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Prevalence of chronic pain: an overview

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HTA 29 Health Technology Assessment

This Health Technology Report has been prepared on the basis of available information of which the Foundation is aware from public literature and expert opinion and attempts to be current to the date of publication. It has been externally reviewed. Additional information and comments relative to the report are welcome and should be sent to:

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SUMMARY

- Chronic pain (CP) is an unpleasant sensory and emotional experience associated with actual or potential tissue damage that persists beyond the expected time frame for healing or that occurs in disease processes in which healing may never occur [1]. Standardized definitions and criteria to define "chronic" or "severe" pain are not available and diverse pain qualifiers have been proposed.
- Two systematic reviews about the prevalence of CP were identified but they did not provide a definite and reliable answer to the research question.
- Thirteen primary studies were systematically reviewed. CP prevalence estimates varied widely in studies that used the International Association for the Study of Pain definition of CP (weighted mean: 35.5%, range: 10.5% to 55.2%). In studies that used the criteria of the American College of Rheumatology (ACR) to determine the prevalence of chronic widespread pain, variation was narrower (weighted mean: 11.8%, range: 10.1% to 13%). Lack of consensus about basic definitions and inconsistencies in measurement among the published studies on CP prevalence may explain these variations. It was not possible to quantitatively compare the findings.
- Based on proxy definitions of severity (intensity, level of functional limitations, and disability) provided by several studies, calculation of the prevalence of severe CP was done. Figures showed little variation in the study populations, ranging from 8% (in children) to approximately 11% (in adults). These estimates are similar to those reported in studies (10% - 13%) using the ACR criteria to define chronic pain.
- Prospective epidemiological studies are needed to estimate the CP prevalence in Alberta (using a very clear case-definition and well-validated and reliable data collection tools). Some important questions should be addressed in these studies: numbers and characteristics of people with CP in Alberta (as well as site of pain, level of intensity, frequency, and quality of life) and the proportion of people in each category of pain based on level of severity).
- Estimation of the size and characteristics of the population affected by CP provides a basis for designing and providing therapeutic efforts toward those most likely to need and benefit from them.

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SCOPE OF THE REPORT

This is the first report of a series of documents being prepared by the Health Technology Assessment (HTA) Unit of the Alberta Heritage Foundation for Medical Research in response to requests from Calgary Health Region and Alberta Health and Wellness (AHW) for updated evidence on the efficacy and effectiveness of multidisciplinary pain programs for chronic pain not related to cancer. In order to establish provincial needs for a multidisciplinary pain program, it was necessary first to provide policy makers with evidence based estimates of the prevalence of chronic pain (CP). Therefore, it was decided to use a convergence approach where research on CP prevalence was analyzed and AHW administrative data were used to estimate local prevalence in Alberta (*Chronic Pain in Alberta: A portrait from the 1996 National Population Health Survey and the 2001 Canadian Community Health Survey*, Health Surveillance - AHW; in press).

The aim of this report was to present and critically appraise the published evidence on the prevalence of chronic non-malignant pain in the general population and the primary care setting. A secondary objective was to summarize all the available information in the primary studies about characteristics of pain (i.e., level of severity and functional limitations) and the use of health services in the population of CP sufferers.

The research question about the prevalence of CP in the general population and primary care setting originated from discussions about how many people would potentially benefit from therapies for CP. This information will be useful for program planning purposes. Issues related to the efficacy, effectiveness and economic evaluation of multidisciplinary pain programs for CP will be the subject of another HTA report.

Prevalence data are not only important in clinical practice but are also a prerequisite for the efficient planning of health services, for assessing health care priorities, and for monitoring trends of disease prevalence. It is expected that the findings provided by this report will be valuable for the organization and prioritization of health services at the provincial level. This report consists of two main sections. The first section summarizes and analyses previous systematic reviews on the prevalence of CP while the second section presents the findings from the systematic review conducted on a selection of published primary studies on the prevalence of CP in the general population and the primary care setting. The search strategy and methodological approaches used for this report are outlined in Appendices A to C, inclusively.

BACKGROUND

Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" [1]. Such vagueness in the definition reflects the subjective nature of pain as well as the variety of ways in which to understand and categorize this complex human experience. Pain is a subjective experience that interferes with emotional, social, as well as physical functioning [1]. It is a multidimensional construct where the relationship between disease (as a biological phenomenon) and illness (as a subjective experience of discomfort and dysfunction) is hard to disentangle.

A problem arises when deciding what CP is. Standardized definitions and criteria to define "chronic" or "severe" pain are not available and diverse options (according to the quality and/or quantity of pain) have been proposed. Following are some of these descriptive definitions and criteria:

- Health and Welfare Canada [2] considers CP as pain that "persists (beyond) the normal time of healing, is associated with protracted illness or is a severe symptom of a recurring condition", and is of 3 months duration or more.
- The Clinical Standards Advisory Group of the National Health System in the United Kingdom [3] defines CP as pain "persisting beyond the expected time frame for healing or that occurs in disease processes in which healing may never occur".
- The International Association for the Study of Pain (IASP) provides one of the most referenced definitions of CP that takes into account factors related to duration and 'appropriateness'. According to the IASP subcommittee on taxonomy, three categories of pain may be defined: less than 1 month, from 1 to 6 months, and over 6 months [1]. CP is defined by the IASP as pain that has persisted beyond the normal tissue healing time (usually taken to be 3 months). The IASP considers a further characteristic related to the 'appropriateness' of the disorder. While acute pain would be usually adaptive (for example, after an injury the organism rests and protects the injured body part during the healing process), in CP there is no obvious biological value for the pain.
- The 1990 classification of fibromyalgia by the American College of Rheumatology (ACR) [4] includes another set of criteria to define CP. Chronic widespread pain (CWP) is defined when all of the following are present for at least 3 months: pain in the left side of the body, pain in the right side of the body, pain above the waist, and pain below the waist. In addition, axial skeletal pain (cervical spine or anterior chest or thoracic spine or low back) must be present.
- The Practice Guidelines of the American Society of Anesthesiologists for Chronic Pain Management consider CP as "persistent or episodic pain of a duration or

intensity that adversely affects the function or well being of the patient, attributable to any non malignant etiology" [5]. These practice guidelines agree with the IASP definition of CP based upon a 3-month duration [6]. Nonetheless, some researchers and clinicians consider that the use of 3 or 6 months criteria as a cut-off point to differentiate chronic from acute pain is arbitrary [7] and that there is no consensus regarding duration [8].

CP has a devastating effect on the lives of sufferers and families [3] and creates a high amount of distress and disability [9]. Patients with CP report severe impairments on multiple quality-of-life measures that consider physical, social and psychological well-being domains [8]. Many patients undergo a progressive physical deterioration caused by sleep and appetite disturbances, decrease in physical activity, and high risk of excessive medication. Apart from anxiety, many patients develop reactive depression, hypochondriasis, somatic preoccupations, and a tendency to deny life problems unrelated to their physical problem [7, 8]. Furthermore, the social effects of CP are equally devastating; many patients become estranged from their families and friends; they decrease their social interactions and are unable to work, leading to loss of their jobs in many cases [7, 10, 11].

Compared to patients with no CP complaints, CP sufferers are five times more likely to utilize health care services [11]. From Canada Health and Welfare's perspective, persons who experience CP become dependent and hence recipients of some type of public or private income-support program, or both [2].

PREVALENCE OF CP

CP is an issue of major importance (although at very different levels) to the health professionals, the health care system, the patient, and society. Valid estimates of CP prevalence (the proportion of a defined population that has CP at some specified time) are obtained by dividing the number of people who currently have the condition by the number of people in the study population [12].

The efforts to determine the prevalence of CP in the general population, however, have been faced with challenges such as prevalence variations according to the population sampled, the method used to collect data, and the criteria to define CP. Consequently, prevalence estimates of CP differ greatly from one study to another. Understanding factors that underline variation in prevalence estimates of CP may help to provide a more complete depiction of the scope and distribution of the public health problem related to CP.

Furthermore, the identification of some methodological factors that may account for differences among studies may guide the interpretation of these studies and be useful to inform future research in this area.

Published systematic reviews

Two systematic reviews of the prevalence of pain disorders were identified [10,13] (see Table 2 in Appendix D).

Verhaak et al. [10] conducted a systematic review of studies on the epidemiology of CP among adults. The first aim of the review was to determine which methods were used in the primary studies to determine the prevalence of CP.

Studies that exclusively focused on the pediatric and elderly populations were excluded, as well as those epidemiological studies that addressed acute pain or pain secondary to a defined disease.

Fifteen descriptive studies that assessed the prevalence of CP were identified. Thirteen of these studies were general population surveys and the remaining two were primary health care surveys. Data collection methods used in the individual studies included telephone survey (three studies); postal questionnaire (six studies); interview (three studies); and expert assessments (three studies). Data on research methods, definition of CP, prevalence, demographic, and co morbidity characteristics were summarized for each study.

The authors reported results such as "women were over-represented in two studies", "CP generally increased with age (peak prevalence between 45 and 65 years)", "prevalence of CP was higher in lower income groups", and "the most prevalent pain was musculoskeletal pain". Publication restrictions may be the reason numeric data was not included to support these conclusions. Therefore, the magnitude and significance of the association among these variables are uncertain.

The authors found a wide variability in the estimates of CP prevalence. A 'median point prevalence' of 15% (range: 2% to 40%) was calculated. When the complexity of the definition of CP was considered ('multidimensional' vs. 'simple', according to the authors and not clearly defined), the reported median point prevalence values were 13.5% (based on six studies) and 16% (number of studies not stated), respectively. The authors concluded that although the studies used a wide range of CP definitions and yielded widely varying CP estimates, neither the method of data collection nor the definition of CP seemed to affect the prevalence reported.

The use of a 'median point prevalence' as a pooled measure estimated from the individual studies however is inappropriate. The set of data used to calculate this measure originates from heterogeneous studies with different populations, data collection methods, and definitions of CP. A combined single estimate therefore is not an accurate reflection of prevalence.

The authors used both electronic and manual search strategies that were appropriate to identify the potential studies to be included in the review. Although the grey

(unpublished) literature was not searched, the authors considered that, given the scarcity of prevalence studies on CP in the general population, it is unlikely that other prevalence studies were not identified by their search strategy. Therefore a publication bias would not seem to be a concern.

Although a set of inclusion and exclusion criteria were established in advance, the criteria were not applied consistently to all studies. For example, a study that provided the incidence instead of the prevalence of CP was included. This added further heterogeneity to the review and a likely selection bias cannot be disregarded. Several individual aspects regarding the quality of the studies were reported, but a systematic assessment of the primary studies' methodological quality was not undertaken using an assessment tool. Therefore, the reproducibility of the process to appraise the quality of primary studies is uncertain.

Nickel and Raspe [13] conducted a qualitative systematic review on the epidemiology and use of services in treating CP. Studies on populations receiving treatment for CP were reported separately. Seventeen epidemiological studies were included in the report. Information regarding data collection methods, prevalence estimates, duration of pain, and demographic variables were extracted from individual studies. Data collection methods of the individual studies included: telephone survey (six studies), postal questionnaire (eight studies), and interview (three studies). The review concludes that epidemiology studies are limited by theoretic, methodological, and economic factors and that quantitative comparisons were precluded due to differences in populations, methods of data collection, definition of CP, and reporting of the results. The authors considered that CP was often not clearly defined and the definition was highly variable among the studies. Nonetheless, they reported that the frequency of CP increased with age, with a peak between 45 and 65 years of age. Likewise, higher rates of CP among women were found and an association between social status and frequency of specific types of pain was noted.

Although the search methods used by the authors to identify the studies were not reported in the publication, contact with the first author indicated that a systematic search strategy was used. Searches, however, were conducted using one database only and keywords were not explicitly reported. It is likely, therefore, that the search for evidence may not have been comprehensive enough.

A set of inclusion and exclusion criteria was defined. However, it was not clear why the review included some studies that were not focused specifically on CP [14-17] and excluded others that actually were [18]. Therefore, it appears that the inclusion and exclusion criteria were not applied consistently and that a selection bias is likely.

The criteria to assess the quality of the included studies were not reported and, in fact, a formal assessment of the quality of primary studies was not undertaken.

Given the heterogeneity of the studies, the review did not try to combine their results in a quantitative way but reported appropriately the results in a narrative way. Nonetheless, conclusions about the association between gender, social status, and age should be reported as observed trends, given the lack of a quantitative analysis to support this finding.

In general, the findings reported in both systematic reviews pointed out that there is a wide variation in CP prevalence estimates among primary studies that may be explained by several factors related to the design and the methodology of the individual studies. Nonetheless, the authors of the present report do not agree with the conclusions of the Verhaak systematic review [10] that methods of data collection or CP definition do not seem to affect prevalence rates. Lack of appropriate quantitative and qualitative analyses about the impact that these and other variables may have on the CP prevalence estimates in the review, preclude drawing such conclusions in a reliably way.

ANALYSIS OF PRIMARY STUDIES

The search strategy identified 32 potentially eligible publications. Based on the inclusion and exclusion criteria, 19 of these were excluded. The reasons for the exclusions are reported in Table 3 (see Appendix E). A total of 13 studies [18-30] were included in this review. Table 1 provides a comparative description of the characteristics of the studies. Table 4 in Appendix F provides further details of the individual studies.

The studies included were published between the years 1991 to 2002. Three studies were conducted in the United Kingdom [18, 20, 21] two in Australia [22, 23] and one each in Canada [19], France [30], Israel [24], Netherlands [25], Scotland [26], Spain [27], and Sweden [28]. A multinational study conducted by the World Health Organisation [29] with collaborative centres in Chile, Germany, Brazil, Turkey, France, Netherlands, England, India, the United States of America, Italy, China, Greece, Japan and Nigeria, was also included.

Eleven of the included studies [18-25, 27, 28, 30] surveyed the general population and two studies [26, 29] surveyed the population from primary care settings.

Most of the studies [18-22, 24, 26-29] (10 out of 12) reported prevalence estimates for adolescent and adults populations (lower age limit defined: 15 years, upper age limit defined: 86 years). There were two studies [23, 30] that provided prevalence data for elderly populations (65 to 85 years and over), exclusively. One further study addressed the prevalence of CP in children aged 0 to 18 years [25].

All the studies used a cross-sectional design to collect the data and the response rates ranged from 100% [30] to 54.6% [29]. The sample sizes varied from 410 [19] to 17,496 [22] participants of both genders. The number of male participants in those studies that

reported raw data by gender ranged from 158 [19] to 2,653 [25]. The number of female participants in the studies ranged from 252 [19] to 2,770 [25].

There were five studies [18, 20, 25, 26, 28] that used postal questionnaires (one of them [25] also used a self-completed questionnaire in a subgroup of participants). Four studies [19, 21, 22, 27] conducted phone interviews; and four studies used face-to-face interviews [23, 24, 29, 30] to collect data.

Pain was the main outcome measure in nine studies [18-21, 24-28]. CP data, however, were collected in four studies [22, 23, 29, 30] as part of a broader community survey that assessed several aspects of the general health state of the population.

Table 1: Comparative description of the characteristics of the studies

Authors/Country/ Study and publication year	Total Prevalence Estimate	Definition of CP (Duration)	Sample Size (N)	Setting	Method of Data Collection	Type of Outcome	Valid and Reliable Instrument	Response Rate	Quality Score
Andersson et al. [28] Sweden **1993**	49.8% (95%CI: 47.4-52.2%) (801/1609)	Dysfunctional Chronic Pain > **6 months.**	1,609	General population	Postal questionnaire	Primary	Yes	89%	86/90
	55.2% (95%CI:52.8-57.6) (885/1609)	Pain with duration **> 3 months** **IASP criteria.**							
Blyth et al. [22] Australia **2001**	18.5% (95%CI: 17.8 to 19.3%)	Pain experienced on most days for **3 months**. **IASP criteria.**	17,496	General population	Computer-assisted phone interview	Secondary	N/A	70.8%	80/90
Bowsher et al. [21] United Kingdom **1991**	11.5% (119/1037)	Pain with duration **> 3 months** **IASP criteria.**	1,037	General population	Phone interview	Primary	N/A	N/A	70/90
Catala et al. [27] Spain **2002**	23.4% (1170/5000)	Pain for more than **3 months.** **IASP criteria.**	5,000	General population	Phone interview	Primary	Unclear	54.6%	76/90
Elliot et al. [26] Scotland **1999**	50.4% (1817/3605) range: 39.4 to 61.2%	Pain or discomfort that persisted continuously or intermittently for longer than **3 months**. **IASP criteria.**	3,605	Primary care	Postal questionnaire	Primary	Yes	82.3%	76/90
Perquin et al. [25] Netherlands **2000**	25% (1358/5423)	Recurrent or continuous pain for more than **3 months**. **IASP criteria.**	5,423	General population	Postal questionnaire and self-completed questionnaire.	Primary	Unclear	82%	82/90
MacFarlane et al. [20] United Kingdom **1997**	13% (252/1953)	Pain for more than **3 months** **ACR criteria**.	1,953	General population	Postal questionnaire	Primary	N/A	75%	66/90

Table 1: Comparative description of the characteristics of the studies (cont'd)

Authors/Country/ Study and publication year	Total Prevalence Estimate	Definition of CP (Duration)	Sample Size (N)	Setting	Method of Data Collection	Type of Outcome	Valid and Reliable Instrument	Response Rate	Quality Score
Croft et al. [18] United Kingdom **1993**	13% (164/1340)	CWP that started more than **3 months** ago. **ACR criteria.**	1,340	General population	Postal questionnaire	Primary	N/A	66%	72/90
	35%	Chronic pain that started more than **3 months** ago.							
Buskila et al. [24] Israel **2000**	10.1% (532/2210)	Current widespread or regional pain for at least **3 months.** **ACR criteria.**	2,210	General population	Face-to-face interview	Primary	N/A	95.2%	84/90
Birse and Lander [19] Canada **1998**	44.4% (CI%: 41.8 – 45.4%) (182/410)	Continuous or intermittent pain for at least **6 months.**	410	General population	Phone interview	Primary	Unclear	69%	76/90
Brochet et al. [30] France **2002**	32.9% (244/741)	Persistent pain: daily pain for more than **6 months**	741	General population	Face-to-face interview	Secondary	Incomplete data	100%	77/90
Gureje et al. [29] World Health Organization **1998**	21.5% (1169/5438)	Current and persistent pain that was present most of the time for a period of **6 months** or more during the prior year.	5,438	Primary care	Face-to-face interview	Secondary	Yes	62%	58/90
Helme and Gibson [23] Australia **1997**	50.2% (497/990)	Pain for more than **3 months.**	990	General population	Face-to-face interview	Secondary	N/A	70%	63/90

The duration of CP was considered in several ways. Four studies [19, 28-30] considered 6 months as a criterion to define CP. Among these, one study [28] also considered a 3-month criterion within the definition. The remaining nine studies [18, 20-27] used 3 months to define the duration of CP.

When the use of formal criteria to define CP was considered, there were three studies [18, 20, 24] that explicitly reported that the ACR definition of chronic widespread pain was used. Seven studies [21-23, 25-28] used the IASP definition of CP (or a close approximation) and three studies [19, 29, 30] used other or non specified set of criteria.

From a qualitative point of view, the studies were very heterogeneous regarding the definitions for CP. Pain parameters such as location, intensity, frequency, and disability were not investigated by all the studies. Even when the same definition (e.g. IASP, ACR) was used as a basis, phrasing and ordering of questions to assess pain parameters were quite different.

Furthermore, other important outcomes related to health perceptions, seeking of medical care, the use of analgesics, or health service resources were not consistently investigated. Six studies [19, 21, 23, 25, 28, 29] provided information about the location of pain among CP sufferers. Four studies [19, 21, 23, 25] reported the frequency or the time spent in pain among those with CP. Severity was defined in many ways including intensity, disability and/or interference with daily activities. Nine studies [19, 21, 22, 24-26, 28-30] provided information about how severity was defined for the purposes of their study. Data on perceived causes of pain or associated disorders were presented in four studies [18, 21, 24, 26]. Finally, three studies [19, 22, 29] provided information of perceived health status and four studies [20, 21, 24, 26] outlined the use of health services or analgesics.

Methodological quality of the primary studies

Ten studies [18, 19, 21, 22, 24-28, 30] reached a quality score of 70 out of 90 or above and three studies [20, 23, 29] were rated below 70. Although total scores ranged from 86 [28] to 58 [29], it can be said that, in general, the quality of the studies was acceptable (mean value of the quality score 70.3; SD 8.2, median value 76). Table 5 in Appendix G provides the results from the critical appraisal and methodological quality scores of the individual studies.

The studies were heterogeneous in terms of the individual items rated to determine the methodological quality. All the studies used a cross-sectional design appropriate for the research question. As a whole, the methods to select the samples (randomization, size and sampling frame) appeared to be appropriate and the study population was usually described. The definition of CP was reported in most of the studies, although they used different criteria.

The main methodological problems were related to the failure to provide validity and reliability data on the data collection instruments, the lack of estimates calculated

around the prevalence values (i.e. 95% confidence intervals) and the low response rates in some studies.

Only three studies [26, 28, 29] provided information on the validity and reliability of the measurement instruments. One study [27] used a questionnaire validated in a pilot study of 800 participants from the general population (personal communication with the first author). However, validity and reliability data were not reported in the article or elsewhere. Two studies [19, 25] stated that the instruments for data collection were developed specifically for the study but no further information about the validity and reliability of the data collection tools were provided. One study [30] reported that trained interviewers applied the instrument to collect the data. None of the other remaining studies provided any information.

Although all studies reported point prevalence estimates (total and subgroups) or raw data to calculate them, only four studies [19, 22, 24, 28] reported confidence intervals (95% CI) around the prevalence estimates. Two studies [22, 26] reported range values around the prevalence estimates. Confidence intervals were not provided in the remaining studies.

All the studies except one [21] reported the response rate or provided enough data to calculate it. Studies with the lowest response rates (less than 70%) [18, 19, 27, 29] did not analyze the impact of a non-response bias on the findings, thereby affecting the level of certain that can be placed in the reported findings.

Studies that used the IASP definition of CP

Prevalence estimates of CP

The search strategy identified seven studies that provided a definition of CP equivalent to the IASP definition for CP [21-23, 25-28]. Two of them were conducted only in children [25] and elderly [23] populations and they will be described separately elsewhere. Five studies [21, 22, 26-28] that used the IASP definition of CP were considered. The studies were analyzed according to relevant variables that may explain the wide differences in the prevalence estimates (see Table 6 for sample sizes and prevalence data for weighted mean calculations in Appendix H).

Based on the information provided by four [21, 26-28] out of the five studies (one study [22] was excluded from calculations because it did not report the numerator used to calculate the prevalence estimates), the weighted mean prevalence of CP was 35.5%. Prevalence estimates ranged from 55.2% [28] to 11.5% [21]. The weighted mean prevalence of CP among male and female populations among the studies was 31.0% (range: 54.9% to 9.1%) and 39.6% (range: 55.5% to 13.4%), respectively.

When publication year was used to group the studies, there was not a clear trend towards lower or higher prevalence estimates according to this variable. Two studies published before 1993 reported figures of 11.5% [21] and 55.2% [28], respectively.

Alternatively, three studies published from 1999 to date reported figures of 18.5% [22], 23.4% [27] and 50.4% [26]. It is unknown the effect that publication year might have on the prevalence estimates.

The type of setting where the studies were conducted (general population, primary care) did not appear to explain the differences in the prevalence estimates. The only study included in this analysis that reported a prevalence estimate [26] in a primary care setting, reached a similar figure (50.4%) than that provided by the study that estimated the highest prevalence in the general population (55.2%) [28]. As would be expected, the population where the cases come from is a main source of variation. The sampling frame, sample selection referral patterns, and other characteristics of the settings where the studies were conducted may contribute to differences in prevalence estimates. Nonetheless, conclusions can not be drawn about a consistent relationship between the type of setting and the prevalence estimates reported in the studies.

In the same way, when studies were analyzed according to arbitrarily cut-off points chosen for sample size (<1,000, 1,000 to 2,000, and >2,000 participants) and response rate (above 70% and below 70%), prevalence estimates did not show a clear trend.

When CP was considered as a primary or secondary outcome, only one study [22] assessed CP as a secondary outcome (prevalence estimate: 18.5%). The remaining four studies [18, 21, 26, 27] assessed CP as a primary outcome and the differences among them continued to be large even when the aforementioned study was excluded. Nonetheless, the fact that there were more studies focussed on CP as a primary outcome highlights the increasing interest in determining the frequency and pattern of CP.

Studies that used phone surveys had lower prevalence rates (11.5% [21], 23.4% [22] and 18.5% [27]) than those that used postal questionnaires as the method for data collection (50.4% [26] and 55.2% [28]). This finding suggests that the method of data collection may be an important variable associated to the differences found in prevalence estimates. Nonetheless, there is not enough information to explain the direction and magnitude of the effect that this variable has on the CP prevalence estimates.

All five studies had a quality score above 70 points; however, due to the lack of data on the validity and reliability of the quality scoring system (personal communication with authors) used in this report, it can not be concluded that these figures are valid. It would perhaps be more reasonable to consider the impact that the individual items within the methodological quality assessment tool may have on the prevalence estimates.

Data on pain parameters and resource utilization

Four of the studies provided information on the characteristics of CP in terms of location [21, 28], frequency [21], severity [21, 22, 26, 28], perceived cause of pain [21, 21, 26], perceived health status [22], level of expressed needs [26], and use of analgesics [21].

Andersson et al. [28] reported that low back was the most frequent location of CP among sufferers (males: 23.8% and females: 22.8%) followed by shoulder, upper arm (males: 17.7%, females: 22.3%), neck, back or head (males: 14.5%, females: 19.1%), and knee (males: 14.2%, females: 12.7%). In this study, 90% of CP was from musculoskeletal origin. Bowsher et al. [21] reported that the distribution of location among CP sufferers was 43% for back, 25.3% for lower limbs, 16% for upper limbs, and 29% for non-specified locations. Although the information provided by both studies is not comparable in terms of the body area involved, it seems to be that musculoskeletal problems were common among both populations of CP sufferers.

This finding is supported by the data provided in the Elliot et al. [26] study, where the more common self-reported cause of pain among those with CP were back problems (16%) and arthritis (15.8%). Alternatively, Bowsher et al. [21] reported a higher estimate of pain associated with arthritis/rheumatism (44%) among CP sufferers that may be due to differences in the categorization of the perceived causes associated with CP. This study also provided information about the time spent in pain. The mean number of days (out of last 28) in pain among CP sufferers was 18.8 days and the percentage of CP patients in pain for more than half of the last month was 60%.

Elliot et al. [26] reported the level of severity among those with CP in terms of intensity and disability: grade I (low disability, low intensity) 48.7%; grade II (low disability, high intensity) 24.4%; grade III (high disability, moderately limiting) 11.1%; and grade IV (high disability, severely limiting) 15.8%.

Andersson et al. [28] also graded the intensity of CP on a scale ranging from 1 (weak) to 5 (intense). Thirty-three percent of the CP sufferers had grade 3 intensity, followed by 22.6% with grade 2 intensity and 19.8% with the most intense grade of CP. Twelve point nine percent and 11.6% of the pain sufferers had grades 4 and 1 of intensity, respectively. Prevalence of definite pain problems (dysfunctional CP) was 12.8% of the total population.

Blyth et al. [22] reported that 11% of males and 13.5% of females in the survey reported some degree of interference with daily activities. Among those with CP, 64.9% had some degree of interference with daily activities caused by pain and 35.1% (1260/3598) had no interference. On the other hand, Bowsher et al. [21] found that 55.2% of CP sufferers had some level of social disability and, among them, 55% were unable to work or lead a normal life due to their CP problems.

Finally, Elliot et al. [26] reported the level of expressed needs of patients with CP in terms of treatment and use of analgesics (using a scale ranging from 0 - low to 4 - high). The highest level of expressed needs was reported by 28% of CP sufferers, followed by 24.7% classified in level 2. Alternatively, Bowsher et al. [21] reported that 70% of CP sufferers were taking analgesics but they continued to have pain. Although these

results are dissimilar regarding the use of analgesics, they do suggest that patients with CP are likely to make extensive use of health services.

Prevalence of severe, limiting or disabling CP

Five primary studies [21, 22, 25, 26, 28] provided data on the number of CP sufferers with severe, limiting or disabling CP. All the studies used the IASP criteria to define CP. The information was collected in very different ways, and definitions of severity were not directly comparable among the studies. For example, severity was measured in one study [28] according to a rating scale graded from 1 (weak) to 5 (intense) while in other study [26] it was rated from Grade 0 (pain free) to Grade IV (high disability, severely limiting CP). Severity of CP can be defined in several different ways in terms of disability, interference, and/or intensity. Nonetheless, it may be assumed that a common factor underlies these definitions: the need to identify and characterize a special group that may demand a greater amount of services within the health care system.

Based on raw data provided by these studies, prevalence was re-calculated for severe, limiting or disabling CP reported by the general population and those from a primary care setting. The prevalence of severe (intense) CP in the general population in the Anderson study [28] was 10.7%. The percentage of participants with Grade III (highly disabling, moderately limiting CP) and Grade IV (highly disabling, severely limiting CP) CP was also 10.7% in the Elliot study [26]. When social disability (inability to work or lead a normal life due to CP) was considered in the Bowsher study [21], the percentage of severe CP was 11%. Thirteen point three per cent of participants in the Blyth study [22] had CP that caused interference with activities.

Prevalence of "very frequent and more intense pain" in children from the general population in the Perquin study [25] was 8%. Therefore, when these figures are considered altogether, it can be said that severe CP (however it is defined) in the general population may vary from 8% among children to approximately 11% among adults.

Studies that used the ACR definition of chronic widespread pain

Three studies reported the prevalence of CWP in the general population [18, 20, 24]. The weighted mean prevalence of CWP was 11.8% (range: 10.1 to 13%). All the studies provided estimates of prevalence by gender (the proportion of males and females that have CWP in the general population). The weighted mean prevalence of CWP among male and female populations was 7.2% (range: 3% to 10.5%) and 14.7% (range: 14.7% to 14.9%), respectively (see Table 6 for sample sizes and prevalence data for weighted mean calculations in Appendix H).

It cannot be reliably concluded that the variation of prevalence estimates among studies on CWP is low. There were only three studies identified and the chance of variation in prevalence estimates may be lower when the number of studies is low.

As prevalence estimates of CWP were similar in the three studies, an analysis considering methodological variables was not conducted. Briefly, studies that reported CWP prevalence estimates of 13% [18, 20] used the same method of data collection (postal questionnaire) and one study [24] that reported a CWP prevalence estimate of 10.1% used face-to-face interviews. Two studies [18, 24] had quality scores above 70 points.

Data on pain parameters and resource utilization

The studies provided information on the characteristics of CWP in terms of disability [24], associated disorders [18, 24], and the use of health services or analgesics among CWP sufferers [20]. Buskila et al. [24] reported that 32% of CWP sufferers had one to seven lost workdays in the last 6 months and 9% had quit work due to pain-related problems. CWP was associated with hypertension in 33% of the cases, followed by dyslipidemia (15%), and ischemic heart disease (15%). Croft et al. [18] reported that CWP patients tended to have symptoms such as tiredness upon waking (42.1%), depression (31.1%), and difficulties in coping with problems (27.4%).

Mac Farlane et al. [20] found that 72% of CWP sufferers had consulted a general practitioner due to pain. Buskila et al. [24] found that 43% of the CWP sufferers had four to six medical consultations in the last 6 months, followed by 35% and 21% that had one to three and more than seven medical appointments, respectively. Eighty percent of them were referred to a specialist. This study also provided information on the use of drugs and other interventions over the last 6 months to relieve pain symptoms. Ninety-five percent of the CWP sufferers used drugs to treat their pain problems. The most common treatments were analgesics (90%) and non-steroidal anti-inflammatory drugs (75%). Physiotherapy (30%), steroid injections (26%) and oral steroids (2%) were used to a lesser degree.

Studies that used other/not clearly defined criteria

Three studies [19, 29, 30] used other or no clearly defined criteria. These studies were not comparable in many ways. One of these studies [30] was exclusively conducted in elderly participants. Therefore, results from this study are described elsewhere.

Birse and Lander [19], a Canadian study, was conducted in the general population and provided a prevalence estimate of 44.4% (males: 33.5%, females: 66.5%) using a definition of "*continuous or intermittent pain for at least 6 months*". The authors recognized that the prevalence rate may have been inflated or deflated by several factors, such as poor recall and lack of probability sampling of individuals within households.

Gureje et al. [29] conducted a multi-centre WHO study in primary care settings. The prevalence of CP 21.5% (males: 16.2%, females: 24.8%) was a secondary outcome defined as "*current and persistent pain that was present most of the time for a period of 6 months or more during the prior year*".

Data on pain parameters

The Canadian study by Birse and Lander [19] provided information about pain parameters and perceived health status among those with CP. Pain experience was characterized in terms of mean pain intensity using an 11-point scale (7.9, SD: 2.0), mean years since pain onset (10.2 years, SD: 10.8) and frequency of pain (infrequently 7.7%; one to two times per month 15.9%; three to ten times per month 18.7%; more than 10 times per month 57.7%). Compared to peers, 42% of CP sufferers considered that their health status was similar and 26.9% considered it as worse when compared to peers without pain. It was surprising that 24.2% considered that their own health status was better when compared to peers without pain.

The multi-centre WHO study [29] identified the three most commonly reported anatomical pain sites among those with persistent pain: back pain (47.8%), headache (45.2%), and joint pain (41.7%). The majority (68%) of primary care patients with persistent pain in this study reported pain in at least two anatomical sites. On the other hand, unfavorable health perceptions were reported by 33.4% of those with persistent pain in this study. Thirty-one point four percent of those with persistent pain were rated as having moderate to severe interference with their work and 41.2% had more than three days of limited activity due to pain in the prior month.

Studies in children and elderly populations

One study [25] assessed the prevalence of CP in children. By using the IASP definition, the study reported prevalence estimates of CP for children from 0 to 18 years of age. The distribution of CP by gender was 19.5% for males and 30.4% for females. The study did not provide additional information on pain characteristics and use of health care resources.

There were two studies [23, 30] that provided data on the prevalence of CP in elderly populations. One study [23] used the IASP definition and calculated a total prevalence of 50.2%. Prevalence estimates by gender were not reported.

The other study [30] calculated a total prevalence of 32.9% for the elderly in the general population. The distribution of CP by gender was 23.7% for males and 40.1% for females. This study was part of a larger cohort study and the response rate was absolute (100%).

Pain parameters

Helme and Gibson [23] provided information about characteristics of pain. The study reported the percentage of pain sites in the past 12 months. Joints, back, and lower limbs were the more common pain sites. Data on resource utilization was not provided in the studies.

DISCUSSION

Verhaak et al. [10] included 15 descriptive studies, Nickel and Raspe [13] included 17 descriptive studies and this systematic review considered 13 studies. Several reasons can be put forward to explain the differences in the number and type of studies included in each of the systematic reviews. Restrictions by date of publication as part of the search strategies and the use of different selection criteria account for the main variations (see Table 7 in Appendix I). Only two studies [21, 28] were similarly included in all three systematic reviews. The same five studies that were included in Verhaak et al. [10] and Nickel and Raspe [13] were identified by our search strategy, but were not included as they did not meet our inclusion criteria. For similar reasons those studies included either solely in Verhaak et al. [10] or Nickel and Raspe [13] were excluded from this review.

The systematic review of CP prevalence studies presented in this report satisfied the Oxman and Guyatt criteria for critical appraisal of systematic reviews [31, 32] and, therefore, has some advantages over the previous published systematic reviews in this field. The search strategy was sensitive and specific to identify all the relevant prevalence studies on CP in the general population and primary care setting published from 1991 to date. Inclusion and exclusion criteria were defined in advance and bias in the selection of studies was avoided by the use of two independent reviewers that selected and appraised the quality of the individual studies. The reasons for excluding studies were reported in every case. Furthermore, a full description of the process used to assess the quality of the individual studies was provided and therefore could be replicated. Although the assessment tool has yet to be validated, it was used consistently by both researchers.

The studies were analyzed according to relevant variables and combined when appropriate in a single estimate (weighted mean prevalence). The conclusions of this report are similar to previous published systematic reviews on CP. Studies were heterogeneous in many ways and several factors need to be considered to explain the variability in prevalence estimates reported by the primary studies. Demographic factors of the populations under study and variations of associated disorders, the use of different criteria to define CP, and methods of data collection are sources for variations in the prevalence estimates.

Although almost all the studies discussed here were conducted in a more or less Anglo-Saxon environment (north-west Europe, North America and Australia), it is still possible that important social and cultural differences in the acceptance of pain reporting behaviour may be an important variable to consider. Nonetheless, caution should be taken when drawing conclusions about the role of these factors in determining responses to CP, given that results are based on samples drawn from limited settings within each geographic location.

The nature of the questions asked in the studies about the temporal nature of pain may be one of the main sources of variability in the prevalence estimates. CP may be defined in terms of interval of occurrence and frequency, and the questions used in the studies to explore these domains were not comparable (see Table 4 in Appendix F for further details on questions used in the individual studies).

Furthermore, the effect that ordering of specific questions might have on the estimates of CP prevalence is unknown. For example, if the first question refers to the identification of "any" pain before asking the location of the pain, it may result in different CP prevalence estimates than when asking first about pain in each anatomical location and then asking specific details concerning that pain [23]. Primary studies used several different CP case definitions. For example, some studies included measures of severity, others included measures of disability, and some included both severity and disability measures while others had no restricted case definitions. It should be noted that researchers may not be able to distinguish between extent of the complaints and the degree of disability (personal communication Dr. Nickel).

Not all of the studies used questions to adequately describe such pain characteristics as the site of pain, its continuous or intermittent nature, its quality and severity at different times, and the level of disability as a result of the pain. All of these aspects (window of pain, the time in pain within this window, the criteria for defining CP, and the effect that ordering has) related to the questionnaires might help to explain the variation in prevalence figures [33].

The method of data collection may be an important variable associated to differences in prevalence estimates. Studies that used phone surveys had lower prevalence rates than those that used postal questionnaires as the method for data collection. Nonetheless, there is not enough information to explain the direction and magnitude of the effect that this variable has on the CP prevalence estimates.

The noted differences in prevalence estimates when the studies were divided according to the ACR and IASP definitions may be attributable to the differences in the level of comprehensiveness of these classification systems. Nonetheless, it should be kept in mind that the ACR definition may also be considered as a subset of the IASP definition. Therefore, each patient with pain that has persisted beyond normal tissue healing time is an IASP-defined pain patient. Only if such pain involves four different parts of the

body, the patient is considered an ACR-defined pain patient (personal communication Dr. Verhaak).

It is noteworthy that little variation was observed among the three studies that used the ACR criteria (weighed mean: 11.83%, range: 10.1 to 13%). Studies that used the IASP definition showed a broader range of variation among their prevalence estimates (weighed mean: 35.5%, range: 10.5 to 55.2%). Variations in the application of criteria may explain some of the discrepancies observed in the primary studies. The questionnaires used in the primary studies using the ACR criteria were more comprehensive and similar. Nonetheless, caution should be taken to interpret the least variation in prevalence estimates among studies that used the ACR criteria. It is also likely that just by chance, the lower number of studies is associated with a lower variation in prevalence estimates.

It is interesting to note that studies using the IASP definition and providing information about CP severity using proxy definitions such as intensity, level of functional limitations and disability had similar prevalence estimates as those studies using the ACR criteria (10% to 13% to define chronic pain). Prevalence estimates from studies of severe CP using the IASP criteria were calculated and ranged from 8% in children to around 11% in adults.

The information about the prevalence of CP in the general population and primary care settings should be put into a Canadian perspective. Two studies that assessed the prevalence of CP in Canadian populations were identified [19, 34]. The Millar article [34] that reported the prevalence of CP based on the results of the 1994-1995 National Population Health Survey was excluded from this review because the duration of CP was not clearly defined. This study considered pain as a secondary outcome and reported that 17% of the Canadian population aged 15 years and over experienced some CP or discomfort. This figure is quite different from the 44% estimated in the Birse and Lander's study [19] that was conducted using a random sample extracted from the general population in Alberta. Differences in CP prevalence estimates in these studies may be explained by the same reasons previously presented.

It is worthwhile to note that the primary focus of this review was on the prevalence of CP in the general population and primary care setting. Consequently, the search strategy was not designed to retrieve specific information about the characteristics of CP in terms of severity and other parameters such as use of health care resources. The information reported here with regard to these parameters should be taken with caution and generalizations should be avoided. Nonetheless the data reported in the primary studies support the findings of a high prevalence of CP among females (usually from musculoskeletal origin) and a significant increase in the use of health care resources within CP sufferers.

CONCLUSIONS

This report has identified and critically appraised the published evidence on the prevalence of CP in the general population and primary care setting. Published systematic reviews on this topic have no definitive answer. The CP prevalence estimates reported in the 13 studies included in the systematic review vary widely from 10.1% to 55.2%. Lack of consensus about basic definitions and inconsistencies in measurement among the published studies on CP prevalence make it difficult to quantitatively compare the findings.

Nonetheless, it is important to point out that based on proxy definitions of severity (intensity, level of functional limitations and disability) provided by five (using the IASP definition) out of the 13 studies included in the review, calculation of severe CP prevalence was possible. Severe CP prevalence figures showed little variation in the study populations, ranging from 8% in children to 11% in adults. These estimates are similar to those reported in the three studies using the ACR criteria, weighted mean 11.8% with a range of 10% to 13%. Given that associated costs for severe CP must be considerable for the health system, the individual and the society, the management of CP problems needs to be recognized and addressed.

Several studies showed high CP prevalence rates. In the particular case of Canada and Alberta settings, CP prevalence estimates were calculated in studies that used broad and non-formal definitions of CP. Wide variations observed in the estimated prevalence rates preclude a generalization of the findings into a regional context.

Therefore, the single most important recommendation in the context of a research agenda is to conduct concurrent, prospective epidemiological studies to estimate the CP prevalence in Alberta (using a clear case-definition, and well-validated and reliable data collection tools). Some important questions should be addressed: numbers and characteristics of people with CP in Alberta and the proportion of people with disabling, limiting or intense CP. Quality of life is a further issue that should be assessed in this CP population. Estimation of the size and characteristics of the population affected by CP may provide a basis for designing and providing therapeutic efforts toward those most likely to need and benefit from them.

More stringent, systematic and uniform methodological approaches to study the prevalence of CP are needed. The results from this report provide a clear description of the impact that various aspects related to the methodology of the studies may have on prevalence estimates. Differences in demographic characteristics of participants, the use of formal criteria to define CP, the type of questions used for case definition, the methods of data collection and the consideration of CP measures as primary or secondary outcomes should be taken into account.

APPENDICES

APPENDIX A: METHODOLOGY

Analysis of systematic reviews:

In order to identify all the systematic reviews that assess the prevalence of CP in the general population and/or primary care settings, a systematic search of the published literature from 1991 to 2002 was performed (see Appendix B). The objective at this stage of the report was to identify valid and reliable information about the prevalence of CP and to assess the quality of the published systematic reviews. The reports had to be described as systematic reviews, or they had to include a pooled analysis (either qualitative or quantitative) of the results from several independent primary studies. The quality of the systematic reviews was assessed using the Oxman and Guyatt criteria for critical appraisal of systematic reviews [31, 32] (see Appendix C, Table 1). Briefly, this set of criteria assesses the question and methods, the search strategy to locate the relevant studies, the description of the inclusion and exclusion criteria to select the studies, the methodological quality assessment of the primary studies, and the combination of the results from primary studies [31].

Analysis of primary studies

Inclusion and exclusion criteria

Types of studies

Studies of any design were included if they met the following criteria:

- Estimate (or provide enough data to calculate) the prevalence of CP.
- When longitudinal studies were available, the first period where CP was measured (by any data collection method) was considered.

Studies focused on acute pain, pain by diagnostic categories or by body area involved, or pain secondary to a defined disease, were excluded.

Types of participants

Male and female subjects. Any age.

Type of setting

General population and primary care settings. Studies of special groups in the community (industrial workers, etc) or hospital settings were excluded.

Type of outcome measures

Point prevalence of CP. Other prevalence estimates were reported, if available. Duration of CP should be clearly defined in the studies. Studies that described CP just in a vague way (i.e., "persistent", "long lasting", "recurrent", "continuous") were excluded.

Methods of the review

One researcher selected the articles that met the inclusion criteria. This could potentially lead to selection bias. Information on the following variables was extracted from each study in a standardized form: publication year, country and date of conduction, setting, study design and sampling frame, sample size and characteristics, methods of data collection, definition of CP, instrument to measure CP, response rates, and prevalence estimates. When prevalence was calculated using more than one case definition, the definition with the most inclusive criteria were considered. For example, if a same study reported CP estimates for 6-month and for 3 month of duration, the later estimate was considered. Data on characteristics of pain and use of services were also abstracted.

One reviewer assessed the methodological quality of all the included studies according to the 1998 criteria proposed by Loney et al. [35] (Table 2 in Appendix C). Briefly, this set of criteria relates to the validity of the study methods (design, sampling frame, sample size, outcome measures, measurement, and response rate), the interpretation of the results and applicability of the findings. Each article was also rated according to the 1999 scoring system proposed by Loney et al. [36] to assess the methodological quality of prevalence studies. This scoring system includes nine items that are rated in a 10 point-scale according to the presence or absence of the aforementioned issues. Scores range from 0 to 90 points. A total methodological score of 70 points was considered a priori as acceptable (see Appendix C, Table 3).

A second researcher independently appraised a random sample of included studies by using the same set of criteria and scoring system. The sample was obtained with a random numbers table. The level of agreement between both reviewers was established by a simple agreement measure.

When both reviewers critically appraised the included studies, the level of agreement was 100% when the total quality methodological score was classified according to a cut-off of 70 out of 90 points. When the individual items of the scoring system were considered, the level of agreement was 71%.

Studies were divided according to the criteria that were used to define CP (IASP, ACR, other/not specified). When prevalence estimates were not reported in the article, these were calculated from the available raw data. Where possible and plausible, a quantitative integration of the results was considered. This approach used data from all relevant studies to calculate prevalence estimates. Studies with CP prevalence estimates that were likely to differ systematically were excluded (Appendix E). Potential biases and their impact on prevalence rates were also explored.

Apart from the criteria for case definition, important variables that may individually explain the differences in the prevalence estimates were considered in the analyses. These included:

- Publication year (before 1993, 1994 to 1998, 1998 to date),
- Type of setting (general population, primary care),
- Sample size (<1000, 1000 to 2000, and >2000 participants),
- Response rate (above 70% and below 70%) [36],
- Type of outcome measure (pain collected as a primary or a secondary outcome in the study),
- Methods for data collection (postal, face to face interview, telephone),
- CP definition (duration) (> 3 months, > 6 months), and
- Methodological score (above 70 points and below 70 points).

The possibilities to calculate a pooled prevalence estimate using meta-analytical techniques were explored. Weighted mean estimates (based on sample size of the studies) adjusted by these variables are reported for each subgroup of studies, if appropriate. Other relevant information related to characteristics of chronic pain (i.e., nature, frequency, location, severity) and use of health services are extracted and presented (Appendix G).

APPENDIX B: SEARCH STRATEGY

The following databases and information sources were searched to identify the literature and related materials:

Database Searched	Dates/Terms Used
AMED (Ovid)	1991- April, 2002 (chronic pain.mp. OR (chronic.mp AND pain.mp.) OR (chronic widespread pain.mp) OR (chronic wide-spread pain.mp) OR (chronic wide spread pain.mp)) AND prevalence.mp.
PubMed	1991- December, 2002 Chronic pain AND **prevalence**
MEDLINE (Ovid)	1991-March 2002 pain.sh,hw,ti. AND chronic.sh,hw,ti. AND prevalence.sh,hw,ti.
EMBASE (Ovid)	1991- March 2002 pain.sh,hw,ti. AND chronic.sh,hw,ti. AND prevalence.sh,hw,ti.
CINAHL (Ovid)	1991-Feb 2002 (chronic pain.mp. OR (chronic.mp AND pain.mp.) OR (chronic widespread pain.mp) OR (chronic wide-spread pain.mp) OR (chronic wide spread pain.mp)) AND prevalence.mp.
BioethicsLine (Ovid)	1991-December 2000 Exp **pain** AND exp **chronic disease**
PsycInfo (Ovid)	1991- February 2002 pain.sh,hw,ti. AND chronic.sh,hw,ti. AND prevalence.sh,hw,ti. 13 citations
Database of Abstracts of Reviews of Effectiveness (DARE) **NHS Economic Evaluations Database (NHSEED)** **Health Technology Assessment Database (HTA)**	Up to December 1, 2001 Chronic AND pain AND prevalence
Cochrane Database of Systematic Reviews (Update software)	2001 Issue 4 (chronic next pain) and prevalence
HealthSTAR (Ovid)	1991- January 2000 **exp** pain **AND exp** chronic disease and prevalence

Websites:	
CMA Practice Guidelines-CPG Infobase **National Guideline Clearinghouse** **ECRI website** **Statistics Canada** **Health Canada** **36 INAHTA members websites**	December 2001 (chronic pain OR (chronic AND pain)) and prevalence
NEOS library catalogue	Keyword search: Chronic AND pain AND prevalence
Internet websites of note:	Canadian Consortium on Pain Mechanisms Diagnosis and Management www.curepain.ca Chronic Pain Association of Canada ecn.ab.ca/cpac The Canadian Pain Society www.canadianpainsociety.ca North American Chronic Pain Association of Canada www.chronicpaincanada.org American Chronic Pain Association www.theacpa.org Amercian Pain Society (annual meeting abstracts at Medscape.com)

It was decided that specific medical condition terms (such as, rheumatoid arthritis, fibromyalgia) are not used in the search because there are numerous conditions related to pain. Searching for all those terms would take an extended period of time and generate large search results with less precision, which is not desirable for the time constraints.

Manual searches of reference list of relevant articles identified by the electronic searches were done to retrieve further studies. Publications in any language were considered. Canadian studies published before 1991 were considered and included in the report, if appropriate.

APPENDIX C: QUALITY ASSESSMENT TOOLS

Oxman and Guyatt criteria for critical appraisal of systematic reviews [31, 32, 37]

- Were the search methods used to find evidence (original research on the primary questions) stated?
- Was the search for evidence reasonably comprehensive?
- Were the criteria used for deciding which studies to include in the overview reported?
- Was bias in the selection of studies avoided?
- Were the criteria used for assessing the validity of the included studies reported?
- Was the validity of all the studies referred to the text assessed using appropriate criteria (either in selecting studies for inclusion or in analysing the studies that are cited)?
- Were the methods used to combine the findings of the relevant studies (to reach a conclusion) reported?
- Were the findings from the relevant studies combined appropriately, relative to the primary question that the overview addresses?
- Were the conclusions drawn by the author(s) supported by the data and/or analysis reported in the overview?

Guidelines for critical appraisal of studies of prevalence or incidence of a health problem [35]

A. ARE THE STUDY METHODS VALID?

1. Are the study design and sampling method appropriate for the research question?
2. Is the sampling frame appropriate?
3. Is the sample size adequate?
4. Are objective, suitable and standard criteria used for measurement of the health outcome?
5. Is the health outcome measured in an unbiased fashion?
6. Is the response rate adequate? Are the refusers described?

B. WHAT IS THE INTERPRETATION OF THE RESULTS?

7. Are the estimates of prevalence or incidence given with confidence intervals and in detail by subgroup, if appropriate?

C. WHAT IS THE APPLICABILITY OF THE RESULTS?

8. Are the study subjects and the setting described in detail and similar to those of interest to you?

Methodological scoring system to rate studies reviewed [36]

Item	Score
1. Random sample	10 points
2. Unbiased sampling frame (i.e. census data)	10 points
3. Adequate sample size (>300 subjects)	10 points
4. Measures valid and reliable	10 points
5. Adequate response rate (70%)	10 points
6. Point prevalence estimates provided	10 points
7. Confidence intervals provided	10 points
8. Definition and duration of CP	10 points
9. Study subjects described	10 points
Maximum score	**90 points**

APPENDIX D: SYSTEMATIC REVIEWS ON THE PREVALENCE OF CP

Table 2: Systematic review on the prevalence of CP

Study: Verhaak et al. [10] – Qualitative review		
Objectives	- To determine the methods used to calculate prevalence of chronic benign pain. - To determine the prevalence of benign pain among adults.	
Search Strategy	- Search on electronic databases (Medline and Embase) (1990-1996); manual search in reference lists of reviews and editorials on pain research. Language restrictions: not available.	
Study selection / inclusion and exclusion criteria	Inclusion criteria: - Studies focused on CP (as defined in the studies). - Epidemiological studies on pain. - Studies should include subjects with ages between 18 and 75 years. - Studies should report prevalence estimates of CP in the general population or in primary health care setting.	Exclusion criteria: - Studies exclusively dealing with pediatric and elderly populations - Studies exclusively focused on acute pain or pain secondary to a defined disease.
Data extraction	- Author and year of publication. - Methods of data collection. - Definition of CP in the studies. - Prevalence of CP (in %). - Non-response rate (in %). - Demographic and co-morbidity characteristics of the samples in the individual studies. - It is unclear how the data extraction process was performed.	
Quality of studies assessment	- Formal criteria to assess the quality of the primary studies were not available.	
Results/ Data integration	- 15 descriptive studies: USA (4), UK (3), Denmark (2), Sweden (2), Canada (1), Finland (1), Germany (1), New Zealand (1). Data collected from 1980 to 1990. 13 population surveys; 2 in general practice. 3 studies restricted to pain in specific body sites; 12 on pain in general. Range of number of subjects in the studies: 308 to >10,000 subjects. Non-response rate varied from 10% to 30%. - Methods to collect data: telephone survey (3); postal questionnaire (6); interview (3); expert assessments (3). - Median point prevalence of CP: 15% (2% to 40%). According to the complexity of the definition of CP (“multidimensional” or “simple”) the median prevalence is 13.5% (6 studies) and 16% (number of studies unknown), respectively.	

Table 2: Systematic review on the prevalence of CP (cont'd)

Study: Verhaak et al. [10] – Qualitative review (cont'd)		
Conclusions	- There have been no epidemiological studies on the prevalence of chronic benign pain in the general population. - There are few epidemiological studies of CP in this population. - The use of different definitions for CP and the variation on the assessment methods did not seem to affect the prevalence reported. - There were no clear-cut differences between prevalence based on each of the methods used. - There was consensus about the characteristics of CP sufferers: they are often middle-aged women from lower socioeconomic strata.	
Reviewers assessment	- The objective of the review is related to a highly significant topic (prevalence of chronic benign pain) that seems to be underreported in the available literature on pain. - The search strategy was sufficiently broad to identify the most relevant studies.. - Although there was not a priori formulation of study design that would be considered, the inclusion and exclusion criteria were clearly stated and are coherent with the main issues of the review question. - The methodological quality of the studies was not assessed in a systematic way using defined criteria. - The use of a "median point prevalence" as a pooled estimate from individual studies is inappropriate. - The reproducibility of the review process is uncertain.	
Study: Nickel and Raspe [13] – Qualitative review		
Objectives	- To provide an overview of the frequency and distribution of CP in the general population and among those receiving treatment.	
Search Strategy	- Search on Medline (1980-2000); manual search of the references listed in the literature (personal communication with the first author). Language restrictions: not available.	
Study selection / inclusion and exclusion criteria	Inclusion criteria: - Studies focused on epidemiology of CP and demographic parameters in general populations. - Studies on populations with CP that received treatment (personal communication with the first author).	Exclusion criteria: - Epidemiological studies that investigate pain in distinct locations (personal communication with the first author). - Studies that investigate pain in specific age groups.
Data extraction	- Author and year of publication. - Sample size of the individual studies. - Methods of data collection. - Prevalence of CP (in %). - Definition of CP in the studies (by duration). - Demographic characteristics of the samples in the individual studies (gender, age).	

Table 2: Systematic review on the prevalence of CP (cont'd)

Study: Nickel and Raspe [13] – Qualitative review (cont'd)	
Quality of studies assessment	- Formal criteria to assess the quality of the primary studies were not available.
Results/ Data integration	- 17 descriptive studies. - Methods to collect data: phone survey (6 studies); postal questionnaire (8 studies); interview (3 studies). - Narrative analysis was presented.
Conclusions	- Epidemiology studies on CP are limited by theoretic, methodological and economic reasons. - There are variations in populations, methods of data collection, definition of CP and reporting that preclude a quantitative integration of the results. - Frequency of CP is increased with age (peak: 45 to 65 years of age).
Reviewers assessment	- Search methods were not reported in the publication, but the review used a formal search strategy to identify the studies. - A set of inclusion and exclusion criteria was defined; nonetheless it appears that they were not applied in the same way and a selection bias is likely. - The methodological quality of the studies was not assessed in a systematic way using defined criteria.

APPENDIX E: EXCLUDED STUDIES

Table 3: Excluded studies

Study (by publication year)	Reasons for Exclusion
Smith et al., 2001 [38]	This was a duplicate report of Elliot et al. study [26]. The article examined CP from a clinician's perspective and reported the prevalence and distribution of the most severe or troubling CP in the community. The article did not provide new relevant information apart from that published in the original paper.
Perquin et al., 2000 [39]	This was a duplicate publication of the data presented in Perquin et al. [25]. Although the report was excluded, it allowed completing some data that were not provided in the first report.
Anderson et al. 1999 [40]	Focused on musculoskeletal CP.
Bassols et al., 1999 [14]	This study assessed the prevalence of pain in a Spanish region, but the definition of pain did not consider the duration. It was not possible to make distinctions between acute and CP from the figures provided.
Cassidy et al. 1998 [41] White et al. 1998 [42]	These were two Canadian studies about the prevalence of low back pain and fibromyalgia, respectively. The definition of CP was limited to specific types of pain. They may be analyzed in futures updates of this report.
Becker et al., 1997 [43]	This study was not a prevalence study. It assessed a sample of 150 CNMP patients consecutively referred to a Danish multidisciplinary pain centre that was not representative of the CNMP patients in Denmark.
Brattberg et al., 1996 [44]	This study of the prevalence of pain in Swedish elderly from the general population. It did not report prevalence data considering the duration of pain. Therefore, there were not distinctions made between acute and CP from the figures provided.
Millar, 1996 [34]	The duration of CP was not clearly stated.
Sjøgren et al., 1996 [45]	The study examined how physicians in Denmark managed cancer pain and did not provide prevalence data.
Mobily et al., 1994 [46]	This is a very interesting analysis from the Iowa 65+ Rural Health Study that assessed the health status of the elderly population in USA. Information on the number of subjects that experienced some type of pain in the year prior to the time for data collection was provided. A definition for CP in this population. Was not stated
Lipton et al. 1993 [47]	The study focused exclusively on the prevalence of orofacial pain and CP was not clearly defined.
Magni et al., 1993 [48]	This was a follow-up study of the participants in HANES I (the Hispanic Health and Nutrition Examination Survey). It was excluded as the original study was related with specific types of pain (musculoskeletal pain).
Magni et al. 1992 [49]	This study addressed exclusively the prevalence of abdominal CP data from the HANES study in the USA.
Potter & Jones, 1992 [50]	This was a follow-up study about the natural history of CP in an apparently non-random sample of forty-five patients. The aims of the study were to describe the progress of pain after a 6-months period and to identify factors associated with chronicity. The study did not focus on the prevalence of CP in the general population or primary care settings.
Sorensen et al., 1992 [51]	The duration of CP was not clearly stated. This study used indirect data collection methods. It was based on information provided by general practitioners about the number of strong analgesics prescribed for each patient. The expected prevalence rate for CNMP pain in a primary care setting was then indirectly calculated. This study is in many ways quite different from the others in respect to the approach to collect the information.

Table 3: Excluded studies (cont'd)

Study (by publication year)	Reasons for Exclusion
James et al., 1991 [17]	This report provides data from an epidemiological study that assessed the prevalence of psychiatric disorders in a random sample of the general population at New Zealand. The study assessed the lifetime prevalence of pain (as a secondary outcome) using 11 questions on pain from the Diagnostic Interview Schedule and did not considered the duration of pain. It was not possible to extract precise information about point prevalence.
Kohlman, 1991 [52]	This was a German-published report of a population-based pain survey. The duration of pain was not explicitly stated and data for CP could not be extracted from the available information.
Mäkelä & Heliövaara, 1991 [53]	The study addressed exclusively the prevalence of primary fibromyalgia (defined by operational criteria) in the Finnish population.

APPENDIX F: CHARACTERISTICS OF THE INCLUDED STUDIES

Table 4: Characteristics of the included studies

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Andersson et al., 1993 [28] Sweden (1988) General population	N = 1,609 1806 eligible participants Adults 25 to 74 years **Mean age:** Not available **Distribution by gender**: ♂ = 49.7% (799/1609) ♀ = 50.3% (810/1,609)	Cross-sectional survey	Random sample from a population register	Postal questionnaire	Pain as primary outcome (persistent or regularly recurrent pain) **CP definition:** ① Pain with duration > 3 months IASP definition ② Dysfunctional CP (DCP): Pain with duration > 6 months, pain intensity grades 4 or 5 (any localisation), impairment in 2 aspects o ADL and/or sick leave due to pain at least once during the past 3 months. **Validity and reliability data of the instrument to measure CP:** Apparently validated questionnaire. Validity and reliability data were provided. **Question:** "Do you feel pain lasting for more than three months?" Survey of pain symptoms (duration, location, intensity, and functional capacity), medical care sought, therapy, and lifestyle. **Questions cueing:** 1. Initial question about pain experiences. 2. Pain localisation by a drawing (11 areas of localisation) 3. Intensity for each location (graded from 1 to 5 – weak to intense) Activities of daily living: questions about the ability to perform seven different activities: no difficulty, some and greater difficulty.	89.9% (1609/1806)	**Total prevalence:** **> 3 months (IASP criteria):** 55.2% (95%CI:52.8-57.6) (874/1609) **By gender:** ♂ = 54.9% (439/799) ♀ = 55.5% (449/810) **DCP > 6 months** 49.8% (95%CI: 47.4-52.2%) (801/1609) **By gender:** Not available **Severe CP (grade 5 - intense):** 10.7% (173/1609) 90% CP from musculoskeletal origin **Prevalence of CP by localisation and gender:** Low back: ♂ =23.8%, ♀ = 22.8% Shoulder, upper arm: ♂ = 17.7%, ♀ = 22.3% Neck, back or head: ♂ = 14.5%, ♀ = 19.1% Knee: ♂ = 14.2%, ♀ = 12.7% **Intensity of CP:** 1 (weak) = 11.6% 2 = 22.6% 3 = 33.1% 4 = 12.9% 5 (intense) = 19.8%

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Birse and Lander, 1998 [19,54] Canada (1991 to 1992) General population	N = 410 592 eligible individuals Adults 18 years and over **Mean age:** 40.8 years (SD: 16.3) **Distribution by gender:** ♂ = 38.8% (158/410) ♀ = 61.2% (252/410)	Cross-sectional survey	Random sample of households with telephones obtained from a databank of random digit numbers. Randomisation within the households by birthday date.	Phone interview	CP as a primary outcome. **CP definition:** Continuous or intermittent pain for at least 6 months. Reference to a specific set of criteria was not provided. **Validity and reliability data of the instrument to measure CP:** Instrument for data collection was developed for the study and was no validated. **Question:** "Do you have or have you had since the past six months any pain or discomfort?"	69% (410/592)	**Total prevalence:** 44.4% (CI%: 41.8 – 45.4%) (182/410) **By gender:** ♂ = 33.5% (61/158) ♀ = 66.5% (121/252)
					Questions cueing: 1. Respondents were asked to report occurrence of any pain in the previous six months and to identify each site where it had occurred. 2. To identify each site where it had occurred. 3. Onset and frequency of pain at each site. 4. Pain intensity assessed on an 11-point scale (0 to 10 – none to worst possible pain).		**Perceived health status of CP sufferers compared to peers:** Much better = 5.0% Better = 24.2% Same = 42.9% Worse = 26.9% Much worse = 1.0% **Mean pain intensity (SD):** 7.9 (2.0) **Mean years since pain onset (SD):** 10.2 (10.8) **Frequency of CP (%)** Infrequently: 7.7% 1-2 times per month: 15.9% 3-10 times per month: 18.7% > 10 times per month: 57.7%

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Brochet et al., 1998 [30] France (1990) General population	N = 741 1,726 eligible participants from a larger cohort study **Mean age:** 74.2 years **Distribution by gender:** ♂ = 39.8% (295/741) ♀ = 60.2% (446/741)	Cross-sectional survey within a cohort study	Stratified random samples from electoral registers of 37 parishes.	Face-to-face interview	Persistent pain as secondary outcome within a large cohort study of elderly people (PAQUID study) **CP definition:** Daily pain for more than 6 months. Reference to a specific set of criteria was not provided. **Validity and reliability data of the instrument to measure CP:** Interviews conducted by psychologists specifically trained and experienced in interviewing elderly subjects. No further information was provided. **Question:** During the previous year, did you feel pain anywhere? Daily for more than 6 months? Was severity of the last 'usual' episode mild, moderate, severe or very severe?	100% (741/741)	**Total prevalence:** 32.9% (244/741) **By gender:** ♂ = 23.7% (70/295) ♀ = 40.1% (179/446)
					Questions cueing: 1. Frequency of pain 2. Location of pain. 3. Temporal pattern of each pain. 4. Severity of pain.		11% of males and 13.5% of females in the survey reported interference with daily activities. Among those with CP, 64.9% (2338/3598) had some degree of interference with daily activities caused by pain and 35.1% (1260/3598) had no interference.

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Blyth et al., 2001 [22] Australia (1997) General population	N = 17,496 24712 eligible participants (calculated from the response rate provided) Adults 16 years and over **Mean age:** ♂ = 42.8 years range: 42.3 to 43.3 years ♀ = 44.1 years range: 43.6 to 44.6 years **Distribution by gender:** ♂ = 49.3% (7484/17496) ♀ = 50.7% (10012/17496)	Cross-sectional population survey	Simple random sampling of household phone numbers within strata and simple random sampling of a resident within each household	Computer-assisted phone interview	Pain measured as a secondary outcome through one question within the 1997 New South Wales Survey **CP definition:** Pain experienced everyday for three months in the six months prior to interview. IASP definition **Validity and reliability data of the instrument to measure CP:** Not available **Question:** Thinking back over the last 6 months, have you had an episode of pain that has lasted more than 3 months?	70.8% (17496/24712)	Raw data for percentages are not presented here due to inconsistencies in the reported figures. **Total prevalence:** 18.5% (95%CI: 17.8 to 19.3%) ***By gender:*** ♂ = *17.2%* (95%CI: 16.2 to 18.2%) ♀ = 19.9% (95%CI: 18.9 to 20.9%) **CP that cause interference with daily activities:** 13.3% (2338/17496)
					Questions cueing: 5. Pain experienced 6. Interference with daily activities on a five-point adjective scale (none to extreme). 7. Self-rated health		11% of males and 13.5% of females in the survey reported interference with daily activities. Among those with CP, 64.9% (2338/3598) had some degree of interference with daily activities caused by pain and 35.1% (1260/3598) had no interference.

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Bowsher et al., 1991 [21] Great Britain (1990) General population	N = 1037 responders from a household population of 2942 people. 15 years and over **Mean age:** 44 years **Distribution by gender:** ♂ = 47.5% (493/1037) ♀ = 52.4% (544/1037)	Cross-sectional survey	Random sample of households from phone lists. Respondents stratified by age and social strata.	Phone interview	CP as the primary outcome. **CP definition:** Pain defined as pain which lasted on or off for more than the last 3 months. IASP definition **Validity and reliability data of the instrument to measure CP:** Not available. **Question:** Not available.	Not available	**Total prevalence:** 11.5% (119/1037) **Recalculated including all household members:** 7% (208/2942) **By gender:** ♂ = 9.1% (45/493) ♀ = 13.4% (73/544) **Social disability caused by CP:** 11% (115/1037)
					Questions cueing: 1. Presence of pain 2. Responded were asked what they believed to be the cause of pain. 3. Location of pain. 4. Total time spent in pain. 5. Social disability.		**Cause of pain among CP sufferers:** Arthritis/rheumatism: 44% "Illness": 8.1% **Location of pain:** Back: 43% Other/not specified: 29% Lower limb: 25.3% Upper limb: 16% 70% of CP sufferers were taking analgesics but they continued to have pain. **Total time spent in pain:** Mean number of days (out of last 28) in pain: 18.8 Percentage of patients in pain for more than half the last month: 60% **Social disability:** 55.2% of positive responders. Unable to work or lead a normal life because of pain: 55%

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Buskila et al., 2000 [24] Israel (1997) General population	N = 2,210 2322 eligible participants Adults 18 to 86 years **Mean age:** 43 years, SD = 17 **Distribution by gender:** ♂ = 40% (884/2210) ♀ = 60% (1326/2210)	Cross-sectional population survey	Stratified random sample from health service register	Face-to-face interview	CP as primary outcome Participants divided according to pain categories (Wolfe et al, 1995): Group 1: No pain Group 2: Current pain as well as pain that had been present for less than 3 months (transient pain) Group 3: Current (non-widespread) pain as well as pain that had been present for at least 3 months (chronic regional pain) Group 4: Current pain as well as pain that had been present for at least 3 months that was considered widespread according to the ACR definition. Group 5: Cancer-related pain. **Validity and reliability data of the instrument to measure CP:** Not available **Question:** Not available.	95.2% (2210 / 2322)	**For Chronic Widespread Pain (CWP):** Total prevalence: 10.1% (224/2210) 95%CI: 8.7 to 11.1% By gender ♂ = 3% (29/884) ♀ = 14.9% (195/1326) **For chronic regional pain (CRP):** Total prevalence:: 13.9% (308 / 2210) 95%CI: 12.4 to 15.2% By gender: ♂ = 13% (114/884) ♀ = 14.6% (194/1326) **For both (CWP and CRP):** Total prevalence: 24.0% (532/2210) By gender: ♂ = 26.9% (143/532) ♀ = 73.1% (389/532) ♂ = 16.2% (143/884) ♀ = 29.2% (388/1326)

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Buskila et al., 2000 [24] (cont'd)					Information on pain complaints, use of health services over the past 6 months (number of visits to a physician, drug consumption, hospitalisation) and effect of pain on work status (lost work days). Questions cueing: 1. Duration 2. Localisation of pain. 3. Classification according to pain categories. 4. Effects of CP on other outcomes (service utilisation and work-related problems).		**Reported comorbidity among those with CWP:** Ischemic Heart Disease = 15% Hypertension = 33% Diabetes = 18% Dyslipidemia = 15% Chronic lung disease = 8% **Distribution of service utilization and work related problems among those with CP:** Number of visits to physician in last 6 months 0 = 1% 1-3 = 3% 4-6 = 43% 7 + = 1% Drugs over last 6 months Any drug: 95% Analgesics: 90% NSAID: 75% Steroid injections: 26%

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Catala et al., 2002 [27] Spain (1998) General population	N = 5,000 respondents 11980 eligible participants 18 to 95 years **Median/mean age:** Not available **Distribution by gender:** ♂ = 48.3% (2416/5000) ♀ = 51.6% (2584/5000)	Population-based Cross-sectional survey	Random sample from phone numbers (not otherwise specified)	Phone interview	CP as one of the primary outcomes. **CP definition:** Pain for longer than 3 months. IASP definition. **Validity and reliability data of the instrument to measure CP:** Pilot study in a sample of 800 subjects. Results under peer review (personal communication with the first author). **Question:** Have you had pain that has lasted more than 3 months? There was no specific information for the group of patients with CP.	54.6% (6546/11980) 1546 interviews exceeding quotas were discontinued by interviewers.	**Total prevalence:** 23.4% **By gender:** ♂ = 14.8% (357/2416) ♀ = 31.4% (811/2584)

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Croft et al., 1993 [18] United Kingdom (1991) General population	N = 1,340 responders 2034 eligible participants 18 to 85 years **Median age:** 46 years range: 20 to 85 years **Distribution by gender:** ♂ = 42.7% (572/1340) ♀ = 57.3% (768/1340)	Cross-sectional survey	Random sample from registered population in two general practices (stratified by age)	Postal questionnaire	CWP as the primary outcome. **CP definition:** 1. Pain: a report of any pain during the last month which had lasted for longer than 24 hours. 2. Chronic pain: pain, as defined above, which had started more than 3 months ago. 3. Widespread pain. Using the drawings of subjects who reported pain, widespread was defined as the presence of marking along the axial skeleton and in at least 2 contralateral quadrants of the body (ACR definition). Pain which has not widespread by this definition is referred as regional pain. 4. Chronic widespread pain: Widespread pain, as defined above which had started more than 3 months ago. **Validity and reliability data of the instrument to measure CP:** Not available. **Question:** Presence of any pain during the previous month which had lasted longer than 24 hours and which had started more than 3 months ago.	75% (It was not clear how the authors calculated this response rate. It seems to be more realistic the other figure that was provided: 66% (1340/2034)	**Total prevalence:** 13% Chronic Widespread Pain **Recalculated without spoiled questionnaires:** 12.7% (164/1340) **Adjusted by age & sex figures to adult population of England and Wales in 1985:** 11.2% **By gender:** ♂ = 8.9% (51/572) ♀ = 14.7% (113/766) **Chronic Pain:** 35%

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Croft et al., 1993 [18] (cont'd)					**Questions cueing:** 1. A screening question about the presence of any pain during the previous month which had lasted longer than 24 hours. 1. A second question to establish whether any such pain had started more than 3 months ago. 2. Four line drawings of the body to locate the pain. 3. Questions about somatic symptoms other than pain: poor quality sleep, daytime fatigue, subjective swelling of joints, numbness of limbs, altered bowel habit, dry eyes or mouth, white painful fingers. 4. Three statements from the General Health Questionnaire covering inability to overcome difficulties, loss of sleep over worry, and feeling unhappy and depressed. **5.** An open ended question about the perceived cause of pain		

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Elliot et al., 1999 [26] Scotland (date was not specified) Primary care setting (Not in general population as stated by the authors)	N = 3,605 4379 questionnaires delivered 25 years and over **Mean age:** Not available **Distribution by gender:** ♂ = 48.3% (1741/3605) ♀ = 51.7% (1864/3605)	Cross-sectional survey	Random sample of patients from 29 general practices using a community health register	Postal questionnaire	CP as a primary outcome. **CP definition:** Pain or discomfort that persisted continuously or intermittently for longer than 3 months. IASP definition **Validity and reliability data of the instrument to measure CP:** Instrument was developed and validated for the study. **Question:** 2 questions. Not clearly defined. **Questions cueing:** 1. Case-screening questions: Two questions: one question to assess whether pain or discomfort was present, and a second to establish whether this pain or discomfort had started longer than 3 months ago. 2. A question on the cause of pain (given a choice of responses such as angina, arthritis, back pain, injury, women's problems, don't know and other). 3. Chronic pain grade questionnaire: seven-item questionnaire that measures severity of chronic pain in three dimensions: persistence, intensity and disability: grade 0 (pain free), grade I (low disability, low intensity), grade II (low disability, high intensity), grade III (high disability, moderately limiting), and grade IV (high disability, severely limiting). 4. Level of expressed needs questionnaire: measure of patients' response to chronic pain in a way that reflects demand for and uptake of health service resources: Have you sought treatment for your pain or discomfort often? Have you taken painkillers for your pain or discomfort recently? Have you taken painkillers for your pain or discomfort often?. Five levels of expressed needs for patients with CP: level 0 (no expressed need, answered no to all four questions) to level 4 (high expressed need, answered yes to all four questions).	82.3% (3605/4379)	**Total prevalence:** 50.4% (1817/3605) range: 39.4 to 61.2% **By gender**: ♂ = 48.9% (852/1741) range: 37% to 61.4% ♀ = 51.8% (965/1864) range: 41.8 to 61.1% **CP of Grade III and IV severity among the general population:** 10.7% (389/3605) **Self-reported cause of pain among those with CP:** Back pain: 16% Arthritis: 15.8% Injury: 5.9% Angina: 4.5% Women's problems: 3.9% Don't know: 4.3% **Level of severity among those with CP:** Grade I: 48.7% Grade II: 24.4% Grade III:11.1% Grade IV: 15.8% **Expressed need of patients with CP:** Level 0: 17.2% Level 1: 16% Level 2:24.7% Level 3: 14.2% Level 4: 28.0%

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Gureje et al., 1998 [29] Multicentre World Health Organisation study (1991-1992). Chile, Germany, Brazil, Turkey, France, Netherlands, England, India, USA, Italy, China, Greece, Japan, Nigeria Primary care (15 centres)	5438 participants 8729 eligible participants Adults 18 to 65 years. **Mean age:** Not available **Distribution by gender:** ♀ = 35.3% (1919/5438) ♂ = 64.7% (3519/5438)	Cross-national and cross-sectional survey	Consecutive primary care attendees were screened (25916 patients) and then stratified random samples were interviewed.	Face-to-face interview	Pain as a secondary outcome within a WHO Collaborative Study of Psychological Problems in General Health Care **CP definition:** Current and persistent pain that was present most of the time for a period of 6 months or more during the prior year **Validity and reliability data of the instrument to measure CP:** The instrument to measure CP was a question from the WHO primary care version of the Composite International Diagnostic Interview. Data on validity and reliability were provided elsewhere **Question:** Not available in the article. **Questions cueing:** 1. General Health Questionnaire (GHQ-12) used as screening instrument to obtain a stratified random sample. 2. Second stage evaluation used the Composite International Diagnostic Interview. Patients needed to report that at some time during their lifetime they talked to either a physician or other health professional about the pain, had taken medication for the main more than once, or had reported that the pain had interfered with life or activities a lot. 3. Disability assessed by the "Occupational Role" section of the Social Disability Schedule. This semi-structured interview rates disability on the basis of work role performance relative to cultural expectations. Ratings were made on a 4-point scale: 0 (no disability), 1 (mild disability), 2 (moderate disability), and 3 (severe disability). **4.** Health perceptions.	Response rate for screening: 96% (25916/26996) Response rate for the second-stage evaluation: 62% (5438/8729)	**For all centres combined:** **Total prevalence:** 21.5% (1169/5438) (range among centres: 5.5% - 33%) When calculated directly from the raw figures provided by the author, the prevalence is estimated in 28.9% (1569/5438) **By gender:** ♂ = 16.2% ♀ = 24.8% **Moderate to severe work role interference due to CP in the primary care population:** 6.7% (367/5438)

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Gureje et al., 1998 [29] (cont'd)							**Anatomical site among subjects reporting CP:** Back pain: 47.8% Headache: 45.2% Joint pain: 41.7% Arms or legs: 34.3% 68% reported pain in at least 2 anatomical sites. Unfavourable health perceptions were reported by 33.4% of those with CP. 31.4% of those with persistent pain were rated as having moderate to severe work role interference. 41.2% with < 3 activity-limitation days in the prior month.

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Helme and Gibson, 1997 [23] Australia (1996) General population	N = 1,000* 1428 eligible participants (calculated from the response rate provided) * Data from 990 participants Adults 65 years and over. **Mean age:** Not available **Distribution by gender:** Not available	Cross-sectional survey	Random sample from electoral rolls (voting is compulsory in Australia)	Face-to-face interview	Pain as a secondary outcome within a survey on health status of older people (persistent or bothersome pain that limits activities over the preceding 12 months) **CP definition**: Pain for more than 3 months. IASP definition. **Validity and reliability data of the instrument to measure CP:** Not available in the article. ***Questions:*** 1) "In the past 12 months, how often have you felt pain that is persistent or bothersome or limits your activities?" 2) About how long ago did you start having (your most severe) pain?" 3) In the past 12 months…. Where is your pain? (maximum of three) **Questions cueing:** 1. List of active disease states, functional ability, and attitudes about health. 2. A brief physical examination completed the interview. 3. A brief series of questions on pain, its expectation and frequency, and then the site, severity, presumed cause, and treatment.	70% (1000/1428)	**Total prevalence**: 50.2% (497/990*) **By gender:** Not available * Data from 900 participants for this calculation. **Pain parameters among individuals with CP:** Pain site more common in the past 12 months among CP sufferers: Joints, back, legs, and feet.

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
MacFarlane et al., 1997 [20] United Kingdom (date was not specified) General population, although sub-analysis in primary care.	N = 1,953 18 to 65 years **Mean age:** Not available **Distribution by gender:** ♂ = 42.8% (835/1953) ♀ = 57.2%(1118/1953)	Cross-sectional survey	Random sample from a population registered to receive treatment care in a general practice. Although the sampling frame was from general practice registers, given that over 95% of the UK population are registered there, the authors considered that this provided a convenient population-sampling frame.	Postal questionnaire + face-to-face interview with those reporting CP	CWP as a primary outcome **CP definition:** CWP for more than 3 months. ACR definition. **Validity and reliability data of the instrument to measure CP:** Unclear **Question:** Unclear **Questions cueing:** 1. Information on whether pain (lasting at least 24 hours) had been experienced during the past month. 2. Subsequent questions established the duration of pain and whether subjects had sought a medical consultation with their general practitioners for the reported symptoms. 3. Shading on a body manikin indicated the site of any pain reported. 4. From these responses, it was determined whether subjects satisfied the CWP definition. 5. GHQ-12, Somatic Symptom Scale, Fatigue Questionnaire, The 9 Illness Attitude Scales, The Self-Care.	75% (1953/2602)	**Total prevalence:** 13% (252/1953) **By gender:** ♂ = 10.5% (88/835) ♀ = 14.7% (164/1118) From those with CP, 72% (181/252) consulted a general practitioner for this reason. In those that consulted a general practitioner for CP: ♂ = 69% (60/88) ♀ = 73% (120/164) **Pain parameters among individuals with CP:** Of those with CWP, 72% reported having consulted a general practitioner regarding the pain.

Table 4: Characteristics of the included studies (cont'd)

Study Country/Date of conduction and Setting	Sample Size and Sample characteristics	Study Design	Sampling Frame	Method of Data Collection	Definition of CP and other measures	Response Rate	Prevalence Estimates Pain parameters and use of health services among CP sufferers
Perquin et al., 2000 [25] Netherlands (1996) General population	N = 5423 6636 eligible participants Children 0 to 18 years **Mean age:** ♂ = 9.1 years (SD=5.0) ♀ = 9.4 years (SD=4.9) Not provided for the whole sample. **Distribution by gender:** ♂ = 49% (2653/5424) ♀ = 51% (2770/5424)	Cross-sectional population survey	**For the 0 to 3 years old group:** Random sample from a register of population **For the 4 to 18 years old group:** 27 primary schools and 14 secondary schools (non stated as random)	**For the 0 to 3 years old group:** Postal questionnaire completed by parents **For the 4 to 18 years old group:** Questionnaire sent to school **For children older than 8 years:** Self-completed questionnaire. Non validated instrument.	Pain as primary outcome (pain experienced within the previous 3 months) **CP definition:** Recurrent or continuous pain for more than 3 months **Validity and reliability data of the instrument to measure CP:** A structured pain questionnaire was designed especially for the study. No further information was available. **Question:** "Did you/your child experience pain in the previous three months?" **Questions cueing:** 1. Question about pain experience in the previous three months?. 2. Additional information about the (location, frequency, duration and intensity). 3. From a list of possible locations (head, abdomen, limb, ear, throat, back, unknown and elsewhere), subjects were asked to tick all locations where they had experienced pain in the previous 3 months. 4. Frequency of occurrence: < 1 x month, 1 x month, 2-3 x month, 1 x week, 2-6 x week, each day. 5. Duration of pain: < 4 weeks, between 4 weeks and 3 months, > 3 months. 6. Intensity of pain: visual analogue scale: How bad is the pain usually? (100 mm long line with the verbal anchors "no pain" versus "the worst pain you can imagine".	82% (5423/6636)	**Total prevalence:** 25% (1358/5423) **By gender:** ♂ = 19.5% (517/2653) ♀ = 30.4% (841/2770) **Very frequent and more intense CP in the general population:** 8% (438/5423) **Pain parameters among individuals with CP:** 49% indicated a frequency of occurrence of at least once a week, 21% less than once a month and 30% somewhere in between. Weekly pain: 49%. Mean age of children reporting weekly pain: 11.0 years (SD = 3.8). Mean intensity of chronic pain: 54.4 (SD = 24.2). Prevalence rates for headache, abdominal pain and limb pain: 23, 22 and 22%, respectively. Mean number of reported locations = 1.87 (SD = 1.11). 31.7% of chronic pain sufferers experienced very frequent and more intense pain.

APPENDIX G: RESULTS OF THE METHODOLOGICAL ASSESSMENT OF THE INDIVIDUAL STUDIES

Table 5: Results of the methodological assessment of the individual studies

Study	Random sample	Unbiased sampling frame	Adequate sample size	Valid and reliable measures	Adequate response rate	Point prevalence estimates provided	Confidence intervals provided	Definition and duration of CP	Study subjects described	Total score	Comments
Andersson et al., 1993 [28]	10	1	10	10	10	8	10	9	9	86	Estimates should be checked for consistency. Some data were presented just in a graphic way.
Buskila et al., 2000 [24]	10	10	8	7	9	10	10	10	10	84	
Perquin et al., 2000 [25]	9	9	10	7	10	10	7	10	10	82	Check of inconsistent data on response rate in the report.
Blyth et al., 2001 [22]	10	10	10	7	7	10	10	9	7	80	
Brochet et al. [30], 2002	10	9	9	6	10	10	6	8	10	78	
Birse and Lander, 1998 [19, 54]	10	10	9	6	6	10	7	10	8	76	
Elliot et al., 1999 [26]	8	8	8	8	9	9	9	9	8	76	
Catala et al, 2002 [27]	10	8	10	7	4	10	7	10	10	76	
Croft et al., 1993 [18]	9	10	8	6	5	10	7	8	9	72	
Bowsher et al, 1991 [21]	10	8	9	6	1	10	6	10	10	70	

Table 5: Results of the methodological assessment of the individual studies (cont'd)

Study	Random sample	Unbiased sampling frame	Adequate sample size	Valid and reliable measures	Adequate response rate	Point prevalence estimates provided	Confidence intervals provided	Definition and duration of CP	Study subjects described	Total score	Comments
MacFarlane et al., 1997 [20]	6	7	7	7	8	8	7	8	8	66	
Helme and Gibson, 1997 [23]	9	7	9	2	10	7	7	6	7	63	
Gureje et al., 1998 [29]	5	5	6	6	5	8	6	10	7	58	

APPENDIX H: SAMPLE SIZES AND PREVALENCE DATA FOR WEIGHTED MEAN CALCULATIONS*

Table 6: Sample sizes and prevalence data for weighted mean calculations

Study	Sample size (n)	Prevalence (%)
Bowsher et al. [21]	1,037	11.5 (CP - IASP definition)
Croft et al. [18]	1,292	13 (CWP - ACR definition)
Andersson et al. [28]	1,609	55.2 (CP - IASP definition)
MacFarlane et al. [20]	1,953	13 (CWP - ACR definition)
Elliot et al. [26]	3,605	50.4 (CP - IASP definition)
Catala et al. [27]	5,000	23.4 (CP - IASP definition)
Buskila et al. [24]	2,210	10.2 (CWP - ACR definition)

APPENDIX I: PRIMARY STUDIES INCLUDED IN SYSTEMATIC REVIEWS ON CP

Table 7: Primary studies included in systematic reviews on CP

Study	Verhaak et al. (1998) [10]	Nickel and Raspe (2001) [13]	HTA report	Status
Andersson et al. (1993) [28]	✓	✓	✓	❶
Birse and Lander (1998) [19]	✗	✓	✓	❹
Croft et al. (1993) [18]	✓	✗	✓	❸
Brochet et al. (2002) [30]	✗	✗	✓	❼
MacFarlane et al. UK (1997) [20]	✗	✗	✓	❼
Bowsher et al.(1991) [21]	✓	✓	✓	❶
Elliot et al. (1999) [26]	✗	✓	✓	❹
Catala et al. (2002) [27]	✗	✗	✓	❼
Perquin et al. (2000) [25]	✗	✗	✓	❼
Helme and Gibson (1997) [23]	✗	✗	✓	❼
Blyth et al. (2001) [22]	✗	✗	✓	❼
Buskila et al. 2000 [24]	✗	✓	✓	❹
Gureje et al.(1998) [29]	✗	✗	✓	❼
Potter and Jones (1992) [50]	✓	✗	✗	❺
Kohlmann (1991) [52]	✓	✓	✗	❷
Von Korff et al. (1988) [55] (1990) [56] (1993) [57]	✓	✓	✗	❷
Frølund and Frølund (1986) [58]	✓	✗	✗	❺
Crook et al. (1984) [16]	✓	✓	✗	❷
Magni et al. (1990) [59] (1992) [49]	✓	✗	✗	❺
Andersson (1993) [28]	✓	✗	✗	❺
Sternbach (1986) [60]	✓	✗	✗	❺
Mäkélä and Heliövaara (1991) [53]	✓	✗	✗	❺

Table 7: Primary studies included in systematic reviews on CP (cont'd)

Study	Verhaak et al. (1998) [10]	Nickel and Raspe (2001) [13]	HTA report	Status
Andersen & Worm-Pedersen (1987) [61]	✓	✗	✗	❺
Brattberg et al. (1989) [15]	✓	✓	✗	❷
James et al. (1991) [17]	✓	✓	✗	❷
Taylor and Curran (1985) [62]	✗	✓	✗	❻
Magni et al. (1993) [48]	✗	✓	✗	❻
Millar (1996) [34]	✗	✓	✗	❻
Chrubasik et al. (1998) [63]	✗	✓	✗	❻
Eriksen et al. (1998) [64]	✗	✓	✗	❻
Bassols et al. (1999) [14]	✗	✓	✗	❻
Schumacher and Brahler (1999) [65]	✗	✓	✗	❻

❶ Included in Verhaak et al. (1998) [10], Nickel and Raspe (2001) [13] and HTA report: 2 studies.
❷ Included in Verhaak et al. (1998) [10] and Nickel and Raspe (2001) [13]: 5 studies.
❸ Included in Verhaak et al. (1998) [10] and HTA report: 3 study.
❹ Included in Nickel and Raspe (2001) [13] and HTA report: 3 studies.
❺ Included only in Verhaak et al. (1998) [10]: 7 studies.
❻ Included only in Nickel and Raspe (2001) [13]: 7 studies.
❼ Included only in HTA report: 8 studies.

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