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What Predicts Pain Coping Style? Three studies of pain coping

by

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ABSTRACT

Introduction: "Pain coping" refers to cognitive and behavioral pain management methods. Little is known about the determinants of coping style.

Objective: To investigate factors predicting coping in whiplash-associated disorders (WAD) and onset of severe neck/low back pain.

Methods: In secondary analyses of three cohort studies (two of WAD and one of a general population sample), baseline factors were assessed for their predictive role in subsequent pain coping. Pain coping was assessed using the Pain Management Inventory (PMI). Baseline information included a wide range of demographic, socioeconomic and health factors.

Results: Better mental health, but not physical health, predicted high active coping and low passive coping in all three studies. In WAD, higher neck pain and headache and poor recovery expectations also predicted high passive coping. Pain intensity was unrelated to active coping.

Conclusions: Identifying modifiable predictors of coping can aid in developing effective intervention strategies to improve coping abilities.

Key words: neck pain, whiplash injury, whiplash-associated disorders, the general population, predictors of coping style.

TABLE OF CONTENTS

LIST OF TABLES

Chapter 2 (Study One):

Chapter 3 (Study Two):

Chapter 4 (Study Three):

LIST OF FIGURES

LIST OF ABBREVIATIONS

CES-D – Centre for Epidemiological Studies – Depression Scale

CT– computerized tomography

GH – General Health subscale of the Short-Form 36 Health Survey

HIRF – Saskatchewan Health Insurance Registration File

MCS – Mental health Component Score of the SF-36

MRI – Magnetic Resonance Imaging

MVC – Motor Vehicle Collision

NPTF– The Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders

PCS – Physical health Component Score of the SF-36

PMI – Pain Management Inventory

QTF– Québec Task Force

SF- 36 – Short-Form 36 Health Survey

SGI – Saskatchewan Government Insurance Corporation

VIF – Variance Inflation Factor

WAD – Whiplash Associated Disorder

Chapter 1: Introduction

1.1 Overview

Neck pain has become a common health problem, and it is reported to currently affect 332 million people worldwide [78;79]. In fact, Haldeman et al. state that "most people can expect to experience some degree of neck pain in their lifetime" [42]. Neck pain problems can have a substantial influence on the health of persons, their families, and health-care systems, causing extensive disability and economic burdens due to both direct and indirect costs [45]. In the United States in 2005, treatment for neck and back problems accounted for approximately $86 billion in health care expenditures [71]. In the Netherlands, the cost of neck pain was estimated at $686 million (in US dollars) [7]. It has been reported that 23% of these costs were due to direct cost such as health-care expenditure, with the vast majority of the costs being accounted for by indirect costs such as work absenteeism and disability [7].

Neck pain is not only common in the general population, but it is also the most frequently described problem in connection with traffic-related whiplash-associated disorders (WAD) [defined in section 1.2.2] [4;70]. From a global perspective, WAD injuries are responsible for up to 80% of traffic injuries, and have been increasing over the past 30 years [26;41;48].

While some of those with neck pain recover quickly within weeks or months, it is unclear why others experience persistent symptoms and disabilities. Although the precise nature of this process remains unknown, many factors have been shown to be associated with the development of persistent pain and subsequent

disability [31;43;84;95;119]. Arguably the most important of these factors to study are modifiable prognostic factors, since these can be the target of interventions.

One such modifiable prognostic factor in the general area of stress is coping. It is believed that individuals use a variety of coping strategies on a daily basis to accommodate different stressful situations [73]. Coping is thought to be influenced by both stable, person-based factors (such as socio-demographic factors and personality) and transitory, situation-based factors, such as the particular stressor in question and the situational context [46]. This indicates the significant need for research about coping with pain since that would lead to early identification of those at greater risk for the development of chronic pain. Coping might also be a relevant target in innovative treatment approaches for interventions.

The overall aim of this thesis is to examine the predictors of pain coping strategies in the early stages of recovery among those with traffic-related WAD and among those with neck pain in the general population. These two pain populations are unique in various ways and this research shows differences in the use of diverse types of coping strategies as an outcome, since widely varying results may be present in one population but not in another. The rationale for the present study and for studying both the general population and WAD-affected population in understanding pain coping is discussed in section 1.6.

In brief, this thesis is comprised of secondary analyses of three sets of data, all with a similar question; that is, to examine the similarities and differences in the

predictors of coping behaviours across these three study populations. Replication of findings in different study samples is important since similarities in findings increases our confidence in the conclusions reached [77].

The format of this thesis is as follows: the first chapter is review of the literature, consisting of a background to the issue of neck pain in two populations (the general population and those with WAD), followed by discussion of the concept of coping, followed by the relevance of pain coping as an important variable in the empirical studies. This chapter concludes with the purpose and research questions for each paper. Next, in the subsequent three chapters, I report the three completed research studies separately. Finally, in the fourth chapter, I present a general conclusion of the findings and their wider implications.

1.2 Literature Review of Neck Pain:

1.2.1 Neck Pain in the General Population:

Neck pain is one of the most common musculoskeletal disorders, affecting up to two-thirds of the population at some point in their lifetime [27;42]. The considerable impact of neck pain problems in the general population is determined by examining both the existing burden of neck pain (prevalence) and the frequency of newly detected cases (incidence). Together, these estimates provide information that can assist health care planners to target individuals at risk by implementation of prevention strategies to reduce the burden of neck pain.

In the general worldwide population, the overall prevalence of neck pain varies widely, depending on how it is measured [53]. For example, in Canada,

Côté et al. found a lifetime prevalence of neck pain of 66% [27], while a study from Finland reported that the lifetime prevalence of neck pain was 71% [69]. However, as the time period of interest decreases (e.g., lifetime vs. period vs. point prevalence), the prevalence estimates decrease as well.

Typically, most estimates of 12-month prevalence range between 30% and 50% among adults and between 21% and 42% among youth [45], while the estimated point prevalence (neck pain right now) is more in the range of 20-22% [30;45;88]. The incidence of neck pain is less frequently studied, likely due to the cost and time requirement for longitudinal studies compared to the faster and less costly cross-sectional studies needed to report prevalence estimates. Some studies suggest that estimated annual incidence of neck pain in the general population is between 15% and 18% [30;33]. However, like prevalence estimates, incidence estimates of neck pain vary by severity of the condition, with mild neck pain being more common than severe neck pain. A 2008 systematic review of the burden of neck pain in the general population suggests that incidence ranges from a rate of 0.055 per 1000 person years for severe neck pain (disc herniation with radiculopathy) to a rate of 213 per 1000 persons (for any degree of self-reported neck pain) [45]. There is also some evidence that there is variation in the rates of neck pain among different occupations. For example, Côté et al. reported that the annual incidence of neck disorders within office and computer workers was 57% among all office workers in the USA, but 36% in municipal administrative workers in Sweden, and 34% in municipal employees in Finland [32]. Health-care workers and transit operators also had a high incidence of neck pain [32].

Overall, it seems clear that understanding the burden of neck pain is highly dependent on the case definitions for what comprises neck pain (e.g. severity and/or duration of pain), and how presence of neck pain is ascertained (e.g., through self-reported questionnaire or diagnosis by a clinician) [45]. To provide an integrated framework for defining neck pain and appropriate interpretation of the research evidence such as incidence and prevalence of neck pain, the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders (NPTF) proposed a simplified, but more detailed four-grade classification system for all neck pain disorders including traumatic and non-traumatic causes. This classification system also considers the factors related to the management of neck pain [40] and it is as follows:

● Grade I neck pain: Neck pain and associated disorders with no signs or symptoms suggestive of major structural pathology and no or minor interference with activities of daily living. Major structural pathologies include (but are not limited to) fracture, vertebral dislocation, injury to the spinal cord, infection, neoplasm, or systemic disease including the inflammatory arthropathies.

● Grade II neck pain: No signs or symptoms of major structural pathology, but major interference with activities of daily living.

● Grade III neck pain: No signs or symptoms of major structural pathology, but presence of neurologic signs such as decreased deep tendon reflexes, weakness, or sensory deficits.

● Grade IV neck pain: Signs or symptoms of major structural pathology.[a]

The authors of NPTF synthesis concluded that though neck pain is common in the general population, it can be viewed as having an iceberg effect [45]. That is, what may be observed in the general populations are many cases of 'some' neck pain that people experience, but fewer cases of neck pain of a severity leading people to use the health care system, and even fewer cases of disabling neck pain [45].

Although many causes of neck pain have been described in the literature, including osteoarthritis, discogenic disorders, trauma, tumors, infection, myofascial pain syndrome, and torticollis, one of the risk factors of both acute and persistent neck pain is whiplash associated disorders (WAD) [76]. In many cases, a person with a history of a whiplash injury in a motor vehicle crash will complain of neck pain even years later. For example, Côté et al. reported that neck pain is more prevalent in individuals with a history of whiplash injury and they are almost five times more likely to have severe (intense) neck pain than those who have no history of neck pain [28]. Berglund et al. reported that among persons involved in a motor vehicle crash, those who reported crash-related neck pain were almost three times more likely than those with no crash related neck pain to report neck pain problems again seven years later [4]. Therefore, it is crucial to discuss the neck pain issues related to the WAD population.

[a] Guzman J, Hurwitz EL, Carroll LJ, Haldeman S, Côté P, Carragee EJ, Peloso PM, van der Velde G, Holm LW, Hogg-Johnson S, Nordin M, Cassidy JD. A new conceptual model of neck pain: Linking onset, course, and care: The Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. Spine 2008; 33:S14-S23.

1.2.2 Neck Pain in Whiplash Associated Disorders (WAD)

Neck pain is a common consequence of traffic collisions [102].The World Health Organization estimates that worldwide, traffic injuries after motor vehicle collision cause injuries or disabling of 20-50 million people per year, predicting that these injuries will be the fifth leading cause of death by 2030 [85;121]. The annual incidence of WAD varies worldwide, but in North America and Western Europe the rate appears to be at least 300 per 100,000 individuals and the WAD incidence has increased over the past 30 years [48;49]. In Canada, WAD estimates have been reported as high as 417 per 100,000 populations [26].

'Whiplash' itself is defined as a mechanism of injury, that is, an acceleration–deceleration mechanism of energy transferred to the neck following collisions [26;102]. While most, but not all, traffic-related whiplash injuries occur due to rear-end or side impact in motor vehicle collision, approximately one-third of WAD arise from frontal impact direction [47;50], and whiplash injuries can also occur in other setting such as work or sports. While the disorder predominantly involves symptoms of neck pain, it also commonly includes other symptoms such as headache, dizziness, and pain in other parts of the body [26;35;36;48;70;102]. The Quebec Task Force on Whiplash-Associated Disorders coined the term 'WAD' to refer to the resulting injury or cluster of symptoms [102]. Other terms often used interchangeably are 'acute whiplash', 'acute whiplash injury', 'acute symptomatic whiplash injury', or 'acute WAD' [104], and the onset of symptoms in patients may arise immediately after the trauma, or after hours or days. Chronic WAD refers to the cases where patients remain symptomatic or show residual

disability after six months [102]. WAD is thought to be a complex condition [48;99], and is often thought to result from cervical sprain or strain, possibly from damage to soft tissue including the joints, ligaments and muscles in the neck, although this is not clear [21;48].

Not only are whiplash injuries expensive for society and the health care system, they also account for a significant and ever-increasing financial burden for insurers. Each year in Canada, about 2 million insurance claims are reported for whiplash injuries, and cost an estimated $8.5 billion. It has been estimated that in British Columbia alone, the economic cost exceeds $600 million annually [55].

The occurrence of WAD is determined by a combination of factors; primarily some exposure to a whiplash mechanism, and secondly the emergence of clinical sign or symptoms [48]. Due to the high prevalence of neck pain and other WAD-like symptoms in the general population (i.e., in those without involving vehicle collision), the clinical assessment of WAD-symptoms is difficult. It is even more difficult for clinicians and researchers to distinguish whether WAD-like symptoms are a new experience related to the collision, or whether they are related to exacerbations of a condition existing before the collision. There is no available gold standard diagnostic test to detect WAD such as x-ray, computerized tomography (CT) or magnetic resonance imaging (MRI) [48].

A WAD grading system was proposed by the Quebec Task Force on Whiplash-Associated Disorders (QTF) to assist health care providers in the classification and management of patients with WAD based on the type and severity of observed signs and symptoms. Briefly, the grading system is as

follows: grade 0 is “no complaint about the neck, no physical sign(s)”; grade 1 is “neck pain, stiffness, or tenderness, with no physical sign(s)”; grade 2 is “neck pain, stiffness, or tenderness with musculoskeletal sign(s)”; grade 3 is “neck pain, stiffness, or tenderness with neurologic signs”; and grade 4 is “neck fracture or dislocation” [102]. Based on the QTF system, approximately most claims of whiplash injured are classified as grade 1 or 2.

1.3 Importance of Course and Prognosis of Neck pain:

Understanding and explaining the natural history of neck pain along with knowing the determinants of neck pain course (i.e., predictive factors) will enable both clinicians and patients to better expect what is most likely to occur after the neck pain episode. It also facilitates the identification of those predictive factors that may be important in terms of treatment. Information about predictive capacity of variables is also needed to help us compare possible interventions to see whether the natural recovery procedure in neck pain changes. To grasp this information, it is required to use study designs that follow persons with neck pain at the start point of the study and have neck pain over a period of time, therefore requiring a longitudinal study. For example, the characteristics of those who recover and those who do not recover over time are compared to find associations between having neck pain at the start of the study and outcome of good or poor recovery at the follow-up time points to predict the course of neck pain.

Over the last decade, the approach to the predictors of neck pain has shifted from a strict biomedical and biomechanical to a more biopsychosocial

perspective. The biopsychosocial framework is a comprehensive, broad perspective emphasizing the important role that biological, psychological, and sociological factors play in the process of recovery from neck pain, along with the reciprocal interactions of these multiple factors. Therefore, to better understand an individual's response to pain, the unique reciprocal interactions of these factors need to be considered.

Within the biopsychosocial framework, many factors have been shown to be associated with the development of persistent pain and subsequent disability [31;43;84;95;119]. Nevertheless, the precise nature of this process remains unknown, there are many inconsistent findings in the research literature, and the mechanism of how these factors affect neck pain recovery is not fully understood.

1.3.1 Predictors of Outcome in Neck pain in the General Population:

Neck pain in the general population is highly persistent or recurrent [19;21], and it is estimated that between 50% and 85% of populations with current neck pain will report neck pain again 1 to 5 years later [16]. The results of one study on the course of neck pain has shown that of individuals with mild or intense but not disabling neck pain, 10% become disabled by their neck pain in the subsequent follow-up periods, 20% report recovery followed by worsening and 40% experience persistent levels of neck pain [30]. Thus, complete and permanent resolution of neck pain does not happen in most people with this problem. Several studies have aimed to identify predictive factors of neck pain outcome and to describe characteristics associated with neck pain persistence in the general

population [6;30;44;52;89]. The predictive factors reported include: age, gender, employment status, duration of neck pain at baseline stage, previous neck pain episode, intensity of pain at baseline, accompanying low back pain, and expectations of treatment [6;21;30;44;52;93;114]. Interestingly, most of the predictors (e.g. age, gender, duration of complaints, pain intensity) identified in these studies do not consistently demonstrate a strong (large) effect on prognosis of neck pain [6;30;44;52;89]. Furthermore, there is inconsistency in research findings regarding some prognostic factors of neck pain such as gender. In 2008, Carroll et al. published a best-evidence synthesis examining course and prognosis for neck pain in the general population [16]. In their review, two studies showed a modest effect of gender, with men slightly more likely than women to experience some resolution of neck pain over a 1-and5-year period [30;86], whereas the remaining three studies noted no effect of gender [9;44;74]. There is more consistent evidence that younger age is predictive of better recovery from neck pain in the general population, although the effect is not large [16]. Other factors also appear to predict the presence and/or greater neck pain intensity at follow up: These include pain intensity at baseline, self-perceived poor general health, prior neck injury and neck/shoulder symptom, co-morbid low back pain, and pain-related difficulties in activity performance [9;44]. In addition, a longitudinal study by Vos et al. in 2008 identified that motor vehicle accident (MVA) was a significant independent prognostic factor for persistent neck pain [116].

However, psychological and social factors appear to play an important role in neck pain outcomes in the general population [67;81;112], and in fact, may be

more important than other prognostic factors [16]. Psychological and social factors studied include vitality, greater social support, being optimistic, and having less need to socialize predicted greater decrease in intensity of neck pain [16].

1.3.2 Predictors of Neck pain in WAD:

With respect to prognosis, neck pain related to WAD resulting from motor vehicle injuries is often regarded as a separate subgroup within the population of neck pain sufferers, and studies have generally viewed and evaluated these patient categories as discrete study populations. For example, the recent overview for neck pain patients by The Neck Pain Task Force (NPTF) has reported findings separately for whiplash (WAD) patients and the general population, suggesting that these disorders are distinct [16;21;45;48]. There is some reason to study traffic-related WAD separately from others with neck pain. For traffic-related WAD, there is a specific event that precipitated the development of pain. Also, these pain sufferers must deal with the traffic injury insurance system, whose unique aspects might contribute to the prediction of recovery outcomes. Nevertheless, the NPTF interestingly found that the prognosis of neck pain seems to be similar in the general population and in the populations of whiplash injured (WAD) after motor vehicle crashes [21;114].

Even though WAD is a non-life-threatening injury, the subsequent process of recovery can be long-lasting and a substantial number of those injured can be left with either temporary or permanent disabilities. Although the number of

prediction studies in WAD has increased recently, still predicting the outcome of WAD remains challenging due to the complexity of the WAD disorders. That means the development of persistent symptoms, which factors are involved in predicting the course and who are at risk for slow recovery or developing chronic pain, is still not fully understood.

Numerous studies have suggested that post-injury symptoms such as greater initial pain intensity [61;117;118], more physical symptoms and greater initial pain-related disability [21;61;103] are the most prominent predictors of poor recovery from WAD [20]. However, although it is frequently assessed in clinical settings, there is no conclusive evidence that neck range of movement is a predictive factor [61;118]. There is also conflicting evidence for the predictive value of sociodemographic variables such as age, gender, level of education, as well as for collision related factors, prior pain, prior health, and comorbidities [20;21;61;103;118]. However, the NPTF reported that there is preliminary evidence that the prevailing compensation system is prognostic for recovery in WAD [21].

In addition, there is evidence that post injury psychological factors such as symptoms of post-traumatic stress [21;120], high pain catastrophising [117;118], depressed mood [21], fear of movement/(re)injury and low self-efficacy, appears to have predictive value for slowed recovery [21;61;103;120]. Recent studies have also demonstrated that lower expectations of recovery are predictive of poor recovery [20;50;115]. In a study of patients with soft tissue neck injuries, Richeter et al concluded that psychological factors are important predictors of outcome as

these factors were more important than collision severity in predicting the symptoms severity [91].

As described above, among those factors that predict outcome of WAD or neck pain in the general population, some are modifiable and some are not. Arguably, the most important factors to study are modifiable prognostic factors, since these can potentially be the target of interventions. One modifiable prognostic factor in WAD recovery is coping. The following section addresses the literature review of the coping concept.

1.4 Review of the Pain Coping Literature:

1.4.1 The importance of the concept of pain coping:

Pain coping is generally viewed as the purposeful effort people use to manage or reduce the negative impact of pain [5;17;65;66]. From a biopsychosocial point of view, coping, including pain coping, is a dynamic, reciprocal and interactive process of psychological, social, and biological factors [65;66]. However, the broad variety of theoretical approaches, models of coping and methods for studying coping has made it a difficult area to study and understand.

1.4.2 What Does Coping Mean?

There is no single definition for "coping" across the different contexts within which coping has been studied. Historically, the theory of coping and stress was conceptualized by two distinct approaches of coping as either 'person

based' (innate to a person's unique personality, and stable across situations) or 'situation based' (dependent upon environmental demands, flexible over time) [38]. Contemporary theoretical views generally characterize coping as a combination of both innate personality type and cognitive reactions to stressful situation. As pioneers in the current views of coping, Folkman and Lazarus reconceptualised the field of coping by emphasizing the role of cognitive appraisals in the coping process [38]. They defined coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" ([66], p.141). In accordance with this definition, coping behavior is viewed as a constant feedback loop of appraisal and action [38]. Thus, they did not only emphasize the role of cognitions in the coping process, but also discussed the importance of considering the person and environment together, stating that threat "is not solely a property of the person or of the environment; it requires the conjunction of an environment having certain attributes with a particular kind of person who will react with threat when exposed to those environmental attributes" (p.142). One key aspect that Lazarus and Folkman highlighted is that coping *efforts* should not be confused with outcome or effectiveness of those efforts [66] and there is no assumption regarding the success or failure of those efforts [66]. Since it is still unknown why some individuals with pain seem to adjust reasonably well whereas those who report greater dysfunction and disability, coping may explain some of these differences in adjustment to pain.

1.4.3 Ways of conceptualizing Coping:

A perusal of the coping literature demonstrates that those who write about this concept have made a bewildering number of distinctions and categorizations of types of coping (see [97]). There have been many different theoretical and empirical frameworks for understanding coping and many different ways of classifying coping strategies, and what follows is a review of the dominant ways of categorizing pain coping.

Problem-Focused versus Emotion-Focused Coping:

The first influential modern way of classifying coping strategies was that made by Lazarus and Folkman; that is the distinction between 'problem-focused' and 'emotion-focused' coping [66]. Problem-focused coping refers to attempt directly to the stressor itself by taking steps to remove or to solve the problem, or diminishing its impact if it cannot be avoided. In problem-focused coping, the individual employs problem solving strategies: to define the problem, to generate alternative solutions, to weigh the alternatives, to choose and act, as captured, for instance, in the Daily Pain Coping Inventory (e.g. "Did something specific to try to reduce pain") [1]. In contrast, emotion-focused coping is directed to deal with the emotional responses by minimizing the distress triggered by stressors or regulating the stressor [37]. The individual aims to minimize stress and negative emotions that are consequences of pain (e.g. "Sought emotional support from loved ones, friends, or professionals concerning my pain").

Active versus Passive coping:

Another frequently used distinction is the 'active' versus 'passive' coping dichotomy, as developed by Brown and Nicassio, who developed this categorization in the Vanderbuilt Pain Management Inventory [13]. Active coping relates to attempting to cope by taking responsibility and trying to manage the pain by making efforts to control the pain or function in spite of it (e.g. "Try to distract yourself from the pain") [12]. Passive coping refers to strategies that include withdrawal and delivering control over pain to someone or something else (e.g. "Take medicine to see whether the pain goes off"). Individuals that use passive coping strategy allow themselves to be controlled by the pain or let it to influence other areas of their lives adversely. This model divides coping strategies into those which are more passive such as withdrawing from others or talking about pain, and those which are more active such as engaging in leisure activities or distracting one's attention from pain.

Approach versus Avoidance Coping (Engagement versus Disengagement):

Another way of categorizing ways of coping is 'approach' or 'engagement' coping and 'avoidance' or 'disengagement' coping (e.g. [97]). Engagement coping is directed at engaging with pain and its related causes, and disengagement coping is aimed at engaging efforts away from pain or escaping the threat [90] (e.g.,[75;92]). Engagement coping consists of problem-focused strategies and some strategies of emotion-focused coping such as seeking treatment or support, emotion regulation, acceptance, and cognitive restructuring

[24]. Disengagement coping includes reactions such as ignoring the pain, attempting to avoid increasing pain, and wishful thinking. Disengagement coping can be thought of as mainly emotion focused because it involves attempts to escape feeling of distress. It also involves aspects of passive coping, described above. Although the disengagement goal is to escape distress, it is generally ineffective in lessening distress for the long term period, since it can involve acting as if the problem does not exist. As a result, the problem will remain and may become more difficult or complex to deal with [25]. Furthermore, avoidance and denial can lead to an increase of invasive thoughts about the problem and a rise in negative mood and anxiety [80].

Besides these broad classifications outlined above, multiple strategies and styles of coping can also be seen as 'adaptive' versus 'maladaptive'. For example, Skinner et al. maintain that it is valuable to differentiate forms of coping on the basis of being beneficial or harmful [97]. It has been pointed out that problem-focused coping strategies, engagement coping, or active coping strategies are likely to be adaptive, whereas passive or emotion-focused coping are more likely to be maladaptive [17;24;68]. In terms of outcome, the time factor is also important. For example, avoidant coping is actually more adaptive than attentive coping in the short term (when the outcome is within a few days) [51;110]. However, attentive coping generally has a more positive outcome in the longer term [51;87;110]. As a general rule, every form of coping can be adaptive or effective under particular situations, but also can be maladaptive or ineffective under others [66].

Nonetheless, each classification that has been introduced can be beneficial for explaining certain questions about responses to stress. Further, it should make clear that the lack of consensus on the conceptualization of coping leads to the frequently interchangeable use of the terms coping actions, strategies, styles, and efforts both in clinical practice and in the research field.

1.5 Pain Coping and Pain Outcomes:

1.5.1 Outcomes of Pain Coping in the General Population:

Individuals in the general population who are suffering neck pain have not been given much research attention concerning their coping behaviours or the influence of their coping strategies on the process of good or poor recovery. Yet, these persons likely vary in a number of ways from the frequently considered pain-clinic attendees' study populations [29;113]. For example, persons in the general population who have pain problems may or may not be looking for treatment and will have a wide variation of pain experiences for a varying amount of time. Thus, it is important to explore how persons in the general population cope with their pain and to examine the determinants of their adjustment.

Given the high prevalence of neck pain in the general population, there are surprisingly few longitudinal studies conducted on the role of coping in predicting the outcome of neck pain in these pain sufferers. In fact, most of the existing studies in the general pain population are cross-sectional. Furthermore, the bulk of evidence has focused almost exclusively on the problem of low back pain rather than including subjects suffering from neck pain or general musculoskeletal

disorders with more than one pain site. This may be in part due to a greater recognition of the high disability associated with back pain and its high cost [34]. Furthermore, most studies in this area also focus more on long lasting pain conditions rather than on recent onset pain. The following two sections discuss in greater detail the existing research on coping with neck pain within the general population.

Cross-sectional studies:

The study of pain coping in the general population is still developing and a very few studies have focused on coping with neck pain. Two such studies are described below.

In 2000, Mercado et al. assessed the relationship between coping and pain severity in the general population with neck or low back pain. The results of their analysis showed that passive coping was associated with being married, greater pain severity, depression, and poor health, whereas active coping was associated with female gender, higher education, less depression, good health, and frequent exercise, but to be unrelated to pain severity [72].

In 2002, a study of 1131 adults in a general population by Carroll et al. examined the associations between combinations of active and passive coping and sociodemographic, pain and health-related factors. They found that lower level of education was associated with the combination of low levels of active and high levels of passive coping. Also, better self-reported general health was associated with lower level of passive coping strategies regardless of their active coping [15].

Furthermore, factors relevant to the particular stressor are thought to influence the individual's appraisal of the situation and method of coping. Carroll et al. concluded that among those who reported neck/low back pain within the past 6 months, disabling pain was strongly associated with passive coping (e.g., relying on medications for symptom relief) regardless of their active coping [15]. Interestingly, no evidence was found on the association between pain severity and active coping [15], confirming the findings of previous study by the same research group.

Longitudinal studies:

As noted, these two studies on coping with neck pain in the general pain population are cross-sectional in nature, which can be useful for hypothesis generating on the potential relationships between coping and outcomes. However, to identify and determine the causal nature of such factors for prediction, prospective studies are needed. Thus, the few prospective studies that provided the best evidence of coping with neck pain as potentially valuable predictive factor in the general population are described in this section.

In one of the few longitudinal design studies available about pain coping in the general population, Mercado et al. set out to assess whether active and passive coping strategies predict the development of disabling pain in a cohort of participants with neck and back pain. Their analysis revealed that passive coping was a strong, independent risk factor for disabling neck and/or back pain. For those who use moderate to high levels of passive coping strategies, the risk of

developing disabling pain increases by over five-fold, compared to those who use low level of passing coping behaviour. They also found that active coping was not a significant risk factor for disabling neck and/or back pain.

Jensen et al. (2007) sought to examine the associations between changes in beliefs and in coping and changes in patients' pain and functioning over the post-treatment follow-up of chronic pain. The findings of their study indicate that increased use of resting, guarding, asking for assistance in response to pain, catastrophizing (all generally considered to be passive types of coping strategies), and increased belief that one is disabled by pain has shown a link with increased disability and depression [58].

In 2008, Carroll et al. published a best-evidence synthesis examining course and prognosis for neck pain in the general population. The evidence from 4 studies related to psychological and social prognostic factors indicated that coping patterns, need to socialize, and psychological health strongly predicted outcome in the general pain population [16]. The studies included in this best evidence synthesis showed that coping strategies that involved becoming angry or frustrated [54], as well as passive coping (worrying, fear avoidance) [9] predicted poorer outcome. But coping that involves self-assurance, greater social support [54], and vitality [9] predicted better outcome. In addition, greater optimism and having less need to socialize predicted greater decrease in neck pain intensity [74].

Finally, in 2012, Laisné et al. published a systematic review to determine biopsychosocial predictors of prognosis in musculoskeletal disorders. The

findings indicate strong evidence for the predictive value of coping, recovery expectations, and somatisation with respect to disability outcomes [39].

1.5.2 Pain Coping in Whiplash-Associated Disorder (WAD) related to an Outcome:

As described previously, many of those in the general populations with neck or back pain may be experiencing it due to traffic injuries (WAD), work or sport injuries. Based upon the present evidence, there are few 'true' longitudinal studies that have examined the role of coping in the recovery from WAD. A large body of studies are cross-sectional studies, identifying coping as a possibly key component of the WAD experience, which might led to some hypothesis-generating findings. Although it is challenging to compare these studies on pain coping due to the variability in conceptualization and measurement of coping, what follows is a brief discussion of some promising cross-sectional and longitudinal research, respectively.

Cross-sectional studies:

Regarding cross-sectional studies on coping and WAD, Jones and Elkit (2007) found that men and women were not different in their use of coping strategies. However, emotion focused coping strategies were strongly related to WAD related symptoms in men compared to women [60].

The 'Catastrophizing' construct has been widely linked to coping, and can be broadly described as an excessively unrealistic and exaggerated negative

thought when an individual confronts actual pain [62;108;109]. There is no general agreement about whether catastrophizing is a form of cognitive appraisal or a different type of psychological variable rather than a pain coping strategy. For example, Sullivan et al. defined catastrophizing as "an exaggerated negative orientation to actual or anticipated pain comprising elements of rumination, magnification, and helplessness." [109]. Others, tracing back to the transactional model of stress by Lazarus and Folkman [66], have viewed catastrophizing as a belief that guides the appraisal process (e.g. [96;111]). Jenson et al. proposed that 'catastrophizing' is a cognitive appraisal of patients' ability to cope rather than a real attempt to cope [59;105]. Sullivan (2011) suggests that catastrophizing is associated with both type and effectiveness of coping strategies utilized [106]. Previously the same research group have established that catastrophizing predicted pain [107] and persistence of post-traumatic stress symptoms [108] in patients with WAD. Furthermore, Buitenhuis et al. found the relation between pain catastrophizing and concurrent severity of whiplash disability [14]. Borsbo et al. concluded that the combination of catastrophizing and depression can adversely impact quality of life for whiplash patients [8].

Nieto et al. (2011) studied how catastrophizing and pain coping strategies are connected to the level of a patient's physical and emotional disability (i.e. depression and functional disability) within the first 3 months after a whiplash injury. They found that only the coping strategy of 'asking for assistance' was a marginally significant predictor of disability after controlling for catastrophizing, though a number of pain coping strategies were related with disability in

univariable analyses. On the other hand, catastrophizing was a predictor of disability even after controlling for pain coping strategies [82]. In another cross sectional study of chronic whiplash patients, Schmitt (2009) demonstrated that catastrophizing explained 57% of the variance in neck disability [94]. With regard to disability, Söderlund et al. found that coping style of 'pain behaviours' were associated with concurrent disability, indicating an increase over time and accounting for 39% of the variance at three weeks and 79% at three years post injury [100].

In another recent cross-sectional study, Jo Nijs, 2011 studied a role of social support and personality traits in long-term functioning following whiplash injury for the evolution purpose of WAD. They results indicated that that those people with poor long-term functioning after whiplash injuries also have poor social support and personality characteristics of inadequacy, self-satisfaction and resentment [83].

Research looking into coping as a daily process with WAD is very recent and limited. A 2013 study by Bring et.al suggests that varying degrees of daily activities are associated with the variability in how WAD patients cope within the first 3 weeks of recovery. On a more active day, individuals reported high capability of coping and self-efficacy, whereas on less active day they were appraising the stressor as a threat and representing more catastrophizing thinking [11].

Prospective studies:

A recent study by Carstensen investigated the gender effect on the association between coping and WAD outcome and found no gender difference in the relationship between coping and long-lasting neck pain [23].

Using the coping strategy of social supports has been examined in WAD area. In 2003, Söderlund et al. reported that in a sample of individuals who made an insurance claim for WAD, those who utilized the coping strategy of social support (i.e., supportive behaviour from others in stressful situations such as talking with friends) had shorter length of insurance claims [100]. Another prospective cohort study on whiplash injured of car crashes concluded that 'seeking social support' and low scores on 'palliative coping' was associated to a shorter duration of neck complains within the first weeks after the crash [14].

In 2006, Carroll and colleagues found that use of "passive" coping strategies within the first six weeks following vehicle-related whiplash injury predicts slower self-reported global recovery [17]. In very recent study (2013) by the same research group, another prospective cohort was examined to determine the predictive association between early stage of post-injury coping style (6-weeks post injury) and two outcomes, neck pain recovery and recovery of disability over the first year after onset of WAD [18]. Results were in the same line with Buitenhuis et al. study, showing that passive coping style assessed slightly later (2-18 weeks after the whiplash injury) predicts duration of neck complaints [14]. However, Kivioja et al. (2005) found no evidence that different patterns of coping strategies measured within the first few days (median of 3

days) after whiplash injuries influenced the prognosis [63]. It has been suggested that this is because coping styles take time to develop [21].

With respect to the relationship between depressive symptoms and coping strategy, Carroll et al. (2006) also found that depressive symptomatology is both a prognostic factor on its own and also an effect modifier of the relationship between passive coping and recovery. Individuals showing signs of depression who used few passive coping strategies recovered four times more quickly than those who showed depressive symptoms and used high levels of passive coping [17].

Coping is closely related to the self-efficacy concept, which can be viewed as the situation-specific belief in having a capability to successfully perform a particular behaviour [2;3]. It is possible that self-efficacy may potentially influence the patterns of thought that affect coping behaviours. In a study of chronic WAD patients undergoing treatment, Söderlund and Lindberg (2007) found that there were a number of differences between the high and low self-efficacy groups in patients' coping repertoire, but no significant differences between groups in self-ratings of disability or pain intensity. Overall, patients with high self-efficacy reported less use of 'maladaptive' and passive coping style at all measurement points (pre-, post-and three-month follow-up). They concluded that self-efficacy is related to patient's use of different coping style and speculate that positive WAD outcome over long-term could be enhanced by boosting self-efficacy [101]. In a recent prospective study, the same authors found that coping was a mediator of the association between self-efficacy and WAD disability [98].

In general, the results of these studies presented here provide good evidence that the use of pain coping strategies are associated with recovery from WAD [17], indicating that exploration of pain coping and its relationship to the outcome in WAD has merit. Given this evidence, future predictive research should examine the specific role of various coping strategies and answer questions such as which strategies are adaptive or maladaptive at different times in recovery [22] or how individuals with acute WAD cope with other stressors than pain.

1.5.3 Predictors of Pain Coping in the General Population:

The question of what factors are influential in the development of coping strategies has not been well studied. Most studies examine the role coping plays in disability and other pain outcomes. What studies there are which examine coping itself have been cross-sectional in nature, which provides a 'snapshot' in time, but does not provide information about temporal associations. A brief overview of the scientific literature on these coping studies is as follows:

Empirical evidence has supported the idea that personal factors like age, gender and other sociodemographic characteristics should impact coping style. For example, in cross-sectional study of 280 older and young adults with pain problems in the general population, Lachapelle and Hadjistavropoulos (2004) focused on age-related changes in coping with pain. They found that increasing age was related with a decline in the use of problem-focused and emotion-focused coping strategies in individuals with pain. Also, increasing age was associated with lower pain severity/ interference and more perceived control over pain. They

concluded that while there was a clear relationship between age and coping style, life context (i.e. health status and stress levels) to some extent mediated this relationship [64].

In terms of sociodemographic characteristics such as family income, Brantley et al. (2002) studied income and coping and found that low-income vs. non-low income individuals used differing coping strategies [10]. By using the Ways of Coping Questionnaire [66], low income individuals in general, reported to utilize a wider range of coping techniques such as avoidance as lower order of coping [10].

As previously mentioned, Carroll et al. found that lower level of education was associated with the combination of low levels of active and high levels of passive coping. Also, those with better self-reported general health were more likely to use lower level of passive coping strategies regardless of their active coping [15]. Furthermore, they found that disabling pain was highly associated with passive coping (e.g. relying on medications for symptom relief) regardless of their active coping. Lower education was associated with the combination of low levels of active coping and high levels of passive coping. Individuals with better self-reported general health were less likely to use high levels of passive coping regardless of their active coping. Interestingly, Carroll et al. [16] found no evidence of an association between pain severity (using an analog scale) and active coping [15]. This result confirms their previous study by the same research group, i.e., that passive coping was associated with being married, greater pain severity, depression, and poor health, whereas active coping was associated with

female gender, higher education, less depression, good health, and frequent exercise [72].

1.5.4 Predictors of Pain Coping in WAD:

There is some literature on what concurrent factors are associated with pain coping in WAD; however, again, these are cross-section studies, meaning they provide a 'snapshot' of coping process in one time point, but do not contain any information about temporal associations.

A previous study by Kivioja (2005) studied on how men and women cope and found that women reported significantly higher coping activity, such as diverting attention, praying and hoping, catastrophizing and increasing behavioural activities compared to men after whiplash injuries [63].

To our knowledge, there are no longitudinal studies investigating the association between possible explanatory factors and subsequent coping styles of neck pain in WAD.

1.6 Rationale for the Present Studies:

As outlined above, the existing state of the evidence shows that there is merit in studying pain coping in both the general population with musculoskeletal conditions such as neck pain and those with traffic-related WAD. To the best of our knowledge, there are no longitudinal studies investigating the predictors of coping style in either of these populations of persons with pain.

This is an important issue, since coping is a potentially modifiable prognostic factor, yet some of the studies in this area suggest that coping behavior may be fairly resistant to change, requiring intensive multi model interventions to be successful [56;57]. This reinforces the importance of developing a solid understanding of what factors influence how people cope with pain.

To address this gap in the literature, the present study looked to examine what factors predict pain coping style. To gain a better understanding of this, three studies have been undertaken. Two of these studies are of predictors of coping styles in persons with WAD and one is of predictors of coping in a general population sample with recent onset pain problems. A comparison of the similarities and differences in predictors of coping style in these groups will provide useful information about what groups of pain populations may benefit from interventions that modify coping style.

The present study is a set of secondary analyses and takes a lens of the *biopsychosocial* approach that is particularly valuable when discussing coping concept as a *process*. This viewpoint of coping describes it as flexible behaviour and reciprocal threefold problem, (1) a psychological/ emotional, (2) sociological, and (3) physical problem that can reflect physical, cognitive and psycho-emotional accommodation.

Studies 1 & 2:

Study 1: "Who Copes Actively? Who Copes Passively? Predictors of Pain Coping Style"

Study 2: "Who Copes Actively? Who Copes Passively? Predictors of Early Use of Pain Coping Strategies in WAD"

Research Question: These two studies have the same research question in two separate cohorts of persons with WAD: In persons with recent traffic-related WAD, what baseline (post-injury) demographic, socio-economic, injury-related and pre-injury and post-injury health-related factors predict use of passive and active pain coping strategies measured at six weeks post-injury?

In studying two different cohorts of persons with WAD, similarities and differences in findings can be identified. Where similar factors are found to predict coping style, we can be more confident of these findings.

Study 3:

Study 3: "Predictors of coping with neck and low back pain in the general population"

Research Question: In persons with onset of intense and/or disabling neck pain over a 6 month period, what prior demographic, socio-economic, and health-related factors predict the use of passive and active pain coping strategies?

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Chapter Two

Study One: Who Copes Actively? Who Copes Passively? Predictors of Pain Coping Style

2.1 Introduction:

Whiplash associated disorders (WAD) comprise up to 80% of traffic injuries, and have been increasing over the past 30 years [10;16]. These injuries, their sequelae and their recovery are likely a result of an interplay among biomechanical, kinematic, psychosocial factors and environmental factors, demanding an enormous price from both society and individuals due to both direct and indirect costs [9;16;23]. Whiplash itself is a mechanism of injury, that is, an acceleration–deceleration mechanism of energy transferred to the neck following collisions. The Quebec Task Force on Whiplash-Associated Disorders coined the term 'WAD' as the resulting injury or cluster of symptoms[37].WAD involves predominant symptoms such as neck pain, but also commonly includes other symptoms such as headache, dizziness, and pain in other parts of the body[10;37].

There is no clear cut understanding of why some of those with WAD recover quickly within weeks or months, while others experience persistent symptoms and disability. Despite the fact that the precise nature of this process remains unknown, many factors have been shown to be associated with the development of persistent pain and subsequent disability [12;14;30;33;41]. Arguably, the most important of

these factors to study are the modifiable prognostic factors, which might be relevant targets for interventions. Pain coping is one such factor, and coping style has been shown to be associated with recovery in WAD [3;7;8;28;29], and has also been shown to be modifiable [18;19]. Individuals use a variety of coping strategies on a daily basis [27], and classification of types of these strategies have not yet been generally agreed upon. Coping can be viewed as a process and conceptualized as a combination of the cognitive and behavioural efforts used to manage or counter external or internal stressors [22;24;32]. As such, coping is thought to likely be influenced by both stable, person-based factors (such as socio-demographic factors and personality) and transitory, situation-based factors, such as the particular stressor in question and the situational context [15].

Although pain coping is considered as an important factor in the process of recovery, there have been limited studies to investigate the factors influencing pain coping style. Much of the investigation on factors associated with pain coping of recently injured individuals has been cross-sectional in nature, which only provides a 'snapshot' in time, but does not provide information about temporal associations. To our knowledge, there are no longitudinal studies investigating the association between possible explanatory factors and subsequent coping styles in either WAD or other types of neck pain.

The objectives of this study were to identify the predictors of pain coping styles in the early stages of recovery after a traffic-related whiplash injury. The potential explanatory factors included pre-crash health, injury characteristics (such as pain intensity), features of the collision itself, and demographic and socioeconomic

characteristics. To address this question, we conducted a secondary analysis of a population-based, incidence cohort study of individuals making personal injury claims for traffic-related whiplash injuries.

2.2 Method

2.3 Study Population and Design

The population base for our cohort included all Saskatchewan residents, 18 years of age or older, who submitted a claim to Saskatchewan Government Insurance (the sole traffic accident insurer in the province) for a traffic injury that occurred between July 1, 1994, and December 31, 1995 [10]. This included all those presenting to insured healthcare providers for treatment of injuries, including physicians, physical therapists, chiropractors, and massage therapists. The study population is described in more detail in Cassidy et al. [10], but briefly, a sub-cohort of persons with whiplash injuries was formed by including those who reported neck pain that resulted from the traffic crash. Those persons who were not injured in a motor vehicle (pedestrians, bicyclists, and motorcyclists), those with serious health problems that precluded completing questionnaires (e.g., those with Alzheimer's disease), and those hospitalized for more than two days (i.e., those with serious injuries) were excluded from this analysis. All claimants completed a claim form, which included items about socio-demographic characteristics, collision-related factors, pain and symptoms related to the injury and prior health. In addition, those consenting to participate in the

study completed questionnaires about health related quality of life and depressive symptomatology and follow-up questionnaires assessing coping and tracking recovery.

Eighty percent of the claimants completed the claim form within one month after the collision. Consenting participants were mailed follow-up questionnaires at six weeks, four months, eight months, and one year after the collision. The current study includes information from the baseline questionnaire and coping information from the six week questionnaires. During the course of the study period, the insurance system changed from a tort system (with limited benefits regardless of fault, but in which those not at fault for the collision could sue for pain and suffering) to a no fault system (with expanded benefits regardless of fault, but limited scope for legal action and no payment for pain and suffering). The first six months of the inception period was under the tort system, and the remaining 12 months of inception was under a no fault system. Data collection for this study was approved by the University of Saskatchewan's Advisory Committee on Ethics in Human Experimentation and the current analysis was approved by the Health Research Ethics Board at the University of Alberta.

2.4 Measures

2.4.1 Outcome

Pain coping strategies

Our outcome of interest was pain coping which was assessed at the time of the first follow-up (six weeks post-collision) using the Vanderbilt Pain Management

Inventory (PMI), an 18-item Likert-type scale which asks participants to report how often they use particular coping strategies when their pain is at a moderate or greater level of intensity. This questionnaire yields two independently scored subscales reflecting types of pain coping strategies, labelled by the questionnaire developers as "active", 7-items, and "passive", 11-items, and has been shown to be valid and reliable [4;26;34;35]. Active coping relates to coping strategies by taking responsibility and trying to manage the pain by efforts to control the pain or function in spite of it [4]. This includes strategies such as engaging in physical exercise or therapy and staying busy or active. Scores for 7-item "Active" subscale range from 7 to 35. On the other hand, passive coping refers to coping strategies in which external sources of managing pain and avoidance of pain are considered as the key factors to pain management [4]. This includes strategies such as restricting or cancelling social activities due to pain and wishing for better pain medication. Scores for 11-item "Passive" subscale range from 11 to 55. It is important to note that passive and active coping strategies are not mutually exclusive and therefore frequent use of the types of strategies included in the ''Passive'' coping scale does not preclude frequent use of the types of strategies included in the ''Active'' coping scale. For example, individuals can cope with their pain by engaging in physical exercise or physical therapy (an ''active'' coping strategy), while still restricting their social activities (a ''passive'' coping strategy) [6]. There are no cut-points validated in the literature; thus, we conducted our analysis using a median split for each subscale.

2.4.2 Explanatory Variables

Potential predictors of coping style included the following variables measured at baseline: socio-demographic factors (age, sex, marital status, family income, education), collision factors (determined to be at fault for the crash, direction of impact, whether there was a rollover, fixed or adjustable headrest, head position at the time of impact), proxy factors for collision severity or injury severity (admission to hospital, lost time from work, percentage of body in pain, pain intensity), neck pain prior to the collision, prior history of work- or traffic-related neck injury, type of initial healthcare provider, depressive symptomatology after the crash, health-related quality of life, whether a lawyer was retained to help with the claim, and whether the claim was made under the tort or the no fault insurance system.

Percentage of body in pain was assessed by a pain drawing, which the respondent indicated painful areas [25]. A 100 mm visual analogue scale (VAS) [20] was used to assess the intensity of neck pain, headache and pain in other parts of the body separately. The VAS is a valid, reliable, and commonly used method of assessing pain intensity. [20;21] Post-collision depressive symptomatology was also measured by the Centre for Epidemiological Studies Depression 20-item Scale, whose scores range from 0 to 60 [31]. Health-related quality of life was measured using the Medical Outcomes Study SF-36, which is a valid and reliable measure of self-perceived general health status. The SF-36 has 36 questions and eight subscales, which comprise the two summary scales, reflecting the physical health component (PCS) and the mental health component (MCS) [38-40]. These scales have scores ranging from 0-100 with higher scores reflecting better health.

2.5 Statistical Analyses

The purpose of this analysis was to identify the baseline variables which predicted passive and active coping strategies, as measured six weeks post-injury, in those with WAD. We used logistic regression statistics to build two multivariable models for active and passive coping, separately. Findings were reported as odds ratios with 95% confidence intervals. These two models were built in the same manner. After ensuring that the variables met the assumptions for logistic regression, a three step modelling approach was used for each model. First, univariable models were built to obtain an estimate of the crude (unadjusted) effect of each candidate predictor variable on the outcomes of passive and active coping. Variables that were associated with coping with a p value of <0.2 using the Wald Test were included in the second phase of the modelling. Those variables reaching a statistically significant level ($p<.05$) in this multivariable model were retained in the final model. We also assessed the models for evidence of collinearity in the second and third phase of modeling, and assessed for the presence of the following biologically plausible interactions: insurance system with pain intensity, percentage of body in pain, and lawyer involvement; pain intensity with age, sex, and education; physical health (PCS) with mental health (MCS).

Multicollinearity was also assessed because high correlations among the independent variables can cause problems in the interpretation of results and instability of coefficients. Specifically, we checked the following two collinearity statistics: tolerance and the variance inflation factor (VIF). Tolerance is an index of the independence between one of the independent variables and the rest of variables in the equation (values in this index of 0.10 or less indicate that there may be serious

problems of multicollinearity) and VIF is an estimation of the amount that the variance of each regression coefficient is increased relative to a situation in which all of the independent variables are uncorrelated (values of this index that are equal to or above 5 suggest serious problems of multicollinearity) [11].

Since there was substantial attrition between baseline and the six-week follow-up, we also assessed our data for the presence of selection bias. To do this, we built a multivariable logistic regression model to identifying sociodemographic and injury-related factors that predicted participation vs. non-participation at six weeks. From the above domains, we selected potential explanatory factors that we believed were most likely to be associated with participation: sex, age, education, insurance system, neck pain intensity and lawyer involvement - that might be associated with participant status. For each variable, a crude model was developed. Variables demonstrating a relationship with participation (with a Wald statistic significant at $p < 0.2$) were included in a multivariable logistic regression model. These variables were considered to be associated with participation if their adjusted estimates were associated with a Wald statistic p-value of <0.05. All analyses were completed using SPSS for Windows, version 19.0 and STATA SE, version 12 [1;2].

2.6 Results

2.6.1 Participants (Description of the Study Population)

Table 1 provides a description of the study population of the 7462 persons with traffic-related whiplash injuries at baseline, 2847 responded at follow-up one (six weeks post-collision). Of these, 2428 indicated that they had "moderate or greater" levels of pain (and so were eligible to complete the coping questionnaire), 2425 completed the passive coping scale, and 2422 completed the active coping scale. The mean passive coping score was 29.4 (s.d 7.9; median 29.0) and the mean active coping score was 20.4 (s.d 4.8; median 20.0). After dichotomizing at the median score, the cut-off score for low vs. high passive coping was 29.0; the cut-off score for low vs. high active coping was 20.0. The Pearson correlation between the passive and active subscale scores was 0.21.

Table 2.1 Characteristics of cohort stratified by coping strategies at baseline (post-injury)

	Passive Coping (N=2425)*		Active Coping (N=2422)*	
Variables	Low	High	Low	High
Age: mean (SD)	37.1 (14.7)	37.3 (14.2)	35.2 (14.1)	38.7 (14.5)
Gender: Female; n (%)	724 (65.8)	904 (68.3)	656 (63.3)	970 (70.0)
Marital status: n (%)				
Married	628 (56.9)	739 (55.9)	535 (51.6)	829 (56.3)
Single	356 (32.3)	412 (31.1)	372 (35.9)	768 (31.7)
Separated or divorced	90 (8.2)	137 (10.4)	102 (9.9)	227 (9.4)
Widowed	28 (2.5)	35 (2.7)	27 (2.6)	63 (2.6)
Physical Health**: mean (SD)	37.8 (9.2)	33.7 (8.9)	34.0(9.5)	36.0 (9.1)
Mental Health**: mean (SD)	50.4 (10.7)	44.9 (12.4)	45.8 (12.3)	48.7 (11.4)
Education: n (%)				
Less than High School	185 (16.8)	332 (25.1)	262 (25.3)	254 (18.3)
High School Graduate	285 (25.9)	376 (28.4)	308 (29.7)	352 (25.4)
Some Post-Secondary	474 (43.0)	487 (36.8)	376 (36.3)	584 (42.1)
University Graduate	158 (14.3)	128 (9.7)	90 (8.7)	196 (14.1)
Depression†: mean (SD)	14.4 (10.4)	21.4 (12.2)	20.0 (12.3)	16.8 (11.5)
Headache Intensity‡: mean (SD)	28.8 (30.4)	43.3 (33.4)	40.5 (33.4)	33.8 (32.2)
Neck Pain Intensity‡: mean (SD)	51.6 (23.1)	62.4 (22.9)	59.9 (23.3)	55.7 (23.7)
Neck or shoulder pain before collision: n (%)	298 (27.0)	373 (28.2)	250 (24.2)	420 (30.3)
Retained a Lawyer: n (%)	39 (3.5)	122 (9.2)	82 (7.9)	79 (5.7)

*There was some missing data for several factors. 293 persons did not complete the CES-D questionnaire, 303 did not report on physical and mental health, and 39 did not report on neck, low back or headache pain.
** Physical Health and Mental Health as measured by the Physical and Mental Health Component scores of the SF-36. Possible scores range from 0-100.
† Depression as measured on the Centre for Epidemiological Studies – Depression Scale. Possible scores range from 0-60.
‡ Headache intensity and neck pain intensity both measured on 100 mm Visual Analogue Scales.

Logistic Regression Analysis

Tables 2and 3 report the crude and adjusted associations for each factor included in the multivariable models for active and passive coping.

Table 2.2 Baseline Factors associated with Active Coping at Six Weeks Post-Injury. Odds Ratios (OR) and 95% Confidence Intervals (CI). N=2117

Factor	Crude OR (95% CI)	Adjusted OR (95% CI)
Mental Health*	1.02 (1.01 – 1.03)	1.02 (1.01 – 1.03)
Female Gender	1.35 (1.14 – 1.61)	1.39 (1.15 – 1.69)
Age	1.02 (1.01 – 1.02)	1.02 (1.01 – 1.03)
Marital Status		
Married	1.00	1.00
Separated/divorced	0.79 (0.60 – 1.05)	0.76 (0.55 – 1.04)
Widowed	0.86 (0.52 – 1.43)	0.56 (0.30 – 1.02)
Single	0.69 (0.57 – 0.82)	0.94 (0.75 – 1.19)
Education		
Less than High School	1.00	1.00
High School Graduate	1.18 (0.94 – 1.48)	1.47 (1.12– 1.92)
Some Post-Secondary	1.60 (1.29 – 1.99)	2.06 (1.60– 2.66)
University Graduate	2.25 (1.66 – 3.04)	2.46 (1.76– 3.45)
Prior neck pain	1.37 (1.14 – 1.64)	1.26 (1.03– 1.54)

* Mental Health as measured by the Mental Health Component scores of the SF-36. Possible scores range from 0-100.

Table 2.3 Baseline Factors associated with Passive Coping at Six Weeks Post-Injury.Odds Ratios (OR) and 95% Confidence Intervals (CI). N=2088

Factor	Crude OR (95% CI)	Adjusted OR (95% CI)
Physical Health*	0.96 (0.95 – 0.97)	0.96 (0.95 – 0.98)
Mental Health*	0.95 (0.94 – 0.96)	0.98 (0.97 – 0.99)
Education		
Less than High School	1.00	1.00
High School Graduate	0.74 (0.58 – 0.93)	0.74 (0.56– 0.98)
Some Post-Secondary	0.57 (0.46 – 0.71)	0.56 (0.43– 0.72)
University Graduate	0.45 (0.34 – 0.61)	0.61 (0.43– 0.86)
Depression†	1.056 (1.047 – 1.064)	1.03(1.02 – 1.04)
Headache Intensity‡	1.014(1.011 – 0.97)	1.007(1.003 – 1.010)
Neck Pain Intensity‡	1.020 (1.017 – 1.024)	1.010(1.006 – 1.015)
Retained a Lawyer	2.77 (1.91 – 4.01)	1.95(1.26 – 3.01)

* Physical Health and Mental Health as measured by the Physical and Mental Health Component scores of the SF-36. Possible scores range from 0-100.
† Depression as measured on the Centre for Epidemiological Studies – Depression Scale. Possible scores range from 0-60.
‡ Headache intensity and neck pain intensity both measured on 100 mm Visual Analogue Scales.

2.6.2 Factors Associated with Active Coping:

In the univariable analyses, those variables predicting high active coping (at a significance level of $p < 0.20$) were: gender, age, educational level, marital status, family income, having been admitted to hospital after the crash, not having retained a lawyer, claiming under the no fault system, better mental health (MCS), better physical health (PCS), less depressive symptomology, better general health before accident, lower headache pain intensity, lower neck pain intensity, and lower other pain intensity (15 variables). After entering these into a multivariable model, six factors were found to predict active coping at $p<.05$. These results show that high levels of active coping are predicted by the following factors: female gender, older age, higher education, better initial mental health (measured at baseline), and having neck pain prior to the crash (estimates and 95% confidence intervals for these factors are reported in Table 2). As age and mental health were all measured on continuous scales, the odds ratios reported reflect the associations between each one-point increment of these factors and active coping. Thus, with an odds ratio of 1.02 for Mental Health, for each one-point increase in Mental Health score, the odds of high active coping increase by 2%; and for each 10-point increase in Mental Health score, the odds of high active coping increased by 21%. Similarly, for each one point increase in age, the odds of high active coping increased by 2%, and for each 10 point increase, the odds of high active coping increased by 25%. The tolerance and VIF scores for the model with 15 independent variables were 0.71 and 1.41, respectively, and for the final model with 6 variables, these values were 0.74 and 1.36. Thus, none of the models showed evidence of multicollinearity.

2.6.3 Factors Associated with Passive Coping:

In the univariable analyses, those variables predicting high passive coping (at a significance level of $p < 0.20$) were: gender, education, family income, being off work due to accident, percent of body in pain, having retained a lawyer, claiming under the tort system, poorer mental health (MCS), poorer physical health (PCS), greater depressive symptomology, neck pain prior to the collision, greater intensity of headache pain, more intense neck pain, and more intense other pain now (14 variables). After entering these into a multivariable model, seven factors were found to predict passive coping at $p<.05$. These results show that high levels of passive coping at six weeks post injury are predicted by the following seven baseline factors: having retained a lawyer prior to making their injury claim, more depressive symptoms, higher intensity of headache pain and of neck pain, less education, and poorer self-perceived mental and physical health. As depressive symptomology, mental and physical health, headache and neck pain were all measured on continuous scales, the odds ratios reported reflect the associations between each one-point increment of these factors and passive coping. This means that for each one point increase in Mental Health score, the odds of high passive coping decreased by 2%; thus, for each 10 point increase in Mental Health score, the odds of high active coping increased by 19%. Similarly, for each one point increase in Physical Health score, the odds of high passive coping decreased by 4%, and for each 10 point increase, the odds of high passive coping decreased by 30 %. Each one point increase in initial (post-crash) headache intensity, increased by 1% the odds of high passive coping (i.e., for each 10 point increase, the odds of high passive coping increased by 7%). Each one point

increase in initial (post-crash) neck pain intensity increased the odds of high passive coping by 1% (this means that for each 10 point increase, the odds of high passive coping increased by 11%). Finally, for each one point increase in depressive symptomology, the odds of high passive coping increased by 3%, and for each 10 point increase, the odds of high passive coping increased by 33%.The tolerance and VIF scores for the model with 14 independent variables were 0.71 and 1.42 respectively, and these values for the final model with 7 variables were 0.64 and 1.57. Again, this indicates no evidence of multicollinearity in the models.

2.6.4 Factors Associated with Participation at Six-weeks:

Five factors were found to be associated with participation at six weeks. Older individuals, women and those with a higher level of education were more likely to have participated at six weeks follow-up. Those with greater neck pain intensity and those who had consulted with a lawyer before making an insurance claim were less likely to have participated.

2.7 Discussion

To the best of our knowledge, this is the first study looking at predictors of coping style within a WAD population. The goal of this study was to identify socio-demographic, crash-related and early post-injury characteristics that predict passive and active pain coping styles six weeks after a traffic-related WAD. Overall, the

findings from this study suggest that the following factors are related to higher levels of active coping: being female, higher education, older age, being married rather than single, better self-reported mental health, and neck pain before crash. A low level of passive coping was predicted by higher education, and better physical and mental health; while those who had consulted a lawyer prior to making an insurance claim, who had more intense headache and neck pain, and who had greater depression post-crash were more likely to use a passive coping style. Despite the fact that coping style appears to be associated with recovery in WAD, little has previously been known about the predictors of coping style in whiplash injuries. In particular, this study extends the previous literature reporting concurrent associations with coping strategies by exploring predictors of coping style.

One of our most interesting findings was the strong relationship between better physical and mental health at baseline and less subsequent use of passive coping strategies to deal with pain. In contrast, there was no association between physical health and use of active coping strategies, although better mental health did predict more active coping strategies. Thus, while passive coping is a function of both physical and mental health, active coping appears to be a function of mental health only. Interestingly, high depression scores at baseline were also highly associated with later passive coping, although low scores were not associated with active coping. The fact that scores on the Mental Health Component Scale of the SF-36 predicted active coping but scores on the depression measure did not, suggests that some aspect of mental health *other* than depressive symptomatology is associated with subsequent active coping. One potential explanation for this is that these findings are an artefact

caused by collinearity between the mental health subscale and the depression scale. However, we do not believe that this is the case, given the values of the tolerance and variable inflation scores, which suggest that collinearity is within acceptable levels.

It is interesting that good physical health is associated with less frequent use of passive coping but it is unassociated with whether or not participants engaged in active coping. While it is to be expected that those with poorer physical health would engage in more passive coping, one might have also expected those with better physical health to also be more active in using such strategies as keeping busy and doing exercise. This is a finding that would need to be replicated in future studies. However, our findings about relation between physical health and less frequent use of passive coping were congruent with findings from a general population-based cross-sectional study, indicating that better self-reported general health is related with lower level of passive coping strategies [6;6] .

Furthermore, individuals who had neck pain sometimes, very often, or every day neck pain prior to crash were more likely to cope actively compared to those who never had pain before; whereas, prior neck pain was not associated with passive coping. It may be that individuals who have a history of neck pain have already learned to cope actively. It is possible that those with prior neck pain had sought treatment for the problem and, given the current trend toward encouraging activity in interventions for most non-specific musculoskeletal pain problems, these individuals may have been encouraged by their health care provider to cope actively.

Our study found that age did not predict use of passive coping, which is consistent with cross-sectional research findings [13;36]. Our findings also showed that older individuals were slightly more likely to use active coping strategies than younger individuals, but this relationship was weak and age does not appear to be an important determinant of active coping. Women used more active coping strategies than men, but there was no association between sex and passive coping in the final model. Our results were congruent with findings from a population-based cross-sectional study, which suggested that women coped more actively than men, but that there were no gender differences in passive coping [26]. This is also supported by two other studies that choice of coping strategy is associated with gender [6;26] . However, our findings are inconsistent with those of Jensen et al., who found that women who were seeking treatment for chronic pain coped more passively (less actively) than men [17]. It is possible that this inconsistency in evidence is due to differences in populations studied (chronic versus acute pain and low back pain versus WAD); alternatively, it may reflect differences in the coping questionnaires used.

Our findings show that education was associated with both coping style. Greater education was associated with *less passive* coping, whereas the greater education was associated with *more active* coping. It is interesting that within educational level, there is no difference between university graduates and high school graduates in their use of passive strategies. However, university graduates and those with some post-secondary education have over twice the odds of coping actively than those who did not graduate from high school. Our findings show that with increased level of education, individuals increase their reliance on active coping strategies. It is speculated that

those with higher education level may have easier and better access to information about the importance of active coping, and thus may learn to cope more actively. Therefore, education level in individuals may be considered as a key element for the purpose of developing more active strategies and consequently improving recovery rates from whiplash injury.

The findings showed that the greater neck pain intensity was associated with more use of passive coping strategies, while it was unassociated with the use of active coping strategies. This is in line with a recent prospective study in WAD that found strong association between passive coping and pain intensity in cross-sectional analyses, whereas in the case of active coping strategies, no strong association has been found [8]. Another cross-sectional study in the general population indicated similar findings [26]. Therefore, it is possible that while passive coping is a consequence of greater severity of pain, active coping strategies appears not to be a reflection of the pain severity. Taken together, it seems that passive coping is highly affected by pain severity, indicating those with higher pain intensity may try to avoid anything that might lead to further pain as their ways of how they coped passively. Also, people with higher intensity of pain may more engage with fear-avoidance strategies to deal with their pain issues and may give up their control by wishing for better pain medications and other passive strategies. However, further investigation of the nature of this relationship and replication in WAD is needed; in particular, it is important to emphasise on those interventions that focus on encouraging less use of passive strategies rather than an increase in active strategies.

Those who had consulted a lawyer prior to making an insurance claim were more likely to use a passive coping style. The reasons for this aren't completely clear, however, it may be reasonable to suggest that those who seek out legal assistance shortly after their injury may rely on their lawyer to help them cope with pain and their injury. It may also be that retain a lawyer might focus on their symptoms more, which may have implications for their choice of coping. An possible alternative explanation for this finding is that those who retained lawyers prior to making their injury claim also tended to have higher baseline neck pain intensity (mean 64.8, s.d. 23.6 versus 57.0, s.d. 23.5), although this difference is of marginal clinical significance. Furthermore, the association between lawyer involvement and passive coping was present even after adjusting for neck pain. It may be that some unmeasured factors lead to both retaining a lawyer and coping passively with pain.

Some limitations of the present study need to be pointed out. First, there is the possibility of misclassification of some explanatory factors. We did not have access to clinical diagnoses of WAD or WAD severity, and relied on an operational definition of neck pain after the collision. We attempted to exclude more serious injuries by excluding those who were hospitalized for more than 2 days, but it is possible that we included those who would not have had the clinical diagnosis of WAD, and excluded some that might have had such a diagnosis. This would likely have had the effect of biasing our findings toward the null. Also, although self-report questions have been widely used to measure pre-crash pain conditions, this may lead to misclassification of prior pain and general health. In fact, prior studies have reported that persons with WAD have poor recall/ poor reporting of prior symptoms. In addition, in the situation

of filing compensation claims, the information may be systematically biased by minimizing the pre-crash pain problem and reporting exaggerated pre-crash good health condition [5].Thus, it is possible that WAD claimants would not have accurately reported prior neck pain to the insurer, or, alternatively, the intensity of the pain after whiplash may have altered their recall of previous episodes of pain.

Another potential limitation of this study is that the coping questionnaire addressed only those coping strategies used for pain of a moderate or severe intensity, which means that coping with mild level of pain remains unexplored. It is also likely that coping with mild pain is qualitatively different from coping with more intense levels of pain. However, moderate or severe pain levels are more likely to have an adverse impact on an individual's life when compared with mild pain. Thus, it might be argued that exploring the issue of coping with moderate to severe pain is of more clinical and personal relevance than coping with mild pain [26].

Another of the limitations of this study was the low response rate which raises the question of response bias. We found that those most likely to drop out of the study were males, those with lower education, those with higher initial neck pain intensity, and those who had consulted a lawyer prior to making a claim. Since some of these factors (lower education, higher pain intensity, having retained a lawyer) also predicted coping style, systematic attrition would likely have artificially decreased the average passive coping score. However, of those factors associated with attrition, those with higher educational level were more likely to use active coping, while males were less likely to cope actively. Therefore, we do not believe that the overall average active coping score was substantially affected by drop-outs between baseline and six-

week follow-up. However, our research question focused on the relationships between a set of predictors and coping. We do not believe that systematic attrition would have necessarily affected the *size* or *direction* of these predictive relationships.

Despite these limitations, our study has a number of strengths. This study, to our knowledge, is the first large population-based study assessing the predictors of coping strategies following six weeks after collision. The large sample size ensures that our analyses have sufficient power. We also had information on a large number of baseline factors, including sociodemographic, injury-related and pre-injury and post-injury health-related factors; and coping was measured using a reliable and well-validated instrument. Our study also employed a longitudinal design, thus contributing important information about the predictors of coping strategies in the WAD population to extend the currently existing literature which consists of cross-sectional findings.

Because coping is an important determinant of WAD outcome, it is important to understand and identify the prognostic factors that predict pain coping behaviour. This study highlights the possibility that identifying predictors of coping behaviour in the early stages of WAD recovery would help in understanding those modifiable and non-modifiable predictors of coping, and would assist researchers to identify the causal pathways of pain coping and consequently it may improve recovery. Furthermore, this study identified modifiable predictors of coping, such as depression symptoms after crash in WAD. However, future research should confirm the role of these predictors in another WAD population and address the other potential predictors of coping, particularly other psychological factors such as recovery expectation that have not been assessed in the current study.

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Chapter Three

Study Two: Who Copes Actively? Who Copes Passively?

(Predictors of early use of pain coping strategies in WAD)

3.1 Introduction:

Whiplash injuries following a motor vehicle crash have been shown to rise sharply over the past 30 years, affecting more than one million people every year in US [20] and comprise up to 80% of traffic injuries [15;26;30]. Not only are whiplash injuries expensive for society and the health care system, they also account for a significant and ever-increasing financial burden for insurers. In the United States and Europe, the economic cost of whiplash injuries was approximately $3.9 billion and $13.4 billion per annum respectively [18;39]. Each year in Canada, 2 million insurance claims reports for whiplash injuries, estimating for approximately $8.5 billion. It has been estimated that in British Columbia alone, the economic cost exceeds $600 million annually [33]. 'Whiplash' itself refers to an acceleration- deceleration mechanism of energy transferred to the neck that may lead to whiplash-associated disorders (WAD).The term 'WAD' is defined as the resulting injury or cluster of symptoms [62], including predominant symptoms such as neck pain, and also commonly involving other symptoms such as headache, dizziness, and pain in other parts of the body [15;23;28;62]. Even though WAD is a non-life-threatening injury, the

subsequent process of recovery can be long-lasting and a substantial number of those injured can be left with either temporary or permanent disabilities. There have been many intervention studies on the efficacy of various interventions used to treat patients with WAD, but the number of empirically supported treatment have remained limited [54]. Further, the results of even intensive interventions are disappointing, showing at the best, some success, but modest improvement and for a limited time period [32]. This indicates a significant need for other ways to reduce disability and produce strong improvement in the outcome of WAD.

Nevertheless, our understanding about the exact causes of long-term WAD and WAD disability is limited and current evidence suggests that a variety of types of factors play a role. For example, research findings have consistently shown that greater initial pain intensity and severity of symptoms are associated with a prolonged course of recovery from WAD [13]. In addition, there is a substantial body of evidence indicating the importance of psychological factors in the process of WAD recovery, with such factors as psychological stress, emotional lability, expectations of recovery, and coping playing key roles in the complex process of WAD recovery [2;12;31;64]. Systematic reviews have also reported that post-traumatic stress [70], poor self-efficacy [70], pain catastrophizing [69], depressed mood [13], and fear of movement [13;63] all predict slowed recovery in WAD. Thus, the nature of recovery in WAD appears multifaceted [63] and a biopsychosocial perspective in WAD research is warranted. Specifically, an important avenue of investigations is to examine potentially modifiable prognostic factors such as coping strategies which might

serve as appropriate targets for researchers and clinicians to develop more effective interventions in WAD.

The current study focuses on pain coping in WAD. Coping has been defined as the wide range of behavioural or cognitive efforts to be able to manage internal or external demands of a stressful situation [16;42]. According to the most commonly accepted view of coping, it is seen as a process; that is, coping style is not only influenced by stable and person-based factors (such as sociodemographic factors and personality), but also may be influenced by the specific situation of stressor event [29]. Pain is an important health-related stressor. Studies have shown that coping is associated with pain outcomes [6], and there is some suggestion that pain coping mediates the association between pain and disability [60], and a variety of coping strategies have been used by people to handle their pain on a daily basis [47].

Over the past decades, the substantial body of literature on pain-related coping has primarily focused on long term pain problems and most of the studies have examined coping in patients with long standing arthritis or other pain problems for which they are seeking heath care [5;56;68]. Coping with chronic pain has been found to be associated with health status, present and subsequent severity of pain, psychological status, treatment response, and other health outcomes [5;8;34;38;40;47].

In addition, previous research has examined the common types of coping styles, active versus passive coping styles [4;22;42]. In general, these studies have found that passive coping is associated with increased depression severity

[4;46;71], more limitation of activity level [59], and helplessness [4;57]. Active coping and pain severity have been found to be unrelated [46], but active coping has been shown to be associated with lower severity of depression [4;5], increased level of activity [71], and less functional impairment [4].

However, there is a growing body of research on coping in those with more recent pain onset. For those with acute WAD, Buitenhuis et al. found that coping style in the first few weeks after the traffic collision is related to longer duration of neck complaints [6]. Further, large population-based studies by Carroll and colleagues indicate that early use of passive coping strategies is associated with slower recovery of neck pain and pain-related disability [10;11]. Such findings have led to an interest in highlighting the importance of acute, early stage of pain coping after crash, in an effort to help to target interventions to modify coping behavior for those who could benefit most.

Furthermore, the predictors of pain coping have been given little attention, even though the effective modification of coping would benefit from such knowledge. Although, as above, coping is potentially modifiable, research in this area suggests that coping behaviour is resistant to change, and requires intensive multi model interventions to be successful [34;35]. This supports the value of developing a solid understanding of what factors influence how individuals cope with pain.

There have been some studies investigating what factors are associated with pain coping in WAD. For instance, a number of factors such as gender, education, general health, pain intensity and disability, general health status, and

depressive symptomatology have been reported to be associated with concurrently measured choice of coping strategy [8;10;46]. However, these are cross-section studies, meaning they provide a 'snapshot' of coping process in one time point, but do not contain any information about temporal associations.

To our knowledge, there have been no published longitudinal studies investigating the predictive association between possible explanatory factors and subsequent coping styles in either WAD or other types of neck pain. The current study is the second in a set of three studies to examine predictors of pain coping style. Like the first study in this set, it is a population-based study of predictors of active and passive coping in persons with recent traffic-related WAD injuries [67]. That first study found that high active coping was predicted by: being female, higher education, older age, being married rather than single, better self-reported mental health, and neck pain before crash. A low level of passive coping was predicted by higher education, and better physical and mental health; while those who had consulted a lawyer prior to making an insurance claim, who had more intense headache and neck pain, and who had greater depression post-crash were more likely to use a passive coping style. The current study examines a different cohort of participants, and, like the first in the series, seeks to identify a set of predictors of active and passive coping in the early stages of recovery after traffic-related WAD. The potential explanatory factors included demographic and socioeconomic characteristics, post-crash health, injury characteristics (such as pain intensity), and features of the collision itself. The purpose of the current study is to identify the similarities and differences of findings across these two

samples of WAD. To address this question, we conducted a secondary analysis of a population-based, incidence cohort study of individuals with traffic-related whiplash injuries.

3.2 Methods

3.3 Study Design and Population

The dataset used in this study was obtained from a prospective population-based cohort study of traffic injuries in the Canadian province of Saskatchewan [14]. At the time of that study, Saskatchewan had a population of approximately one million inhabitants, universal health care coverage, and a single administered motor vehicle insurance company, Saskatchewan Government Insurance Corporation (SGI). The insurance system in place at the time of the study was a no fault compensation system; that is, income replacement, health care and other benefits were available to injured individuals regardless of fault for the collision, but there was no payment for pain and suffering. Included in this study were adults aged 18 years or above, who claimed compensation for traffic-related injuries sustained between December 1, 1997 and November 30, 1999. This also included those who sought treatment for their traffic injuries as health care providers were required to report these for reason of reimbursement. Other inclusion criteria were: injury occurred in a motor vehicle and whiplash-associated disorder, as operationally defined in this study as "yes" to the question "Did the accident cause neck or shoulder pain." Excluded were those who did not understand English (and could not, therefore, complete the questionnaires); those

with serious illnesses unrelated to traffic injuries (e.g., Alzheimer's disease); those with serious injuries that required them to be admitted for more than 2days; and those who completed the baseline questionnaire more than 42 days after the accident as they cannot be considered to be part of the 'baseline' data. In addition, we excluded those who had experienced pain recovery within the first six weeks of their injury, since these individuals would not be coping with pain.

3.4 Sources of Data

All data are self-reported from questionnaire for baseline data and structured telephone interview for follow-up data. The baseline questionnaire for this study was part of the application for benefits form filled out by all claimants. It measured items related to sociodemographic characteristics, crash characteristics, prior health, post injury symptoms, and initial health care utilization. All consenting participants were followed through structured computer assisted interviews at six weeks and three, six, nine and twelve months post-crash. The telephone interviewers did not have access to information from the baseline questionnaires. This study utilizes data from the baseline and the first six week follow-up point. Ethical clearance was gained from the Research ethics boards of the University of Saskatchewan for data collection and the current analysis was approved by the Health Research Ethics Board at the University of Alberta.

3.5 Measures

3.5.1 Outcome:

For this study, the outcome was pain coping at six weeks post-crash, which was measured using the 11-item Pain Management Inventory (PMI) [4;58;59], a likert-type questionnaire. The measure is valid and reliable, and is used to assess how people manage their pain. The questionnaire asks respondents how frequently they engage in a particular coping strategy when their pain is at a moderate or greater level of intensity, and it yields two subscales: Active coping, which includes items such as "keeping busy or active" and passive coping, having items such as "taking medication for purposes of immediate pain relief". Response options for questionnaire items were: never do when in pain, rarely do when in pain, occasionally, frequently or very frequently do when in pain. Possible range of scores is 5 to 25 for the active coping subscale, and 6 to 30 for the passive coping subscale, with higher scores, meaning a higher frequency of that type of coping strategy. It should be emphasized that passive and active coping are not mutually exclusive and may be mainly independent of each other, meaning that an individual may develop both passive and active coping strategies to some extent. The measure has been used in different populations [4;5;45;46;49;58;66]. Since there are no validated cut-points for these subscales, a median split was used to reflect high vs. low levels of passive and active coping.

3.5.2 Potential Explanatory Variables:

Potential explanatory variables were chosen due to their theoretical and/or empirical association with pain coping strategies. These were measured at baseline and were: sociodemographic variables (age, sex, marital status, education); pre-crash health (prior musculoskeletal disorders, prior neck injuries); crash-related factors (position in the vehicle: driver, passenger, other; direction of main impact to the vehicle: frontal, rear, side impact); other injuries (fractured bones, having hit one's head); post-crash pain and other indices of injury severity (self-perceived general health at the time of the baseline questionnaire, neck pain intensity, head pain intensity, back pain intensity, extent of body in pain, post-crash depressive symptomatology, admission to hospital after the crash), expectations for recovery; and type of initial healthcare provider (physician, physical therapist, chiropractor or massage therapist).

Pain intensity was assessed using an 11-point numerical rating scale (NRS) for each of neck, low back, and headache, which asked the respondent to rate their current neck pain intensity on a scale from 0-11, with higher scores signifying greater pain intensity [36;37]. Extent (percentage) of the body in pain was assessed at baseline using a Pain Drawing, on which the participant shaded in the painful areas and percentage of body in pain was calculated from this [43]. Depressive symptomatology was measured using the CES-D, a commonly used and well validated depression screening tool, which measures a one-week period prevalence of depressive symptoms [12;19;31;52;65].

3.6 Statistical Analyses

The aim of this analysis was to identify which baseline factors predicted passive and active coping strategies, as measured six weeks post-crash, in those with WAD. For our main analyses, we built two sets of multivariable models, one for active and the other for passive coping. Both models were built in the same manner using logistic regression statistics. After ensuring that the variables met the assumptions for logistic regression, a three step modelling approach was used for each model. First, univariable models were built to obtain an estimate of the crude (unadjusted) effect of each candidate predictor variable on the outcomes of passive and active coping. Variables that were associated with coping with a p-value of less than 0.2 using the Wald Test were entered into a multivariable model. Those variables reaching a statistically significance ($p<0.05$) in this multivariable model were retained in the final model. We used tolerance and the variance inflation factor (VIF) to evaluate the models for evidence of collinearity in the second and third phase of modeling [17]. Findings were presented as crude and adjusted odds ratios (ORs) with 95% confidence intervals (CIs).

3.6.1 Assessment of Response Bias due to Attrition

To assess bias due to attrition between baseline and six weeks, we built a multivariable logistic regression model to identify predictors of participation. Potential predictors considered were age, gender, education, self-perceived general health after the collision, neck pain intensity, head pain intensity, depressive symptomatology, prior musculoskeletal disorders, prior neck injuries,

position in the vehicle; type of initial healthcare provider ,and direction of main impact to the vehicle. For each variable, a crude model was developed. Variables demonstrating a relationship with participation (with a Wald statistic significant at $p<0.2$) were included in a multivariable logistic regression model. These variables were considered to be associated with participation if their adjusted estimates were associated with a Wald statistic p-value of <0.05. All analyses were completed using SPSS for Windows, version 19.0 and STATA SE, version 12 [4;5].

3.7 Results

The baseline questionnaire was completed a median of 11 days post-crash. There were 6021 (described in Table 1) who met the inclusion/exclusion criteria at baseline and 86% of these (n=5204) consented to participate and provided information at the six week follow-up. Four factors predicted participation in the six week follow-up: female gender (OR=1.31, 95%CI=1.12-1.54), higher level of education (OR=1.33, 95% CI =1.07-1.66 and OR=1.18,95%CI=0.98-1.42 for high school graduate and university/post-secondary graduate, separately, compared to less than high school as a reference category), lower intensity of headache (OR=0.97, 95% CI=0.950.99), and less depressive symptomology (OR=0.99,95% CI=0.98-0.99).

Of 5204 follow-up participants, 2886 reported having pain of at least moderate intensity (as per the instructions on the PMI) and were eligible for inclusion at six weeks. Of these, 2853 completed the passive coping scale, and

2814 completed the active coping scale. Those indicating that they had moderate or greater pain at the six week follow-up had an average neck pain score of 5.45 (s.d. 2.42; median=6) on the 0-10 point neck pain intensity scale, versus an average pain intensity score of 1.84 (s.d. 2.40; median=0) for those reporting that they did not experience moderate or greater pain.

The correlation between the active and passive subscale scores at six weeks was -0.17, indicating that, while not completely unrelated, they are not opposite ends of the same continuum, that is, individuals can engage in both passive and active coping strategies. The mean passive coping score was 15.5 (s.d 4.5; median 15) and the mean active coping score was 15.5 (s.d 3.5; median 16) at six weeks.

3.7.1 Baseline Characteristics of Low and High Active and Low and High Passive Copers:

According to Table1, where the characteristics of low and high scoring groups are reported as different, these differences were significant at $p \leq .001$ unless noted. Women made up the majority of the cohort (69%), and tended to have high, as opposed to low active coping scores at 6 weeks, whereas a higher proportion of men had low active, as opposed to high active scores. There was no sex difference seen in high versus low passive coping. The mean age was similar across high versus low active and passive coping groups (approximately 40 years old in all groups). Persons with low levels of education were more likely to have scores in the low active and high passive coping categories. Single people were

more likely to have low active scores, whereas separated/divorced individuals were somewhat more likely to have high active scores at six weeks. Marital status had no association with passive coping scores at 6 weeks point. Those who had broken bones in the crash were more likely to have low active coping scores although there was no association between sustaining a fracture and passive coping scores at 6 weeks point. Having had a prior neck injury in a motor vehicle crash was not associated with either active or passive coping. However, prior musculoskeletal problems lead to both higher active scores and higher passive coping scores, just over 30% of participants in all coping categories reported having had excellent health before the crash, but only 3% reported excellent health at the point of the initial post-crash questionnaire. Those reporting poor or fair self-perceived general health immediately after the crash had lower active and higher passive coping scores on six weeks later. Those with high passive coping scores had higher initial neck pain scores than those with low passive coping scores (7.2 vs. 6.5 at six weeks), although this difference is small and not clinically important. No differences were observed in initial neck pain scores for high vs. low active coping. There were small initial depression score differences between those with high active vs. low active coping scores (initial depression scores of 20.0 vs. 16.0 for high vs. low active coping at six weeks). The initial depression scores for high vs. low passive copers at six weeks were 21.8 vs. 14.7. Those expecting to get better soon were more likely to have high vs. low active coping scores at six weeks (22% vs. 14%). With respect to passive coping scores,

those stating that they expected to recover quickly were twice as likely to have low as opposed to high passive coping scores (24% vs. 11%).

Table 3.1 Baseline characteristics of participants stratified by low or high Active Coping score and by low and high Passive Coping score at 6 weeks. Numbers (percentages) for categorical data and means (standard deviations: s.d.) for continuous data.

	Passive Coping (N=2853)*		Active Coping (N=2814)*	
Variables	Low A	High	Low	High
Age: mean (SD)	39.5 (15.0)	38.3 (14.5)	38.2 (15.2)	38.8 (14.1)
Gender: Female; n (%)	1012(68.1)	946 (69.1)	1060 (64.8)	883 (74.9)
Marital status: n (%)				
Married/Common Law	818 (55.1)	716 (52.3)	881 (53.9)	641 (54.4)
Single	460 (31.0)	450 (32.9)	556 (34.0)	339 (28.8)
Separated or divorced	163 (11.0)	161 (11.8)	155 (9.5)	160 (13.6)
Widowed	43 (2.9)	41 (3.0)	43 (2.6)	38 (3.2)
General Health now §: n (%)				
Excellent	44 (3.0)	16 (1.2)	23 (1.4)	33 (2.8)
Very Good/Good	601 (40.5)	300 (22.0)	446 (27.3)	437 (37.1)
Fair/Poor	839 (56.5)	1051(76.9)	1165 (71.3)	708 (60.1)
Education: n (%)				
Less than High School	264 (17.8)	349 (25.5)	412 (25.2)	198 (16.9)
High School Graduate	334 (22.5)	334 (24.4)	387 (23.7)	266 (22.6)
Some Post-Secondary/ Technical School Graduate	884 (59.7)	684 (50.0)	836 (51.1)	711 (60.5)
University Graduate				
Depression†: mean (SD)	14.7 (11.1)	21.8 (12.8)	19.7 (12.7)	16.0 (11.7)
Head Pain Intensity‡: mean (SD)	5.16 (3.22)	6.23 (3.06)	5.70 (3.21)	5.67 (3.14)
Neck Pain Intensity‡: mean (SD)	6.5 (1.9)	7.2 (1.9)	6.9 (1.9)	6.7 (1.9)
Back Pain Intensity‡: mean (SD)	3.9 (3.4)	4.8 (3.6)	4.5 (3.6)	4.1 (3.5)

*Active and passive coping scores assessed using the Pain Management Inventory. Scores dichotomized using a median split. Median scores were 16 for Active Coping and 15 for Passive Coping. N=2814 for Active Coping and 2853 for Passive Coping.
§ Refers to self-perceived health at the time of the initial questionnaire (post-injury).
†Depression measured on the CES-D. Scores can range from 0 to 60.
‡ Neck, head, and back pain intensity assessed with a 0-11 point numerical rating scale.

Logistic Regression Analysis: Tables 2 and 3 report the crude (unadjusted) and adjusted associations (estimates and their 95% confidence intervals) for each factor included in the multivariable models for active and passive coping.

Table 3.2 Baseline Factors associated with Active Coping at Six Weeks Post-Injury. Odds Ratios (OR) and 95% Confidence Intervals (CI). N= 2740

Factor	Crude OR (95% CI)	Adjusted OR (95% CI)
Self-perceived health **		
Excellent	1.00	1.00
Very good/ Good	0.68 (0.39 – 1.18)	0.73 (0.41 – 1.29)
Fair/ Poor	0.42 (0.25 – 0.73)	0.55 (0.31 – 0.98)
Depression score †	0.97 (0.97 – 0.98)	0.98 (0.97 – 0.99)
Female Gender	1.62 (1.37 – 1.91)	1.55 (1.30 – 1.85
Expectations for Recovery††		
Recover Soon	1.00	1.00
Recover Slowly	0.63 (0.51 – 0.78)	0.75 (0.69 – 0.94)
Never Recover	0.48 (0.28 – 0.82)	0.60 (0.35 – 1.05)
Don't Know	0.53 (0.42 – 0.65)	0.70 (0.55 – 0.89)
Marital Status		
Single	1.00	1.00
Married or Common Law	1.19 (1.01 – 1.41)	1.12 (0.94 – 1.34)
Widowed	1.45 (0.92 – 2.29)	1.43 (087 – 2.34)
Separated or Divorced	1.69 (1.31 – 2.19)	1.72 (1.31 – 2.25)
Education		
Less than High School	1.00	1.00
High School Graduate	1.43 (1.13 – 1.80)	1.33 (1.04 – 1.70)
Some Post-Secondary/ University Graduate	1.77 (1.45 – 2.15)	1.50 (1.22 – 1.86)
Prior musculoskeletal condition		
None	1.00	1.00
Yes, mild	1.32 (1.11– 1.57)	1.17 (0.97 – 1.40)
Yes, moderate to severe	1.41 (1.15 – 1.75)	1.42 (1.13 – 1.77)

*Active and passive coping scores assessed using the Pain Management Inventory. Scores dichotomized using a median split. Median scores were 16 for Active Coping and 15 for Passive Coping.
**Refers to self-perceived health at the time of the initial questionnaire (post-injury)
† Depression as measured on the Centre for Epidemiological Studies – Depression Scale. Possible scores range from 0-60.
†† Expectations for recovery assessed at baseline (median of 11 days post-crash)

Table 3.3 Baseline Factors associated with Passive Coping at Six Weeks Post-Injury. Odds Ratios (OR) and 95% Confidence Intervals (CI). N=2746

Factor	Crude OR (95% CI)	Adjusted OR (95% CI)
Depression score †	1.05 (1.04 – 1.06)	1.04 (1.03 – 1.04)
Age	0.99 (0.989 –0.999)	0.99 (0.99 – 1.00)
Expectations for Recovery ††		
Recover Soon	1.00	1.00
Recover Slowly	1.94 (1.55 – 2.42)	1.49 (1.17 – 1.89)
Never Recover	5.22 (3.01 – 9.05)	3.63 (2.02 – 6.52)
Don't Know	3.41 (2.72 – 4.28)	2.16 (1.68 – 2.77)
Education		
Less than High School	1.00	1.00
High School Graduate	0.76 (0.61 – 0.94)	0.80 (0.62 – 1.02)
Some Post-Secondary/ University Graduate	0.58 (0.48 – 0.71)	0.67 (0.54 – 0.82)
Neck pain intensity ‡	1.22 (1.17 – 1.27)	1.08 (1.03 – 1.13)
Head pain intensity ‡	1.11 (1.09 – 1.14)	1.05 (1.02 – 1.08)
Primary health care provider		
Doctor visit only	1.00	1.00
Doctor & physio visits	0.88 (0.70 – 1.11)	0.92 (0.72 – 1.19)
Doctor & chiropractor visits	0.93 (0.72 – 1.21)	0.99 (0.74 – 1.32)
Doctor & massage visits	0.67 (0.50 – 0.90)	0.74 (0.53 – 1.02)
Chiropractor visit only	0.41 (0.29 – 0.57)	0.65 (0.45 – 0.92)
Doctor & Chiropractor & massage visits	0.77 (0.51 – 1.16)	0.82 (0.53 – 1.28)
Chiropractor & massage visits	0.52 (0.30 – 0.90)	0.75 (0.42 – 1.36)
None	0.69 (0.48 – 1.00)	0.85 (0.58 – 1.26)
Other practice visits	0.77 (0.56 – 1.04)	0.91 (0.65 – 1.29)

*Active and passive coping scores assessed using the Pain Management Inventory. Scores dichotomized using a median split. Median scores were 16 for Active Coping and 15 for Passive Coping.
† Depression as measured on the Centre for Epidemiological Studies – Depression Scale. Possible scores range from 0-60.
†† Expectations for recovery assessed at baseline (median of 11 days post-crash)
‡ Headache intensity and neck pain intensity both assessed with a 0-10 point numerical rating scale.

3.7.2 Factors Associated with Active Coping:

In the univariable analyses, those variables predicting high active coping were: gender, age, educational level, marital status, having been admitted to

hospital after the crash, prior musculoskeletal disorders , better self-perceived general health after the crash, lower neck pain intensity, lower back pain intensity, post-crash depression, direction of main impact to the vehicle: rear, fractured bones, having hit one's head, type of initial healthcare provider, and expectations for recovery (15 variables). After entering these into a multivariable model, seven factors were found to predict active coping. These results show that high levels of active coping are predicted by the following factors: female gender, higher education, being separated/divorced rather than single, better self-perceived general health (measured at baseline), less post-crash depression, having better expectations for recovery, and having more prior musculoskeletal disorders prior to the crash (estimates and 95% confidence intervals for these factors are reported in Table 2).

As depression was measured on continuous scale, the odds ratio reported reflects the association between each one-point increment on the 60-point depression scale and active coping. Thus, with an odds ratio of 0.98 for depression symptomology, for each one-point increase in Depression score, the odds of high active coping decrease by 2%; and for each 10-point increase in Depression score, the odds of high active coping decrease by 18%. There was no evidence of multcollinearity in the multivariable models. The tolerance and VIF scores for the final model were 0.92 and 1.09, respectively.

3.7.3 Factors associated with Passive Coping:

In the univariable analyses, those variables predicting high passive coping were: gender, age, educational level, marital status, having been admitted to hospital after the crash, more intense neck pain, headache and back pain, greater extent of body in pain, prior musculoskeletal disorders, better self-perceived general health after the crash, greater post-crash depression, direction of main impact to the vehicle :rear, and others such as rollover; position in the vehicle: passenger, having fractured bones in the collision, having hit one's head, type of initial healthcare provider: those having seen doctors and massage therapist, those having seen doctors, chiropractors, and massage therapists, and those only have seen other practitioners: and having higher expectations for recovery. After entering these into a multivariable model, seven factors were found to predict passive coping. These results show that high levels of passive coping at six weeks post injury are predicted by: more depressive symptoms, younger age, higher intensity of neck and headache pain, lower education, poorer expectations for recovery, and having seen a physician only. As depressive symptomology, headache and neck pain were all measured on continuous scales, the odds ratios reported reflect the associations between each one-point increment of these factors and passive coping. This means that for each one point increase in depression score, the odds of high passive coping increased by 4%; thus, for each 10 point increase in depression score, the odds of high active coping increased by 44%. Similarly, for each one point increase in neck pain intensity, the odds of high passive coping increased by 8% and each one point increase in initial (post-crash)

headache intensity increased by 5% the odds of high passive coping. Finally, for each one year increase in age, the odds of high passive coping decreased by 1%, and for each 10 year increase, the odds of high passive coping decreased by 7%. These models showed no evidence of multicollinearity, and the tolerance and VIF scores for the final model were 0.88 and 1.14, respectively.

3.8 Discussion:

Overall, the results from this research revealed that there were some commonalities among factors that predict active and passive coping. The study findings suggest that those with higher education are more likely to engage in high levels of active coping after their injury, and less likely to use passive strategies. Depressed mood in the early days after the collision predicts low levels of active coping, and high levels of passive coping. Expectation for recovery in the early days after the injury also predicts coping style, with those expecting to recover quickly being more likely to use high levels of active coping strategies and those expecting to recover slowly or not at all to use high levels of passive coping strategies at 6 weeks post-collision. Other than these three factors, passive coping and active coping were predicted by different sets of characteristics. Being female predicted active coping, but was unrelated to passive coping. Age predicted passive coping but not active coping. Also, those who are separated/divorced rather than single were more likely to engage in higher levels of active coping, whereas marital status was unrelated to passive coping. Better self-perceived general health (post-crash) predicted active coping, but post-crash

health was unassociated with passive coping. With respect to indices of injury severity, greater headache and neck pain intensity predicted more passive coping, but were not related to active coping. Having had musculoskeletal problems before crash was a predictor of more active coping, but not passive coping. Finally, type of health care provider did not predict active coping, but seeing only a physician after the collision predicted passive coping. The estimates (odds ratios) and their 95% confidence intervals are reported in Table 2 and 3.

This study is one of the first efforts to our knowledge exploring the predictors of pain coping in cohort of whiplash-exposed. The purpose of this paper was to identify socio-demographic, crash-related and early post-injury characteristics that predict passive and active pain coping styles in the acute stage of recovery process. The fact that the major focus of research on pain coping behaviour has been to explore its association with recovery and other health outcomes, and much of the literature has supported such a linkage. However, there has been little attention paid to understand the determinants of pain coping styles. Thus, this study adds to our current body of knowledge about pain coping, and, in particular extends the body of published literature which up to now has focused on reporting concurrent associations.

We found that the predictors of pain coping strategies were multifactorial and psychological prognostic factors were very important. One of our most interesting findings was the strong relationship between early expectations to never recover and subsequent use of more passive coping strategies to deal with pain. These findings are consistent with the previous literatures, showing a relationship

(concurrent) between coping and expectations. For example, the study of musculoskeletal injuries by Ferrari et.al has shown that those who expect severe symptoms after a crash also use less adaptive coping strategies [22]. Given this finding, it may be that expectation serves a key role in the observed association with subsequent use of coping strategies. Given the clear association between early expectations for WAD recovery and actual recovery [12;48], this is an important association to explore further. In particular, future research might explore whether the relationship between expectations and recovery is mediated by coping as suggested by Ferrari et al. [21].

Regarding to the depressive symptomology, our findings revealed the fact that as post-crash depressive symptoms increased, the frequency use of passive coping increased, whereas the depressive symptoms decreased with less use of active coping. The results are in the line with general literature on the importance of paying attention to depression particularly due to the increasing occurrence of post-crash depressive symptomology in the first weeks after a whiplash injury [9;51].

Indeed, the linkage between coping and depression has been well documented, although most findings are cross-sectional in nature. For example, Mercado et al. (2005) found passive coping to be associated with concurrent depression, while active coping is associated with less depression. Another cross-sectional study by Samwel (2006) showed that passive coping strategies were related to self-rated disability and post injury depression [55]. In the recent study from Spain,

catastrophizing was found to be related to depression and disability within the first three months of WAD recovery [50].

Blokhorst (2002) mentioned that, in general, stressors have a greater impact on patients with WAD than on healthy individuals [1]. While researchers have demonstrated that certain types of coping are related to concurrent and subsequent pain severity, specifically in those with chronic pain problems [8;46], it might also be expected that coping style may be a consequence of the severity of the injury. For example, those with more severe injuries might be expected to cope more passively. This idea receives some support from the current study findings. Several indices of injury severity (greater headache and neck pain intensity) strongly predict higher use of passive coping.

The association between moderate/severe musculoskeletal condition before crash and high use of active coping is an interesting one. It could be speculated that individuals who have a history of moderate/severe musculoskeletal condition have already learned that active coping is a good way of managing pain problems. This knowledge may have come from their own experiences, but given that most current interventions for non-specific musculoskeletal problems involve encouraging activity, it may be that those with prior musculoskeletal problems have been encouraged by their health care provider to cope actively. However, this cannot be confirmed in the current study since there is no information in this study about prior health care.

The study findings suggested that socio-demographic factors such as age, gender, marital status, and education were also predictors of particular types of chosen coping style. In general, the literature is inconsistent with respect to whether older age is associated with active coping [53], passive coping [24;27;44;61] or neither [25]. In the current study it was found that age did not predict the use of active coping strategies, although there was an association between older and less reliance on passive coping.

Our results showed an association between education and both coping style. Not surprisingly, within educational level, there was a meaningful pattern in relation with both coping strategies. University graduates and those with some post-secondary schooling are one and a half times as likely to cope actively as those with less than high school level of education. Conversely, University graduates and those with post-secondary schooling are half as likely to cope passively as those with less than high school education. However, both effect sizes of the education level were small.

Women used more active coping strategies than men, but sex and passive coping were not related in the final model. Our results were congruent with findings from a general population-based cross-sectional study, which suggested indicating that women coped more actively than men, but that there were no gender differences in passive coping [46]. Also, Kivioja et al. found that women with WAD reported greater use of behavioral activities [41]. However, our findings are inconsistent with those of Jensen et al. (1994), who found that women who were seeking treatment for chronic pain coped more passively (less actively)

than men [34]. It is possible that this inconsistency in evidence is due to differences in populations studied or chronic versus acute stage.

In general, there is some evidence to point out that having a passive coping style has a negative impact on health and health outcome regardless of the injury issue itself, suggesting that those who copes passively also respond in more negative ways to their health conditions [11]. A recent study by Bring et.al suggests that varying degrees of daily activities are associated with the variability in how WAD patients cope within the first 3 weeks of recovery. On a more active day, individuals reported high capability of coping and self-efficacy, whereas on less active day they were appraising the stressor as a threat and representing more catastrophizing thinking [3]. However, it is unclear whether this represents a causal relationship. There is some evidence about reciprocal link between coping and general health, indicating that better self-reported general health is related with lower level of passive coping strategies [8]. Interestingly, we found that general health did not predict degree of passive coping, although those who reported fair or poor self-perceived general health after crash were less likely to cope actively compared with those with excellent general health.

The type of health care provider was found to be associated with passive coping. It seems those who visited only a chiropractor coped less passively compared to those who only visited physicians. Although this might be partially explained by the lower pain level in those visiting only chiropractors, the analysis adjusted for pain intensity. However, active coping was not dependent on the type of health care providers.

We believe that this study has a number of strengths. The major strength is the large sample size of whiplash population-based cohort, ensuring that our analysis have sufficient power. Measuring a large number of baseline factors related to the injury and individuals' health allowed us to test good range of potential predictors of pain coping strategies. Another important strength of the study is to conduct a prospective cohort with respect to time to event data, which minimize potential for selection bias due to including all eligible individuals within the cohort study, and they have been ascertained over the time frame of study.

Since the majority of individuals with WAD have numerous and widespread complaints, some WAD studies exclude patients with other non-neck pain complaints, which affects the external validity of findings. However, this study did not exclude such persons, making our sample a better representative of individuals who have injury claims.

Although low participation due to loss to follow up and missing information in the large prospective cohort studies becomes a concern, the current study had a very high participation rate of successive cohort, with 80% percent of participants completing the 6- week follow-up measure. This data increased our confidence that the estimates of the predictors of coping have been reported to some extent precisely and not a result of bias, similar to the reality of coping in whiplash injured.

In addition, we assessed the possibility of response bias due to attrition and found little evidence of selective attrition in this study. Most of the predictors

considered in this study were weakly associated with participation at 6-week follow up. In addition, we used a brief, but well-validated reliable questionnaire as the instrument to measure coping strategies, permitting us to assess coping in a valid and responsive manner.

This study also has limitations. We used self-report questionnaire rather than having access to medical record for external confirmation of WAD or ability to determine WAD classification based on the Quebec Task Force on Whiplash-Associated Disorders [62], which may be a potential for misclassification of WAD cases. However, in WAD grade I, it is only required to have pain and/or neck stiffness with no physical signs. While pain is considered as subjective phenomenon, an assessment of pain by using self- report has shown to be valid [36]. Therefore, patients' report of post-crash neck pain to his/her physician seems to be similar to a report of neck pain by questionnaire after whiplash injury and it is less likely that WAD misclassification would have affected our result.

We may also have misclassification regarding prior musculoskeletal condition, since it has been reported that persons with WAD have poor recall/ poor reporting of prior symptoms [7]. However, that study was performed in a state with a tort insurance system, which may increase the likelihood of such misclassification. At the time of the current study, Saskatchewan had a 'no-fault' insurance system, and there may have been less incentive to report exaggerated prior good health.

In addition, regarding the coping questionnaire, individuals were asked to response coping strategies if they had moderate or greater level of pain. Thus, it is difficult to extend our findings to those individuals who had mild pain, though it is likely that people with mild level of pain are sufficiently distressed to try to deal with their pain in their daily life and come up with some sort of coping strategies.

3.9 Conclusion:

It is well known that people cope with pain in a variety of ways, but it is not well understood what leads to these differences. We report a variety of factors that predict whether individuals use high vs. low levels of passive and active pain coping strategies. This has important implications in clinical setting because passive coping is associated with slower recovery [10].

Understanding modifiable predictors of coping such as psychological factors are important, since they can help in developing effective intervention strategies to improve individuals' coping abilities, and consequently improve the outcome of WAD recovery. However, our findings, of course, must be confirmed in the future studies by examining other modifiable factors that predict coping strategies in whiplash-exposed population.

Although the one-time assessment of pain coping at 6-weeks has been shown to be reliable for our understanding the early use of coping strategies, it would be of value to measure at the consequent follow-up points to extend our understanding about the changes of coping strategies over time. This may explain

whether the coping strategies remain stable over time or to what extent coping strategies have been modified or encouraged by contacting the health care systems. Future studies in this area should examine the determinants of changes in coping strategies over the course of WAD recovery.

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Chapter 4

Study Three: Predictors of Pain Coping with Neck and Low Back Pain in the General Population

4.1 Introduction:

Neck pain is common in the general population. One-year prevalence estimates of neck pain typically range between 30% and 50% for both adults and children [18]. Back pain is even more common, in the general population, with reports of the lifetime prevalence of neck and back pain at 67 and 84%, respectively [11;12]. Although most individuals carry on their daily life with minimal pain-related interference, an important minority have significant limitations due to neck pain (almost 5% of the population) and/or back pain (almost 11% of the population) [11;12] .

Catastrophizing, helplessness, praying/hoping, wishful thinking, negative thinking/passive adherence, decreasing levels of activity, and expression of negative emotions, all of which can be thought of as passive coping strategies, are associated with poor adjustment in a variety of different pain populations (e.g.; [16;17;19-22;28;34;35;37]. Pain coping is important to explore, since it is a potentially modifiable prognostic factor in pain outcomes. Coping is often conceptualized as a combination of the cognitive and behavioural efforts to manage or counter external or internal stressors [23;25;31]. Although much of the current literature on pain coping relates to coping with chronic pain conditions

[13;36], over the past decade, there has been substantial attention paid to the role of coping with pain of more recent onset, for example, after whiplash injuries (e.g., [7;9;10;24]). That work supports the idea that coping style is an important determinant of outcome in the early stages of whiplash-associated disorders (WAD).There is also some research suggesting that coping style predicts the development of disability in general population samples with initially non-disabling pain [29].

However, little empirical work has been done to understand the determinants of pain coping behavior, yet such information may help patients and providers discuss how to develop more effective coping styles. There have been studies examining concurrent associations between various characteristics and coping. For example, Mercado et al. found that greater severity of pain and disability was positively associated with greater concurrent use of passive coping strategies [29]. Carroll et al. found a concurrent association between different combinations of active and passive coping and pain severity, general health and education [8]. However, since these are cross-sectional studies, the temporal direction of these associations is unclear.

Although no studies have identified determinants of coping styles used by individuals in the general population, two recent studies have identified predictors of pain coping in persons with recent WAD. These findings suggest that high active coping was predicted by: being female, having higher education, older age, marital status (although which marital status was associated was inconsistent in two WAD studies), better self-reported mental health, better self-perceived

general health, less post-crash depression, having better expectations for recovery, and having experienced musculoskeletal disorders (including neck pain) before the crash. A low level of passive coping was predicted by higher education, and better physical and mental health; while a high level of passive coping was predicted by: more depressive symptoms, younger age, higher intensity of neck and headache pain post-crash, poorer expectations for recovery, having seen a physician only, and having retained a lawyer prior to making an insurance claim [38;39].

It is unclear whether these factors are important predictors of pain coping in the absence of a whiplash injury. The current study aimed to identify predictors of pain coping style in a general population sample of individuals who have experienced an onset of severe (intense and/or disabling) non-specific neck and/or back pain.

4.2 Methodology

4.3 Source Population and Design:

Data for this study are from a larger study involving a random sample of the Saskatchewan adult population, with follow-up six and 12 months after the index survey. This study is described in more detail elsewhere [11;12;28], but briefly, was conducted in 1995/1996. It included a random sample of noninstitutionalized Saskatchewan residents between the ages of 20 and 69 holding a valid Saskatchewan Health Services card. Inmates of provincial correction facilities, residents under the Office of the Public Trustee, foreign

students and workers with employment or immigration visas, and residents of special care homes were excluded. The sampling frame of the Saskatchewan Health Insurance Registration File (HIRF) was used to obtain an age-stratified random sample of the eligible population. The randomization was conducted by the Health Insurance Registration branch of Saskatchewan Health to preserve the confidentiality of HIRF. A sample of 2184 inhabitants meeting the inclusion criteria was sent the baseline questionnaire. One hundred and twenty nine questionnaires (5.9%) were returned due to mailing errors, death, the person leaving the province, and health reasons, which left a random sample of 2055 individuals. The response rate achieved from the first stage of the survey was 55.1% (1131 participants). Follow-up questionnaires were sent six and twelve months later, with follow-up rates of 75.7% and 64.8%.

From the larger sample, we identified those participants with no or mild neck or low back pain at the start of the study but who developed intense or disabling pain at either the six or the twelve month follow-up points, and were thus eligible to complete the pain coping questionnaire. Pain was assessed using the von Korff Chronic Pain Questionnaire, described in the next section [40].

4.4 *Measures*

4.4.1 Outcome variable: Passive and Active Pain Coping Strategies

Pain coping was assessed using the Vanderbilt Pain Management Inventory (PMI), and is designed to be used when pain is of moderate to greater severity [5]. This scale categorizes coping as active or passive in nature [5].

‘‘Active’’ coping refers to coping strategies of taking responsibility for pain management and making efforts to control the pain or to function in spite of it. Passive coping involves leaving the management of pain to an external resource (such as relying on pain medication) and avoidance of potentially painful activities, such as withdrawing from activities because of the pain [5]. The 11-item abbreviated version of the PMI was used since this brief measure has sufficient internal consistency, reliability and validity [5;28;33;34]. Each subscale is made of items that ask the respondent to rate their use of a particular coping strategy on a five point Likert scale. The two subscales of Active Coping Scale and the Passive Coping Scale are relatively unrelated and scored separately. Active coping scores range from 5 to 25 and passive coping scores range from 6 to 30, with higher scores indicating higher use of that coping style. Because, there are no cut-points validated in the literature, we conducted our analyses using a median split for each subscale.

4.4.2 Pain Presence and severity

Pain presence and severity was assessed using the Chronic Pain Questionnaire developed by von Korff and colleagues to assess the 6-month period prevalence of pain [40]. The questionnaire has good reliability, and good concurrent, predictive, and discriminant validity [32;40]. The Chronic Pain Questionnaire scores pain severity into five categories: Grade 0 = no pain; Grade I = low disability-low intensity pain; Grade 11 = low disability-high intensity pain; Grade III = high disability moderately limiting pain; and Grade IV = high

disability-severely limiting pain. Respondents completed this scale separately for neck and low back pain, and for the current study, we used the higher pain grade of the two if individuals had pain in both locations. For example, if a participant had reported Grade II neck pain and Grade I low back pain, we considered that participant to have Grade II pain. Grades III and IV pain were combined for our analyses.

4.4.3 Potential Explanatory Variables:

Potential predictors of coping style included the following variables measured at baseline: socio-demographic factors (age, gender, marital status, highest education level, and family income), pain presence and severity (no versus mild neck and/or back pain), and health-related factors (health-related quality of life: SF- 36), vitality, depressive symptomatology: CES-D).

Health-related quality of life [26;27;41] was assessed using the Short-Form health survey SF-36, which is a valid and reliable measure of mental health and physical health.. The SF-36 is made up of 36 questions and eight subscales, which are combined into two summary scales; reflecting the physical health component score (PCS) and the mental health component score (MCS) [41-43].Scores on each of these summary scales and vitality range from 0-100 and the higher scores reflect better health. Depressive symptomatology was measured using the Centre for Epidemiological Studies Depression Scale [30]. The CES-D is a commonly used, valid and reliable measure of depressive symptoms [4;14;30;44]

4.5 Statistical Analyses:

The purpose of this analysis was to identify the baseline variables which predicted passive and active coping strategies, as measured at either the 6 or 12 months follow-up. We included in our analysis all those who had Chronic Pain Questionnaire scores of 0 or 1 (no pain or mild pain) at baseline and who developed pain of a severity to require pain coping during the course of the 1-year follow-up (i.e., those who developed Grade II-IV pain). We used Cox proportional hazards regression to build separate multivariable models for active and passive coping. The outcome of interest was high versus low use of passive and active pain coping in those who developed Grades II to IV pain at either six or 12 months. Those lost to follow-up were censored at three months (for those lost to the six month follow-up) or 9 months (for those lost to the 1 year follow-up, who had not developed Grades II to IV pain at six months).

Both two models were built in the same manner. After ensuring that the variables met the Proportional Hazards Assumption (PH) for Cox Proportional Hazard regression, a three step modelling approach was used for each model. First, univariable models were built to obtain an estimate of the crude (unadjusted) effect of each candidate predictor variables at baseline on the outcomes of use of passive and active coping. Variables that were associated with coping with a p value of <0.2 using the Wald Test were included in the second phase of the modelling. Those variables reaching a statistically significant level ($p<.05$) in this multivariable model were retained in the final model. We also

assessed the models for evidence of collinearity in the second and third phase of modeling. Furthermore, all factors associated with attrition (modeling strategy described below) were included in the final model. Because there were only two follow-up points, we used exact marginal methods for dealing with ties of failure times [3].

Since there was attrition over the follow-up period, we explored the presence of selection bias by building a multivariable logistic regression model to compare baseline characteristics of participants and non-participants. Our modeling strategy was as follows. All variables significantly associated with non-response (with a Wald statistic significant at $p < 0.2$) were entered into a multivariable logistic regression model. These variables were considered to be associated with participation if their adjusted estimates were associated with a Wald statistic p-value of <0.05. All analyses were completed using SPSS for Windows, version 19.0 and STATA SE, version 12 [1;2].

4.6 Results:

4.6.1 Participants (Description of the Study Population)

Of the 1131 participants at baseline, 790 had no pain or mild pain (Grade 0 or I) at that index point. Of these, 599 participants provided follow-up information and 89 developed Grades II-IV pain (59 at six months and 30 at 12 months) and were thus eligible for analysis. Thus, of the 89 respondents included in the study sample, 55 of these individuals had scores above the median on the active coping scale and 64 individuals had scores above the median on the passive coping scale

(Figure 1). Table 1 provides a description of the study sample of the 790 persons with no or mild neck and/or low back pain (Grade 0 or I) at the index stage. Participants had a mean age of 41.6 (SD=13.4). The percentage of men to women was approximately equivalent (51.5% and 48.5% respectively), although the bulk of participants were married (72.5%) and had graduated from post-secondary school (30.3%). The majority of participants had neck pain intensity of Grade I (77.7%) rather than Grade 0. The mean level of mental and physical health was 52.1 and 50.5 respectively, which reflects the population norms. After dichotomizing at the median, the cut-off score for low vs. high passive coping and active coping was 14 and 16, respectively. The Pearson correlation between the passive and active subscale scores was -0.15, reflecting a very small negative association between the two subscales.

Figure 4.1: Summary of Study Three Participants

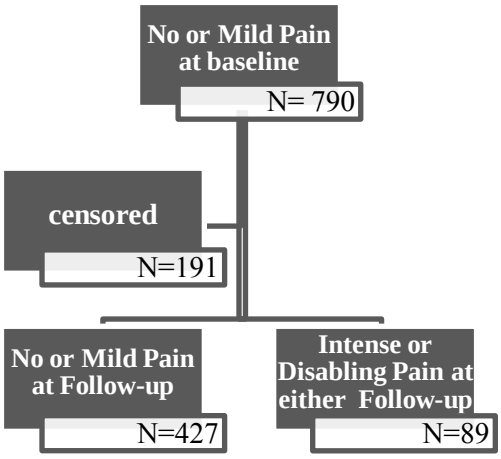

Table 4.1 Sociodemographic Characteristics of the Study Population (n=790)

Variable	%
Age: mean (s.d.)	41.6
Gender:	
Male	187 (51.5)
Female	176 (48.5
Marital Status:	
Married	259 (72.5)
Separated/divorced	26 (7.3)
Widowed	3 (0.8)
Never Married	69 (19.3)
Education Level:	
University graduate	46 (12.9)
Some post-secondary	108 (30.3)
High school graduate	98 (27.5)
>grade 8	81 (22.8)
<grade 8	23 (6.5)
Income:	
>60K	60 (18.2)
40-60K	70 (21.2)
20-40K	107 (32.4)
<20K	93 (28.2)
Physical Health: mean (s.d.)	50.5 (9.7)
Mental Health: mean (s.d.)	52.1 (7.3)
Back pain intensity: mean (s.d.)	0.7(0.5)
Neck pain intensity: mean (s.d.)	0.5(0.5)
Depressive Symptoms: mean (s.d.)+	9.7 (9.1)
Neck/Back pain Intensity‡	
No Pain	81 (22.3)
Grade 1	282 (77.7)

*Mean (Standard Deviation**)**
+ Depression measured on the CES-D. Scores can range from 0 to 60.
‡ Neck pain intensity assessed with a 0-10 point numerical rating scale.

4.6.2 Attrition Analysis (Factors Associated with Participation throughout the One-year Follow-up):

In the univariable analyses, gender, age, education and income were associated with follow-up participation. In the multivariable model, older individuals were more likely to have participated (OR=1.02; 95% CI=1.01-1.64) and those with lower education were less likely to have participated (OR=0.54; 95% CI=0.34-0.85). Because age and education were associated with attrition, we included both factors in our final models of coping (below).

4.7 Cox Proportional Hazards Regression Analysis

4.7.1 Factors associated with Active Coping:

In the univariable analyses, those variables predicting high active coping (at a significance level of $p < 0.20$) were: age, marital status, family income, better mental health (MCS), vitality, less depressive symptomatology. After entering these into a multivariable model along with education (since education was associated with non-response), one factor (MCS) was found to predict active coping at $p<.05$. A final model was built with MCS and the two variables predicting participation, age and education. This result shows that high levels of active coping is predicted by better baseline mental health (estimates and 95% confidence intervals for multivariable model is reported in Table 2). As mental health was measured on continuous scales, the hazard rate ratio reported reflects the associations between each one-point increment of this factor and active coping. Thus, with an hazard rate ratio of 1.05 for Mental Health, for each one-

point increase in Mental Health score, the odds of high active coping increase by 5%; and for each 10-point increase in Mental Health score, the odds of high active coping increased by 65%. In addition, there is a suggestion that those with lower education are less likely to cope actively, although the confidence interval is wide and cross unity (HRR=0.56, 95% CI=0.31-1.02). The tolerance and VIF scores for the model with 6 independent variables were 0.53 and 1.89, respectively, and for the final model with 3 variables, these values were 0.94 and 1.06.Thus, none of the models showed evidence of multicollinearity.

Table 4.2. Baseline Factors associated with Active Coping at 12 Month.

Hazard Rate Ratios (HR) and 95% Confidence Intervals (CI). N= 324

Factor	Crude HR (95% CI)	Adjusted HR (95% CI)
Mental Health	1.05 (1.01 – 1.09)	1.05 (1.01 – 1.09)
Age	1.02 (0.996 – 1.04)	1.01 (0.98 – 1.03)
Education		
Post-secondary/ University Graduate	1.00	1.00
High School Graduate and less	0.80 (0.46 – 1.38)	0.56 (0.31 – 1.02)

*Active and passive coping scores assessed using the Pain Management Inventory. Scores dichotomized using a median split. Median scores were 16 for Active Coping and 14 for Passive Coping.

4.7.2 Factors associated with Passive Coping:

In the univariable analyses, those variables predicting high passive coping (at a significance level of $p < 0.20$) were: education, family income, poorer mental health (MCS), vitality, and greater depressive symptomology. After entering these into a multivariable model along with age (since age was associated with

participation), three factors were found to predict passive coping at $p<.05$. A final model was built with these three factors including age and education. These results show that high levels of passive coping at the 6 or 12 month follow-up are predicted by the following 3 baseline factors: older age, lower income, and poorer self-perceived mental health. As mental health and age were all measured on continuous scales, the hazard rate ratios reported reflect the associations between each one-point increment of these factors and passive coping. This means that for each one point increase in Mental Health score, the odds of high passive coping decreased by 3%; thus, for each 10 point increase in Mental Health score, the odds of high active coping increased by 37%. However, for each one point increase in age, the odds of high passive coping increased by 2%, and for each 10 point increase, the odds of high passive coping increased by 28%. Similarly, we found that individuals who reported the income category of $20-40 thousand /year were 3.68 (95% CI=1.47–9.20) times more likely to develop passive coping than people reporting the highest income category (>60k) (Table 3). However, those at the lowest income level were similar to the two higher income levels. Then, this finding is difficult to interpret and may represent a spurious result, since one would expect a dose-response relationship. The tolerance and VIF scores for the model with 5 independent variables were 0.48 and 2.08 respectively, and these values for the final model with 4 variables were 0.67 and 1.50. Again, this indicates no evidence of multicollinearity in the models.

Table 4.3. Baseline Factors associated with Passive Coping at 12 Month.

Hazard Rate Ratios (HR) and 95% Confidence Intervals (CI). N= 301

Factor	Crude HR (95% CI)	Adjusted HR (95% CI)
Mental Health	0.98 (0.96 – 1.00)	0.97 (0.94 – 0.999)
Age	1.01 (0.99 – 1.03)	1.02 (1.00 – 1.05)
Education		
Post-secondary/ University Graduate	1.00	1.00
High School Graduate and less	1.22 (0.72 – 2.04)	0.89 (0.48 – 1.63)
Income		
>60K	1.00	1.00
40-60K	1.53(0.63 – 3.74)	1.86 (0.72 – 4.82)
20-40K	2.67 (1.18 – 6.05)	3.68 (1.47 – 9.20)
<20K	1.56 (0.64 – 3.78)	1.63 (0.57 – 4.61)

*Active and passive coping scores assessed using the Pain Management Inventory. Scores dichotomized using a median split. Median scores were 16 for Active Coping and 14 for Passive Coping.

4.8 Discussion:

To the best of our knowledge, this is the first study looking at predictors of pain coping style within a general population of individuals experiencing pain. This is important since pain is extremely common in the general population [11;12]. We found that the predictors of coping strategies in the general pain population were multifactorial and psychological prognostic factors were very important. Overall, the findings from this study suggest that in those people with onset of intense or disabling neck/low back pain over a 6 month to one year period, only better self-reported mental health was related to higher levels of active coping. A low level of passive coping was predicted by better mental

health; while those with older age and who had a lower family income were more likely to use a passive coping style.

Despite the fact that coping style appears to be associated with disabling pain and delay in recovery (e.g.[6;15]), little has previously been known about the determinants of coping style in the general population. In particular, this study extends the previous literature on coping strategies in two ways. First, previous studies examining factors associated with coping style were cross-sectional and thus of limited use in understanding why people in pain chose the coping strategies they use. Secondly, the majority of previous studies investigated pain coping primarily in patients from chronic pain clinics. Those who are coping with long-standing pain may cope differently and for different reasons than those with more recent pain onset.

One of our most interesting findings was the strong relationship between better mental health at baseline and less subsequent use of passive coping strategies and more use of active coping to deal with pain. In contrast, there was no association between physical health and neither the use of passive and active coping strategies. Our findings were in line with previous work by Vakilian et al. (2013) that found mental health was predictor of active and passive coping in the early stages of recovery after a traffic-related whiplash injury[39]. Furthermore, our results did not come to the conclusion of causality. As an exploratory analysis, this study provided a hypothesis that mental health is independently associated with the consequent development of coping strategies. However, further study of this relationship is essential.

In our univariate analyses examining depression and coping, we found that depression at baseline was highly associated with lower levels of active coping (HR=0.93), as well as higher levels of passive coping. However, when we included age, mental health, education, income, and marital status in the multivariate model, we found the association between depression and active coping was no longer significant. It is possible that including both the mental health scale and the measure of depressive symptomatology lead to collinearity in the model, despite the fact that the values of the tolerance and variable inflation scores, which indicate collinearity, were within acceptable levels. The two constructs are closely related. However, in prior work, Vakilian et al. found that both mental health and depression (using the same scales as in this study) were predictors of passive pain coping in WAD in the adjusted analyses[39].

We found that physical health is not a predictor of either passive or active coping strategies. However, previous study in WAD indicated that good physical health was associated with less frequent use of passive coping, though not associated with the use of active coping[39]. It is possible that this inconsistency is due to the differences in populations that were studied (WAD versus the general population with neck and/or low back pain), and that good physical health is important in predicting coping only when there is an acute and sudden onset of pain (such as in a whiplash injury).

Our study also found that age was associated with the use of passive coping style, showing that older individuals were slightly more likely to use

passive coping strategies than younger individuals, but this relationship was weak and age does not appear to be an important determinant of coping.

The limitations of the present study need to be acknowledged, as they might address some potential alternative explanations. Firstly, although the attrition rate was relatively low (75.7% provided information during at least one follow-up), there was some selective attrition by age and education, with older individuals less likely to drop out than younger individuals. Also, individuals with a higher level of education were less likely to drop out than those with lower level of education. In order to control for this bias, the final models included age and education.

Furthermore, the 11-items coping questionnaire that only measured those coping strategies that have been used for moderate or severe intensity of pain. Thus, the coping strategies with mild pain levels have been left unexplored. However, because it is more expected that moderate or severe pain will have a more adverse effect on people's lives, the question of how persons cope with mild pain is arguably a less crucial question.

The present study is a secondary analysis of a previously collected data of study that was not focused primarily on coping, but was designed to examine risk and prognostic factors for spinal pain, including coping. Therefore, there may have been other important potential factors related to the prediction of coping that were not included in the study (e.g., attributions, coping efficacy, etc.).

Despite these limitations, this study does provide crucial information. First, it contributes to the knowledge of describing characteristics of individuals in

a general population who suffer from neck and/or back pain. It is a population-based study identifying who is likely to use more effective coping strategies versus less effective ones by employing a longitudinal design and understanding the factors associated with both active and passive coping strategies. Moreover, gaining an appreciation of these predictive factors, especially those which are modifiable, can aid in developing effective intervention strategies to improve individuals' coping abilities and changing maladaptive coping behaviour. Second, coping and pains severity were measured using a reliable and well-validated instrument. Third, this exploratory information can aid as the first step in examining causal factors associated with active and passive coping in this population.

Because current study examined some potential predictors, future research have to confirm the role of these predictors in another general population with neck and/or low back pain and address the other potential predictors of coping, particularly modifiable factors such as recovery expectation that have not been assessed in the current study.

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Chapter 5

Discussion & Conclusion

Coping is one of the most frequently cited psychological variables in pain and injury research. It is also a potentially modifiable factor, and this reinforces the importance of understanding what factors influence how people cope with pain. The goal of this MSc research was to examine and report the important predictors of pain coping strategy in the early stages of recovery among those with traffic-related WAD and among those with neck pain in the general population. This is novel research, since no longitudinal studies explaining how individuals develop pain coping strategies has before been carried out in either of these pain populations. To gain a better understanding of this, three studies have been undertaken. Study one and two examined predictors of coping styles in persons with WAD in two different cohort of participants and study three examined predictors of coping in a general population sample with recent (during the past six months) onset of severe pain problems.

Why is it necessary to know about these predictive factors of coping in these two pain populations? Firstly, these two pain populations (WAD-related pain and pain in the general population) are unique in various ways and this research characterizes the similarities and differences in the predictors of pain coping styles. Secondly, a comparison of the similarities and differences in predictors of coping style in these groups may provide useful information about what interventions might be useful in modifying coping styles.

5.1 Comparison of the two WAD studies (study 1 and 2):

The purpose of studies one and two was to identify demographic and socioeconomic characteristics, post-crash health, injury characteristics (such as pain intensity), and features of the collision that predict passive and active pain coping styles six weeks after a traffic-related WAD. In addition, this thesis aimed to identify the similarities and differences of findings across these two samples of WAD, since replication of findings increases our confidence in their validity.

Overall, the results from study one and two revealed one common factor predicting both active and passive coping in both studies. Education was the only common factor for study one and two that was associated with both active and passive coping styles. These two sets of findings both suggest that those with higher education are more likely to engage in high levels of active coping after their injury, and are also less likely to use passive strategies. It is speculated that those with higher education level may have easier and better access to information about the importance of coping actively and of not coping passively. However, in study two, the associations between education level and coping were relatively small, suggesting that there are other, more important influences on coping style.

Active coping:

In addition to education, there are three common factors in both studies (study one and two) that predicted high active coping: sex, marital status (although the exact association was inconsistent in study one and two), and having experienced musculoskeletal disorders (including neck pain) before the crash.

In both study one and study two, women used more active coping strategies than men. Our results in study one and two were congruent with findings from a general population-based cross-sectional study, which suggested indicating that women coped more actively than men [5].

Furthermore, both studies one and two showed that individuals who had experienced musculoskeletal disorder (including neck pain sometimes, very often, or every day) prior to crash were more likely to cope actively compared to those who never had pain before. It could be speculated that individuals who have a history of moderate/severe musculoskeletal condition have already learned that active coping is a good way of managing pain problems. This knowledge may have come from their own experiences, but given that most current interventions for non-specific musculoskeletal problems involve encouraging activity, it may be that those with prior musculoskeletal problems have been encouraged by their health care provider to cope actively. However, this cannot be confirmed in the current studies since there is no information on prior health care available in either WAD study.

Marital status was a predictor of active coping in both WAD studies. However, type of marital status predicting coping was inconsistent across the two studies. While in study one, married individuals rather than single were more likely to cope actively, in study two separated/divorced individuals were somewhat more likely to use active coping compared to single people. This is a finding that would need to be further explored in future studies, although the

effect sizes were not large, and the findings of the relationship between marital status and active coping may be a chance finding.

Passive coping:

There are two common factors in both studies (study one and two) that predicted high levels of passive coping: depressed mood and higher intensity of neck and headache pain post-crash. Sex, marital status, and prior neck pain were unrelated to passive coping in both of these two WAD cohorts.

Study one and two both indicated that those who had greater depression post-crash were more likely to use a passive coping style. These results are in line with other literature on the importance of paying attention to depression; particularly due to the frequent occurrence of post-crash depressive symptomology in the first weeks after a whiplash injury [1;7].

In study two, several indices of injury severity (greater headache and neck pain intensity) strongly predict higher use of passive coping. Study one also showed that greater neck and headache pain intensity were associated with more use of passive coping strategies. Thus, it seems that passive coping is highly affected by pain severity, suggesting that those with higher pain intensity may try to avoid anything that might lead to further pain and thus may cope passively. It could be speculated that people with higher intensity of pain may have greater fear-avoidance, and that fear avoidance mediates the association between intense pain and use of passive pain coping strategies, such as wishing for better pain

medications and other passive strategies. However, further investigation of the nature of this relationship and replication is needed.

5.2 Other findings in Study 1 and 2:

Other than the factors mentioned above, active and passive coping were predicted by different sets of characteristics in the two WAD studies. For example, study one showed that older individuals were slightly more likely to use active coping strategies than younger individuals, but age was unassociated with passive coping. In study two, there was an association between older age and less reliance on passive coping and no association was found between age and active coping. However, these relationships were all weak and age does not appear to be an important determinant of either active or passive coping.

Most notably, study one showed that while passive coping is a function of both poorer physical and poorer mental health, active coping appears to be a function of better mental health only, and was unrelated to physical health. This is interesting because one might have expected active coping (which includes items related to physical activity) to have been used more by those in better physical health.

Another interesting finding of study one was a strong association between lawyer involvement and passive coping, even after adjusting for initial neck pain and other factors potentially related to injury severity. The reasons for this aren't completely clear; however, it may be reasonable to suggest that those who seek out legal assistance shortly after their injury may rely on their lawyer to help them

cope with pain and their injury. It may also be that retaining a lawyer might lead to a greater focus on their symptoms, which may in turn have implications for their choice of coping. However, it may also be that some unmeasured factors (such as unmeasured indices of injury severity) may lead to both retaining a lawyer and coping passively with pain. Interestingly, in study one, which spanned a change in insurance system, there was no association between filing a claim under tort vs. no fault and either active or passive coping. Study two has no data on lawyer involvement, and was carried out in a no fault only system. Thus, those findings from study one could not be replicated.

One of most interesting findings from study two was the strong relationship between early expectations to never recover and subsequent use of more passive coping strategies to deal with pain (this variable was not measured in study 1). These findings are consistent with the previous literature, showing a relationship (concurrent) between coping and expectations. For example, the study of musculoskeletal injuries by Ferrari et.al has shown that those who have not experienced a whiplash injury but who would expect severe WAD symptoms if they were to have a crash, also anticipate using less adaptive coping strategies [4]. Given this finding, it may be that expectation serves a key role in subsequent use of coping strategies. Given the clear association between early expectations for WAD recovery and actual recovery [2;6], this is an important association to explore further. In particular, future research might explore whether the relationship between expectations and recovery is mediated by coping, as suggested by Ferrari et al.[3].

5.3 Study 3:

The goal of the third paper was to identify predictors of pain coping style in a general population sample of individuals who have experienced an onset of severe (intense and/or disabling) non-specific neck and/or back pain during the past 6 months.

Active Coping:

Study three showed that better self-reported mental health was the only factor predicting higher levels of active coping.

Passive Coping:

Those with poorer mental health, older age and lower family income were more likely to use a highly passive coping style.

5.4 Comparison of predictors of coping across the three studies:

The comparisons between predictors of high active and high passive coping across three studies are shown in Tables 1 and 2. One of the most interesting findings of study three was the strong relationship between better mental health at baseline and less subsequent use of passive coping strategies and more use of active coping to deal with pain. Our findings were consistent with studies one and two, which found that mental health and/or depressive symptomatology predicted active and passive coping in the early stages of recovery after a traffic-related whiplash injury. That is, those with better initial post-crash mental health and/or

less depressive symptomatology were less likely to use passive coping strategies and more likely to use active coping strategies. This suggests the importance of attention to psychological health in identifying how persons with pain are likely to cope.

In contrast, physical health does not seem to be an important predictor of coping style. Studies two and three found that physical health did not predict either passive or active coping strategies. Only study one indicated that good physical health had a small association with coping (i.e., less use of passive coping, although no association with active coping).

Interestingly, in both study one and two (WADs) initial neck pain intensity was important in coping passively and not actively, whereas in study three, initial neck pain was not associated with later coping. It should be noted that in study three, only those with no or mild pain at baseline (and thus at risk for moderate to severe pain requiring coping) were included, so there was little variability in that factor, thus an association was unlikely.

Finally, study three showed that older individuals were slightly more likely to use passive coping strategies than younger individuals, whereas in study two, there was an association between older age and less reliance on passive coping. Study one showed no association between age and passive coping. This leaves the question of whether age is associated with coping, although even where an effect was found, it was small, suggesting that age is not an important factor.

Table 5.1 Comparison of Predictors of High Active Coping across Three Studies

Factor	Study 1	Study 2	Study 3
Age	Older age	Not sig.	Not sig.
Gender	Female	Female	Not sig.
Marital status	Married vs. single	Separated/divorced vs. single	Not sig.
Education	Higher education	Higher education	Not sig.
Income	Not sig.	Not sig.	Not sig.
General health (GH)	N/A	Better GH	N/A
Physical health (PCS)	Not sig.	N/A	Not sig.
Mental health (MCS)	Better MCS	N/A	Better MCS
Depression (CESD)	Not sig.	Lower CESD	Not sig.
Expectation for recovery	N/A	Better expectations	N/A
Prior neck pain/MSK disorder	Yes	Yes	N/A
Initial neck pain intensity	Not sig.	Not sig.	Not sig.(neck/back)
Initial head pain intensity	Not sig.	Not sig.	N/A
Primary health care provider	Not sig.	Not sig.	N/A
Retained lawyer	Not sig.	N/A	N/A

Table 5.2 Comparison of Predictors of High Passive Coping across Three Studies

Factor	Study 1	Study 2	Study 3
Age	Not sig.	Younger age	Older age
Gender	Not sig.	Not sig.	Not sig.
Marital status	Not sig.	Not sig.	Not sig.
Education	Lower education	Lower education	Not sig.
Income	Not sig.	Not sig.	Lower income
General health (GH)	N/A	Not sig.	N/A
Physical health (PCS)	Lower PCS	N/A	Not sig.
Mental health (MCS)	Lower MCS	N/A	Lower MCS
Depression (CESD)	Higher CESD	Higher CESD	Not sig.
Expectation for recovery	N/A	Poorer expectation	N/A
Prior neck pain/MSK disorder	Not sig.	Not sig.	N/A
Initial neck pain intensity	Higher neck pain	Higher neck pain	Not sig.(neck/back)
Initial head pain intensity	Higher head pain	Higher head pain	N/A
Primary health care provider	Not sig.	Having seen a physician only	N/A
Retained lawyer	Yes	N/A	N/A

5.5 Implications for future studies:

Combined, these three studies fit together in beginning to identify the determinants of pain coping strategies. Further exploration and testing is required to examine the influence of predictors of changes in coping over time, such as changes of coping between 6 weeks and 3 months. The current set of studies explored a wide variety of potential predictors of coping style, and is unique in identifying which factors actually predict how individuals in pain cope. This information sets the stage to begin to focus on how to intervene in improving pain coping abilities, by targeting those predictors which are modifiable.

These findings also emphasize the importance of being aware of a broad spectrum of psychological factors, some of which may emerge or be more fully explored in future research. It will be important to assess the clinical importance of these psychological factors, especially depression symptomatology and expectation to recovery.

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Appendix A

AQ 005919 **Claim No.:** _____

ACCIDENT QUESTIONNAIRE

Please print:

Name: Surname: First Name: Second Initial:

_____ _____ ___

Address: Street/Postal Box:

_____

City/Town: Postal Code:

_____ _____

Phone: Home : Work:

_____ _____

AQ

Please answer **all** questions.
check the appropriate space ☑1 or write answers where applicable.

A. Personal information

1. Today's Date: Day ____ Month ____ Year 19____

2. Male ☐1 Female ☐2

3. Date of birth: Day ____ Month ____ Year 19____

4. Height: Feet ____ Inches ____ Weight: Pounds _____

5. Marital status (please check one) .....Married/Common Law ☐1
Separated/Divorced ☐2
Widowed ☐3
Single ☐4

6. Number of dependents: _____ (children and others)

7. Education level: (check highest level).....Grade 8 or less ☐1
Higher than Grade 8, but did not graduate from high school ☐2
High school graduate ☐3
Post-secondary or some university ☐4
University graduate ☐5

8. Combined family income: $0 — $20,000 ☐1 $20,001 — $40,000 ☐2
$40,001 — $60,000 ☐3 Above $60,000 ☐4

9. Employment status: .....Full-time ☐1 Part-time ☐2
(please check one) Homemaker ☐3 Student ☐4
Unemployed ☐5 Retired ☐6

10. Main work activity: .....Heavy labor ☐1 Light labor ☐2
(please check one) Mostly sitting at a desk ☐3 Driving or operating a vehicle ☐4
Mostly standing ☐5 Mostly walking or moving about ☐6

AQ [illegible]

B. Accident information

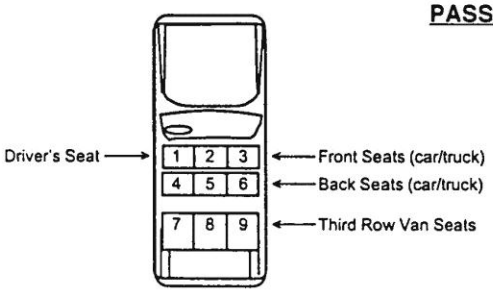
1. Date of accident: Day ____ Month ____ Year 19____

2. When did the accident occur? (please check one)

Night	☐1	Day	☐2
Sunrise	☐3	Sunset	☐4

3. Where were you seated during the accident?
(Refer to the seat number in vehicle diagram)

DRIVER'S SIDE **PASSENGER'S SIDE**



I was sitting in seat number _____ (Choose between 1 and 9)

or, I was a passenger in a bus	☐10
or, I was on a motorcycle	☐11
or, I was on a bicycle	☐12
or, I was a pedestrian	☐13

4. From which direction was the "main" impact to your vehicle? (please check one)
Front ☐1 Rear ☐2 Driver's side ☐3 Passenger's side ☐4

5. Did your vehicle roll over? .... No ☐1 Yes ☐2 Do not know ☐3

6. Was your vehicle drivable after the accident?.... No ☐1 Yes ☐2 Do not know ☐3

7. Type of road:

Provincial highway	☐1	Rural road	☐2	Urban street	☐3
Private property	☐4	Other location	☐5	Do not know	☐6

8. Condition of road surface:..... Dry ☐1 Wet ☐2 Icy ☐3

9. Was your car stopped at the time of the accident? No ☐1
Yes ☐2 Do not know ☐3

10. Was the seat belt fastened?.. No ☐1 Yes, lap ☐2
Yes, lap and shoulder ☐3 Do not know ☐4

11. Was there a head rest?.....No ☐1 Yes, fixed ☐2
Yes, adjustable ☐3 Yes, type unknown ☐4
Do not know ☐5

12. Head position at moment of impact:...Straight forward ☐1 Turned to right ☐2
Turned to left ☐3 Do not know ☐4

13. Have you hired a lawyer to help you with your claim?..... No ☐1 Yes ☐2

14. Did you go to the hospital immediately after the accident?..... No ☐1 Yes ☐2

If **yes**, were you admitted over night? No ☐1 Yes ☐2.... For how many days were you in hospital?____

Are you still in the hospital? No ☐1 Yes ☐2

C. Post-accident symptoms/pains

1. Did you have any type of symptoms/pains after the accident?
No ☐1 (skip to part **E**)
Yes ☐2 (continue **below**)

2. Symptoms/pains in which part(s) of the body? (check all that apply)

	Yes		Yes
Head/Face	☐2	Neck/Shoulder	☐2
Arm(s)	☐2	Back	☐2
Leg(s)	☐2	Other part(s) of the body	☐2

3. Did you visit a doctor?.....No ☐1
Yes, the day of the collision ☐2
Yes, the day after the collision ☐3
Yes, the second day after the collision ☐4
Yes, the third day after the collision ☐5
More than three days after the collision ☐6

4. Did you visit a chiropractor?.....No ☐1
Yes, the day of the collision ☐2
Yes, the day after the collision ☐3
Yes, the second day after the collision ☐4
Yes, the third day after the collision ☐5
More than three days after the collision ☐6

5. Did you visit a physiotherapist? .....No ☐1
Yes, the day of the collision ☐2
Yes, the day after the collision ☐3
Yes, the second day after the collision ☐4
Yes, the third day after the collision ☐5
More than three days after the collision ☐6

AQ 005>19

6. Were you off work due to the accident?..... No ☐1
Yes ☐2..How many days have you been off work so far?____ days
If yes, are you still off work?... No ☐1 Yes ☐2

7. If you are working, are you working reduced hours because of the accident?... No ☐1 Yes ☐2

D. Symptoms

Have you felt the following symptoms since the accident? (please check the appropriate box)

	If not, check "no".		If "yes", when did the symptoms "begin"?				
Symptoms	No	Yes.....	Day of accident	Day after accident	Third day	Fourth day	Later than fourth day
1. Neck/shoulder pain	☐1	☐2	☐1	☐2	☐3	☐4	☐5
2. Reduced/painful neck movement	☐1	☐2	☐1	☐2	☐3	☐4	☐5
3. Headache	☐1	☐2	☐1	☐2	☐3	☐4	☐5
4. Reduced/painful jaw movement	☐1	☐2	☐1	☐2	☐3	☐4	☐5
5. Feeling of numbness, tingling or pain in arms or hands	☐1	☐2	☐1	☐2	☐3	☐4	☐5
6. Feeling of numbness, tingling or pain in legs or feet	☐1	☐2	☐1	☐2	☐3	☐4	☐5
7. Dizziness or unsteadiness	☐1	☐2	☐1	☐2	☐3	☐4	☐5
8. Nausea	☐1	☐2	☐1	☐2	☐3	☐4	☐5
9. Vomiting	☐1	☐2	☐1	☐2	☐3	☐4	☐5
10. Difficulty swallowing	☐1	☐2	☐1	☐2	☐3	☐4	☐5
11. Ringing in the ears	☐1	☐2	☐1	☐2	☐3	☐4	☐5
12. Memory problems	☐1	☐2	☐1	☐2	☐3	☐4	☐5
13. Concentration problems	☐1	☐2	☐1	☐2	☐3	☐4	☐5
14. Vision problems	☐1	☐2	☐1	☐2	☐3	☐4	☐5
15. Lower back pain	☐1	☐2	☐1	☐2	☐3	☐4	☐5

16. Did you lose consciousness?..... No ☐1 Yes ☐2 Uncertain ☐3

17. Did you hit your head?..... No ☐1 Yes ☐2 Uncertain ☐3

18. Did you break any bones?..... No ☐1 Yes ☐2 Uncertain ☐3

19. Describe any other symptoms, pains or injuries:

E. Your general health before the accident

1. How was your health the month before the accident?
   Excellent ☐1 Very good ☐2 Good ☐3 Fair ☐4 Poor ☐5

2. How did you feel before the accident? (please check the appropriate box for each condition)

Condition	Never or almost never	Sometimes, every month	Very often, every week	Every day
1. Headache	☐1	☐2	☐3	☐4
2. Ache/pain in the lower back	☐1	☐2	☐3	☐4
3. Ache/pain in the neck/shoulder	☐1	☐2	☐3	☐4
4. Ache/pain in jaw	☐1	☐2	☐3	☐4
5. Bodily discomfort	☐1	☐2	☐3	☐4
6. Tired and lack of energy	☐1	☐2	☐3	☐4
7. Depressed	☐1	☐2	☐3	☐4
8. Sleeping problems	☐1	☐2	☐3	☐4
9. Anxious or nervous	☐1	☐2	☐3	☐4
10. Memory problems	☐1	☐2	☐3	☐4
11. Concentration problems	☐1	☐2	☐3	☐4
12. Angry	☐1	☐2	☐3	☐4
13. Frustrated	☐1	☐2	☐3	☐4
14. Fearful	☐1	☐2	☐3	☐4

3. Have you been injured in a motor vehicle accident "in the past"?
   No ☐1 (skip to part **F**)
   Yes ☐2 (continue **below**)

4. If you have been injured in a motor vehicle accident "in the past", which parts of your body were injured? (check all that apply)

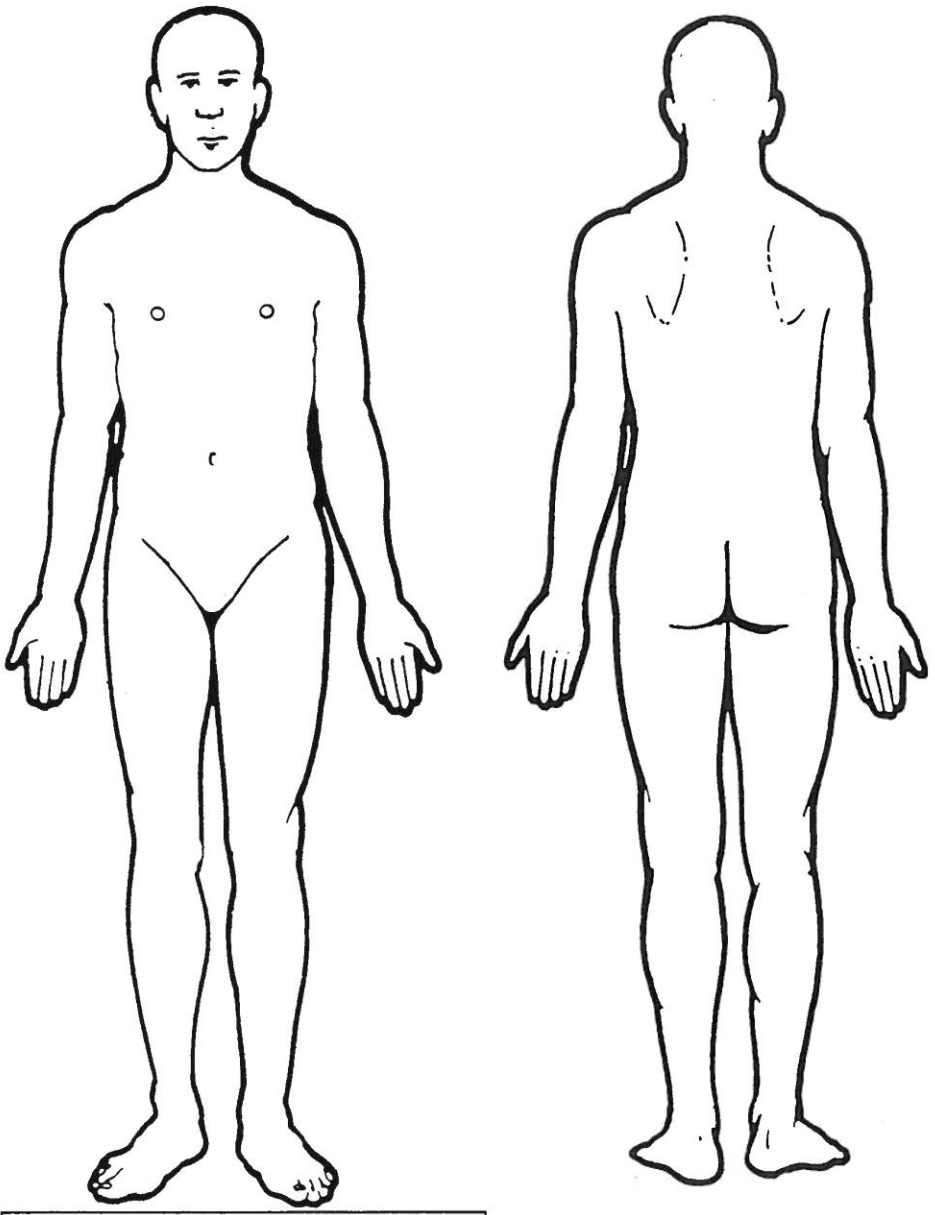
	Yes		Yes
Head/Face	☐2	Neck/Shoulder	☐2
Arm(s)	☐2	Back	☐2
Leg(s)	☐2	Other part(s) of the body	☐2

AQ

F. Pain drawing

1. Do you have pain as a result of this recent accident? No ☐ 1 (skip to part **G**)
Yes ☐ 2 (continue **below**)

Carefully shade in or mark the areas where you feel any pain on the drawings below.



FOR OFFICE USE ONLY:

Number of areas: _____

Percentage of body: _____

Injury code(s): ____, ____, ____, ____, ____,
____, ____, ____, ____, ____, ____, ____, ____.

2. Did the accident cause **neck/shoulder pain**?

No ☐1 (skip to question **5** below);
Yes ☐2 (continue with question **3** below).

3. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **neck/shoulder pain** is **now**.

No Pain ——— Pain as Bad as it Could be

4. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **neck/shoulder pain** is **usually** since the accident.

No Pain ——— Pain as Bad as it Could be

5. Did the accident cause **headaches**? No ☐1 (skip to question **8** below);
Yes ☐2 (continue with question **6** below).

6. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **headache pain** is **now**.

No Pain ——— Pain as Bad as it Could be

7. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **headache pain** is **usually** since the accident.

No Pain ——— Pain as Bad as it Could be

8. Did the accident cause **pain** in areas **other** than your head, neck and shoulder regions?

No ☐1 (skip to part **G**);
Yes ☐2 (continue with question **9** below).

9. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **other pain** is **now**.

No Pain ——— Pain as Bad as it Could be

10. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **other pain** is **usually** since the accident.

No Pain ——— Pain as Bad as it Could be

OFFICE USE

3. ____
4. ____
6. ____
7. ____
9. ____
10. ____

CQ

G. Consent form

The Centre for Neuromusculoskeletal Health at the Royal University Hospital and University of Saskatchewan has established a research unit to study and treat motor vehicle injuries in Saskatchewan. These injuries are a big problem in Saskatchewan because, although some people heal quickly, others suffer considerable pain, disability, family and social disruption, and economic hardship. There are approximately 9,000 personal injuries from motor vehicle accidents each year in Saskatchewan, and yet there has been little research into what factors determine how quickly people recover, what kinds of injuries heal more quickly, or what treatments are the most effective for these injuries. In order to find answers to these questions, the Centre for Neuromusculoskeletal Health has put together a group of experts in this field at the University of Saskatchewan.

The Centre for Neuromusculoskeletal Health has asked SGI to work with us in gathering information. We are also asking for your help in providing information about injuries by filling out some brief questionnaires. These questionnaires will take approximately 1/2 hour of your time, and will ask questions about your accident and injury, how you are coping, and how the injury is affecting your general well-being. If you agree to help us by participating in this study, we will be sending you questionnaires over the next year, so that we can learn from your experience. We will mail to you no more than four sets of questionnaires over the next year, and will provide you with self-addressed, stamped envelopes so that there will be no costs to you.

If you agree to participate in our study, SGI will provide us with a copy of your personal injury claim form. However, SGI will not have access to the results of the questionnaires that you fill out for our study. At the end of the study, all the information will be combined and reported, but you will not be identified in this report, and there will be no way of knowing which information came from which person. All information will be kept secure at the Centre for Neuromusculoskeletal Health at the Royal University Hospital in Saskatoon.

You are under no obligation to participate in our study, and your participation in our study will not affect your claim with SGI. However, we believe that this research will lead to a better understanding of injuries like yours and better treatment for these problems. The more people that agree to participate in this study, the more knowledge we will gain about these problems. We ask for your participation even if you do not have pain or symptoms at this time. Anyone who agrees to be in this study can withdraw at any time; this decision will in no way influence your claim. We will advise you of any new information that will have a bearing on your decision to continue with the study. At the end of the study, we will ask all participants if they want a summary of our results, and we will send this summary to anyone who is interested.

If, during the course of this study, you have questions or concerns about your participation, please feel free to call or write to:

Research Officer,
Centre for Neuromusculoskeletal Health
Royal University Hospital
Saskatoon, Saskatchewan,
S7N 0W8

Phone: 966-8465 in Saskatoon and 1-800-667-8505 outside of Saskatoon.

Researchers
Dr. K. Yong-Hing, Dr. David Cassidy and Dr. Linda Carroll

Please see other side

Consent Form

If you consent to being in this study, please sign your name below and have someone witness your signature. Keep one copy of this consent for your own records.

_____ _____

(Signed) (Date)

_____ _____

(Witness) (Date)

If you agree to participate in this study, please fill out the remaining questionnaires. Then place one copy of this consent form with the completed questionnaires in the self-addressed, stamped envelope provided, seal it, and mail the packet to the Centre for Neuromusculoskeletal Health. If you have any questions about filling out the questionnaires, please call the Centre for Neuromusculoskeletal Health.

CQ 0050 19

G. Consent form

The Centre for Neuromusculoskeletal Health at the Royal University Hospital and University of Saskatchewan has established a research unit to study and treat motor vehicle injuries in Saskatchewan. These injuries are a big problem in Saskatchewan because, although some people heal quickly, others suffer considerable pain, disability, family and social disruption, and economic hardship. There are approximately 9,000 personal injuries from motor vehicle accidents each year in Saskatchewan, and yet there has been little research into what factors determine how quickly people recover, what kinds of injuries heal more quickly, or what treatments are the most effective for these injuries. In order to find answers to these questions, the Centre for Neuromusculoskeletal Health has put together a group of experts in this field at the University of Saskatchewan.

The Centre for Neuromusculoskeletal Health has asked SGI to work with us in gathering information. We are also asking for your help in providing information about injuries by filling out some brief questionnaires. These questionnaires will take approximately 1/2 hour of your time, and will ask questions about your accident and injury, how you are coping, and how the injury is affecting your general well-being. If you agree to help us by participating in this study, we will be sending you questionnaires over the next year, so that we can learn from your experience. We will mail to you no more than four sets of questionnaires over the next year, and will provide you with self-addressed, stamped envelopes so that there will be no costs to you.

If you agree to participate in our study, SGI will provide us with a copy of your personal injury claim form. However, SGI will not have access to the results of the questionnaires that you fill out for our study. At the end of the study, all the information will be combined and reported, but you will not be identified in this report, and there will be no way of knowing which information came from which person. All information will be kept secure at the Centre for Neuromusculoskeletal Health at the Royal University Hospital in Saskatoon.

You are under no obligation to participate in our study, and your participation in our study will not affect your claim with SGI. However, we believe that this research will lead to a better understanding of injuries like yours and better treatment for these problems. The more people that agree to participate in this study, the more knowledge we will gain about these problems. We ask for your participation even if you do not have pain or symptoms at this time. Anyone who agrees to be in this study can withdraw at any time; this decision will in no way influence your claim. We will advise you of any new information that will have a bearing on your decision to continue with the study. At the end of the study, we will ask all participants if they want a summary of our results, and we will send this summary to anyone who is interested.

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Research Officer,
Centre for Neuromusculoskeletal Health
Royal University Hospital
Saskatoon, Saskatchewan,
S7N 0W8

Phone: 966-8465 in Saskatoon and 1-800-667-8505 outside of Saskatoon.

Researchers
Dr. K. Yong-Hing, Dr. David Cassidy and Dr. Linda Carroll

Please see other side

CQ

Section H

Today's date: Day _____ Month _____ Year _____

Using the scale below, indicate the number which best describes how often you felt or behaved this way **DURING THE PAST WEEK.**

0 = Rarely or none of the time (less than 1 day)

1 = Some or a little of the time (1-2 days)

2 = Occasionally or a moderate amount of time (3-4 days)

3 = Most or all of the time (5-7 days)

During the past week:

____ 1. I was bothered by things that usually don't bother me.
____ 2. I did not feel like eating; my appetite was poor.
____ 3. I felt that I could not shake off the blues even with help from my family or friends.
____ 4. I felt that I was just as good as other people.
____ 5. I had trouble keeping my mind on what I was doing.
____ 6. I felt depressed.
____ 7. I felt that everything I did was an effort.
____ 8. I felt hopeful about the future.
____ 9. I thought my life had been a failure.
____ 10. I felt fearful.
____ 11. My sleep was restless.
____ 12. I was happy.
____ 13. I talked less than usual.
____ 14. I felt lonely.
____ 15. People were unfriendly.
____ 16. I enjoyed life.
____ 17. I had crying spells.
____ 18. I felt sad.
____ 19. I felt that people disliked me.
____ 20. I could not get "going".

I. Smoking Information

Do you smoke cigarettes? .....No ☐1 Yes ☐2

How many years have you smoked cigarettes? _____ years.

How many cigarettes do you smoke per day? _____ cigarettes.
(Please give best estimate; one pack = 25 cigarettes)

CQ .CE: 19

Section J

SF-36 HEALTH STATUS SURVEY/CANADA

INSTRUCTIONS: This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

Answer every question by marking the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:

(circle one)

Excellent	1
Very good	2
Good	3
Fair	4
Poor	5

2. Compared to one year ago, how would you rate your health in general now?

(circle one)

Much better now than one year ago	1
Somewhat better now than one year ago	2
About the same as one year ago	3
Somewhat worse now than one year ago	4
Much worse now than one year ago	5

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

(circle one number on each line)

ACTIVITIES	Yes, Limited A Lot	Yes, Limited A Little	No, Not Limited At All
a. **Vigorous activities,** such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b. **Moderate activities,** such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
c. Lifting or carrying groceries	1	2	3
d. Climbing **several** flights of stairs	1	2	3
e. Climbing **one** flight of stairs	1	2	3
f. Bending, kneeling, or stooping	1	2	3
g. Walking **more than a kilometre**	1	2	3
h. Walking **several blocks**	1	2	3
i. Walking **one block**	1	2	3
j. Bathing or dressing yourself	1	2	3

4. During the past 4 weeks have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

(circle one number on each line)

	YES	NO
a. Cut down the **amount of time** you spent on work or other activities.	1	2
b. **Accomplished less** than you would like	1	2
c. Were limited in the **kind** of work or other activities	1	2
d. Had **difficulty** performing the work or other activities (for example, it took extra effort)	1	2

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

(circle one number on each line)

	YES	NO
a. Cut down the **amount of time** you spent on work or other activities	1	2
b. **Accomplished less** than you would like	1	2
c. Didn't do work or other activities as **carefully** as usual	1	2

CQ [illegible]19

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

(circle one)

Not at all 1

Slightly 2

Moderately 3

Quite a bit 4

Extremely 5

7. How much bodily pain have you had during the past 4 weeks?

(circle one)

None 1

Very mild 2

Mild 3

Moderate 4

Severe 5

Very severe 6

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

(circle one)

Not at all 1

A little bit 2

Moderately 3

Quite a bit 4

Extremely 5

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks

(circle one number on each line)

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
a. Did you feel full of pep?	1	2	3	4	5	6
b. Have you been a very nervous person?	1	2	3	4	5	6
c. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
d. Have you felt calm and peaceful?	1	2	3	4	5	6
e. Did you have a lot of energy?	1	2	3	4	5	6
f. Have you felt downhearted and blue?	1	2	3	4	5	6
g. Did you feel worn out?	1	2	3	4	5	6
h. Have you been a happy person?	1	2	3	4	5	6
i. Did you feel tired?	1	2	3	4	5	6

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

(circle one)

All of the time 1

Most of the time 2

Some of the time 3

A little of the time 4

None of the time 5

11. How **TRUE** or **FALSE** is **each** of the following statements for you?

(circle one number on each line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
a. I seem to get sick a little easier than other people	1	2	3	4	5
b. I am as healthy as anybody I know	1	2	3	4	5
c. I expect my health to get worse	1	2	3	4	5
d. My health is excellent	1	2	3	4	5

15

FQ

CENTRE FOR NEUROMUSCULOSKELETAL HEALTH

Royal University Hospital, University of Saskatchewan,
Saskatoon, Saskatchewan
S7N 0W8

Thank you again for agreeing to participate in our study on how you are coping with your recent injury and how the injury is affecting your general well-being. This information will help us to design better treatment programs for people like you.

Please fill out the enclosed questionnaires, even if you do not have pain or symptoms at this time. We are interested in problems that you may have developed since the last questionnaire. Please return the completed questionnaires in the self-addressed, stamped envelope that we have provided for you.

We would like to remind you that this information is confidential and will not be released to SGI or anyone else. You may withdraw from the study at any time without any influence on your claim with SGI.

We need as many people as possible participating in this study, in order to ensure that the results are accurate and useful in understanding the problems that people develop after motor vehicle accidents.

If you have any questions or concerns about your participation in this study, please feel free to call or write:

Research Officer
Centre for Neuromusculoskeletal Health
Royal University Hospital
Saskatoon, Saskatchewan
S7N 0W8
Phone: 966-8465 in Saskatoon and 1-800-667-8505 outside of Saskatoon.

Dr. Ken Yong-Hing
Medical Director

Dr. David Cassidy
Research Director

Dr. Linda Carroll
Registered Psychologist

FQ

FOLLOW-UP QUESTIONNAIRE

A. Symptoms caused by the accident

What is today's date? Day _____ Month _____ Year 19____

Have you felt the following symptoms **in the past two weeks**? (please check the appropriate box).

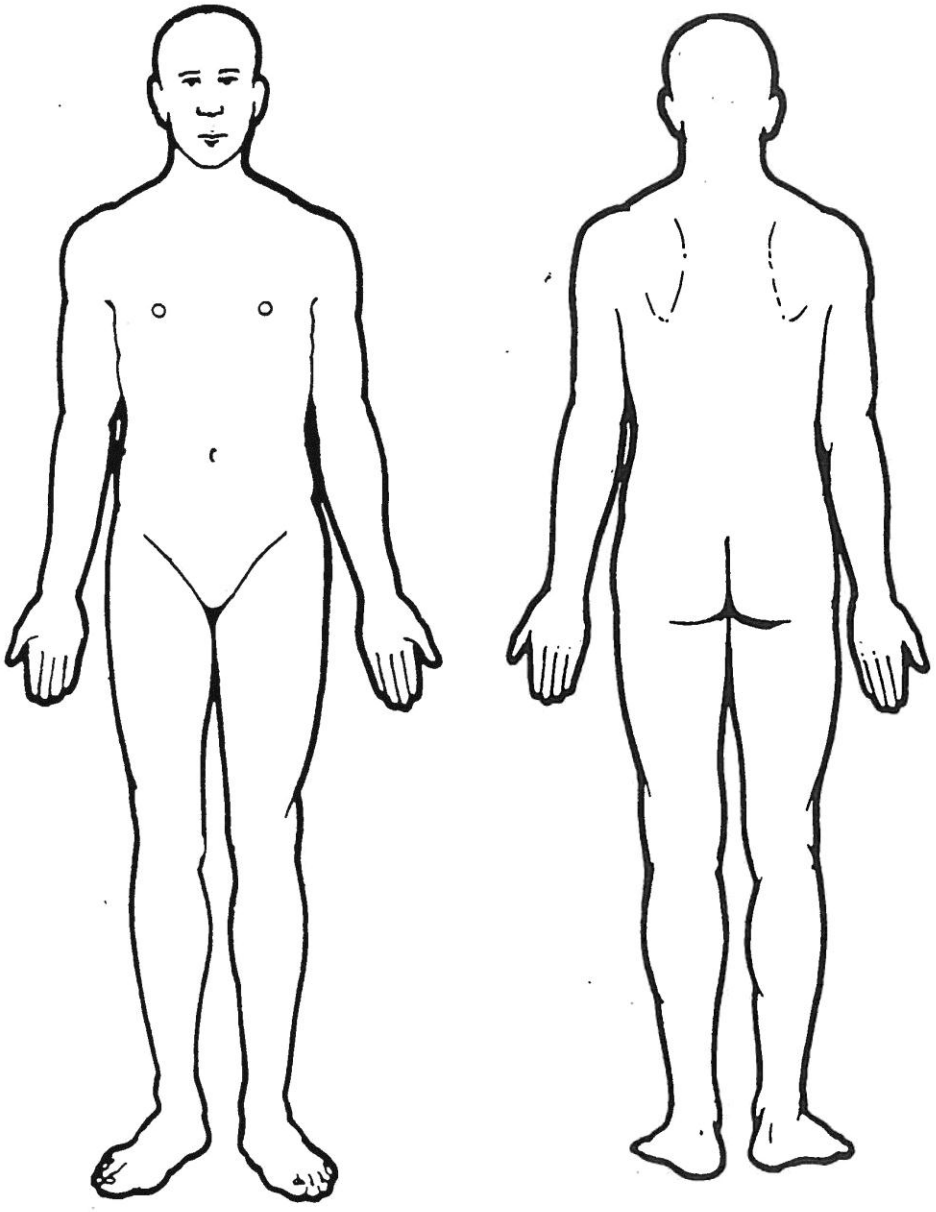
Symptoms	If not, check "**No**".	If "**Yes**", are these symptoms the result of the accident?		
	No	Yes	No	Yes	Do not know
1. Neck/shoulder pain	☐1	☐2	☐1	☐2	☐3
2. Reduced/painful neck movement	☐1	☐2	☐1	☐2	☐3
3. Headache	☐1	☐2	☐1	☐2	☐3
4. Reduced/painful jaw movement	☐1	☐2	☐1	☐2	☐3
5. Feeling of numbness, tingling or pain in arms or hands	☐1	☐2	☐1	☐2	☐3
6. Feeling of numbness, tingling or pain in legs or feet	☐1	☐2	☐1	☐2	☐3
7. Dizziness or unsteadiness	☐1	☐2	☐1	☐2	☐3
8. Ringing in the ears	☐1	☐2	☐1	☐2	☐3
9. Memory problems	☐1	☐2	☐1	☐2	☐3
10. Concentration problems	☐1	☐2	☐1	☐2	☐3
11. Vision problems	☐1	☐2	☐1	☐2	☐3
12. Lower back pain	☐1	☐2	☐1	☐2	☐3

FQ

B. Pain drawing and information

1. Do you have pain as a result of the accident?..... No ☐1 (skip to question **16**)
   Yes ☐2 (continue **below**)

Carefully shade in or mark the areas where you feel **any pain** on the drawings below.



FOR OFFICE USE ONLY:

Number of areas: _____

Percentage of body: _____

Injury code(s): ____, ____, ____, ____, ____,
____, ____, ____, ____, ____, ____, ____, ____.

FQ

2. Did the accident cause **neck/shoulder pain**?

No ☐1 (skip to question **5** below);
Yes ☐2 (continue with question **3** below).

OFFICE USE

3. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **neck/shoulder pain** is **now**.

No Pain ——— Pain as Bad as it Could be

3. _____

4. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **neck/shoulder pain** is **usually** (over the last two weeks).

No Pain ——— Pain as Bad as it Could be

4. _____

5. Did the accident cause **headaches**? No ☐1 (skip to question **8** below);
Yes ☐2 (continue with question **6** below).

6. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **headache pain** is **now**.

No Pain ——— Pain as Bad as it Could be

6. _____

7. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **headache pain** is **usually** (over the last two weeks).

No Pain ——— Pain as Bad as it Could be

7. _____

8. Did the accident cause pain in areas **other** than your head, neck and shoulder regions?

No ☐1 (skip to question **11**);
Yes ☐2 (continue with question **9** below).

9. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **other pain** is **now**.

No Pain ——— Pain as Bad as it Could be

9. _____

10. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **other pain** is **usually** (over the last two weeks).

No Pain ——— Pain as Bad as it Could be

10. _____

FQ

11. On the line below, mark one point between "None" and "The Most Severe Imaginable" to indicate how **anxious** you feel about your **pain**.

None ——————————— The Most Severe Imaginable

12. On the line below, mark one point between "None" and "The Most Severe Imaginable" to indicate how **angry** you feel about your **pain**.

None ——————————— The Most Severe Imaginable

13. On the line below, mark one point between "None" and "The Most Severe Imaginable" to indicate how much **fear** you feel about your **pain**.

None ——————————— The Most Severe Imaginable

14. On the line below, mark one point between "None" and "The Most Severe Imaginable" to indicate how **frustrated** you feel about your **pain**.

None ——————————— The Most Severe Imaginable

15. On the line below, mark one point between "None" and "The Most Severe Imaginable" to indicate how much **depression** you feel about your **pain**.

None ——————————— The Most Severe Imaginable

OFFICE USE

11. ____

12. ____

13. ____

14. ____

15. ____

16. Were you off work due to the accident?..... No ☐1
Yes ☐2

How many days have you been offwork so far? _____days

If yes, are you still off work?.... No ☐1 Yes ☐2

17. If you are working, are you working reduced hours because of the accident?....
No ☐1 Yes ☐2

18. Have you hired a lawyer to help you with your claim?..... No ☐1 Yes ☐2

19. Are you taking medications to ease the pain?..... No ☐1 Yes ☐2

20. Have you taken beer, wine or liquor to ease the pain?..... No ☐1 Yes ☐2

FQ

Section C

Using the scale below, indicate the number which best describes how often you felt or behaved this way **DURING THE PAST WEEK.**

0 = Rarely or none of the time (less than 1 day)

1 = Some or a little of the time (1-2 days)

2 = Occasionally or a moderate amount of time (3-4 days)

3 = Most or all of the time (5-7 days)

During the past week:

____ 1. I was bothered by things that usually don't bother me.
____ 2. I did not feel like eating; my appetite was poor.
____ 3. I felt that I could not shake off the blues even with help from my family or friends.
____ 4. I felt that I was just as good as other people.
____ 5. I had trouble keeping my mind on what I was doing.
____ 6. I felt depressed.
____ 7. I felt that everything I did was an effort.
____ 8. I felt hopeful about the future.
____ 9. I thought my life had been a failure.
____ 10. I felt fearful.
____ 11. My sleep was restless.
____ 12. I was happy.
____ 13. I talked less than usual.
____ 14. I felt lonely.
____ 15. People were unfriendly.
____ 16. I enjoyed life.
____ 17. I had crying spells.
____ 18. I felt sad.
____ 19. I felt that people disliked me.
____ 20. I could not get "going".

D. Smoking information

Do you smoke cigarettes? .....No ☐1 Yes ☐2

How many cigarettes do you smoke per day? _____ cigarettes.
(Please give best estimate; one pack = 25 cigarettes)

FQ

Section E

SF-36 HEALTH STATUS SURVEY/CANADA

INSTRUCTIONS: This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

Answer every question by marking the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:

(circle one)

Excellent	1
Very good	2
Good	3
Fair	4
Poor	5

2. Compared to one year ago, how would you rate your health in general now?

(circle one)

Much better now than one year ago	1
Somewhat better now than one year ago	2
About the same as one year ago	3
Somewhat worse now than one year ago	4
Much worse now than one year ago	5

FQ

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

(circle one number on each line)

ACTIVITIES	Yes, Limited A Lot	Yes, Limited A Little	No, Not Limited At All
a. **Vigorous activities,** such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b. **Moderate activities,** such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
c. Lifting or carrying groceries	1	2	3
d. Climbing **several** flights of stairs	1	2	3
e. Climbing **one** flight of stairs	1	2	3
f. Bending, kneeling, or stooping	1	2	3
g. Walking **more than a kilometre**	1	2	3
h. Walking **several blocks**	1	2	3
i. Walking **one block**	1	2	3
j. Bathing or dressing yourself	1	2	3

4. During the past 4 weeks have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

(circle one number on each line)

	YES	NO
a. Cut down the **amount of time** you spent on work or other activities.	1	2
b. **Accomplished less** than you would like	1	2
c. Were limited in the **kind** of work or other activities	1	2
d. Had **difficulty** performing the work or other activities (for example, it took extra effort)	1	2

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

(circle one number on each line)

	YES	NO
a. Cut down the **amount of time** you spent on work or other activities.	1	2
b. **Accomplished less** than you would like	1	2
c. Didn't do work or other activities as **carefully** as usual	1	2

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

(circle one)

Not at all 1
Slightly 2
Moderately 3
Quite a bit 4
Extremely 5

7. How much bodily pain have you had during the past 4 weeks?

(circle one)

None 1
Very mild 2
Mild 3
Moderate 4
Severe 5
Very severe 6

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

(circle one)

Not at all 1
A little bit 2
Moderately 3
Quite a bit 4
Extremely 5

FQ

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks

(circle one number on each line)

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
a. Did you feel full of pep?	1	2	3	4	5	6
b. Have you been a very nervous person?	1	2	3	4	5	6
c. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
d. Have you felt calm and peaceful?	1	2	3	4	5	6
e. Did you have a lot of energy?	1	2	3	4	5	6
f. Have you felt downhearted and blue?	1	2	3	4	5	6
g. Did you feel worn out?	1	2	3	4	5	6
h. Have you been a happy person?	1	2	3	4	5	6
i. Did you feel tired?	1	2	3	4	5	6

FQ

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

(circle one)

All of the time 1

Most of the time 2

Some of the time..... 3

A little of the time 4

None of the time 5

11. How **TRUE** or **FALSE** is **each** of the following statements for you?

(circle one number on each line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
a. I seem to get sick a little easier than other people	1	2	3	4	5
b. I am as healthy as anybody I know	1	2	3	4	5
c. I expect my health to get worse	1	2	3	4	5
d. My health is excellent	1	2	3	4	5

If you have pain as a result of the accident, please continue to answer the following sections (**F** & **G**). If you do not have pain, return this packet (including the unanswered sections) to us in the self-addressed stamped envelope.

Thank you for your participation.

FQ

Section F

The rating scales below are designed to measure the degree to which several aspects of your life are presently disrupted by chronic pain. In other words, we would like to know how much your pain is preventing you from doing what you would normally do, or from doing it as well as you normally would. Respond to each category by indicating the *overall* impact of pain in your life, not just when the pain is at its worst.

For each of the seven categories of life activity listed, **please circle the number on the scale** which describes the level of disability you typically experience. A score of 0 means no disability at all, and a score of 10 signifies that all of the activities in which you would normally be involved have been totally disrupted or prevented by your pain.

1. ***Family/Home Responsibilities***. This category refers to activities related to the home or family. It includes chores and duties performed around the house (eg, yard work) and errands or favors for other family members (eg, driving the children to school).

0	1	2	3	4	5	6	7	8	9	10
no disability										total disability

2. ***Recreation***. This category includes hobbies, sports, and other similar leisure time activities.

0	1	2	3	4	5	6	7	8	9	10
no disability										total disability

3. ***Social Activity***. This category refers to activities which involve participation with friends and acquaintances other than family members. It includes parties, theater, concerts, dining out, and other social functions.

0	1	2	3	4	5	6	7	8	9	10
no disability										total disability

4. ***Occupation***. This category refers to activities that are a part of or directly related to one's job. This includes nonpaying jobs as well, such as that of a housewife or volunteer worker.

0	1	2	3	4	5	6	7	8	9	10
no disability										total disability

5. ***Sexual Behavior***. This category refers to the frequency and quality of one's sex life.

0	1	2	3	4	5	6	7	8	9	10
no disability										total disability

6. ***Self Care***. This category includes activities which involve personal maintenance and independent daily living (eg, taking a shower, driving, getting dressed, etc).

0	1	2	3	4	5	6	7	8	9	10
no disability										total disability

7. ***Life-Support Activity***. This category refers to basic life-supporting behaviors such as eating, sleeping, and breathing.

0	1	2	3	4	5	6	7	8	9	10
no disability										total disability

FQ

Section G

We would like to know how frequently you have the following thoughts or engage in the following behaviors only when your pain is at a **MODERATE level of intensity or greater**. Please indicate how frequently you do the following when experiencing pain by checking the appropriate box next to each statement.

Check ☐1 Never do when in pain.

Check ☐2 Rarely do when in pain.

Check ☐3 Occasionally do when in pain.

Check ☐4 Frequently do when in pain.

Check ☐5 Very frequently do when in pain.

1. Engaging in physical exercise or physical therapy ...	☐1	☐2	☐3	☐4	☐5
2. Saying to yourself, "I wish my doctor would prescribe better pain medication for me."	☐1	☐2	☐3	☐4	☐5
3. Ignoring the pain (not even recognizing that it is there)	☐1	☐2	☐3	☐4	☐5
4. Staying busy or active	☐1	☐2	☐3	☐4	☐5
5. Clearing your mind of bothersome thoughts or worries	☐1	☐2	☐3	☐4	☐5
6. Thinking, "This pain is wearing me down."	☐1	☐2	☐3	☐4	☐5
7. Talking to others about how much your pain hurts ...	☐1	☐2	☐3	☐4	☐5
8. Reading	☐1	☐2	☐3	☐4	☐5
9. Praying for relief	☐1	☐2	☐3	☐4	☐5
10. Restricting or canceling your social activities	☐1	☐2	☐3	☐4	☐5
11. Depending on others for help with daily tasks	☐1	☐2	☐3	☐4	☐5
12. Participating in leisure activities (such as hobbies, sewing, stamp collecting, etc.)	☐1	☐2	☐3	☐4	☐5
13. Thinking, "I can't do anything to lessen this pain." ...	☐1	☐2	☐3	☐4	☐5
14. Distracting your attention from the pain (recognizing you have pain, but putting your mind on something else)	☐1	☐2	☐3	☐4	☐5
15. Taking medication for purposes of immediate pain relief	☐1	☐2	☐3	☐4	☐5

FQ

We would like to know how frequently you have the following thoughts or engage in the following behaviors only when your pain is at a **MODERATE level of intensity or greater**. Please indicate how frequently you do the following when experiencing pain by checking the appropriate box next to each statement.

Check ☐1 Never do when in pain.

Check ☐2 Rarely do when in pain.

Check ☐3 Occasionally do when in pain.

Check ☐4 Frequently do when in pain.

Check ☐5 Very frequently do when in pain.

16. Calling or seeing the doctor or nurse for help or advice	☐1	☐2	☐3	☐4	☐5
17. Focusing on where the pain is and how much it hurts	☐1	☐2	☐3	☐4	☐5
18. Keeping angry, depressed, or frustrated feelings inside	☐1	☐2	☐3	☐4	☐5

THANK YOU FOR YOUR PARTICIPATION

Appendix B

SGI

PERSONAL INJURY PROTECTION PLAN

APPLICATION FOR BENEFITS

LAST NAME: _____ **FIRST NAME:** _____ **MIDDLE INITIAL:** _____

CLAIM NUMBER: _____

ADJUSTER: _____

TODAY'S DATE: _____ (day) _____ (month) _____ (year)

ACCIDENT DATE: _____ (day) _____ (month) _____ (year)

DATE OF BIRTH: _____ (day) _____ (month) _____ (year)

PLEASE PRINT ALL ANSWERS

SECTION A: PERSONAL INFORMATION

1. Current Address: (please include street address, town or city, postal code)

_____
(Street Address)

_____
(Town or City) (Postal Code)

Mailing Address (if different from above):

_____

_____

2. Phone Number: _____ (home) _____ (work)
3. Social Insurance Number: _____
4. Driver License Number: _____
5. Are you a Saskatchewan Resident? ☐ .. No (Skip to question #8)
   ☐ .. Yes (Continue below)
6. Saskatchewan Health Number: _____
7. Have you lived outside Saskatchewan during the twelve months prior to the accident?

   ☐ .. No (Skip to question #8)
   ☐ .. Yes , from _____ (day / month / year) to _____ (day / month / year)

   I lived outside of Saskatchewan for the following reason:

   ☐ .. Student ☐ .. Work assignment ☐ .. New residence

   ☐ .. Extended holiday ☐ .. Other reason _____

   During this time, did you maintain a permanent home in Saskatchewan?

   ☐ .. No ☐ .. Yes

8. If you were the driver of the vehicle → Do you or any of your immediate family members (living in the same residence) currently hold an automobile insurance policy with SGI CANADA or any other private insurance company in addition to your plate insurance?

☐ .. No ☐ .. Yes → Policy Number _____

Name of Company _____

If you were a passenger in the vehicle → Was there insurance for the vehicle you were in in addition to the plate insurance?

☐ .. No ☐ .. Yes → Policy Number _____

Name of Company _____

9. Sex: ☐ .. Male ☐ .. Female

10. Height: _____ ft _____ in Weight: _____ lbs

11. Marital Status:

☐ .. Single ☐ .. Widowed

☐ .. Married/Common Law ☐ .. Separated/Divorced

12. Number of Dependents: _____ (Skip to question #13 if you have no dependents)

☐ .. I am able to care for my dependents (Skip to question #13)

☐ .. Due to the accident, I am no longer able to care for my dependents (continue below)

Number of dependents under 16 years of age you are unable to care for due to the accident: _____

Name _____ (last name/first name/initial) Age _____ Birthdate _____ (day / month / year)

Name _____ Age _____ Birthdate _____

Name _____ Age _____ Birthdate _____

Name _____ Age _____ Birthdate _____

Name _____ Age _____ Birthdate _____

Number of dependents over 16 years of age you are unable to care for due to the accident: _____

Name _____ Age _____ Birthdate _____
(last name/first name/initial) (day / month / year)

Name _____ Age _____ Birthdate _____

Name _____ Age _____ Birthdate _____

Name _____ Age _____ Birthdate _____

Name _____ Age _____ Birthdate _____

Please explain why you are unable to care for the above people, and what arrangements you have made to have someone else care for them:

_____

_____

_____

13. Please check your highest level of education:

- ☐ .. Grade 8 or less
- ☐ .. Higher than grade 8, but did not graduate from high school
- ☐ .. High school graduate
- ☐ .. Post secondary or some university
- ☐ .. Technical school graduate
- ☐ .. University graduate

14. What is your combined total family unit/household income per year?

- ☐ .. $0 - $20,000
- ☐ .. $20,001 - $40,000
- ☐ .. $40,001 - $60,000
- ☐ .. Above $60,000

SECTION B: ACCIDENT CIRCUMSTANCES

1. Time of accident: _____ ☐ .. am ☐ .. pm

2. Location of the accident: _____

3. I was:

   ☐ .. the driver ☐ .. a front seat passenger ☐ .. a back seat passenger

   ☐ .. a cyclist ☐ .. a pedestrian ☐ .. other (please specify) _____

4. If you were in a vehicle when you were injured, from which direction was the "main" impact to the vehicle you were in? (please check one)

   ☐ .. front ☐ .. rear ☐ .. driver side ☐ .. passenger side ☐ .. not applicable

   ☐ .. other (please specify) _____

5. Has the accident been reported to the police?

   ☐ .. No → If no, please report

   ☐ .. Yes → Police Officer Name _____

   Police Force Name _____

   Were charges laid? ☐ .. No

   ☐ .. Yes (please specify) _____

If you were a pedestrian or cyclist, skip to #11

6. Identity of the driver of the vehicle you were in:

   Last name _____ First name _____

   Address _____

7. Identity of the owner of the vehicle you were in:

   Last name _____ First name _____

   Address _____

8. Description of the vehicle you were in:

   Licence Plate Number: _____ Make/Model _____

   Year _____ Prov/State _____

9. Identity of the other vehicle's driver:

Last name _____ First name _____

Address _____

10. Description of the other vehicle in the accident:

Licence Plate Number:_____ Make/Model _____

Year _____ Prov/State _____

Owner's Name _____

11. Give a brief description of the facts surrounding the accident:

_____

_____

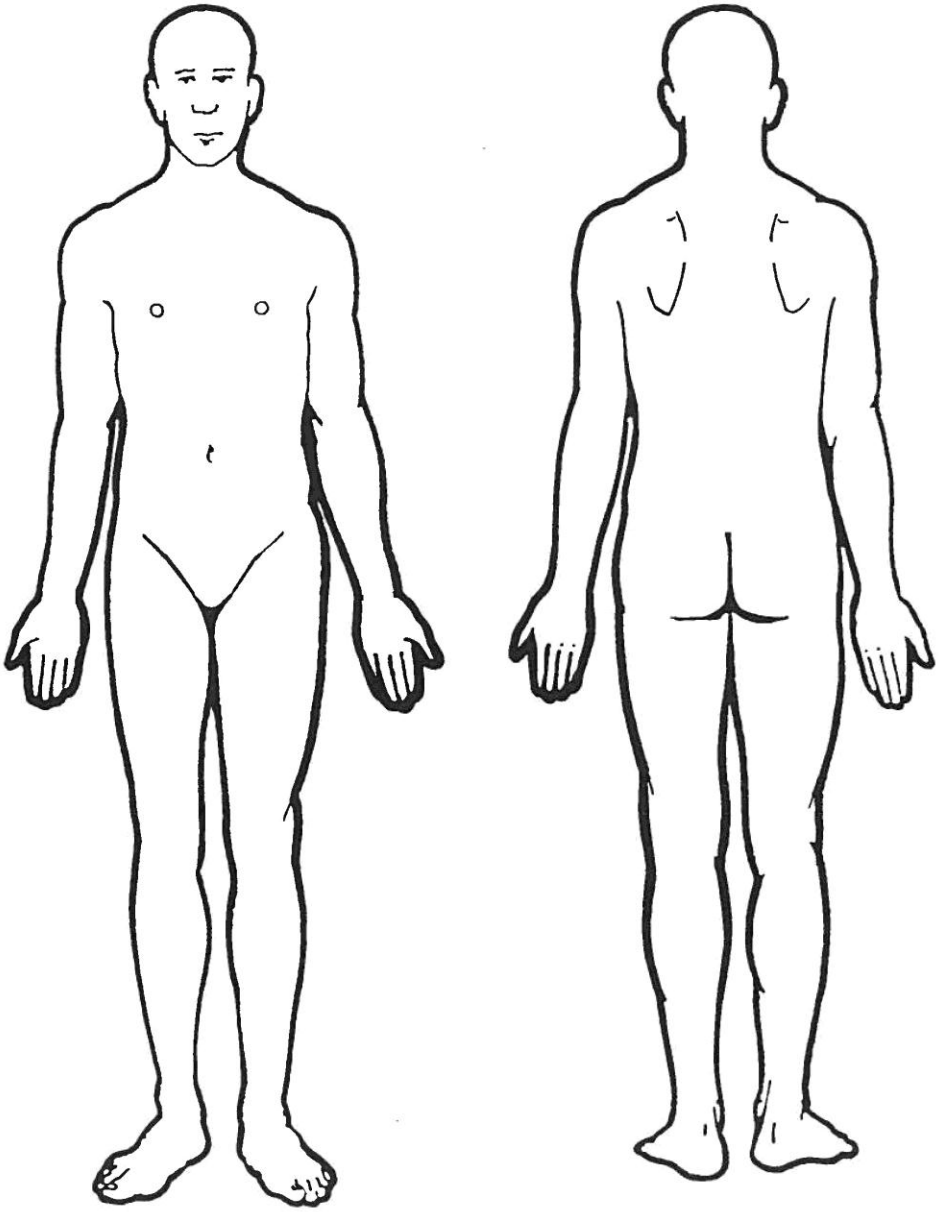
_____

_____

CTION C: ABOUT YOUR INJURIES

1. Do you have pain as a result of this accident? ☐ .. No (Skip to question #7)
   ☐ .. Yes (Continue below)

2. Carefully shade in or mark the areas where you feel any pain on the drawings below.



3. Did the accident cause **neck or shoulder** pain?

☐ .. No (skip to #4)
☐ .. Yes (continue below)

Please rate your average **neck or shoulder** pain on a scale of 0 to 10 where 0 means no pain at all and 10 means pain as bad as it could be.

No Pain										Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

4. Did the accident cause **low back** pain?

☐ .. No (skip to #5)
☐ .. Yes (continue below)

Please rate your average **low back** pain on a scale of 0 to 10 where 0 means no pain at all and 10 means pain as bad as it could be.

No Pain										Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

5. Did the accident cause **headache** pain?

☐ .. No (skip to #6)
☐ .. Yes (continue below)

Please rate your average **headache** pain on a scale of 0 to 10 where 0 means no pain at all and 10 means pain as bad as it could be.

No Pain										Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

6. Did the accident cause pain in **other parts of your body**?

☐ .. No (skip to #7)
☐ .. Yes (continue below)

Pain in **Arm(s)**? ☐ .. No (skip to next question)
☐ .. Yes (please rate pain below)

No Pain										Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

Pain in **Hand(s)**? ☐ .. No (skip to next question)
☐ .. Yes (please rate pain below)

No Pain									Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

Pain in **Face**? ☐ .. No (skip to next question)
☐ .. Yes (please rate pain below)

No Pain									Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

Pain in **Leg(s)**? ☐ .. No (skip to next question)
☐ .. Yes (please rate pain below)

No Pain									Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

Pain in **Foot/feet**? ☐ .. No (skip to next question)
☐ .. Yes (please rate pain below)

No Pain									Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

Pain in **Mid Back**? ☐ .. No (skip to next question)
☐ .. Yes (please rate pain below)

No Pain									Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

Pain in **Abdomen, Chest, Groin**? ☐ .. No (skip to next question)
☐ .. Yes (please rate pain below)

No Pain									Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

7. Did you go to a hospital or emergency clinic immediately after the accident?
☐ .. No (skip to question #8)
☐ .. Yes → Name of Hospital _____
Did you go by ambulance? ☐ .. No ☐ .. Yes
Admitted overnight? ☐ .. No
☐ .. Yes → How many days were you in hospital? _____

8. Since the accident, have you seen health care practitioners?

☐ .. No (Skip to question #9)

☐ .. Yes → ☐ .. Physician → # of visits: _____; Name _____

☐ .. Chiropractor → # of visits: _____; Name _____

☐ .. Physiotherapist → # of visits: _____; Name _____

☐ .. Massage therapist → # of visits: _____; Name _____

☐ .. Other → type: _____ # of visits: _____; Name _____

9. Did the accident cause any of the following symptoms? (check any that apply)

☐ .. Feeling of numbness, tingling or pain in arms or hands
☐ .. Feeling of numbness, tingling or pain in legs or feet
☐ .. Dizziness or unsteadiness
☐ .. Memory problems or forgetfulness
☐ .. Concentration or attention problems
☐ .. Irritability
☐ .. Vision problems
☐ .. Hearing problems
☐ .. Sleep problems
☐ .. Unusual fatigue or tiredness
☐ .. Anxiety or worry
☐ .. Pain when neck is moved
☐ .. Reduced ability to move neck
☐ .. Sore jaw

10. Did you break any bones? ☐ .. No ☐ .. Yes ☐ .. Uncertain

11. Did you hit your head? ☐ .. No ☐ .. Yes ☐ .. Uncertain

12. Did you lose consciousness immediately after the accident?

☐ .. No
☐ .. I don't know
☐ .. Yes → for how long? ☐ .. less than 30 minutes
☐ .. more than 30 minutes
☐ .. don't know

13. Immediately after the accident, did you experience:

a) amnesia or loss of memory? ☐ .. No
☐ .. I don't know
☐ .. Yes → for how long? ☐ .. less than 1 hour
☐ .. more than 1 hour
☐ .. don't know

b) disorientation or confusion? ☐ .. No
☐ .. I don't know
☐ .. Yes → for how long? ☐ .. less than 1 hour
☐ .. more than 1 hour
☐ .. don't know

14. Have the injuries resulting from the accident prevented you from carrying out any of the following activities? (check all that apply)

☐ .. Daily home activities (Explain: _____)

☐ .. Employment (Explain: _____)

☐ .. Education (Explain: _____)

☐ .. Other (Explain: _____)

15. Have you had an **SGI** injury claim due to a motor vehicle accident in the past?

☐ .. No

☐ .. Yes → Which part(s) of your body were injured in the accident in the past?

☐ .. Head ☐ .. Neck/shoulder
☐ .. Face ☐ .. Arm(s)
☐ .. Lower back ☐ .. Leg(s)
☐ .. Other part(s) of the body

16. Have you had an injury claim through **any other insurance or disability plan** (such as the Workers Compensation Board) in the past?

☐ .. No

☐ .. Yes → Which part(s) of your body were injured in the accident in the past?

☐ .. Head ☐ .. Neck/shoulder
☐ .. Face ☐ .. Arm(s)
☐ .. Lower back ☐ .. Leg(s)
☐ .. Other part(s) of the body

SECTION D: ABOUT YOUR HEALTH

1. Please check the circle "O" if you **currently** have any of the following health problems. If you do, to what extent have these problems affected your health in the last six months?

Not at all: the problem **does not** affect my health.
Mild: the problem makes my health **a little worse** than it should be.
Moderate: the problem makes my health **worse** that it should be.
Severe: the problem makes my health **much worse** than it should be.

Health Problem	Have it?	Affects your health?
a. **Muscle, bone or joint problems before the accident** (such as rheumatoid arthritis, osteoarthritis, back or neck pain, fibromyalgia, thin bones or osteoporosis, fracture, infection, others)	Yes ○ →	Not at all ○ Mild ○ Moderate ○ Severe ○
	No ○ ↓	
b. **Allergies** (such as hay fever, dermatitis, eczema, allergies to medication, food allergy, others).	Yes ○ →	Not at all ○ Mild ○ Moderate ○ Severe ○
	No ○ ↓	
c. **Breathing problems** (such as asthma, emphysema, bronchitis, fibrosis, lung scarring, TB, pneumonia, infection, common cold, others).	Yes ○ →	Not at all ○ Mild ○ Moderate ○ Severe ○
	No ○ ↓	
d. **High blood pressure** (hypertension)	Yes ○ →	Not at all ○ Mild ○ Moderate ○ Severe ○
	No ○ ↓	
e. **Heart and circulation problems** (such as angina, heart attack, heart failure, heart valve problem, hardening of arteries, varicose veins, claudication, foot or leg ulcers, others)	Yes ○ →	Not at all ○ Mild ○ Moderate ○ Severe ○
	No ○ ↓	

Health Problem	Have it?	Affects your health?
f. **Digestive system problems** (such as ulcer, gastritis, inflammatory or irritable bowel disease, colitis, Crohn's disease, hiatus hernia, gall stones, pancreatitis, others)	Yes ○ → No ○	Not at all ○ Mild ○ Moderate ○ Severe ○
g. **Diabetes**	Yes ○ → No ○	Not at all ○ Mild ○ Moderate ○ Severe ○
h. **Kidney, Genitourinary problems** (such as kidney failure, nephritis, kidney stones, gynecological or prostrate problems, endometriosis, dysmenorrhea or menstrual problems, fibroids, urinary tract infection, prostate problems, bladder control problems, others).	Yes ○ → No ○	Not at all ○ Mild ○ Moderate ○ Severe ○
i. **Neurological problems <u>before the accident</u>** (such as stroke, seizures, multiple sclerosis, Parkinson's, paraplegia, quadriplegia, paralysis, Alzheimer's, dizziness, others).	Yes ○ → No ○	Not at all ○ Mild ○ Moderate ○ Severe ○
j. **Headaches <u>before the accident</u>** (such as migraine, tension, stress, sinus, others).	Yes ○ → No ○	Not at all ○ Mild ○ Moderate ○ Severe ○
k. **Mental or emotional problems <u>before the accident</u>** (such as depression, anxiety, substance abuse: alcohol or drugs, others).	Yes ○ → No ○	Not at all ○ Mild ○ Moderate ○ Severe ○
l. **Cancer** (such as breast, lung, prostate, cervix, stomach, colon, kidney, bone, metastasis or spread, lymphoma, leukemia, others).	Yes ○ → No ○	Not at all ○ Mild ○ Moderate ○ Severe ○

Health Problem	Have it?	Affects your health?
m. **Other Problems:** Please list	Yes ○ →	Not at all ○
		Mild ○
	No ○	Moderate ○
		Severe ○

2. Circle the number for each statement which best describes how often you felt or behaved this way -- DURING THE PAST WEEK.

DURING THE PAST WEEK:

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
a. I was bothered by things that usually don't bother me.	0	1	2	3
b. I did not feel like eating; my appetite was poor.	0	1	2	3
c. I felt that I could not shake off the blues even with help from my family or friends.	0	1	2	3
d. I felt that I was just as good as other people.	0	1	2	3
e. I had trouble keeping my mind on what I was doing.	0	1	2	3
f. I felt depressed.	0	1	2	3
g. I felt that everything I did was an effort.	0	1	2	3
h. I felt hopeful about the future.	0	1	2	3
i. I thought my life had been a failure.	0	1	2	3
j. I felt fearful.	0	1	2	3
k. My sleep was restless.	0	1	2	3
l. I was happy.	0	1	2	3
m. I talked less than usual.	0	1	2	3
n. I felt lonely.	0	1	2	3
o. People were unfriendly.	0	1	2	3
p. I enjoyed life.	0	1	2	3
q. I had crying spells.	0	1	2	3
r. I felt sad.	0	1	2	3
I felt that people disliked me.	0	1	2	3
t. I could not get "going".	0	1	2	3

3. How was your health the month before the accident? (choose one)

- ☐ .. Excellent
- ☐ .. Very good
- ☐ .. Good
- ☐ .. Fair
- ☐ .. Poor

4. In general, would you say your health is now: (that is, since the accident)

- ☐ .. Excellent
- ☐ .. Very good
- ☐ .. Good
- ☐ .. Fair
- ☐ .. Poor

5. Compared to one year ago, how would you rate your health in general now? (choose one)

- ☐ .. Much better now than one year ago
- ☐ .. Somewhat better now than one year ago
- ☐ .. About the same as one year ago
- ☐ .. Somewhat worse now than one year ago
- ☐ .. Much worse now than one year ago

6. Have you ever suffered a head or brain injury in the past?

☐ .. No ☐ .. Yes → When? _____

7. Have you had any chiropractic treatments in the past 5 years?

☐ .. No ☐ .. Yes → Name of Doctor: _____

Date of last treatment: _____

8. Have you had any physical therapy treatments in the past 5 years?

☐ .. No ☐ .. Yes → Name of Therapist: _____

Date of last treatment: _____

9. Do you think that your injury will ...

- ☐ .. get better soon
- ☐ .. get better slowly
- ☐ .. never get better
- ☐ .. don't know

SECTION E: ABOUT YOUR WORK

Work Status (check all that apply)

☐ .. Employed full-time ☐ .. Self-employed ☐ .. Workers' Compensation
☐ .. Employed part-time ☐ .. Unemployed ☐ .. Homemaker
☐ .. Employed temporarily ☐ .. Maternity leave ☐ .. Social Assistance
☐ .. Disability leave ☐ .. Student
☐ .. Retired ☐ .. Employment Insurance (formerly UIC)

2. If you checked <u>any</u> of the following - Employed full-time, Employed part-time, Employed temporarily, Workers' Compensation, Disability Leave, or Self-employed - please complete the following questions. If you <u>did not</u> check any of these, skip to next section called Income Replacement.

a) Were you off work due to the accident?

☐ .. No (skip to b)
☐ .. Yes → How many days have you been off work so far? _____ days
Are you still off work due to the accident? ☐ .. No
☐ .. Yes (skip to c)

b) Are you working reduced hours or modified/different duties because of the accident?

☐ .. No (skip to c)
☐ .. Yes (please explain) _____

c) If you are off work <u>or</u> if your work has changed because of the accident, do you think you will recover enough to return to your <u>usual</u> job?

☐ .. No ☐ .. Yes ☐ .. Don't know ☐ .. Not applicable

d) How satisfied would you say you are with your job?

☐ .. Very dissatisfied
☐ .. Dissatisfied
☐ .. Neither satisfied or dissatisfied
☐ .. Satisfied
☐ .. Very satisfied

SECTION F: INCOME REPLACEMENT (Please complete if you are claiming for Income Replacement)

1. If you are a student and can not attend classes because of the accident, please complete the following questions. If you are not a student, skip to question #2.

   Are you attending an educational institution on a full-time basis?

   ☐ .. No (skip to question #2)

   ☐ .. Yes (please continue below)

   Name of Institution: _____

   Type of Institution: ☐ .. Elementary School ☐ .. Technical School
   ☐ .. High School ☐ .. University

   Number of courses enrolled in: _____

   Number of class hours per week: _____

   What diploma, certificate or degree are you working toward at this time?

   _____

   Scheduled completion date for the diploma, certificate or degree? _____

2. Are you going to be off work for more than 7 days? ☐ .. No → (Skip to the end)
   ☐ .. Yes → (Continue)

About your Work Status

1. If you are unable to work due to the accident or other health reasons, please explain

   _____

2. Please check all that apply

   ☐ .. Self-employed → ☐ .. Sole ownership of a business
   ☐ .. In a partnership
   ☐ .. In a limited company
   ☐ .. Other (please specify _____)

   ☐ .. Working for wages, profit or commission

   ☐ .. Unemployed at time of accident, but have been promised employment (complete page 18)

Primary Source of Income

1. Business Name _____
2. Address _____
3. Start Date _____
4. Type of Business _____ Job Title _____
5. Main Duties _____
6. Name of Supervisor _____
7. Supervisor Phone # _____ Usual # of Hours worked per week _____
8. How often are you paid? ☐ .. every two weeks ☐ .. twice per month
   ☐ .. monthly ☐ .. other _____
9. What is your gross income for each pay period? $ _____
10. What is your yearly gross income? $ _____
11. Number of months worked at this employment in the past year? _____

Other Income Earned (if applicable)

1. Business Name _____
2. Address _____
3. Start Date _____
4. Type of Business _____ Job Title _____
5. Main Duties _____
6. Name of Supervisor _____
7. Supervisor Phone # _____ Usual # of Hours worked per week _____
8. How often are you paid? ☐ .. every two weeks ☐ .. twice per month
   ☐ .. monthly ☐ .. other _____
9. What is your gross income for each pay period? $ _____
10. What is your yearly gross income? $ _____
11. Number of months worked at this employment in the past year? _____

(If you have other employment please ask for additional copies of this page)

Your Work History

Please state your occupations over the previous 5 years other than those already listed (start with the most recent).

Business Name and Address	Job Title	From Date	To Date	# Hours per week	Income per pay period
					_____ bi-weekly _____ monthly
					_____ bi-weekly _____ monthly
					_____ bi-weekly _____ monthly
					_____ bi-weekly _____ monthly
					_____ bi-weekly _____ monthly

Have you or are you likely to lose Employment Insurance (formerly Unemployment Insurance/UIC) or National Training Act Benefits due to this accident?

☐ .. No

☐ .. Yes (please explain)_____

The following information is for tax calculation purposes in regard to your Income Replacement Benefit.

1. Are you declaring child maintenance on your personal Income Tax Return?

   ☐ .. No ☐ .. Yes $ _____ per year → (income tax return required)

2. Are you declaring alimony on your personal Income Tax Return?

   ☐ .. No ☐ .. Yes $ _____ per year → (income tax return required)

3. Do you have a legally married spouse or a common-law spouse? A common-law spouse is defined here as (a) someone you have been living in a common-law relationship with for two or more years or (b) someone you have been living in a common-law relationship with for one year if you've had a child together.

   ☐ .. No ☐ .. Yes

4. Are you Income Tax exempt? (for example, First Nations individual working on reserve)

   ☐ .. No ☐ .. Yes

5. Are you Employment Insurance (formerly Unemployment Insurance/UIC) exempt? (for example, classified as self-employed)

   ☐ .. No ☐ .. Yes

6. Are you Canada Pension Plan (CPP) exempt? (for example, under age 18 or over age 65)

   ☐ .. No ☐ .. Yes

7. Are you receiving the Infirm Tax Deduction?

   ☐ .. No ☐ .. Yes (for whom? _____)

8. Are you entitled to any benefits from another Insurance Policy or Plan due to this accident?

   ☐ .. No ☐ .. Yes (check all that apply)

   - ☐ .. Workers Compensation Board
   - ☐ .. Canada Pension Plan Disability (CPP)
   - ☐ .. Social Assistance
   - ☐ .. Long term disability through employer
   - ☐ .. Life Insurance
   - ☐ .. Mortgage Insurance
   - ☐ .. Vehicle Disability Coverage
   - ☐ .. Other (please specify _____)

IMPORTANT

PLEASE PROVIDE THESE DOCUMENTS TO YOUR ADJUSTER

1. ***If you are paid a wage or salary**, please have a Verification of Earnings form (SGI will provide the form) completed by each current employer. You must also provide a pay stub for the most current full pay period prior to the automobile accident.

2. ***If you are self-employed**, please provide copies of the last 3 annual income and expense statements from your business and the last 3 income tax returns, including the Notice of Assessment.

3. ***If declaring maintenance or alimony or receiving Infirm Tax Deduction**, please provide a copy of your most current tax return.

Please Note

You may qualify for Canada Pension Plan (CPP) Disability pension if your disability is **severe** (your condition prevents you from doing any job) and **prolonged** (your condition is long term or may result in death).

IMPORTANT!!

PLEASE READ BEFORE YOU SIGN.

1. I am applying to Saskatchewan Government Insurance (SGI) for any compensation to which I may be entitled under the Automobile Accident Insurance Act (the Act) and Regulations.
2. The information on this form is true and correct in every respect and I agree to let my adjuster know right away if anything changes that may affect my claim, including any return to work or income earned from employment.
3. I understand that the Criminal Code makes it an offense, punishable by fine and/or imprisonment to obtain or attempt to obtain, money or property (including compensation or services under the Automobile Accident Insurance Act) by deceit, falsehood or other fraudulent means; and that anyone who does so is also liable to reimburse SGI, in full, for any payment obtained this way.
4. I understand that holding back information about income, interfering with or delaying my recovery or not cooperating with rehabilitation or with reasonable requests for medical examination may cause my benefits to be cut back or cancelled altogether.
5. I understand and agree that SGI may share the information regarding my claim for benefits with health care professionals, vocational rehabilitation professionals, Saskatchewan Social Services and the Institute for Health Outcomes Research at the University of Saskatchewan. I further understand and agree to better facilitate the administration of my claim, medical or vocational information may be exchanged directly between health care professionals or vocational rehabilitation professionals, and I hereby authorize such direct exchange or provision of information.
6. I authorize SGI to undertake any investigations are necessary with respect to my claim for compensation, including the collection of any medical and employment information that SGI deems as relevant.
7. I give permission to the medical professionals to contact my primary care practitioner directly.

SIGNED AT _____ *THIS* _____ *DAY OF* _____, *19*____

CLAIMANT/REPRESENTATIVE SIGNATURE _____

PRINT CLAIMANT'S NAME _____

WITNESS _____

WITNESS _____

Note: A photocopy of this form is to be accepted as if it were an original.

Thank you for your help in completing this application.

22

2523-1 06/97

TELEPHONE INTERVIEW

Questionnaire

Telephone Interview Data Entry - 1

SGI: _____ Interview: _____

How well do you feel you are recovering from your injuries? Are you . . .

- ☐ All Better (cured)
- ☐ Feeling Quite a Bit of Improvement
- ☐ Feeling Some Improvement
- ☐ Feeling No Improvement
- ☐ Getting a little worse
- ☐ Getting much worse
- ☐ Not Answere

In the last week have you had pain as a result of the accident?

☐ Yes ☐ No ☐ Not Answere

In the past week have you had Neck or Shoulder Pain as a result of the accident?

☐ Yes ☐ No ☐ Not Answere

Please rate your average Neck or Shoulder pain over the past week on a scale of 0 to 10 where 0 means no pain at all and 10 means pain as bad as it could be.

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐ Not Answere

In the past week have you had Low Back Pain as a result of the accident?

☐ Yes ☐ No ☐ Not Answere

Please rate your average low back pain using the scale of 0 to 10 as before.

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐ Not Answere

In the past week have you had Headaches as a result of the accident?

Yes No Not Answere

Please rate your headache pain.

0 1 2 3 4 5 6 7 8 9 10 Not Answere

In the past week have you had pain in other parts of the body as a result of the accident?

Yes No Not Answere

Have you had Arm pain?

Yes No Not Answere

Please rate your Arm pain.

0 1 2 3 4 5 6 7 8 9 10 Not Answere

Have you had Leg pain?

Yes No Not Answere

Please rate your Leg pain.

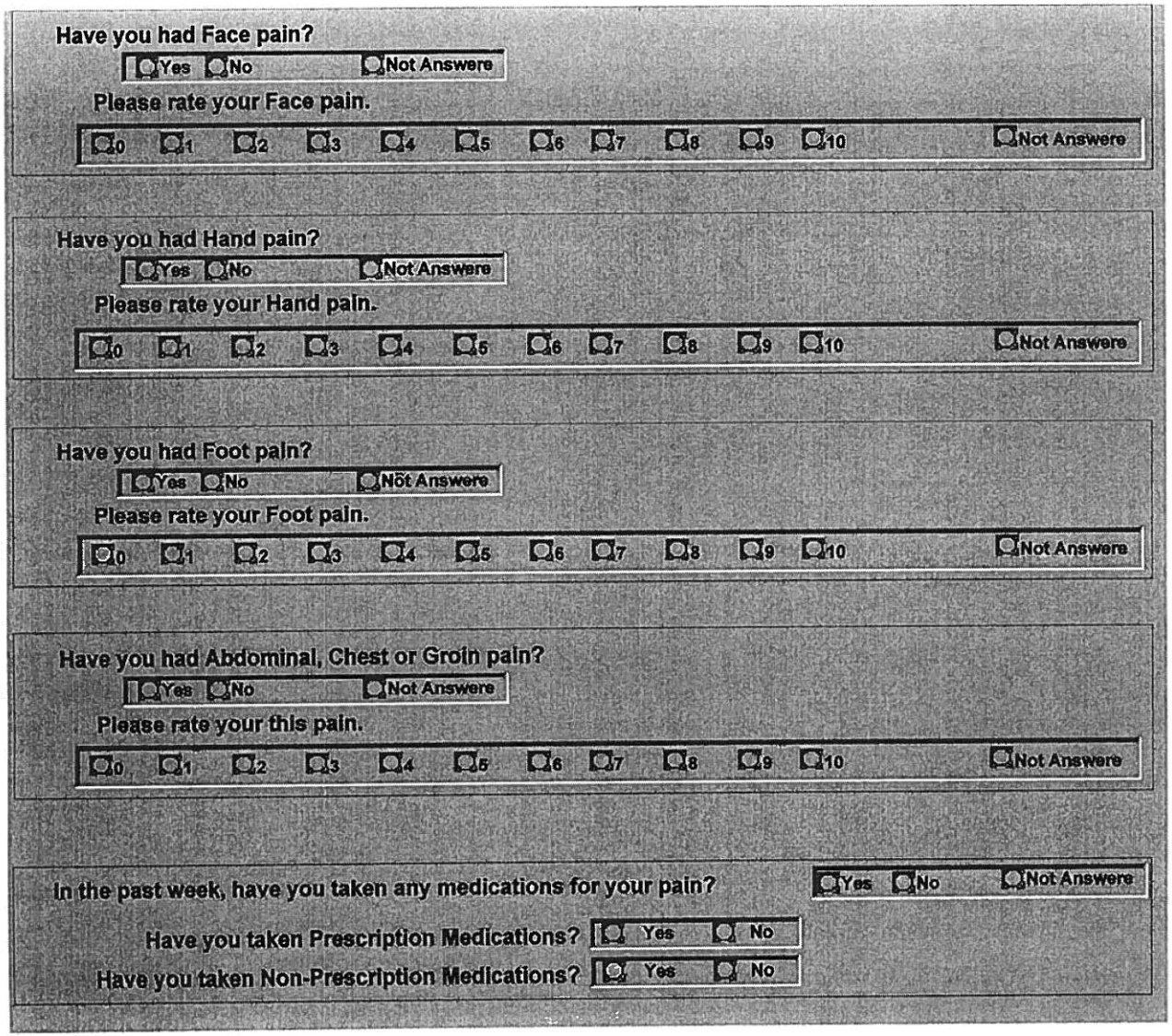
0 1 2 3 4 5 6 7 8 9 10 Not Answere

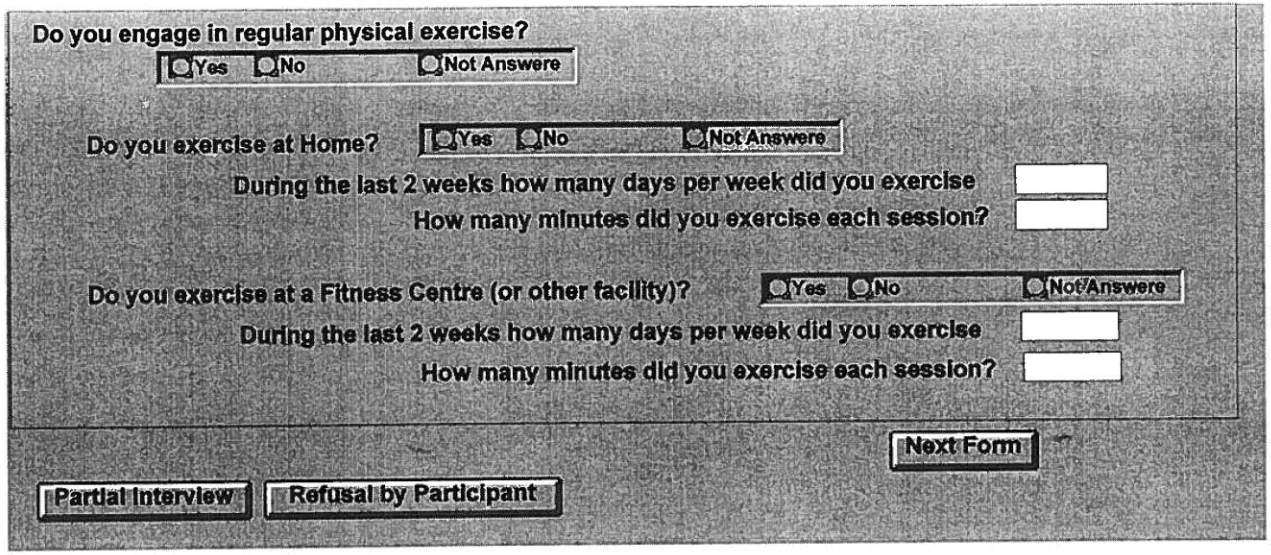
Have you had Mid Back pain?

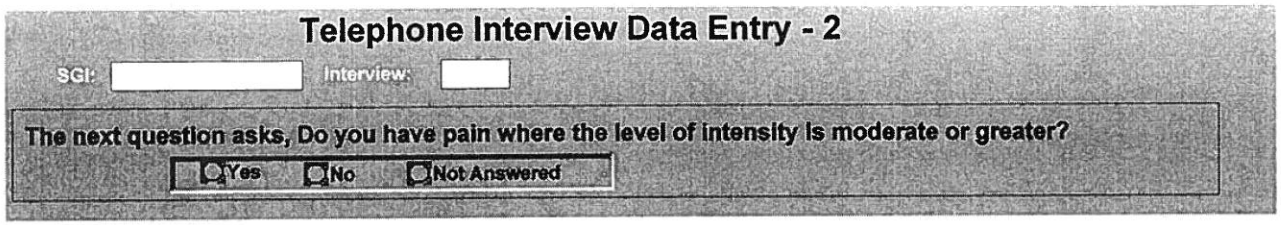
Yes No Not Answere

Please rate your Mid Back pain.

0 1 2 3 4 5 6 7 8 9 10 Not Answere


Have you had Face pain?
Yes No Not Answere
Please rate your Face pain.
0 1 2 3 4 5 6 7 8 9 10 Not Answere
Have you had Hand pain?
Yes No Not Answere
Please rate your Hand pain.
0 1 2 3 4 5 6 7 8 9 10 Not Answere
Have you had Foot pain?
Yes No Not Answere
Please rate your Foot pain.
0 1 2 3 4 5 6 7 8 9 10 Not Answere
Have you had Abdominal, Chest or Groin pain?
Yes No Not Answere
Please rate your this pain.
0 1 2 3 4 5 6 7 8 9 10 Not Answere
In the past week, have you taken any medications for your pain?
Yes No Not Answere
Have you taken Prescription Medications? Yes No
Have you taken Non-Prescription Medications? Yes No


Do you engage in regular physical exercise?
Yes
No
Not Answere
Do you exercise at Home?
Yes
No
Not Answere
During the last 2 weeks how many days per week did you exercise
How many minutes did you exercise each session?
Do you exercise at a Fitness Centre (or other facility)?
Yes
No
Not Answere
During the last 2 weeks how many days per week did you exercise
How many minutes did you exercise each session?
Next Form
Partial Interview
Refusal by Participant


Telephone Interview Data Entry - 2
SGI:
Interview:
The next question asks, Do you have pain where the level of intensity is moderate or greater?
Yes
No
Not Answered

We need to know what activities you do when you are experiencing THIS TYPE of pain. The first activity is:

Engaging in physical exercise or physical therapy: None Answered: ☐

Would you say you:
- ☐ never do when in pain
- ☐ rarely do when in pain
- ☐ occasionally
- ☐ frequently or
- ☐ very frequently do when in pain

☐ Not Answere

When in pain do you say to yourself: "I wish my doctor would prescribe better pain medication for me?"

☐never ☐rarely ☐occasionally ☐frequently ☐very frequently ☐Not Answere

Again, when in pain do you stay busy or active?

☐never ☐rarely ☐occasionally ☐frequently ☐very frequently ☐Not Answere

Do you clear your mind of bothersome thoughts or worries?

☐never ☐rarely ☐occasionally ☐frequently ☐very frequently ☐Not Answere

Do you think "This pain is wearing me down?"

☐never ☐rarely ☐occasionally ☐frequently ☐very frequently ☐Not Answere

Do you talk to others about how much your pain hurts?

☐never ☐rarely ☐occasionally ☐frequently ☐very frequently ☐Not Answere

Do you restrict or cancel your social activities?

☐never ☐rarely ☐occasionally ☐frequently ☐very frequently ☐Not Answere

Do you participate in leisure activities (such as hobbies, sewing, etc)

☐never ☐rarely ☐occasionally ☐frequently ☐very frequently ☐Not Answere

Do you think "I can't do anything to lessen this pain?"

never | rarely | occasionally | frequently | very frequently | Not Answere

Do you distract your attention from the pain by recognising that you have pain, but putting your mind on something else?

never | rarely | occasionally | frequently | very frequently | Not Answere

Do you focus on where the pain is and how much it hurts?

never | rarely | occasionally | frequently | very frequently | Not Answere

10. The next 7 questions ask you to rate how much your pain is preventing you from doing your normal activities. Your rating should reflect the overall impact of pain in your life, not just when the pain is at its worst. We are using a scale of 0 to 10, where 0 means no disability at all and 10 means total disability. If a category does not apply to you, say '0'.

None Answered: ☐

Family/Home responsibilities. This category refers to activities related to the home or family. It includes chores and duties performed around the house. (eg. yard work) and errands or favours for other family members (eg. driving the children to school).

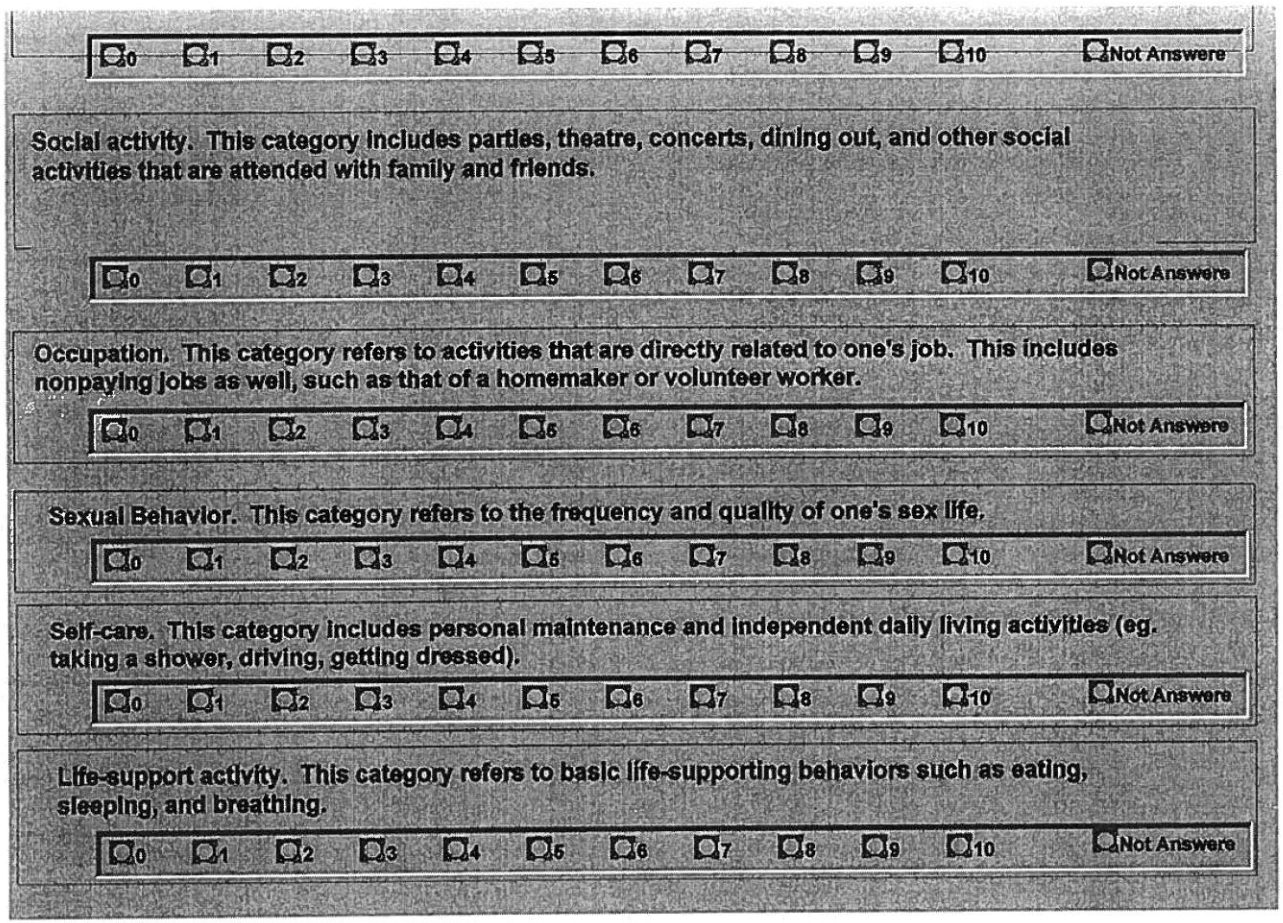
0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Not Answere

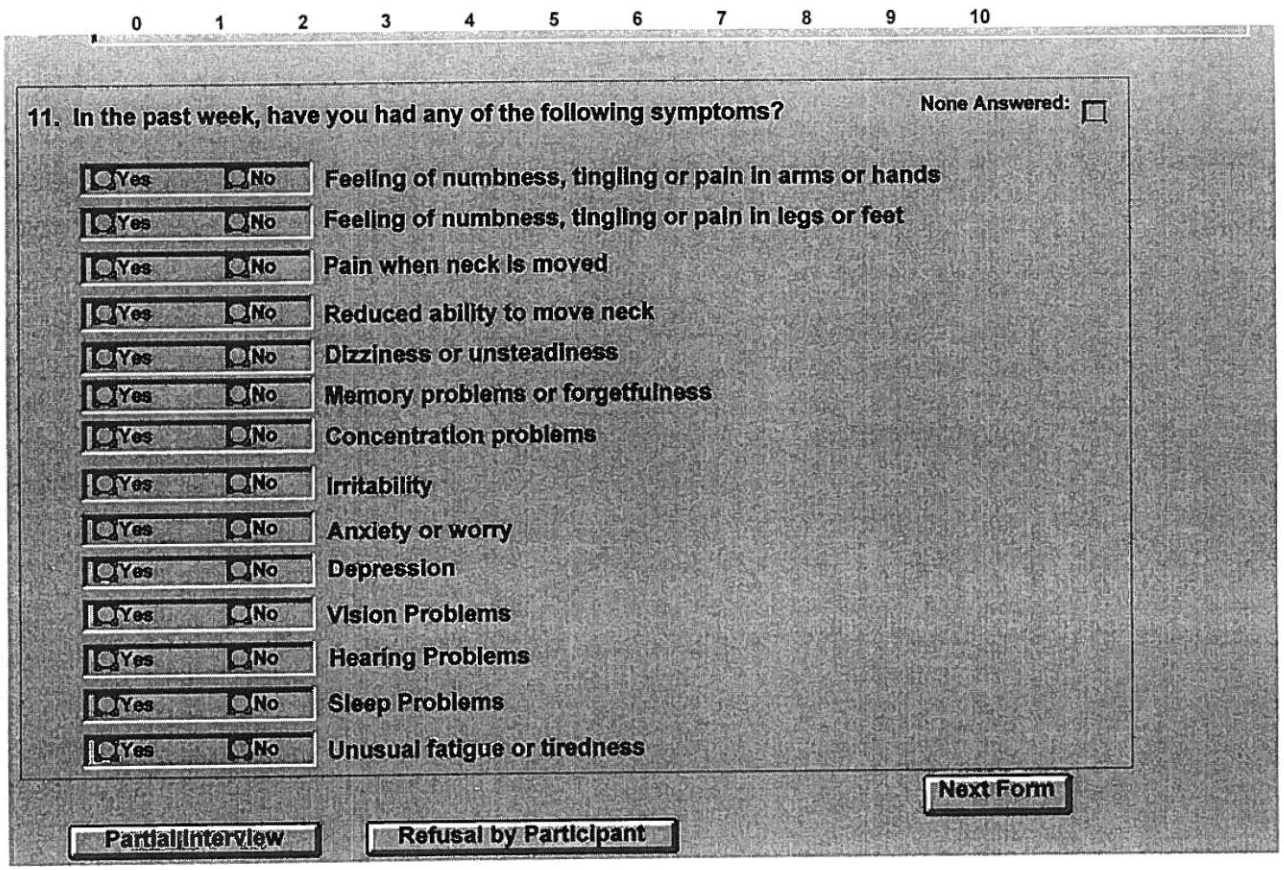
Recreation. This category includes hobbies, sports, and other leisure-related activities.

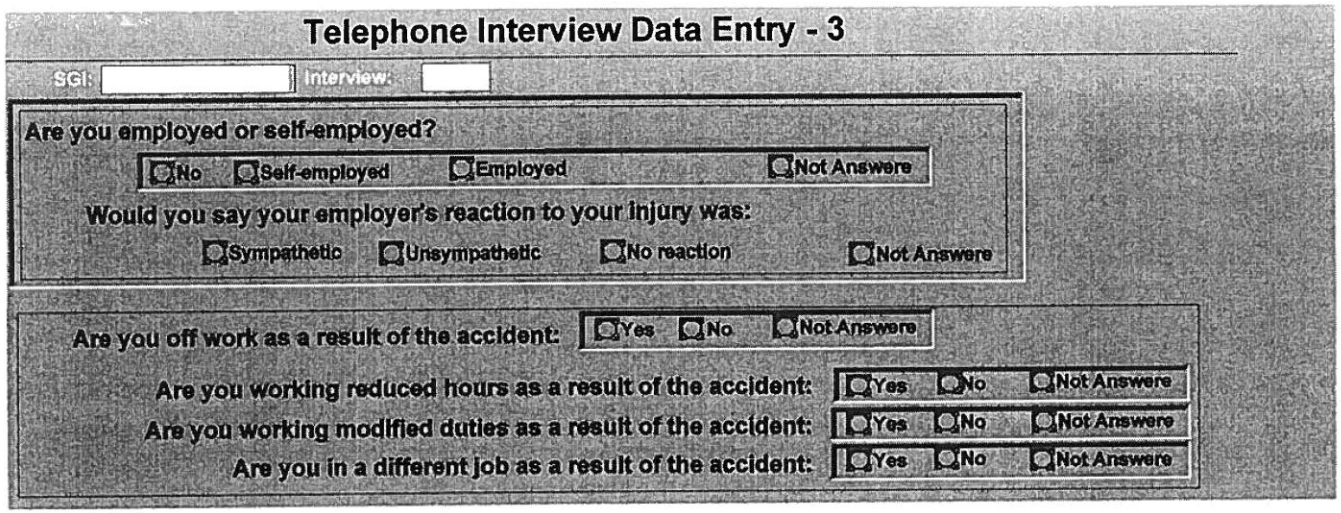
0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Not Answere

Social activity. This category includes parties, theatre, concerts, dining out, and other social activities that are attended with family and friends.

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Not Answere


0 1 2 3 4 5 6 7 8 9 10 Not Answere
Social activity. This category includes parties, theatre, concerts, dining out, and other social activities that are attended with family and friends.
0 1 2 3 4 5 6 7 8 9 10 Not Answere
Occupation. This category refers to activities that are directly related to one's job. This includes nonpaying jobs as well, such as that of a homemaker or volunteer worker.
0 1 2 3 4 5 6 7 8 9 10 Not Answere
Sexual Behavior. This category refers to the frequency and quality of one's sex life.
0 1 2 3 4 5 6 7 8 9 10 Not Answere
Self-care. This category includes personal maintenance and independent daily living activities (eg. taking a shower, driving, getting dressed).
0 1 2 3 4 5 6 7 8 9 10 Not Answere
Life-support activity. This category refers to basic life-supporting behaviors such as eating, sleeping, and breathing.
0 1 2 3 4 5 6 7 8 9 10 Not Answere


0 1 2 3 4 5 6 7 8 9 10
11. In the past week, have you had any of the following symptoms?
None Answered:
Yes No Feeling of numbness, tingling or pain in arms or hands
Yes No Feeling of numbness, tingling or pain in legs or feet
Yes No Pain when neck is moved
Yes No Reduced ability to move neck
Yes No Dizziness or unsteadiness
Yes No Memory problems or forgetfulness
Yes No Concentration problems
Yes No Irritability
Yes No Anxiety or worry
Yes No Depression
Yes No Vision Problems
Yes No Hearing Problems
Yes No Sleep Problems
Yes No Unusual fatigue or tiredness
Next Form
Partial Interview
Refusal by Participant


Telephone Interview Data Entry - 3
SGI:
Interview:
Are you employed or self-employed?
No
Self-employed
Employed
Not Answere
Would you say your employer's reaction to your injury was:
Sympathetic
Unsympathetic
No reaction
Not Answere
Are you off work as a result of the accident:
Yes
No
Not Answere
Are you working reduced hours as a result of the accident:
Yes
No
Not Answere
Are you working modified duties as a result of the accident:
Yes
No
Not Answere
Are you in a different job as a result of the accident:
Yes
No
Not Answere

None Answered:

How often during the past week were you bothered by things that usually don't bother you?

- rarely or none of the time (less than 1 day)
- some or a little of the time (1-2 days)
- occasionally (3-4 days)
- or most or all of the the time (5-7days)
- Not Answere

How often did you not feel like eating; your appetite was poor?

rarely | some of the time | occasionally | or most of the time | Not/Answere

Did you feel that you could not shake off the blues even with help from family or friends?

rarely | some of the time | occasionally | or most of the time | Not Answere

Did you feel you were just as good as other people?

rarely | some of the time | occasionally | or most of the time | Not Answere

Did you have trouble keeping your mind on what you were doing?

rarely | some of the time | occasionally | or most of the time | Not Answere

Did you feel depressed?

rarely | some of the time | occasionally | or most of the time | Not Answere

Did you feel that everything you did was an effort?

rarely | some of the time | occasionally | or most of the time | Not Answere

Did you feel hopeful about the future?

rarely | some of the time | occasionally | or most of the time | Not Answere

Did you think your life had been a failure?

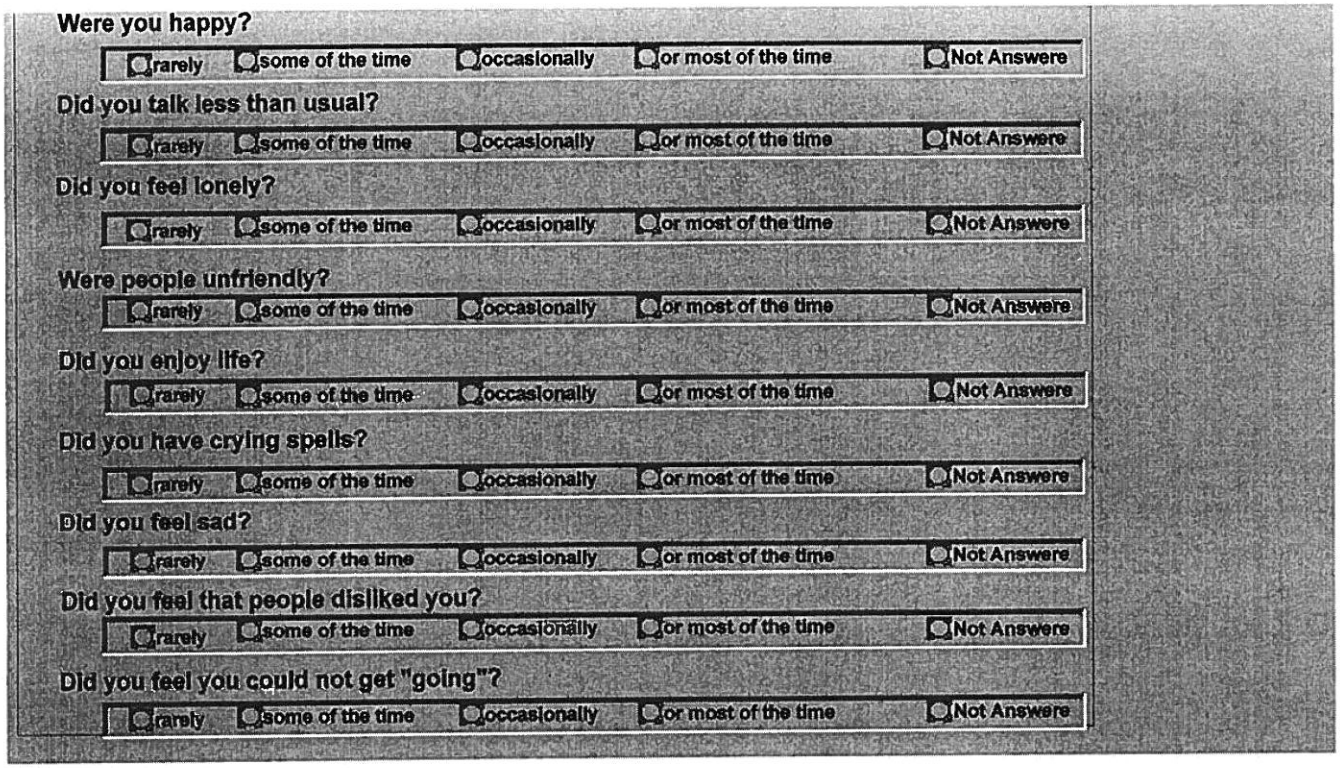
rarely | some of the time | occasionally | or most of the time | Not Answere

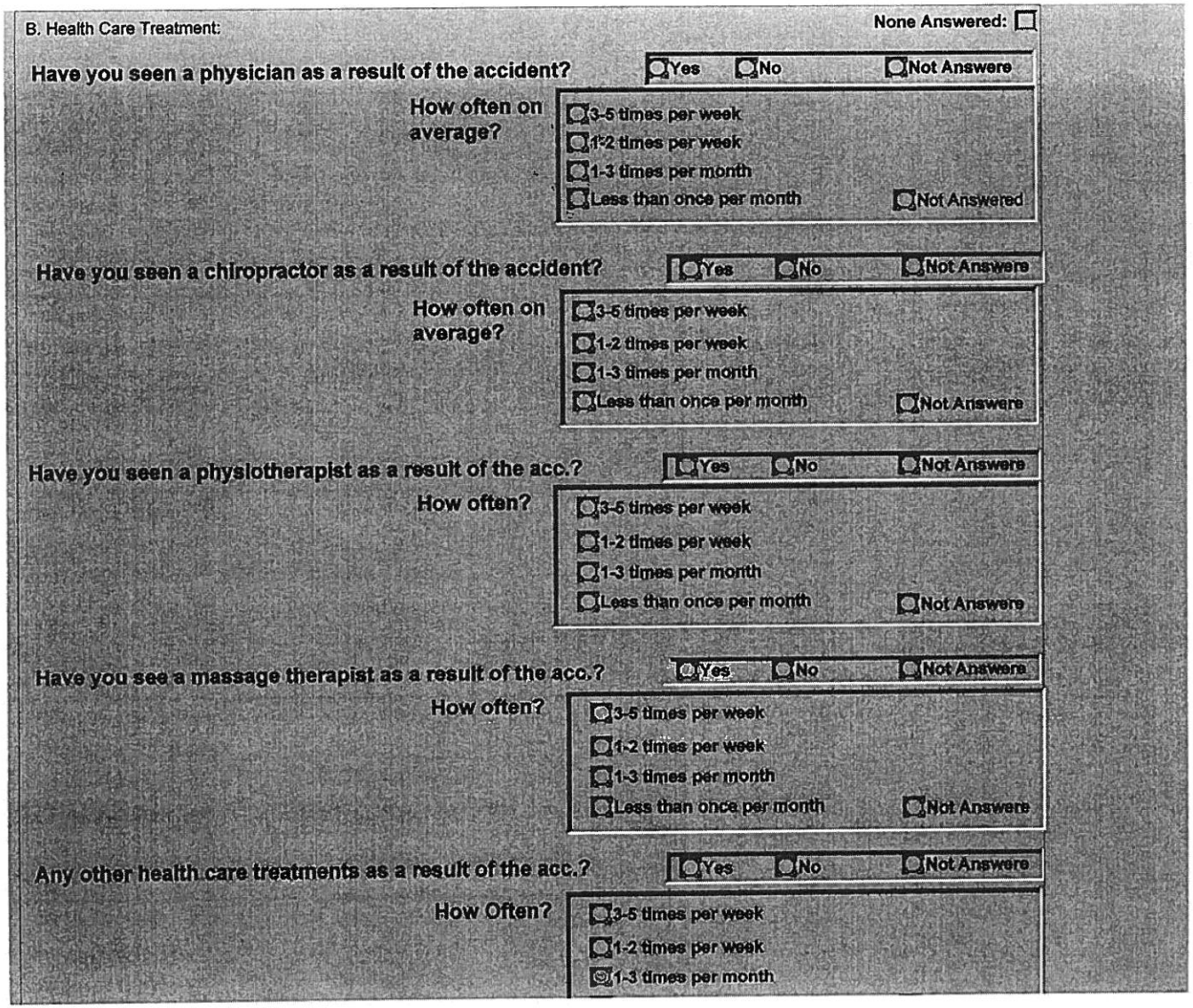
Did you feel fearful?

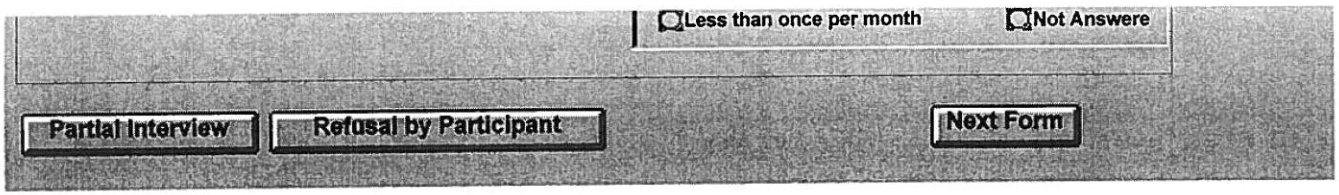
rarely | some of the time | occasionally | or most of the time | Not Answere

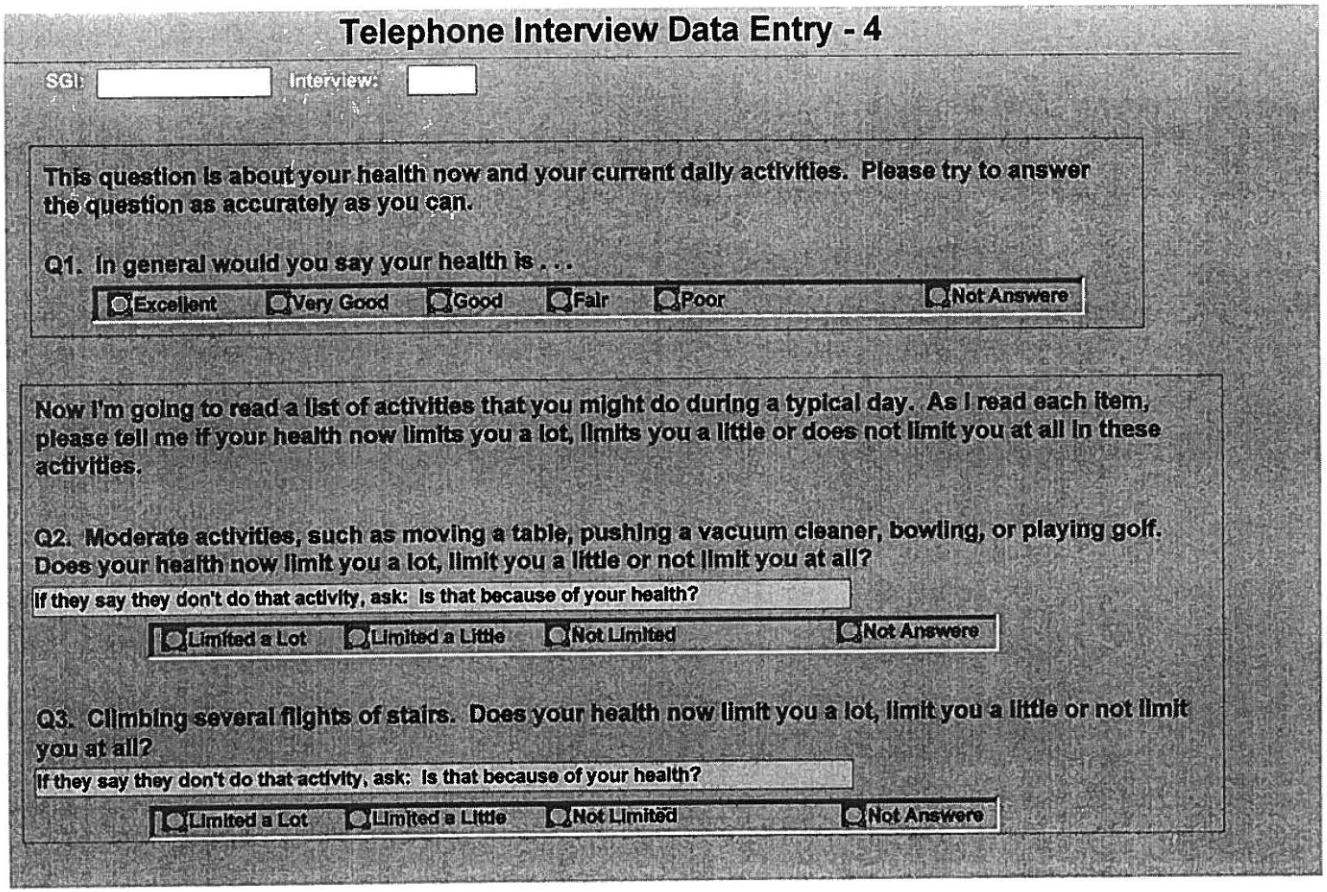
Was your sleep restless?

rarely | some of the time | occasionally | or most of the time | Not Answere


Were you happy?
rarely
some of the time
occasionally
or most of the time
Not Answere
Did you talk less than usual?
rarely
some of the time
occasionally
or most of the time
Not Answere
Did you feel lonely?
rarely
some of the time
occasionally
or most of the time
Not Answere
Were people unfriendly?
rarely
some of the time
occasionally
or most of the time
Not Answere
Did you enjoy life?
rarely
some of the time
occasionally
or most of the time
Not Answere
Did you have crying spells?
rarely
some of the time
occasionally
or most of the time
Not Answere
Did you feel sad?
rarely
some of the time
occasionally
or most of the time
Not Answere
Did you feel that people disliked you?
rarely
some of the time
occasionally
or most of the time
Not Answere
Did you feel you could not get "going"?
rarely
some of the time
occasionally
or most of the time
Not Answere


B. Health Care Treatment:
None Answered:
Have you seen a physician as a result of the accident?
Yes
No
Not Answere
How often on average?
3-5 times per week
1-2 times per week
1-3 times per month
Less than once per month
Not Answered
Have you seen a chiropractor as a result of the accident?
Yes
No
Not Answere
How often on average?
3-5 times per week
1-2 times per week
1-3 times per month
Less than once per month
Not Answere
Have you seen a physiotherapist as a result of the acc.?
Yes
No
Not Answere
How often?
3-5 times per week
1-2 times per week
1-3 times per month
Less than once per month
Not Answere
Have you see a massage therapist as a result of the acc.?
Yes
No
Not Answere
How often?
3-5 times per week
1-2 times per week
1-3 times per month
Less than once per month
Not Answere
Any other health care treatments as a result of the acc.?
Yes
No
Not Answere
How Often?
3-5 times per week
1-2 times per week
1-3 times per month


Less than once per month
Not Answere
Partial Interview
Refusal by Participant
Next Form


Telephone Interview Data Entry - 4
SGI:
Interview:
This question is about your health now and your current daily activities. Please try to answer the question as accurately as you can.
Q1. In general would you say your health is . . .
Excellent
Very Good
Good
Fair
Poor
Not Answere
Now I'm going to read a list of activities that you might do during a typical day. As I read each item, please tell me if your health now limits you a lot, limits you a little or does not limit you at all in these activities.
Q2. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf. Does your health now limit you a lot, limit you a little or not limit you at all?
If they say they don't do that activity, ask: Is that because of your health?
Limited a Lot
Limited a Little
Not Limited
Not Answere
Q3. Climbing several flights of stairs. Does your health now limit you a lot, limit you a little or not limit you at all?
If they say they don't do that activity, ask: Is that because of your health?
Limited a Lot
Limited a Little
Not Limited
Not Answere

Limited a Lot Limited a Little Not Limited Not Answere

Q3. Climbing several flights of stairs. Does your health now limit you a lot, limit you a little or not limit you at all?

If they say they don't do that activity, ask: Is that because of your health?

Limited a Lot Limited a Little Not Limited Not Answere

The following two questions ask you about your physical health and your daily activities.

Q4. During the past week, have you accomplished less than you would like as a result of your physical health?

Yes No Not Answere

Q5. During the past week, were you limited in the kind of work or other regular daily activities you do as a result of your physical health?

Yes No Not Answere

The following two questions ask you about your emotions and your daily activities.

Q6. During the past week, have you accomplished less than you would like as a result of any emotional problems, such as feeling depressed or anxious?

Yes No Not Answere

Q7. During the past week, did you not do work or other regular activities as carefully as usual as a result of any emotional problems, such as feeling depressed or anxious?

Yes No Not Answere

Q7. During the past week, did you not do work or other regular activities as carefully as usual as a result

Yes No Not Answere

Q8. During the past week, how much did pain interfere with your normal work, including both work outside the home and housework? Did it interfere . . .

Not at all A little bit Moderately Quite a bit Extremely Not Answere

Q9. During the past week, how much of the time has your physical health or emotional problems interfered with your social activities like visiting with friends or relatives? Did it interfere . . .

All of the time Most of the time Some Little of the time None Not Answere

The next questions are about how you feel and how things have been with you during the past week.

As I read each statement, please give me the one answer that comes closest to the way you have been feeling; is it all of the time, most of the time, a good bit of the time, some of the time, a little of the time, or none of the time?

Q10. How much of the time during the past week have you felt calm and peaceful?

(Read Categories only if necessary)

All of the time Most of the time Good bit Some Little of the time None Not Answere

Q11. How much of the time during the past week did you have lots of energy?

(Read Categories only if necessary)

All of the time Most of the time Good bit Some Little of the time None Not Answere

Q12. How much of the time during the past week have you felt downhearted and blue?

(Read Categories only if necessary)

All of the time Most of the time Good bit Some Little of the time None Not Answere

Save/Close

Partial Interview | Refusal by Participant

Appendix C

Welcome to...

The Saskatchewan Health and Back Pain Survey

Your participation is important because:

1. It is likely that you or somebody you know suffers from a painful neck or back.
2. To develop helpful and cost-effective treatments for neck and low back pain we need to understand how it affects peoples' lives.
3. Prevention is the best cure. Please help us to find the causes of neck and low back pain by filling out this questionnaire.

Dr. J. David Cassidy | Dr. Linda Carroll | Dr. Ken Yong-Hing | Dr. Pierre Côté

Section A
Your General Health

Section B
Neck and Low Back Pain

Section C
How You Manage Your Pain

Section D
Questions About Your Mood

Section E
About You

Return Date

Please return the completed questionnaire in the enclosed pre-paid envelope **as soon as possible**.

Help and Advice

If you have any questions about this survey or need help completing the questionnaire, please call 966-8465 in Saskatoon or 1-800-667-8505 toll-free outside of Saskatoon.

Section A. Your General Health

In this section, we are interested in your general health. Please answer these questions to the best of your knowledge.

1. Please check the circle "✓" if you **currently** have any of the following health problems. If you do, to what extent have these problems affected your health in the last six months.

   Not at all: the problem does not affect my health.
   Mild: the problem makes my health **a little worse** than it should be.
   Moderate: the problem makes my health **worse** than it should be.
   Severe: the problem makes my health **much worse** than it should be.

Health Problem	Have it?	Affects your health?
a. **Rheumatoid arthritis; Osteoarthritis of the knee, hip or hand; Osteoporosis or thin bones; Fracture**	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O
b. **Allergies** (such as hay fever, dermatitis, eczema, allergies to medication, food allergy, others)	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O
c. **Breathing problems** (such as asthma, emphysema, bronchitis, fibrosis, lung scarring, TB, pneumonia, infection, common cold, others)	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O
d. **High blood pressure** (hypertension)	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O

Health Problem	Have it?	Affects your health?
e. **Heart and circulation problems** (such as angina, heart attack, heart failure, heart valve problem, hardening of arteries, varicose veins, claudication, foot or leg ulcers, others).	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O
f. **Digestive system problems** (such as ulcer, gastritis, inflammatory or irritable bowel disease, colitis, Crohn's disease, hiatus hernia, gall stones, pancreatitis, others)	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O
g. **Diabetes**	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O
h. **Kidney, bladder or urinary problems** (such as kidney failure, nephritis, kidney stones, urinary tract infection, prostate problems, bladder control problems, others)	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O
i. **Neurological problems** (such as stroke, seizures, multiple sclerosis, Parkinson's, paraplegia, quadriplegia, paralysis, Alzheimer's, dizziness, others)	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O
j. **Headaches** (such as migraine, tension, stress, sinus, others)	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O
k. **Mental or emotional problems** (such as depression, anxiety, substance abuse: alcohol, drugs, others)	Yes O → No O ↓	Not at all . . O Mild . . . . . O Moderate . . O Severe . . . . . O

Health Problem	Have it?	Affects your health?
l. **Cancer** (such as breast, lung, prostate, cervix, stomach, colon, kidney, bone, metastasis or spread, lymphoma, leukemia, others)	**Yes** O → **No** O ↓	**Not at all** . . O **Mild** . . . . . O **Moderate** . . O **Severe** . . . . . O
m. **Gynecological problems** (such as endometriosis, dysmenorrhea or menstrual problems, fibroids, ovarian cysts, others).	**Yes** O → **No** O ↓	**Not at all** . . O **Mild** . . . . . O **Moderate** . . O **Severe** . . . . . O
n. **Blood problems** (such as AIDS or HIV+, anemia, bleeding problems)	**Yes** O → **No** O ↓	**Not at all** . . O **Mild** . . . . . O **Moderate** . . O **Severe** . . . . . O
o. **Other problems** Please list:_____	**Yes** O → **No** O ↓	**Not at all** . . O **Mild** . . . . . O **Moderate** . . O **Severe** . . . . . O

2. Have you ever smoked at least one cigarette a day for <u>at least one year</u>?

   No . . O → (skip to page 5)
   Yes . O

3. How many years have you smoked at least one cigarette a day? _____ years.

4. Do you still smoke cigarettes?

   No . . O → (skip to page 5)
   Yes . O

5. On average, how many cigarettes do you smoke <u>per day</u>? (one pack equals "25" cigarettes)

   Less than one pack per day . . . . . O
   One pack or more than one pack per day . . . . O

SF-36 HEALTH SURVEY

INSTRUCTIONS: This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

Answer every question by marking the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:

(circle one)

Excellent	1
Very good	2
Good	3
Fair	4
Poor	5

2. Compared to one year ago, how would you rate your health in general now?

(circle one)

Much better now than one year ago	1
Somewhat better now than one year ago	2
About the same as one year ago	3
Somewhat worse now than one year ago	4
Much worse now than one year ago	5

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

(circle one number on each line)

ACTIVITIES	Yes, Limited A Lot	Yes, Limited A Little	No, Not Limited At All
a. **Vigorous activities**, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b. **Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
c. Lifting or carrying groceries	1	2	3
d. Climbing **several** flights of stairs	1	2	3
e. Climbing **one** flight of stairs	1	2	3
f. Bending, kneeling, or stooping	1	2	3
g. Walking **more than a kilometre**	1	2	3
h. Walking **several blocks**	1	2	3
i. Walking **one block**	1	2	3
j. Bathing or dressing yourself	1	2	3

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

(circle one number on each line)

	YES	NO
a. Cut down on the **amount of time** you spent on work or other activities	1	2
b. **Accomplished less** than you would like	1	2
c. Were limited in the **kind** of work or other activities	1	2
d. Had **difficulty** performing the work or other activities (for example, it took extra effort)	1	2

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

(circle one number on each line)

	YES	NO
a. Cut down the **amount of time** you spent on work or other activities	1	2
b. **Accomplished less** than you would like	1	2
c. Didn't do work or other activities as **carefully** as usual	1	2

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

(circle one)

Not at all 1

Slightly 2

Moderately..... 3

Quite a bit..... 4

Extremely 5

7. How much bodily pain have you had during the past 4 weeks?

(circle one)

None..... 1

Very mild..... 2

Mild..... 3

Moderate..... 4

Severe..... 5

Very severe..... 6

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

(circle one)

Not at all	1
A little bit	2
Moderately	3
Quite a bit	4
Extremely	5

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks -

(circle one number on each line)

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the time
a. Did you feel full of pep?	1	2	3	4	5	6
b. Have you been a very nervous person?	1	2	3	4	5	6
c. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
d. Have you felt calm and peaceful?	1	2	3	4	5	6
e. Did you have a lot of energy?	1	2	3	4	5	6
f. Have you felt downhearted and blue?	1	2	3	4	5	6
g. Did you feel worn out?	1	2	3	4	5	6
h. Have you been a happy person?	1	2	3	4	5	6
i. Did you feel tired?	1	2	3	4	5	6

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc)?

(circle one)

All of the time	1
Most of the time	2
Some of the time	3
A little of the time	4
None of the time	5

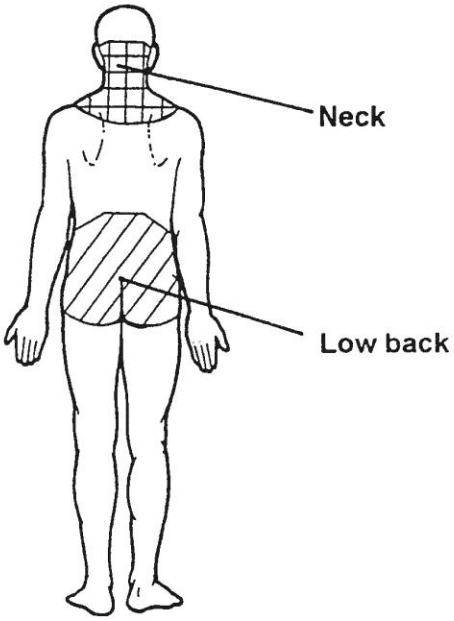
11. How TRUE or FALSE is each of the following statements to you?

(circle one number on each line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
a. I seem to get sick a little easier than other people	1	2	3	4	5
b. I am as healthy as anybody I know	1	2	3	4	5
c. I expect my health to get worse	1	2	3	4	5
d. My health is excellent	1	2	3	4	5

Section B. Neck and Low Back Pain

In this section, we will ask you about neck and low back problems. What we mean by neck and low back is illustrated on this diagram. When answering questions about neck and low back pain, please refer to the diagram.



1. Have you ever **injured** your neck or low back in a motor vehicle accident?

   a) Neck ..... Yes O No O

   b) Low back..... Yes O No O

2. Have you ever injured your neck or low back **at work**?

   a) Neck..... Yes O No O

   b) Low back..... Yes O No O

If yes, have you ever had to **take time off work or perform light duties at work** because of a work injury?

a) Neck injury..... Yes O No O

b) Low back injury.. Yes O No O

Neck Pain (please refer to body diagram on page 10)

1. In your **lifetime**, have you ever had neck pain? No . . O → (skip to page 13)
   Yes . O

2. About how many days in the **past six months** have you had neck pain ?

   0 days... O 1-30 days... O 31-89 days... O 90-180 days... O

3. Do you have neck pain at the present time, that is **right now**? No . . O
   Yes . O

   If you have neck pain **right now**, does it travel into your arm(s)? No . . O
   Yes . O

In the next section, you will be asked to describe your neck pain. Please answer by circling the appropriate number from 0 to 10. Answer all questions by circling only one number.

1. How would you rate your neck pain on a 0-10 scale at the present time, that is right now, where 0 is "no neck pain" and 10 is "neck pain as bad as could be"?

No pain										Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

2. In the past 6 months, how intense was your worst neck pain rated on a 0-10 scale where 0 is "no neck pain" and 10 is "neck pain as bad as could be"?

No pain										Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

3. In the past 6 months, on the average, how intense was your neck pain rated on a 0-10 scale where 0 is "no neck pain" and 10 is "neck pain as bad as could be"?

No pain — Pain as bad as could be

0 1 2 3 4 5 6 7 8 9 10

4. About how many days in the last 6 months have you been kept from your usual activities (work, school, or housework) because of neck pain? (please check appropriate circle)

0-6 days	O	15-30 days	O
7-14 days	O	31 or more days	O

5. In the past 6 months, how much has your neck pain interfered with your daily activities rated on a 0-10 scale where 0 is "no interference" and 10 is "unable to carry on any activities"?

No interference — Unable to carry on any activities

0 1 2 3 4 5 6 7 8 9 10

6. In the past 6 months, how much has your neck pain changed your ability to take part in recreational, social and family activities where 0 is "no change" and 10 is "extreme change"?

No change — Extreme change

0 1 2 3 4 5 6 7 8 9 10

7. In the past 6 months, how much has your neck pain changed your ability to work (including housework) where 0 is "no change" and 10 is "extreme change"?

No change — Extreme change

0 1 2 3 4 5 6 7 8 9 10

Low Back Pain (please refer to body diagram on page 10)

1. In your **lifetime**, have you ever had low back pain? No O → (skip to page 15)
   Yes O

2. About how many days in the **past six months** have you had low back pain ?

   0 days... O 1-30 days... O 31-89 days... O 90-180 days... O

3. Do you have low back pain at the present time, that is **right now**? No ..... O
   Yes ..... O

   If you have low back pain **right now**, does it travel into your leg(s)? No ..... O
   Yes ..... O

Now, we would like to know a bit more about your low back pain. Please answer by circling the appropriate number from 0 to 10. Answer all questions by circling only one number.

1. How would you rate your low back pain on a 0-10 scale at the present time, that is right now, where 0 is "no low back pain" and 10 is "low back pain as bad as could be"?

No pain										Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

2. In the past 6 months, how intense was your worst low back pain rated on a 0-10 scale where 0 is "no low back pain" and 10 is "low back pain as bad as could be"?

No pain										Pain as bad as could be
0	1	2	3	4	5	6	7	8	9	10

3. In the past 6 months, on the average, how intense was your low back pain rated on a 0-10 scale where 0 is "no low back pain" and 10 is "low back pain as bad as could be"?

No pain — Pain as bad as could be

0 1 2 3 4 5 6 7 8 9 10

4. About how many days in the last 6 months have you been kept from your usual activities (work, school, or housework) because of low back pain? (please check appropriate circle)

0-6 days	O	15-30 days	O
7-14 days	O	31 or more days	O

5. In the past 6 months, how much has your low back pain interfered with your daily activities rated on a 0-10 scale where 0 is "no interference" and 10 is "unable to carry on any activities"?

No interference — Unable to carry on any activities

0 1 2 3 4 5 6 7 8 9 10

6. In the past 6 months, how much has your low back pain changed your ability to take part in recreational, social and family activities where 0 is "no change" and 10 is "extreme change"?

No change — Extreme change

0 1 2 3 4 5 6 7 8 9 10

7. In the past 6 months, how much has your low back pain changed your ability to work (including housework) where 0 is "no change" and 10 is "extreme change"?

No change — Extreme change

0 1 2 3 4 5 6 7 8 9 10

Section C. How you manage your pain

Answer this section (page 15-17) if you have had neck or low back pain.

1. In the past four weeks, have you used medication every day for at least seven days because of your neck pain or back pain? No....O → (skip to question 2)
   Yes...O

If yes, did you use prescription medication, non-prescription medication or both ?

a) Neck pain..... Non-prescription medication O Prescription medication O

b) Low back pain... Non-prescription medication O Prescription medication O

2. In the past four weeks, have you seen a health care professional for neck pain or low back pain?

Neck pain	Yes O No O
Low back pain	Yes O No O

If you have seen any health care professionals for neck pain or low back pain in the past four weeks, who did you see? (please check all that apply)

	For your neck pain	For your low back pain
Family Doctor	Yes O	Yes O
Chiropractor	Yes O	Yes O
Physiotherapist	Yes O	Yes O
Orthopedic Surgeon	Yes O	Yes O
Neurologist or Neurosurgeon	Yes O	Yes O
Rheumatologist	Yes O	Yes O
Massage therapist	Yes O	Yes O
Counsellor/Psychologist	Yes O	Yes O
Other: (please specify) _____	Yes O	Yes O

3. If you have ever been treated for neck pain or low back pain, please indicate whether the treatment helped or not?

	Neck pain	Low back pain
Pills (medication)	Helped O Did not help O	Helped O Did not help O
Chiropractic	Helped O Did not help O	Helped O Did not help O
Physiotherapy	Helped O Did not help O	Helped O Did not help O
Bed rest	Helped O Did not help O	Helped O Did not help O
Massage Therapy	Helped O Did not help O	Helped O Did not help O
Back brace (corset)	Helped O Did not help O	Helped O Did not help O
Injection(s)	Helped O Did not help O	Helped O Did not help O
Surgery	Helped O Did not help O	Helped O Did not help O
Back School	Helped O Did not help O	Helped O Did not help O
Counselling or Psychotherapy	Helped O Did not help O	Helped O Did not help O
Exercise	Helped O Did not help O	Helped O Did not help O
Neck Collar	Helped O Did not help O	Helped O Did not help O
Other: (please specify) _____	Helped O Did not help O	Helped O Did not help O

Have you ever suffered from **moderate** neck or back pain? No....O → (skip to page 18)
Yes...O

We would like to know how frequently you have the following thoughts or engage in the following behaviours only when your pain is at a MODERATE level of intensity or greater. Please indicate how frequently you do the following when experiencing pain by checking the appropriate circle next to each statement.

Check ① Never do when in pain
Check ② Rarely do when in pain
Check ③ Occasionally do when in pain
Check ④ Frequently do when in pain
Check ⑤ Very frequently do when in pain

1. Engaging in physical exercise or physical therapy.....	①	②	③	④	⑤
2. Saying to yourself, "I wish my doctor would prescribe better pain medication for me".....	①	②	③	④	⑤
3. Staying busy or active.....	①	②	③	④	⑤
4. Clearing your mind of bothersome thoughts or worries.	①	②	③	④	⑤
5. Thinking, "This pain is wearing me down.".....	①	②	③	④	⑤
6. Talking to others about how much your pain hurts.....	①	②	③	④	⑤
7. Restricting or cancelling your social activities.....	①	②	③	④	⑤
8. Participating in leisure activities (such as hobbies, sewing, stamp collecting etc.).....	①	②	③	④	⑤
9. Thinking, "I can't do anything to lessen this pain".....	①	②	③	④	⑤
10. Distracting your attention from the pain (recognizing you have pain, but putting your mind on something else).....	①	②	③	④	⑤
11. Focusing on where the pain is and how much it hurts..	①	②	③	④	⑤

Section D. Questions about your mood.

Using the scale below, indicate the number which best describes how often you felt or behaved this way -- DURING THE PAST WEEK.

0 = Rarely or none of the time (less than 1 day)
1 = Some or a little of the time (1-2 days)
2 = Occasionally or a moderate amount of time (3-4 days)
3 = Most or all of the time (5-7 days)

DURING THE PAST WEEK:

_____ 1. I was bothered by things that usually don't bother me.
_____ 2. I did not feel like eating; my appetite was poor.
_____ 3. I felt that I could not shake off the blues even with help from my family or friends.
_____ 4. I felt that I was just as good as other people.
_____ 5. I had trouble keeping my mind on what I was doing.
_____ 6. I felt depressed.
_____ 7. I felt that everything I did was an effort.
_____ 8. I felt hopeful about the future.
_____ 9. I thought my life had been a failure.
_____ 10. I felt fearful.
_____ 11. My sleep was restless.
_____ 12. I was happy.
_____ 13. I talked less than usual.
_____ 14. I felt lonely.
_____ 15. People were unfriendly.
_____ 16. I enjoyed life.
_____ 17. I had crying spells.
_____ 18. I felt sad.
_____ 19. I felt that people disliked me.
_____ 20. I could not get "going".

How satisfied would you say you are with your life? (please check the **most appropriate** answer)

Very dissatisfied..... O
Dissatisfied..... O
Neither satisfied nor dissatisfied.... O
Satisfied..... O
Very satisfied ..... O

Section E. About You.

1. Male O Female O → Are you currently pregnant? Yes O
   No O

2. Date of Birth: day_____ month_____ year_____

3. Height: Feet _____ Inches_____ Weight: Pounds _____

4. Check your current marital status:

Married/Common Law.....	O
Separated/Divorced.....	O
Widowed.....	O
Single.....	O

5. Check your highest education level:

Grade 8 or less.....	O
Higher than Grade 8, but did not graduate from high school...	O
High School Graduate.....	O
Post secondary or some university.....	O
University Graduate.....	O

6. What is your household's total yearly income before taxes?

$0 - $20,000.....	O
$20,001-$40,000.....	O
$40,001-$ 60,000.....	O
Above $60,000.....	O

7. What is your present employment status?

Full-time	O	Part-time.....	O
Homemaker.....	O	Student.....	O
Unemployed.....	O	Retired.....	O
Maternity leave.....	O	Disability leave.....	O
Compensation.....	O		

8. **Main** work activity: (please check **main** one)

Heavy labour	O	Light labour.....	O
Mostly sitting at desk	O	Driving, operating a vehicle.....	O
Mostly standing.....	O	Mostly walking, moving around.....	O

9. What is your **main** occupation. _____
(Please Print)

10. If you are currently employed, how satisfied would you say you are with your job? (please check the **most appropriate** answer)

Very dissatisfied	O
Dissatisfied	O
Neither satisfied nor dissatisfied	O
Satisfied	O
Very satisfied	O

11. During the last 6 months, on average, how many days a week have you engaged in 30 minutes or more of exercise? (please circle the appropriate number of days)

0 1 2 3 4 5 6 7 days/week

12. Where do you **currently** live? (please check one)

Large city (population more than 100,000).....	O
Small city (population 5,000 - 100,000).....	O
Town (population 500 - 4,999).....	O
Village (population 100 - 499).....	O
Rural municipality but not in city, town or village.....	O
Reserve.....	O

Comments

If you have any comments about this study, please write them below.

_____

_____

_____

_____

_____

Thank you for your participation.

Please fold this questionnaire, place it in the enclosed stamped self-addressed envelope and return it as soon as possible. Thank you for helping us.

Appendix D

Approval

Date:	May 29, 2013
Study ID:	Pro00040403
Principal Investigator:	Linda Carroll
Study Title:	Predictors of coping with whiplash: population-based inception cohort study of traffic injuries
Approval Expiry Date:	May 28, 2014
Sponsor/Funding Agency:	There are no items to display
Sponsor/Funding Agency:	There are no items to display

RSO-Managed Funding:

Project ID	Project Title	Speed Code	Other Information
There are no items to display			

Thank you for submitting the above study to the Health Research Ethics Board - Health Panel . Your application has been reviewed and approved on behalf of the committee.

A renewal report must be submitted next year prior to the expiry of this approval if your study still requires ethics approval. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

Approval by the Health Research Ethics Board does not encompass authorization to access the patients, staff or resources of Alberta Health Services or other local health care institutions for the purposes of the research. Enquiries regarding Alberta Health Services approvals should be directed to (780) 407-6041. Enquiries regarding Covenant Health should be directed to (780) 735-2274.

Sincerely,

Carol Boliek, Ph.D.
Associate Chair, Health Research Ethics Board - Health Panel

Note: This correspondence includes an electronic signature (validation and approval via an online system).

Appendix E

Approval

Date:	June 20, 2013
Study ID:	Pro00040914
Principal Investigator:	Linda Carroll
Study Title:	Predictors of coping with whiplash: a replication study
Approval Expiry Date:	June 19, 2014

Thank you for submitting the above study to the Health Research Ethics Board - Health Panel . Your application, which involves the secondary analysis of anonymized data, has been reviewed and approved on behalf of the committee.

A renewal report must be submitted next year prior to the expiry of this approval if your study still requires ethics approval. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

Approval by the Health Research Ethics Board does not encompass authorization to access the patients, staff or resources of Alberta Health Services or other local health care institutions for the purposes of the research. Enquiries regarding Alberta Health Services approvals should be directed to (780) 407-6041. Enquiries regarding Covenant Health should be directed to (780) 735-2274.

Sincerely,

Carol Boliek, Ph.D.
Associate Chair, Health Research Ethics Board - Health Panel

Note: This correspondence includes an electronic signature (validation and approval via an online system).

Appendix F

Approval

Date:	June 20, 2013
Study ID:	Pro00040919
Principal Investigator:	Linda Carroll
Study Title:	Predictors of pain coping in the general population
Approval Expiry Date:	June 19, 2014

Thank you for submitting the above study to the Health Research Ethics Board - Health Panel . Your application has been reviewed and approved on behalf of the committee.

A renewal report must be submitted next year prior to the expiry of this approval if your study still requires ethics approval. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

Approval by the Health Research Ethics Board does not encompass authorization to access the patients, staff or resources of Alberta Health Services or other local health care institutions for the purposes of the research. Enquiries regarding Alberta Health Services approvals should be directed to (780) 407-6041. Enquiries regarding Covenant Health should be directed to (780) 735-2274.

Sincerely,

Carol Boliek, Ph.D.
Associate Chair, Health Research Ethics Board - Health Panel

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