral group	10 weeks	No change
Kole-Snijders	1999	Patients awaiting cognitive-behavioral treatment for chronic low back pain	10 weeks	Deterioration
Kerns	1986	Patients referred to a cognitive-behavioral pain management program	10 weeks	No change
Williams	1996	Patients with chronic pain referred to cognitive-behavioral pain management unit	12 weeks	No change
Gustafsson	2002	Patients with fibromyalgia awaiting multiprofessional rehabilitation programe	12 and 24 weeks	Deterioration
Becker	2000	Chronic non-cancer pain awaiting multidisciplinary treatment	24 weeks	Deterioration
Cedraschi	2004	Fibromyalgia patients awaiting an outpatient multidisciplinary program	24weeks	Deterioration

physical and mental health status by 15 months regardless of length of wait. The actual treatment program was not described.

The second study explored the effectiveness of cognitive-behavioral group therapy for chronic pain based on age of the patient (Puder, 1988). Participants consisted of volunteers with chronic pain who responded to a request for volunteers for a treatment study. Participants were screened and randomized to immediate or delayed treatment. The delayed treatment group received the group treatment after waiting 10 weeks and completed the outcome measures at randomization, after 10 weeks wait and again after completing treatment described as "delayed". It was therefore possible to compare the outcomes of the immediate versus delayed treatment group. The authors indicated that the wait-list control group exhibited similar decreases in perceived pain interference with activities and increases in coping skills with no significant change in high and low pain intensity ratings replicating the results obtained from the immediate-treatment group. These findings suggest that a wait of 10 weeks did not lead to significant changes in outcomes between the two groups.

A third uncontrolled study reported on a group of 51 patients waiting an average of 4 years for evaluation of lumbar or pelvic pain with a view to external fixation. This paper found that only 11 patients were still working full-time and 6 half-time while they continued to wait. The authors concluded a poor prognosis for return to work if patients were left untreated (Ordeberg et al., 1991).

There were no trials examining the impact of waiting on outcomes for multidisciplinary pain treatment. The studies reviewed above have identified that an additional wait of 2 months did not affect the health outcomes of patients deemed to be non-urgent who were referred to a rheumatology service (Hurst et al., 2000), a wait of 10 weeks for cognitive-behavioral group therapy did not significantly change the outcome in a group of people with chronic pain who volunteered for a treatment study (Puder, 1988) and that patients awaiting evaluation for external fixation for lumbar or pelvic pain may have a poor prognosis for returning to work if left untreated (Ordeberg et al., 1991), but shed no light on the impact of waiting for treatment of chronic pain on health outcomes subsequent to multidisciplinary treatment.

3.3. Quality assessment

3.3.1. Mean and standard deviation of QI and global scores

Quality assessment scores are presented in Table 2. The mean QI was 19.6 for rater 1 (SD = 5.1), 21.7

for rater 2 (SD = 3.6), and 20.7 for the average of the two ratings (SD 3.9). The mean global score was 5.1 for rater 1 (SD = 1.2), 5.1 for rater 2 (SD = 1.3), and 5.1 was the average of the two ratings (SD = 1.0).

3.3.2. Inter-rater reliability

The inter-rater reliability of the QI and the global score was assessed using the intraclass correlation coefficient (ICC). The ICC is the estimate of $\sigma_b^2/(\sigma_b^2+\sigma_w^2)$ in the one-way random effects ANOVA model where each rating of paper i is assumed to be normally distributed with mean μ_i, variance σ_w^2, and μ_i is normally distributed with variance σ_b^2. The ICC is therefore a measure of the ratio of the *between papers* variance to the sum of the *between papers* variance and the *within papers* (between raters) variance. A value near zero suggests that there is no variation in quality between papers. A value greater than zero suggests that there is variation between papers. The larger the ICC, the larger the variation between papers relative to the variation between raters. A value of 1 would imply that there is no variation between raters (i.e. perfect agreement between raters). The variances σ_b^2 and σ_w^2 are estimated by mean squares $(MS_b - MS_w)/2$ and MS_w, respectively, which leads to the result $ICC = (MS_b - MS_w)/(MS_b + MS_w)$.

The ICC for the QI was 0.50 ($p < .05$) and for the global score it was 0.32 ($p = .056$). A significant p-value in the case of the QI indicates that the variation in quality between papers was marked ($\sigma_b^2 > 0$). In the case of the global score, the variation between papers was only marginally significant and may have resulted from variation between raters.

3.3.3. Spearman correlations between QI and global score

The Spearman correlation between QI and global score was 0.67 based on rater 1's scores ($p = .0003$), and 0.76 based on rater 2's scores ($p < .0001$). The correlation between the average of the two QI ratings and the average of the two global scores was 0.75 ($p < .0001$).

3.3.4. Spearman correlations between team 1 and team 2

The Spearman correlations between "team 1 (ML/JS/JC)" and "team 2 (F.C./D.G./P.P./S.B.P.)" were 0.47 for QI and 0.20 for the global score. This is consistent with the ICC findings above in terms of the strength of association.

4. Discussion

A systematic review of the literature regarding the relationship between waiting times, health status and health outcomes for patients awaiting treatment for chronic pain was undertaken. Twenty-four studies met the inclusion criteria for the review. In all but one study the primary focus was to determine the effectiveness of a particular type of treatment as compared to a wait-list control group rather than to examine health status of those waiting. Thus the details of within groups analyses on the wait-list control group were often very brief with minimal or no comment by the authors. Results of the quality assessment revealed the studies were generally of good quality with a mean QI of 20.7 (range 5.4–26.5 out of 27 possible points).

The studies varied widely in study design, study population, treatment administered, sample size, waiting time and outcome measures for pain, HRQL and psychological well being. Many of the studies examined populations recruited through advertisements and were from community based populations, who subsequent to screening, were then randomized to active treatment or a wait-list. This is quite a different situation from that of a patient who has been referred to a pain clinic who is waiting for assessment and care for the chronic pain condition. Given these limitations one must use caution in interpreting the results.

The evidence obtained in the current review supports that patients experience a significant deterioration in HRQL and psychological well being while waiting for treatment for chronic pain for 6 months. It is unknown at what point this deterioration begins as results from the 14 trials involving wait-times of 10 weeks or less yielded mixed results with wait-times amounting to as little as 5-weeks, associated with deterioration in some studies. The deterioration after 6-months of waiting is consistent with the findings of the wait-times group for joint replacement who identified that there is evidence that a deterioration in functional health status occurs in patients waiting more than 6-months for joint replacement surgery (Noseworthy et al., 2005). This group also found evidence indicating that poor pre-operative functional health status is associated with poor post-operative status and that very long waits of greater than 12 months result in poorer post-operative outcomes after joint replacement surgery. In the chronic pain literature there were no studies examining the second question of the CPSWT regarding the impact of waiting on the outcomes of multidisciplinary pain treatment.

The major limitation of the current review is that the wait-time from the onset of pain to referral to a specialty clinic is often far greater than the wait-time from referral to treatment. The wait-time from onset of symptoms to treatment is the most important to consider. Unfortunately there were no

studies that examined this question and it is possible that the results of the current review underestimate the deterioration experienced by patients while waiting. Future studies should address the wait-time from onset of symptoms to treatment and should use outcome measures recommended by IMMPACT (Dworkin et al., 2005). It is probable that the longer patients have to wait for treatment for chronic pain the more their HRQL will deteriorate and the poorer the response to treatment. For this reason it is essential to take steps to prevent the onset of chronic pain and to initiate treatment as early as possible to prevent the negative impact on HRQL.

Chronic pain is an escalating public health problem currently affecting 15–29% of the population (Moulin et al., 2002; Ospina and Harstall, 2002). The Canadian National Population Health Survey of 1996–1997 found that compared to the general population, people with chronic pain experienced more disability days off work, spent more days in hospital annually, and experienced 12.9 more physician contacts annually. The 1998 Health Canada Economic Burden of Illness Report estimated the impact of chronic pain (lost work, clinic and hospital visits and medication costs) was approximately $14,744 per person per year (Health-Canada, 1998). A major US study identified the cost of lost productive time in active workers with chronic pain to be $61.2 billion annually (Stewart et al., 2003). Even though cost effective methods for pain care are available, pain, both acute and chronic, is under-treated and timely access to care is a growing problem in nations with access to the best in health care. Canadian data identify waits of over a year for treatment at publicly funded pain clinics with many areas having no access to treatment (Peng et al., 2006). This situation is unacceptable in light of evidence supporting that uncontrolled pain promotes tumor growth, compromises immune function and healing with an increase in morbidity and mortality following surgery (Liebeskind, 1991; Page, 2005) and doubles the risk of death by suicide (Tang and Crane, 2006). The current review has identified that wait-times of 6 months from the time of referral to treatment for chronic pain are associated with deterioration in HRQL and psychological well being making this length of wait medically unacceptable.

The combination of lengthy wait-times along with a shortage of highly qualified personnel available to assist in multi-modal and multidisciplinary chronic pain management argues for innovative solutions to meet the demand. The development of approaches to enhance self-care and community-based treatment of patients with chronic pain holds promise. Many countries have developed evidence-based guidelines for primary practitioners for management of chronic pain conditions (Koes et al., 2001). An excellent example of this approach is being pursued in Western Canada. The Alberta Ambassador Program uses a multidisciplinary, case based, interactive workshop format to teach primary care providers about evidence based care for chronic pain. This project created "evidence in brief" one-page documents summarizing the best quality research evidence in a format actionable in primary care and resulted in the development of clinical pathways for low back pain and headache (Rashiq et al., 2006; Taenzer et al., in press). This program has been successfully piloted with further studies planned to determine the impact of this strategy on clinical practice and patient outcomes.

Additional approaches using community (LeFort et al., 1998; Blyth et al., 2005) distance (e.g. telehealth Blixen et al., 2004) and web-based treatments have been developed in other fields (Murray et al., 2006) and may have application for treatment of chronic pain. For example it has been demonstrated that mental health care can be enhanced through collaborative at-a-distance relationships between family practitioners and psychiatrists through a mentorship network (Rockman et al., 2004). Web-based initiatives for self-care such as the Canadian Virtual Hospice (www.virtualhospice.ca) have been developed to assist in delivering information and support to patients living with life-threatening illness. Such approaches may also have significant potential for the management of chronic pain, especially in areas where patients have access to little or no service. Enhancing community-based and self-care of patients suffering with chronic pain may allow more timely care along with a potential decrease in the number of tertiary level pain centre referrals. Further study will be necessary to evaluate these possible benefits.

5. Conclusions

Despite differences in study design the results of this systematic review indicate that waits of 6 months from the time of referral to treatment for chronic pain are associated with deterioration in HRQL and psychological well being with an increase in depression scores. It was concluded that wait-times for chronic pain treatment of 6 months or longer are medically unacceptable and that further study is necessary to determine at what stage the deterioration begins from the onset of pain to treatment and the impact of waiting on treatment outcomes. There are lengthy wait-lists for treatment at publicly funded multidisciplinary pain centres across Canada and in a number of other nations with public health care

systems. The evidence from this review demonstrates that failure to treat leads to increased physical and psychosocial problems. There is a clear need for earlier referral and decreased wait-times. In order to accomplish improvements in resource allocation for chronic pain it is necessary to develop evidence-based benchmarks regarding medically acceptable wait-times so that our medical systems and governments are able to identify what is a socially tolerable wait. Most of all there is a clear need to improve access to appropriate care for patients with chronic pain, an escalating public health care problem with significant human and economic costs.

Acknowledgements

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Appendix A

List of databases searched and search strategies used

ABI/INFORM Global
Biological Abstracts
Canadian Research Index
Central
CINAHL
DARE
Digital Dissertations
Econlit
Embase
GrayLit Network
HTAs
Ingenta
KUUC
NHS Econ
Novanet
New York Academy of Medicine
PsychInfo
Pubmed
Scirus
Scopus
Sociological abstracts
Web of Science

Search strategies

ABI /INFORM Global

(pain) AND (wait*) AND (outcome* or prognos*)

Biological Abstracts

1. CHRONIC-PAIN (920 records)
2. WAITING-LIST (153 records)
3. OUTCOME-ASSESSMENT (108 records)
4. (PROGNOSIS) or (PROGNOSIS-) (52886 records)
5. DISEASE-PROGRESSION (4049 records)
6. QUALITY-OF-LIFE (7916 records)
7. #3 or #4 or #5 or #6 (64238 records)
8. pain (69781 records)
9. wait list* or waiting list* or wait time* or waiting time* or wait-list* or await* or queu* (5290 records)
10. outcome* or prognos* or "disease progression" or "natural history" or quality or HRQOL or HRQL (317551 records)
11. #2 or #9 (5290 records)
12. #7 or #10 (320646 records)
13. #1 or #8 (69781 records)
14. #11 and #12 and #13 and (English in la) (70 records)

Canadian Research Index

The following keyword searches were used:

chronic AND pain
wait* AND (list* OR time*) AND health

Central

1. "Pain" [Mesh] or pain
2. "Waiting Lists" [Mesh] or wait list* or waiting list* or wait time* or waiting time* or wait-list* or await* or queu*
3. "Health Services Accessibility" [Mesh]
4. #2 or #3
5. "Outcome Assessment" [Mesh] or "Prognosis" [Mesh] or "Disease Progression" [Mesh] or "Quality of Life" [Mesh] or outcome* or prognos* or "disease progression" or "natural history" or Quality or HRQOL or HRQL
6. #1 and #4 and #5

CINAHL

1. ((MH "Pain") or pain)
2. ((MH "Waiting Lists") or (MH "Health Services Accessibility") or wait list* or waiting list* or wait time* or waiting time* or wait-list* or await* or queu*)

3. ((MH "Outcome Assessment") or (MH "Prognosis") or (MH "Disease Progression") or (MH "Quality of Life") or outcome* or prognos* or "disease progression" or "natural history" or Quality or HRQOL or HRQL)
4. #1 and #2 and #3

Limits: English

Digital dissertations

Your search KEY(pain) and KEY(wait* or queu* or await*) and KEY(outcome* or prognos* or quality) produced 8 citations.

Econlit

Several different versions of the search strategy yielded no citations at all.

Embase

1. Pain/exp or pain
2. Hospital admission/exp or hospital admission
3. wait list* or waiting list* or wait time* or waiting time* or wait-list* or await* or queu*
4. #2 or #3
5. disease course/exp or prognosis/exp or treatment outcome/exp or quality of life
6. disease progression or natural history or prognos* or outcome* or quality or hrqol or hrql
7. #5 or #6
8. #1 and #4 and #8

GrayLit Network

Searched pain and wait* and outcome*

HTA database in Cochrane Library

1. "Pain" [Mesh] or pain
2. "Waiting Lists" [Mesh] or wait list* or waiting list* or wait time* or waiting time* or wait-list* or await* or queu*
3. "Health Services Accessibility" [Mesh]
4. #2 or #3
5. "Outcome Assessment" [Mesh] or "Prognosis" [Mesh] or "Disease Progression" [Mesh] or "Quality of Life" [Mesh] or outcome* or prognos* or "disease progression" or "natural history" or Quality or HRQOL or HRQL
6. #1 and #4 and #5

INGENTA

Pain AND ("wait list*" or "waiting list*" or "wait time*" or "waiting time*" or wait-list* or await* or queu*) and (outcome* or prognos* or "disease progression" or "natural history" or quality or hqrol or hrql)

Knowledge Utilization Database

Searched wait* and 'pain' as keywords

NHS Econ

1. "Pain" [Mesh] or pain
2. "Waiting Lists" [Mesh] or wait list* or waiting list* or wait time* or waiting time* or wait-list* or await* or queu*
3. "Health Services Accessibility" [Mesh]
4. #2 or #3
5. "Outcome Assessment" [Mesh] or "Prognosis" [Mesh] or "Disease Progression" [Mesh] or "Quality of Life" [Mesh] or outcome* or prognos* or "disease progression" or "natural history" or Quality or HRQOL or HRQL
6. #1 and #4 and #5

New York Academy of Medicine

Searched pain and wait* - no useful results

Novanet

Waiting lists [Mesh]

PsycInfo

1. ((DE "Pain") or pain)
2. ((DE "Health Care Delivery") OR wait list* OR waiting list* OR wait time* OR waiting time* OR wait-list* OR await* OR queu*)
3. (((DE "Treatment Outcomes") or (DE "Prognosis") or (DE "Quality of Life")) or (outcome* OR prognos* OR "disease progression" OR "natural history" OR quality OR HRQOL OR HRQL)
4. #1 and #2 and #3

Limits: human, English

PubMed

The search was divided into three main components:

1. Pain
2. Waiting
3. Outcomes

MeSH terms are indicated as such, all other terms are 'keywords'.

'*' denotes truncation.

Limiters of English, Human will be applied whenever possible.

1. Pain

Pain[MeSH] OR
Pain

2. Waiting

Waiting Lists[MeSH] OR wait list* OR

waiting list* OR
wait time* OR
waiting time* OR
wait-list* OR
await* OR
queu* OR

Health Services Accessibility [MeSH:no expl]

3. Outcomes

Outcome and process assessment (health care) [MeSH] OR

outcome* OR

Prognosis[MeSH] OR

prognos* OR

Disease Progression [MeSH] OR

"disease progression" OR
"natural history" OR

Quality of Life [MeSH] OR

Quality OR
HRQOL OR HRQL

Scirus

keyword:pain AND (keyword:wait* or keyword:await* or keyword:wait-list* or keyword:queu*) AND (keyword:outcome* or keyword:prognos* or keyword:quality

Scopus

(TITLE-ABS-KEY(pain)) AND (TITLE-ABS-KEY((wait list*) OR (waiting list*) OR (wait time*) OR (waiting time*) OR (wait-list*) OR (await*) OR (queu*))) AND (TITLE-ABS-KEY((outcome*) OR (prognos*) OR ("disease progression") OR ("natural history") OR (quality) OR (hrqol) OR (hrql))) AND LANGUAGE(english)

Sociological abstracts

Searched keywords: pain and wait*

Web of Science

1. TS = (pain)DocType = All document types; Language = All languages; Databases = SCI-EXPANDED, SSCI, A& HCI; Timespan = 1980-2006
2. TS = (wait list* or waiting list* or wait time* or waiting time* or wait-list* or await* or queu*)DocType = All document types; Language = All languages; Databases = SCI-EXPANDED, SSCI, A& HCI; Timespan = 1980-2006
3. TS = (outcome* or prognos* or disease progression or natural history or quality or hrqol or hrql)DocType = All document types; Language = All languages; Databases = SCI-EXPANDED, SSCI, A& HCI; Timespan = 1980–2006
4. #1 and #2 and #3

Appendix B

Screening Tool for 2nd Screen of Abstracts

Inclusion Criteria

Studies that are about patients with pain and describe at least one of the following areas:

1. The impact of waiting time on health status while awaiting treatment for chronic pain.
2. The impact of waiting time on health outcomes after treatment for chronic pain.
3. Describe disease or pain progression or consequences of no or inadequate treatment for the pain on health outcomes or QOL (regardless of wait time).
4. The relationship of duration of pain on QOL or impact on outcomes regardless of any mention of wait times.
5. Papers or studies regarding benchmark (target or recommended wait times) and evidence supporting the benchmarks as well as how the situation is managed in order to meet these benchmarks.

Note. Health status includes QOL measures, clinical status, level of function, pain levels, adverse events, complications.

Exclusion criteria

1. Outcome studies of pain treatments that do not contain information about wait time impact on health while waiting or outcomes.
2. Comparisons of different pain treatments that do not contain information about wait time impact on health while waiting or outcomes.
3. Guidelines for pain treatment that do not contain information about wait time impact on health while waiting or outcomes.
4. Capacity of the system to treat patients with pain.
5. Barriers to access.

Appendix C

Screening tool for full text articles

☐ **Accept** ☐ **Reject**

Accept if at least one research question or one inclusion criteria is checked, reject if not.

Title	
First Author	
Journal	
Year	
Design (circle)	Prospective Cross-sectional Comparative Random allocation Qualitative Other

RESEARCH QUESTIONS
For each study, please check the research questions, if the article provides evidence towards answering the question. If more than one are checked circle the most relevant one.

	What is the relationship between waiting times and health status or clinical condition or QOL while patients wait for treatment for chronic pain?
	What is the relationship between waiting times and health outcomes following treatment for chronic pain?
	What are the national or international wait time benchmarks (proposed or in use) for treatment of chronic pain and what research evidence are they based on?

INCLUSION AND EXCLUSION CRITERIA please check those that apply
Inclusion Criteria
Studies that are about:

	The impact of waiting time on health status while awaiting treatment for chronic pain
	The impact of waiting time on health outcomes after treatment for chronic pain
	Describe disease or pain progression or consequences of no or inadequate treatment for the pain on health outcomes or QOL.
	The relationship of duration of pain on QOL or impact on outcomes regardless of any mention of wait times.
	Papers or studies regarding benchmark (target or recommended wait times) and evidence supporting the benchmarks as well as how the situation is managed in order to meet these benchmarks.

Exclusion criteria

	Outcome studies about pain treatments that do not contain information about wait time impact on health while waiting or outcomes
	Comparisons of pain treatments, that do not contain information about wait time impact on health while waiting or outcomes
	Guidelines for pain treatment that do not contain information about wait time impact on health while waiting or outcomes
	Capacity of the system to treat patients with pain
	Barriers to access
	*Articles regarding wait times for joint replacement, cancer or cardiac care**

* Although it was acknowledged that pain is a significant symptom presenting in these literatures, the CPSWT members decided to add this as an exclusion criterion as these articles have been or will be reviewed in the context of CIHR wait times projects regarding joint replacement, cancer and cardiac care.

Appendix D

Quality assessment form full text articles

First author Year Journal

Reporting

INTRODUCTION AND METHODS: Items 1–5 should be described in the introduction or methods.

1. **Is the hypothesis/aim/objective of the study clearly described?** This question refers to a clear statement of the objective, i.e., to measure the effectiveness of *x* in population *y* with respect to *z*, even if *x*, *y*, and *z* are not clearly described (see questions 2, 3, and 5).

Yes	1	
Partial	.5	
No	0	

2. **Are the main outcomes to be measured clearly described in the Introduction or Methods section?** If the main outcomes are first mentioned in the Results section, the question should be answered no.

Yes	1	
No	0	
N/A	9	

3. **Is the study design clearly described in the Introduction or Methods section?**

Yes	1	
Partial	.5	
No	0	
N/A	9	

4. **If waiting time is a variable, is it defined clearly in the introduction or methods?** The definition should include an indication of when the waiting time starts (e.g., specialist assessment/consultation, booking date, GP referral) and when the waiting ends (i.e., treatment for pain). For definitions that do not specify the exact start time, but include a description such as 'the time the patient is placed on the waiting list', the question should be answered 'partial'. For patient self-reported waiting time, the exact question should be stated to receive a 'yes'.

Yes	1	
Partial	.5	
No	0	
N/A	9	

5. **Are the inclusion and/or exclusion criteria provided?**

Yes	1	
Partial	.5	
No	0	
N/A	9	

RESULTS: Items 6–10 should be described in the results section.

6. **Have the characteristics of patients lost to follow-up been described?** This should be answered yes where there were no losses to follow-up or where losses to follow-up were so small that findings would be unaffected by their inclusion. This should be answered no where a study does not report he number of patients lost to follow-up.

Yes	1	
No	0	
N/A	9	

7. **Are the distributions of principal confounders clearly described?** A list of principal confounders is provided.

Yes	1	
Partial	.5	
No	0	
N/A	9	

8. **Are the main findings of the study clearly described?** Outcome data (where relevant) should be reported for all major findings so that the reader can check the major analyses and conclusions. This question does not cover statistical tests, which are considered below.

Yes	1	
No	0	

9. **Does the study provide estimates of the random variability in the data for the main outcomes?** In non-normally distributed data the median or inter-quartile range of results should be reported. In normally distributed data the standard error, standard deviation or confidence intervals should be reported. If the distribution of the data is not described, it must be assumed that the estimates used were appropriate and the question should be answered yes.

Yes	1	
No	0	
N/A	9	

10. **Have 95% CIs and/or actual probability values been reported (e.g., 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?** (both CI and *p* value, either CI or *p* value, neither).

Yes	1	
No	0	
N/A	9	

External validity

METHODS

11. **We RESULTS SECTIONasked to participate in the study mmmmrepresentative of the population from which they were recruited?** The study must describe the source population from which the subjects were drawn and how the subjects were selected. Subjects would be representative if they comprised the entire source population, and unselected sample of consecutive subjects, or a random sample. Random sampling is only feasible where a list of all members of the relevant population exists. Where a study does not report the proportion of the source population from which the subjects are derived, the question should be answered as unable to determine.

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

METHODS OR RESULTS

12. **Where those subjects who were prepared to participate typical of the source population from which they were recruited?** The proportion of those asked who agreed should be stated. Validation that the sample was representative would include demonstrating that the distribution of the main confounding factors was the same in the study sample and the source population.

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

Internal validity – bias

13. **Was an attempt made to blind those measuring the main outcomes of the intervention?** This question is not applicable if all main outcome measures are patient self-report or if blinding is not feasible.

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

14. **Where the follow-up differs, do the analyses adjust for different lengths of follow-up of subjects/patients?** Where follow-up was the same for all study patients the answer should be yes. If different lengths of follow-up were adjusted for by, for example, survival analysis the answer should be yes. Studies where differences in follow-up are ignored should be answered no.

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

15. **Were the statistical tests used to assess the main outcomes appropriate?** The statistical techniques used must be appropriate to the data. For example non-parametric methods should be used for small sample sizes. Where little statistical analysis has been undertaken but where there is no evidence of bias, the question should be answered yes. If the distribution of the data (normal or not) is not described it must be assumed that the estimates used were appropriate and the question should be answered yes.

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

16. **Was the reliability and validity of the main outcome measures reported?** If reliability and validity values assessed in a similar population for commonly used outcomes measures (e.g., SF-36, WOMAC, VF-14) are not reported, a reference should be given. If some, but not all, of the main outcome measures meet the criteria, a partial score should be given.

Yes	1	
Partial	.5	
No	0	
Unable to determine	8	
N/A	9	

Internal validity – confounding (selection bias) items 17–20 apply ONLY to studies with intervention groups (randomized or cohort) and case-control studies).

17. **Were the patients in different intervention groups (randomized and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?** For example, patients for all comparison groups should be selected from the same hospital. The question should be answered unable to determine for cohort and case-control studies where there is no information concerning the source of patients included in the study.

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

18. **Were study subjects in different intervention groups (randomized and cohort studies) or cases and controls recruited over the same period of time?** For a study which does not specify the time period over which patients were recruited, the question should be answered as unable to determine.

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

19. **Were the subjects randomized to intervention groups?** Studies which state that subjects were randomized should be answered yes except where method of randomization would not ensure random allocation. For example alternate allocation would score no because it is predictable.

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

20. **Was the randomized intervention assignment concealed from both patients and health care staff until recruitment of all cases (or block of cases if recruitment over time) was complete?** If assignment was concealed from patients but not from staff, it should be answered no.

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

RESULTS

21. **Was there adequate adjustment for confounding in the analyses from which the main findings were drawn? In non-randomized studies** if the effect of the main confounders was not investigated or confounding was demonstrated but no adjustment was made in the final analyses the question should be answered as no. This question should be answered no for *randomized studies* if: the main conclusions of the study were based on analyses of treatment rather than intention to treat; the distribution of known confounders in the different treatment groups was not described; or the distribution of known confounders different between the treatment groups but was not taken into account in the analyses.

Yes	1	
No	0	
Unable to determine	8	

22. **Were losses of patients to follow-up addressed?** If the numbers of patients lost to follow-up are not reported, the question should be answered as unable to determine. If the proportion lost to follow-up was too small to affect the main findings, the question should be answered yes.

Yes	1	
No	0	
N/A	9	

24. **Was the clinical significance of the main outcome results addressed?**

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

25. **Were the major limitations of the paper addressed?**

Yes	1	
Partially	.5	
No	0	

26. **Were the conclusions made by the author(s) in the discussion and the abstract supported by the data and/or analysis reported in the paper?**

Yes	1	
Partially	.5	
No	0	

27. **Was the paper clearly written and presented?**

Yes	1	
Partially	.5	
No	0	

28. **Overall how would you rate the scientific quality of this paper?**

Extensive flaws		Major flaws		Minor flaws		Minimal flaws
1	2	3	4	5	6	7

Yes	1	
No	0	
Unable to determine	8	
N/A	9	

Reporting and conclusions

23. **If statistically non-significant results were reported, was a power analysis reported?**

29. **General comments (include major strengths and weaknesses of article).**

STRENGTH
WEAKNESS
Data extraction form
ID Ref: _____ Author: _____ Year of publication _____ Reviewer: _____

Comments (strengths, weaknesses, etc.)

Country	
Type of Treatment	
Inclusion criteria	
Exclusion criteria	
Sampling frame or source of sample	
Sampling technique (e.g., consecutive)	
Study Objectives	
Definition of waiting time	
Source of WT data (e.g., Registry, self-report)	
Study Design (e.g., prospective)	
Data Collection Methods (e.g. mailed survey)	
Assessment Times	
Statistical Tests for Main Analyses	
Sample size	
Response rate	
%of follow-up cases/baseline	
Key differences in non-responders	
Key differences in cases lost to follow-up	
Main outcomes/measures	
Waiting time information (mean, median, categories)	
Other variables: e.g., age, sex, adjusting variables (possible confounders)	
PATIENT CHARACTERISTICS	
Sample age (median or mean, SD)	
Proportion Male/Female	
Diagnosis	
Main findings relevant to Task Force Objectives (use additional page if necessary):	
Study Limitations	

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